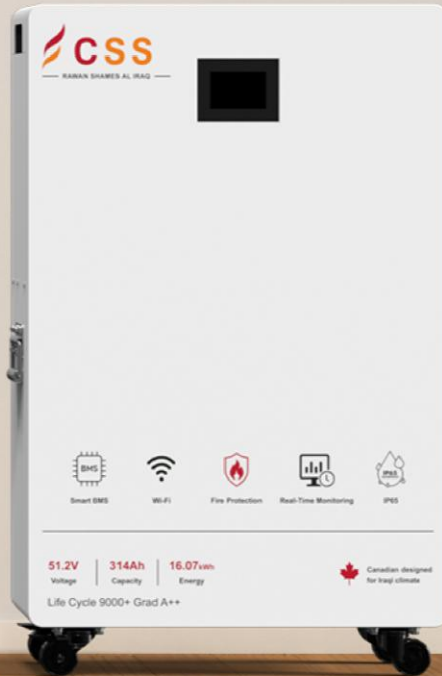




RAWAN SHAMES AL IRAQ

User Manual

B-LFP48 PW Series

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Version History

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Catalogue

01 Safety Instructions..... 1

1.1 Safety Symbol Description.....	1
1.2 General Security	1
1.3 Personal Safety	2
1.4 Battery Leakage Handling Measures	3
1.5 Electrical Safety	4
1.5.1 General Requirements.....	4
1.5.2 Wiring Requirements.....	4
1.5.3 Grounding Requirements	5
1.5.4 Maintenance Requirements.....	5
1.6 Mechanical Safety	5
1.7 Maintenance and Replacement	6

02 Product Introduction..... 7

2.1 Product Overview	7
2.2 Product Appearance.....	7
2.3 Product Specification.....	10
2.4 Configuration List	12
2.6 Product Applications	14

03 Product Installation 16

3.1 Pre-installation Storage.....	16
3.2 Pre-installation Inspection.....	16
3.3 Environment Requirement.....	16
3.4 Installation Tools	19

3.5 Installation Steps.....	20
3.6.1 Power Cable Connection.....	23
3.6.2 Communication Cable Connection	24
3.7 Installing Battery Strings in Parallel.	27
3.8 Electrical Connection Diagram.....	30
3.8.1 pack---1 Inverter. Single Mode.	30
3.8.2 3pack---1 Inverter.	31

04 Operation and Maintenance..... 32

4.1 Pre-energization Inspection.....	32
4.2 Power-on Procedure	32
4.3 Battery Display Screen	33
4.4 Power-off Procedure	34
4.5 Mobile application (App)	34
4.6 PC end cloud platform.....	37
4.6.1 Log in to the PC cloud platform.....	37
4.6.2 Operation Instructions	39
4.7 Supervisory computer monitoring.....	40
4.7.1 Product Upgrade Procedure	41
4.7.2 Installation and Selection of the Host Computer	43
4.8 Battery Fault Handling	47
4.9 Inspection and Maintenance.....	49

05 Warranty Services..... 50

5.1 Warranty Period.....	50
5.2 Warranty Scope.....	50
5.3 Disclaimer Statement.....	50

06 Appendix..... 51

Appendix A-Logo Description.....	51
Appendix B	52
Appendix C-Emergency handling	56
Appendix D-Exceptional Situation Explanation	58

01 Safety Instructions

1.1 Safety Symbol Description

When installing, operating and maintaining the equipment, please read this manual first and follow all safety precautions marked on the equipment and in the manual. To ensure that users can better use this product and protect personal and property safety, please read the following symbols carefully.



Danger Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



Warning Indicates a situation with a moderately hazardous situation which, if not avoided, could result in death or serious injury.



Caution: Indicates a situation with a low risk of hazard which, if not avoided, may result in moderate or minor injury.



Illustrate:: Emphasis and supplementation of content may also provide tips for optimal use of the product.

1.2 General Security



Illustrate:

This equipment should be used in an environment that meets the design specifications. Otherwise, it may cause equipment failure. The resulting equipment malfunction or component damage, personal safety accidents, property losses, etc. are not within the scope of equipment quality assurance. Local laws, regulations and specifications should be followed when installing, operating and maintaining the equipment. The safety precautions in the manual are only used as a supplement to local laws, regulations and specifications. The company does not assume responsibility for any of the following situations.

- 1.The installation and use environment exceeds the requirements of relevant international, national and regional standards.
- 2.Operation not within the conditions of use described in this manual.
- 3.Unauthorized disassembly, modification of products or modification of software codes.
- 4.Failure to follow the operating instructions and safety warnings in the product and documentation.
- 5.Equipment damage caused by abnormal natural environment (force majeure, such as earthquake, fire, storm, flood, mudslide, etc.).
- 6.Damage caused by the customer's failure to comply with transportation and installation requirements.

7. Damage caused by storage conditions not meeting the requirements of product documentation.
8. Damage to the hardware or data of the device due to customer negligence, improper operation or intentional damage .
9. System damage caused by a third party or customer , including relocation and installation of the system that does not comply with the requirements of this manual, and damage caused by adjustments, changes or removal of identification marks that do not comply with the requirements of this manual.
10. Defects, failures or damages caused by acts, events, omissions or accidents beyond the reasonable control of the Seller, including power outages or electrical failures, theft, war, riots, civil unrest, terrorism, intentional or malicious damage, etc.



Danger:

Elevated voltage is present in the equipment. Non-compliant operation may cause electric shock or fire, leading to death, serious personal injury, or significant property damage. Comply with the operating sequence and safety precautions provided in this manual and other relevant documents, and operate properly:

1. Check that the pre-installed cable connections are secure. Check the equipment for damage, such as holes, dents, or other signs of possible internal damage. Check that components inside the equipment have not shifted. Do not modify the structure or installation sequence of the equipment without authorization.
2. Do not clean electrical components inside the equipment with water. If liquid enters the equipment, immediately press the emergency stop button and notify the on-site manager.
3. Do not perform installation, wiring, maintenance, or replacement operations on live equipment. Before touching any conductor surface or terminal, measure the voltage at the contact point, confirm that the protective grounding wire of the equipment or the component requiring maintenance is reliably grounded, and confirm there is no electric shock risk.
4. Except for personnel operating the equipment, other personnel should not approach the equipment. Do not power on the equipment before installation is complete or without confirmation by a professional. During initial power-on or live main circuit operations, at least two personnel must be present on site.



Illustrate:

1. User operations and tools used during transportation, handling, installation, wiring, and maintenance must comply with the laws, regulations, and applicable standards of the relevant country or region.
2. Reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the device software are prohibited. It is forbidden to investigate the internal implementation of the device, obtain the source code of the device software, misappropriate intellectual property rights in any way, or disclose the results of any device software performance testing.

1.3 Personal Safety



Danger:

1. Wear appropriate personal protective equipment during equipment operation. If faults that may cause personal injury or equipment damage are detected, immediately terminate operations, report to the responsible person, and implement effective protective measures.
2. Before using tools, master their correct operation methods to avoid personal injury or equipment damage.
3. During equipment operation, certain internal surfaces may reach high temperatures posing burn hazards. Do not touch.
4. Ensure reliable grounding before use to guarantee personal safety and normal operation.
5. When battery modules fail, temperatures may exceed burn thresholds on touchable surfaces. Avoid contact.
6. Do not open or damage battery modules. Released electrolytes are harmful to skin and eyes. Avoid exposure.
7. Do not place unrelated objects on top of or insert into any part of the equipment.
8. Do not place flammable materials near the equipment.
9. Never expose batteries to fire to prevent explosion and personal danger.
10. Do not immerse battery modules in water or other liquids.
11. Never short-circuit battery module terminals. Short-circuiting may cause combustion.
12. Batteries may pose electric shock and high short-circuit current risks.
13. Do not clean internal or external electrical components with water or detergents.
14. Do not stand, lean, or sit on the equipment.
15. Do not damage any modules of the equipment.
16. If a battery module is dropped or subjected to severe impact during installation, discontinue use immediately. Continued operation poses safety risks (e.g., electrolyte leakage, electric shock).



Warning:

1. Remove watches, rings, or other metal objects.
2. Use tools with insulated handles.
3. Wear rubber gloves and boots.
4. Do not place small tools or metal parts on top of battery modules.
5. Disconnect charging power before connecting or disconnecting battery terminals.
6. Determine whether the battery is accidentally grounded. If accidentally grounded, remove the power source from the ground. Contact with any part of a grounded battery may cause electric shock. If such grounding is removed during installation and maintenance, the possibility of electric shock can be reduced.

1.4 Battery Leakage Handling Measures



Caution:

In the event of electrolyte leakage, take the following emergency measures according to the severity of the leakage.

1. Ensure adequate ventilation. Remove all ignition sources.
2. Quickly evacuate personnel to a safe area, away from the leakage zone and upwind.
3. Use personal protective equipment (PPE). Avoid inhaling vapors, fumes, gases, or dust.

- 4.If safe to do so, take measures to prevent further leakage or spillage.
- 5.For minor leaks, use dry sand or inert absorbent materials to contain the leakage. For major leaks, construct barriers to control spread.
- 6.Contaminated materials or collected residue must be stored in sealed containers and disposed of in compliance with local regulations.
- 7.Eliminate all ignition sources and use spark-proof tools and explosion-proof equipment.



Danger:

Avoid contact with leaked liquid or gas during leakage incidents. The electrolyte is corrosive and may cause skin irritation or chemical burns. If exposed to battery electrolyte, take these immediate actions.

- 1.Inhalation: Evacuate the contaminated area immediately; move to fresh air; maintain clear breathing; administer oxygen if breathing is difficult; do not perform mouth-to-mouth resuscitation if the victim ingested/inhaled the substance; if breathing stops, begin CPR immediately; seek urgent medical assistance.
- 2.Eye Contact: Flush eyes with copious clean water for at least 15 minutes (hold eyelids open); do not rub eyes; obtain immediate medical help.
- 3.Skin Contact: Remove contaminated clothing immediately; wash affected area thoroughly with plenty of water and soap; seek prompt medical aid.
- 4.Ingestion: Do NOT induce vomiting; never give oral substances to unconscious persons; seek emergency medical care.
- 5.First Responder Protection: Ensure medical personnel are informed of the electrolyte's hazards; implement personal protective measures to prevent exposure and cross-contamination.

1.5 Electrical Safety

1.5.1 General Requirements



Illustrate:

- 1.All electrical connections must comply with the electrical standards of the country/region where the equipment is located.
- 2.Installation, operation and maintenance must strictly follow the manual procedures. Unauthorized equipment modifications or installation sequence changes are prohibited.
- 3.Temporary fencing and "No Entry" signs must be installed in work areas. Unauthorized personnel are strictly prohibited from entering.
- 4.Tools must be registered and inspected for completeness before operation, and counted after operation to prevent being left inside the equipment.



Danger:

Before performing electrical connections, ensure the equipment is undamaged to prevent electric shock or fire hazards. Prior to installing power cables, verify the cable labels are correct and terminal insulation protections are intact. Do not energize the equipment until installation is complete and verified by qualified personnel.

1.5.2 Wiring Requirements

1. Select cables that comply with local laws and regulations. Cables of the same type shall be bundled together, while different types shall be routed separately. Intertwining or cross-routing of cables is strictly prohibited.
2. Remove sharp edges from cable trays/conduit holes. Install protective sleeves at wire penetration points to prevent insulation damage.
3. Maintain a minimum distance of $\geq 30\text{mm}$ between cables and heat-generating components to prevent insulation degradation due to high temperatures.
4. When installing cables in environments below 0°C :
 - All cables must be installed in environments above 0°C ;
 - If storage temperature was below 0°C , relocate cables to a warm environment ($\geq 0^{\circ}\text{C}$) for at least 24 hours prior to installation.



Danger: Never install or remove power cables while energized. Contact between power conductors and terminals may generate electric arcs/sparks, potentially causing fire or personal injury.

1.5.3 Grounding Requirements

1. The equipment must be permanently connected to a protective grounding conductor. Verify reliable grounding before operation.
2. Do not operate the equipment without installing the grounding conductor. Damaging the grounding conductor is strictly prohibited.
3. Grounding impedance must comply with local electrical standards. Regularly test grounding reliability.
4. For three-core socket equipment: Ensure the grounding terminal connects to protective earth. For equipment with high touch current: Ground before connecting to power supply.

1.5.4 Maintenance Requirements

1. Before connecting or disconnecting cables, disconnect the protective switch of the corresponding circuit.
2. Use a multimeter rated for the applicable voltage level to verify de-energization and ensure complete power-off.
3. Hang "Do Not Close" tags on upstream/downstream switches and post warning signs during maintenance. Re-energize only after the malfunction is fully resolved.



Illustrate:

1. Before connecting cables, confirm that the cable labels are correct before proceeding with the connection.
2. For equipment with multiple inputs, disconnect all inputs to the equipment. Operation may only be performed after the equipment is fully powered down.
3. After completing maintenance, remove the grounding wire between the maintenance circuit and the grounding circuit.

1.6 Mechanical Safety

1. When manually handling equipment, assess weight-bearing capacity and wear protective gear including gloves and safety toe boots.

2. Move equipment carefully during handling to prevent impact or drops. Avoid scratching surfaces, damaging components, or compromising cables.

3. During transportation, large equipment may obstruct operator's view; assign assistants to ensure safe movement.

1.7 Maintenance and Replacement

Perform equipment maintenance only after thoroughly understanding this manual and with appropriate tools/testing devices.

1. Before maintenance work, de-energize the equipment and wait for the duration specified on the delayed-discharge label to ensure complete power-off before operation.

1. During maintenance, restrict access to unauthorized personnel. Erect temporary warning signs or barriers for isolation.

2. Contact your distributor immediately for equipment malfunctions.

3. Do not re-energize until malfunctions are fully resolved. Failure to comply may cause expanded failures or equipment damage.

4. Unauthorized opening of covers is prohibited due to electrocution risks. Resulting damages void warranty coverage.

5. Operators and technicians must receive comprehensive safety and maintenance training. Perform tasks only with adequate precautions and personal protective equipment.

6. When relocation or rewiring is required, the power input must be disconnected. After waiting 5 minutes for complete internal energy discharge and verifying the absence of hazardous voltage on DC busbars and maintenance areas using a multimeter, maintenance may commence.

7. Battery maintenance must be performed/supervised by personnel trained in battery handling and safety protocols.

8. Replace batteries only with identical types.

9. After maintenance, immediately verify no tools or components remain inside the equipment.

For prolonged storage: Follow battery preservation and recharging procedures specified in this manual.

02 Product Introduction

2.1 Product Overview

This product is a home energy storage battery system. Comprising an LFP battery pack and BMS, it operates with energy storage inverters to regulate electricity consumption. Simultaneously, it generates power via photovoltaic solar systems, prioritizing supply to household appliances to achieve household green power utilization.

