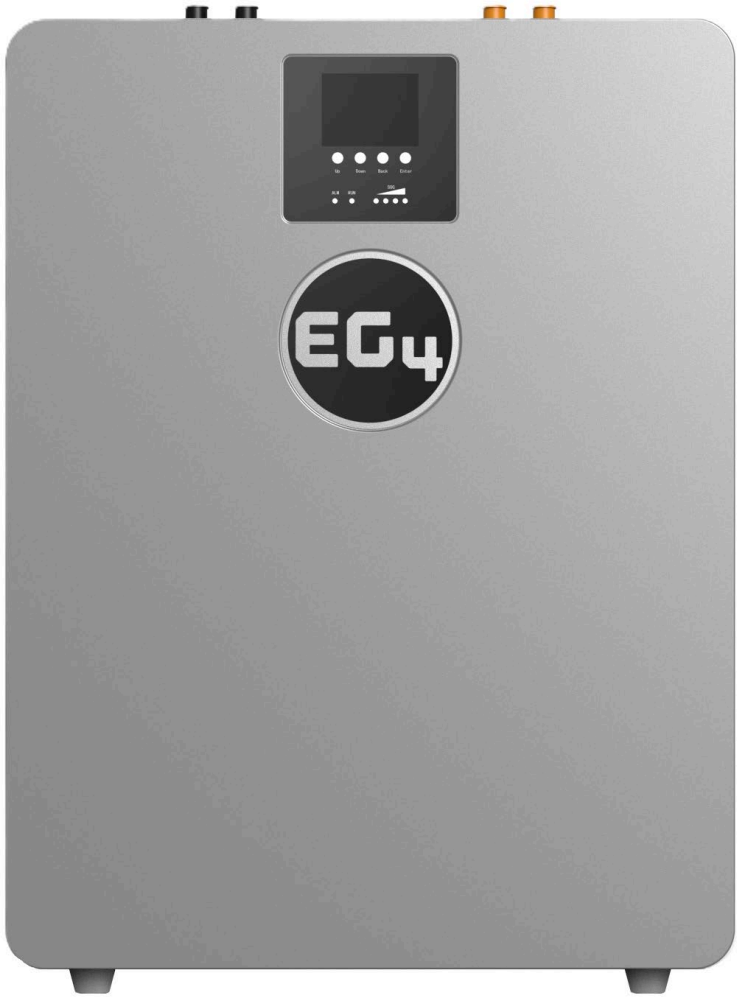
EG4® WALLMOUNT INDOOR 100Ah LITHIUM BATTERY

USER MANUAL



VERSION 1.0 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: WM-48-100-IN-XX (XX is a number between 00-99)

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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 SETTING**	
TOTAL ENERGY CAPACITY	5.12kWh	–	
VOLTAGE	51.2V	–	
CAPACITY	100Ah	–	
CHARGING VOLTAGE (BULK/ABSORB)	56.0V (±0.2V)	56.6V (±0.2V) (open loop communications)	
SOC CUTOFF	-	*20%	
CHARGING CURRENT	100A (Max. continuous)	50A	
DISCHARGING CURRENT	100A (Max. continuous)	50A	
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 PROTECTION 1	>102A	20 sec	–
OVER CHARGING CURRENT PROTECTION 2	≥120A	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-DISCHARGING CURRENT PROTECTION 1	>102A	30 sec	60 sec
OVER-DISCHARGING CURRENT PROTECTION 2	>150A	3 sec	60 sec
SHORT CIRCUIT	>250A	<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

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

GENERAL SPECIFICATIONS			
PARAMETER	**SPEC**	**TYPE**	**CONDITION**
PCB TEMP PROTECTION	>221°F (>105°C)	Delay: 1 sec	@ <176°F (<80°C)
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	Measuring Range: ±200A
SOC ACCURACY	5%	–	Integral Calculation
POWER CONSUMPTION (SLEEP & OFF MODE)	<300uA	–	Storage/Transport/ Standby
POWER CONSUMPTION (OPERATING)	<14mA	–	Charging/Discharging
COMMUNICATION PORTS	RS485/CAN	–	Configurable
DIMENSIONS (H × W × D)	23.2 in. × 17.8 in. × 7.6 in. (590 mm × 453 mm × 193 mm)		
WEIGHT	108 lbs. (49 kg)		
DESIGN LIFE	*>15 Years		
CYCLE LIFE	>6000 cycles at 0.5°C, 80% DOD		
ENVIRONMENTAL PARAMETERS			
CHARGING RANGE	32°F – 122°F (0°C – 50°C)		
DISCHARGING RANGE	-4°F – 131°F (-20°C – 55°C)		
STORAGE RANGE	**32°F – 113°F (0°C – 45°C)		
INGRESS PROTECTION	IP20		
STANDARDS AND CERTIFICATIONS			
UL1973, UL9540A			

**(51.2V×100Ah/1000×80%×6000/1000)90%=22.1 MWh or (4096 kWh×6000 cycles×90% efficiency) = 22.1 MWh*

***Less than 3 months of storage. If longer than 3 months recommended storage temperature will be 59°F – 86°F (15°C - 30°C). Refer to section 5.4 for complete storage requirements.*

3. BATTERY SAFETY

3.1 SAFETY INSTRUCTIONS

Before any work begins, carefully read all safety instructions, and always observe them when working on or with the battery. The installation must follow all applicable national or local standards and regulations. Consult with the local AHJ and/or utility to obtain the proper permits and permissions before installation.

Incorrect installation may cause:

- *Injury or death to the installer, operator or third party*
- *Damage to the battery or other attached equipment*

3.2 IMPORTANT SAFETY NOTIFICATIONS

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

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.** 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 bank is 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 the 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. Keep children away from touching or misusing the battery and relevant systems.

The battery is designed to stop charging when reaching the low threshold of 23°F. If charging current is observed when the internal battery temperature is below 23°F, disconnect battery immediately and consult the distributor.

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.

4. SÉCURITÉ DE LA BATTERIE

4.1 CONSIGNES DE SÉCURITÉ

Avant de commencer tout travail, lisez attentivement toutes les consignes de sécurité et respectez-les toujours lorsque vous travaillez sur ou avec la batterie. L'installation doit être conforme à toutes les normes et réglementations nationales ou locales applicables. Consultez l'autorité compétente locale et/ou le service public pour obtenir les permis et les autorisations appropriés avant l'installation.

Une installation incorrecte peut entraîner les effets suivants :

- *Blessure ou décès de l'installateur, de l'exploitant ou d'un tiers*
- *Dommages à la batterie ou à tout autre équipement attaché*

4.2 NOTIFICATIONS DE SÉCURITÉ IMPORTANTES

DANGER: ***Circuits à haute tension!***

Il existe divers problèmes de sécurité qui doivent être soigneusement observés avant, pendant et après l'installation, ainsi que lors de l'utilisation et de la maintenance futures. Ce qui suit sont des notifications de sécurité importantes pour l'installateur et tout utilisateur final de ce produit dans des conditions de fonctionnement normales.

1. **Ne démontez pas la batterie.** Contactez le distributeur pour tout problème nécessitant une réparation pour plus d'informations et des instructions de manipulation appropriées. Un entretien ou un remontage incorrect peut entraîner un risque d'électrocution ou d'incendie et annuler la garantie.
2. **Ne court-circuitez jamais les entrées CC.** Un court-circuit de la batterie peut entraîner un risque d'électrocution ou d'incendie et peut entraîner des blessures graves ou la mort et/ou des dommages permanents à l'appareil et/ou à tout équipement connecté.
3. **Soyez prudent lorsque vous travaillez avec des outils métalliques sur ou à proximité des batteries et des systèmes. Le risque** d'arcs électriques et/ou de court-circuit de l'équipement peut entraîner des blessures graves ou la mort et des dommages à l'équipement.
4. **Attention au courant de batterie élevé.** Assurez-vous que les disjoncteurs du module de batterie et/ou les interrupteurs marche/arrêt sont en position « ouvert » ou « arrêt » avant d'installer ou de travailler sur la batterie. Utilisez un voltmètre pour confirmer qu'il n'y a pas de tension présente afin d'éviter les chocs électriques.
5. **N'effectuez aucune connexion ou déconnexion du système pendant que les batteries fonctionnent.** Des dommages aux composants du système ou un risque d'électrocution peuvent survenir si vous travaillez avec des batteries sous tension.
6. Assurez-vous que le banc de batteries est correctement mis à la terre.
7. Un installateur doit s'assurer d'être bien protégé par un équipement isolant raisonnable et professionnel [par exemple, un équipement de protection individuelle (EPI)].
8. Avant d'installer, d'utiliser ou d'entretenir le système, il est important d'inspecter tout le câblage existant pour s'assurer qu'il répond aux spécifications et aux conditions d'utilisation appropriées.
9. Assurez-vous que les connexions de la batterie et des composants du système sont sécurisées et appropriées pour éviter les dommages ou les blessures causés par une mauvaise installation.

AVERTISSEMENT : *POUR RÉDUIRE LE RISQUE DE BLESSURE, LISEZ TOUTES LES INSTRUCTIONS !*

Tous les travaux sur ce produit (conception du système, installation, fonctionnement, réglage, configuration et maintenance) doivent être effectués par du personnel qualifié. Pour réduire le risque d'électrocution, n'effectuez aucun entretien autre que ceux spécifiés dans le mode d'emploi, à moins d'être qualifié pour le faire.

1. Lisez toutes les instructions avant de commencer l'installation. Pour les travaux électriques, suivez toutes les normes de câblage locales et nationales, les réglementations et ces instructions d'installation. Tout le câblage doit être conforme au Code national de l'électricité (NEC), ANSI/NFPA 70.
2. La batterie et le système ne peuvent se connecter au réseau public que si le fournisseur d'électricité l'autorise. Consultez l'AHJ local avant d'installer ce produit pour connaître les réglementations et exigences supplémentaires de la région.
3. Toutes les étiquettes d'avertissement et les plaques signalétiques de cette batterie doivent être clairement visibles et ne doivent pas être retirées ou couvertes.
4. L'installateur doit tenir compte de la sécurité des futurs utilisateurs lors du choix de la position et de l'emplacement corrects de la batterie, comme spécifié dans ce manuel.
5. Tenez les enfants à l'écart de la batterie et des systèmes concernés ou de les utiliser à mauvais escient.

La batterie est conçue pour arrêter de se charger lorsqu'elle atteint le seuil bas de 23 °F. Si un courant de charge est observé lorsque la température interne de la batterie est inférieure à 23 °F, débranchez immédiatement la batterie et consultez le distributeur.

Cancer et troubles de la reproduction – Voir www.P65Warnings.ca.gov pour plus de détails.

