Battery Module

51,2V 100Ah

200001 (blue)
200002 (gold)
200003 (grey)
200004 (white)

Document title:	Operation manual
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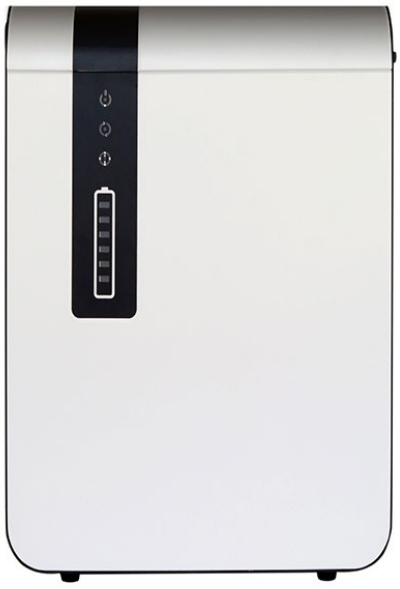
Index:	03



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1. Product description

1.1. General information

Welcome to the innovative world of the Acada Home Energy Storage Battery System. Designed for modern energy needs, this advanced system offers high performance, safety, and user convenience, making it an excellent choice for ensuring energy independence.

Key Features:

- **Powerful Storage Capacity:** The system comes equipped with a 51.2V and 100Ah (5.12kWh) capacity, capable of providing a sustainable and reliable energy supply to power your home effectively.
- **Flexible Applications:** Whether integrated into off-grid or grid-connected setups, the battery system adapts seamlessly to your specific energy requirements, supporting a wide array of household applications.
- **Advanced Safety:** Utilizing state-of-the-art lithium iron phosphate cells (LiFePo4), the system meets the highest standards of safety, ensuring stable and secure operation under diverse environmental conditions.
- **Easy Installation:** Designed for straightforward wall or floor mounting, the system allows for quick installation and commissioning, facilitating a hassle-free start.
- **Intuitive User Interface:** An easy-to-navigate interface lets you effortlessly monitor and manage your energy consumption, giving you full control over your energy usage.
- **Eco-Conscious Design:** Committed to sustainability, the system reduces both, emissions and your ecological footprint, supporting a greener future.

Enhancing Your Energy Experience

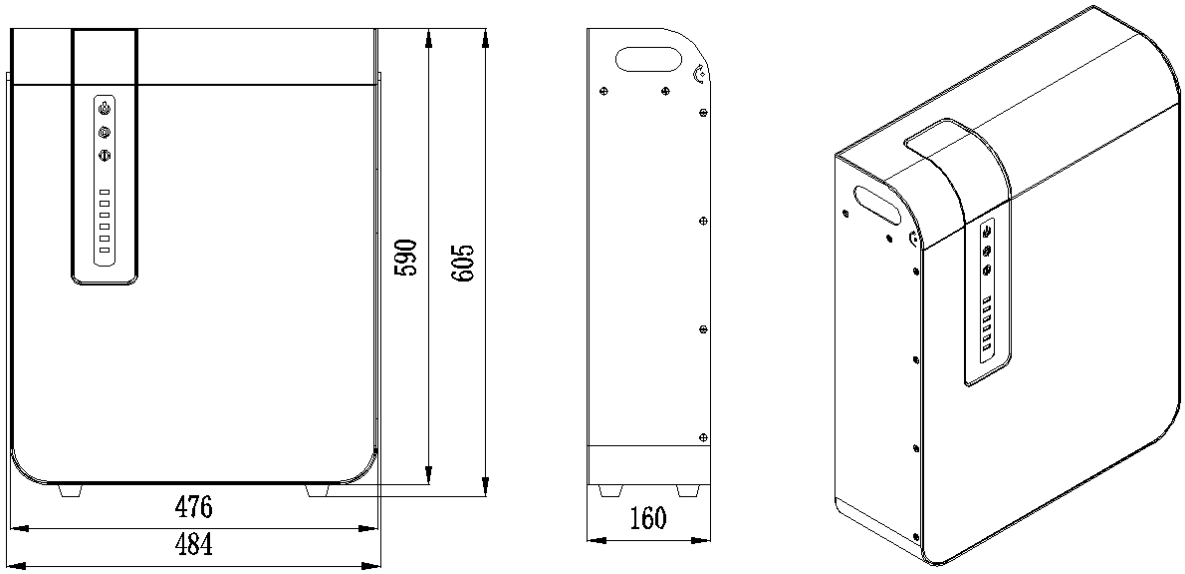
This manual provides comprehensive guidance on how to effectively utilize the Acada Home Energy Storage Battery System.

