



EndurEnergy Systems, Inc.



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ESP-BCU HL

User Manual



EndurEnergy Systems, Inc.



About this manual

This manual is meant for the Battery Control Unit: ESP-BCU HL. This product is designed to enhance the capacity of energy storage systems. It is suitable for residential, commercial, and small industrial applications. The ESP-BCU HL supports multiple communication methods, including CAN, RS485, RS232, and Internet communication protocols.

Declaration

EndurEnergy declares that the ESP-BCU HL is compliant with the requirements of the RE Directive 2014/53/EU.

Disclaimer

EndurEnergy cannot be responsible for system failure, damage, or injury resulting from improper installation of their products. The information included in this manual is subject to change without notice.

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1 Safety Introduction

1.1 Important Safety Instructions

This manual contains crucial instructions for the **ESP-BCU HL product**. **It is imperative to follow this manual during installation and use of the product.**








While this product is designed and tested to meet international safety requirements such as IEC 62040, and IEC 62619, it is essential to take certain precautions when installing and/or operating any electrical and electronic equipment.

To minimize the risk of personal injury and ensure the safe installation and operation of the product, it is crucial to thoroughly read and adhere to all instructions, cautions, and warnings provided in this manual.

WARNING
<p>Failure to follow the instructions or warnings in this document can result in electrical shock, serious injury, or death. Damage to the Battery Control Unit is also possible, potentially rendering it inoperable.</p> <p>ONLY qualified personnel should install the ESP-BCU HL.</p>

1.2 Warnings in this Document

A warning indicates a potential hazard to equipment or personnel. It highlights procedures or practices that, if not performed correctly, may result in damage to or destruction of the equipment, other connected equipment, or personal injury.

Symbol	Description
	Caution, risk of electric shock
	Heavy enough may cause severe injury
	Keep the battery away from open flame or ignition sources
	Keep the battery away from children
	Dispose of waste batteries according to local laws and regulations
	Recycling
	Read this manual before installation and operation



For safety reasons, it is the responsibility of installers to thoroughly review the contents of this manual and familiarize themselves with all warnings prior to performing the installation.

1.3 Battery Control Unit Handling Guide

Please follow the guidelines below to ensure safe handling and usage of the battery control unit:

- Use the battery control unit only as directed.
- If the battery control unit appears cracked, broken, damaged, or fails to operate, immediately contact EndurEnergy hot line at 1-888-E2-ENDUR (1-888-323-6387).
- Do not attempt to open, disassemble, repair, tamper with, or modify the battery in any way.
- The battery control unit is not suitable for users to handle independently.
- When transporting the battery control unit, handle it with care to protect the battery control unit and its components from damage.
- Avoid subjecting the battery control unit to any strong force or impact.
- Do not insert foreign objects into any part of the battery control unit.
- Refrain from using cleaning solvents to clean the battery control unit.
- Never connect the battery control unit directly to a SELV (Separated Extra-Low Voltage) circuit.

1.4 Response to Emergency Situations

While the ESP-BCU HL is equipped with multiple safety features to prevent hazards caused by failures, it is important to note that EndurEnergy cannot guarantee absolute safety in uncertain situations.

1.4.1 Leaking Batteries

The ESP-BCU HL includes an auxiliary battery to maintain operation in the absence of an alternate power source. In case of electrolyte leakage from the auxiliary battery, it's imperative to prevent any contact with the leaked liquid or gas. Electrolyte possesses corrosive properties and can result in skin irritation and chemical burns. Should you come into contact with the leaked substance, please take the following steps:

- Inhalation:
 - Evacuate the contaminated area immediately.
 - Seek medical attention without delay.

- Eye contact:
 - Rinse your eyes with flowing water for at least 15 minutes.
 - Seek medical attention promptly.
- Skin contact:
 - Wash the affected area thoroughly with soap and water.
 - Seek medical attention as soon as possible.
- Ingestion:
 - If the electrolyte is ingested, promptly induce vomiting.
 - Seek immediate medical attention.

The previous instructions are provided to address potential risks associated with electrolyte leakage. It is important to prioritize your safety and seek professional medical assistance without delay in case of exposure to the leaked substance.

1.4.2 Fire

In the event of a fire, it is important to have an ABC or carbon dioxide extinguisher readily available. Do not use water to extinguish the



fire.

WARNING

The auxiliary battery may catch fire when heated above 150°

If a fire breaks out where the battery control unit is installed, please follow these actions:

- Prioritize extinguishing the fire before the battery catches fire if it is safe to do so. Use appropriate fire extinguishing methods and equipment according to the type of fire (e.g., ABC or carbon dioxide extinguisher). Ensure your safety and consider seeking professional assistance if necessary.
- If the battery control unit has already caught fire or if it is not safe to attempt extinguishing the fire, prioritize the immediate evacuation of all individuals from the area. Follow established emergency evacuation procedures and ensure everyone moves to a safe location. Contact the appropriate emergency services to report the fire.

Note: The above actions are intended to address fire situations where the battery is involved. Always prioritize personal safety and adhere to established emergency procedures.

WARNING
If the battery control unit catches fire, it will produce poisonous gases. Do not approach.

1.4.3 Wet Unit

If the battery control unit becomes wet or submerged in water, do not attempt to access it. Instead, please contact EndurEnergy Customer Service or reach out to your distributor for immediate technical assistance.

1.4.4 Damaged Battery Control Unit

If you notice any damage to the battery control unit, please contact EndurEnergy customer service or your distributor for assistance as soon as possible. It is crucial to handle a damaged battery control unit with extreme caution, as it can be dangerous. A damaged battery control unit is not suitable for use and may pose a risk to people and property. If you suspect the battery control unit is damaged, promptly return it to EndurEnergy or your distributor.

CAUTION
A damaged battery control unit may release electrolyte or flammable gas. Additionally, please note that a damaged battery control unit can adversely affect the functionality of connected batteries, potentially causing damage to them.

1.5 Installers

It is highly recommended that the installation of the ESP-BCU HL is carried out by a skilled worker or electrician. A skilled worker is defined as an individual who has received proper training and possesses the necessary qualifications as an electrician, or has acquired the following skills and experience:

- Comprehensive knowledge of the functional principles and operation of on-grid Energy Storage systems.



- Understanding of the potential dangers and risks associated with the installation and use of electrical devices, as well as familiarity with acceptable mitigation methods.
- Proficiency in the installation of electrical devices.
- Familiarity with and adherence to the instructions provided in this manual, including all safety precautions and best practices.

1.6 Disposing

When dealing with scrap battery(-ies), it is important to comply with local laws and regulations regarding the recycling or disposal of batteries. Please ensure that you follow the appropriate procedures as outlined by your local authorities for recycling or disposing of Lithium Iron Phosphate batteries.

1.7 Contact Information

For technical assistance, please use the contacts provided. Please note that the phone numbers are available for assistance during business hours on weekdays.

Customer careline	1-888-E2-ENDUR (1-888-323-6387)
Email	support@endurenergy.com

2 Guidance for Disconnection During Shipment

- The ESP-BCU HL is not suitable for air transport.
- Cartons that have been crushed, punctured, or torn in such a way that the contents are revealed shall be set aside in an isolated area and inspected by a skilled person. If the package is deemed to be non-shippable, the contents shall be promptly collected, segregated, and either the consignor or consignee should be contacted.
- The AC circuit of the ESP-BCU HL has been disconnected and turned off prior to shipping.
- We have conducted comprehensive tests to ensure that the equipment distributed worldwide is safe for shipping. These products should be handled with care and immediately inspected if visibly damaged. If the carton is visibly damaged, please contact EndurEnergy customer service to confirm whether the battery control unit can be used safely or not.

