

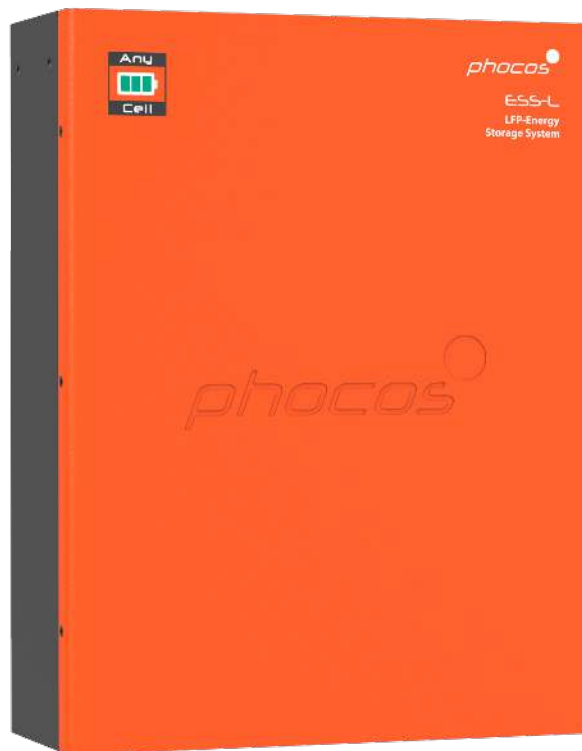


Phocos Any-Cell™ series

LFP Energy Storage System

ESS-L-5kWh-48V

User and Installation Manual



English

For further languages see
Für weitere Sprachen siehe
Pour autres langues voir
Para otros idiomas ver
对于其他语言请参阅

www.phocos.com

Contents

1.0	Abbreviations	2
2.0	About This Manual	2
3.0	Important Safety Information	2
3.1	Response to emergency situations.....	3
4.0	Regulatory Information	4
5.0	Product Overview	5
5.1	Outline and Dimensions	6
5.2	CAN communication interface pinout (CAN1 & CAN2)	8
5.3	LED Indicators	9
6.0	Installation	10
6.1	Unpacking	10
6.2	Packing List	11
6.3	Installation Materials	13
6.4	Installation Location	14
6.5	Installation Options	15
6.6	Communications Connections	18
6.7	Wiring Specification.....	19
6.8	Connecting a single Any-Cell to an Any-Grid.....	20
6.9	Connecting multiple Any-Cells to an Any-Grid	21
6.10	Battery Terminal Connections.....	22
7.0	Operation	23
7.1	Option A – Default BMS Power Switch	23
7.2	Option B – Remote BMS Power Switch Option.....	23
7.3	System Startup with Any-Grid	24
7.4	Safety Shutoff Feature	25
8.0	Troubleshooting	26
8.1	Any-Cell Warnings	26
8.2	General Issues	26
9.0	Specifications	27
10.0	Warranty	28
10.1	Conditions.....	28
10.2	Liability Exclusion	28

1.0 Abbreviations

Abbreviations	
ESS-L	Energy Storage System-Lithium
BMS	Battery Management System
RoHS	Restriction of Hazardous Substances
AHJ	Authority Having Jurisdiction

2.0 About This Manual

SAVE THESE INSTRUCTIONS: This manual contains important instructions for the Any-Cell ESS-L-5kWh-48V (referred to as Any-Cell ESS-L) that shall be followed during installation and maintenance of the Any-Cell ESS-L. Read and save this manual for future reference.

This manual describes how to install the Phocos Any-Cell Energy Storage System LFP Series (ESS-L). Read this manual before you attempt to install the product and follow the instructions throughout the installation process. If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact Phocos for advice and clarification. The information included in this manual is accurate at the time of publication. However, with regards to the product design and technical specification updates, our company reserves the right to make changes at any time without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. The illustrated items may differ from the actual items at the installation location.

3.0 Important Safety Information

For safety reasons, installers are responsible for familiarizing themselves with the contents of this manual and all warnings before performing installation.



WARNING: The installation of this unit may only be undertaken by qualified personnel with appropriate training. High voltages in and around the unit can cause serious injury or death. This unit must be installed in accordance with rules and regulations at the site of installation.



CAUTION: A battery can present a risk of electrical shock, burn from high short-circuit current, fire or explosion from vented gasses. Observe proper precautions.

General safety precautions

Failure to observe the precautions described in this section can cause serious injury to persons or damage to property. Please observe the following precautions.

Risks of explosion

- Do not subject the Any-Cell ESS-L to strong impacts.
- Do not crush or puncture the Any-Cell ESS-L.
- Do not dispose of the Any-Cell ESS-L in a fire.

Risks of fire

- Do not expose the Any-Cell ESS-L to temperatures in excess of 60°C.
- Do not place the Any-Cell ESS-L near a heat source, such as a fireplace.
- Do not expose the Any-Cell ESS-L to direct sunlight.

Do not allow the battery connectors to touch conductive objects such as wires.

Risks of electric shock

- Do not disassemble the Any-Cell ESS-L.
- Do not touch the Any-Cell ESS-L with wet hands.
- Do not expose the Any-Cell ESS-L to moisture or liquids.
- Keep the Any-Cell ESS-L away from children and animals.

Risks of damage to the Any-Cell ESS-L

- Do not allow the Any-Cell ESS-L to come in contact with liquids.
- Do not subject the Any-Cell ESS-L to high pressures.
- Do not place any objects on top of the Any-Cell ESS-L.

Battery handling guide

- Use the Any-Cell ESS-L only as directed.
- Do not use the Any-Cell ESS-L if it is defective, appears cracked, broken or otherwise damaged, or fails to operate broken or otherwise damaged, or fails to operate.
- Do not attempt to open, disassemble, repair, tamper with, or modify the Any-Cell ESS-L. The Any-Cell ESS-L is not user serviceable.
- To protect the Any-Cell ESS-L and its components from damage when transporting, handle with care.
- Do not impact, pull, drag, or step on the Any-Cell ESS-L.
- Do not subject the Any-Cell ESS-L to any strong force.
- Do not insert foreign objects into any part of the Any-Cell ESS-L.
- Do not use cleaning solvents to clean the Any-Cell ESS-L.

3.1 Response to emergency situations

The Phocos Any-Cell ESS-L comprises multiple cells that are designed to prevent hazards resulting from failures. However, Phocos cannot guarantee their absolute safety.

Leaking batteries



WARNING: If the Any-Cell ESS-L leaks electrolyte, avoid contact with the leaking liquid or gas. Electrolyte is corrosive and contact may cause skin irritation and chemical burns.

If one is exposed to the leaked substance, follow these steps:

- **Inhalation:** Evacuate the contaminated area and seek medical attention immediately.
- **Eye contact:** Rinse eyes with flowing water for 15 minutes and seek medical attention immediately.
- **Skin contact:** Wash the affected area thoroughly with soap and water and seek medical attention immediately.
- **Ingestion:** Induce vomiting and seek medical attention immediately.

Fire

In case there is a fire, always have an ABC or carbon dioxide extinguisher.

The Any-Cell ESS-L may catch fire when heated above 150°C.

If a fire breaks out where the Any-Cell ESS-L is installed, follow these steps

- Extinguish the fire before the Any-Cell ESS-L catches fire.
- Refer to your local AHJ to determine the best course of action in cases where it is impossible to extinguish the fire, but you may have time to move the Any-Cell ESS-L to a safe area before it catches fire.
- If the Any-Cell ESS-L has caught fire, do not try to extinguish the fire. Evacuate the area immediately.



WARNING: If the Any-Cell ESS-L catches fire, it will produce toxic and poisonous gases. Do not approach.

Wet batteries

If the Any-Cell ESS-L is wet or submerged in water, do not try to access it. First contact the local AHJ for advice on how to proceed. If the battery has been recovered, and cleared by the AHJ, please reach out to your distributor or Phocos for technical assistance.

Damaged batteries



WARNING: Damaged batteries are dangerous and must be handled with extreme caution. They are not fit for use and may pose a danger to people or property.

- If the Any-Cell ESS-L seems to be damaged, take photos, pack it in its original container, and then return it to your distributor.
- If the Any-Cell ESS-L is damaged, it may leak electrolyte or produce flammable gas. If you suspect your Any-Cell ESS-L is damaged, immediately contact Phocos for advice and information.

4.0 Regulatory Information

This product is CE and RoHS (Restriction of Hazardous Substances) compliant. Please find the CE declaration at www.phocos.com.



This equipment is suitable for use in non-hazardous locations only.

IEC62619, UL1973, and UN38.3 Certified.