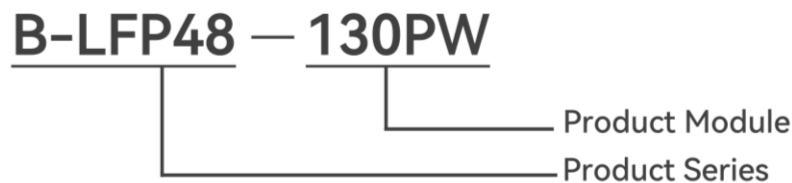


Figure2.1

No.	Meaning	Description
1	Product Module	Wall-mounted home battery
2	Product Series	Battery type: LiFePO ₄ (Phosphate Iron Lithium)

Table 2.2

2.2 Product Appearance

100PW:

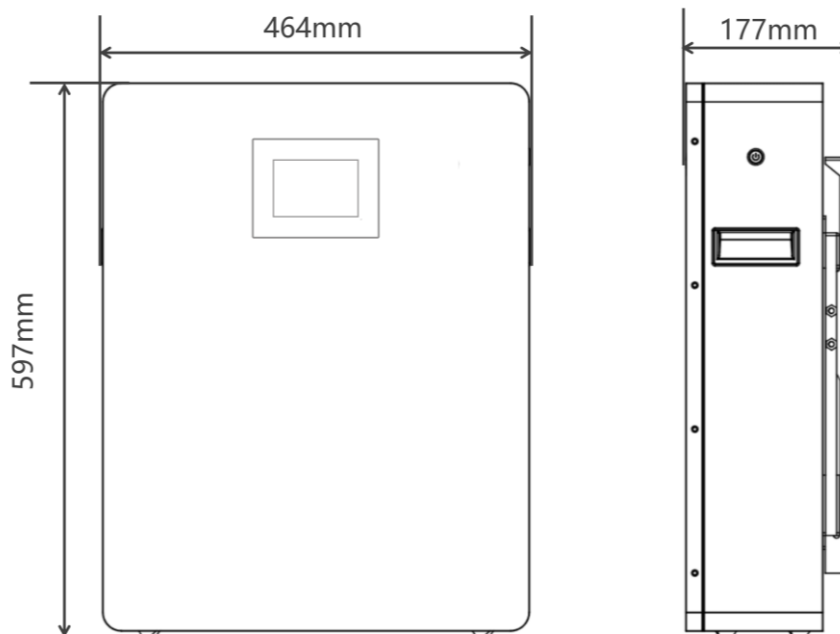


Figure2.2-2

130PW:

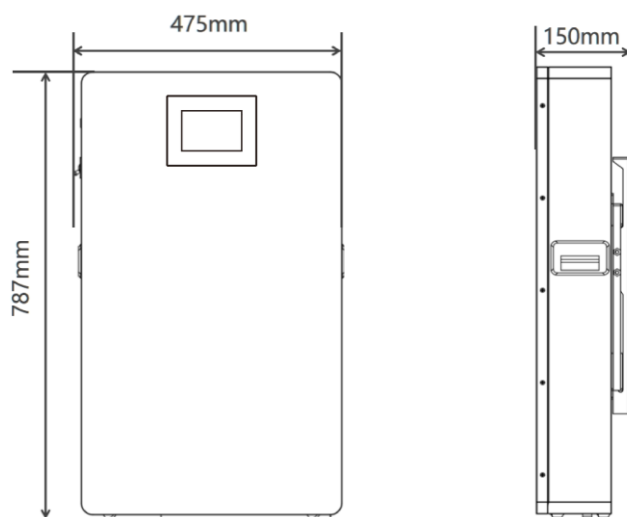


Figure2.2-1

200PW:

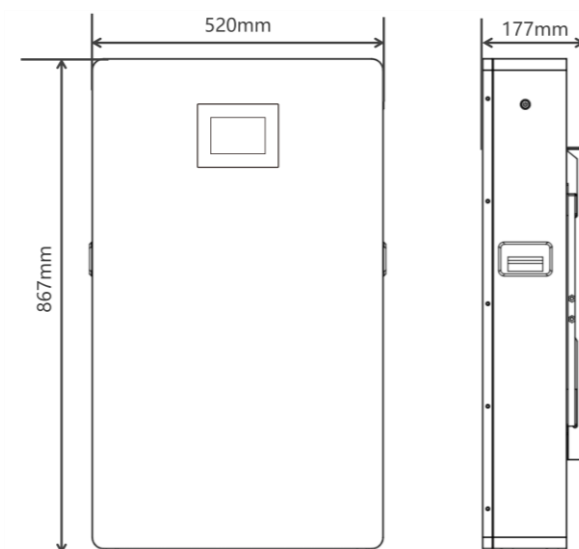
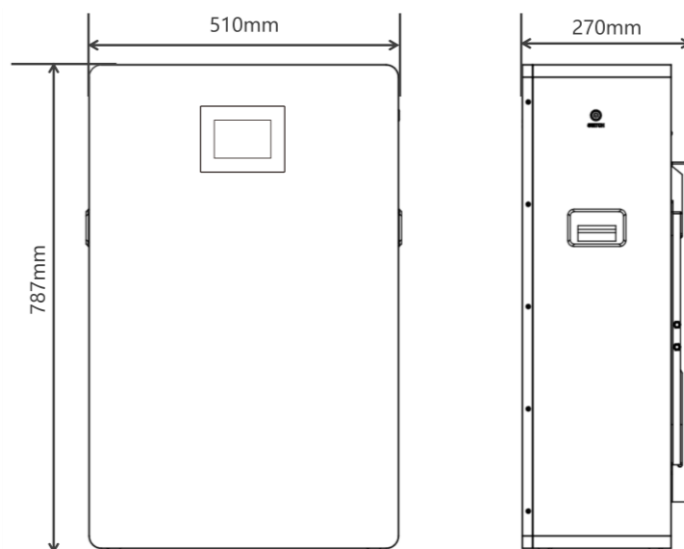


Figure2.2-3

300PW/314PW:
(Without Wheels)



(With Wheels)

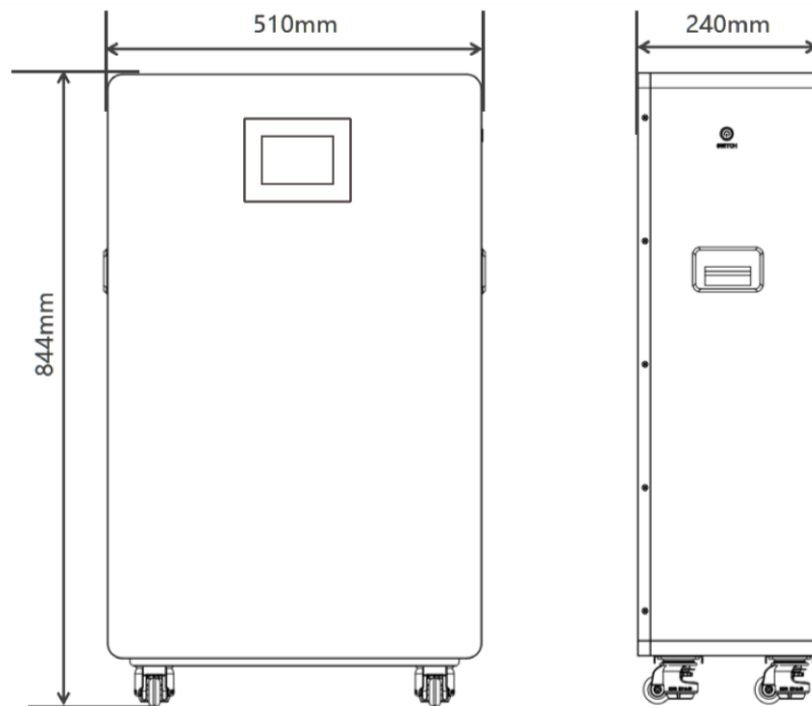


Figure2.2-4

300PW (Side Connection) :

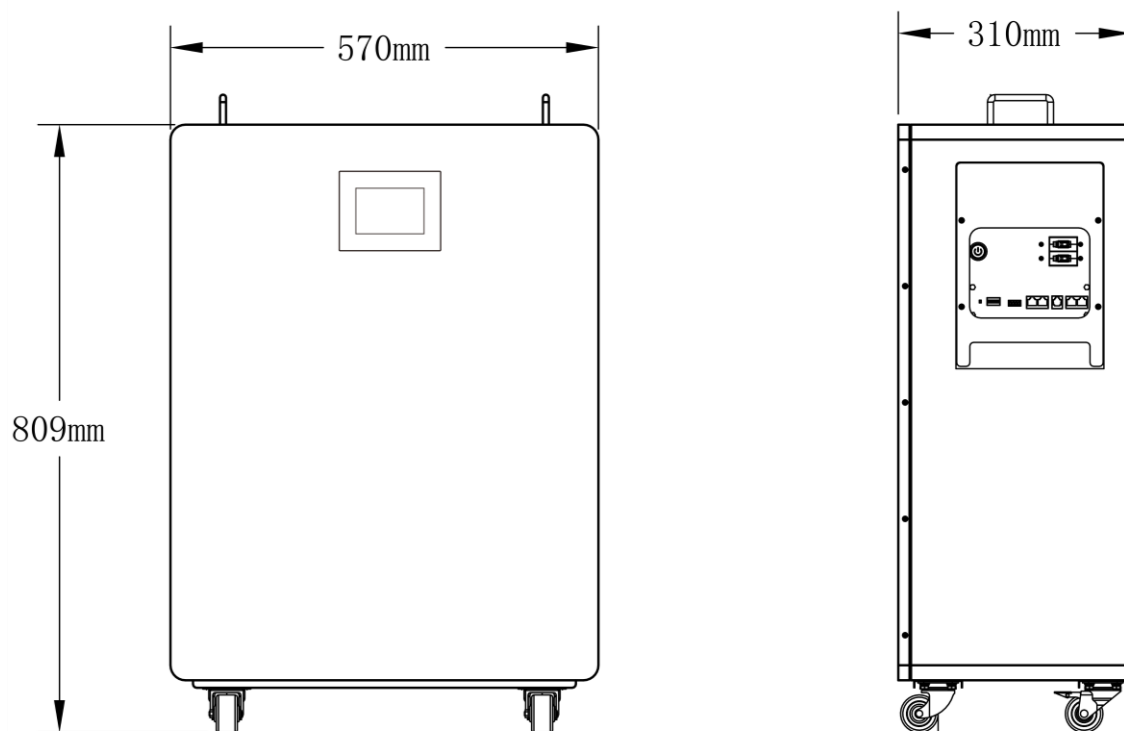


Figure2.2-4



Illustrate: Actual product configuration varies per project and is dependent on the final delivered unit.

2.3 Product Specification

Item	General Parameter		
Nominal Voltage	51.2V		
Rated Capacity (Ah)	100	200	300
Cell Model (LFP-3.2V)	100Ah	100Ah	300Ah
Pack Configuration	16S1P	16S2P	16S1P
Rate Power (Wh)	5120	10240	15360
Charging Voltage	55V		
Charging Rate Current/Power	40A / 2.048kW	80A / 4.096kW	80A / 4.096kW
Charging Max Current/Power	80A / 4.096kW	160A / 8.192kW	160A / 8.192kW
Discharging Rate Current/Power	100A / 5.12kW (25±2°C)	200A / 10.24kW	200A / 10.24kW
Discharging Max Current/Power	120A / 6.144kW, 1s	220A / 11.264kW, 1s	220A / 11.264kW, 1s
Depth Of Discharge(%)	90%		
Protection Level	IP20		
Dimension(mm)(W*D*H)	460*147*590	510*147*860	510*270*778
Weight	50kg±3%	91.5kg±3%	115kg±3 (wheels) /117kg±3% (no wheels)
Communication protocol	RS232, RS485, CAN, WIFI(Optional), Bluetooth(Optional)		
Host software and Communication protocol	RS232		
Operation Temperature Range	Charge:0~55°C Discharge: -20~55°C		
Storage Temperature Range(recommend)	20%~40% SOC, 0°C~35°C, humidity≤60%		

Table 2.3-1

Item	General Parameter	
Nominal Voltage	51.2V	
Rated Capacity (Ah)	130	314

Cell Model (LFP-3.2V)	127Ah	314Ah
Pack Configuration	16S1P	16S1P
Rate Power (Wh)	6500	16076
Charging Voltage	55V	
Charging Rate Current/Power	80A / 4.096kW	80A / 4.096kW
Charging Max Current/Power	160A / 8.192kW	160A / 8.192kW
Discharging Rate Current/Power	127A / 6.502kW [2C(optional)]	200A / 10.24kW
Discharging Max Current/Power	200A / 10.240kW [2C(optional)]	220A / 11.264kW, 1s
Depth Of Discharge(%)	90%	
Protection Level	IP20	
Dimension(mm)(W*D*H)	460*120*780	510*270*778 (With wheels: 510*240*844)
Weight	55kg±3%	135kg±3%
Communication protocol	RS232, RS485, CAN, WIFI(Optional), Bluetooth(Optional)	
Host software and Communication protocol	RS232	
Operation Temperature Range	Charge:0~55°C Discharge: -20~55°C	
Storage Temperature Range(recommend)	20%~40% SOC, 0°C~35°C, humidity≤60%	

Table 2.3-2

Item	General Parameter (300PW (Side Connection))
Nominal Voltage	51.2V
Rated Capacity (Ah)	300
Cell Model (LFP-3.2V)	300Ah
Pack Configuration	16S1P
Rate Power (Wh)	15360
Charging Voltage	55V

Charging Rate Current/Power	150A / 7.680kW
Charging Max Current/Power	160A / 8.192kW
Discharging Rate Current/Power	150A / 7.680kW
Discharging Max Current/Power	200A / 10.240kW
Depth Of Discharge(%)	90%
Protection Level	IP20
Dimension(mm)(W*D*H)	570*310*809
Weight	55kg±3%
Communication protocol	RS232, RS485, CAN, WIFI(Optional), Bluetooth(Optional)
Host software and Communication protocol	RS232
Operation Temperature Range	Charge:0~55°C Discharge: -20~55°C
Storage Temperature Range(recommend)	20%~40% SOC, 0°C~35°C, humidity≤60%

Table 2.3-3



Illustrate: All product specifications are subject to updates and changes without notice.