3 Product Introduction

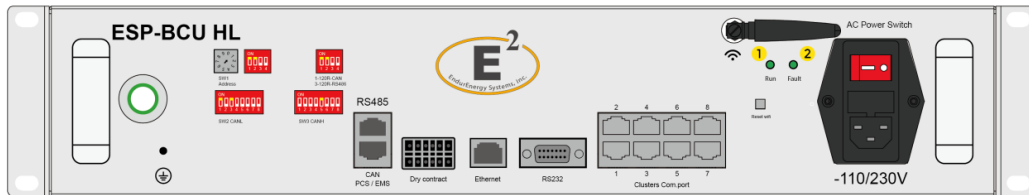
3.1 Technical Specifications

Product Model	ESP-BCU HL
Port Power	40 W
Power Supply	13-17 VDC / Backup battery
Nominal Discharge/Charge Power	15 W
UPS Rated Capacity	15 Ah
UPS Nominal Current	2 A
UPS Power Supply	12 V
Communication Protocols	CAN / RS485 / Internet
Communication Method	Protocol & Baud rate: Depend on Inverter
Protective Mode	Dual hardware protection
UPS working temperature	0-45 °C 32-113 °F
Port Temperature (Working)	-20-65 °C -4-149 °F
Port Temperature (Storage)	-30-70 °C -22-158 °F
WiFi Frequency Range	2400 MHz-2483 MHz
IP Rating	IP20
Protective Class	I
Max. Number of Parallel Connections	4
Dimensions	442 x 300 x 89 mm 17.4 x 11.8 x 3.5 inch
Weight	5 kg 11.2 lb
Cooling Type	Natural cooling
Case Material	Steel
Color	White
Installation	Rack / Enclosure / Ground
Protections	Over-current/Over-voltage/Short circuit/ Under-voltage/Over temperature
Hazardous Material Classification	9
Warranty	10-Year
Lifespan	> 15 years

3.2 Indicators and Ports

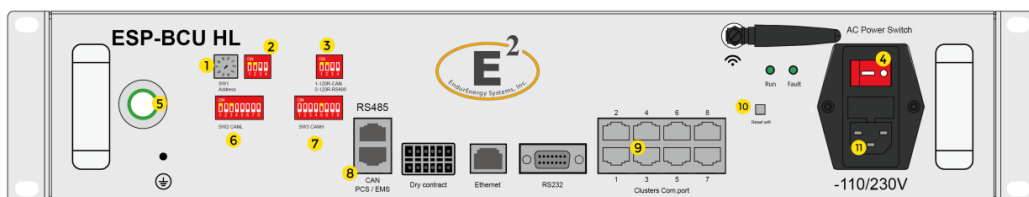
3.2.1 Indicators

There are two LED indicators on the front of the battery control unit that show its operating status.



Item	Designation	Definition
1	Run	Steady: The battery control unit is working normally. Blinking: Reset Button pressed, expecting Wi-Fi connection from App.
2	Fault	There are failures or issues with the battery control unit. See troubleshooting or contact EndurEnergy Tech Support.

3.2.2 Ports and Communication Interface



Designation	Image Number	Definition
Power Button	5	The power button on the Battery Control Unit (BCU) serves to control the unit's operational status. When the BCU is turned on, a green indicator light will illuminate, signaling that the unit is active and operational. Conversely, if the green light is not illuminated, it indicates that the BCU is turned off and not currently functioning.

SW 1	1 and 2	This is a combination of two DIP switches: one rotary DIP switch and one slide DIP switch. Both switches are used according to the number of batteries, and the battery clusters.
CAN/RS485 Switch	3	The DIP switch is used to select the communication mode used between the BCU and the inverter, you can set it to CAN or RS485. Please refer to the inverter's user manual for detailed instructions. <ul style="list-style-type: none"> • For CAN Communication, set SW1 to positions 1 and 2. • For RS485 Communication, set SW1 to positions 3 and 4.
SW 2	6	Used for communication between the battery control unit and the inverter, either through CAN Low or RS485B communication. Please refer to the inverter's user manual for detailed instructions.
SW 3	7	Used for communication between the battery control unit and the inverter, either through CAN High or RS485A communication. Please refer to the inverter's user manual for detailed instructions.
PCS / EMS	8	Used for communication between the battery control unit and the inverter: <ul style="list-style-type: none"> • For CAN Communication, use the bottom port. • For RS485 Communication, use the upper port.
Clusters Communication Port	9	Ethernet ports used for communication between the battery control unit and the battery clusters. Use one port for each battery cluster.
Reset	10	Used to reset the Wi-Fi or GPPS/GPS module configuration.
AC Power Switch	4	Control mechanism designed to manage the electrical power supply to a device. When the switch is in the "On" position, it enables the flow of alternating current (AC) electricity to the battery control unit.

		Conversely, when the AC Power Switch is in the "Off" position, it interrupts the flow of AC electricity to the battery control unit.
AC Power Socket	11	Power cable connection designed to deliver alternating current (AC) electrical power to the battery control unit. Connect this input to an AC outlet to provide energy to the BCU. If not connected the internal battery will drain and stop working after 3 hours.

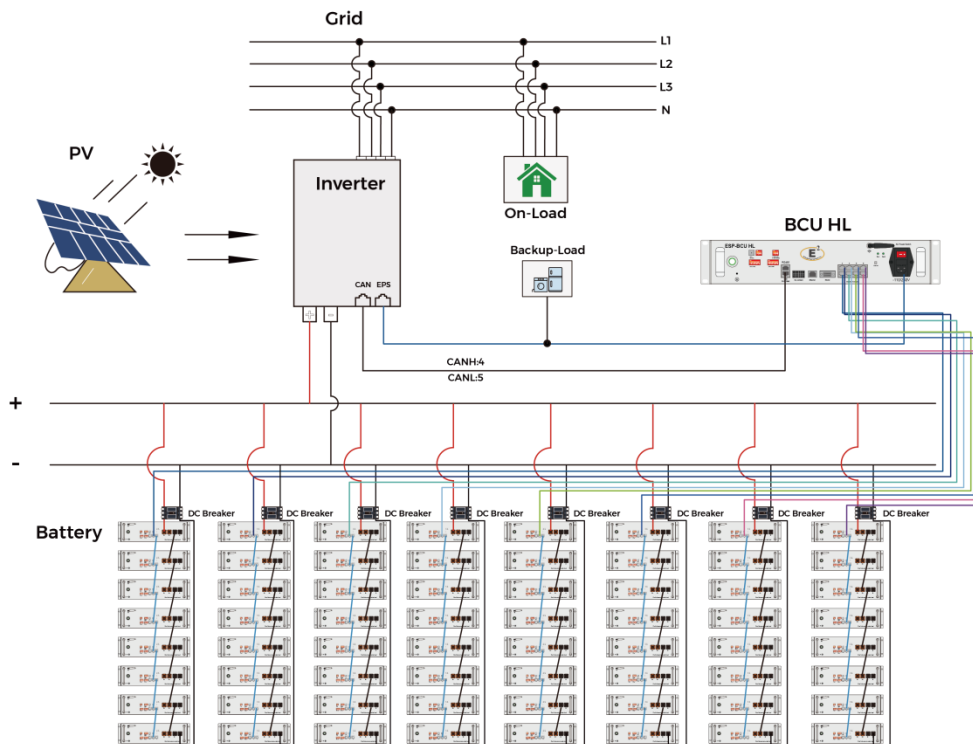
Note: Dry contact terminals and RS232 are not used for the installation, configuration, or connection of the battery clusters.

