

USER MANUAL BATTERY CABINET



WELDED INDOOR CABINET

SCAN FOR UPDATED
DOCUMENTS



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1. TECHNICAL SPECIFICATIONS

PHYSICAL SPECIFICATIONS	
DIMENSIONS OF THE CABINET (WxDxH)	23.6 × 26.8 × 46.3 in. (59.9 × 68.1 × 117.6 cm)
DIMENSIONS WITH CASTERS (WxDxH)	23.6 × 26.8 × 49.4 in. (59.9 × 68.1 × 125.5 cm)
TOP CABLE EXIT POINT DIAMETERS	1.9 in. (47.6 mm)
SIDE CABLE EXIT POINT DIAMETERS	2.4 in. (62 mm)
CABLE GLANDS SIZE	4 AWG
MAX. NUMBER OF BATTERIES	6 EG4 Server Rack Style
BATTERY CABLE BOLTS (IN BUSBAR)	(*) M6-1.0x15 with a 10mm hex head (and Phillips head)
SYSTEM CABLE BOLTS (IN BUSBAR)	(*) M8-1.25x15 with a 13mm hex head (and Phillips head)
BATTERY SECURING BOLTS	M5-0.8x10 with an 8mm hex head (and Phillips head)
BUSBAR TORQUE VALUE	60 in-lbs. (7 Nm)
WEIGHT (INCLUDING CASTERS)	168.9 lbs. (76.6 kg)
CABINET MATERIAL	Heavy-duty Steel and Welded Joints
FINISH COLOR	Black: Powder-coated
INVERTER MODE SPECIFICATIONS	
MAX. BUSBAR CURRENT	600A
ENERGY STORAGE CAPACITY	5.12 – 30.72kWh
BUSBAR COVERS	Yes
BUSBAR HEAT SHRINK PROTECTION	Yes
STANDARDS AND CERTIFICATIONS	
UNDERWRITERS LABORATORIES	UL9540 (**)
WARRANTY	
STANDARD WARRANTY	3 years

(*) Always use the proper torque to fasten DC power cable connections. The M6 cable bolts should be torqued to 70 in-lbs. (8 Nm) and the M8 cable bolts should be torqued to 150 in-lbs. (17 Nm).

(**) To ensure proof of compliance to UL9540, please contact EG4 Electronics to get a printed sticker certifying the system's compliance.

2. ABBREVIATIONS

A – Amp(s)	kW – Kilowatt
AC – Alternating Current	kWh – Kilowatt-hour
Ah – Amp hour(s)	L1 – Line 1
AHJ – Authority Having Jurisdiction	L2 – Line 2
ANSI – American National Standards Institute	LCD – Liquid Crystal Display
AWG – American Wire Gauge	LFP – Lithium Iron Phosphate or LiFePO ₄
BAT – Battery	MID – Micro-Grid Interconnection Device
BMS – Battery Management System	mm – Millimeter(s)
COM – Communication	MPPT – Maximum Power Point Tracker
CT – Current Transformer	ms – Millisecond(s)
DC – Direct Current	mV – Millivolt(s)
DIP – Dual In-line Package	NEC – National Electrical Code
DOD – Depth of Discharge	NEMA – National Electrical Manufacturers Association
EG – Equipment Ground	NFPA – National Fire Prevention Association
EGS – Equipment Grounding System	Nm – Newton Meters
EPS – Emergency Power System	NOCT – Normal Operating Cell Temperature
ESS – Energy Storage System	PC – Personal Computer
E-Stop NO – Emergency Stop Normally Open	PCB – Printed Circuit Board
FCC – Federal Communication Commission	PE – Protective Earth (G or Ground)
GE – Grounding Electrode	PPE – Personal Protective Equipment
GEC – Grounding Electrode Conductor	PV – Photovoltaic
GEN – Generator	RSD – Rapid Shut Down
GES – Grounding Electrode System	SCC – Standards Council of Canada
GFCI – Ground Fault Circuit Interrupter	SOC – State of Charge
GFDI – Ground Fault Detector/Interrupter	STC – Standard Testing Conditions
IEEE – Institute of Electrical and Electronic Engineers	UL – Underwriters Laboratories
Imp – Maximum Power Point Current	UPS – Uninterrupted Power Supply
In-lbs. – Inch Pounds	V – Volt(s)
IP – Ingress Protection	Vmp – Voltage Maximum Power
Isc – Short-Circuit Current	Voc – Open-Circuit Voltage

3. SAFETY

3.1 SAFETY INSTRUCTIONS

Before beginning any work, carefully read all safety instructions, and always observe them when working on or with the cabinet and/or batteries. The installation must follow all applicable national or local standards and regulations. Consult with the local Authority Having Jurisdiction (AHJ) 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 inverter or other attached equipment*

4. 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.