2.4 Configuration List

Configuration List Table

Name	Qty	Remarks
Battery Pack	1 set	Includes wall-mounted bracket
User's Manual	1 copy	Electronic version
Matching accessories	1 set	Includes power cable and communication cable
Expansion Screws M8*50mm	1 set	10 pieces in total

Table 2.4

2.5 Interface Description

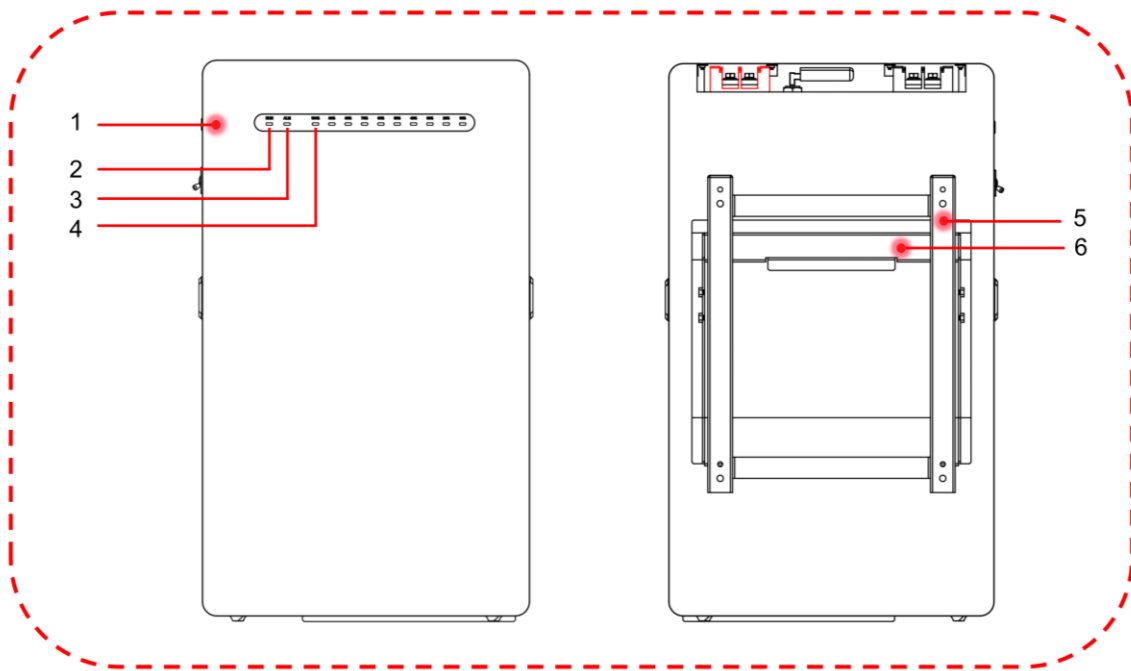


Figure2.5-1

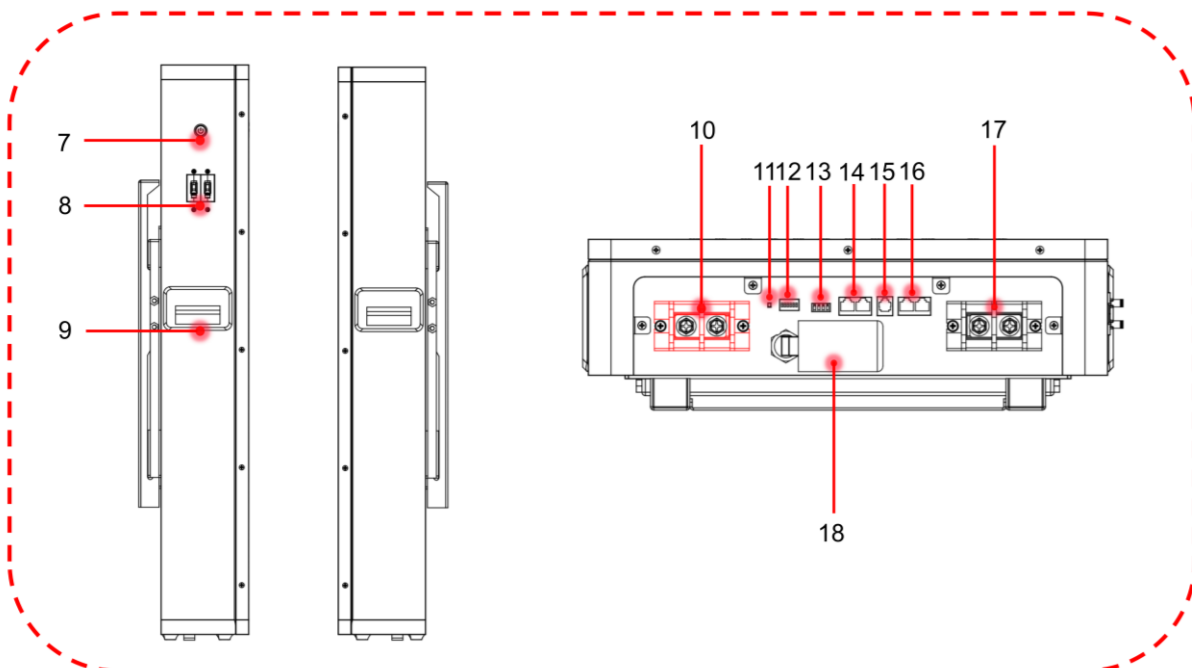


Figure2.5-2 Interface Definition Description

Table1.Battery Pack Front Panel Port Definition

No.	Illustration	Silk-screen	Remark
1	Battery pack	/	Battery pack assembly
2	Running indicator light	Run	After startup, the LED blinks green

3	Alarm indicator light	ALM	The fault is displayed in red
4	Capacity indicator light	SOC	Refer to Table 4.3-1
5	Fixed bracket	/	For fixing to the wall when mounting the battery on the wall
6	Mounting bracket	/	Mounting bracket for securing
7	Switch	/	Used to start the BMS
8	DC Breaker	On/Off	For starting the battery
9	Battery handle	/	Facilitates battery handling
10	Battery positive	+	positive output
11	Reset	Reset	For restarting the battery system
12	Dial switch	DIP	Address setting, range 1~63
13	Dry connection	DRY	Default: Pin1 to pin2 usually open, closed when SOC≤10%. pin3 to pin4 usually open, closed when SOC≥100%.
14	RS485 Port	RS485	RS485 communication with monitoring equipment or inverter
15	CAN bus port	CAN	CAN bus and inverter connection ports
16	RS232 port	RS232	Communicate with the upper computer
17	RS485-1/2 port	RS485-1/R S485-2	RS485 paralleling communication port
18	Battery negative	—	negative output

Table 2.5

2.6 Product Applications

This product is a household energy storage battery pack. The system is matched with a 5.1kwh/6.5kwh/10.2kwh/15.3kwh lithium iron phosphate battery pack. This product can be used in conjunction with electricity, so that electricity consumption can be adjusted. This product supports a variety of application modes, such as PV self-use surplus power to grid, peak shaving and valley filling, standby power supply, etc. The specific operation logic is as follows.

1.PV Self-use Surplus Power to Grid

Under the condition of good illumination in the daytime, the DC power from PV panel is changed into AC through inverter to supply power for household load. If the household load cannot run out of photovoltaic power, the remaining power will be stored in the

battery. If the battery is full, photovoltaic power will be supplied to the grid. In the night or rainy days, photovoltaic cannot generate electricity. The battery supplies power to the home load through an inverter. If the battery SOC is low, the household load will take power from the grid.

2. Peak Shaving and Valley Filling

In some countries and regions where peak valley time of use price is implemented, if the difference between peak price and low price is large, the application mode of peak shaving and valley filling can be adopted in energy storage system. In the low electricity price period, the energy storage system is charged; in the peak period of electricity price, the energy storage system supplies power to the household load. It can avoid users using too much power grid when the electricity price is high and save energy expenditure.

3. Standby Power Supply

In some extreme weather (such as tornadoes, typhoons, hail), or substation operation failure, power supply will be interrupted. If the energy storage system is installed, the user can still enjoy sufficient power guarantee under this situation.

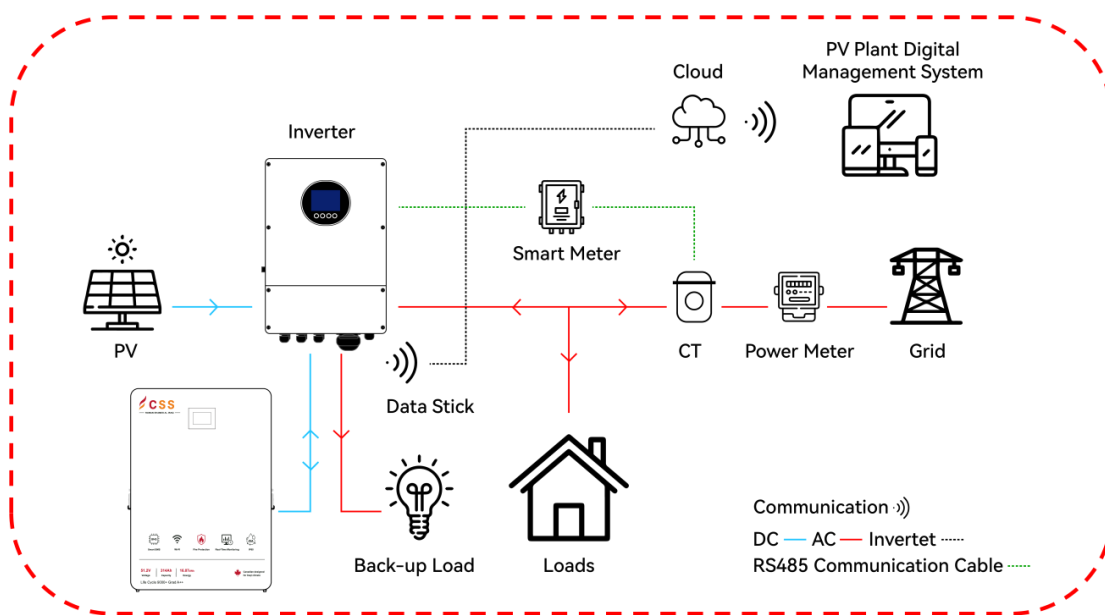


Figure 2.10



Illustration:

The product application modes and operational logic described above are based on typical scenarios. Actual performance and suitability will depend on various factors including user-specific installation environments, local grid policies and regulations, equipment configuration, and usage habits.

03 Product Installation

3.1 Pre-installation Storage

1. Preparation before storage : Make sure the outer packaging box of the equipment is intact and do not dismantle it ; make sure the desiccant in the box is not lost to keep the inside dry.

2.Storage environment requirements: When storing the equipment, keep it away from flammable, explosive, or corrosive materials.It is recommended to install a sunshade above the battery to avoid direct sunlight, rain, and snow accumulation. Ensure the storage environment is clean with appropriate temperature and humidity ranges, and free from condensation.

3.Battery storage requirements: It has the IP20 ingress protection, which only allows it to be installed indoor.Before installing the battery system, lay out available floor space or wall space including aisles for installation, maintenance and possible battery pack replacement.

4.Storage temperature range: 0°C to 35°C, with charging required at least once every 3-6 months.

5.Storage humidity range: Storage humidity should be 5-60%RH without condensation. If moisture or condensation is found on battery terminals, do not install the battery system and handle it appropriately.

3.2 Pre-installation Inspection

1.External packaging inspection: Verify the outer packaging is intact and undamaged, including checking for deformation, openings, cracks, or other signs that may indicate internal equipment damage.

2.Equipment model and delivered components inspection: Confirm the equipment model matches the order; verify the types and quantities of delivered components are correct, and inspect for any visible damage.

3.3 Environment Requirement

1.Installation environment requirements: The equipment must not be installed in flammable, explosive, or corrosive environments; the installation location should prevent access by children and avoid areas prone to accidental contact; simultaneously note that surfaces may become hot during operation to prevent burn injuries.

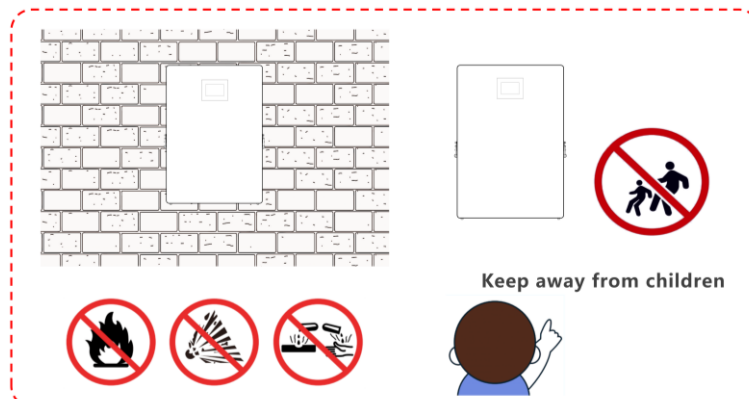


Figure 3.3-1

2.Installation Location Precautions: Avoid installing where water pipes, cables, or similar utilities exist within walls to prevent damage to the battery; the installation environment must avoid direct sunlight exposure, rain, and snow accumulation. It is recommended to install in a well-ventilated indoor area.

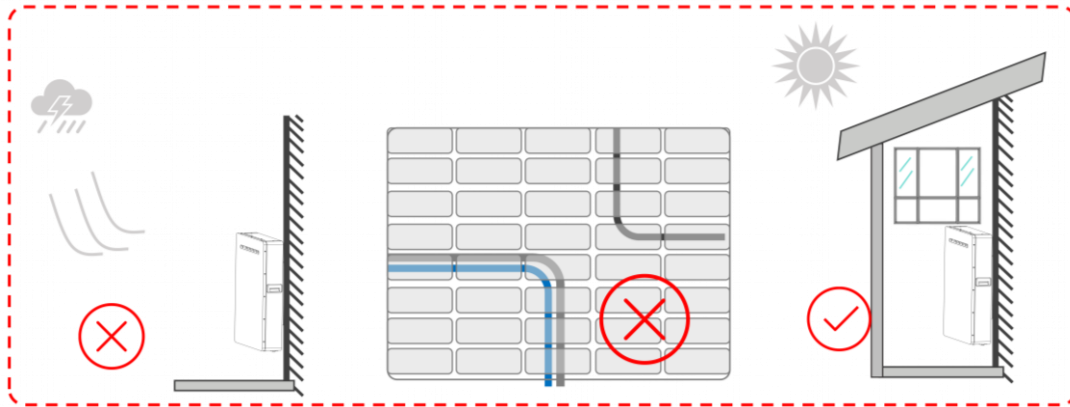


Figure 3.3-2

3.Installation space and environmental conditions: Ensure the installation space meets equipment ventilation, heat dissipation, and operational clearance requirements; This series of products is only suitable for indoor installation, and ambient temperature/humidity must remain within appropriate ranges.

4.Clearance Requirement: To guarantee proper heat dissipation and ease of disassembly, the minimum space around the rechargeable battery must meet the standards indicated below:

- (1) No matter which floor mounting or wall mounting is chosen, a distance between 200 and 300 mm wide shall be provided from the wall to the edge of the battery Pack.
- (2) No matter which floor mounting or wall mounting is chosen, a distance 300 mm wide shall be provided from the left side edge of a battery pack to the right-side edge of the neighboring battery packs.
- (3) In the case of floor mounting, 55 mm shall be provided from the rear side of the battery pack to the wall.
- (4) In the case of wall mounting, the distance between 300 and 350 mm shall be provided from the ground to the bottom of the battery pack.
- (5) There should be no water pipes in the wall where the battery is installed to prevent excessive moisture for the battery.

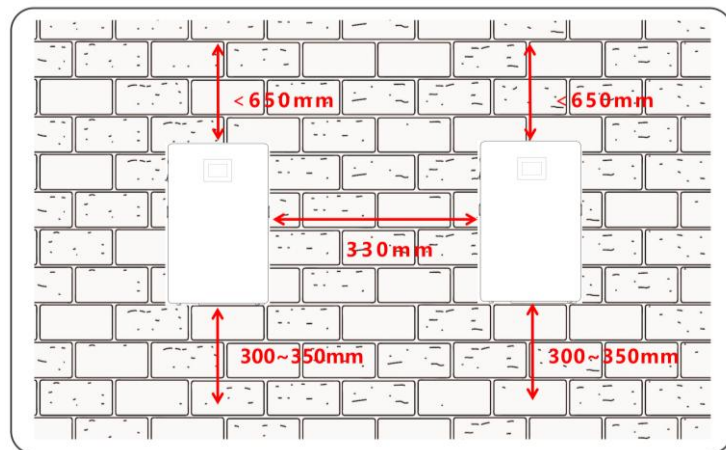


Figure 3.3-3

5.Equipment installation height and protection: Installation height should enable easy operation/maintenance with clear visibility of indicators/labels and terminal accessibility; installation altitude must not exceed 2000 meters.

6.Electromagnetic interference protection: Install batteries >30 meters from strong magnetic fields or radio equipment below 30MHz to prevent interference.

