TROUBLESHOOTING & MAINTENANCE GUIDE

EG4® WALLMOUNT INDOOR 280Ah LITHIUM BATTERY

The purpose of this document is to educate the end-user on troubleshooting and maintaining the integrity of the WallMount Indoor 280Ah lithium battery.

VERSION 1.3.1 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: IV-8000-HYB-AW / IV-8000-HYB-AW-00

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1. TECHNICAL SPECIFICATIONS

MODULE OPERATING PARAMETERS		
PARAMETER	**BMS**	**RECOMMENDED SETTING**
TOTAL ENERGY CAPACITY	14.3kWh @25C, 100% SOC	-
VOLTAGE	51.2V	-
CAPACITY	280Ah	-
CHARGING VOLTAGE (BULK/ABSORB)	56.0V (+/-0.8V)	56.2V (+/-0.2V)
FLOAT	-	54V (+/-0.2V)
SOC CUTOFF	-	20%*
CHARGING CURRENT	200A (Max. continuous)	60A – 160A
DISCHARGING CURRENT	200A (Max. continuous)	160A
DISCHARGE RATE	10.24kW (Max. continuous)	-

BMS PARAMETERS			
CHARGE	**SPEC**	**DELAY**	**RECOVERY**
CELL VOLTAGE PROTECTION	3.8V	1 sec	3.45V
MODULE VOLTAGE PROTECTION	60.0V	1 sec	55.2V
OVER CHARGING CURRENT 1	>205A	10 sec	-
OVER CHARGING CURRENT 2	>225A	3 sec	-
TEMPERATURE PROTECTION	<23°F or >158°F <-5°C or >70°C	1 sec	>32°F or <140°F >0°C or <60°C
DISCHARGE	**SPEC**	**DELAY**	**RECOVERY**
CELL VOLTAGE PROTECTION	2.3V	1 sec	3.1V
MODULE VOLTAGE PROTECTION	44.8V	1 sec	48V
OVER-CHARGING CURRENT 1	>205A	10 sec	60 sec
OVER-CHARGING CURRENT 2	>300A	3 sec	60 sec
SHORT CIRCUIT	>600A	<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	>230°F (>110°C)	1 sec	@ <176°F (<80°C)

GENERAL SPECIFICATIONS			
PARAMETER	**SPEC**		**CONDITION**
CELL BALANCE	120mA	Passive Balance	Cell Voltage Difference >40mV
TEMPERATURE ACCURACY	3%	Cycle Measurement	Measuring Range -40°F to ≈212°F (-40°C to ≈100°C)
VOLTAGE ACCURACY	0.5%	Cycle Measurement	For Cells & Module
CURRENT ACCURACY	3%	Cycle Measurement	Measuring Range -200A – 200A
SOC	5%	-	Integral Calculation
POWER CONSUMPTION	Sleep & Off Mode	<300uA	Storage/Transport/Standby
POWER CONSUMPTION	Operating Mode	<25mA	Charging/Discharging
COMMUNICATION PORTS	RS485/CAN		Can be customized

BATTERY HEATER SPECIFICATIONS		
PARAMETER	**SPEC**	**CONDITION**
VOLTAGE	56V	-
POWER CONSUMPTION	224W	-
INTERNAL BATTERY TEMPERATURE	≤32°F (0°C)/≥41°F (5°C)	Heat On/Heat Off

ENVIRONMENTAL PARAMETERS	
CHARGING RANGE	32° to ≈113°F (0°C to ≈45°C)
DISCHARGING RANGE	-4°F to ≈122°F (-20°C to ≈50°C)
STORAGE RANGE	-4°F to ≈122°F (-20°C to ≈50°C)
INGRESS PROTECTION	IP20
PHYSICAL SPECIFICATIONS	
DIMENSIONS (H×W×D)	36.4 in.×18.1 in.×9.6 in. (925 mm×460 mm×245 mm)
WEIGHT	282.2 lbs. (128 kg)
DESIGN LIFE	>10 Years
CYCLE LIFE	>8000 cycles, 0.5C 80% DOD
LIFETIME PRODUCTION	82.6MWh**
SAFETY CERTIFICATIONS	
CERTIFICATIONS	UL1973, UL 9540A (Passed)

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

***(51.2V×280Ah/1000×80%×8000 cycles/1000)90%=MWh*

2. SAFETY

2.1 SAFETY INSTRUCTIONS

DANGER! ***Hazardous Voltage Circuits!***

International safety regulations have been strictly observed in the design and testing of the inverter. Before beginning any work, carefully read all safety instructions, and always observe them when working on or with the inverter. The installation must follow all applicable national or local standards and regulations.

Incorrect installation may cause:

- Injury or death to the installer, operator or third party.
- Damage to the inverter or other attached equipment.