1.2. Product specifications

Model	200001 51.2V100Ah-LFP (blue) 200002 51.2V100Ah-LFP (gold) 200003 51.2V100Ah-LFP (grey) 200004 51.2V100Ah-LFP (white)
Rated voltage	51.2 V
Operating voltage range	44.8-58.4 V
Rated Capacity	100 Ah
Usable Energy (100% Depth of Discharge)	5.12 kWh
Rated power	5.12 kW
Max continuous charging current	100 A
Max continuous discharging current	100 A
Size (L*W*H)	590 mm x 484 mm x 160 mm
Weight	46 kg
Mount method	Wall mount/Floor mount
Life cycles (80% DOD,25℃)	6000
Charging temperature	0-65 ℃
Discharging temperature	-20-75 ℃
Communication ports	CAN/RS485/RS232
Protections	Overcharge, over discharge, over temperature, over current, short circuit
Operation life	15+ Years
Shelf life (-20℃~35℃)	3 Months
Operating temperature range	-20-65 ℃
Storage temperature range	-10-40 ℃
EMC Standard	IEC 61000
Warranty	5Years
IP rating	IP51

1.3. Dimensions

(in mm)



2. Safety instructions

Please read these instructions thoroughly before installing or operating the Acada Home Energy Storage Battery System (referred to as the "Battery" or "Battery System"). Ignoring or deviating from any instructions or warnings provided in this document can lead to electrical shock, serious injury, or death, and may also cause damage to the battery or other property. Non-compliance with these guidelines may result in voiding your warranty. Do not discard this document. After installation, ensure it is kept near the battery system for easy future reference.

2.1. Installation

⚠WARNING

Installation Compliance: Install the battery in accordance with national and local codes and standards. Ensure the installation site complies with local building codes.

Qualified Installation: Only qualified electricians trained in low voltage electricity works should carry out the battery installation.

Handling Heavy Equipment: The battery module is heavy. Comply with local regulations regarding material handling and heavy lifting.

Installation Environment: Do not install the battery in habitable spaces, such as bedrooms.

Mounting Surface: Ensure the mounting surface is robust enough to support the total weight of the battery module and its mounting bracket.

Condition of the Battery: Do not install the battery if it shows signs of damage, such as being dropped or crushed.

Fire Safety: In residential environments, install fire detection and protection equipment in compliance with local building and fire codes.

Proximity to Heat and Ignition Sources: Do not install the battery near heating equipment, ignition sources, or open flames. Install the battery only on non-combustible surfaces and away from combustible materials.

Proximity to Gas Installations: Maintain a safe distance from gas meters, valves, regulators, lines, or appliances. A minimum spacing of 2 meters is highly recommended due to the risk of flammable gases being ignited by a failing battery.

Exposure to Elements: Avoid placing the battery in direct sunlight and ensure the installation site is protected from flooding.

Proximity to Water Sources: Do not install the battery near water sources such as downspouts, sprinklers, or faucets.

Garage Installations: When installed in a garage, position the battery away from vehicle paths and, if possible, on a side wall and/or above the height of vehicle bumpers.

Electrical Safety: Before starting any wiring tasks, ensure that the battery and the DC safety switch of all inverters in the associated PV system are switched off.

2.2. Operation

Hazardous Materials: The battery contains rechargeable lithium-ion cells that can be hazardous and may pose a serious fire risk, or cause injury or property damage if damaged, defective, or misused.

Chemical Exposure: Lithium-ion batteries may expose you to chemicals such as antimony trioxide, cobalt lithium nickel oxide, and nickel.

Electrolyte Leakage: In the event of an electrolyte leak, avoid contact with the substance and consult the emergency response guide provided for safe handling instructions.

Proper Use: Operate the battery strictly according to the instructions in this document. Do not use if the battery is defective, appears damaged, or fails to operate.

Service and Modification: Do not disassemble, repair, or modify the battery. The components inside are not user-serviceable or replaceable.

Temperature Limits: Do not operate the battery in environments where the temperature is above 55°C or below -0°C.

Exposure to Flame: Avoid exposing the battery and its components to direct flame.

Storage of Flammable Materials: Do not store flammable substances near the battery. Maintain a minimum distance of 15 meters if installed outdoors.

Clearance: Keep combustible materials at least 2 meters away from the battery.

Fire Emergency: If the battery catches fire or a fire occurs nearby, immediately contact the fire department and follow the emergency response guide. Be aware that the battery may re-ignite after being extinguished.

Immersion: Do not immerse the battery or its components in water or other fluids.

Temperature Control: Avoid operating the battery outside the specified temperature range to prevent damage.

Cleaning and Exposure: Do not use solvents, harsh chemicals, or flammable substances to clean the battery.

Compatible Parts: Only use parts, accessories, and fluids specified for use with this battery to ensure safety and functionality.

Storage Limits: Do not place the battery in storage for more than one month, or discontinue power for extended periods.

Painting and Snow Accumulation: Do not paint any part of the battery. Ensure that snow does not accumulate around the battery.

Handling Non-Functional Batteries: Handle non-functioning batteries with caution and contact the manufacturer for guidance.

Transport and Disposal: Do not attempt to remove or transport a damaged or non-functioning battery on your own. For disposal, consult local regulations to ensure proper procedures are followed**.**

3. System installation

3.1. Installation precautions

Voltage Check:
Before installation, turn on the power switch and check the voltage between the positive and negative poles of the battery box. Ensure that the voltage is within the specified range of 45V to 58V to confirm it is ready for safe operation.