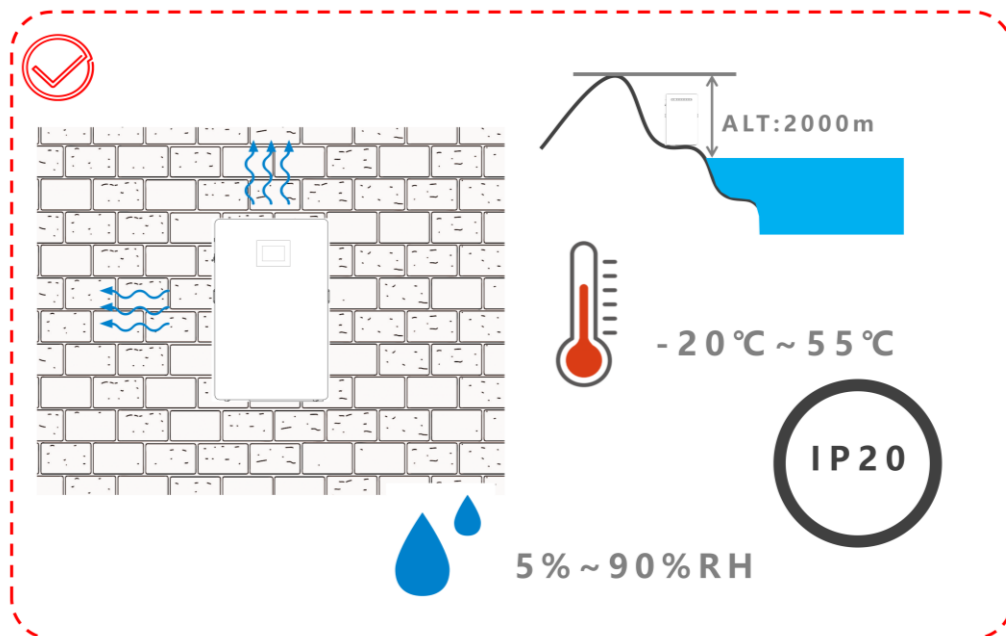


Figure 3.3-4

7.Electromagnetic interference protection: Install batteries >30 meters from strong magnetic fields or radio equipment below 30MHz to prevent interference.

8.Installation angle requirements: The equipment must be installed horizontally without tilting or inversion. Installation shall comply with product technical documentation; where unspecified, vertical installation is preferred with tilt angle not exceeding 5°.

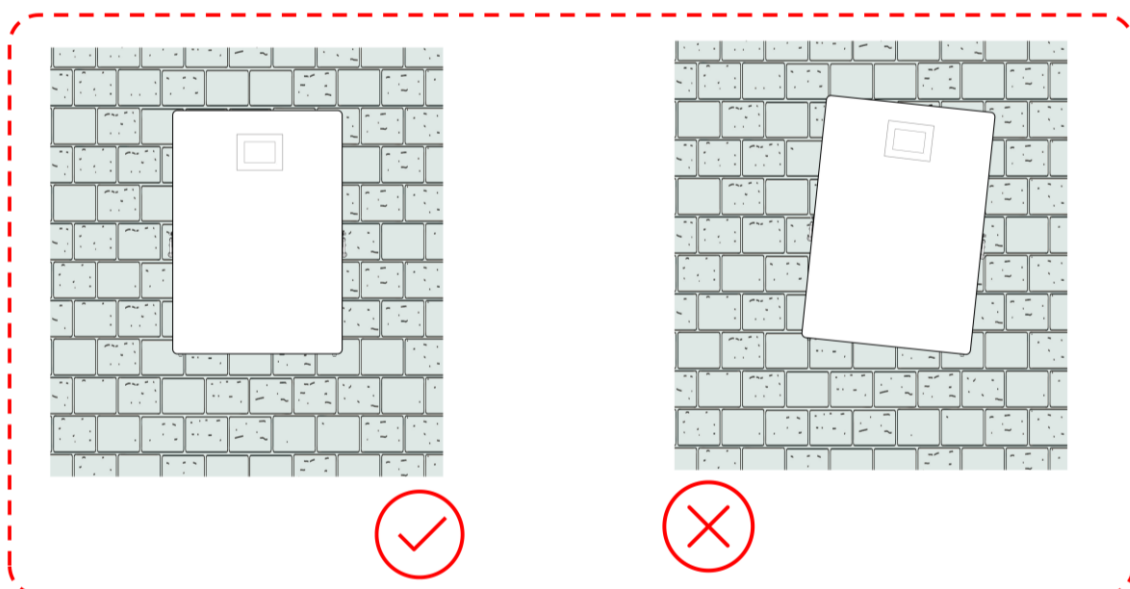


Figure 3.3-5

3.4 Installation Tools

Installation Tools Table

No.	Tool Name	Legend
1	Insulating gloves	
2	Safety goggles	
3	Insulating shoes	
4	Work clothes	
5	Safety helmet	
6	Screwdriver	
7	Wire stripper	
8	Hydraulic clamp	
9	Heat gun	
10	Multimeter	
11	Torque wrench	
12	Marker pen	

Table 3.4



Illustration: This table is for reference only. Actual tools required shall comply with local installation standards.

3.5 Installation Steps



Warning : Due to the battery weight, two or more persons are required to move the equipment.

Strictly follow installation procedures. The company shall not be liable for any injuries or losses resulting from improper assembly or operation.

Step 1 :Unpacking the battery:

The rechargeable battery undergoes 100% testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur.

Before unpacking the rechargeable battery, please verify that the model and outer packing materials for damage, such as holes and cracks.

Unpacking the battery pack according to the following figures. If there are other Cartons, such as the rack carton, cabinet carton, cables carton, or cartons about Wall mounting, the unpacking procedure can also be referred to the following Figures.

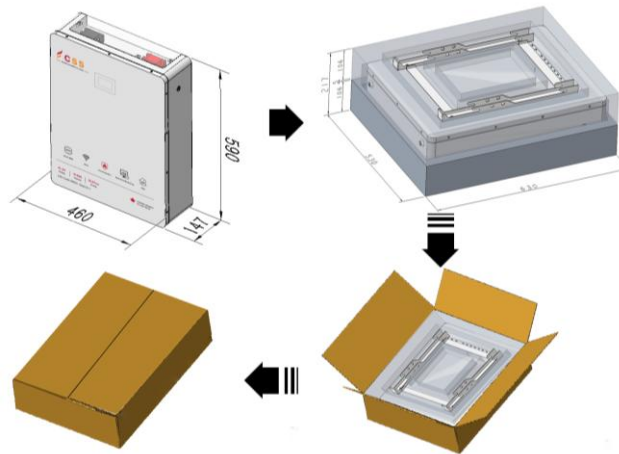


Figure3.5-1 Unpacking the battery pack



Illustration:

- (1) Be careful when dealing with all package materials which may be reused for storage and relocation of the rechargeable battery in the future.
- (2) Upon opening the package, check whether the appearance of the rechargeable battery is damaged or lack of accessories. If any damage is found or any parts are missing, contact your dealer immediately.

Step 2: Mounting Bracket Installation

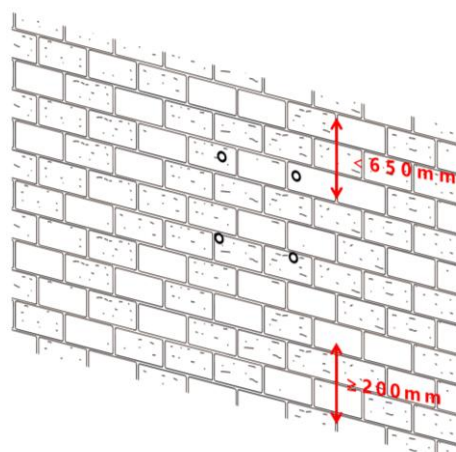


Figure 3.5-2

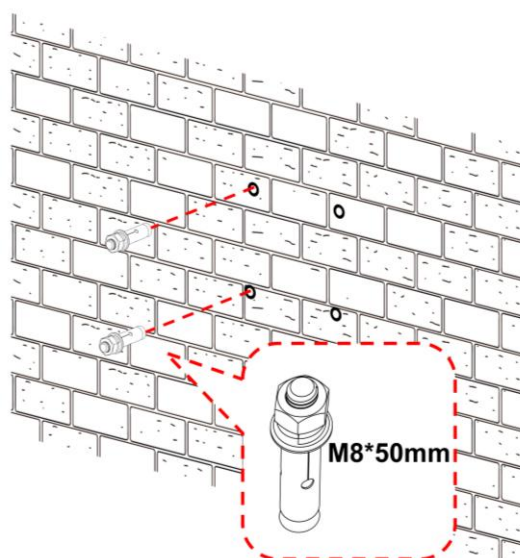


Figure 3.5-3

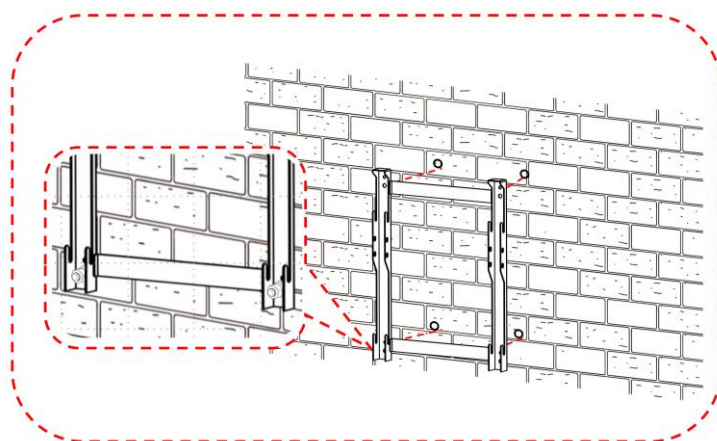


Figure 3.5-4 Securing wall-mount bracket with nuts

- ① Keep installation points within 650mm from the ground.
- ② Securely anchor wall-mount bracket using M8×50mm expansion bolts.

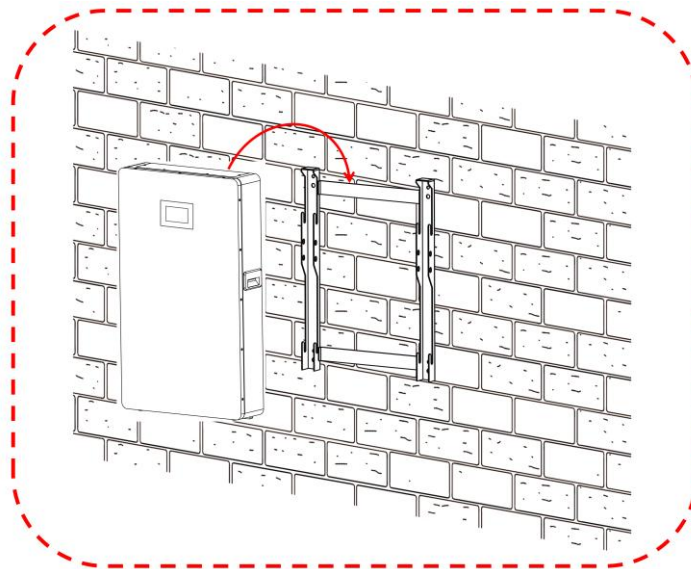


Figure 3.5-5

Step 3: Rail Mounting

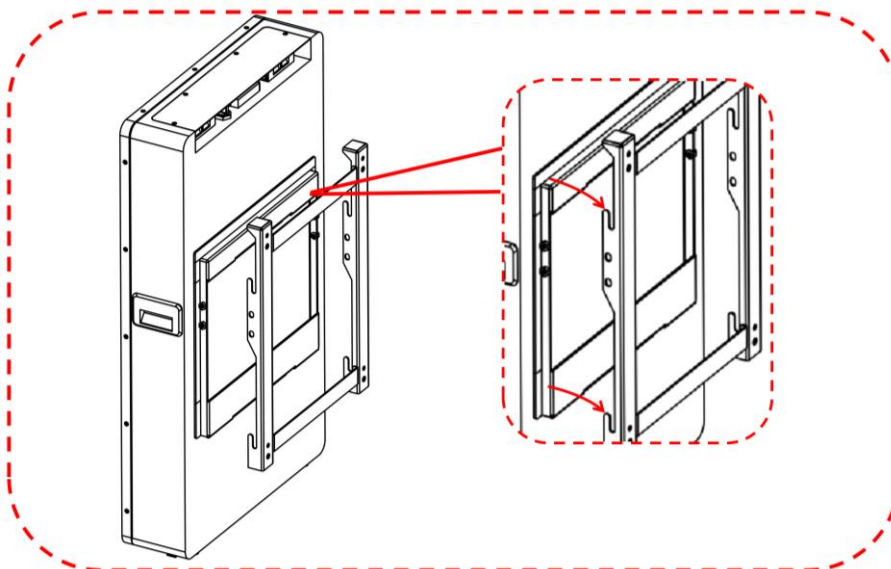


Figure 3.5- 6

Fix the wall-mounted battery bracket onto the support and tighten the nuts on both sides.



Caution :When using rail support installation, the rail must match the product specifications. Deformed or non-compliant rails shall not be used.

3.6 Electrical Connection



Danger :

1.Safe power-off operation

Before performing any operation on the equipment in the battery system, ensure that the equipment is completely powered off to prevent electric shock accidents.

Strictly abide by the safety precautions in this manual and the safety signs on the equipment.

2. Electrical connection specifications

During the electrical connection process, cables and components that meet the requirements of local laws and regulations must be used.

Cables of the same type should be bound together, and arranged separately from cables of different types to avoid mutual entanglement or crossing of cables.

3. Precautions for crimping of terminal blocks

When crimping the terminal blocks, ensure that the conductor part of the cable is in full contact with the terminal blocks.

It is strictly forbidden to crimp the cable insulation with the terminal blocks. This may cause the equipment to fail to operate normally, or cause heat due to unreliable connection during operation, which may further damage the inverter terminal block.



Caution :

1. Electrical connection operations are restricted to professional personnel only;
2. The cable colors shown in the diagrams are for reference only, and the actual selection should be based on specific circumstances;
3. Ensure that the specifications of the cables used comply with local laws and regulations.