NOTICE

The battery control unit is designed to work on a close loop environment for communicating with compatible inverter (check inverter compatibility list), for open loop type of applications we do not ensure proper operation and not encourage it.

If you intend to use the battery control unit on an open loop application or not supported inverter, call our technical support.

3.3 System Layout



3.4 Feature

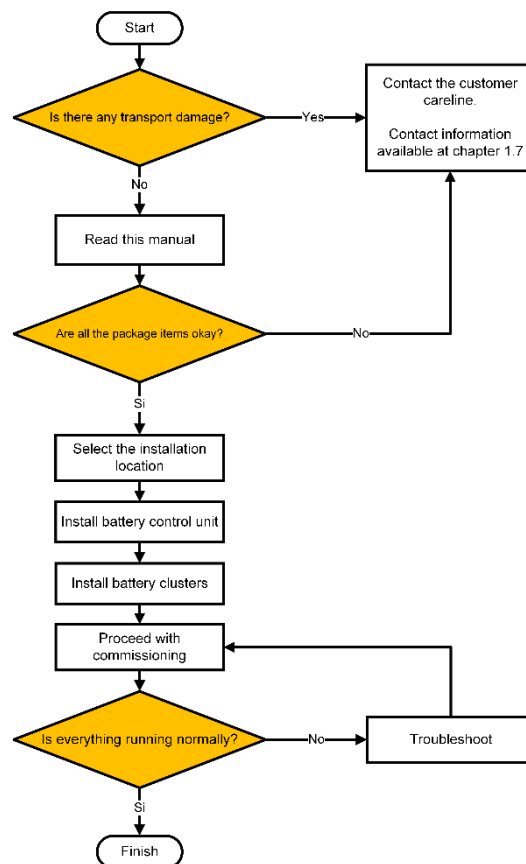
This product is designed to enhance the capacity of energy storage systems. It is suitable for residential, commercial, and small industrial applications. The ESP-BCU HL has the following features:

- **Support for Multi-Cluster Batteries:** This unit enables seamless connectivity for multi-cluster batteries, both in series and parallel configurations.
- **Capacity for Single Cluster Batteries:** The ESP-BCU HL has the capability to support up to sixteen batteries in a single cluster, effortlessly connected in either series or parallel configurations.
- **Versatility for Multi-Cluster Batteries:** Experience flexibility like never before as this product empowers you to link up to eight-cluster batteries in configurations of series or parallel, further expanding your energy storage options.

4 Installation Prerequisites

4.1 Installation Process

The battery should be installed according to the following flowchart. The detailed installation process is described in Section Battery [Installation](#).



4.2 Installation Location

Ensure that the installation location meets the following conditions:

- The building is designed to withstand earthquakes as per the building code (when applicable).
- It is far away from the sea to avoid saltwater and humidity.
- The floor is flat and level.
- There are no flammable or explosive materials nearby.
- The optimal ambient temperature is between 15°C and 30°C.
- The temperature and humidity remain at a constant level.
- There is minimal dust and dirt in the area.
- There are no corrosive gases present, including ammonia and acid vapor.
- The battery and racks are rated IP20, indicating that they are suitable for indoor use, if required to be placed outside it will require an enclosure or cabinet.

If the ambient temperature is outside the operating range, the battery control unit will protect itself by shutting down. The optimal operating temperature for the battery is 15°C to 30°C. Frequent exposure to severe operating conditions would negatively affect the performance and lifespan of the battery.

4.3 Tools

To install the battery control unit, the following tools are required:

			
Flat-head & Phillips Screwdriver	Torque wrench	Cable crimper	Wire clamp
			
Voltmeter	Measuring tape	Drill	Bubble Level

To ensure the safety of the operator and installer, please select and use suitable tools and measuring instruments that are certified for precision and accuracy.

4.4 Personal protective equipment (PPE)

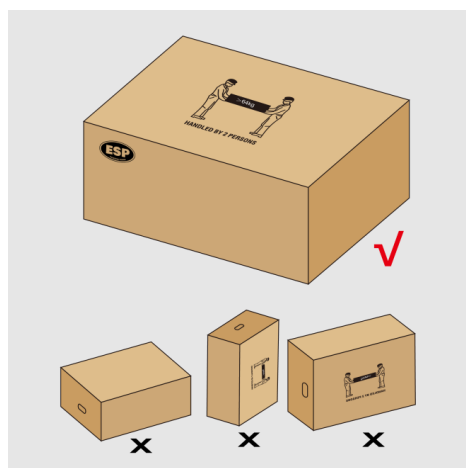
When handling the battery control unit, the following safety gear should be worn. Installers must comply with the relevant requirements of UL1973, IEC 62040, and IEC 62619, or applicable domestic legislation and other relevant international standards.



4.5 Storage

If the battery control unit is not going to be installed immediately and needs to be stored for a long period, please choose an appropriate location for storage. Follow these instructions for storage:





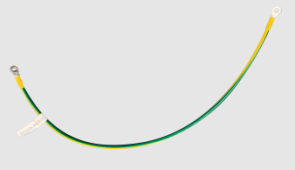

- Do not stack more than four boxes.
- The recommended storage temperature for the battery control unit is in the range of -20°C to 30°C.
- Avoid exposing the battery control unit to water.
- If the battery control unit needs to be stored for over 3 months, the auxiliary battery will discharge at a minimum rate and the capacity may degrade depending on the storage time.
- The boxes should be stored upright as shown in the following figure and should not be stacked upside down.



5 Battery Installation

5.1 Package Items

You will receive one packing carton containing the batteries. The items included are summarized as follows:

		
1 x ESP-BCU HL	1 x User Manual	1 x Warranty Letter
		
1 x Communication Cable	1 x Grounding Wire	1 x Power Cord

Note: Product accessories are customized according to customer needs. This list represents only the standard accessories. EndurEnergy does not provide cables for all situations, for special projects ask sales team.

5.2 Mounting

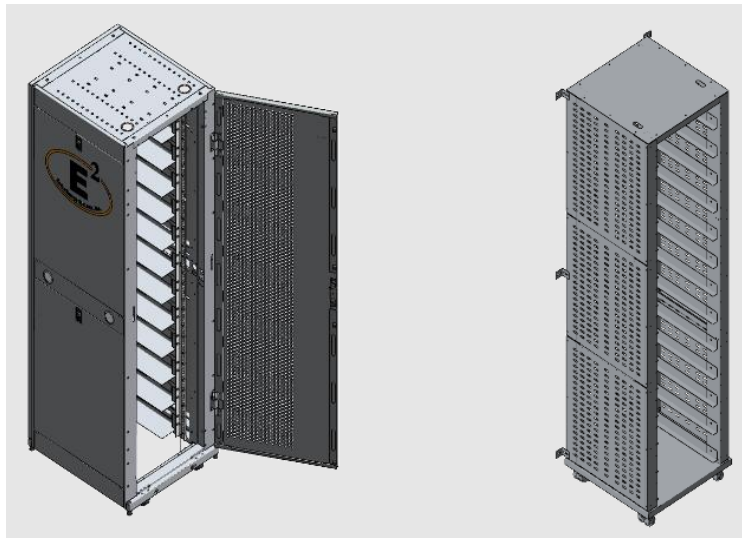
The ESP-BCU HL is designed as a rack mount type battery control unit, this adds flexibility on installation and modularity for different configurations.