5.0 Product Overview

The Phocos Any-Cell™ ESS-L LFP Series (ESS-L) is a Lithium Iron Phosphate (LiFePO4) battery product with an integrated BMS (Battery Management System). The Any-Cell ESS-L is shipped with features including CAN communication, undervoltage, over-voltage, over-current, over-temperature, and under-temperature protection functions. Users can expect reliable operation with the safety of an LFP system over a long cycle life. Energy storage systems implementing the Any-Cell ESS-L are expandable; up to 8 Any-Cell products may be used in parallel to increase storage capacity accordingly. Users can also expect seamless integration of their Any-Cell ESS-L with new and existing Any-Grid inverters designed for 48V battery systems.

NOTICE: The Any-Cell ESS-L may only be used with the Any-Grid™ 48V series of hybrid inverters with accompanying Any-Bridge™ AB-PLC-CAN gateway and monitoring device. This device facilitates closed loop communication between the Any-Grid hybrid inverter and the Any-Cell ESS-L, which is necessary for normal battery operation. Failure to include an AB-PLC-CAN in the installation of the Any-Cell ESS-L will result in a non-functioning system.

Please see **7.3 System Startup with Any-Grid** for additional details on setting up the Any-Grid ecosystem.



5.1 Outline and Dimensions

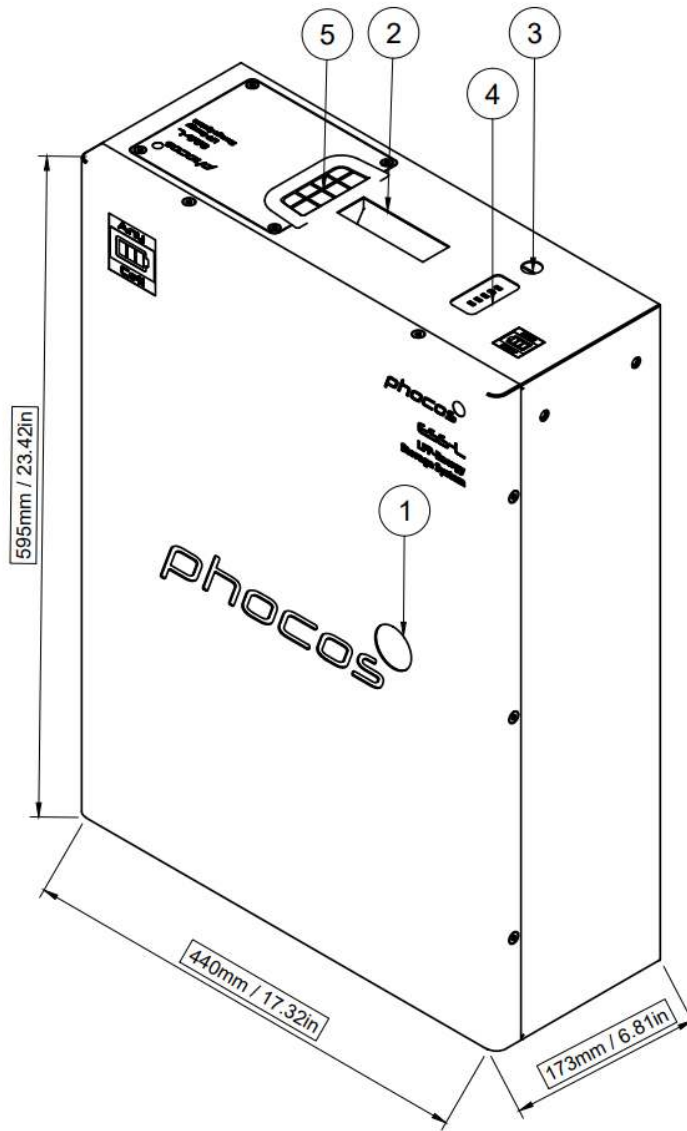


Figure 1.1: Dimensions

Number	Description
①	Front Logo
②	Handle
③	BMS Power Button
④	SOC (State of Charge) & Warning light indicator
⑤	Terminal Entry

The wiring port of the Any-Cell ESS-L is accessed by removing the x4 T15 screws holding the terminal cover plate and lifting the cover plate from the unit. Please see the following pictures for details.

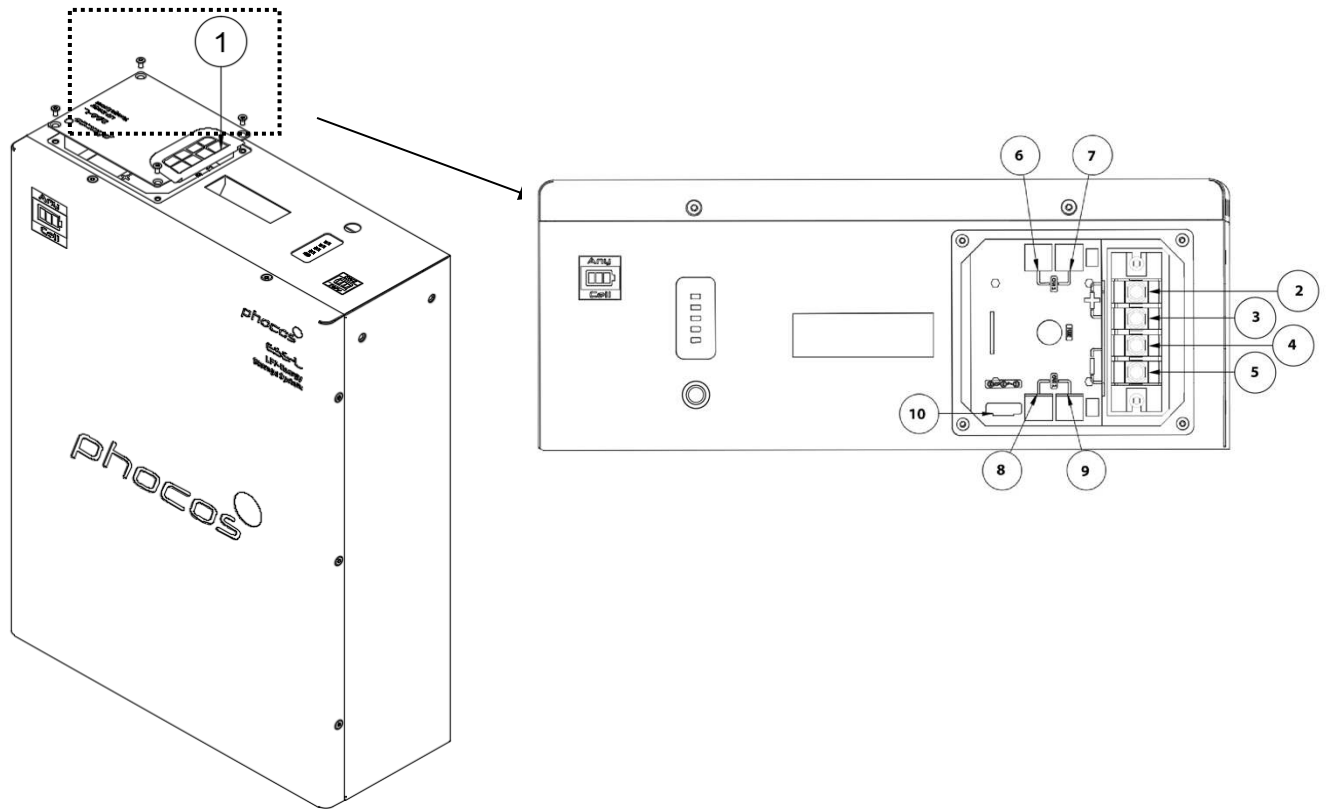


Figure 1.2: Terminal cover and Wiring port

Number	Description	Notes
①	Terminal Cover Plate	To cover and protect the electrical connections
② ③	Battery+	Positive terminals of battery
④ ⑤	Battery-	Negative terminals of battery
⑥ ⑦	CAN1 ports	For battery-to-battery communication when in parallel
⑧ ⑨	CAN2 ports	For battery to Any-Bridge communication
⑩	Remote port	To enable installation of a remote BMS power switch

5.2 CAN communication interface pinout (CAN1 & CAN2)

The Any-Cell ESS-L has four modular 8P8C communication connectors for CANbus communication. CAN1 is used exclusively for battery-to-battery communication between the BMSs of Any-Cell units when in parallel. CAN2 is used to communicate between the BMS of one or multiple Any-Cells and the Any-Bridge gateway device. For installers creating custom communication cables, the pinout of an Any-Cell CAN port is shown below.

There is no difference between the two ports labeled CAN1 - they may be used interchangeably, and both connect to the same CANbus node. The same applies to the two CAN2 ports.