3.6.1 Power Cable Connection

External Power Cables (Factory pre-installed)

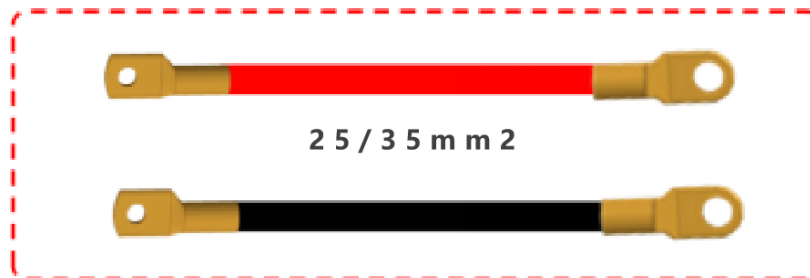


Figure 3.6.1-1

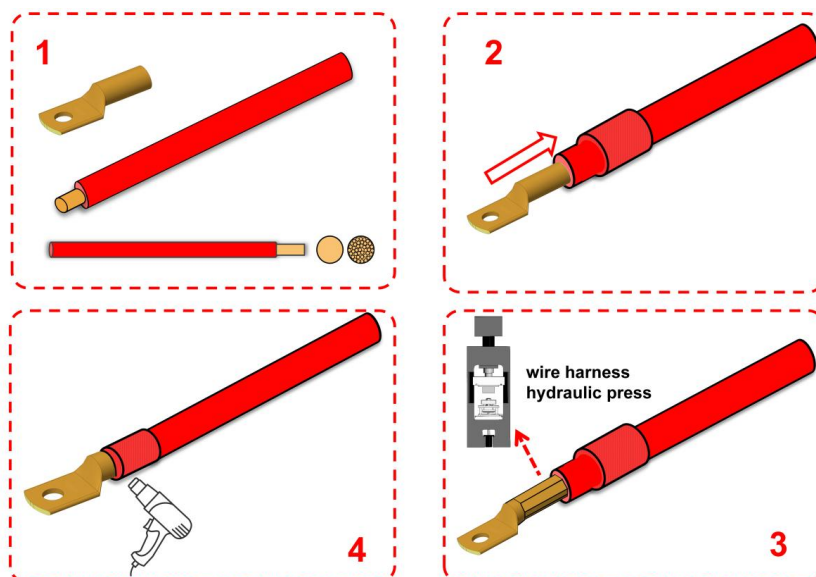


Figure 3.6.1-2

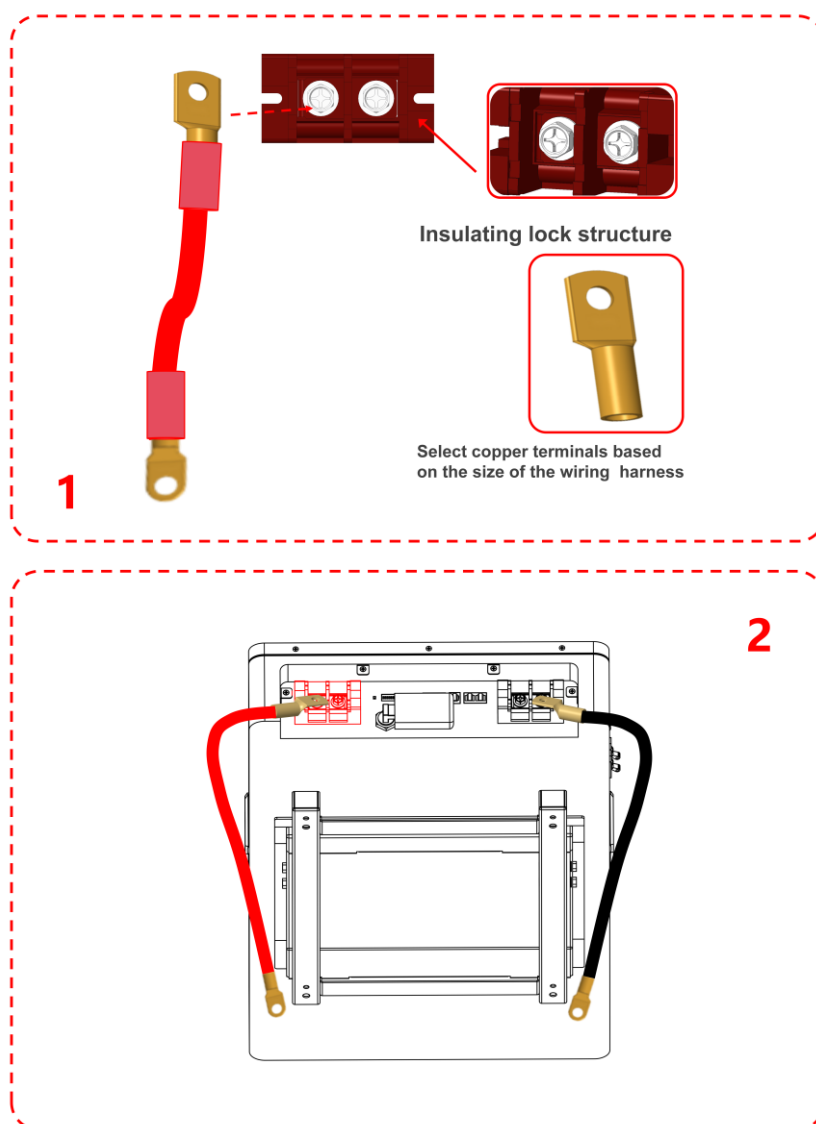


Figure3.6.1-3



Illustration: When connecting power cables:

At both ends of the power cord, there are crimp terminals for users to connect to the inverter.

3.6.2 Communication Cable Connection



Caution :

- 1.Users should decide whether to use the communication cable provided with the inverter according to installation requirements, and refer to the user manual for cable specifications and connection methods.
- 2.For communication cables purchased by users themselves or provided by the manufacturer, it is recommended to use standard Ethernet cables with RJ45 crystal connectors as the connection solution.

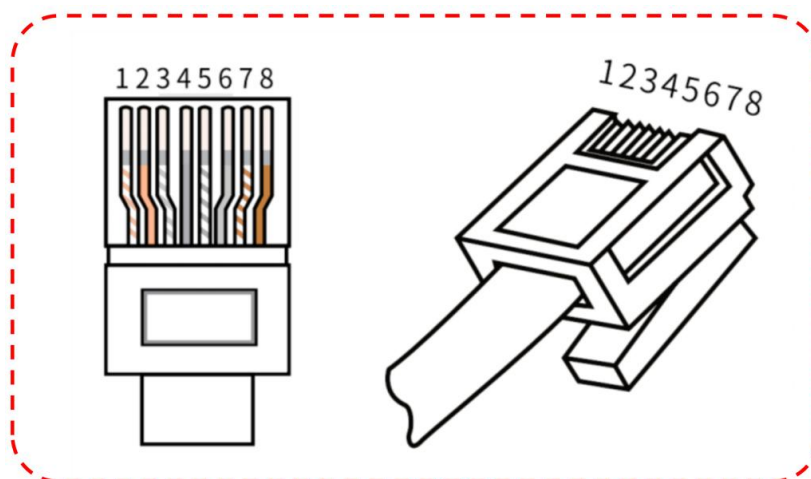


Figure 3.6.2-1

RS232 Communication: The BMS communicates with host computers via RS232 interface, enabling monitoring of battery parameters including voltage, current, temperature, status, and manufacturing data. Default baud rate: 9600bps.

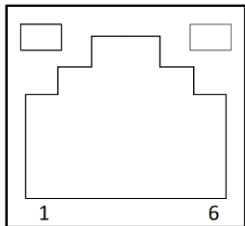
CAN Communication: Default baud rate 500K. This interface connects to inverters. When configured as master, it aggregates slave data for inverter communication.

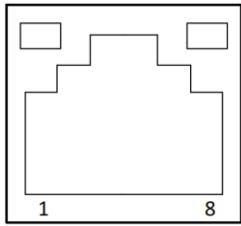
Parallel RS485 Communication: Default baud rate 9600bps. For battery parallel clusters, the master unit uses RS485 for inter-PACK communication, polling data via DIP switch addresses to monitor battery status.

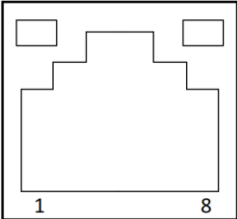
Independent RS485 Communication: Default baud rate 9600bps. Interfaces with inverters. In master configuration, aggregates slave data for inverter communication.

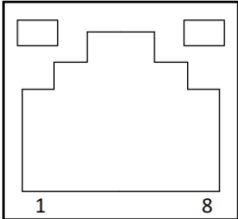
WiFi Communication : The BMS connects to cloud platforms via WIF module, enabling remote monitoring of voltage, current, temperature, status, SOC, SOH, and manufacturing data. Default baud rate: 9600bps.

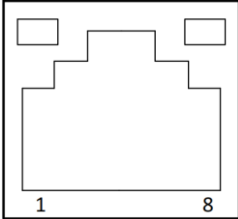
DIP Switch Settings : During parallel cluster operation, BMS automatically assigns addresses via DIP switches. Master units receive primary addresses; slaves get sequential addresses. All addresses are dynamically allocated by BMS without manual configuration.

Picture (RS232)	PIN	Description
	1	NC
	2	NC
	3	TX
	4	RX
	5	GND
	6	NC

Picture(CAN)	PIN	Description
	1	NC
	2	GND
	3	NC
	4	CAN-H
	5	CAN-L
	6	NC
	7	NC

	8	NC
Picture (RS485)	PIN	Description
	1	NC
	2	GND
	3	NC
	4	CAN-H
	5	CAN-L
	6	NC
	7	NC
	8	NC

Picture (RS485-1)	PIN	Description
	1	RS485-B
	2	RS485-A
	3	GND
	4	NC
	5	NC
	6	GND
	7	RS485-A
	8	RS485-B

Picture (RS485-2)	PIN	Description
	9	RS485-B
	10	RS485-A
	11	GND
	12	NC
	13	NC
	14	GND
	15	RS485-A
	16	RS485-B

Item	Figure	Specification
Rack-mounted battery and network cable(Standard Configuration)	white/0.3m	with RJ-45 connector
Victrion inverter connection cable - for connecting inverter(optional)	blue/3m	Customized energy storage battery
Multiple universal connection cables for inverters - for connecting inverters(optional)	black/3m	two-ended crimped crystal connector
RS232 serial communication cable (optional)	black/1.8m	With USB to RS232 conversion,Both ends

have USB and RJ11 plugs

Table 3.6.2-3

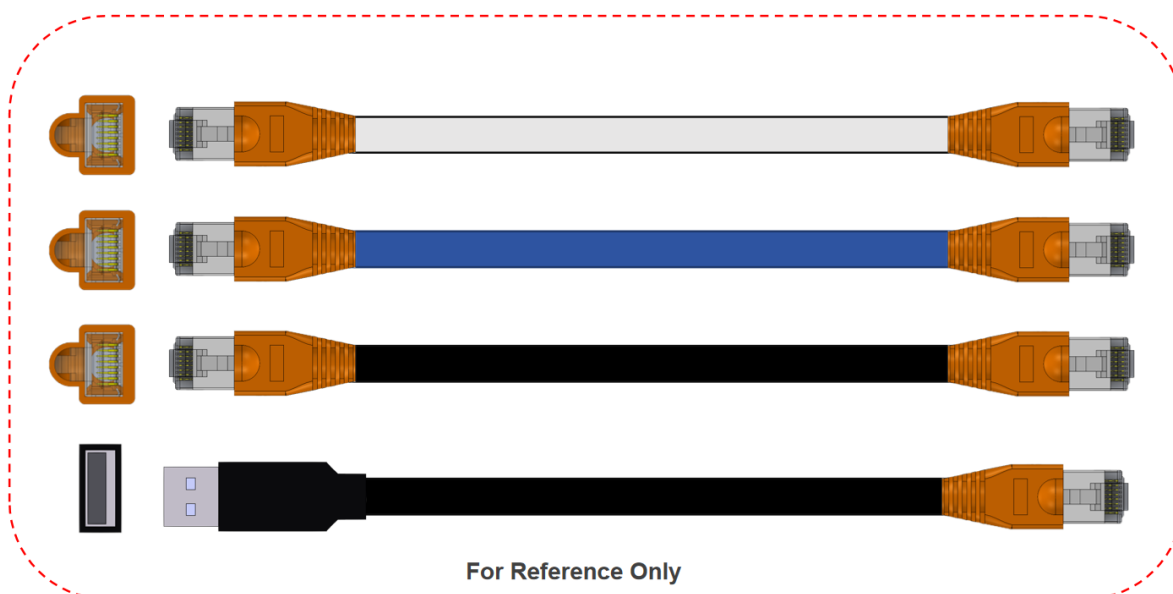


Figure 3.6.2-2

3.7 Installing Battery Strings in Parallel.

Taking two 51.2V100Ah batteries as an example, two parallel power lines (25 mm²) are used to combine the positive and negative outputs of two batteries.

One battery pack's positive relates to another battery pack's positive; negative relates to negative. The communication between the battery packs adopts RJ45 network wire to connect through the RS485, the battery packs dial code address were set as the table below for details.

Set the address of pack Table

Address	Dial switch posit1						Remark
	#1	#2	#3	#4	#5	#6	
1	1	0	0	0	0	0	Set as main Pack1
2	0	1	0	0	0	0	Set as subordinate Pack2
3	1	1	0	0	0	0	Set as subordinate Pack3
4	0	0	1	0	0	0	Set as subordinate Pack4
5	1	0	1	0	0	0	Set as subordinate Pack5
6	0	1	1	0	0	0	Set as subordinate Pack6
7	1	1	1	0	0	0	Set as subordinate Pack7
8	0	0	0	1	0	0	Set as subordinate Pack8
9	1	0	0	1	0	0	Set as subordinate Pack9

10	0	1	0	1	0	0	Set as subordinate Pack10
11	1	1	0	1	0	0	Set as subordinate Pack11
12	0	0	1	1	0	0	Set as subordinate Pack12
13	1	0	1	1	0	0	Set as subordinate Pack13
14	0	1	1	1	0	0	Set as subordinate Pack14
15	1	1	1	1	0	0	Set as subordinate Pack15
16	0	0	0	0	1	0	Set as subordinate Pack16
17	1	0	0	0	1	0	Set as subordinate Pack17
18	0	1	0	0	1	0	Set as subordinate Pack18
19	1	1	0	0	1	0	Set as subordinate Pack19
20	0	0	1	0	1	0	Set as subordinate Pack20
21	1	0	1	0	1	0	Set as subordinate Pack21
22	0	1	1	0	1	0	Set as subordinate Pack22
23	1	1	1	0	1	0	Set as subordinate Pack23
24	0	0	0	1	1	0	Set as subordinate Pack24
25	1	0	0	1	1	0	Set as subordinate Pack25
26	0	1	0	1	1	0	Set as subordinate Pack26
27	1	1	0	1	1	0	Set as subordinate Pack27
28	0	0	1	1	1	0	Set as subordinate Pack28
29	1	0	1	1	1	0	Set as subordinate Pack29
30	0	1	1	1	1	0	Set as subordinate Pack30
31	1	1	1	1	1	0	Set as subordinate Pack31
32	0	0	0	0	0	1	Set as subordinate Pack32
33	1	0	0	0	0	1	Set as subordinate Pack33
34	0	1	0	0	0	1	Set as subordinate Pack34
35	1	1	0	0	0	1	Set as subordinate Pack35
36	0	0	1	0	0	1	Set as subordinate Pack36
37	1	0	1	0	0	1	Set as subordinate Pack37
38	0	1	1	0	0	1	Set as subordinate Pack38

39	1	1	1	0	0	1	Set as subordinate Pack39
40	0	0	0	1	0	1	Set as subordinate Pack40
41	1	0	0	1	0	1	Set as subordinate Pack41
42	0	1	0	1	0	1	Set as subordinate Pack42
43	1	1	0	1	0	1	Set as subordinate Pack43
44	0	0	1	1	0	1	Set as subordinate Pack44
45	1	0	1	1	0	1	Set as subordinate Pack45
46	0	1	1	1	0	1	Set as subordinate Pack46
47	1	1	1	1	0	1	Set as subordinate Pack47
48	0	0	0	0	1	1	Set as subordinate Pack48
49	1	0	0	0	1	1	Set as subordinate Pack49
50	0	1	0	0	1	1	Set as subordinate Pack50
51	1	1	0	0	1	1	Set as subordinate Pack51
52	0	0	1	0	1	1	Set as subordinate Pack52
53	1	0	1	0	1	1	Set as subordinate Pack53
54	0	1	1	0	1	1	Set as subordinate Pack54
55	1	1	1	0	1	1	Set as subordinate Pack55
56	0	0	0	1	1	1	Set as subordinate Pack56
57	1	0	0	1	1	1	Set as subordinate Pack57
58	0	1	0	1	1	1	Set as subordinate Pack58
59	1	1	0	1	1	1	Set as subordinate Pack59
60	0	0	1	1	1	1	Set as subordinate Pack60
61	1	0	1	1	1	1	Set as subordinate Pack61
62	0	1	1	1	1	1	Set as subordinate Pack62
63	1	1	1	1	1	1	Set as subordinate Pack63

Note: Suggested parallel groups no big than 30

3.8 Electrical Connection Diagram

3.8.1 pack---1 Inverter. Single Mode.