5.2.1 Rack Mounting (R6 / R12)

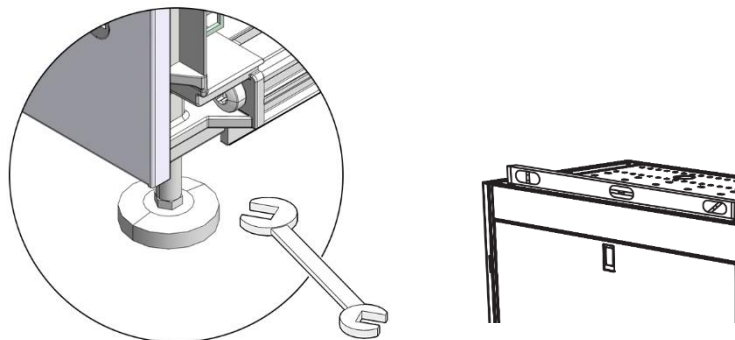
1. Place the Rack in the location desired (refer to the details about the installation location described in [Chapter 4.2](#)). The enclosure should be moved close to its installation location inside its shipping container before it is unpacked. The enclosure must be installed in a structurally sound area with a level floor that is able to bear the weight of the rack + the weight of the battery control unit + the intended number of batteries to be installed inside.

CAUTION

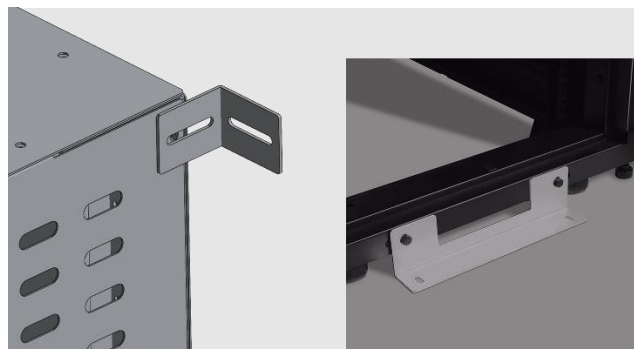
Our rack solutions are designed for indoor installations IP20/NEMA1.
If the battery control unit or batteries are intended to be used outdoors, a cabinet / enclosure is required.



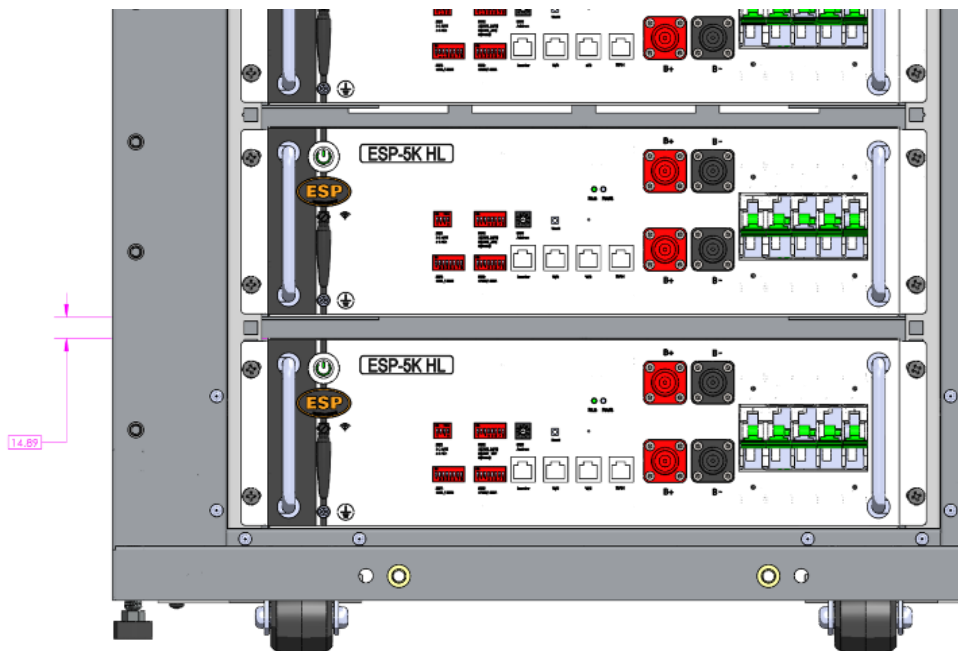
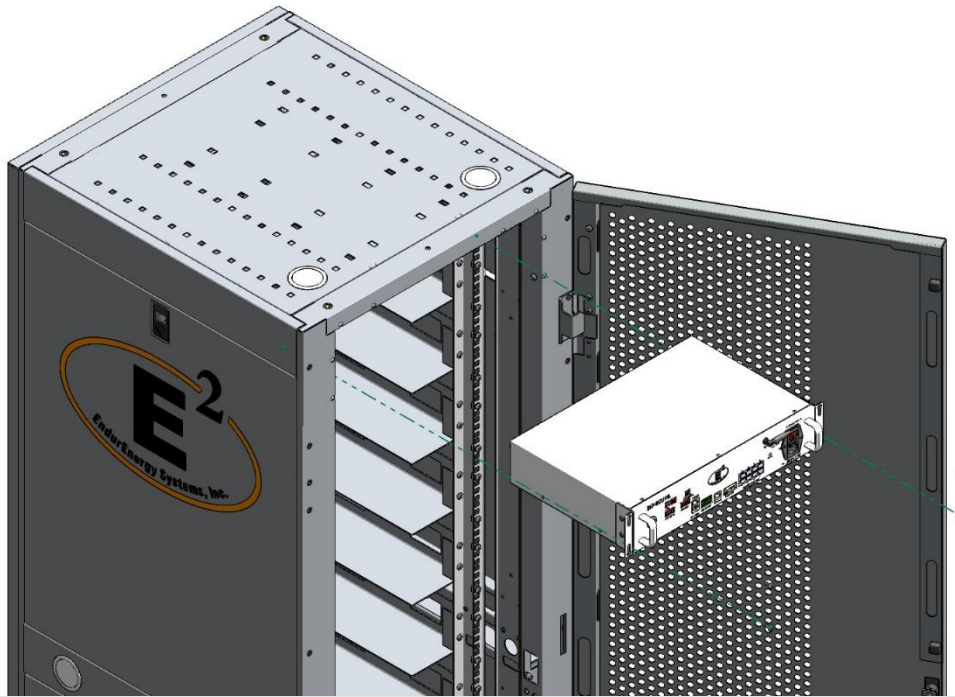
2. Adjust leveler feet (if included), lower each leveler unit it reaches the floor, make sure each leveler contacts the floor solidly. After lowering each leveler, use the carpenter's level / bubble level to confirm that the rack is level. Adjust levelers as needed to get level.