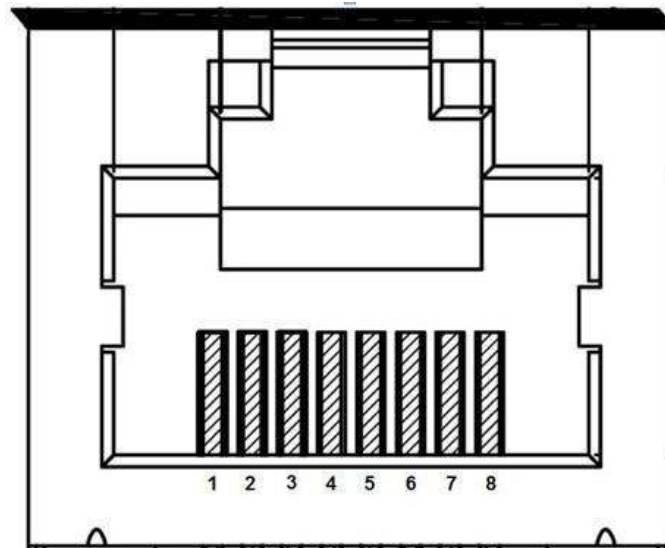


Figure 1.3: CAN interface pinout

Pin Number	Name
①②③	NC
④	CANH
⑤	CANL
⑥⑦⑧	NC

No grounded shield connection is required for proper communication for local cable runs.

5.3 LED Indicators

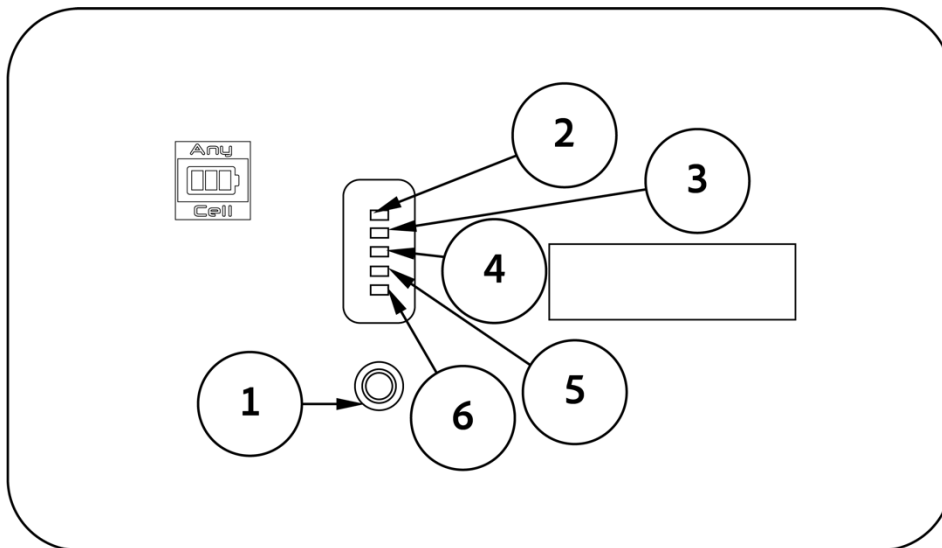


Figure 1.4: LED Indicators

Number	Name	LED Operation
①	BMS power button	White light, solid: BMS on
②	100% capacity indicator	Green light, solid: 100% SOC
③	75% capacity indicator	Green light, solid: >75% SOC
④	50% capacity indicator	Green light, solid: >50% SOC
⑤	25% capacity indicator	Green light, solid: >25% SOC
⑥	Warning indicator	Yellow light, solid: Normal Yellow light, blinking: Warning

The warning indicator will blink when the Any-Cell BMS has encountered an error. See section **8 Troubleshooting** for details.

6.0 Installation



CAUTION: The Any-Cell ESS-L is too heavy for a single person to carry. Always have two or more people carry the unit.

6.1 Unpacking

Cut the packing tape, open the carton, and remove the EPE foam.

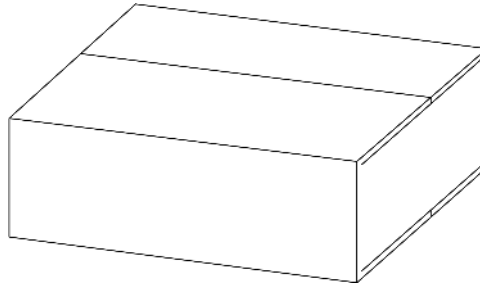


Figure 2.1: Any-Cell ESS-L carton packaging

Pull out the Any Cell ESS-L. Remove the Cardboard, PE bag, carton, and EPE Foam.

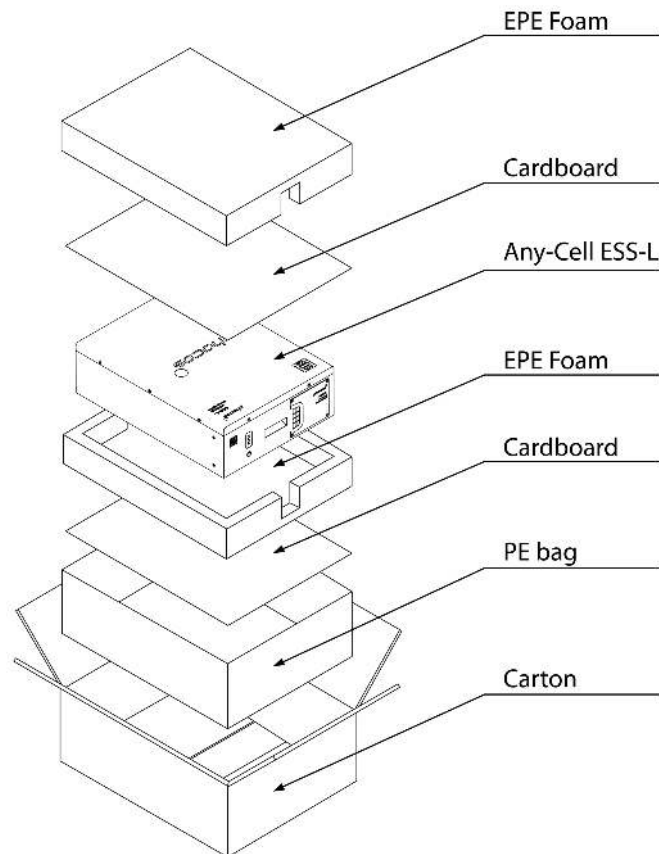


Figure 2.2: Any-Cell ESS-L

6.2 Packing List

The following table lists the quantity of each item included with the purchase of a Phocos Any-Cell ESS-L. If anything is damaged or missing, please contact Phocos or your distributor.

Item	Name	Purpose	Qty (pcs)
1	Phocos Any-Cell ESS-L	-	1
2	CAT5e patch cables	CANbus Communication	3
3	T15 Wrench Tool	Terminal cover plate removal	1
4	M4 T15 Screws	Extra for Terminal cover plate	2
5	M6 T30 Screws	Rack Mounting	6
7	Rack Mount Brackets	Rack Mounting	2
6	M6 Phillips Hex Screws	Wall Mounting	7
8	Wall Mounting Rails	Wall Mounting	2
9	Side Support Bracket	Wall Mounting	1
10	User manual	-	1

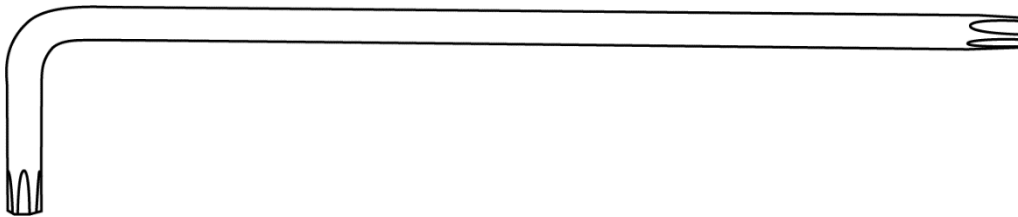


Figure 3.1: Included T15 Tool

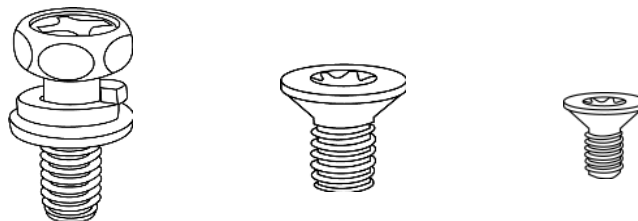


Figure 3.2: (from left) M6 Phillips Hex screw, M6 T30 screw, M4 T15 terminal cover screw