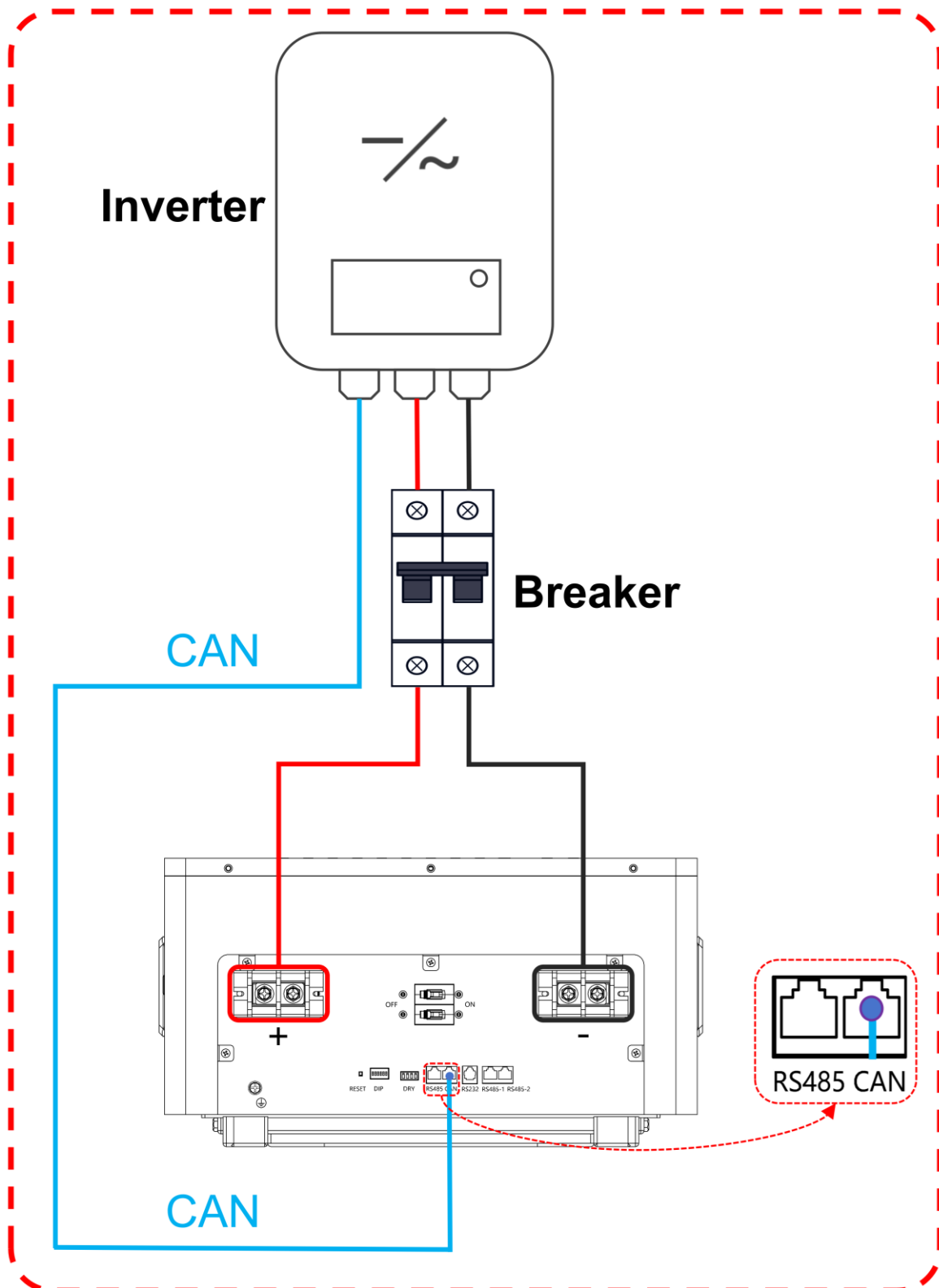


Figure 3.8.1

3.8.2 3pack---1 Inverter.

Pack 2,3 is slave; pack 1 is master. More packs are paralleled, one pack is master, other are slave. Negative and Positive power cable has the same length.

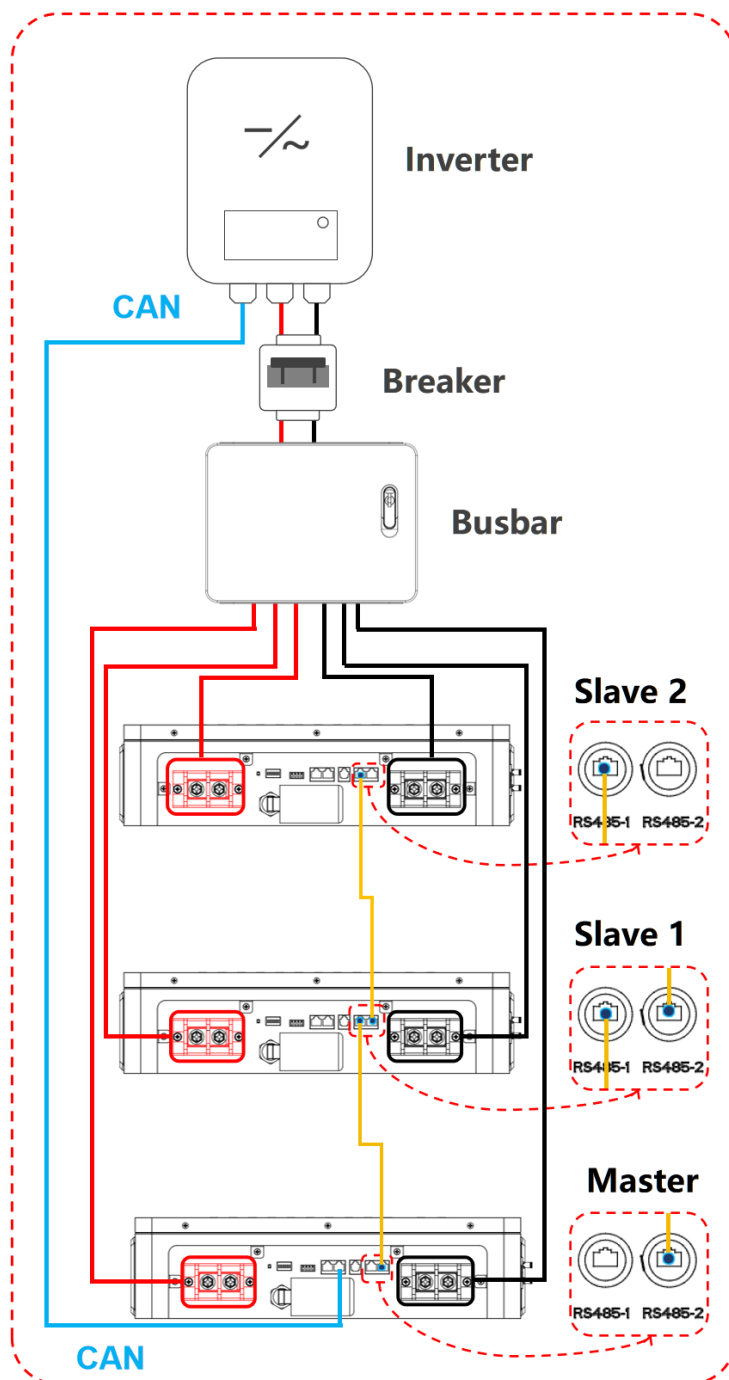


Figure 3.8.2

Note: when a single unit is used, the inverter uses the battery as the main machine to communicate; when multiple batteries are used in parallel, the batteries inside are connected in parallel through the RS485-1/2 hardware interface, RS485/CANBUS communicates with the inverter.

04 Operation and Maintenance



Danger:

Please use special protective equipment and special insulating tools to prevent electric shock injuries or short-circuit faults.



Caution :

1. During energization, monitor continuously. Immediately de-energize the battery if abnormalities occur, investigate the cause, and resume energization only after resolution.
2. After battery installation, debugging, de-energization, or complete discharge, recharge promptly to prevent damage from over-discharge.

4.1 Pre-energization Inspection

Inspection Items and Acceptance Standard

No.	Inspection Item	Inspection Standard
1	The system is installed in place	Installed correctly, firmly and reliably.
2	Reasonable cable arrangement	Cables are arranged reasonably and meet user requirements.
3	Cable ties are bound neatly	Cable ties are evenly placed, and no sharp corners are left at the cut positions.
4	Reliable grounding	Ground wires are connected correctly, firmly and reliably
5	Switches are turned off	The "inverter" and all switches connected to the battery are in the "OFF" state.
6	Cables are connected in place	DC cables, AC cables and communication cables are connected correctly, firmly and reliably.
7	Unused terminals and interfaces are sealed	Unused terminals and interfaces are fitted with waterproof covers.
8	Installation environment meets requirements	Installation space is reasonable, and the environment is clean and tidy.

Table 4.1

4.2 Power-on Procedure

Step 1: Use a multimeter to confirm grid voltage is within the predetermined range;

Step 2: Close the circuit breaker between the inverter and battery;

Step 3: Switching the the air circuit breaker and press the switch to activate the BMS;

Step 4: Follow the inverter's user manual to perform energization and start the system inverter.

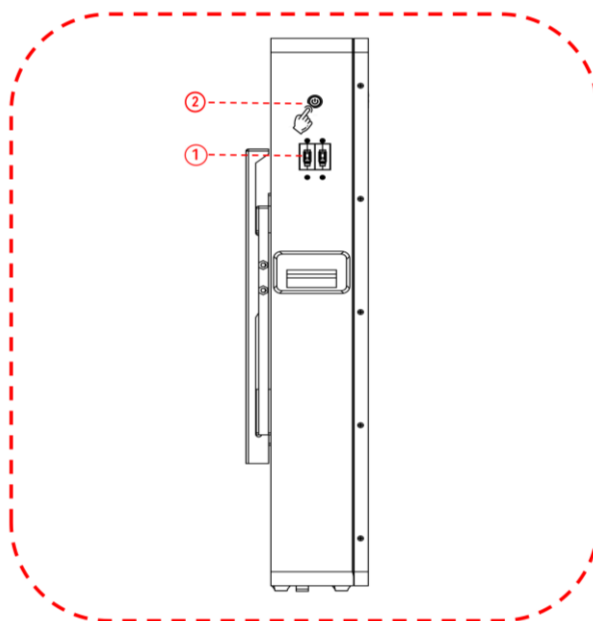


Figure 4.2



Illustration: This figure takes a 130Ah wall-mounted battery as an example.

4.3 Battery Display Screen



Run-LED	Alarm-Led	Led-10	Led-9	Led-8	Led-7	Led-6	Led-5	Led-4	Led-3	Led-2	Led-1
Run	ALM	Capacity indicator light									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%

Table4.3-1

LED Working Status Indicators Table

Status	Normal/alarm	RUN	ALM	Electricity indicator LED									
	/Protection	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Power off	sleep or Under voltage	off	off	off	off	off	off	off	off	off	off	off	off
Standby	Normal	●Steady	off	●Display according to the battery SOC									
	Alarm or SOC<20%	●Steady	●Flash										
Charge	Normal	●Flash	off	●Display according to the battery SOC (The remaining SOC indicators display a flowing effect)									
	Alarm	●Flash	●Flash										
	Protection	●Flash	●Flash										
Discharge	Normal	●Flash	off	●Display according to the battery SOC (The remaining SOC indicators display a flowing effect)									
	Alarm	●Flash	●Flash										

Protection		Flash	Flash										
Invalid	Normal	off	Steady	off	off	off	off	off	off	off	off	off	off

4.4 Power-off Procedure



Danger :

When shutting down the battery system, please strictly follow the power-off requirements of the battery system to prevent damage to it.

Step 1: Follow the instructions in the inverter's user manual to perform the power-off operation to shut down the inverter in the system;

Step 2: Press the power button "SWITCH" on the battery system to ensure that all indicator lights of "SWITCH" are off.

Step 3: Disconnect the circuit breaker between the inverter and the battery.

4.5 Mobile application (App)



Illustration: If you choose the battery with WiFi function, after the battery system is powered on, you can view the specific information of the battery on your mobile device.

Step One: Scan the QR code to download the mobile app

IOS



Android



Figure 4.5-1

Step Two: Network Configuration of the WIFI Module

Turn on the Bluetooth, WLAN (Wireless Local Area Network) and location functions of your mobile phone;

Select "Local Connections";

Click "Search Bluetooth" and "Select the device number" (for example: wl1001_2188260000*);

Click the "Change WIFI password" box, select the currently available 2.4G WIFI account, enter the password and confirm.

The network configuration is complete. Click "View Data" to enter the Bluetooth data page.

Note: When configuring the network on the mobile phone, the phone needs to be connected to the same 2.4G WIFI network as the device.

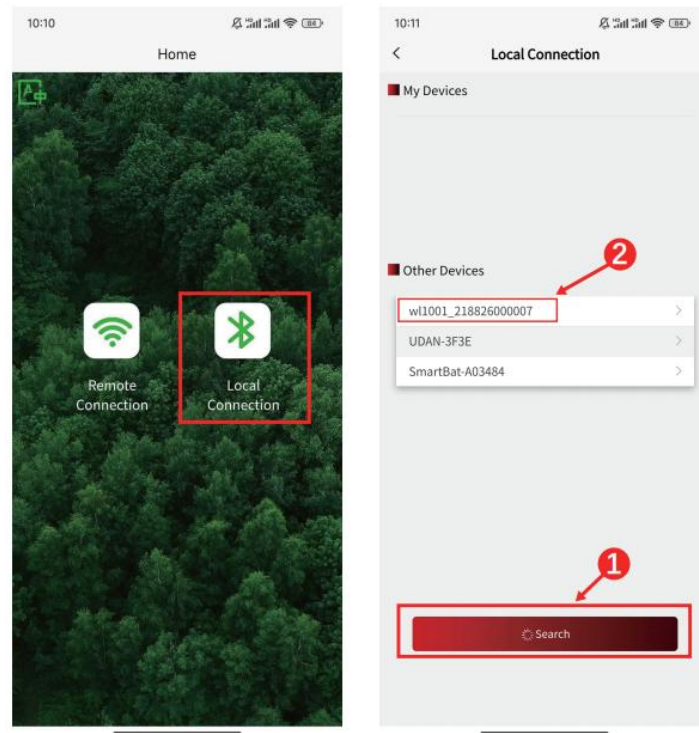


Figure 4.5-2

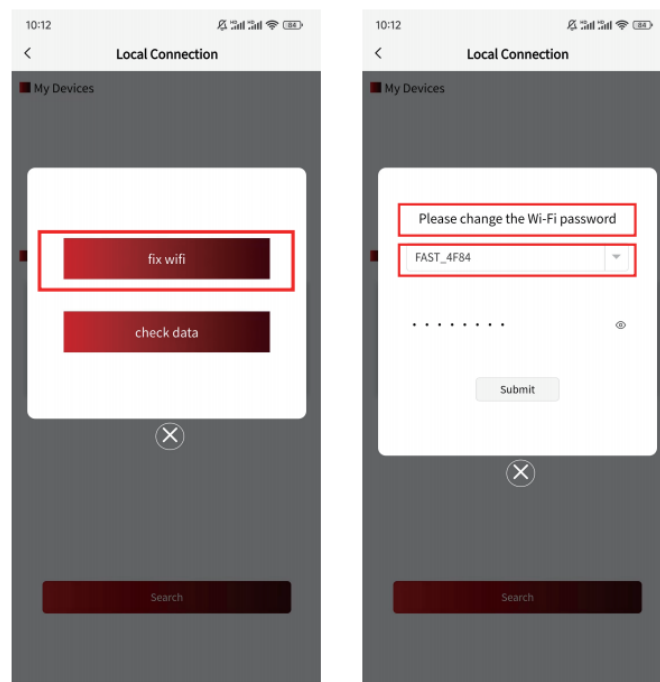


Figure 4.5-3

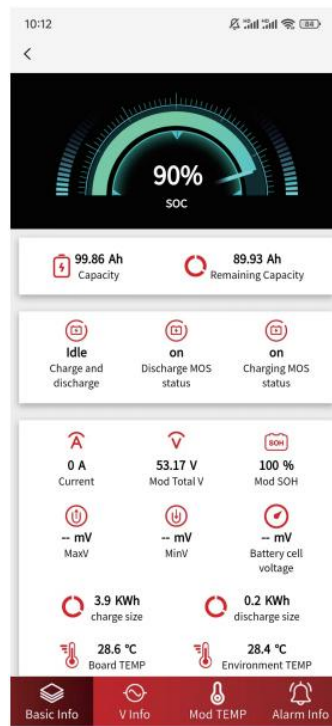


Figure 4.5-4

Step Three: Click on "Remote Connection", register a new account and log in;

Click on the scanning function at the top right corner, scan the QR code on the WIFI module to bind the device;

Click on the WIFI module number to view the remote monitoring data.