3. In order to secure the rack to the building structure for stability, attach the provided brackets to the wall or to the floor (depending on the rack model) using adequate screws. Verify foundation for seismic installations.

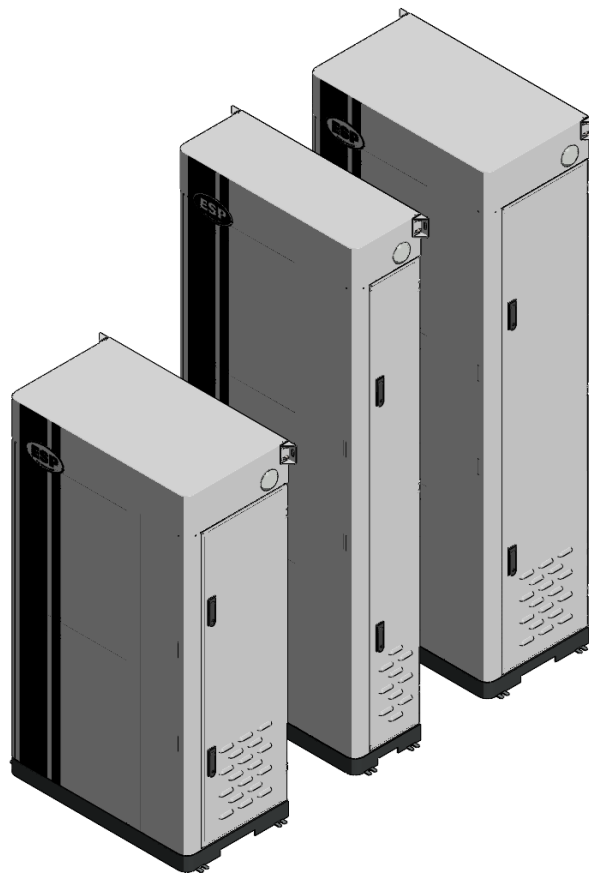


- Slide the battery control unit into the horizontal brackets of the rack. Ensure that each battery control unit or batteries are vertically spaced out by 1/3 U (0.583" / 14.82 mm) to facilitate heat dissipation. Utilize M6 screws to securely fasten the batteries in place onto cage nuts, with a maximum torque of 8.7 lb*ft. If the rack does not feature cage nuts, employ suitable screws to affix the unit firmly into the predrilled holes.



5.2.2 Enclosure Mounting - (BU10/15/20/30)

1. Place the enclosure in the location desired (refer to the details about the installation location described in [Chapter 4.2](#)). The enclosure should be moved close to its installation location inside its shipping container before it is unpacked. The enclosure must be installed in a structurally sound area with a level floor that is able to bear the weight of the enclosure + the weight of the battery control unit + the intended number of batteries to be installed inside.



NOTICE

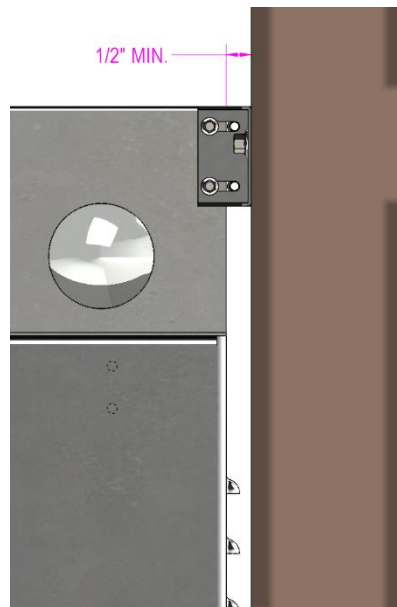
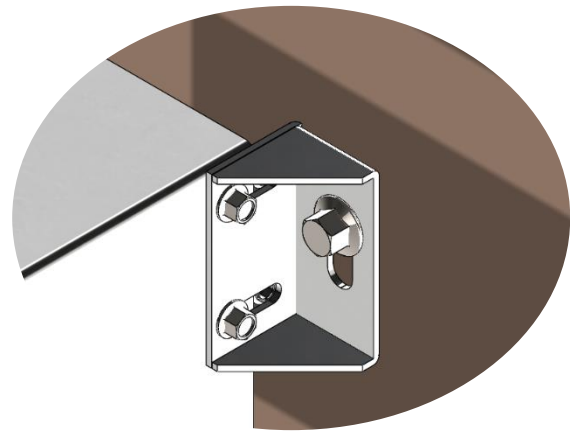
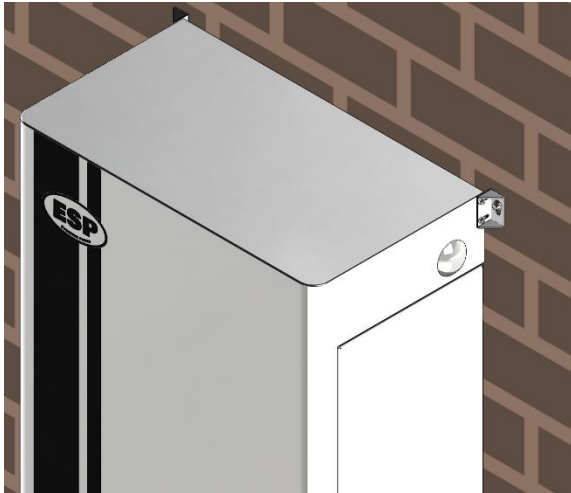
Our enclosure solutions are designed for outdoor installations rated IP55 / NEMA 3R.



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2. In order to secure the enclosure to the building structure for stability, adjust the 2x wall brackets by losing the screws, move the brackets to leave a gap of at least 0.5" between the wall and the enclosure to allow airflow and door opening. Tighten the screw brackets and attach both brackets to the wall with 2x adequate screws (M8 or 5/16").

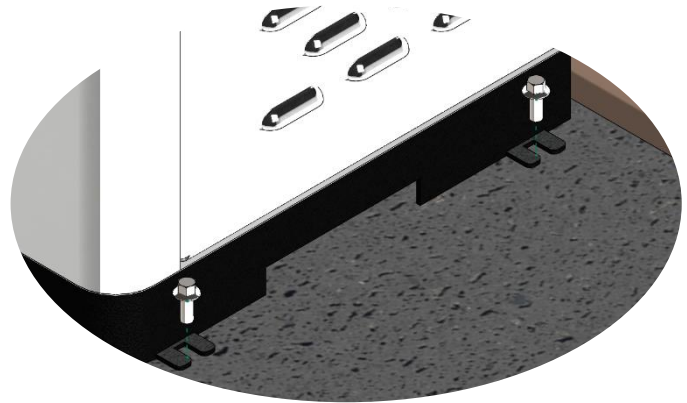
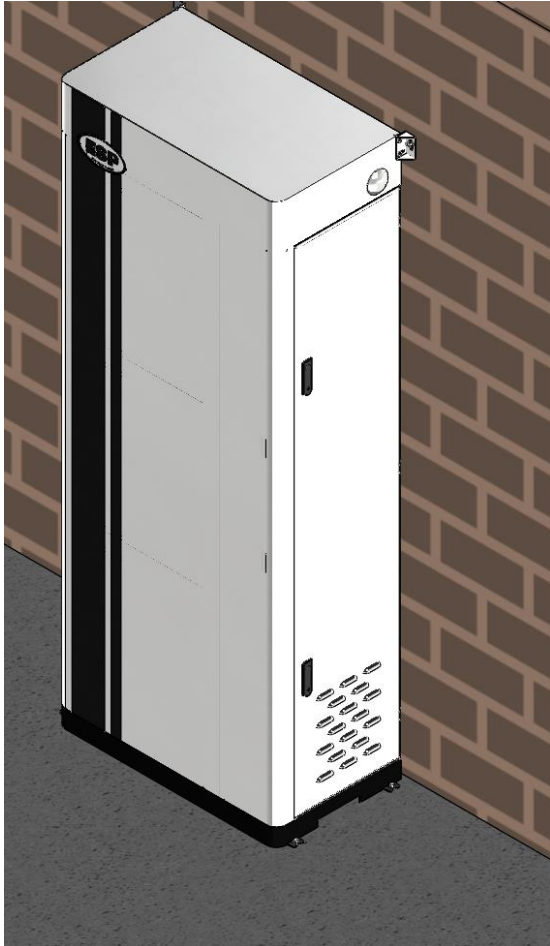