DANGER!

AVERTISSEMENT!

Hazardous Voltage Circuits!

Circuits à tension élevée!

1. **Do not disassemble the cabinet.** Contact the distributor for any issues in need of repair for proper handling instructions. Incorrect servicing or re-assembly may result in a risk of electric shock or fire and voiding the warranty.
2. **Never connect AC or PV power directly to the cabinet busbars as they are not meant to be present at the busbar. Doing so can result in serious injury and/or death.**
3. **Never short-circuit DC inputs when working with the batteries.** 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.
4. **Use caution when working with metal tools on or around the cabinet.** Risk of electrical arcs and/or short circuiting of equipment can lead to severe injury or death and equipment damage.
5. **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 cabinet. Use a voltmeter to confirm there is no voltage present to avoid electric shock.
6. **Do not make any connections or disconnections to the cabinet while the batteries are operating.** Damage to system components or risk of electrical shock may occur if working with energized batteries.
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 cabinet 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 installing. For electrical work, follow all local and national wiring standards, regulations, and these installation instructions.
2. All wiring and grounding should be in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.
3. All warning labels and nameplates on this cabinet should be clearly visible and must not be removed or covered.
4. The installer should consider the safety of future users when choosing the cabinet's correct position and location as specified in this manual.
5. Please keep children away from touching or misusing the cabinet and relevant systems.

DISCLAIMER

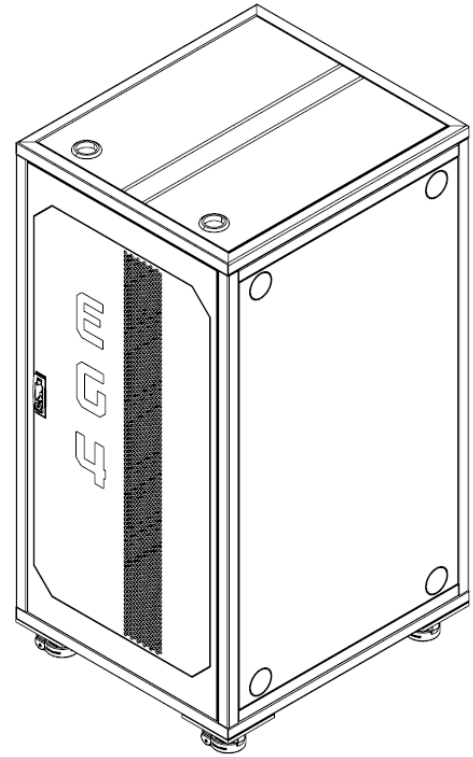
EG4 reserves the right to make changes to the material herein at any time without notice. Please refer to www.eq4electronics.com for the most updated version of our manuals/spec sheets.

5. BRIEF INTRODUCTION

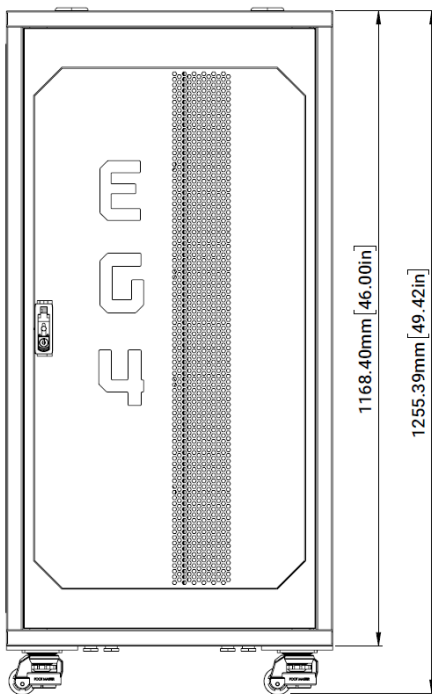
5.1 PRODUCT DESCRIPTION

The EG₄® Welded Indoor Cabinet is a great addition to a new or expanding Energy Storage System (ESS). Made of high-quality steel with welded joints and a durable powder coat finish, this rugged unit is resistant to wear and tear over time and is perfect for housing up to six EG₄ rack-mountable batteries. It features a locking door handle to prevent unauthorized access and heavy-duty swivel casters with adjustable feet making it simple to move and easy to level and fix in place.