Caution: On the WIFI module list page, the green box in the upper left corner indicates that the WIFI module's network configuration is successful. If it shows gray, it means you need to reconfigure the WIFI module's network.

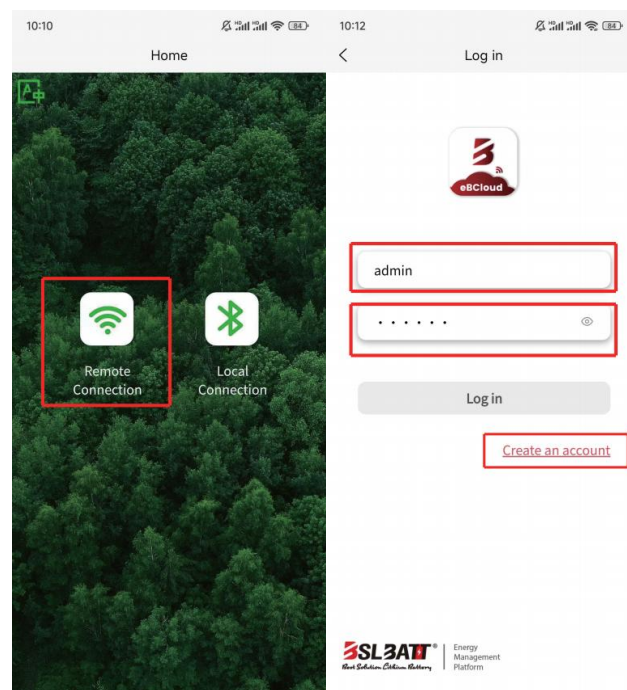


Figure 4.5-5

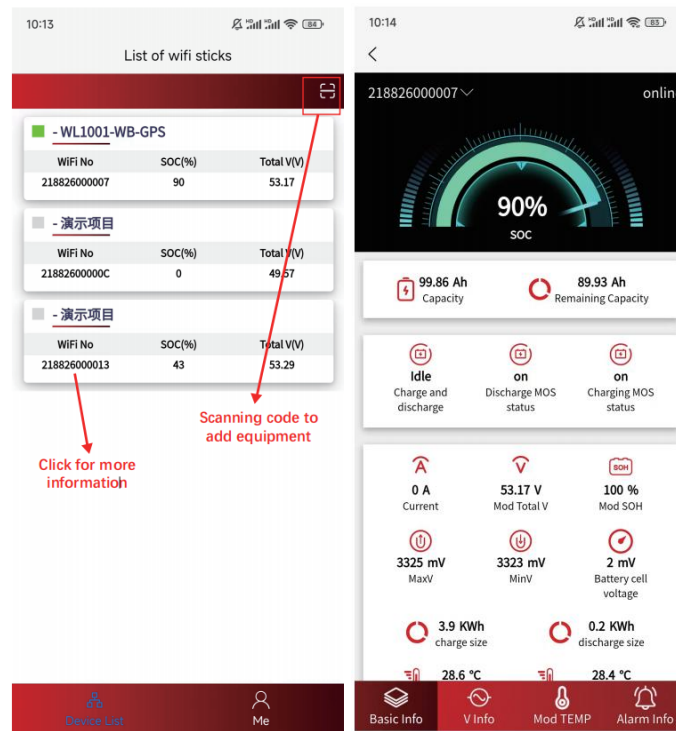


Figure 4.5-6

4.6 PC end cloud platform

4.6.1 Log in to the PC cloud platform

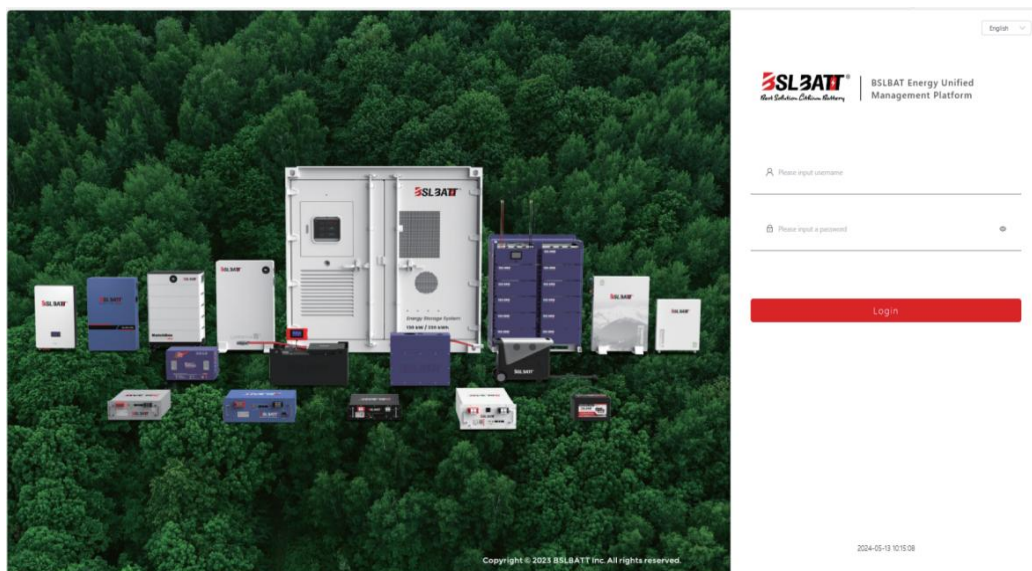


Figure 4.6.1-1

Click on <http://3.230.167.72/#/login/1481625648143839234> , enter the account and password assigned to you on the login interface to log in.

After entering the home page, the page will display information such as "Offline WIFI Module Quantity", "Charging Distribution", "Alarm Distribution" and "Account Items".

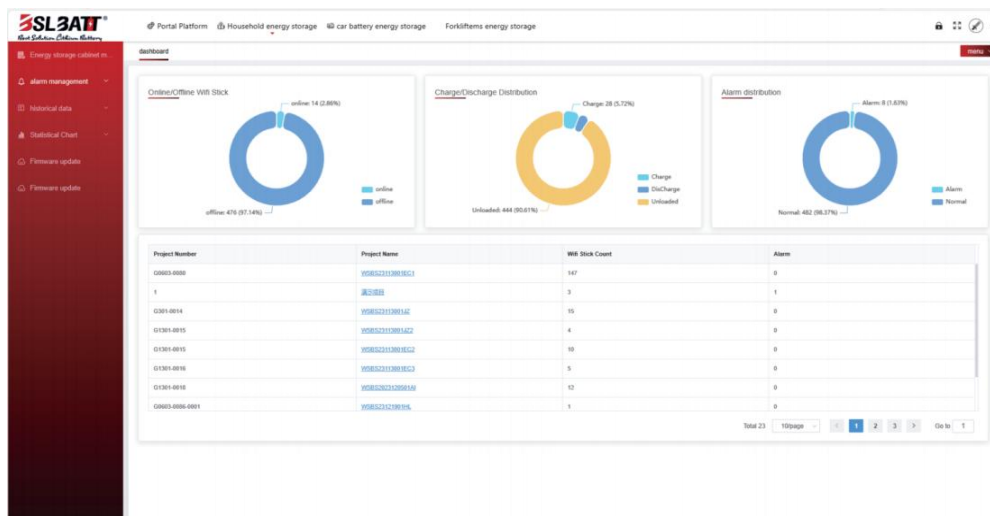


Figure 4.6.1-2

Click on "Project Name" and you will be able to access the WIFI management list of your project.

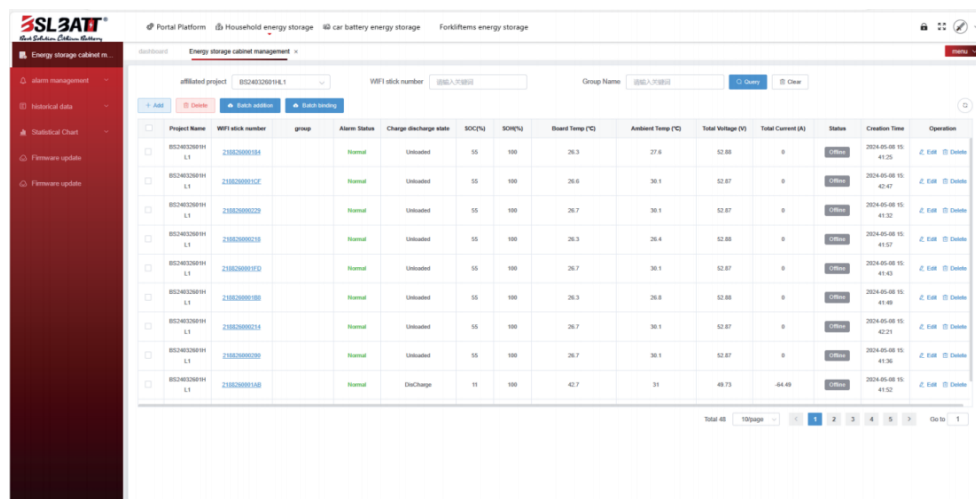


Figure 4.6.1-3

Click on any "WiFi module number (WiFi number)", and you can enter the data page of the monitored battery pack.

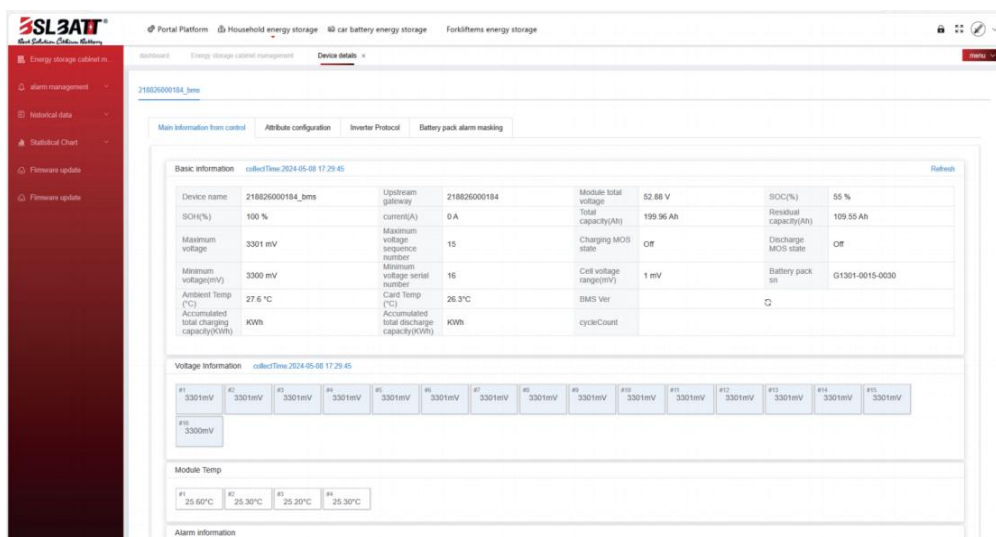
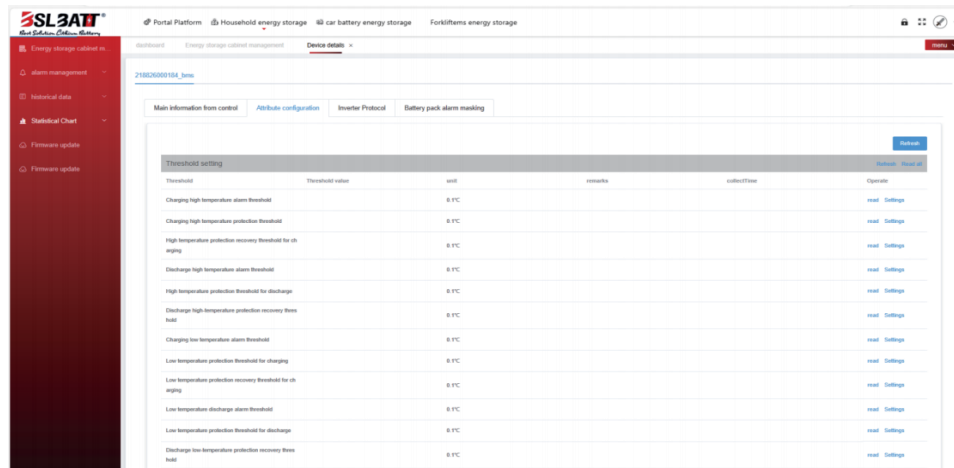


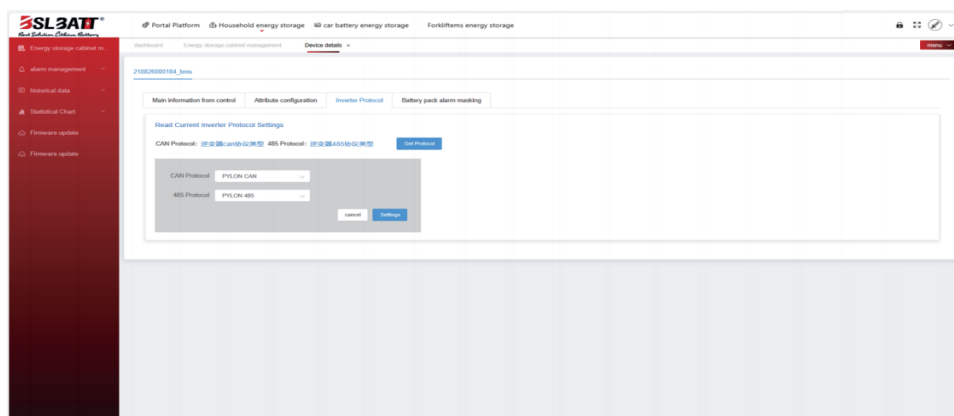
Figure 4.6.1-4



Threshold	Threshold value	unit	remarks	collectTime	Operate
Charging high temperature alarm threshold	6.1°C				read Settings
Charging high temperature protection threshold	6.1°C				read Settings
High temperature protection recovery threshold for charging	6.1°C				read Settings
Discharge high temperature alarm threshold	6.1°C				read Settings
High temperature protection threshold for discharge	6.1°C				read Settings
Discharge high temperature protection recovery threshold	6.1°C				read Settings
Charging low temperature alarm threshold	6.1°C				read Settings
Low temperature protection threshold for charging	6.1°C				read Settings
Low temperature protection recovery threshold for charging	6.1°C				read Settings
Low temperature discharge alarm threshold	6.1°C				read Settings
Low temperature protection threshold for discharge	6.1°C				read Settings
Discharge low temperature protection recovery threshold	6.1°C				read Settings

Figure 4.6.1-5

4.6.2 Operation Instructions



Read Current Inverter Protocol Settings

CAN Protocol: 0123456789ABCDEF 485 Protocol: 0123456789ABCDEF

CAN Protocol: PLYON CAN
485 Protocol: PLYON 485

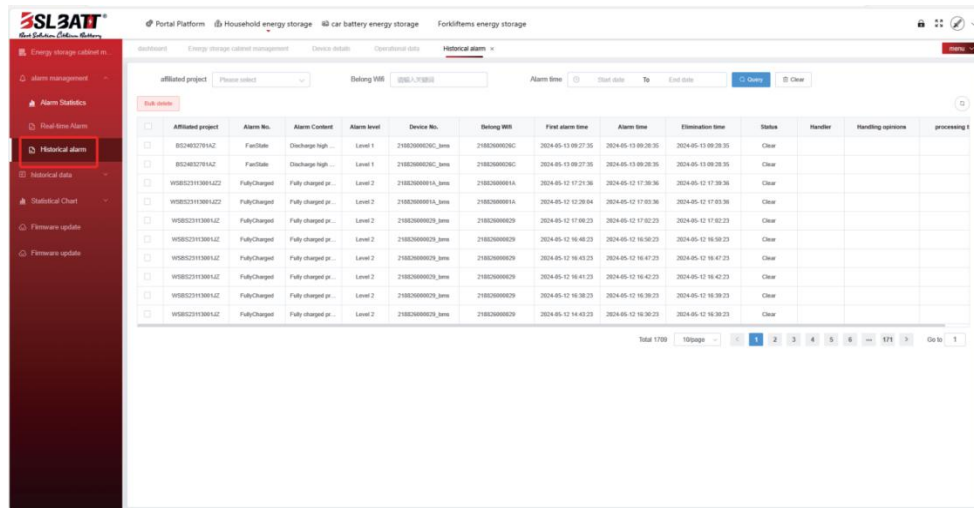
Cancel Settings

Figure 4.6.2-1

The battery pack data display page includes: "Single cell voltage", "Single cell temperature", "Total voltage", "Current", "Charging MOS tube status", "BMS software version", "Cycle count", "Real-time alarm information".