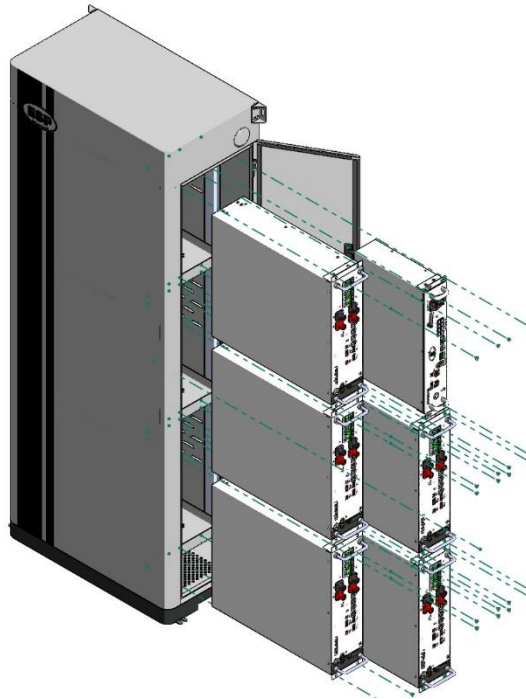
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3. Fix the enclosure to the floor by using 4x adequate screws (M8 or 5/16"). Verify foundation for seismic installations.



- Slide in each battery into the enclosure, the battery enters vertically. Use M6 screws to fix into the predrilled holes and secure the batteries in place, max torque of 8.7 lb*ft.



5.3 Cable Connections of the Battery

WARNING

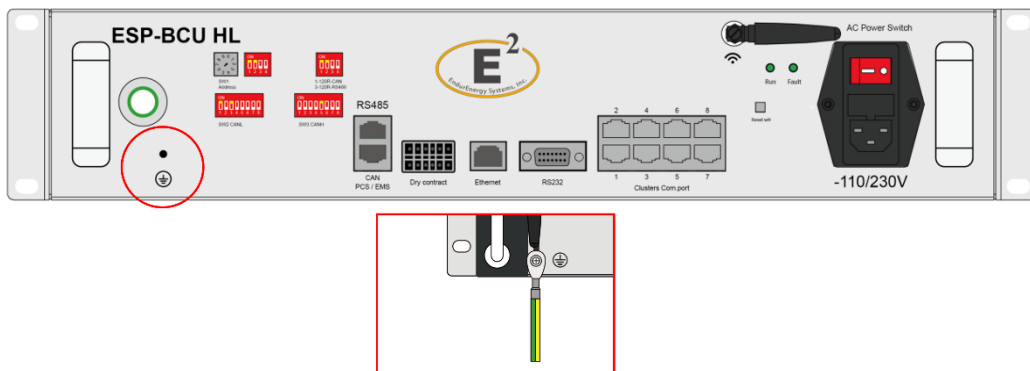
Although the ESP-BCU HL does not have any direct power connection with the high-voltage batteries, it will be installed beside them. Therefore, we encourage you to connect the cables in accordance with local installation laws and regulations. Before connecting the cables, ensure that the battery is turned OFF. Additionally, make sure to turn off the DC breaker of each battery. Failure to do so may result in electric shocks due to the high voltage of the battery.

Make sure the cap is on if you don't need to use the power interface.



5.3.1 Battery Control Unit Grounding

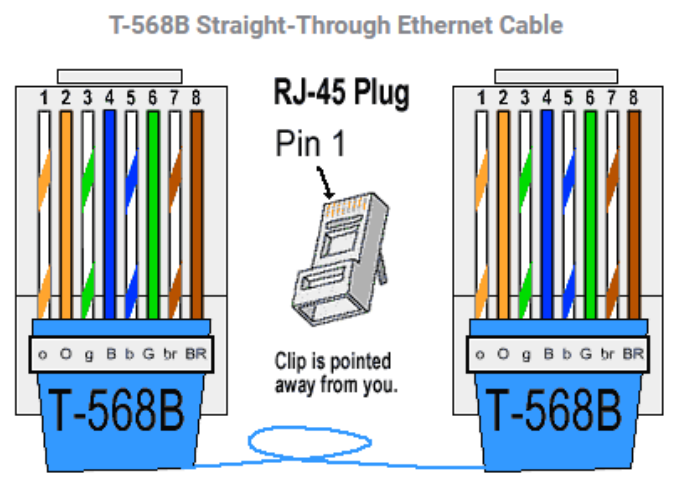
There is a grounding icon on the front of the battery that indicates the grounding screw of the battery, connect the grounding wire on this screw and make sure all the batteries grounds are interconnected, this ground shall also be connected to the bonding ground of the inverter or PCS where the batteries will be installed, the ground bonding system shall be installed as per NEC Article 250 or local regulations.



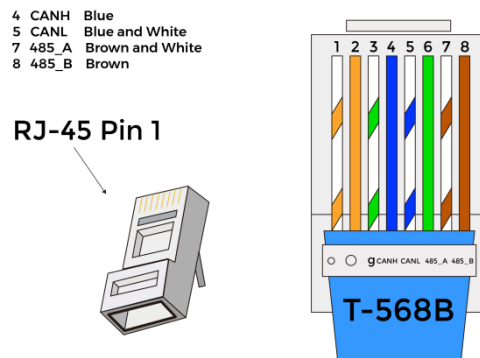
5.3.2 Communication Cables

Each battery control unit communicates with compatible inverters; this communication takes place through an Ethernet cable UTP CAT6 with an RJ45 connector, which accommodates both RS485 and CAN BUS protocols.

There are no special cable requirements for the wiring of these Ethernet cables, as long as all cables are wired the same. If needed, the network cable should be constructed following the standard T-568B.