DISCLAIMER

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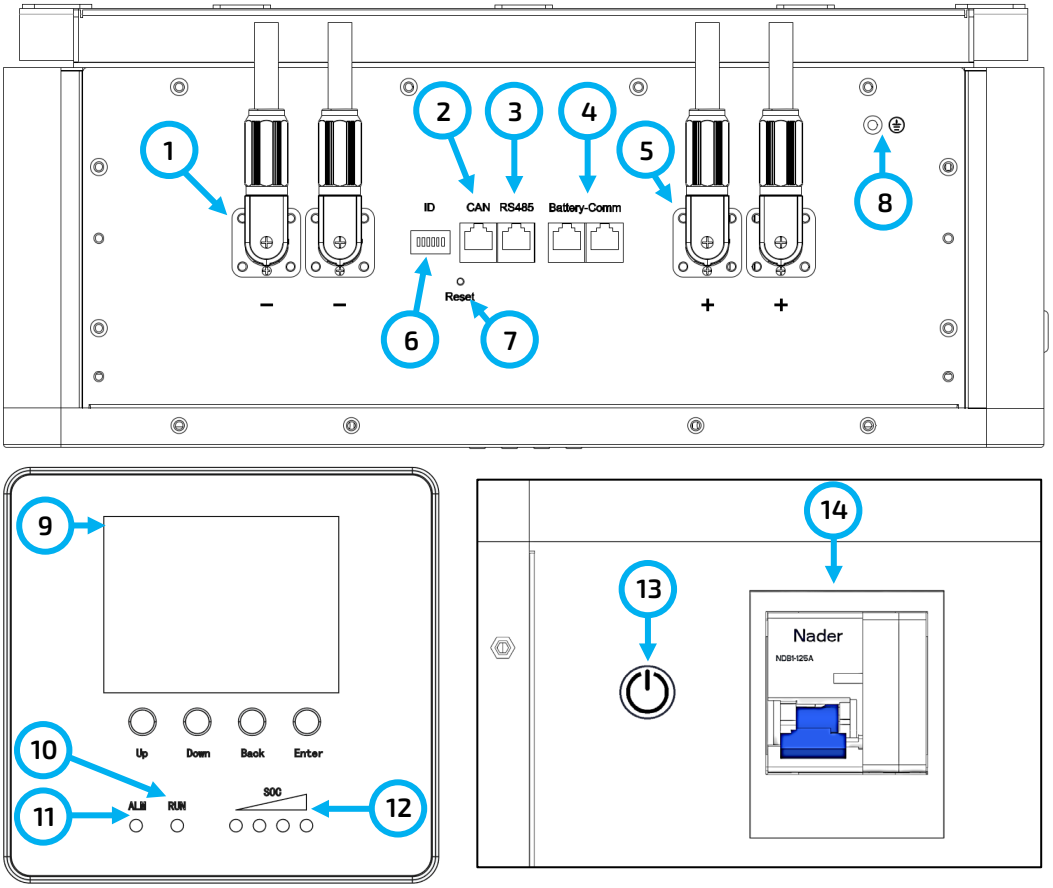
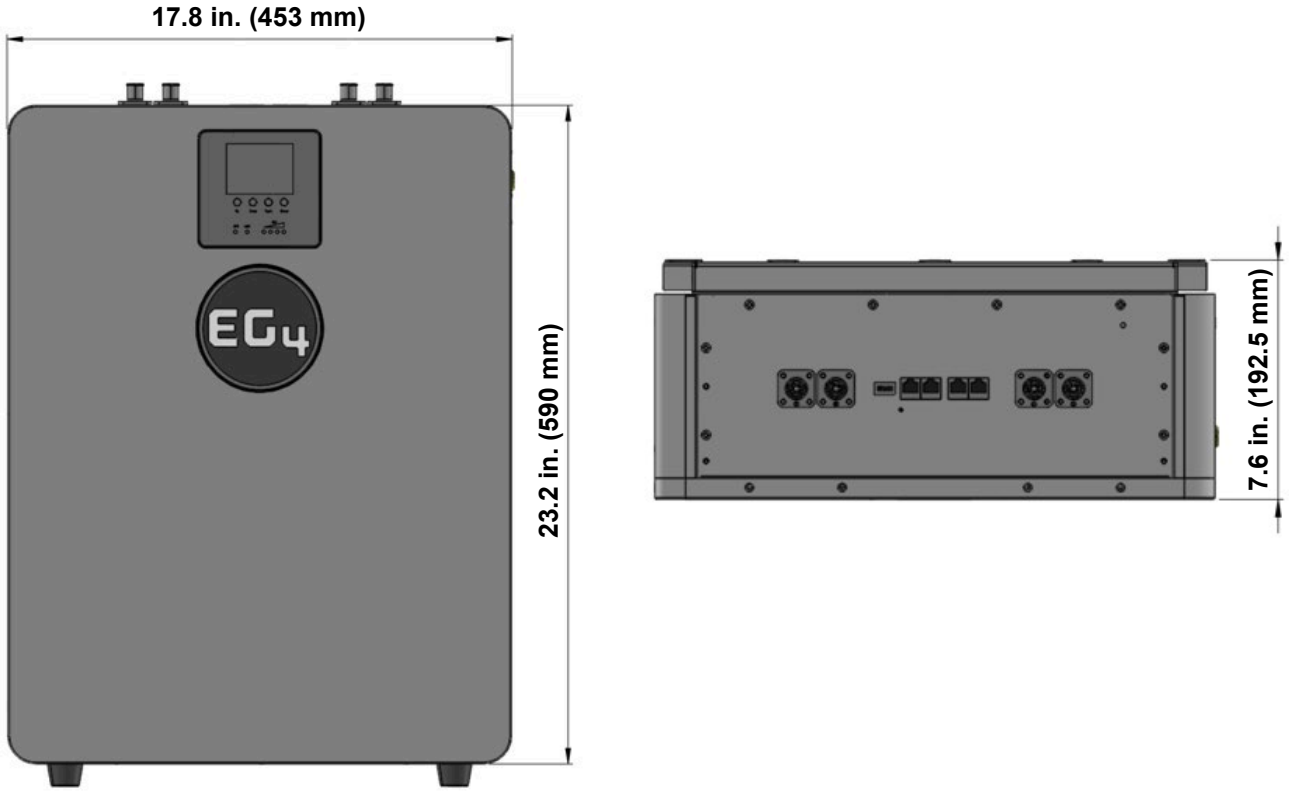
5. PRODUCT OVERVIEW

The EG4® WallMount Indoor 100Ah Lithium battery is ideal for low voltage residential indoor energy storage applications. The batteries use lithium iron phosphate cells with the highest safety performance and an intelligent Battery Management System (BMS) that can monitor and record the voltage, current, and temperature of each cell in real-time. The BMS also contains additional features and protections such as passive cell balancing, advanced battery control methods, additional safety features, and more.



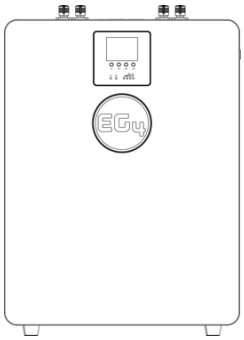
NO.	ITEM	DESCRIPTION	REMARKS
1	Terminal	Negative ×2	120A rated Degson battery connector
2	CAN	CAN Communication Interface	For inverter communications
3	RS485	RS485 Communication Interface	For inverter communications
4	Battery-Comm	Battery Communication Paralleling	For multiple batteries in parallel
5	Terminal	Positive ×2	120A rated Degson battery connector
6	ID DIP Switch	Used to assign a unique battery address	-
7	Reset	BMS Reset Button	-
8	GND	Equipment Grounding Conductor (EGC)	For grounding the battery
9	LCD	LCD Display	-
10	ALM	Run LED Display	To show normal operating status
11	RUN	Alarm LED Display	To show alarm status
12	SOC	State Of Charge Display	4 green lights = full charge
13	ON/OFF Switch	Turn BMS on/off	-
14	Breaker	Output switch and over current protection	-

5.1 BATTERY DIMENSIONS

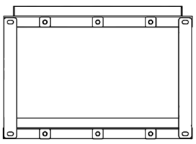


5.2 PACKING LIST

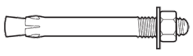
The items listed below will arrive with the product shipment:



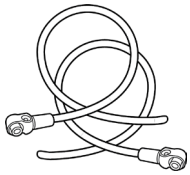
EG4 WallMount Indoor
100Ah Battery (x1)



Mounting Bracket (x1)
(Will come attached to
the back of the battery)



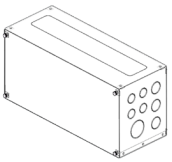
Expansion Bolt (x6)
M8*70



Red and Black Degson power
cables (1 set each)
4 AWG (59 in.)

Battery to Inverter
Communication Cable (x1)

User Manual



Sold Separately
100Ah Indoor Buildable Conduit
Box (7 pcs)
Total Weight: 8.7 lbs. (3.96 kg)

DANGER

DANGER:

When installing or removing the battery ensure the battery is powered off and use a multimeter to confirm there is no voltage present. This will prevent users from encountering live (powered) terminals by accident.

5.3 BMS OVERVIEW

The Battery Management System (BMS) is intended to safeguard the battery and battery cells against a variety of situations that could damage or destroy system components. The BMS utilizes a 100A rated charge/discharge limit which also aids in keeping the battery and battery cells operational for a greater number of life cycles. Each EG4® WallMount Indoor 100Ah Lithium 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 component houses most of the “brains” of the battery. This feature will turn off the battery if it begins to overheat.

VOLTAGE PROTECTION

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

CELL BALANCE PROTECTION

Cell balancing ensures that each individual cell within the battery maintains a specific voltage range relative to the others. This process is essential for optimizing the battery's performance and longevity. It is seamlessly carried out automatically, without the need for manual intervention.

ENVIRONMENTAL TEMPERATURE PROTECTION

It may be dangerous to attempt using the battery in temperatures outside of the environmental parameters provided on the spec sheet. 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. See section 5.4 for more information.

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 or extremely high amperage and delayed shut down for amperage that is slightly above the maximum capacity.

5.4 STORAGE INFORMATION

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

BATTERY STATE

The State of Charge (SOC) of the battery when placed into storage will affect how long the battery maintains its SOC. EG4® recommends that each battery is brought to a 20 – 50% SOC 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. EG4 recommends charging/discharging the batteries every 3 months for best performance.

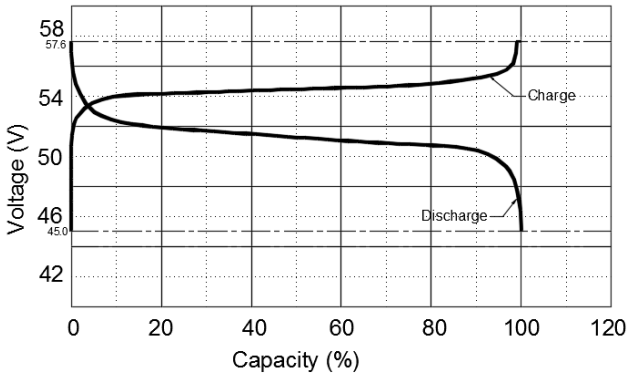
ENVIRONMENTAL FACTORS

The storage location for the battery can greatly affect the health of the battery.
For best results, the temperature should remain moderate, between 32°F – 113°F (0°C – 45°C) up to three months. If stored longer than three months, the recommended temperature range is 59°F – 86°F (15°C – 30°C).
If storage time of the cell exceeds 6 months, the SOC of the cell needs to be adjusted to 20 – 50% SOC by a charge and discharge process, humidity is less than or equal to 90% RH, and the recommended storage temperature is 41°F – 77°F (5°C – 25°C).