Cable Management:
Keep the cables attached to the battery box as short as possible to minimize voltage drop along the lines. This helps maintain efficient operation and reduces potential energy loss.

Compatibility:
Do not use battery boxes of different models or from different manufacturers in parallel. Incompatibilities between different types could lead to malfunctions or safety hazards.

Surface for Installation:
Ensure that the walls or floors where the battery box is installed are level and flat. This provides a stable base and helps prevent any physical damage due to uneven surfaces.

Polarity Check:

Before using the battery box, carefully check to ensure that the positive and negative poles are connected correctly. Incorrect installation can lead to electrical hazards or damage to the battery box.

3.1.1. General location guidelines

- The battery system is suitable for both outdoor and indoor installations but must be mounted to a wall using the supplied bracket.
- Ensure the installation area is clean, dry, and well-ventilated to support natural convection.
- The installation site must provide unobstructed access to the battery for ease of installation and ongoing maintenance.
- Avoid placing the battery in locations where it would be exposed to direct sunlight or rain.
- Ensure that no part of the battery, especially the front panel, is covered by building structures, room furniture, or other equipment.

3.1.2. Restricted locations

Avoid placing the battery in:

- Residential living spaces such as bedrooms or living rooms.
- Wall or ceiling niches.
- Entrances and exits.
- Areas beneath staircases or in narrow passages.
- Humid environments where the condensed water level exceeds 90%.
- Earthquake-prone areas unless additional safety measures are taken.
- Locations at altitudes exceeding 2000 meters above sea level.
- Proximity to flammable materials, gases, or in explosive environments.

3.1.3. Clearance requirements

Maintain a minimum clearance of:

- 20 cm from all sides of the battery module.
- 30 cm from any heat sources such as water heaters, gas heaters, air conditioning units, or other equipment.
- 30 cm from doors and 25 cm from windows.
- 20 cm from air vents and other devices.
- 100 cm from emergency exits to ensure safe and unimpeded access.

3.2. Packaging information and tools

The packaging of the battery box is designed to be safe and secure, ensuring that the components and the battery box are well protected together. When receiving your

order, please carefully review the included configuration list to verify that the battery box and all accompanying components are complete and undamaged.

3.2.1. Bill of materials

Number	Part Name	Quantity	Explanation
1	Battery box	1	
2	Installation plate	1	For wall mounting
3	Screws	4	
4	CAN communication cable	1	Network cable
5	Power cable (red)	1	Inverter connection
6	Power cable (black)	1	Inverter connection
7	Parallel lines between boxes	optional	

3.2.2. Required tools

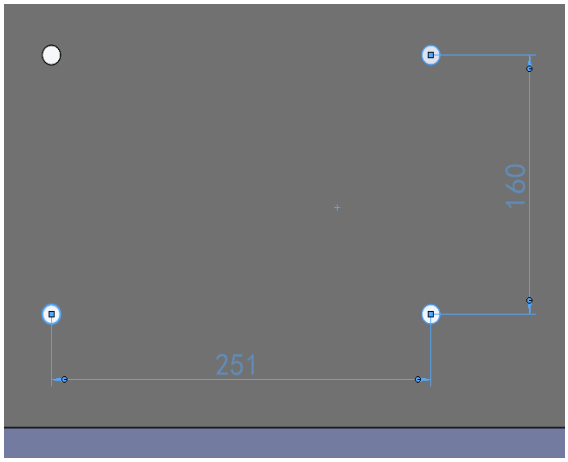
Cutter blade 	Wire cutter 	Phillips screwdriver 
Socket set 	Adjustable wrench 	Flathead screwdriver 

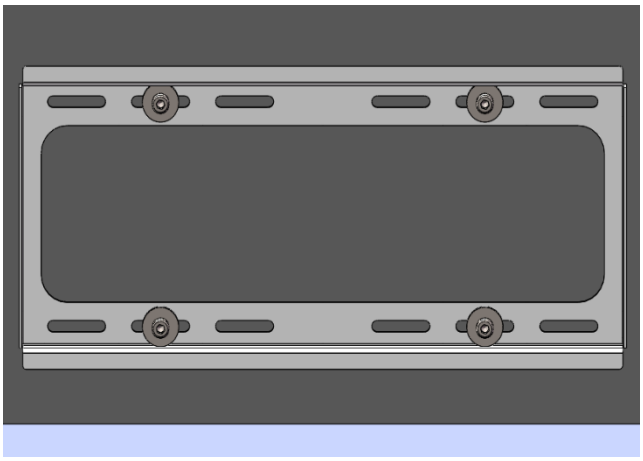
3.3. Wall Mount Installation

The following steps provide detailed instructions for installing the battery module in a wall-mounted configuration.

Step 1 - Mark the mounting points:

- Measure and mark the height at which you want to install the battery module
- Using the mounting plate as a template, mark the positions of the screw holes on the wall.





Step 2 – Drill the holes:

- Drill holes at the marked positions to fit the fixing screws.
- The diameter and depth of the holes should be ⌀12 mm x 45 mm.