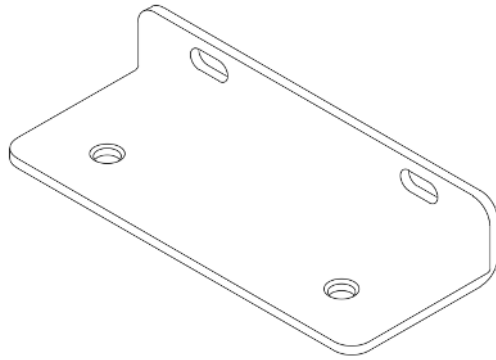


Figure 3.3: Rack Mount Bracket

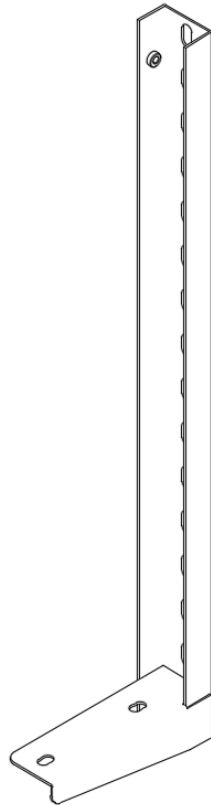


Figure 3.4: Wall Mounting Rail (left side)

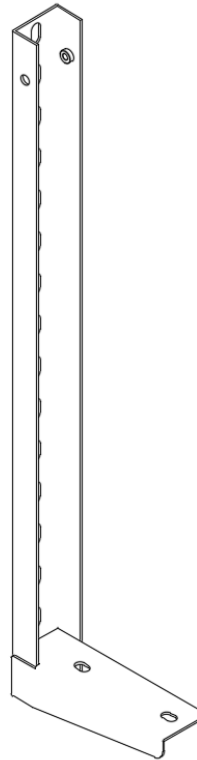


Figure 3.5: Wall Mount Rail (right side)

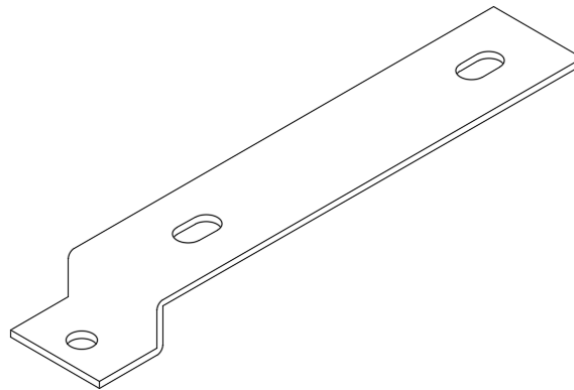


Figure 3.6: Side Support Bracket for wall mount

6.3 Installation Materials

The following installation materials are to be provided by the installer or user and are not included in your Any-Cell purchase. Always check with the local AHJ regarding best practices and regulations for electrical equipment installations.

- Battery Wires, Terminals, DC disconnect(s), DC breaker(s) (rated as required by AHJ)

We recommend using 2-4AWG / 25-35mm² of a conductor with double insulation, with properly rated and crimped ring terminals for mating on an M6 bolt, at a maximum of 10ft round trip length (5ft per terminal) per Any-Cell. See **6.7 Wiring Specification** and **6.10 Battery Terminal Connections** for more details. Always check with your local Authority Having Jurisdiction so you can most accurately comply with local regulation and wire

sizing requirements. Wires that are too thin and/or too long will result in excessive power loss and wire heating. Take caution and use best practice when determining the correct wire size and length for your application and expected loads.

6.3.1 Wall Mounting

- Wall anchors/concrete lags to fit 10mm diameter slots in the Wall Mount Rails (See **6.2 Packing List**)
For drywall and concrete wall mounting, only use anchors rated for the weight of the Any-Cell ($\geq 56\text{kg}$). At a minimum, 4 mounting points must be made with the wall. Mount on a vertical surface only.

6.3.2 Rack Mounting

- Standard 19" wide, ≥ 24 " deep Telecom rack
- 19" wide, ≥ 24 " deep Telecom rack shelf capable of holding the weight of the Any-Cell ($\geq 56\text{kg}$)
One shelf required per battery unit. See **9 Specifications** for more details on the Any-Cell size and weight.

6.3.3 Floor Mounting

- A method of setting the Any-Cell off the floor 6-12" to prevent water damage in the event of flooding. This can be accomplished with a short rack/table, either stationary or on locking casters. Mount only on a flat surface.

6.4 Installation Location

The Any-Cell ESS-L has an IP rating of IP20 when wall mounted, and IP54 when rack mounted. Therefore, we strongly recommend only using the Any-Cell ESS-L in indoor installations that meet the following criteria:

- The building is designed to withstand earthquakes
- The location is far away from the sea, to avoid salt water and humidity
- The floor is flat and level
- There are no flammable or explosive materials nearby
- The ambient temperature is between 15 and 30°C
- The temperature and humidity stay at a constant level
- There is minimal dust and dirt in the area
- There are no corrosive gases present, including ammonia and acid vapor



CAUTION: If the ambient temperature is outside the operating range, the Any-Cell ESS-L stops operating to protect itself. The optimal temperature range for the Any-Cell ESS-L is 15 °C to 30 °C. Frequent exposure to harsh temperatures may affect the performance and lifetime of the Any-Cell ESS-L.

6.5 Installation Options

The Any-Cell ESS-L can be installed in three configurations: mounted on the wall, in a rack, or on the floor.



WARNING: The Any-Cell contains hazardous levels of energy. Never work on a live circuit. When installing and connecting the Any-Cell, ensure that the BMS is powered OFF (button out, no lights on). Leave the terminal cover plate on while mounting. Never pierce or strike the Any-Cell housing.

6.5.1 Wall Mounting

When mounting an Any-Cell to a wall, first securely anchor the rails to the wall surface at the correct spacing. With two people, lift the Any-Cell into position and screw in x4 M6 Phillips Hex screws to the bottom of the unit through the holes in the rail. Attach the side support bracket to one side of the Any-Cell using x3 M6 Phillips Hex screws.