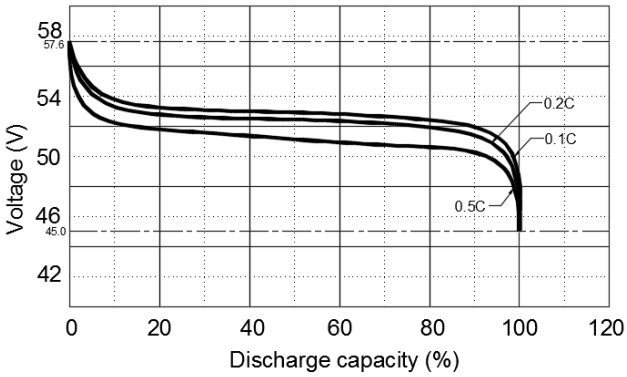
Keep the battery away from locations where it may get wet or locations with high humidity (≥90%).
Store the batteries away from combustible materials!

5.5 BATTERY PERFORMANCE CURVES

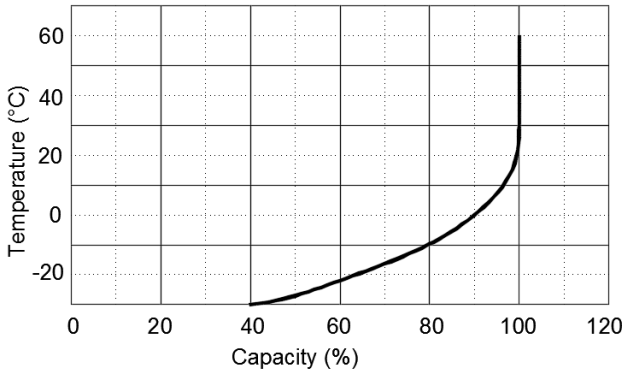
Charge & Discharge curve with 0.5C @ 25°C



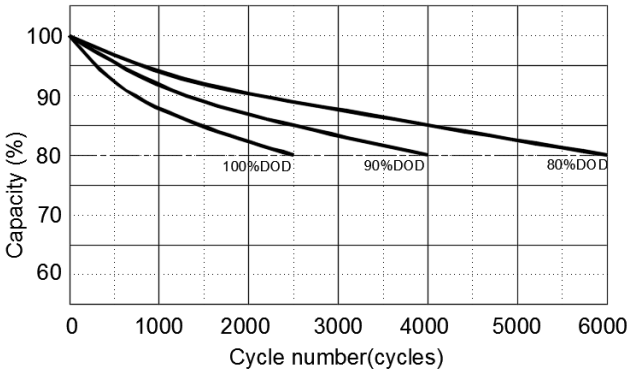
Discharge perfomance with different rate @ 25°C



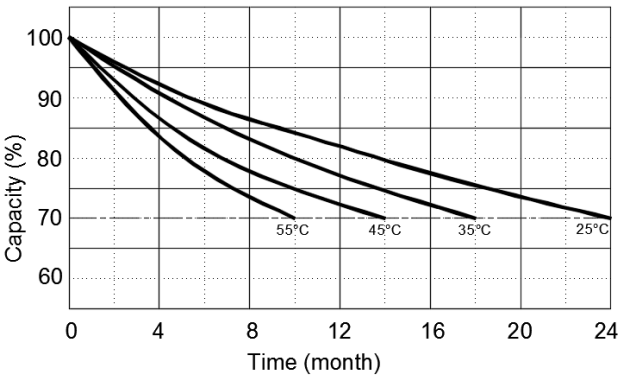
Discharge capacity with different temperature @ 0.5C



Cycle life with DOD @ 0.5C，25°C



Self-discharge @ different temperature



5.6 BATTERY CHARGING

Ensure the proper settings are set on the charge controller and/or inverter being used to avoid overcharging or damaging the module. (Refer to Section 1: Technical Specifications for a full list of charging/discharging parameters.)

It is normal for EG4® WallMount Indoor 100Ah Lithium batteries that have their own BMS and are wired in parallel to demonstrate a wide variety of SOC readings during any given charge or discharge cycle. Variations of up to 10% are common. For more information on Battery State of Health (SOH) & Depth of Discharge (DoD), scan the QR code below.

This is not a cause for concern or indication that the module is providing less than the maximum capacity. This is caused by even slight variations in wiring resistance to each battery, internal resistance, temperature differences, and even variations in each cell. Even a slight variation causes one battery to take more of the load or charge for a short time. Over the duration of the discharge or charge cycle, this will balance out with the lagging battery then taking the load or charge at the other end of the cycle resulting in recovering the full listed kWh capacity of the pack. The voltage differences created as batteries diverge in SOC will eventually cause them to converge at some point in the cycle.

NOTE:

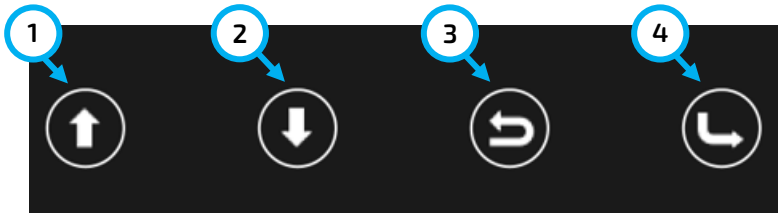
When installing multiple batteries or adding a battery to an existing rack, ensure all batteries are charged to 100% before paralleling together. This step is crucial to optimize battery performance and ensure proper operation.

6. LCD SCREEN

Each module has a built in HD LCD touch screen used to display important information about the cells including voltage, current, temperature, and SOC.

6.1 BUTTON DESCRIPTION

There are four function buttons below the display with descriptions, as shown in the table below.

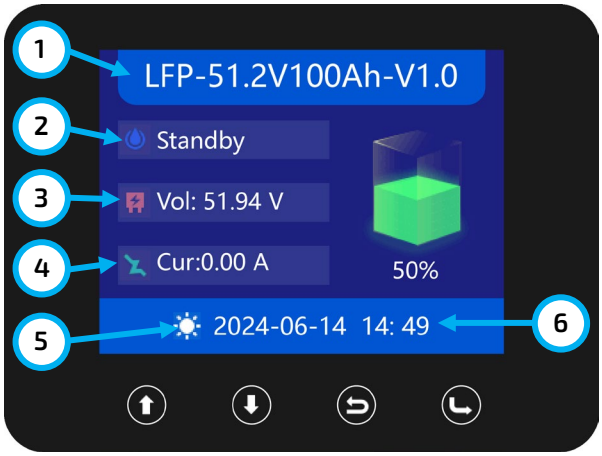


NO.	BUTTON	DESCRIPTION
1	Up	Page up
2	Down	Page Down
3	Return	Back
4	Enter	Confirm

6.2 WAKING UP THE LCD

When the power is on, press any key to wake up the display and information will appear on the screen. Waking up the screen will show the LCD's main page by default.

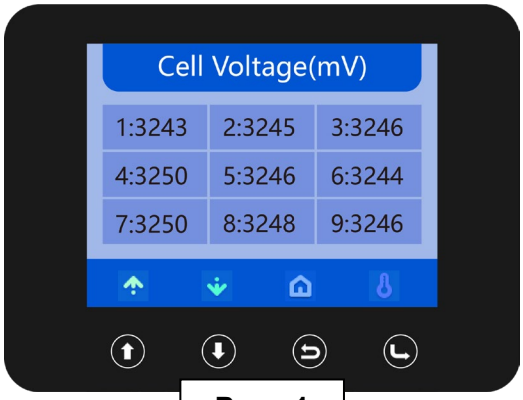
MAIN PAGE INFORMATION



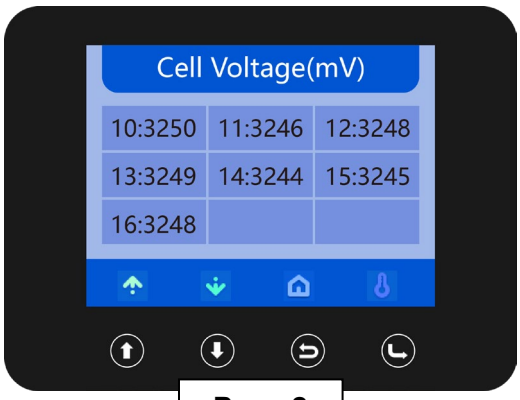
NO.	MODULE DESCRIPTION
1	Battery Name
2	Status
3	Voltage
4	Current
5	System Date
6	System Time

6.3 CELL INFORMATION

Check individual cell voltage (*shown in mV*) by pressing "Enter" on the main page of the LCD screen. There are 2 pages. Pressing "Up" and "Down" changes the page.

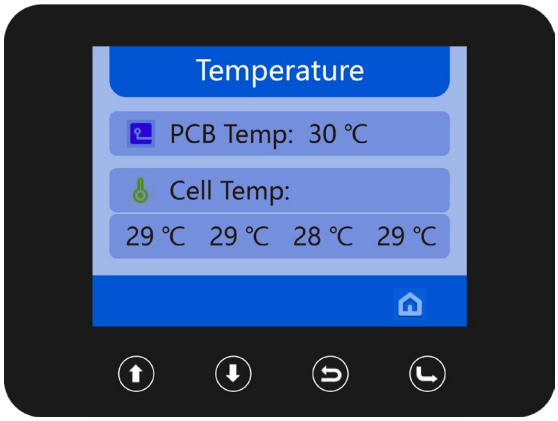


Page 1



Page 2

6.4 TEMPERATURE INFORMATION



Press "Enter" on the Cell Voltage page to view the temperature information of the PCB and the cells (*shown in °C*).

7. GENERAL INSTALLATION

This section provides detailed steps for installing and configuring the inverter. It is recommended to complete each section in order as listed below

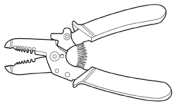
INSTALLATION STEPS

7.1 RECOMMENDED TOOLS


Safety Goggles


Dielectric Shoes


Gloves


Wire Stripper

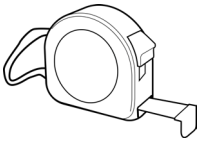

Multimeter


Cross Screwdriver


Socket Set


Electric Drill and Drill Bits


Slotted Screwdriver


Tape Measure

7.2 LOCATION REQUIREMENTS

Requirements for installation location:

- The EG4® WallMount Indoor battery is heavy. Use an equipment lift or the team-lift technique to move the battery.
- If the battery is installed against a wall, the wall should be made of non-combustible material. If this is not possible, then the unit **MUST** have a minimum of 1.08 in. (27.5 mm) clearance from the wall. Also note that whatever mounting solution that is used to grant the 1.08 in. clearance from the wall **MUST** be made of a non-combustible material.
- If installing on flat ground, ensure there is proper drainage on the ground surrounding the install location to help prevent potential damage from flooding. If installing against a wall, ensure at least a 6 in. (152 mm) gap on each side of the unit for adequate airflow and operations.
- If installing multiple batteries on the wall vertically, ensure the distance between the top of one battery and the bottom of another is ≥10cm.
- The minimum volume of installation room is 17.16m^3 without ventilation.
- Ensure the battery is mounted upright.