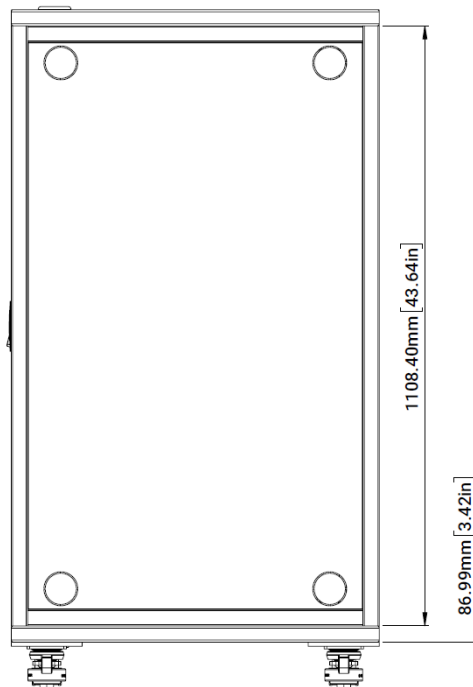
Designed to facilitate efficient installation, maintenance, and troubleshooting, this purpose-built cabinet is ideal for collocating batteries in a compact space. The integrated positive and negative busbars support up to 600 Amps of current for increased energy density and the multiple cable entry/exit knockouts on the top, sides, and bottom of the cabinet provide maximum configuration and installation flexibility.