2.2 IMPORTANT SAFETY NOTIFICATIONS

There are various safety concerns that must be carefully observed before, during, and after the installation, as well as during future operation and maintenance. The following are important safety notifications for the installer and any end users of this product under normal operating conditions.

1. **Do not disassemble the battery.** Contact the distributor for any issues that need repair for more information and proper handling instructions. Incorrect servicing or re-assembly may result in a risk of electric shock or fire and void the warranty.
2. **Never short-circuit DC inputs.** Short-circuiting the battery may result in a risk of electric shock or fire and can lead to severe injury or death and/or permanent damage to the unit and/or any connected equipment.
3. **Use caution when working with metal tools on or around batteries and systems.** Risk of electrical arcs and/or short circuiting of equipment can lead to severe injury or death and equipment damage.
4. **Beware of high battery current**. Please ensure that the battery module breakers and/or on/off switches are in the “open” or “off” position before installing or working on the battery. Use a voltmeter to confirm there is no voltage present to avoid electric shock.
5. **Do not make any connections or disconnections to the system while the batteries are operating.** Damage to system components or risk of electrical shock may occur if working with energized batteries.
6. Make sure the battery and rack are properly grounded.
7. An installer should make sure to be well protected by reasonable and professional insulative equipment [e.g., personal protective equipment (PPE)].
8. Before installing, operating, or maintaining the system, it is important to inspect all existing wiring to ensure it meets the appropriate specifications and conditions for use.
9. Ensure that the battery and system component connections are secure and proper to prevent damage or injuries caused by improper installation.

WARNING: *To reduce the risk of injury, read all instructions!*

All work on this product (system design, installation, operation, setting, configuration, and maintenance) must be carried out by qualified personnel. To reduce the risk of electric shock, do not perform any servicing other than those specified in the operating instructions unless qualified to do so.

1. Read all instructions before commencing installation. For electrical work, follow all local and national wiring standards, regulations, and these installation instructions. All wiring should be in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.
2. The battery and system can connect with the utility grid only if the utility provider permits. Consult with the local AHJ before installing this product for any additional regulations and requirements for your area.
3. All warning labels and nameplates on this battery should be clearly visible and must not be removed or covered.
4. The installer should consider the safety of future users when choosing the battery's correct position and location as specified in this manual.
5. Please keep children away from touching or misusing the battery and relevant systems

WARNING!

Cancer and Reproductive Harm – See www.P65Warnings.ca.gov for more details.

DISCLAIMER

EG4 reserves the right to make changes to the material herein at any time without notice.
Please refer to www.eg4electronics.com for the most updated version of our manuals/spec sheets.

3. TROUBLESHOOTING, MAINTENANCE & DISPOSAL

3.1 INTRODUCTION TO THE BMS

The BMS (Battery Management System) 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 battery is specifically configured to ensure peak performance and operation with any system.

3.2 BMS PROTECTION

3.2.1 PCB TEMPERATURE PROTECTION

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

3.2.2 CELL BALANCE PROTECTION

Cell balancing 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 always done automatically.

3.2.3 ENVIRONMENTAL TEMPERATURE PROTECTION

It may be dangerous to attempt using 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 down the battery to prevent damage.

3.2.4 VOLTAGE PROTECTION

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

3.2.5 CURRENT PROTECTION

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

4. TROUBLESHOOTING

4.1 ALARM DESCRIPTION AND TROUBLESHOOTING

When the ALM light on the battery control panel is on, it means that the battery has given an alarm or has been protected from potential damage. Please check the cause of the failure through the app or BMS Tools. 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. Take appropriate measures or go directly to the battery site to troubleshoot.
BMS Tools alarms are shown in the table below:

WARNING AND PROTECT STATUS DEFINITIONS:

STATUS	NAME	DEFINITION	ACTION
Warning/ Protect	Pack OV	Pack over-voltage	Module needs to be discharged to lower its voltage.
	Cell OV	Cell over-voltage	Check individual cell voltage in BMS Tools.
	Pack UV	Pack under-voltage	Module needs to be charged.
	Cell UV	Cell under-voltage	Check individual cell voltage in BMS Tools.
	Charge OC	Charge over-current	Incoming current needs to be reduced.
	Discharge OC	Discharge over-current	Discharge current is too high; lower loads.
	Temp Anomaly	Temperature anomaly	Check ambient and module temperature.
	MOS OT	MOSFET over-temperature	BMS temperature is too high. Power off module and cool down location.
	Charge OT	Charge over-temperature	Power off module and cool down location.
	Discharge OT	Discharge over-temperature	Power off module and cool down location.
	Charge UT	Charge under-temperature	Power off module and warm up location.
	Discharge UT	Discharge under temperature	Power off module and warm up location.
Warning	Low Capacity	Low battery capacity	Module needs to be charged.
Warning	Other Error	Error not listed	Contact the distributor
Protect	Float Stopped	Float stopped	Contact the distributor
Protect	Discharge SC	Discharge short circuit	Discharge current is too high, turn BMS and breaker off and back on to reset. Lower loads

NOTE: The "Historical Record" tab can indicate what occurred with the module before entering a warning or protection state. It is recommended to export this data into a text (.txt) file to provide to the distributor for any additional troubleshooting assistance.