NOTE:

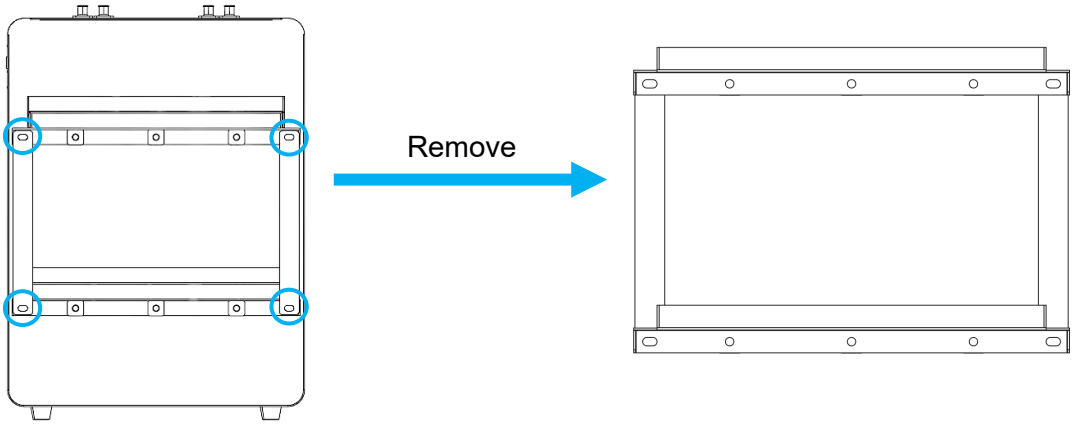
The battery is very heavy. Use the team-lift technique during installation.

WARNING:

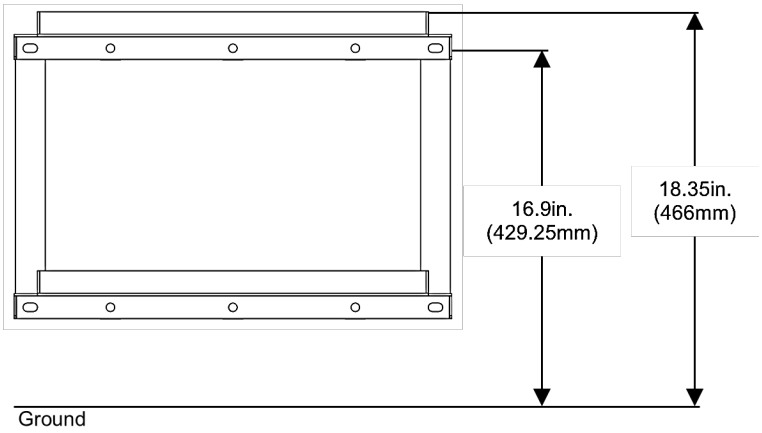
Do not make any electrical connections until the battery is in its final location!

7.3 BATTERY INSTALLATION

1. Remove the four set screws holding the mounting bracket to the back of the battery and set them to the side.
2. Remove the mounting bracket from the battery and set it to the side.



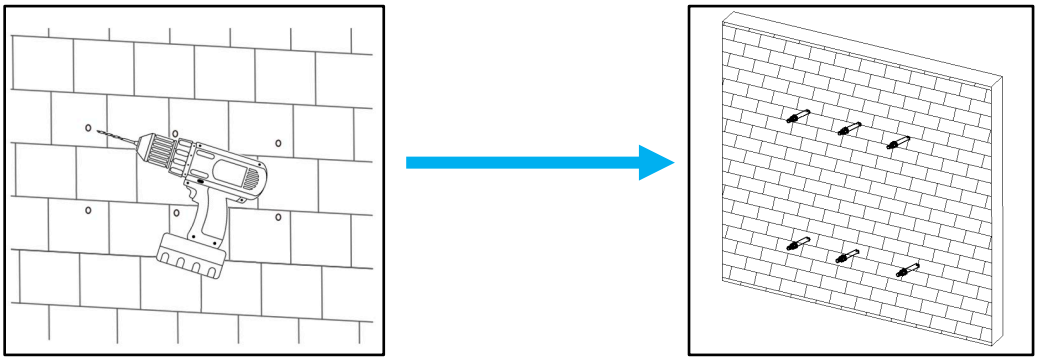
3. Position the top of the mounting bracket on the wall at the desired mounting height, with a minimum clearance from the ground of 18.35 in. (466 mm).



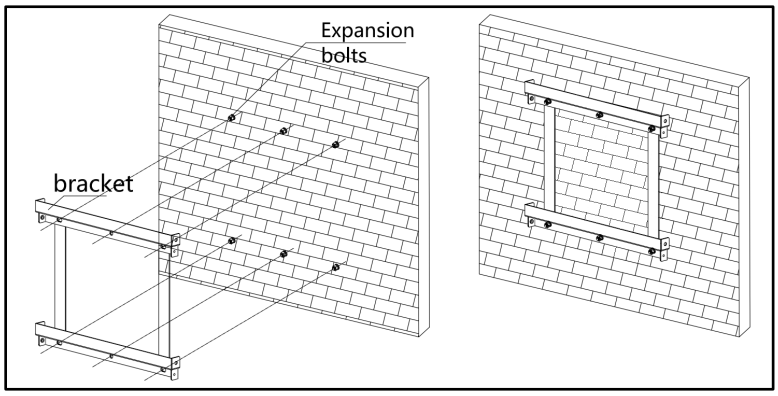
NOTE:

If fully wall mounting the battery, disregard the spacing requirements in the image above.

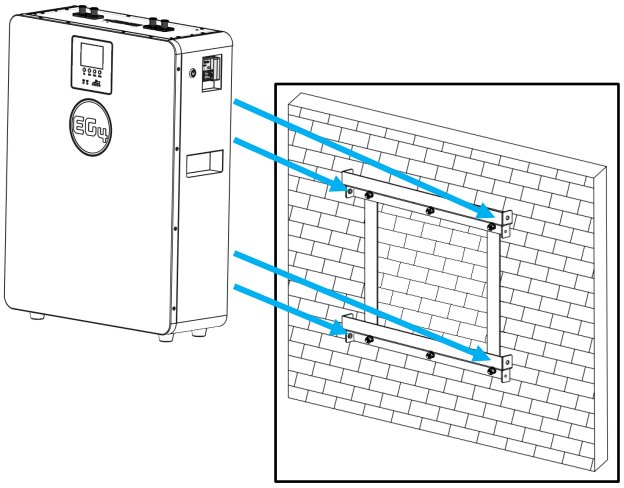
4. Using a level, ensure the bracket is level with the ground and drill six holes to accommodate the mounting hardware used.



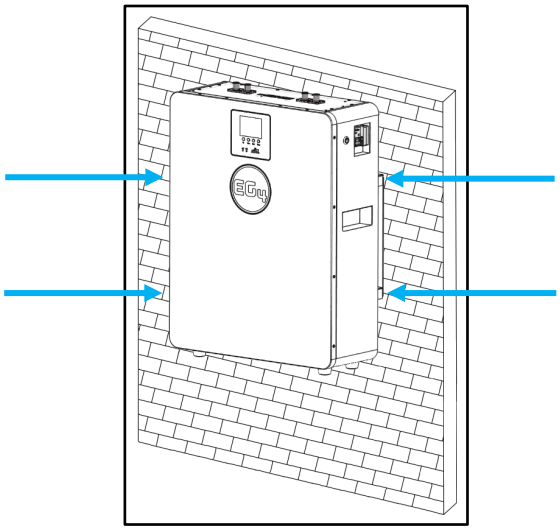
5. Secure the mounting bracket to the wall using the appropriate hardware required for the mounting surface. Use the included expansion bolts for mounting to concrete or brick.



6. Attach the battery to the mounting bracket. Using the team-lift technique, lift the battery and hook the back flange of the battery onto the front flange of the mounting bracket.



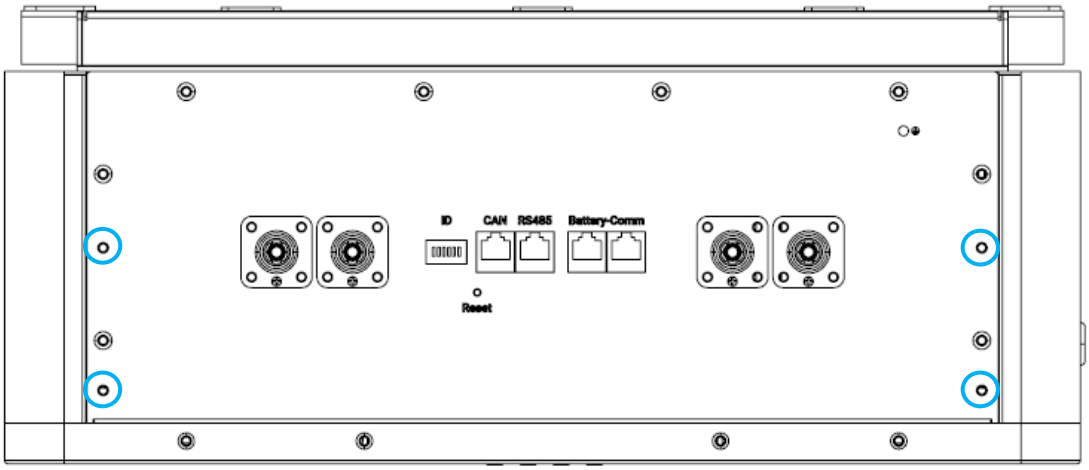
7. Secure the battery to the mounting bracket using the four included side screws from Step 1.



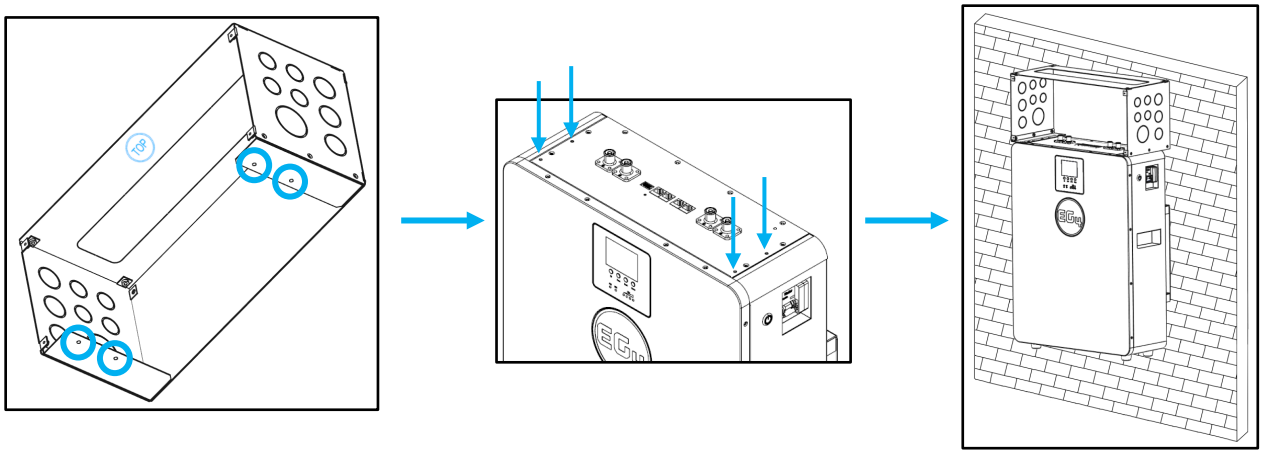
7.4 BATTERY WITH CONDUIT BOX

If installing the battery with the optional conduit box, follow the steps below continuing from step 7 on the previous page. Make sure to leave the front cover of the 100Ah conduit box until fully assembled.