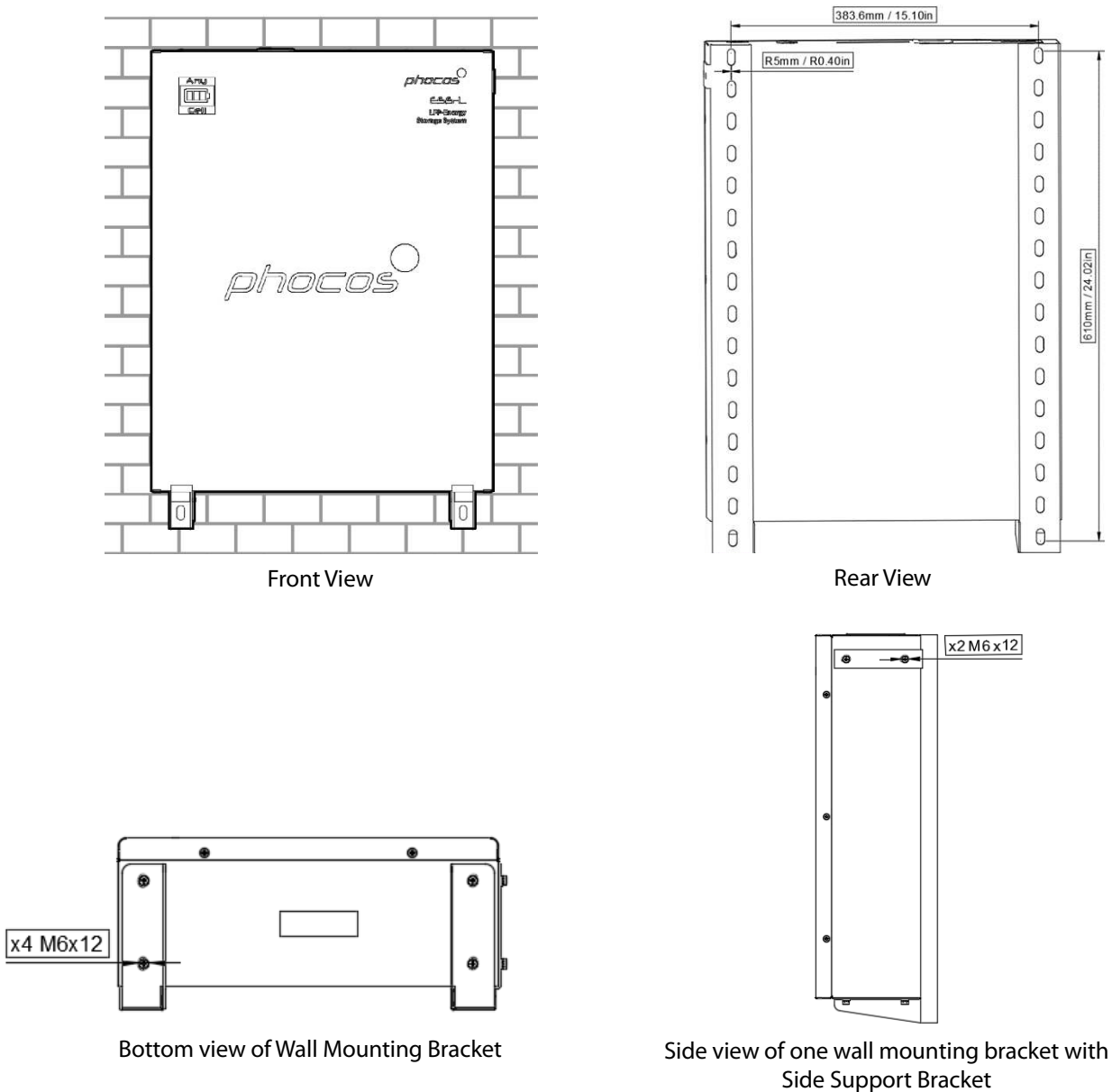


Figure 4.1: Illustration of wall mount installation

6.5.2 Rack Mounting

If mounting your Any-Cell(s) within a standard 19" telecom rack, first be sure that the shelves and rack are rated for the weight of the Any-Cell(s) you plan to install. If necessary, attach the two included rack mount brackets to the top of the Any-Cell (the face with the LED indicators) using x4 M6 T30 Screws, and secure these brackets to the front rails of the telecom rack. Always have two people move the Any-Cell.

The included rack mount brackets are not designed to support the weight of the Any-Cell. A shelf must be provided (not pictured below). Telecom rack screws are not provided. Use the hardware included with your telecom rack.

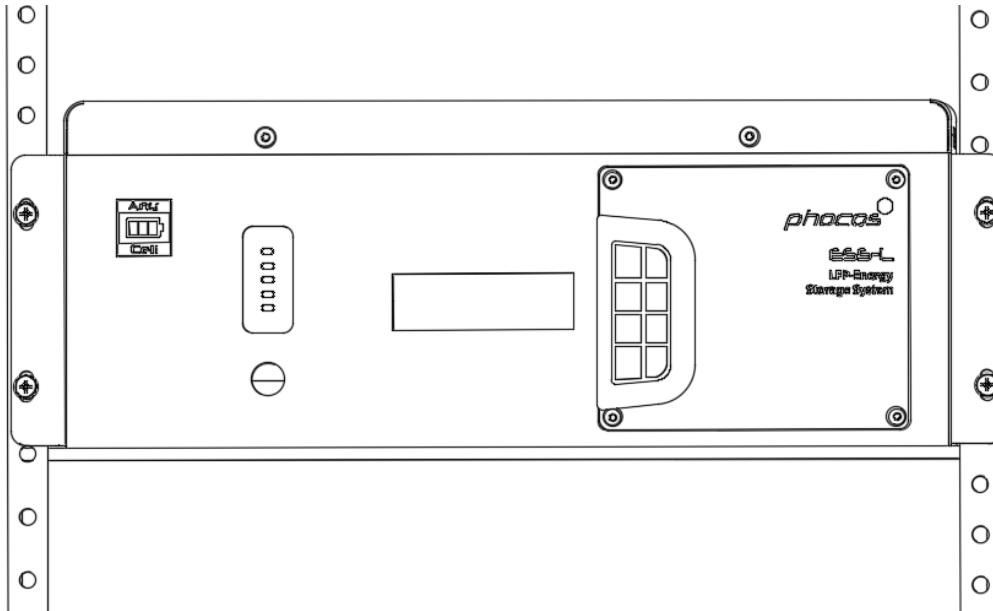


Figure 4.2: Illustration of Any-Cell ESS-L unit installed in a standard telecom rack using supplied Rack Mount Bracket

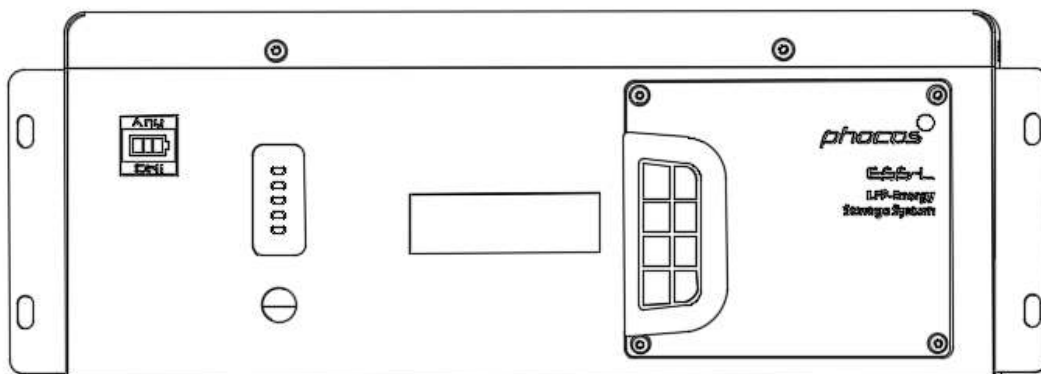


Figure 4.3: Illustration of Any-Cell ESS-L with included Rack Mount Brackets

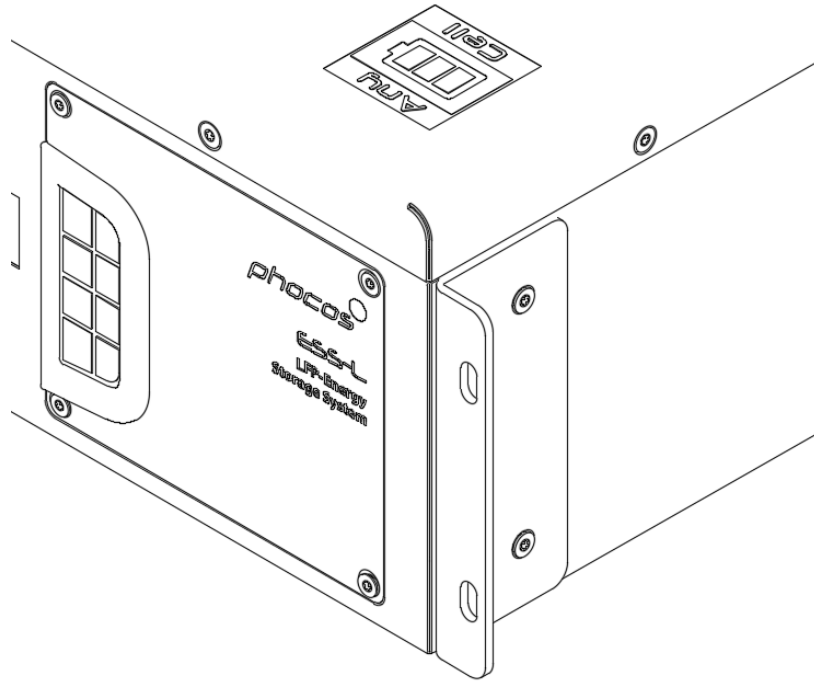


Figure 4.4: Correct placement of Rack Mount Brackets using included M6 T30 screws

6.5.3 Floor Mounting

For Floor mounting installations, please ensure that the Any-Cell is not at risk of water immersion due to flooding. The provided wall mounts may be incorporated into a table or stand on the ground or on wheels, or the installer/user may provide hardware to mount the Any-Cell directly to a table or mount. We highly recommend against mounting the Any-Cell on the floor of a basement where flooding may be common. If using a mobile floor mount or rack with casters, always provide a locking/immobilization method for when the Any-Cell(s) is connected and in use. Phocos cannot be held liable for damage to the Any-Cell based on location or method of mounting, or in the event of major flooding.

Custom mounting solutions are performed at the installers risk. Do not mount directly to the floor if in a basement or ground level.

6.6 Communication Connections

6.6.1 CANbus Communication

There are 2 ways to connect the Any-Cell ESS-L to the Any-Grid, depending on how many units need to be connected.

1. When connecting a single Any-Cell to an Any-Grid, CAN2 is used to communicate to the Any-Bridge, which is in turn connected to the Any-Grid over RS232.
2. When multiple Any-Cells are used in parallel, their CAN1 and CAN2 networks must be chained respectively through each battery (Example: CAN1 of units 1, 2, and 3 connected, and CAN2 of units 1, 2, and 3 connected) with the CAN2 port of one Any-Cell connected to the Any-Bridge.

In any configuration, CAN1 of any one Any-Cell is never to be connected to CAN2 of the same or any other Any-Cell. See the diagrams below (Section **6.8** and **6.9**) for more detail on these two configurations.

6.6.2 CANbus Termination - DIP Switches

For any configuration, the last Any-Cell connection to CAN2 must have its CAN2 DIP switch #2 set to ON. This is to ensure proper termination of the CANbus. The Any-Bridge CAN port has built in termination. Only one Any-Cell requires CAN 2 DIP switch #2 to be set to ON.