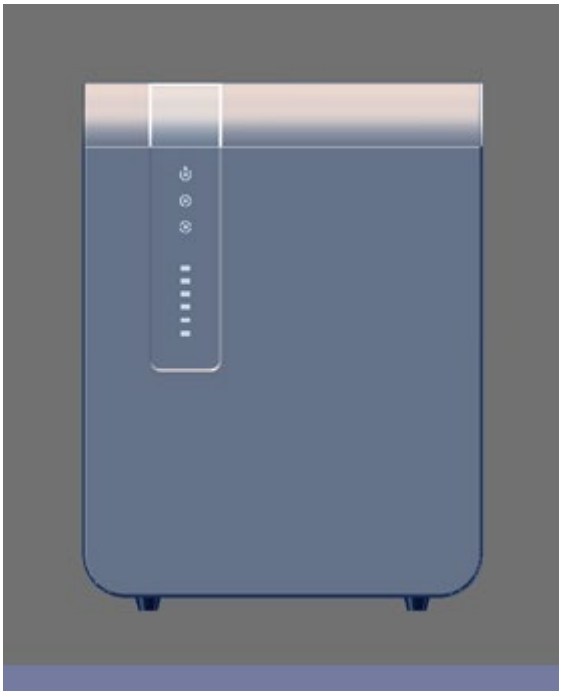
Step 3 – Attach the mounting plate:

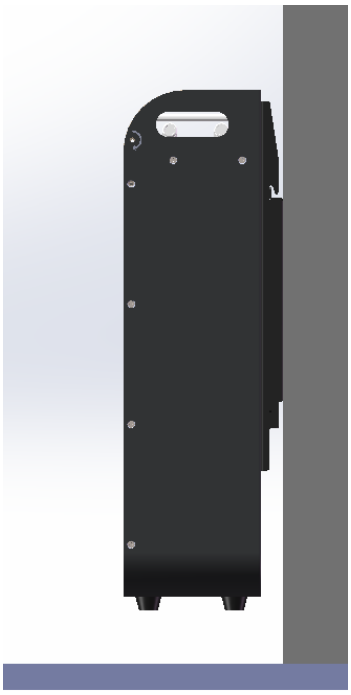
- Secure the mounting plate to the wall using the fixing screws. Make sure the plate is levelled and securely fastened.

Step 4 – Mount the battery module:

- With the help of another person, lift the battery module and align the hooks on the back of the module with the mounting plate.
- Carefully hang the battery module onto the mounting plate, ensuring the hooks engage securely with the plate.

- See the following schemas as reference:



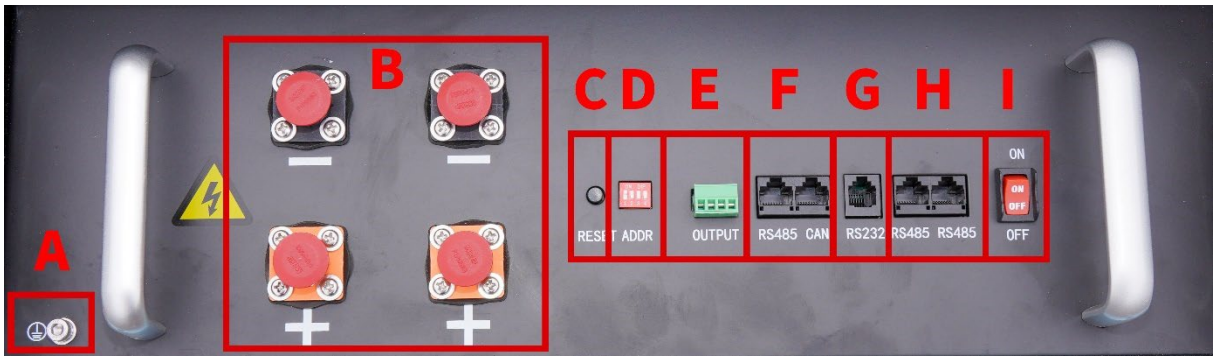


Step 5 – Installation Check:

- Verify that all screws and connections are tight and secure.
- Ensure the battery module is level and properly aligned.
- Check that there is no physical damage to the battery module or mounting plate.