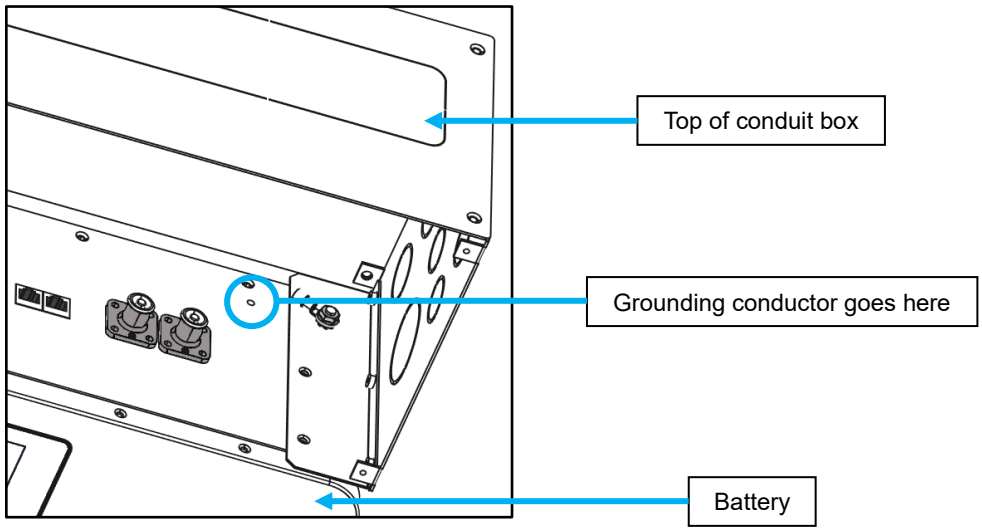
1. Remove the four screws on the top of the battery as shown in the image below and retain them for use in step 2.



2. Identify the four screw locations on the 100Ah conduit box, that line up with the screw holes that are on top of the 100Ah WallMount Indoor battery. Place the conduit box on top of the battery and use the screws from step 1 to attach the box to the top of the battery.



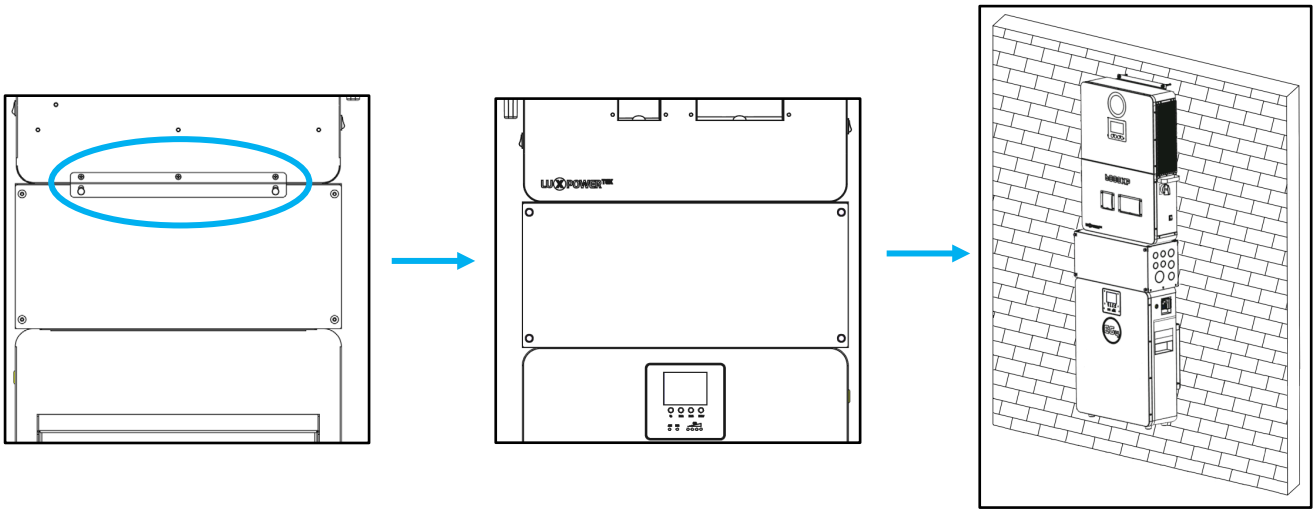
3. Finally, properly ground the battery, attach the grounding conductor to the M6 grounding screw on top of the battery to the Equipment Grounding System.



7.5 BATTERY WITH CONDUIT BOX & EG4 6000XP INVERTER

The EG4® WallMount Indoor 100Ah Lithium battery is designed to integrate with the EG4® 6000XP off-grid inverter. Follow the steps listed below to ensure proper connections are made in the system:

1. Attach the 6000XP inverter to its mounting location (see the 6000XP user manual at www.eg4electronics.com for installation steps), ensuring the bottom knockouts of the inverter align with the conduit box. When the inverter is secured to the wall, the bottom mounting ear on the back bottom of the inverter should fit behind the conduit box.



8. CONNECTING MULTIPLE BATTERIES IN PARALLEL

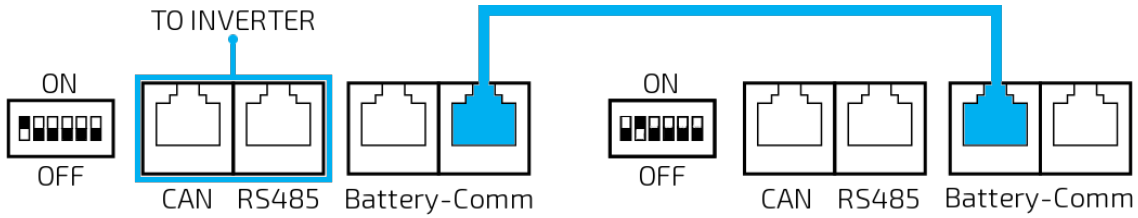
When paralleling multiple EG4® WallMount Indoor 100Ah Lithium batteries, a paralleling kit must be purchased through the distributor. When paralleling batteries, utilize the battery-to-battery communications cable included in the paralleling kit to parallel each battery together.

IMPORTANT:

The battery can charge/discharge up to 100A before the BMS shuts off the battery. Ensure the inverter is properly configured to maintain the charge/discharge rates of the battery. If needing to create custom battery power cables, see an NEC approved ampacity chart.

Follow the steps outlined below to ensure proper installation of multiple batteries in parallel:

1. Ensure all circuit breakers are open (off). Using a multimeter, check for voltage at all available disconnects and lines. Once no voltage is confirmed, proceed to the next step.
2. Set the DIP switch address on the master battery to address 1 (see image below), and all other batteries in parallel to differing addresses going in ascending order. (*See page 21*)
3. Reset the battery BMS via the power button to register the address change.
4. Set up communication between the batteries via the “Battery-Comm” ports by using the communication cable provided in the paralleling kit (sold separately) or a CAT 5, 5e, or 6 cable.



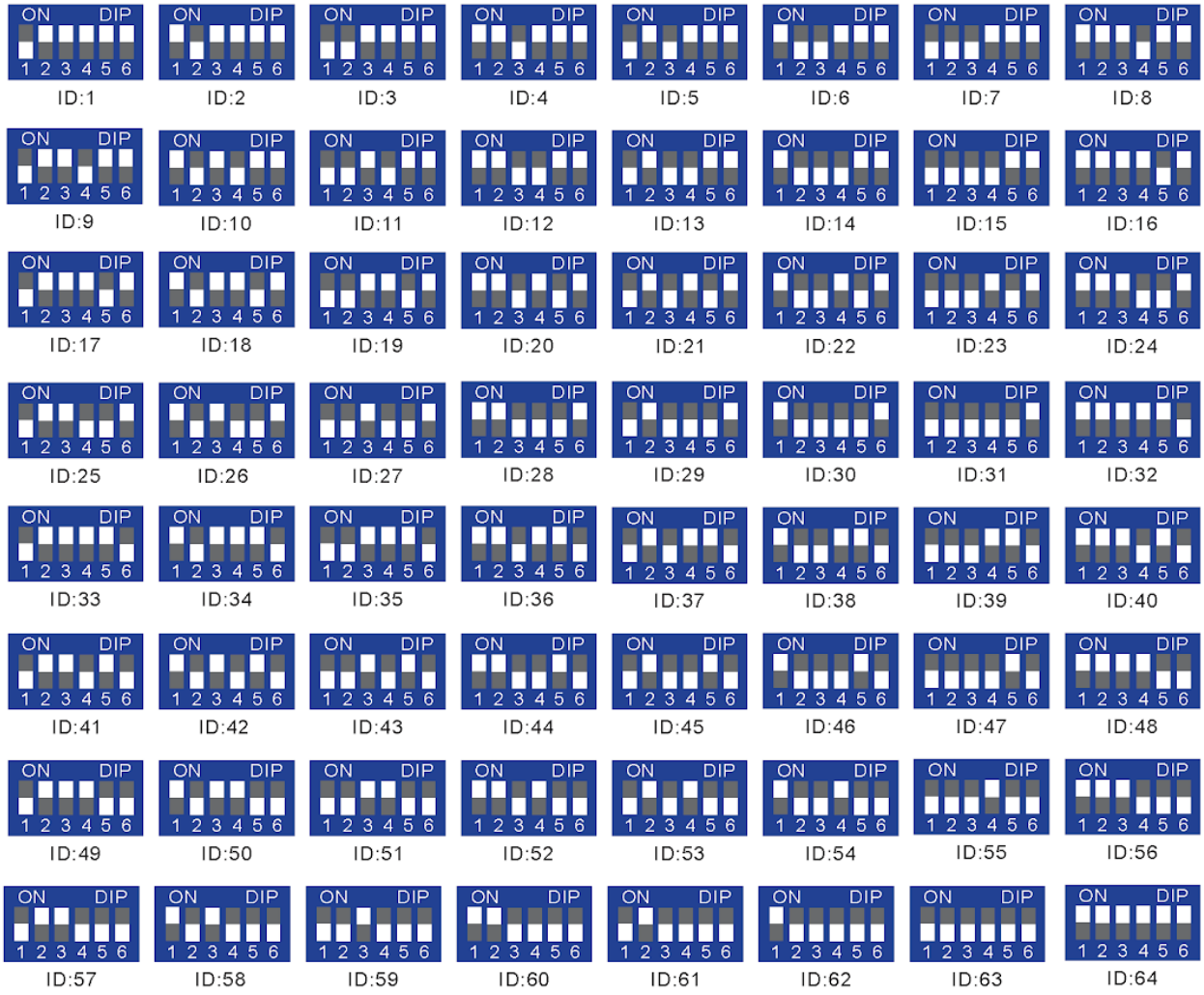
5. The battery set to address 1 will connect directly to the inverter BMS communication port via the provided battery to inverter communication cable or a CAT 5, 5e, CAT 6 cable.
6. Install the battery paralleling cables, included in the optional paralleling kit, between the batteries, ensuring the connectors are seated properly.

WARNING:

Do not put EG4® WallMount batteries in series! The BMS and internal components are not designed to handle this setup, which could cause the modules to fail, leading to damage.