OTHER COMMON FAULTS AND SOLUTIONS:

FAULT	ANALYSIS	ACTION
Inverter communication failure	Check communication port connection, and battery ID setting.	Input proper “host” battery DIP switch address, and power cycle the battery.
No DC output	Open breaker, or battery voltage is too low.	Check battery breaker or charge the battery.
Power supply unstable	Battery capacity is not at full power.	Check for proper battery cable connection.
Battery cannot be charged fully	DC output voltage is below the minimum charge voltage.	Check the charging settings on the inverter to ensure they match battery requirements.
ALM LED always on	Short circuit	Disconnect the power cable and check all cables.
The battery output voltage is unstable.	Battery management system does not operate normally.	Press the reset button to reset the battery, then reboot the system.
ALM LED flashes 20 times with SOC1 LED on.	Unbalanced voltage within a cell	Deep discharge the battery bank (<20% SOC), then charge battery bank fully.
ALM LED flashes 20 times with SOC2 LED on.	Unbalanced temperature	Contact the distributor.
ALM LED flashes 20 times with SOC 3/4 LED on.	BMS damaged	Contact the distributor.
Different SOC value of batteries in parallel operation.	No issue	Deep discharge the battery bank (<20% SOC), then charge battery bank fully.
Low voltage protection with no LED on	BMS is in low voltage protection, and is in sleep mode	Contact the distributor.
Deeply discharged with “RUN” LED on	The battery voltage is too low to start BMS.	Contact the distributor.

NOTE: If any of the warnings or faults from both tables persist, please contact the distributor for additional troubleshooting steps.

4.2 BATTERY END OF LIFE

The EG4 WallMount Indoor 280Ah lithium battery is designed to last for *more than 15 years* when used correctly. EG4 has worked tirelessly to ensure that our batteries will maintain a charge after thousands of cycles. However, when it does come time to retire the battery, there are a few things to consider. Lithium batteries are considered a hazardous material and should not be disposed of by simply placing them in the trash. There are several websites and organizations that will accept this battery to recycle at little to no cost to the user. At EG4, we understand that we are working with customers across the United States and the world. Our recommendation is to go online and search the term “Lithium Battery Disposal Near Me.” There will likely be an assortment of organizations that can safely dispose of LFP batteries. **EG4 recommends calling ahead of time to ensure that the location is still open and accepting material.**

If users are unable to locate a disposal location safely, EG4 is here to help. Before dumping the battery or disposing of it incorrectly, please contact our customer service team for assistance.

5. WARRANTY INFORMATION

For information regarding warranty registration on EG4® Electronics products, please navigate to https://eg4electronics.com/warranty/ and select the corresponding product to begin the registration process.

6. STORAGE

Please follow these instructions for the safe storage of the unit to maintain the longevity of the battery, if choosing not to install the product immediately after purchasing or unpacking the box.

There are a few steps that can be taken to ensure that batteries are stored safely and in a state that will ensure they are not damaged during storage. The steps are detailed below.

6.1 BATTERY STATE

The state of the battery when placed into storage will affect how long it can be stored, as well as the battery’s condition when it is brought out of storage. EG4® recommends that each battery is brought to a 50% SOC (state of charge) before placing it in storage. Lithium batteries will lose a certain percentage of their total charge while in storage, depending on how long they are stored and the conditions they are stored in. We recommend recharging the batteries after 8 – 9 months in prolonged storage.

6.2 ENVIRONMENTAL FACTORS

The environment the battery is stored in can greatly affect the health of the battery. **For best results,** the temperature should range between 33°F and 90°F (0.6°C and 32°C). Mount the battery in a location where it is not exposed to direct rain, standing water and ***ensure the battery is mounted on non-combustible material. Keep the battery away from direct sunlight.*** Store the batteries away from combustible materials.

7. CHANGELOG

Version 1.3.1

- Modified warranty information in section 5

Version 1.3

- Modified recommended storage SOC down to 50%.

Version 1.2

- Replaced Low DC Cutoff with SOC Cutoff at 20% SOC with SOC note under specification table.

Version 1.0.3

- Cover image changed to reflect updated product logo

Version 1.0.2

- Added 2 line items to the Technical Specifications Table: Total Energy Capacity & Discharge Rate
- Minor formatting changes

Version 1.0.1

- Added changelog
- Corrected minor formatting

Version 1.0

- First iteration of the completed white sheet

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