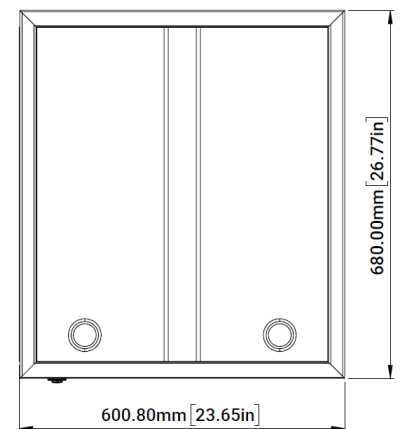
Isometric View



Front View



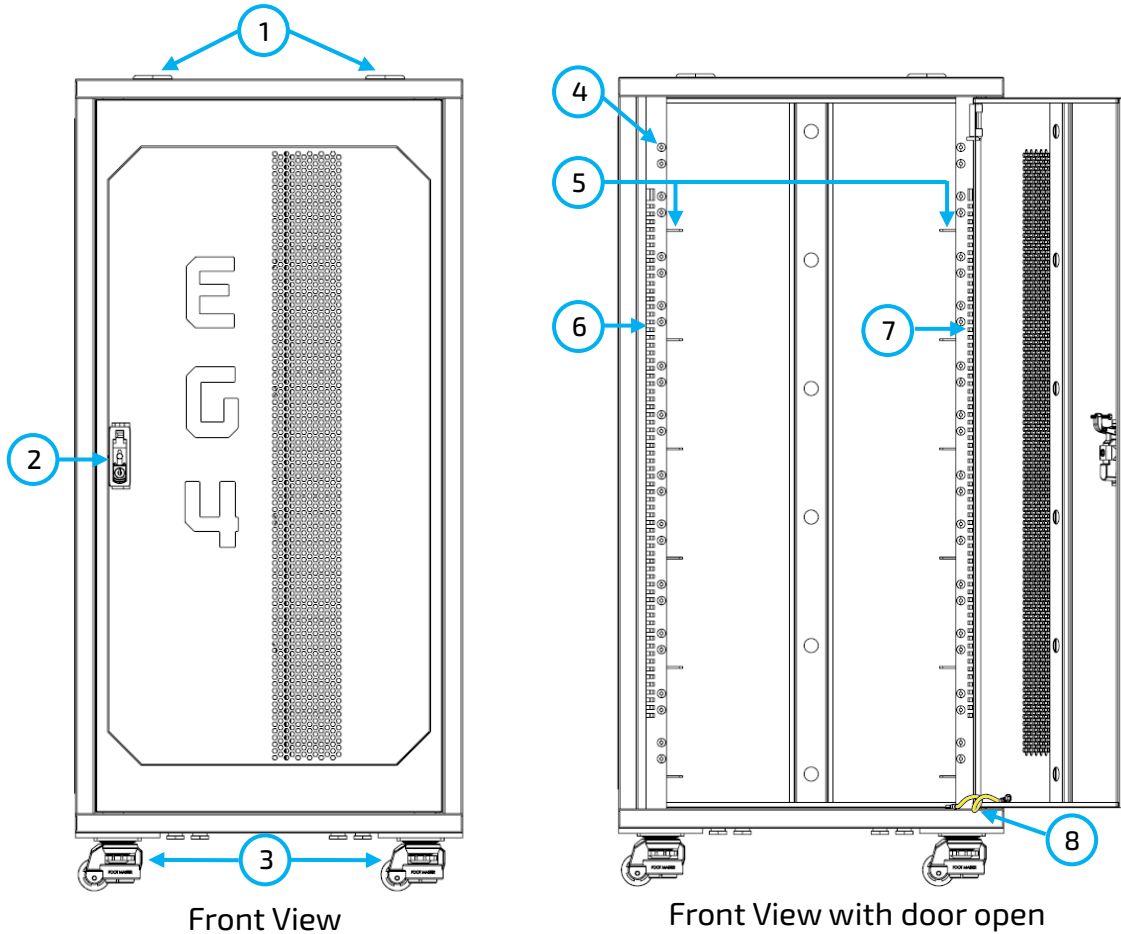
Right Side View



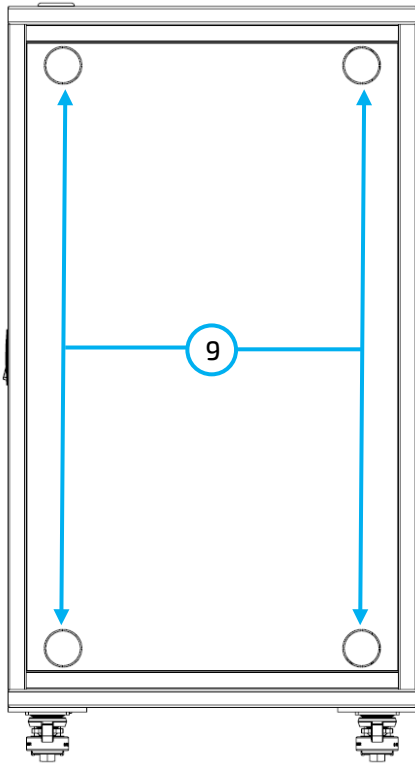
Top View

5.2 OVERVIEW OF SYSTEM COMPONENTS

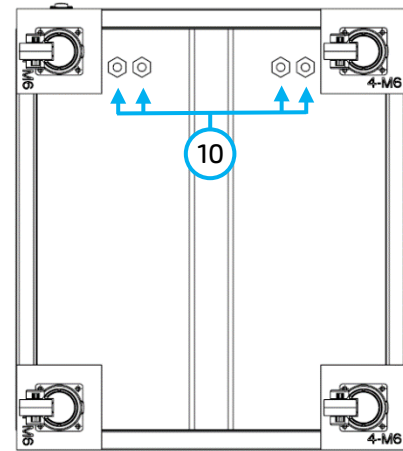
Cabinet Diagrams



NO.	ITEM	DESCRIPTION
1	Cable Exit Points	Two 1.5 in. top entry/exit points for positive/negative battery cables
2	Handle with Lock	Depress “Push” button and turn handle clockwise to open the door
3	Swivel Casters	Four heavy-duty swivel casters with adjustable feet
4	Battery Securing Bolts	48 M5-0.8x10 Phillips hex head bolts for securing batteries to the cabinet
5	Horizontal Battery Rails	Six pairs of horizontal rails to house each battery
6	Positive Busbar	825mm 600A rated busbar with red heatshrink, mounted in Panduit wiring duct (10xM6 bolts, 6xM8 bolts, 2xM10 holes)
7	Negative Busbar	825mm 600A busbar with Black heatshrink mounted in Panduit wiring duct (10xM6 bolts, 6xM8 bolts, 2xM10 holes)
8	Cabinet Ground Fastener(s)	Cabinet Ground Fasteners are two M6-1.0x15 studs with a 10mm nut in the floor of the cabinet (one in the front-right and one in the back-left). There is a 10 AWG yellow/green wire from each stud to the cabinet door and back panel, respectively.



Right Side View



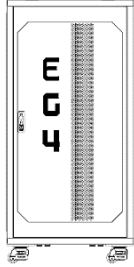
Bottom View

NO.	ITEM	DESCRIPTION
9	Side Cable Knockouts	Four 2 in. cable knockouts on each side for cable entry/exit
10	Wire Glands	Four alternative cable entry/exit points

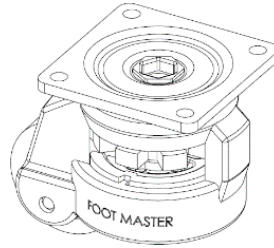
6. INSTALLATION

6.1 UNPACKING AND INSPECTION

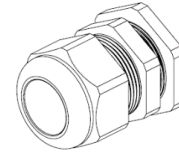
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.



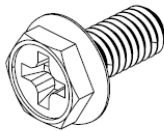
(1) EG4 Indoor Cabinet



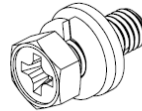
(4) Swivel Casters



(4) Wire Glands



(16) M6-1.0x10 Phillips
hex head bolts



(24) M5-0.8x10 Phillips
hex head bolts



(2) Keys

6.2 LOCATION FOR STORAGE

The environment the cabinet is stored in can greatly affect the health of the batteries.

For best results, the temperature should remain between -4°F and 113°F (-20°C and 45°C). Keep the cabinet away from locations where it may get wet or locations with high humidity (>55%). Install the cabinet away from combustible materials.