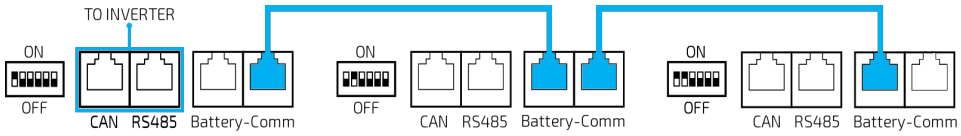
For additional examples of paralleling batteries, see page 24 for more example diagrams

DIP switch ID table – 6 Pin

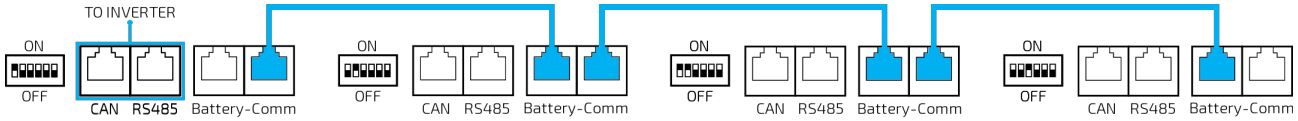


NOTE:

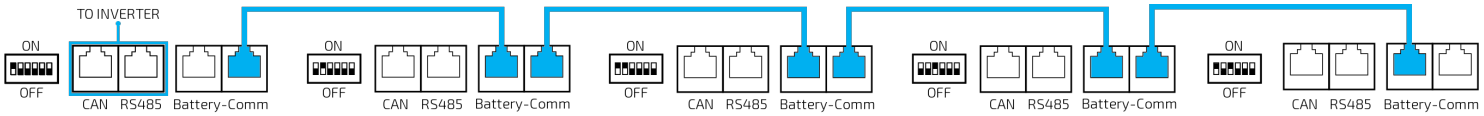
The master battery will communicate directly with the system via the CAN/RS485 port.



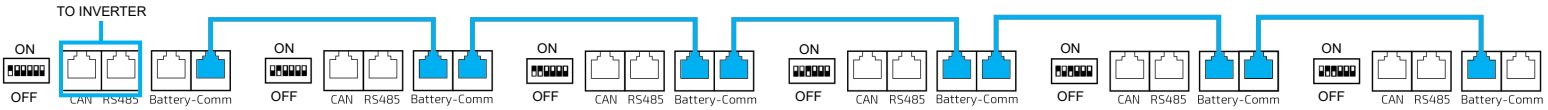
WallMounts in Parallel x 3



WallMounts in Parallel x 4



WallMounts in Parallel x 5



WallMounts in Parallel x 6

8.1 BATTERY CABLE CONNECTIONS

EG4® Electronics 48V 100Ah WallMount battery can charge and discharge up to 50A and 100A, respectively.

1. **Standalone Battery Configuration:**
   When using a standalone battery, ensure that the compatible inverter limits the current to 50A for charging and 100A for discharging.
2. **Parallel Battery Installation (Up to 120A):**
   When installing multiple batteries in parallel, ensure that the total current (charge or discharge) does not exceed 120A DC through the compatible inverters.
3. **Parallel Battery Installation (Above 120A):**
   If the total charge or discharge current exceeds 120A, external busbars must be used to safely manage the increased current flow. EG4 recommends using 125 Amp Class T fuses from each battery connected to an external busbar for the battery positives rated 120A times the # of batteries being paralleled. For the negative connection a busbar or power distribution block rated to the same value can be used. Additionally, it's advised to utilize both terminals on the battery when connecting to the inverter, ensuring optimal current utilization.

NEC may require further amperage limitations when it's not routed in free air. Refer to 2023 NEC Ampacity Table 310.16 and 2023 NEC Ampacity Table 310.17 for further clarification.

It's recommended to use at least three 48V 100Ah Indoor WallMount batteries with the EG4 6000XP inverter to maintain a 0.5C charging/discharging rate per battery. Keep the inverter's charging and discharging current limited to 120 amps, in line with the Degson connections' 120A capacity. If using an external busbar with appropriately sized conductors, the EG4 6000XP can support up to 140 amps discharging and 125 amps charging.

Note: To comply with the UL9540 listing for this integrated battery, conduit box, and inverter system, the batteries must be wired as shown on page 26 & 28 using the supplied inverter to battery cables. *An additional paralleling kit is required for each additional paralleled battery (sold separately).*

Caution: To minimize voltage drop in the wire, the battery cables should maintain optimum length. The 53.1 in. cables from the "parallel kit" are sufficient to daisy chain the batteries.

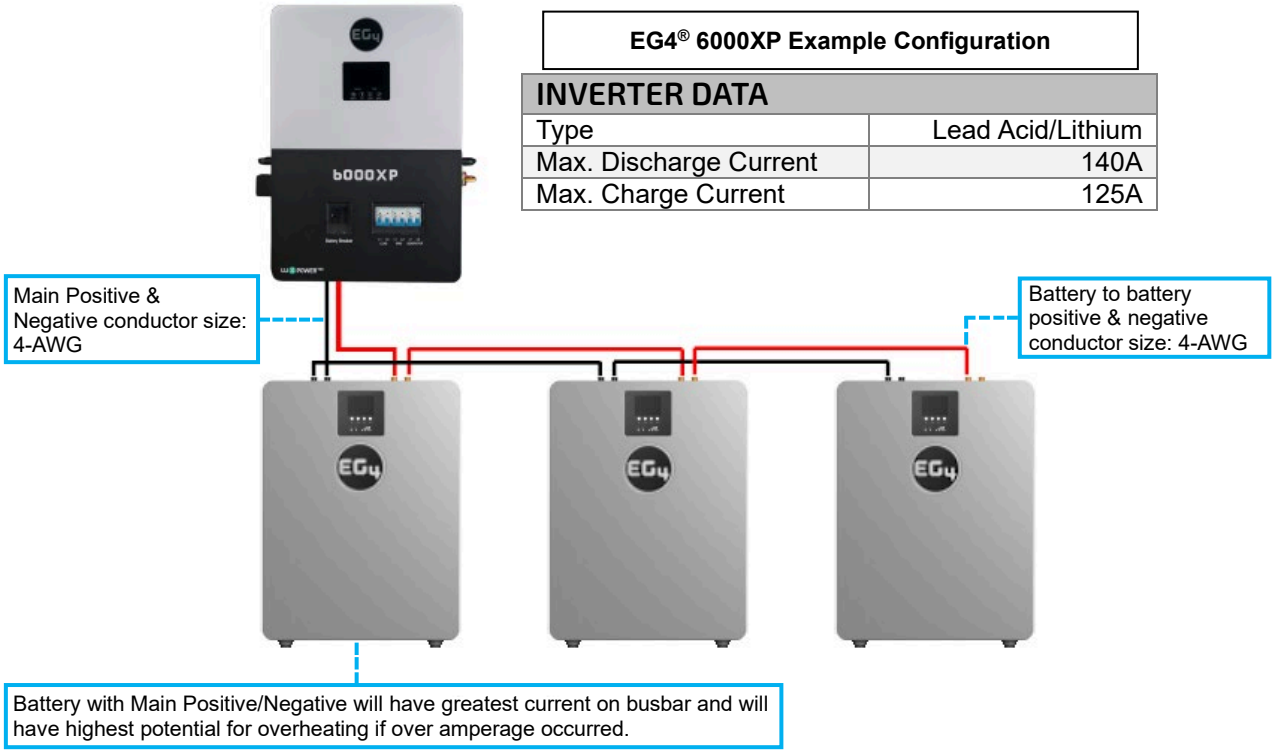
Note: Some configurations require additional wiring/connectors to achieve the example layouts. Inverter to inverter paralleling cables are not shown in the following diagram. *Other configurations can be achieved by using external busbars. Contact an electrician or qualified personnel for optional system layout.*

Reminder!
The separation between batteries should be ≥ 6 in.

NOTE:
In the diagram shown on the following page, the units are spaced 6 in. apart. Local regulations may require a larger minimum battery spacing than the 6 in. Check with the local AHJ for these requirements. If longer parallel cables are required, please check with the distributor for availability.

IMPORTANT:

Due to the Degson ESP-120A-25-OR-00 having a maximum rating of 120A DC the inverter will **HAVE** to be current limited at 120A charging/discharging which will not allow overheating of the battery's Degson Connector of 120A DC.



EG4® 6000XP Example Configuration

INVERTER DATA	
Type	Lead Acid/Lithium
Max. Discharge Current	140A
Max. Charge Current	125A

Due to NEC Code Table 310.16 4 AWG XHHW-2 cable will need to be limited in conduit to a maximum of 95A DC. Refer to the NEC Tables 310.16 & 310.17 Ed.2023 for allowable conductor ampacities.

Configurations:
Inverter: 6000XP [IV-6000-XP-IN-XX (XX is a number between 0-99)]
Battery: WallMount Indoor 100Ah Lithium [WM-48-100-IN-XX (XX is a number between 0-99)]
Positive/Negative: Degson Connector
Maximum Rating: 120A
4 AWG Conductor Rating:
In conduit: 95A DC
In free-air: 140A DC

1 battery: Inverter 140A discharge/125A charging=Battery Internal Busbar=150A
Battery Internal Busbar=140/125A

2 batteries: Inverter 140A discharge/125A charging=Battery Internal Busbar=150A
Battery Internal Busbar Each=70/62.5A

3 batteries: Inverter 140A discharge/125A charging=Battery Internal Busbar=150A
Battery Internal Busbar Each=46.6/41.6A

Minimum amount of batteries in parallel: Two (×2)
Maximum amount of batteries in parallel with 6000XP: 64 in closed loop communication
Battery Communications: 64
Energy Storage: Based on residential NEC Code
Maximum amount of current from battery bank to inverter: 120A DC due to Degson Connector

Pro-tip: One EG4® 6000XP and a minimum of 3 100Ah WallMount batteries is the recommended configuration to maximize the system's functionality.

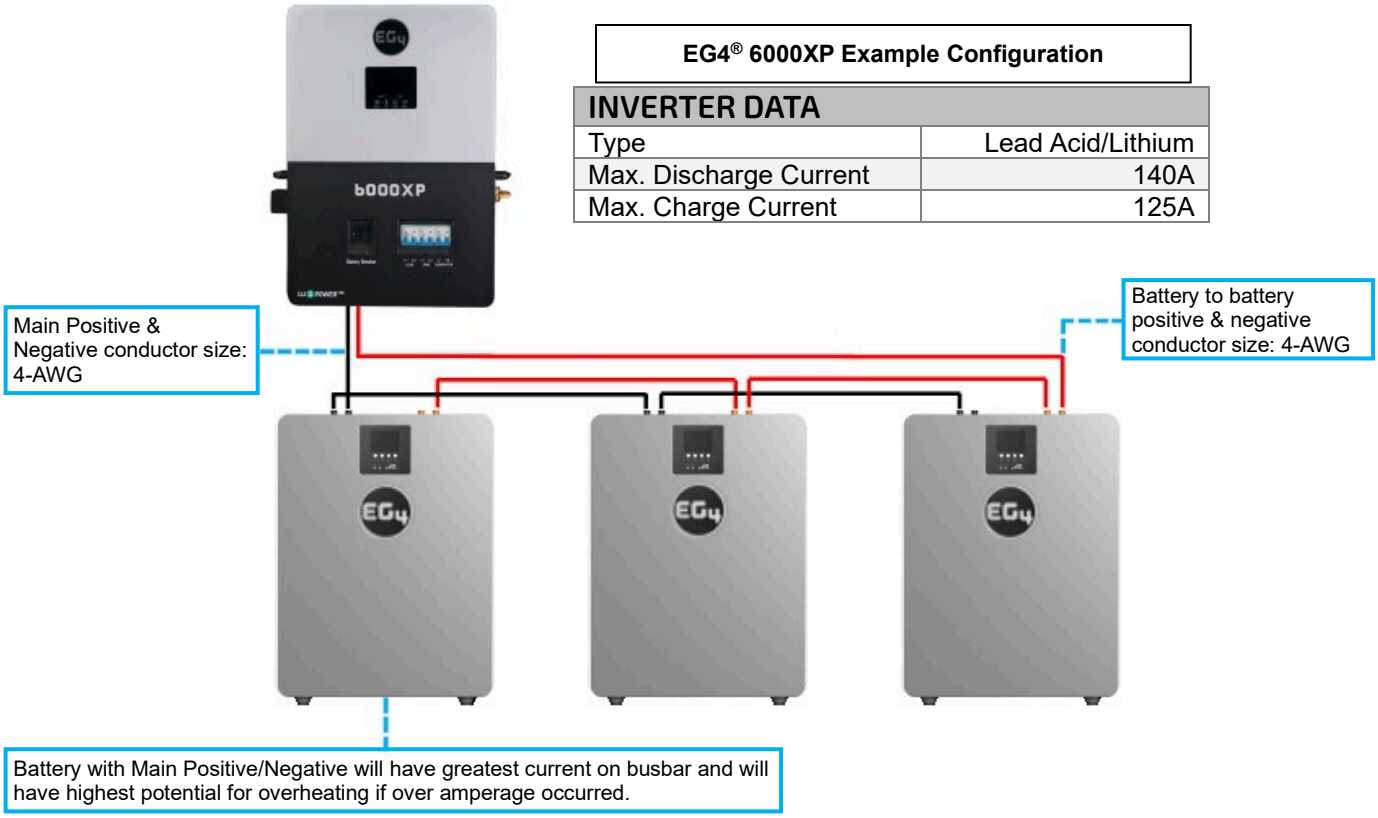
Scan QR code below for reference on how to set 6000XP current limit.