For configurations using more than one Any-Cell, the first and last Any-Cell connections to CAN1 must have their CAN1 DIP switches #2 set to ON. There should only be two CAN1 DIP switches with #2 set to ON. For more detail, please see the diagrams in **6.9 Connecting multiple Any-Cells to an Any-Grid**.

If you experience issues with the AB-PLC-CAN communication between the Any-Cell and Any-Grid, please check CANbus termination.



WARNING: Never work on a live circuit. When installing and connecting the Any-Cell, ensure that the BMS is powered OFF (button out, no lights on). Additionally, ensure the Any-Grid is de-energized and disconnected from all other power sources (Grid and PV). Electrical installation should only be performed by a qualified electrical technician.

6.7 Wiring Specification

The following specifications are required for wires and cables used to connect the Any-Cell ESS-L to other systems.

Battery Wires	CANbus Communication Cable(s)	Remote BMS Power Switch Wires
<p>It is recommended to use 2-4AWG / 25-35mm² of a conductor with double insulation, crimped with M6 sized ring terminals rated for the same wire size. Maximum 10ft round trip (per battery unit)*</p> <p>These will connect the Any-Cell to the Any-Grid inverter for charging/discharging.</p>	<p>It is recommended to use standard 8P8C communication cables length up to 10ft, i.e., the provided CAT5e 1:1 patch cables.</p> <p>These will provide a communication link between the Any-Cell(s) and the Any-Bridge, which in turn communicates to the Any-Grid inverter.</p>	<p>If using this optional feature, it is recommended to use 0.5 mm² of insulated wire up to 20ft round trip</p> <p>These will provide a connection to an optional remote switch for powering on the Any-Cell BMS.</p> <p>(See 7.2 Remote Switch Option)</p>

*Wire lengths should be minimized for maximum performance and least loss.

After mounting and physically installing your Any-Cell(s), we recommend first connecting the necessary communication cables between with the Any-Grid and the Any-Bridge. First remove the terminal cover plate using the provided T15 Tool.

Please visit www.phocos.com to access the setup manual for the Any-Bridge AB-PLC-CAN gateway device. Please download the latest “PhocosLink Mobile” App from the Google Play™ store or Apple’s App Store® with an Android™ or iOS device, respectively.

The Any-Cell will not communicate with the Any-Grid without an accompanying Any-Bridge. Please contact Phocos or your distributor if you experience difficulties setting up your Wi-Fi or BLE connection.

6.8 Connecting a single Any-Cell to an Any-Grid

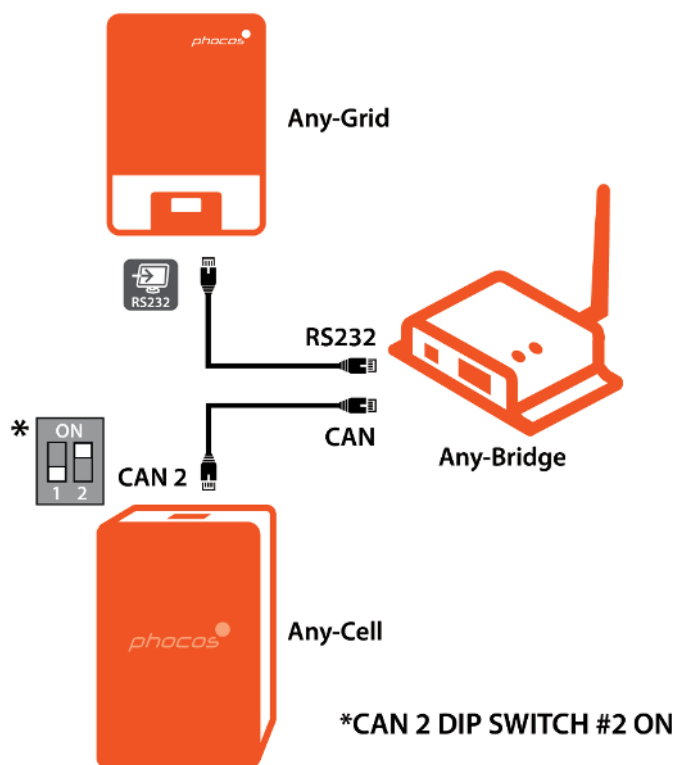


Figure 3.1: Connecting a single Any-Cell to an Any-Grid

Any-Cell CAN2 is connected to the Any-Bridge CAN port with a communication cable. No connections to CAN1 are necessary when using a single Any-Cell unit. Notice that the CAN2 DIP switch #2 is set to ON.

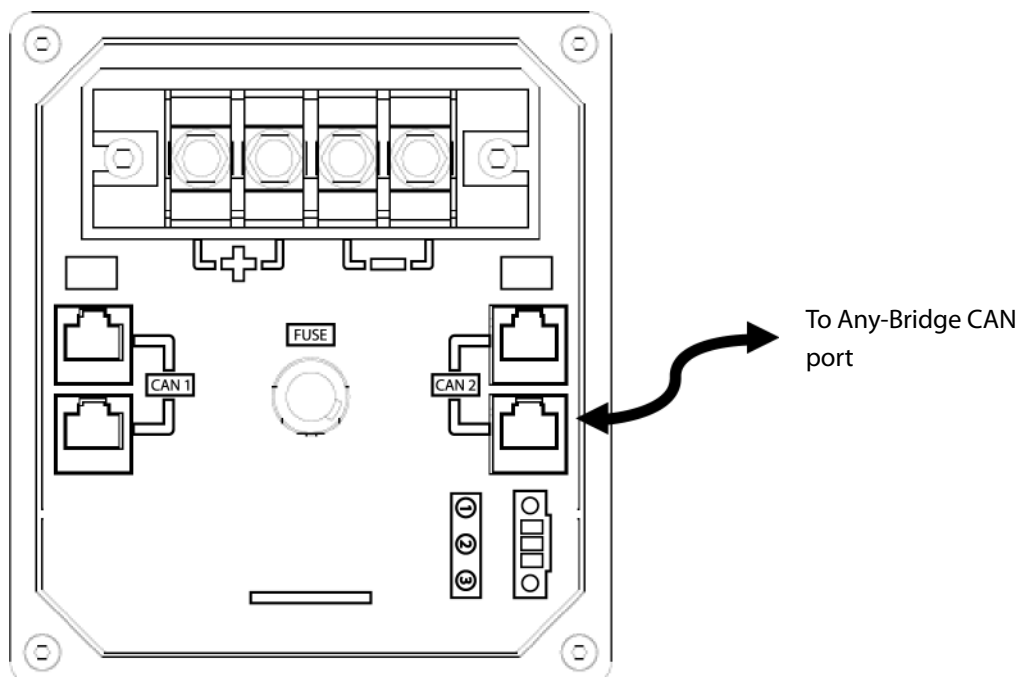


Figure 3.2: CAN communication wiring, single Any-Cell

6.9 Connecting multiple Any-Cells to an Any-Grid

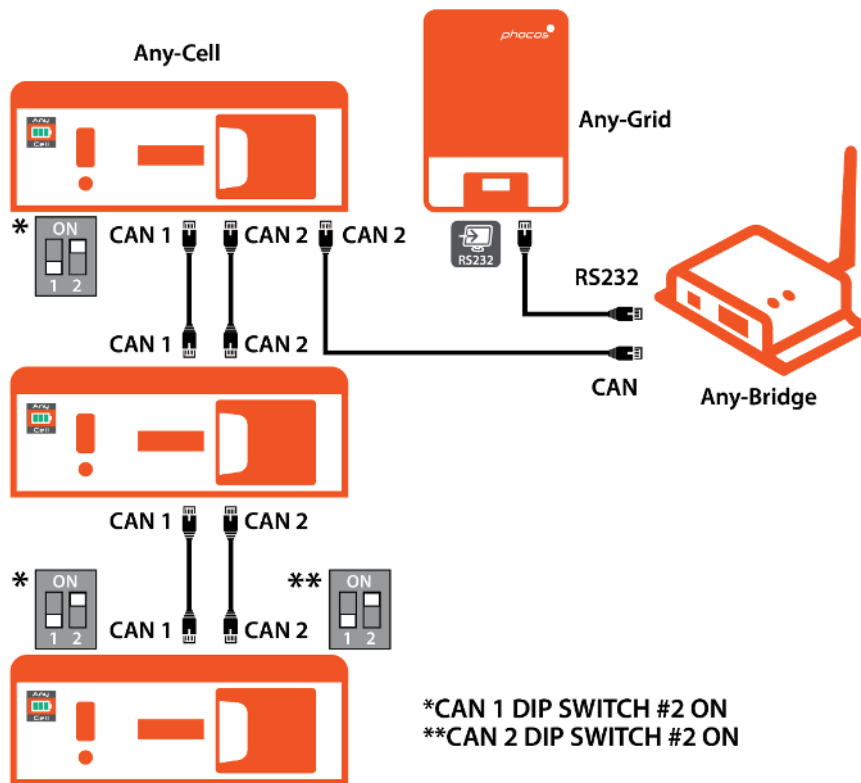


Figure 4.1: Connecting multiple Any-Cells to an Any-Grid

When connecting more than one battery unit in parallel to an Any-Grid, the CAN1 must be connected across all batteries. CAN2 must be connected across all batteries and to the Any-Bridge. Notice that only the first and last Any-Cell have CAN1 DIP switch #2 set to ON, and only the last Any-Cell has the CAN2 DIP switch #2 set to ON.