6.3 REQUIREMENTS FOR INSTALLATION



WARNING!

- Avoid exposing the cabinet to conductive materials, such as water, strong oxidizers, and strong acids.
- Avoid putting an operational cabinet in direct sunlight to avoid overheating.
- When working with the cabinet, keep all flammable materials out of the working area.
- Follow all local requirements for earthquake safety and anchoring.
- Before installing the batteries, inspect them for signs of damage. Never use damaged or puffy batteries. Please contact the distributor if a battery is received in this state or experiences this issue.
- Use caution when installing the batteries to avoid damaging the battery casing or connections.
- Use caution when installing the batteries to avoid pinching fingers



DANGER!

When adding or removing a battery from any rack, cabinet, or busbar, turn off ALL batteries, and use a voltmeter to confirm there is no DC voltage present. This will prevent users from encountering live (powered) busbars by accident. **Failure to do so can result in severe injury and/or death.**

The 6 AWG red and black cables included with EG4 batteries are intended only for the connection from the battery to the battery cabinet busbars.

The busbar is designed to handle a max current rating of 600A.

Cable sizing from the battery cabinet to the remainder of the ESS is dependent on multiple factors including the system maximum current draw, distance between the battery cabinet and ESS, location, temperature, etc.

Under engineering supervision, conductor ampacities should be calculated to ensure compliance with NEC 310.15(C). Where ambient temperature is above 86°F (30°C), cable size must be increased according to NEC 310.

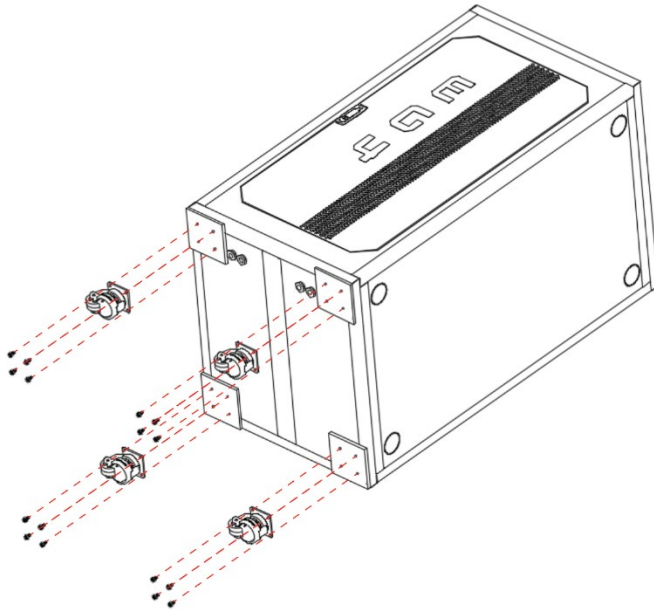
6.3.1 TOOLS NEEDED FOR INSTALLATION

The following tools are commonly needed to install the casters and the batteries into the battery cabinet. These items are not included with the cabinet.

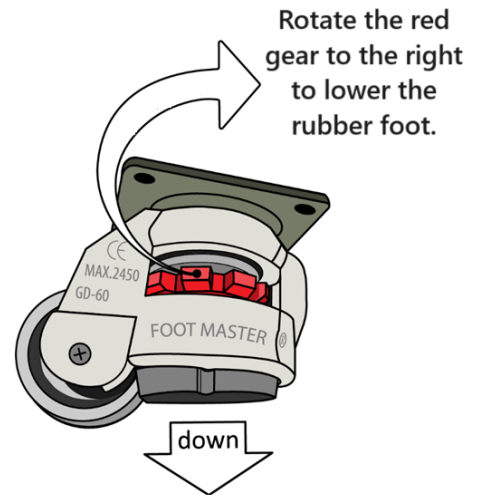
- 8mm, 10mm and 13mm sockets and ratchet with extensions
- Phillips head screwdriver
- Torque wrench capable of 70-150 in-lbs. (8-17 Nm)

6.3.2 INSTALLING THE CASTERS ON THE CABINET

1. Before installing batteries into the cabinet, carefully remove all items from inside the cabinet and lay it on its back, preferably on a clean surface or a furniture blanket.
2. Using the sixteen M6-1.0x10 Phillips hex head bolts included with the cabinet, and a 10mm socket and ratchet, or Phillips head screwdriver, attach the casters to the bottom of the cabinet as shown in following figure.