3.4. Electrical connections

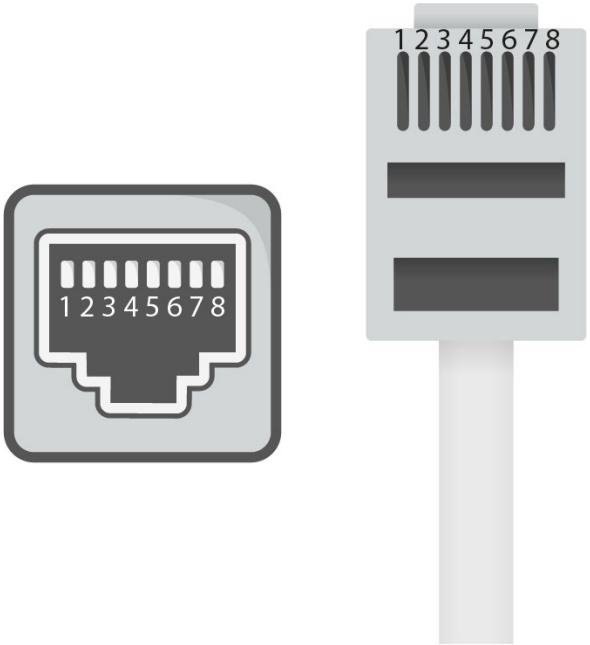
3.4.1. Terminals



Interface letter	Name	Function
A	PE	Grounding
B	+	Positive pole of battery box (two positive poles are the same, one of which can be used when the battery box is connected in parallel)
	-	Negative pole of battery box (two negative poles are the same, one of which can be used when the battery box is connected in parallel)
C	RESET (Reset switch)	When the BMS is in sleep mode, press the button (3-6s) and release it to activate the protection board. When the BMS is in an active state, press the button (3-6s) and release it, and the protection board is put into sleep. When the BMS is in an active state, press the button (6-10s) and release it to reset the protection board.
D	ADDR	DIP switch, set RS485 address
E	1-2 dry contacts 1	Normally open, closed during fault protection
	3-4 dry contacts 2	Normally open, low battery alarm closed
F	CAN	CAN bus interface, baud rate 500K, used for connecting inverters, monitoring real-time data of battery boxes, and fault diagnosis

	RS485	RS485 interface with a baud rate of 9600bps, used to connect inverters, monitor real-time data of battery boxes, and diagnose faults
G	RS232	RS232 interface, used for monitoring real-time data and fault diagnosis of battery box on upper computer
H	LINK0 (RS485)	When battery boxes are used in parallel, the LINK0 interface is used for synchronous communication between battery boxes
	LINK1 (RS485)	When battery boxes are used in parallel, the LINK1 interface is used for synchronous communication between battery boxes
I	Power Switch	Set to the ON position and start the system
		Set to the OFF position and turn off the system

3.4.2. Communication interface definition



1 RJ45 pin reference

Interface Letter G: RS232- Using 6P6C vertical RJ11 socket

RJ11 Pin	Definition Description
2	NC
3	TX (Single Board)

4	RX (Single Board)
5	GND

Interface Letter F: CAN and RS485 interfaces

RS485- Using 8P8C vertical RJ45 socket		CAN - adopts 8P8C vertical RJ45 socket	
RJ45 pin	**Definition Description**	**RJ45 pin**	**Definition Description**
1,8	RS485-B1	1,3,6,7,8	NC
2,7	RS485-A1	5	CAN-L
3,6	GND	4	CAN-H
4,5	NC	2	GND

Parallel communication

RS485- Using 8P8C vertical RJ45 socket		RS485- Using 8P8C vertical RJ45 socket	
RJ45 pin	**Definition Description**	**RJ45 pin**	**Definition Description**
1,8	RS485-B	1,3,6,7,8	NC
2,7	RS485-A1	5	CAN-L
3,6	GND	4	CAN-H
4,5	NC	2	GND

3.4.3. Recommended cable diameters

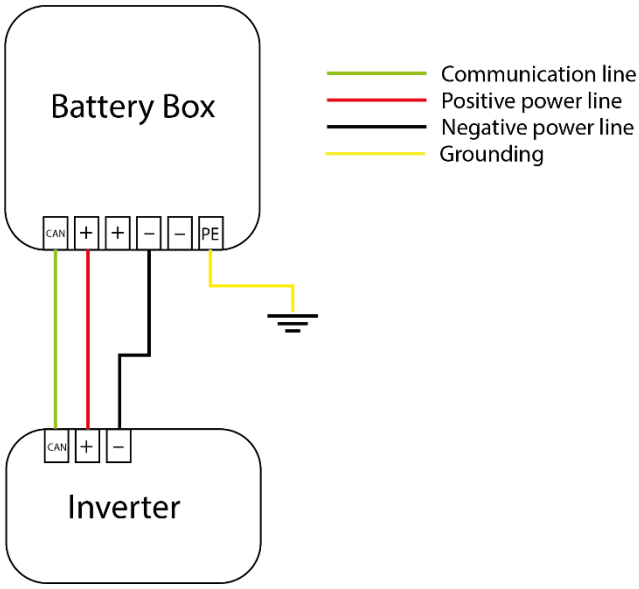
Here is a table listing the recommended cable diameters for different types of connections in the installation of the battery module.

Connection Type	Cable Diameter (AWG)	Cable Diameter (mm²)
Communication Cable (CAN / RS485)	≥ 20 AWG	≥ 0.5 mm²
Power Cable (Positive and Negative)	≥ 3 AWG	≥ 25 mm²
Grounding Cable	≥ 13 AWG	≥ 2.5 mm²