Conclusion: Due to the Degson ESP-120A-25-OR-00 having a maximum rating of 120A DC the inverter will **HAVE** to be current limited at 120A charging/discharging which will not allow overheating of the battery's Degson connector of 120A DC.

IMPORTANT:

Due to the Degson ESP-120A-25-OR-00 having a maximum rating of 120A DC the inverter will **HAVE** to be current limited at 120A charging/discharging which will not allow overheating of the battery's Degson Connector of 120A DC.

EG4® 6000XP Example Configuration #2: The diagram below illustrates a similar configuration of three batteries as shown in the first example on the previous page. However, in this case, the positive connection is directed to the last battery rather than the first.



EG4® 6000XP Example Configuration

INVERTER DATA	
Type	Lead Acid/Lithium
Max. Discharge Current	140A
Max. Charge Current	125A

Due to NEC Code Table 310.16 4 AWG XHHW-2 cable will need to be limited in conduit to a maximum of 95A DC. Refer to the NEC Tables 310.16 & 310.17 Ed.2023 for allowable conductor ampacities.

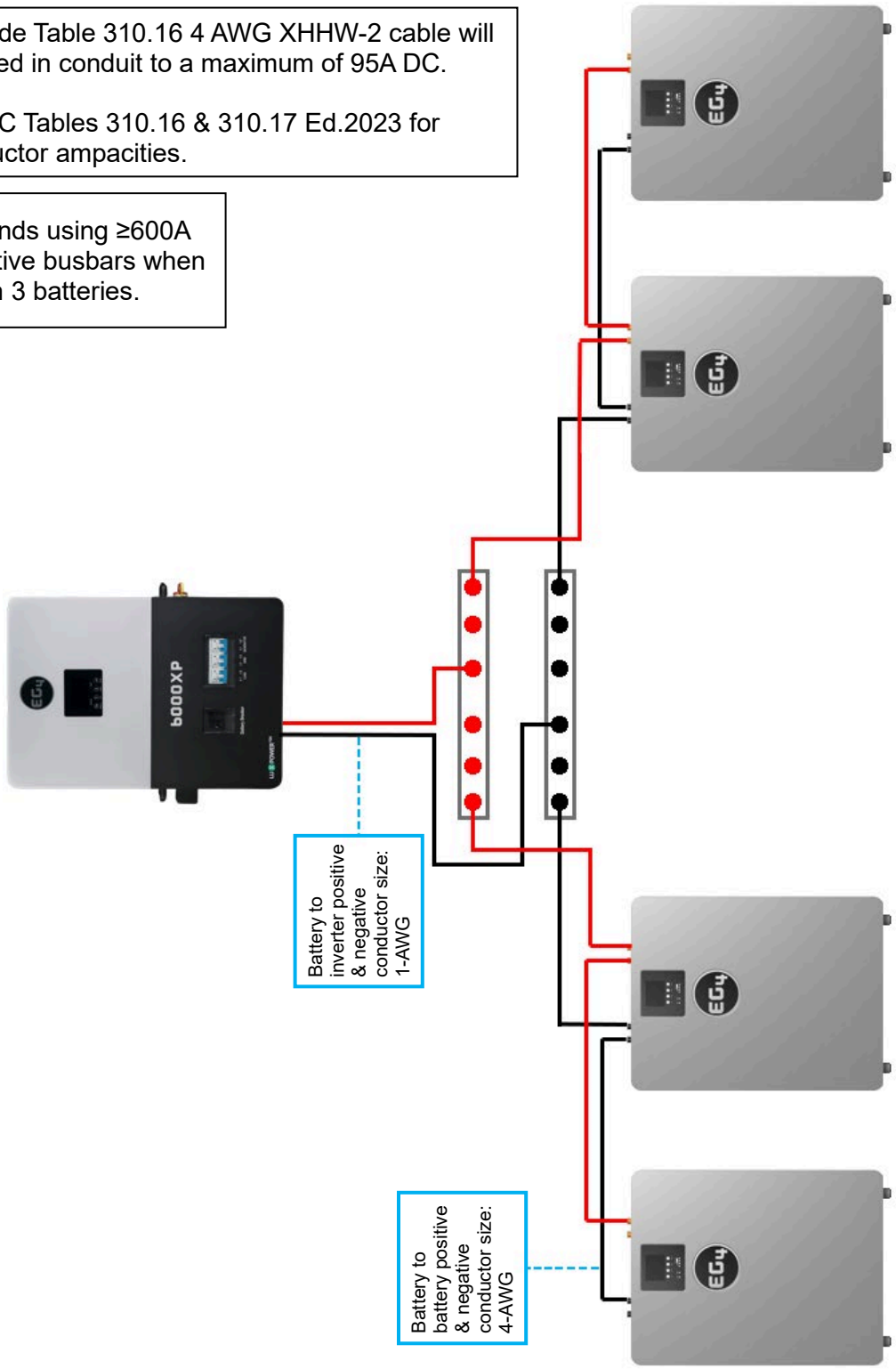
IMPORTANT:

Due to the Degson ESP-120A-25-OR-00 having a maximum rating of 120A DC the inverter will **HAVE** to be current limited at 120A charging/discharging which will not allow overheating of the battery's Degson Connector of 120A DC.

Due to NEC Code Table 310.16 4 AWG XHHW-2 cable will need to be limited in conduit to a maximum of 95A DC.

Refer to the NEC Tables 310.16 & 310.17 Ed.2023 for allowable conductor ampacities.

EG4® recommends using ≥600A positive & negative busbars when using more than 3 batteries.



9. BATTERY COMMUNICATIONS

Each EG4® battery is engineered with seamless communication between the battery and inverter, ensuring the end user can easily monitor and control their system. The battery features advanced communication protocols that allow real-time data exchange with the inverter, providing crucial insights into battery performance, charge levels, and system status.

9.1 ID & PROTOCOL SELECTION

REMINDER:

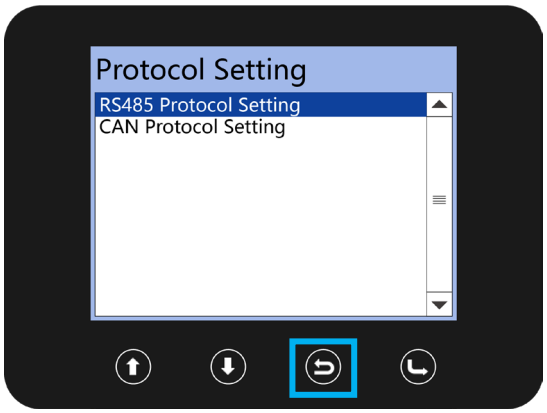
Only the master battery (address 1) needs to be set to the inverter protocol, all other batteries must have unique addresses starting at address 2 and ascending in sequential order. The master battery must connect from the CAN/RS485 port to the inverter's (or communication device's) BMS communication port.

1. Power off all battery DC breakers and BMS power buttons. **Use a multimeter to ensure no voltage is present on the positive & negative busbars.**

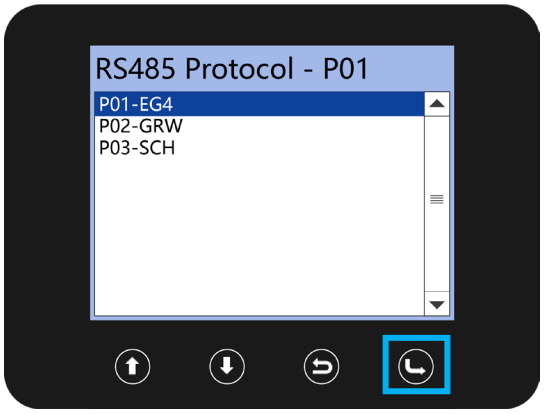
2. The inverter protocol can only be changed with the master battery temporarily set to address 64 (all switches on). After the switches are changed, restart the battery's BMS using the power button for the settings to take effect. (*See image to the right*)

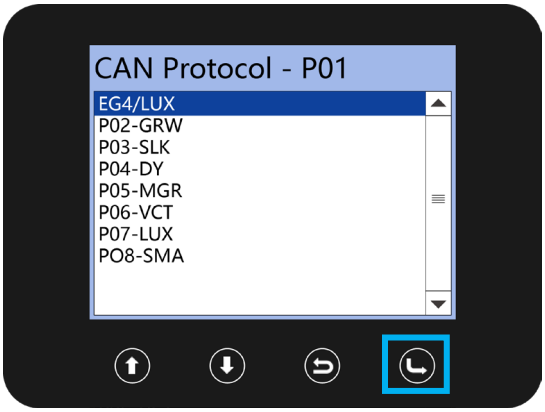
ID:64

3. On the master battery, press and hold the "Return" button for five seconds and release to enter the "Protocol Setting".



4. Select the corresponding RS485 protocol (P01-EG4) or CAN protocol (EG4/LUX) for the system if using EG4 inverters, and press “Enter”.

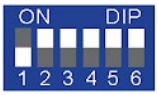




RS485 PROTOCOL	INVERTER
P01-EG4	EG4
P02-GRW	Growatt
P03-SCH	Schneider

CAN PROTOCOL	INVERTER
EG4/LUX	EG4
P02-GRW	Growatt
P03-SLK	Sol-Ark
P04-DY	Deye
P05-MGR	Megarev
P06-VCT	Victron
P07-LUX	Luxpower
P08-SMA	Sunny Boy

5. Press the “Return” button to go back to the main interface.
6. Change the master batteries DIP switch address back to address 1 *(see image to the right)*.
7. Power cycle the master battery, and the BMS will update the protocol to the selection.