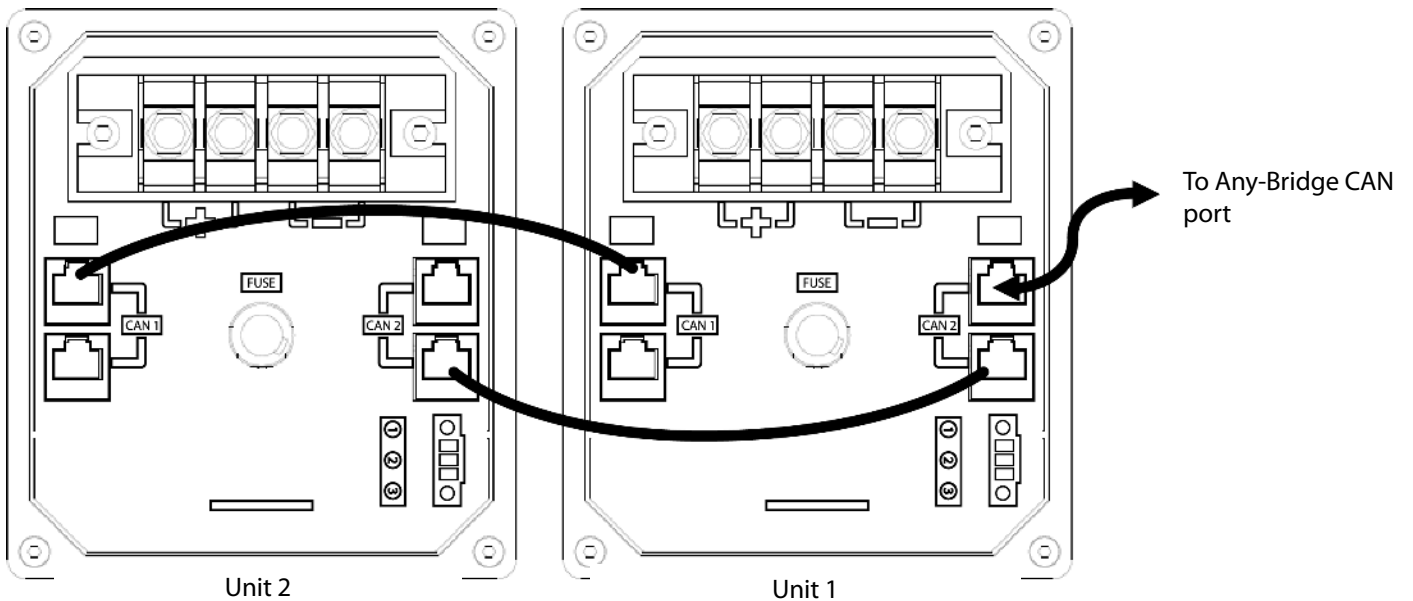


Figure 4.2: CAN communication wiring, multiple Any-Cells

6.10 Battery Terminal Connections

Please see the following diagram for details regarding the battery terminal connection. Be sure to use properly sized wires for battery wiring. See the wiring specifications table in **6.7 Wiring Specification** above for wiring gauge and ring terminal sizing recommendation. Always consult local guidelines and regulations to ensure you meet the requirements for the installation location. Always minimize the length of battery wires and place the Any-Cell as close as possible to the Any-Grid.



WARNING: Never work on a live circuit. When installing battery terminal connections to the Any-Cell, ensure that the BMS is powered OFF (button out, no lights on). Additionally, ensure the Any-Grid is de-energized and disconnected from all other power sources (Grid and PV). Electrical installation should only be performed by a qualified electrical technician.

When multiple Any-Cells are used in parallel, the installer will need to take care in routing the current path through appropriately sized conductors. Please refer to best practice for wiring batteries in parallel to ensure all batteries are kept balanced. Always make positive and negative connections at opposite ends of the parallel chain – failure to do so could result in battery units at different States of Charge. Always use equal lengths of wire to connect battery units. Alternatively, use two bus bars and equal length battery wires to connect all battery terminals to a common positive and common negative electrode, which are then connected to the Any-Grid. Each Any-Cell terminal should be protected by a DC breaker or fuse of the appropriate size and rating.

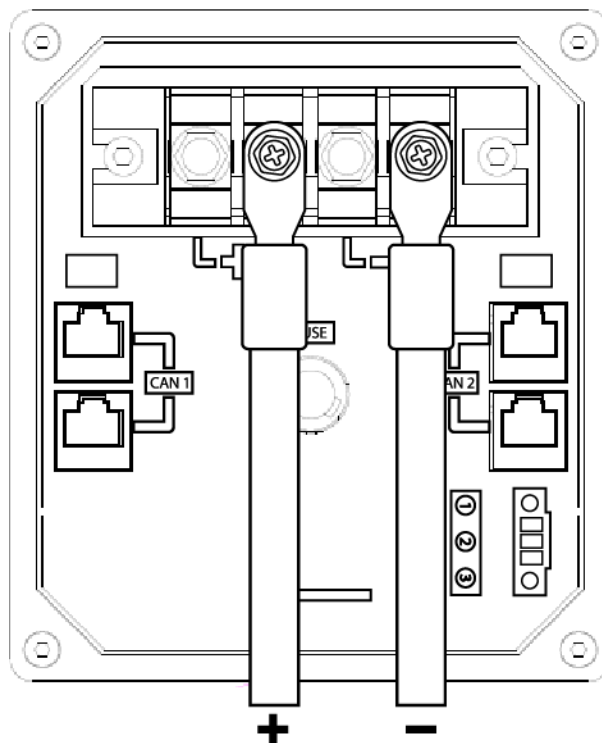


Figure 5.1: Battery Terminal Connections

The battery terminal connections should be torqued to **4.4-5.2 Nm / 3.3-3.8 lb-ft** using either an insulated #3 Phillips head screwdriver or 10mm socket wrench. Failure to properly torque battery terminal connections could result in increased contact resistance (under-torque), or damaged terminals (over-torque), and will void the warranty.

7.0 Operation

At any point in time, the Any-Cell output may be enabled/disabled at the press of a button. When the BMS is powered off, the external terminals will be disconnected from the battery cells. In this state, no energy can be transferred to or from the Any-Cell. There are two options to power on the Any-Cell ESS-L BMS to enable charging and discharging:

7.1 Option A – Default BMS Power Switch

From the factory, a small red jumper is installed between PIN2 and PIN3 of the remote port. When configured this way, simply press the metal button below the LED indicators to power on the Any-Cell BMS to enable charging and discharging. The Any-Cell ESS-L will power up within 25 seconds.

7.2 Option B – Remote BMS Power Switch Option

The built-in power button can be bypassed and replaced with a user provided switch or relay. With the system disconnected and off, remove the remote port connector (green screw contact) using a small flathead screwdriver. Remove the red jumper that is between PIN2 and PIN3. Install a switch between PIN1 and PIN2 on the Remote port (See **6.7 Wiring Specification** for details). Reinstall the remote port connector within the Remote port. When the remote switch is closed, the Any-Cell ESS-L will power up within 25 seconds.

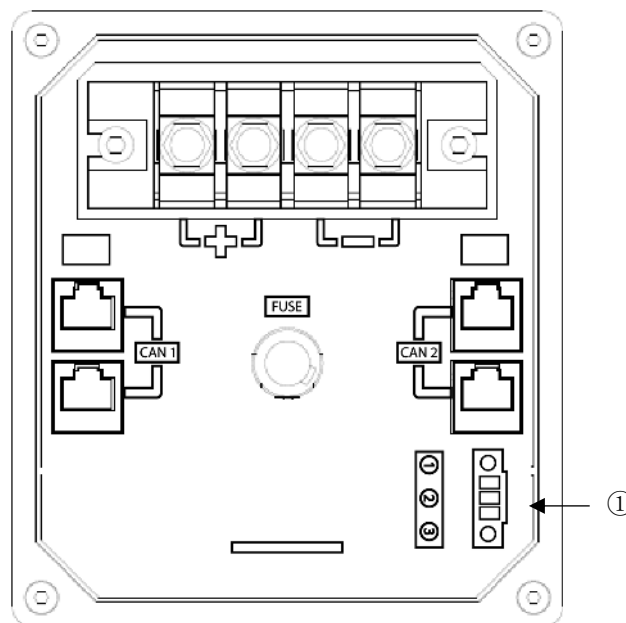


Figure 3: Remote port

Number	Name
①	Remote port

After communication cables, battery wires (and the optional remote switch) are all installed, the Any-Cell is ready to be enabled by powering on the internal BMS. We strongly recommend double checking that proper polarity is achieved and that good continuity is established through all points of high current contact.