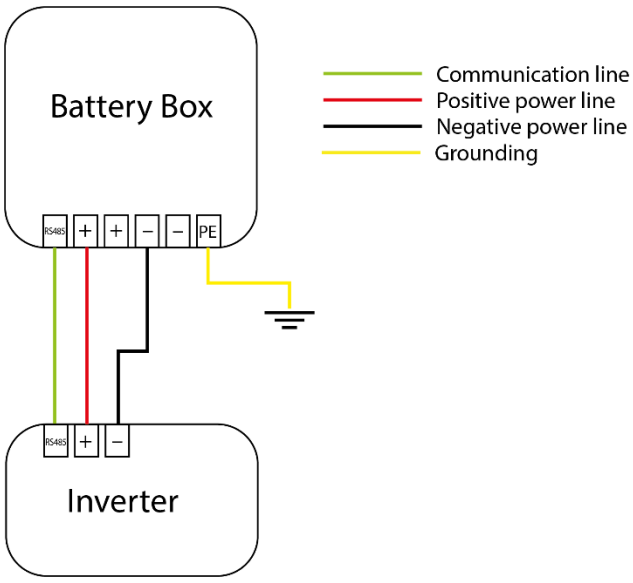
Make sure to use cables that meet or exceed these specifications to ensure safe and efficient operation of your home energy storage system.

3.4.4. Single battery box inverter connection

The following diagrams illustrate the connection between a single battery module and an inverter, either with CAN or RS485:



3 Inverter CAN Communication



2 Inverter RS485 Communication

The following steps provide detailed instructions for connecting a single battery module to an inverter or load**.**

Step 1 – Preparation:

- Ensure the battery module is turned off.
- Visually inspect the battery module for any signs of damage. Do not proceed if the module appears damaged.

Step 2 – Turn on the battery module:

- Turn on the power switch of the battery module while the battery is not connected to the inverter or load. Verify that the green operation indicator light is on, and the red fault indicator light is off.
- Use a multimeter to check the open circuit voltage of the battery module. The voltage should be within the range between 44.8V and 58.4V.

Step 3 – Turn off the battery module:

- Turn off the power switch of the battery module before making any connections.

Step 4 – Connect wires:

- Choose the appropriate communication interface (CAN or RS485) based on the inverter's requirements.
    - CAN Communication: Use the CAN port on both the battery module and the inverter.
    - RS485 Communication: Use the RS485 port on both the battery module and the inverter.
    - Ensure the connection is secure and the cable is not under tension.
- Connect the Power Cables
    - Connect the positive power cable (red) to the positive terminal of the battery module and the inverter.
    - Connect the negative power cable (black) to the negative terminal of the battery module and the inverter.
    - Ensure all connections are tight and secure.
- Set the DIP switch according to the configuration table chapter 4.5

Step 5 – Power on the system:

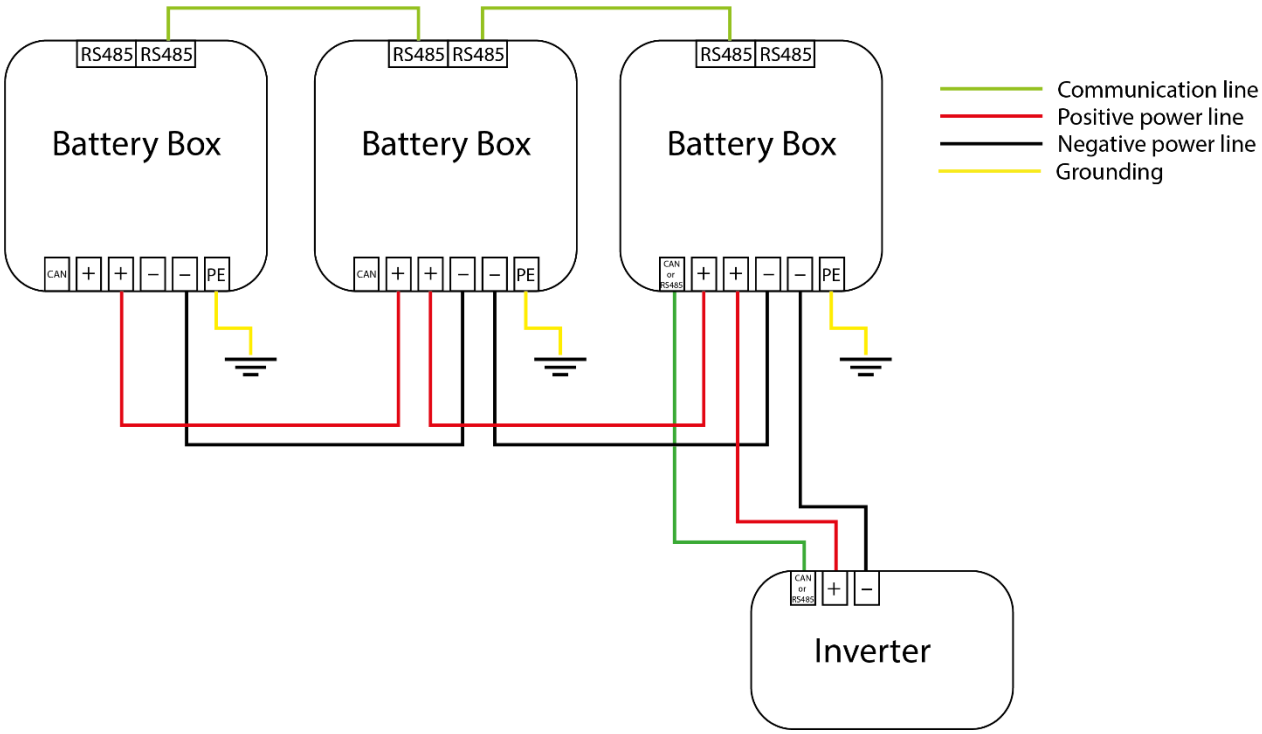
- Turn on the power switch of the battery module.
- Verify that the green operation indicator light is on, and the red fault indicator light is off.
- Check that the inverter is receiving power and the communication link is established.