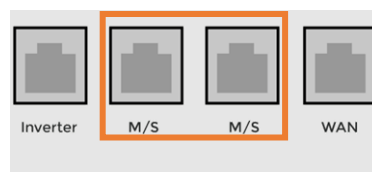
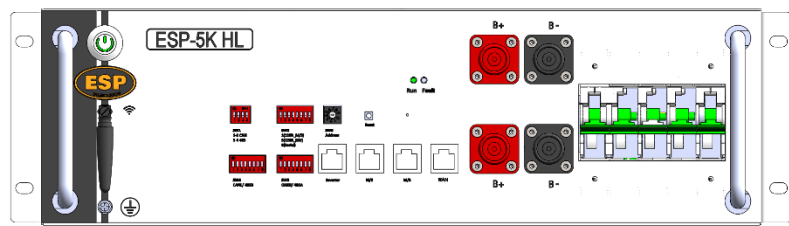
Cable configuration plays a crucial role in establishing effective communication within a system. In this context, specific pins undertake distinct roles to facilitate communication protocols. Notably, pin 4 functions as CANH, while pin 5 serves as CANL within the CAN communication protocol. Moreover, for RS485 communication, pin 7 operates as 485A and pin 8 is designated as 485B. Precise understanding of pin assignments ensures accurate signal transmission, thus fostering seamless communication and optimal performance among connected devices.



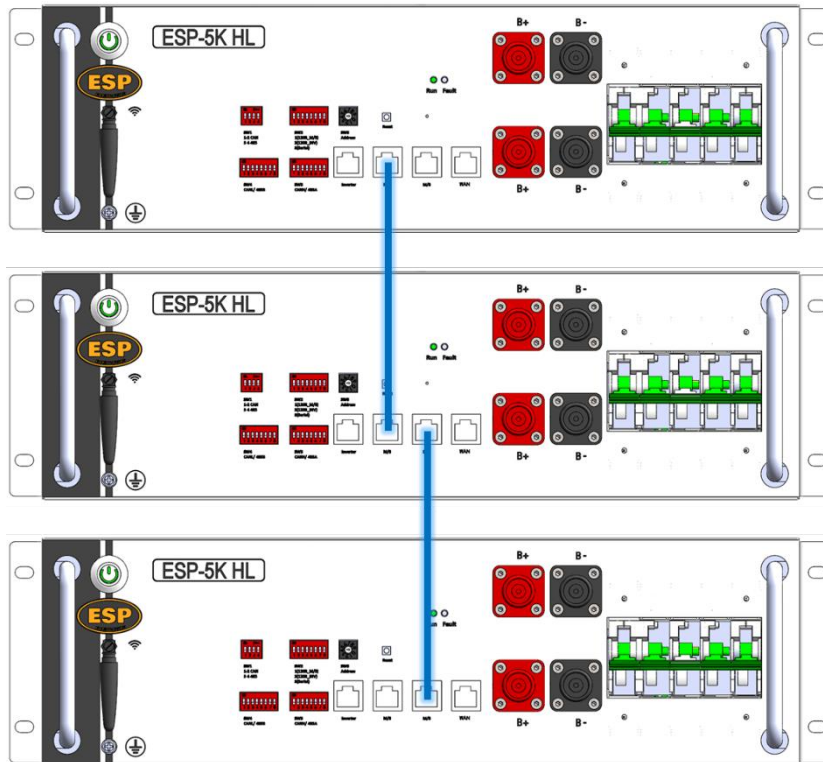
However, the network cable connecting the battery and the ESP-BCU HL should conform to the specifications outlined by the Inverter. If available, a LAN cable tester can be employed to determine whether the cable is faulty.

5.3.2.1 Connecting Batteries for communication

When connecting a string of batteries (either series or parallel) all the batteries of that string must have communication between each other using a communication cable connected between their M/S Port.



Connect all batteries in the string with a communication cable between their M/S Port. See diagram below for an example of 3 batteries connected.

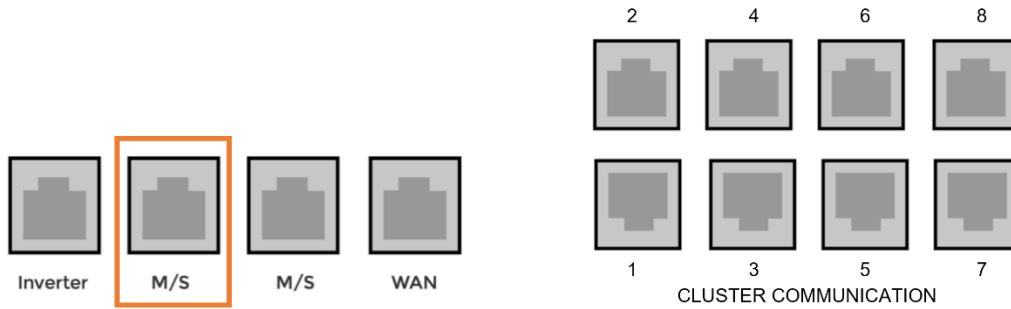


5.3.2.2 Connecting battery string for communication with battery control unit

NOTICE
<p>The battery is designed to work on a close loop environment for communicating with the inverter / PCS (check inverter compatibility list), for open loop type of applications we do not ensure proper operation.</p>

To ensure proper functionality of the batteries, the batteries must communicate to the battery control unit through the supported protocols using a communication cable.

In a battery string only one of the batteries will acquire the role of Primary or Master, this Primary battery will connect to the battery control unit with the communication cable, this allows the battery control unit to communicate with all the batteries in the cluster. The primary battery will use the “M/S” Port for that purpose, while the battery control unit will use the “Cluster Communication” Ports.

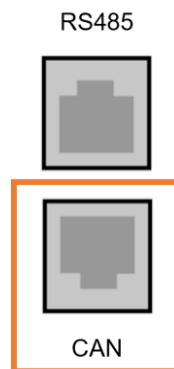


5.3.2.3 Connecting battery control unit for communication with inverter

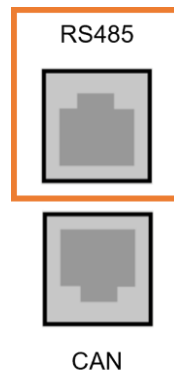
NOTICE
<p>The battery control unit is designed to work on a close loop environment for communicating with the inverter / PCS (check inverter compatibility list), for open loop type of applications we do not ensure proper operation.</p>

To ensure proper functionality of the battery control unit, the battery control unit must communicate to the inverter through any of the supported protocols using a communication cable.

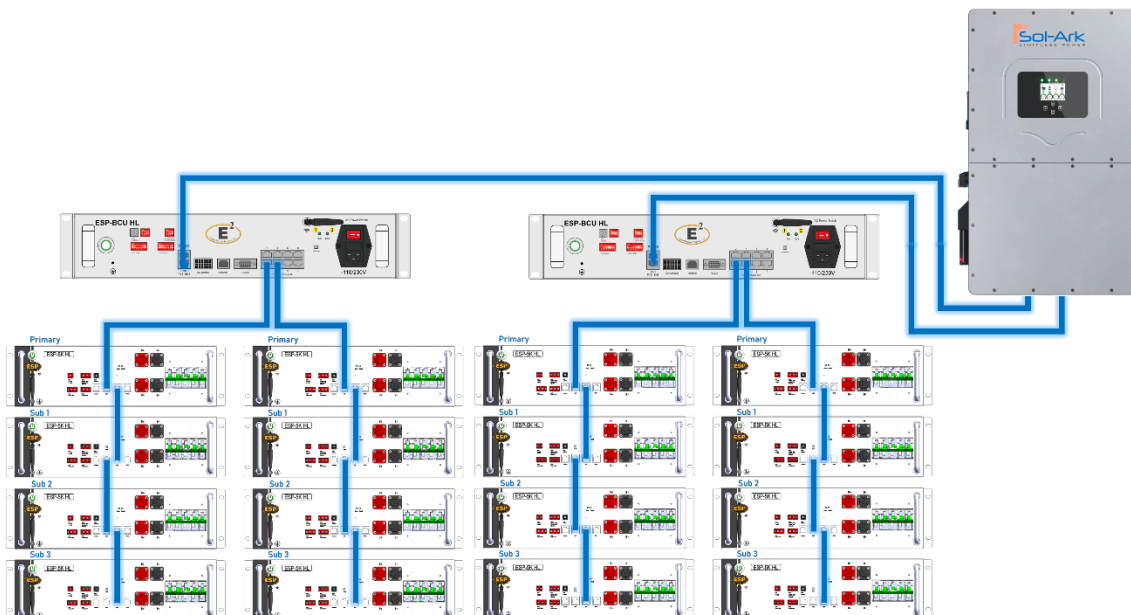
The battery control unit will utilize the "CAN" Port to establish communication with the inverter using the CAN communication protocol.