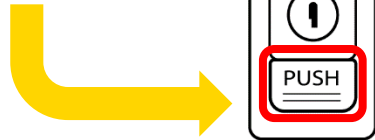
3. After installing and securing all 4 casters, stand the cabinet upright and roll it into the final location.
4. Rotate the red gear located on each caster to the right to lower the rubber feet until the weight of the cabinet is supported by the rubber feet and not the wheels. Level the cabinet by making small adjustments to each caster. (See image to the right)



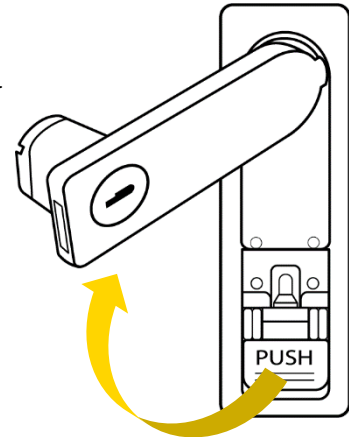
REMINDER: It is strongly advised the caster wheels are only adjusted when relocating the rack. During operation, the caster feet should be extended down to support the full weight of the batteries and the cabinet.

6.3.3 OPENING AND LOCKING THE CABINET

1. Locate the button under the keyhole that says "PUSH" and press it to release the door handle.

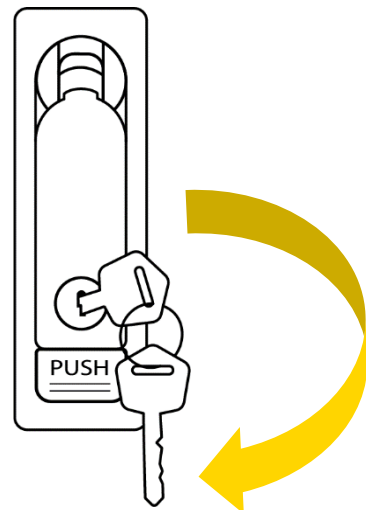


2. Turn the door handle clockwise 90° and pull to open the door.



3. Push the door closed and rotate the handle counterclockwise to the closed position. Push the handle into the door until it is flush as shown in step 1 above.
4. Insert the key and turn clockwise 180° to lock the door handle.
5. Test the lock by pressing the "PUSH" button. The handle should not fully extend.

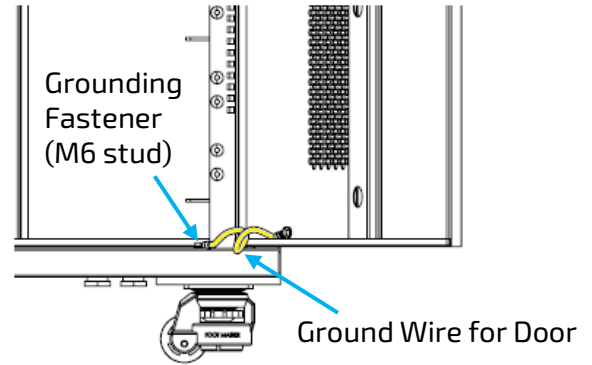
Note: *There is play in the handle. When conducting this test, the handle may release slightly, but the door will not open. Simply press the handle back down into the flush position.*



6.3.4 CABINET GROUNDING

It is important that the cabinet be properly grounded before installing any batteries. Attach an Equipment Grounding Conductor (EGC) from the cabinet's grounding fastener to the Equipment Grounding System (EGS).

It is important that the Equipment Ground Conductor is sized to the Over-Current Protection of the cabinet. Refer to an NEC approved ampacity chart for specifications.



The cabinet Grounding Fastener is an M6-1.0x15 stud with a 10mm nut. The cabinet door and back panel both have a 10 AWG Yellow/Green grounding wire attaching them to the cabinet grounding fasteners. The grounding fasteners should always be torqued to 70 in.-lbs. (8 Nm).



CAUTION! Do NOT ground the cabinet or cabinet door to the positive or negative busbars!

6.3.5 BATTERY INSTALLATION

Before installing any batteries into the cabinet, verify the cabinet is properly grounded to the system's earth ground. Ensure the casters have been raised off the floor and the cabinet is resting on the adjustable rubber feet integrated into the casters (see section 5.3.2). This will prevent the cabinet from moving while the batteries are installed. Also note that the batteries are very heavy. Please use the team lift technique while installing batteries to prevent damage to personnel and/or equipment.