Step 6 – Installation Check:

- Verify that all cables are securely connected and there is no physical damage.
- Ensure the battery module and inverter are properly communicating and operating as expected.
- Check for any error indicators on the battery module and inverter.

3.4.5. Multiple battery boxes inverter connection

The battery box supports up to 6 units in parallel, the example below shows a schematic diagram of 3 battery boxes connected in parallel with the inverter. Parallel power lines and inter-box communication lines need to be purchased separately.



The following steps provide detailed instructions for connecting multiple battery modules in parallel to an inverter or load.

Step 1 – Preparation:

- Ensure every battery module is turned off.
- Visually inspect each battery module for any signs of damage. Do not proceed if one module appears damaged.

Step 2 – Turn on the battery modules:

- Turn on the power switch of each battery module individually to check the operation indicators. Verify that the green operation indicator light is on and the red fault indicator light is off.
- Use a multimeter to check the open circuit voltage of each battery module. The voltage should be within the range between 44.8V and 58.4V and ensure the voltage difference between the modules does not exceed 2V.

Step 3 – Turn off the battery modules:

- Turn off the power switch of each battery module before making any connections.

Step 4 – Connect wires:

- Choose the appropriate communication interface (CAN or RS485) based on the inverter's requirements for the inverter communication. Only the master battery needs to have a communication line to the inverter.
    - CAN Communication: Use the CAN port on both the battery module and the inverter.
    - RS485 Communication: Use the RS485 port on both the battery module and the inverter.
    - Ensure the connection is secure and the cable is not under tension.
- Connect the communication cables between the battery modules, using the RS485 ports for inter-module communication, see chapter 3.4.1, interface letter “H”.

Step 5 – Set the DIP Switches:

- Configure the DIP switches on each battery module for the selected communication interface, see chapter 4.5
- Turn on the power switch of each battery module in sequence, starting with the master module followed by the slave modules.
- Verify that the green operation indicator lights are on and the red fault indicator lights are off on all modules.
    - If the alarm light is on, please check whether the communication cable connection is correct and whether the DIP switch setting is correct.

Step 6 – Power off and connect wires:

- Turn off the power switch of each battery module.
- Connect the power cables. There are two connection methods for the power lines:
    - As seen in the schema above, the second (positive/negative) terminal of each battery can be used, to connect all batteries to the same positive / negative lines.
    - A busbar could also be used to consolidate the power connections:
        - Connect all positive power cables (red) from each battery module to the positive busbar.
        - Connect all negative power cables (black) from each battery module to the negative busbar.
        - Connect the busbar terminals to the inverter.
- Ensure all connections are tight and secure.

Step 7 – Power on the system:

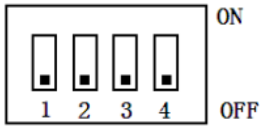
- Turn on the power switch of each battery module in sequence, starting with the master module followed by the slave modules.
- Verify that the green operation indicator lights are on and the red fault indicator lights are off on all modules.
- Check that the inverter is receiving power and the communication link is established.

Step 8 – Installation Check:

- Verify that all cables are securely connected and there is no physical damage.
- Ensure all battery modules and the inverter are properly communicating and operating as expected.
- Check for any error indicators on the battery modules and the inverter.

3.5. DIP Switch settings

Proper configuration of the DIP switches is essential for the correct operation and communication of the battery modules when multiple modules are connected in parallel. This section provides detailed instructions on setting the DIP switches. See chapter 3.4.1 interface letter “D” to locate the switch.



4 DIP Switch reference

Address	#1	#2	#4	#4	Explanation
0	OFF	OFF	OFF	OFF	No parallel function. Single battery use.
1	ON	OFF	OFF	OFF	Set as master
2	OFF	ON	OFF	OFF	Set as Slave 1
3	ON	ON	OFF	OFF	Set as Slave 2
4	OFF	OFF	ON	OFF	Set as Slave 3
5	ON	OFF	ON	OFF	Set as Slave 4
6	OFF	ON	ON	OFF	Set as Slave 5

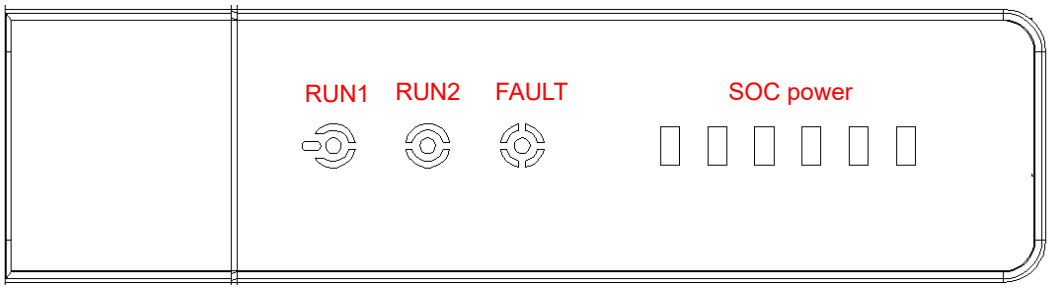
General Guidelines:

- Master Battery Box: The master battery box should always be configured with DIP switch 1 set to ON.
- Slave Battery Boxes: Each slave battery box should have a unique DIP switch configuration to ensure proper communication and avoid conflicts.
- Power on the master battery box first, followed by each slave battery box in sequence.

- Observe the status indicators to confirm that the system is functioning correctly.

4. Battery Panel

4.1. Display indicator meaning



5 The schematic diagram is for reference only, please refer to the actual product

Name	Meaning	Function or indicator status
RUN1	Always on (green)	On, when the battery switch is on. Off, when the battery switch is off.
RUN2	Running indicator light (green)	Stays on during charging and flashes during discharging
SOC	Battery indicator light (green)	Indicating the battery SOC. All bars are off when battery SOC is low (< 5%)
FAULT	Fault indicator light (red)	On, when there is an active alarm

5. Maintenance

Regular maintenance of the battery module is essential to ensure optimal performance, safety, and longevity of the system. This section provides detailed instructions on the routine maintenance tasks and checks that need to be performed.

5.1. Maintenance Tasks

Maintenance Task	Maintenance cycle
Check battery charge status if not in use: • If the battery module is not in use, fully charge and then discharge the battery to a state of charge (SOC) of 40-50%. • This helps to maintain the battery health and prevent deep discharge or overcharge conditions.	Every 3 months
Check for Damage:	Every 6 months

• Inspect the battery module for any signs of physical damage to the casing or connectors. • If any damage is found, contact after-sales service for assistance and do not use the damaged module.	
Mounting Brackets: • Ensure that the wall or floor mounting brackets are securely fastened and have not become loose. • Tighten any loose screws or bolts to ensure the battery module is firmly attached.	Every 6 months
Cable Inspection: • Check all power and communication cables for signs of wear, aging, or damage. • Replace any damaged cables immediately to prevent electrical hazards.	Every 6 months
Connection Check: • Verify that all cable connections are secure and free from corrosion. • Tighten any loose connections to maintain proper electrical contact.	Every 6 months

6. Errors and Solutions

Error	Error description	Error phenomenon	Error cause	Solution
Running light on Fault light on, no voltage output from battery	Battery self-protection function	The battery box has low battery and the fault light is on, indicating that there is no power supply to the battery box	The battery box is too low	The battery box must be charged immediately
		During the operation of the battery box, the battery indicator lights are all on, the fault light is not on, and the battery box has no output.	The battery box's battery level is too high	Charging the battery box must be stopped immediately.
		During the operation of the battery box, the fault light of the battery box is on.	Excessive current	Please refer to the parameter values of the charging and discharging currents of the corresponding model of battery box, and compare them with the technical parameters of the inverter or load.
			Excessive temperature	Stop using the battery, let it cool down or use external tools to force air cooling. If the temperature is too high frequently during

				normal use, contact after-sales personnel for handling.
			Low temperature	The charging temperature of the battery shall not be lower than 0 ℃, and the discharge temperature shall not be lower than 20 ℃.
	Incorrect use of battery box	After starting up, the fault light will be on.	Incorrect DIP switch setting	Check if the battery box dial switch is set correctly. If it is not correct, please refer to the user manual to set the dial switch.
		When the batteries are used in parallel, the fault light on the slave station battery box lights up, indicating that there are no faults when the slave station battery box is used alone.	Incorrect DIP switch setting	Check if the communication connection line between the battery box master station and the slave station is firmly connected, and check if the dial switch of the battery box master station and the slave station is set correctly. If it is not correct, please refer to the user manual to set the dial switch.
		When the battery box is first connected	Protective measures for parallel	Measure the positive and negative voltage

		in parallel, when the parallel connection system is turned on, the fault light of the slave station battery box is on, and there is no voltage output from the slave station.	connection of battery boxes to prevent damage to the battery boxes.	of each battery box. If the voltage difference between the battery boxes is greater than 2V, please keep the voltage difference below 2V before attempting parallel connection
The running light is on, the fault light is not on, and the battery has no voltage output	There is component damage in the battery box	No battery failure alarm, but no voltage output	Damaged internal components of the battery box	Please contact after-sales service personnel
Press the battery power button, all battery indicator lights do not light up	There is component damage in the battery box	The battery box indicator light is not on, and the battery has voltage output	The battery box indicator light is damaged, the circuit is loose or aged.	Please contact after-sales service personnel
		The battery box indicator light is not on, and the battery has no voltage output	Battery circuit board malfunction, loose or aged circuit board wiring.	Please contact after-sales service personnel
Other abnormalities				Please contact after-sales service personnel