ID:1

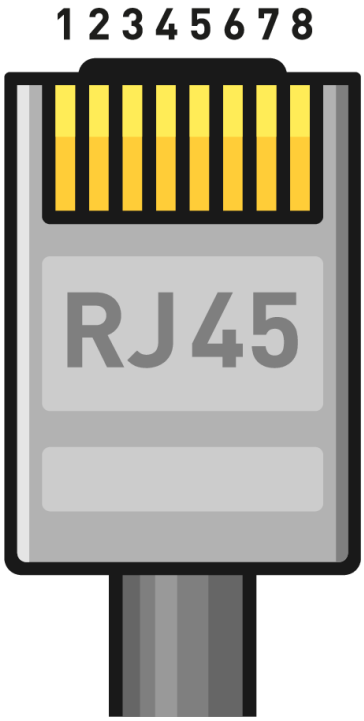
9.2 COMMUNICATION CABLE PINOUT

EG4® batteries interface with an inverter by designating a “Master” battery (DIP switch ID No. 1). The available ID codes range from 1 – 64. The battery will connect directly to the inverter via a CAT 5, 5e, or 6 cable pinned 1-5 on the inverter side. For closed loop communications using CAN bus protocols with non-EG4 inverters, please check the other manufacturer’s documentation for more information.

REMINDER:

If paralleling multiple batteries, all DIP switch settings MUST be different from each other. This allows all equipment to see each battery in the bank separately. For best practice, place IDs in sequence starting with ID:1 as the master battery.

Communication Cable Pinout & Table*



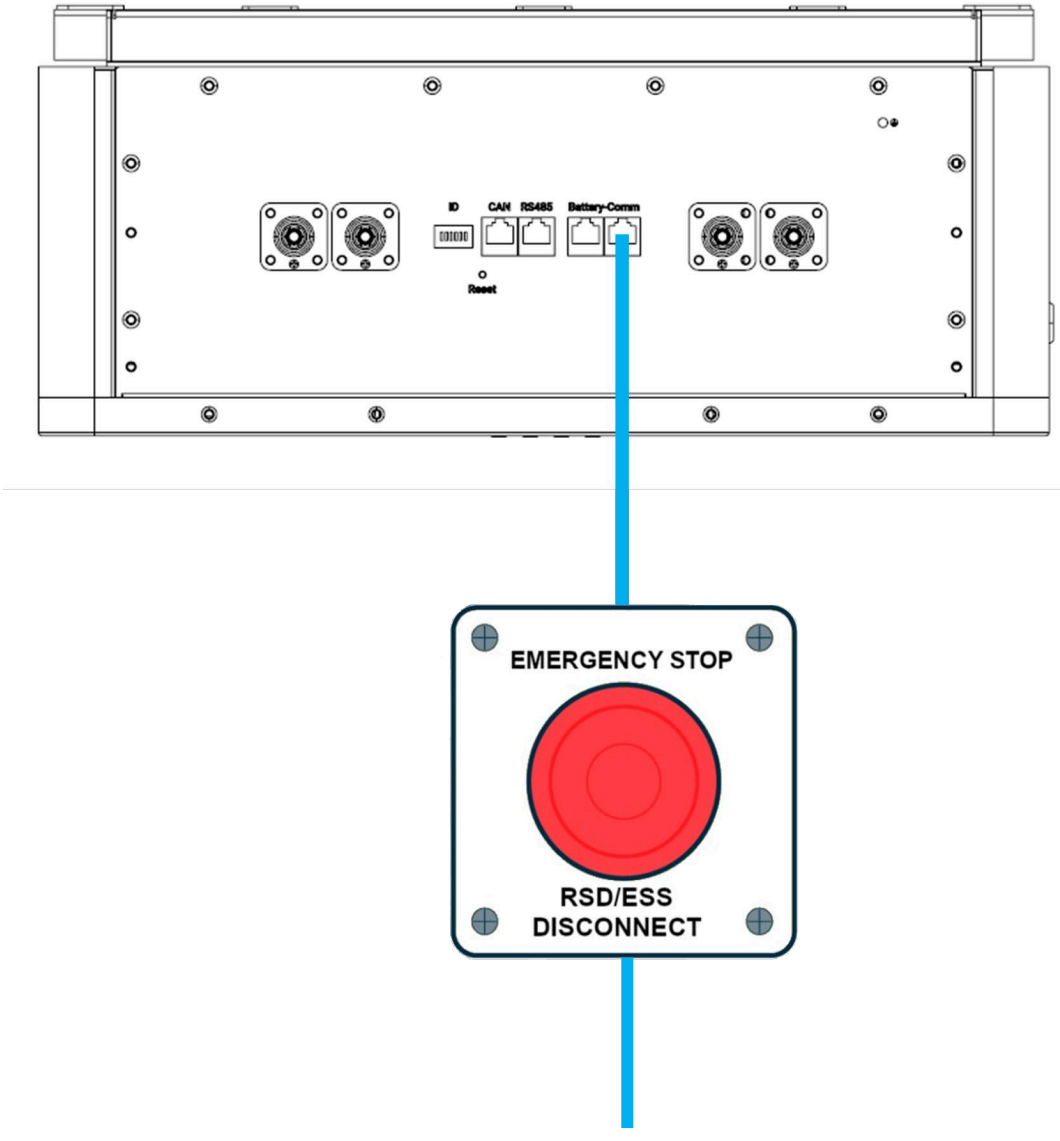
PIN	DESCRIPTION
1	RS485-B
2	RS485-A
3	CAN Ground (optional)
4	CAN High
5	CAN Low

***Pinouts are for battery side; please refer to the 6000XP system manual for pinout configuration on system end.**

10. EMERGENCY STOP (RSD/ESS DISCONNECT)

An optional ESS disconnect can be used to shut down all batteries and inverters (if equipped) with the push of a button and can also be integrated with an RSD PV shutdown initiator. When paralleling multiple batteries, the ESS disconnect only needs to have connections made with the master battery. This integrated safety feature ties directly into the battery communication system via an open “Batt-Com” port using a standard CAT 5/6 ethernet cable. Pins 3 & 6 are used to communicate the emergency stop information to the batteries once the stop button is pressed. If the inverter is equipped with rapid shut down (RSD) capabilities, the emergency stop feature can be used to initiate this function. Check with the local AHJ and NEC code for compliance.

10.1 CABLING



To inverter, RSD Initiator, or ESS Disconnect
(Inverter recommended if compatible with inverter’s RSD system)
Normally Open (NO) or Normally Closed (NC) contacts depending on inverter

11. BMS TOOLS

11.1 OVERVIEW

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.

11.2 DOWNLOADING AND INSTALLING BMS TOOLS

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 or V2.2.1.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

12. TROUBLESHOOTING, MAINTENANCE & DISPOSAL

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. Check the cause of the alarm or fault through the app or BMS Tools and take appropriate measures or go directly to the battery site to troubleshoot. BMS Tools alarms are shown in the tables below:

12.1 LED INDICATOR STATUS AND DEFINITION

STATUS	NORMAL/ ALARM/ PROTECTION	RUN	ALM	SOC INDICATOR LED	NOTES
				SOC1~SOC4	-
Shutdown/Sleep		OFF	OFF	OFF	-
Stand-by	Normal	ON	OFF	Based on battery indicator (*Each LED indicates 25% SOC*)	-
Charge	Normal	Flash 1	OFF		-
	Alarm	Flash 1	Flash 1		-
	End-off Voltage	ON	OFF		-
	Over-Temp Protection	OFF	ON		-
	Over-current transfer limit current	Flash 1	Flash 3/OFF		Over-current flash 3, limit-current OFF
Discharge	Normal	Flash 2	OFF	Based on SOC indicator	-
	Alarm	Flash 2	Flash 3		-
	End-off Voltage	OFF	OFF		Go to sleep
	Over-Temp/ Over-current Protection	OFF	ON		-

The following bullets further define the values in the table above:

- **Every SOC light represents ~25% capacity**
- **Shutdown:** All LED lights are off
- **Power on:** RUN light is always on
- **System failure:** ALM light is always on
- **Flash 1:** Flash once every second
- **Flash 2:** Flash once every 1.5 seconds
- **Flash 3**: Flash once every 2 seconds

WARNING DEFINITIONS AND SOLUTIONS

STATE	TYPE	INDICATOR	SOLUTION
Charge	Over current protection	ALM	Stop charge, check the settings and limitation
	Temperature protection	ALM	Stop charge, wait for the temp to recover
Discharge	Over current protection	ALM	Stop discharge, check if there is an overload
	Temperature protection	ALM	Stop discharge, wait for the temp to recover

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.

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

FAULT DEFINITIONS AND SOLUTIONS

NO.	FAULT	ANALYSIS	SOLUTION
1	Inverter communication failure	Check communication port connection, and battery ID setting.	Input proper "host" battery DIP switch address, and power cycle the battery.
2	No DC output	Open breaker, or battery voltage is too low.	Close the battery breaker or charge the battery.
3	Power supply unstable	Battery capacity is not at full power.	Check for proper battery cable connection.
4	Battery cannot be fully charged	DC output voltage is below the minimum charge voltage.	Check charging settings on the inverter to ensure they match battery requirements.
5	ALM LED always on	Short circuit	Disconnect the power cable and check all cables.
6	Battery output voltage is unstable	Battery management system is not operating normally.	Press the reset button to reset the battery, then reboot the system.
7	ALM LED flashes 20 times with SOC1 LED on	Unbalanced voltage within a cell.	Deep discharge the battery bank (<20% SOC), then fully charge the battery bank.
8	ALM LED flashes 20 times with SOC2 LED on	Unbalanced temperature.	Double check the temperature of the battery. If the temperature range is good, restart the battery. If the issue persists, contact the distributor.
9	ALM LED always on	Battery management system is damaged.	Contact the distributor.
10	Different SOC value of batteries in parallel operation	No issue.	Deep discharge the battery bank (<20% SOC), then fully charge the battery bank.
11	Low voltage protection with no LED on	BMS is in low voltage protection and is in sleep mode.	Fully charge and restart the battery. If issue persists, contact the distributor.
12	Deep discharged with no LED on	Battery voltage is too low to start the BMS	Apply low charge to the battery until BMS is able to start up. If the issue persists, contact the distributor.

12.2 MAINTENANCE

ITEM	MAINTENANCE INTERVAL	MAINTENANCE SOLUTION
Power Cables	Every 6 months	1. Inspect the power cable for any signs of mechanical damage and ensure that the terminal insulation sleeves are intact. If any damage is found, turn off the battery and perform maintenance or replace the cable. 2. Check for any looseness in the power cable. If there are any signs of looseness, replace the cable. 3. Examine the system for loose screws. If any screws are found loose, tighten them with a Phillips Head screwdriver.
Communication Cables	Every 12 months	1. Verify that the terminals of the parallel communication cable are securely tightened. If any terminal is loose, retighten it. 2. Check the communication cable for any obvious discoloration. If discoloration is present, shut down the battery and replace the communication cable. See section 9 for more information.
System Status	Every 6 months	1. Check if all parameters (system voltage, current, temperature, etc.) are normal when the system is running. 2. Check if the main core components of the system, including system switches and contactors, are functioning properly.
Charge & Discharge	Every 6 months	Perform a light load and shallow charge/discharge test to access the normality of the SOC and SOH status of the battery (using the EG4 monitor site to read the parameters). It is recommended that the depth of discharge and charge/discharge power should not exceed 20% of the rated value.

12.3 BATTERY END OF LIFE

The EG4® WallMount Indoor 100Ah Lithium battery is designed to last for **more than 15 years** when used correctly, assuming no more than one charge-discharge cycle per day. We have worked tirelessly to ensure that our batteries will maintain a charge after thousands of cycles. However, when it comes time to retire the battery, there are a few things to consider.

Lithium iron phosphate 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.

We recommend 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.

13. 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.

14. CHANGELOG

v1.0

- Published document

NOTES

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