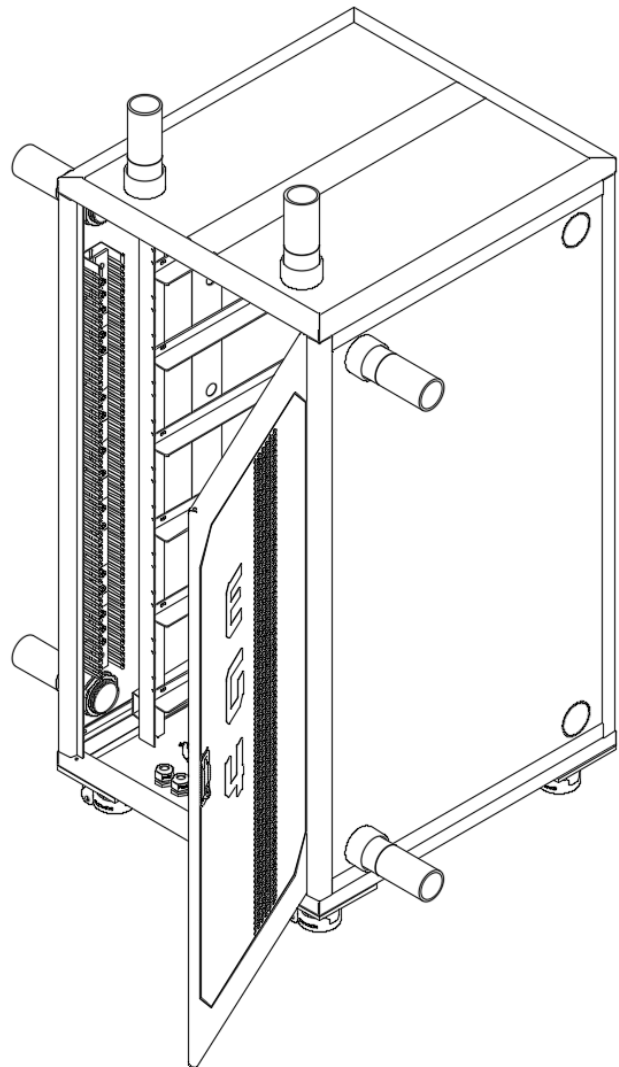
1. Beginning with the top cabinet slot and progressing downward, insert the batteries into the cabinet one at a time. Slide each battery into the cabinet until the battery is firmly seated in the slot before progressing to the next battery. Secure each battery to the cabinet rails with four of the M5-0.8x10 Phillips hex head bolts included with the cabinet. These bolts require an 8mm socket or Phillips head screwdriver.
2. Use the M6-1.0x15 Phillips hex head bolts included in the cabinet busbars and the 6 AWG red and black DC power cables included with the EG4 batteries to connect each battery to the internal positive and negative busbars, respectively. These bolts require a 10mm socket and should be torqued to 70 in.-lbs. (8 Nm). Always use the proper torque to fasten DC power cable connections.
3. **DO NOT** simply finger tighten the battery or busbar terminal bolts. Both require a specific torque to ensure they do not come loose during operation. The M6 cable bolts should be torqued to 70 in.-lbs. (8 Nm) and the M8 cable bolts should be torqued to 150 in.-lbs. (17 Nm). Failure to properly torque the terminal bolts can result in serious damage and will void the warranty.
4. If the battery came with a ground stud on the front panel and a 10AWG Yellow/Green ground wire, install the ground wire between the battery ground stud and the cabinet ground stud on the left or right of each battery slot (see image below). The ground studs on the left and right of each battery slot are M6-1.0x15 with a 10mm nut. Always torque the 10mm nut to 70 in.-lbs. (8 Nm) for a secure connection.

5. To ensure no connection errors, clearly identify the location of the Energy Storage System's (ESS) positive and negative terminals—normally on the system's inverter. Once sure of the system polarity, connect the main cabinet positive (red) and negative (black) cables to the ESS using a properly sized fuse/breaker between the battery cabinet and the system. Attach the main DC power cables to the cabinet busbars using the M8-1.25x15 Phillips hex head bolts included in the busbars. These bolts require a 13mm socket and should be torqued to 150 in-lbs. (17 Nm). Always use the proper torque to fasten DC power cable connections.

6.3.6 CABINET CABLING OPTIONS

This battery cabinet comes with several knockouts on the sides and top to facilitate cabling from the battery cabinet to the remainder of the ESS. For demonstrative purposes, the figure to the right includes conduit stubs installed in six of the 10 available knockouts. These knockouts provide maximum flexibility to install the cabinet in the location and orientation of choice while minimizing cable runs.

There are also 4 small 23mm (0.9 in.) holes in the floor of the cabinet (reference item 10 in the callouts of section 4.2). The four glands provided with the cabinet can be installed in these holes to protect wires up to 4 AWG from abrasion. If no wires or cables are fed through the holes in the bottom of the cabinet, it is highly recommended that the glands be installed to better prevent accumulation of dust particles and/or other foreign objects & materials.



6.3.7 EXAMPLE CABINET CONFIGURATION

For demonstration purposes, the image below shows a fully populated EG4® Welded Indoor Cabinet with six EG4 48V batteries.

Batteries:

There are four EG4-LLV2 48V/100Ah batteries (top 4), one EG4-LLV1 48V/100Ah battery, and one EG4 LifePower4 48V/100Ah battery (bottom). These batteries have been connected in parallel using the integrated busbars. This maintains the appropriate 48V system voltage while increasing the discharge rating of this battery bank to 600Ah. In addition, the potential DC output amperage of the rack now approaches 600 Amps. In addition, the potential DC output amperage of the rack now approaches 600 Amps, ~100 Amps per battery.