The terminal cover plate(s) may be reinstalled on the Any-Cell(s) wiring port.



CAUTION: A reverse polarity connection will damage the Any-Grid inverter.

7.3 System Startup with Any-Grid

After carefully reviewing and following the steps above to setup your Any-Cell configuration, leave the Any-Grid de-energized from external power sources (PV and Grid). Disconnect any AC loads from the inverter output, so that the Any-Cell is the only load/source electrically connected to the Any-Grid.

7.3.1 Battery Test:

1. Press the BMS power button(s) OR close the optional remote switch(es), if installed. Do this for all installed Any-Cells.
2. The BMS(s) will power up within 25 seconds. During this time, the white LED ring around the power button will illuminate, and the SOC indicators will light.
3. An audible “click” should be heard, indicating the safety isolation relay has closed.
4. Press the Any-Grid AC load ON switch, if not already pressed in.
5. The Any-Grid will detect the battery voltage and boot up. The display should power up in 10 seconds.
6. Using the arrows on the Any-Grid display, scroll to the battery voltage. Ensure that it reads between 50V and 55V.
7. Continue to **7.3.2 Any-Bridge Setup** below. Ensure that AC loads remain disconnected until the Any-Bridge has been commissioned. Do not continue if a voltage outside of 50-55V is detected.

7.3.2 Any-Bridge Setup:

1. After the Any-Grid powers on, the Any-Bridge will receive power over RS232 and the indicators should begin to blink. See your Any-Bridge manual for details. Do not disconnect the RS232 cable while the Any-Grid is powered on. This may damage the remote display and/or the Any-Bridge.
 - a) Within 2 minutes, the Any-Bridge will update the Any-Grid with information from the connected Any-Cell. If Grid or PV is connected, the Any-Cell will begin to charge.
2. Recommended: Download and open the PhocosLink Mobile app on your mobile device. Ensure BLE is enabled on your device. Pair to your Any-Bridge with the PhocosLink Mobile App. You may need to refresh the BLE search screen. Follow the steps in the Any-Bridge manual to connect your Any- system to Wi-Fi and the PhocosLink Cloud. You may then disconnect and close the app.

3. The Any-Bridge will monitor your Any-Cell and configure the Any-Grid battery settings automatically. You know this has been successful if the Any-Cell does not enter Safety Shutoff mode after 5 minutes.
4. You may now switch back on AC loads and use your system normally.

Contact your installer, distributor, or Phocos if you are unable to complete any of the steps above.

7.4 Safety Shutoff Feature

If communication between the Any-Cell and the Any-Bridge is lost for more than 5 minutes, the BMS will enter a safety shutoff mode, preventing any discharging or charging of the battery. This state can be identified if the power button/remote switch is in the ON position and all LED indicators are OFF. The BMS will automatically reenables its output when the communication link is reestablished – this may take up to five minutes after the Any-Bridge has powered back on. Always power off the BMS if the Any-Cell will be stored for long periods of time without an active communication link with a powered Any-Bridge. Failure to do so could result in reduction of pack life.

When first installing the Any-Cell and AB-PLC-CAN, check that the BMS has not entered safety shutoff mode after 5 minutes of operation. Check all CANbus connections if the Any-Cell will not stay on for longer than 5 minutes. Restart the Any-Grid (remove all power sources until the display powers down, then reapply power) if unsuccessful.

8.0 Troubleshooting

8.1 Any-Cell Warnings

Check the warning indicator on the front of the unit to determine the state of the Any-Cell ESS-L. A warning state is triggered when voltage, current, or temperature, is beyond the limitation set by the Any-Cell BMS. The Any-Cell ESS-L unit's BMS periodically reports its operating state to the Any-Bridge. When a warning is reported, the Any-Grid immediately ceases charging or discharging from the battery. The possible warning conditions are as follows:

8.1.1 Battery Over Voltage

Likely Cause – Charging Voltage set too high / Communication error with Any-Grid

Solution – Check that AB-PLC is connected properly, on, and operating correctly. Power cycle the Any-Grid.

8.1.2 Battery Under Voltage

Likely Cause – Battery discharged past lower limit / Communication error with Any-Grid

Solution – Check that AB-PLC is on and operating correctly. Power cycle the Any-Grid. Provide AC/PV power and allow battery to charge.

8.1.3 Battery Over Temperature

Likely Cause – Ambient temperature too high

Solution – Ensure that installation location is suitable. Provide cooling to installation location

8.1.4 Battery Under Temperature

Likely Cause – Ambient temperature too low

Solution – Ensure that installation location is suitable. Provide heating to installation location

8.1.5 Battery Discharge Over Current

Likely Cause – Discharge Current set too high / Communication error with Any-Grid

Solution – Check that AB-PLC is connected properly, on, and operating correctly. Power cycle the Any-Grid.

8.1.6 Battery Charge Over Current

Likely Cause – Charge Current set too high / Communication error with Any-Grid

Solution - Check that AB-PLC is connected properly, on, and operating correctly. Power cycle the Any-Grid.

The error state is cleared when the Any-Cell ESS-L recovers and returns to normal operation. The yellow warning light should stop blinking and return to solid.

8.2 General Issues

Most Any-Cell issues will arise from communications failure with the Any-Bridge and/or Any-Grid. If the Any-Cell is not operating as expected, or is stuck in safety shutoff mode (See **7.4 Safety Shutoff Feature**), double check that all communication cables between the Any-Cell(s), Any-Bridge, and Any-Grid are connected, and that the Any-Bridge is ON and seen in the PhocosLink Mobile app. If the problem persists, please contact your distributor or Phocos.

9.0 Specifications

Type	ESS-L-5kWh-48V
Chemistry	LiFePO4 / LFP
Nominal Voltage	51.2 V
System Voltage	48 Vdc
Capacity (kWh)	5.12 kWh*
Capacity (Ah)	100 Ah
Max. Discharge	100 A
Peak Discharge	200 A
Max. Charge	75A
Max DoD	90%
Usable Voltage Range	50.1 V to 54.8 V
Cycle Life (@ 25 °C)	> 6,000 Cycles @ 90% DoD
Extensibility	Up to 8 batteries in parallel
Idle Self-Consumption	< 3 W continuous
Ambient Temperature	-10 to +50 °C / +14 to +122 °F
Storage Temperature	-30 to +60 °C / -22 to +140 °F
Max. Altitude	2,000 m
Humidity	5% to 95%
Communication	CANbus
Dimensions (WxHxD)	440 x 595 x 172 +/-2 mm / 17.3 x 23.4 x 6.8 in (without bracket)
Weight	56 kg / 123.5 lbs.
Mounting	Wall or rack mount (wall mount hardware included)
Ingress Protection	IP20**
Certificates	UL 1642, UL1973, IEC 62619, UN38.3, CE, RoHS
Warranty	10 years***

*Total capacity assumes a full charge cycle for properly balanced cells.

**IP20 applies when wall mounted, IP54 applies when rack mounted.

***Per Phocos warranty conditions. See **10.1 Conditions** below.

10.0 Warranty

10.1 Conditions

A limited warranty is provided for the Any-Cell ESS-L covering quality defects and performance under qualifying conditions including type and length of operation.

Details of our warranty conditions can be found at www.phocos.com.

10.2 Liability Exclusion

The manufacturer shall not be liable for damages, especially on the battery, caused by use other than as intended or as mentioned in this manual or if the recommendations of the battery manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, unusual use, wrong installation, or incorrect system design.

Phocos is not liable if:

- If the Any-Cell is opened
- If the BMS is somehow bypassed
- If the Any-Cell has burnt/damaged terminals due to:
 - Higher discharge currents than limits of the battery
 - Improper cable installation
 - Improper cable gauge
 - Improper cable torque

Specifications are subject to change without notice.

Version: 20230206

Made in China

Phocos AG

Magirus-Deutz-Str. 12

89077 Ulm, Germany

Phone +49 731 9380688-0

Fax +49 731 9380688-50

www.phocos.com

info@phocos.com