The battery control unit will utilize the "RS485" Port to establish communication with the inverter using the RS485 communication protocol.



5.3.2.3.1 Communication connection example: 4 strings of 4*ESP-5K-HL to a SA-60K inverter



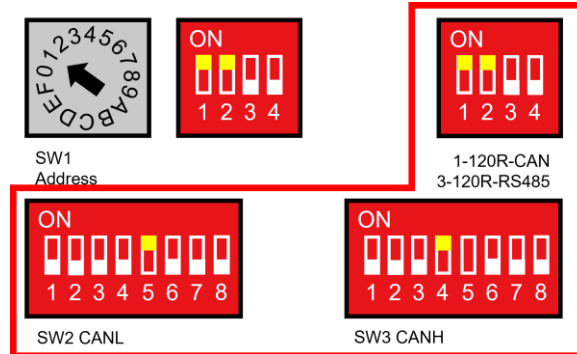
WARNING

Always follow Inverter's installation manual prior to making any connection.
This manual does not substitute inverter manual.

NOTICE

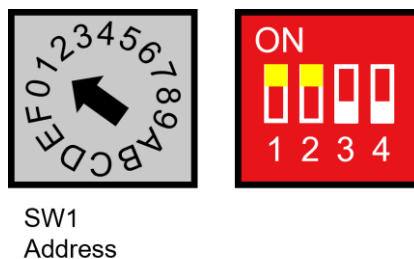
Once you complete the wiring for communication, verify the inverter manual or with inverter technical support for the correct settings on the inverter to properly ensure communication.

5.4 Battery Control Unit DIP Switch Setting



















The settings for the DIP switches are defined in the inverter's user manual.

WARNING:
<p>Please ensure that the SW2/SW3/Protocol Switch settings are correctly set to the manufacturer's default and have not been accidentally changed.</p>
<p>The default communication protocol for the battery is CAN (Protocol Switch 1 & 2 on). If the inverter's communication mode is RS485 or any other protocol, please contact EndurEnergy before installing the battery.</p>
<p>SW2 default: 5 on; SW3 default: 4 on.</p>



In the following table, you will find the configurations for SW1 rotary and slide DIP switch. This table includes configurations for 1 battery up to 16 batteries. Identify the actual number of batteries of your system/string and adjust the switches accordingly.

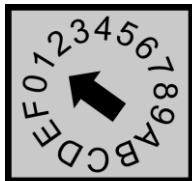
The difference between parallel and series connection is as follows: For parallel connection, set Slide DIP Switch 4 to 'OFF', and for series connection, set Slide DIP Switch 4 to 'ON'. Please be careful in selecting the type of connection as this can affect the operation of your batteries.

Number of Battery Clusters Connected	SW1 Slide DIP Switch	
	Clusters connected in Parallel - Standard	Clusters connected in Series**
1		
2		
3		
4		
5		
6		
7		
8		

WARNING:

**** Typical application is to connect the clusters in parallel, for series clustering the voltage limit is 1000 VCD (18 batteries), never exceed this or the system could be damaged. Consult EndurEnergy if in doubt.**

The rotary DIP switch on the ESP-BCU HL Battery Control Unit allows you to set the number of batteries in a group. Each position on the switch corresponds to a specific number of batteries, ranging from 1 battery to 16 batteries. The DIP switch has 16 positions labeled 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F. Each of these positions corresponds to a specific number of batteries in a group, as follows:



- 0: Represents 16 batteries in a group.
- 1: Represents 1 battery in a group.
- 2: Represents 2 batteries in a group.
- ...
- 9: Represents 9 batteries in a group.
- A: Represents 10 batteries in a group.
- B: Represents 11 batteries in a group.
- C: Represents 12 batteries in a group.
- D: Represents 13 batteries in a group.
- E: Represents 14 batteries in a group.
- F: Represents 15 batteries in a group.

Remember that accurate configuration of the DIP switch is essential for proper battery management within the ESP-BCU HL unit.

6 Commissioning

Step 1: Unboxing and Inspection

- Carefully unpack the ESP-BCU HL unit from its packaging.
- Inspect the unit for any visible damage during transit. If you notice any damage, please contact our customer support before proceeding.

Step 2: Mounting and Connection

- Select a suitable location for mounting the ESP-BCU HL. Ensure it is placed in a well-ventilated area and away from direct sunlight or moisture.
- Mount the unit securely using the provided instructions.
- Connect the communication cables from your battery clusters to the ESP-BCU HL communication ports labeled "Cluster Communication."
- Connect the ESP-BCU HL to your inverter using the provided cables. Connect to the

ports labeled "CAN" or "RS485".

Step 3: DIP Switch Configuration

- Locate the 5 DIP switches on the ESP-BCU HL unit.
- Refer to the user manual for detailed instructions on how to configure these switches. They control communication type (CAN or RS485) and cluster configuration (number of clusters, batteries, and connection type).

Step 4: Powering On

- Plug the 220V power cable into the AC power socket. (The ESP-BCU HL is equipped with a built-in UPS battery that can provide continuous power for up to 3 hour if no power is available nearby.)
- Locate the power button on the ESP-BCU HL unit.
- Press and hold the power button for 4 seconds or until you hear a distinct beep sound. This indicates that the unit is powering on.
- Wait for the Run LED to light up, indicating that the unit is operational.

Step 5: LED Status Indicators

- Observe the Run LED. A lit Run LED indicates the unit is operating normally.
- If the Fault LED is lit, consult the troubleshooting section in the user manual for guidance on resolving the issue.

Step 6: Troubleshooting

- If the Fault LED is on, consult the troubleshooting section of the user manual for detailed steps to diagnose and resolve the issue.

Step 7: System Verification

- Ensure that communication between the ESP-BCU HL unit and your battery clusters is established.
- Verify that the communication between the ESP-BCU HL unit and the inverter is also established.

7 Shutting Down

Only shut down the ESP-BCU HL when the battery is neither charging nor discharging.

- Press and hold the power Button for 5 seconds, then release it after hearing the relay break.
- Ensure that all lights on the ESP-BCU HL are turned off.

8 Firmware Update & Troubleshooting



EndurEnergy Systems, Inc.



If there is a persistent fault indicator in the battery control unit, review the connections and dip switch settings again as well as the inverter connections and settings. If the problem persists and you require further assistance, please contact us (**see [Section 1.7](#)**).

If you need to upgrade the BMS software version, please contact the after-sales staff via email: support@endurenergy.com.