Battery Power Cables:

The 6 AWG power cables required to connect each battery to the internal positive and negative busbars are included with the EG4 batteries. Be sure to choose the correct size cables to connect the cabinet busbars to the remainder of the ESS. Refer to an NEC approved ampacity chart for specifications. **Always use the proper torque to fasten DC power cable connections!**

Battery Grounding Wires

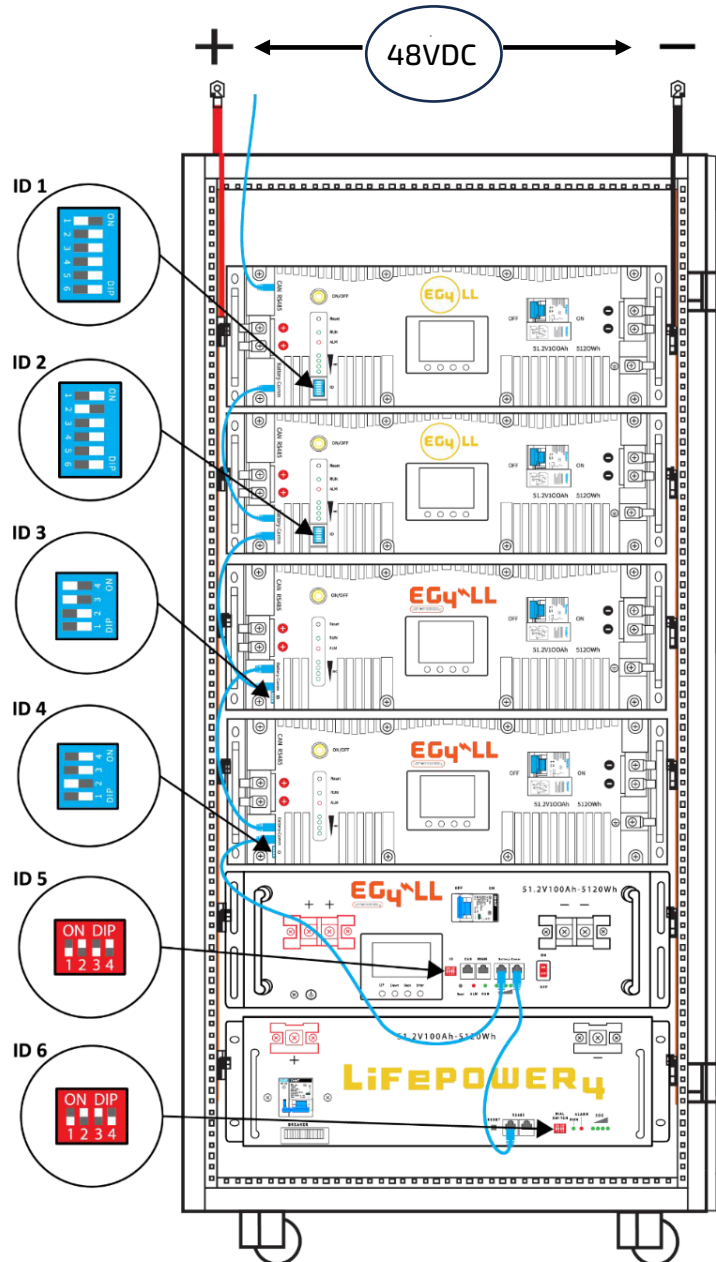
The LLV1 and LLV2 batteries come with a ground stud on the front panel and a 10AWG Yellow/Green ground wire. These wires are installed between the battery ground stud and the cabinet ground stud on the left or right of each battery slot.

DIP Switches:

The DIP switches are set according to each battery's individual requirements. In this example, the top battery acts as master to the bottom five slave batteries.

Communications Cables:

The blue communications cables are daisy-chained to allow all six batteries to share information with the ESS Inverter. In this example, the top Master battery connects to the ESS and is daisy-chained to the remainder of the slave batteries below it.



Note: To ensure compliance to UL9540, please contact EG4 Electronics to get a printed sticker certifying the system's compliance.

7. TROUBLESHOOTING AND MAINTENANCE

Regular cleaning is essential since collected dust and debris can block battery fan filters and cause overheating.

Check cable connections to avoid loose or damaged cables from interfering with network connectivity. Always use the proper torque to fasten DC power cable connections.

Inspect the cabinet for physical damage such as dents or scratches that may require repairs to maintain structural integrity.

In addition, power cords and surge protectors should also be inspected because they can fray over time, resulting in power outages or electrical problems.



CONTACT US

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