Clicking "Property Configuration (Properties Configuration)" allows you to display the battery protection parameters and enables modification;

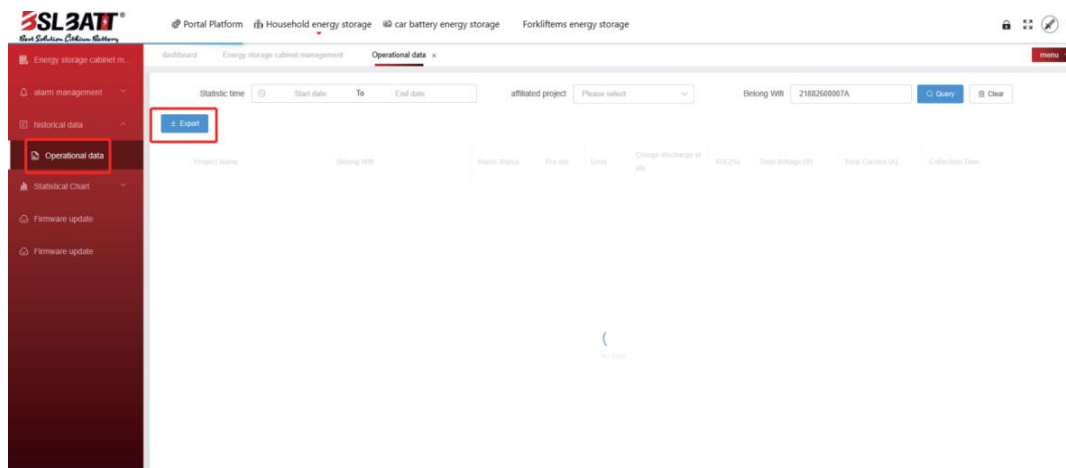
Clicking "Inverter Protocol (Inverter Protocol)" displays the currently selected inverter protocol and enables modification.



Affiliated project	Alarm No.	Alarm Content	Alarm level	Device No.	Belong WVR	First alarm time	Alarm time	Elimination time	Status	Handler	Handling options	processing time
B02405271942	FacState	Discharge high ...	Level 1	2182600002C_Jena	2182600002C	2024-05-13 09:27:35	2024-05-13 09:28:35	2024-05-13 09:28:35	Clear			
B02405271942	FacState	Discharge high ...	Level 1	2182600002C_Jena	2182600002C	2024-05-13 09:27:35	2024-05-13 09:28:35	2024-05-13 09:28:35	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	2182600001A_Jena	2182600001A	2024-05-12 17:21:36	2024-05-12 17:26:36	2024-05-12 17:26:36	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	2182600001A_Jena	2182600001A	2024-05-12 17:26:36	2024-05-12 17:26:36	2024-05-12 17:26:36	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 17:06:23	2024-05-12 17:06:23	2024-05-12 17:06:23	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 16:48:23	2024-05-12 16:48:23	2024-05-12 16:48:23	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 16:48:23	2024-05-12 16:48:23	2024-05-12 16:48:23	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 16:41:23	2024-05-12 16:41:23	2024-05-12 16:41:23	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 16:38:23	2024-05-12 16:38:23	2024-05-12 16:38:23	Clear			
W05852311386122	FullyCharged	Fully charged pr...	Level 2	21826000029_Jena	21826000029	2024-05-12 16:38:23	2024-05-12 16:38:23	2024-05-12 16:38:23	Clear			

Figure 4.6.2-2

Click on "History Alarm" to view the historical alarm records of the battery pack.



Project Name	Belong WVR	Alarm Status	Pre-alar	Error	Charge Discharge at rate	SOC, PMA	Total Voltage (V)	Total Current (A)	Collection Time
(Loading...)									

Figure 4.6.2-3

Click on "Operation Data" to view the historical operating data of the battery pack, including voltage and temperature during its operation;
You can also query the data of the battery pack within a specific time period and export it.

4.7 Supervisory computer monitoring



Caution: Before upgrading, ensure the BMS (Battery Management System) and battery are in standby mode, turn off the load switch and charger switch, and confirm the RS232-USB line cable is connected as follows.

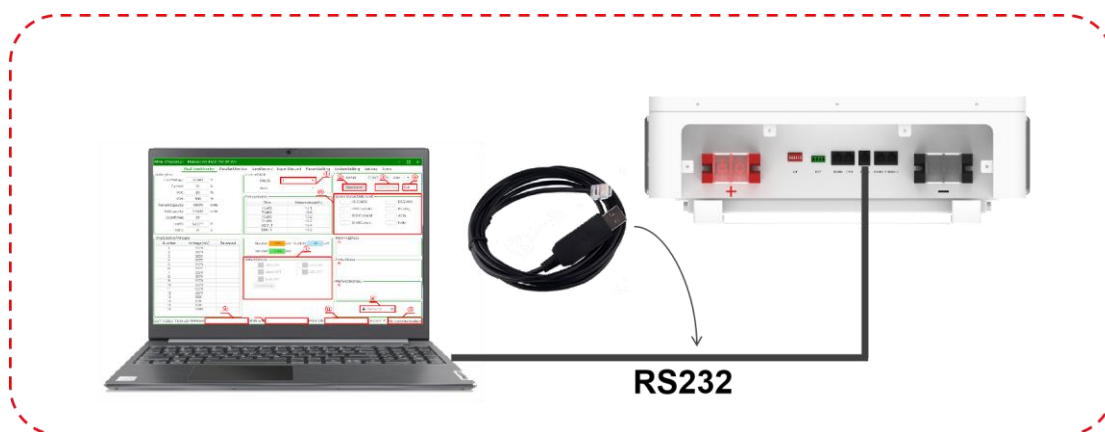


Figure 4.7 RS232 Serial port communication device

When the equipment manufacturer confirms that it is necessary, it can authorize to provide the customer with the host software and operating instructions.

4.7.1 Product Upgrade Procedure

1. Enter the [Windows Device Manager], and in the [Windows Device Manager], click on [Ports (COM and LPT)] to find the matching COM port. If you can see the device as shown in the following picture, it indicates that the RS232 driver has been installed. If you cannot find it, it means that the driver software is not installed. Please install the driver package first.

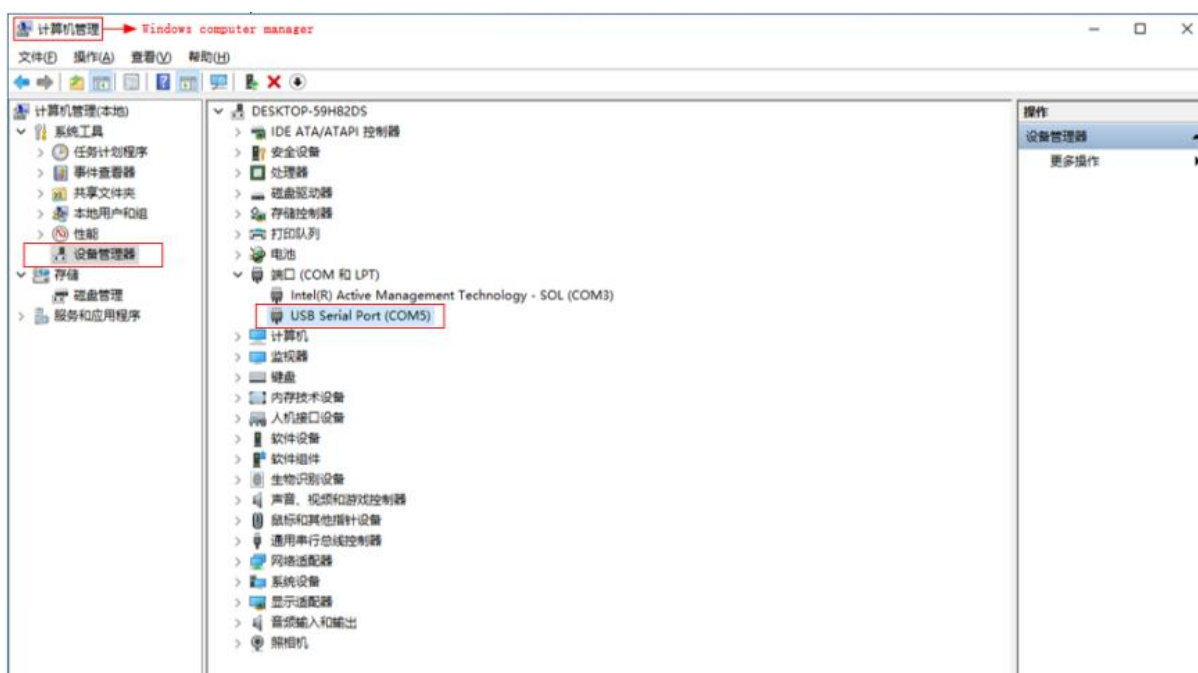


Figure 4.7.1-1



Note: The above image is for reference only.

2. Click on the RS232 driver installation package.

PL2303_Prolific_GPS_1013_20090319 (1) 2023/9/15 10:04

WinRAR ZIP 压缩...

2,201 KB

3.Double-click the application icon "BMS Upgrade V1.0.8.exe" to open the upgrade tool.
The specific interface is as follows:

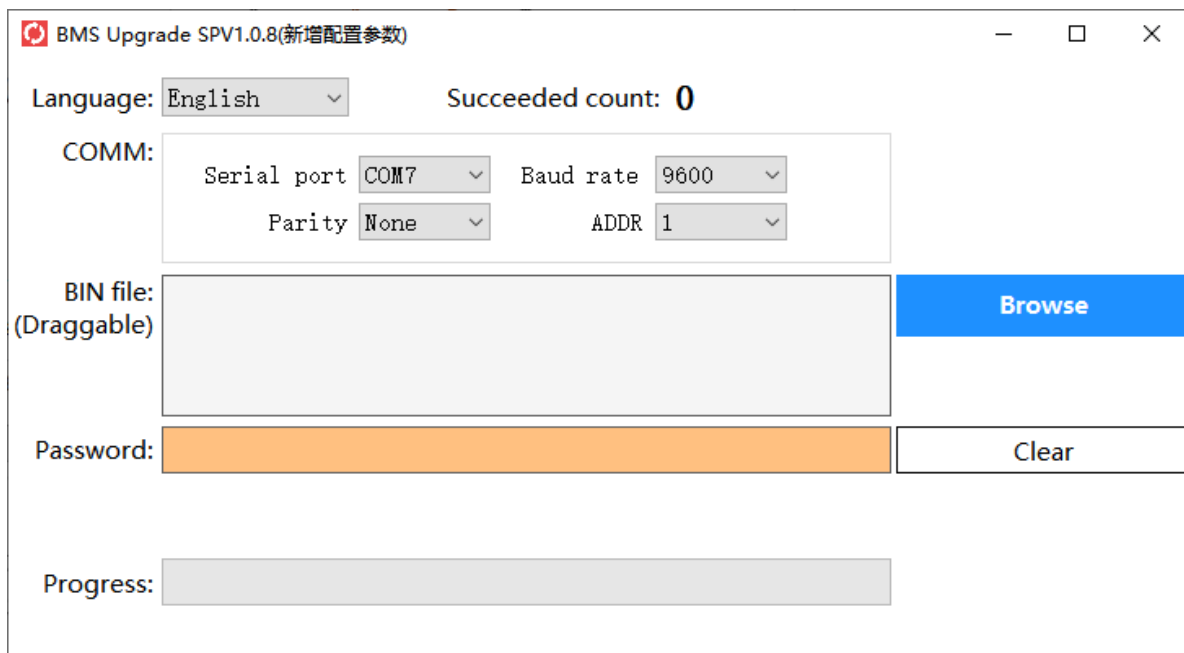


Figure 4.7.1-2

4.Select the correct serial port and baud rate. The default baud rate is 9600. Click "Browse" to select the corresponding BIN file.

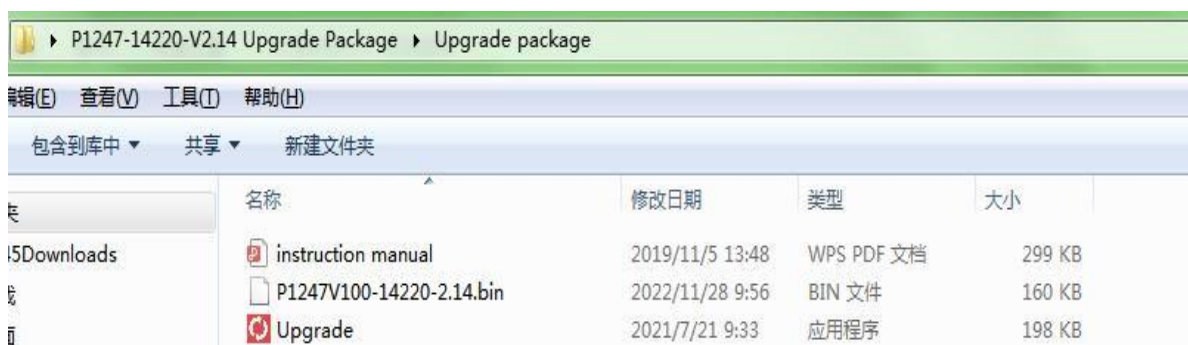


Figure 4.7.1-3

5.After importing the BIN file, select the correct address 0 or 1. Follow the picture below to select the BIN file.

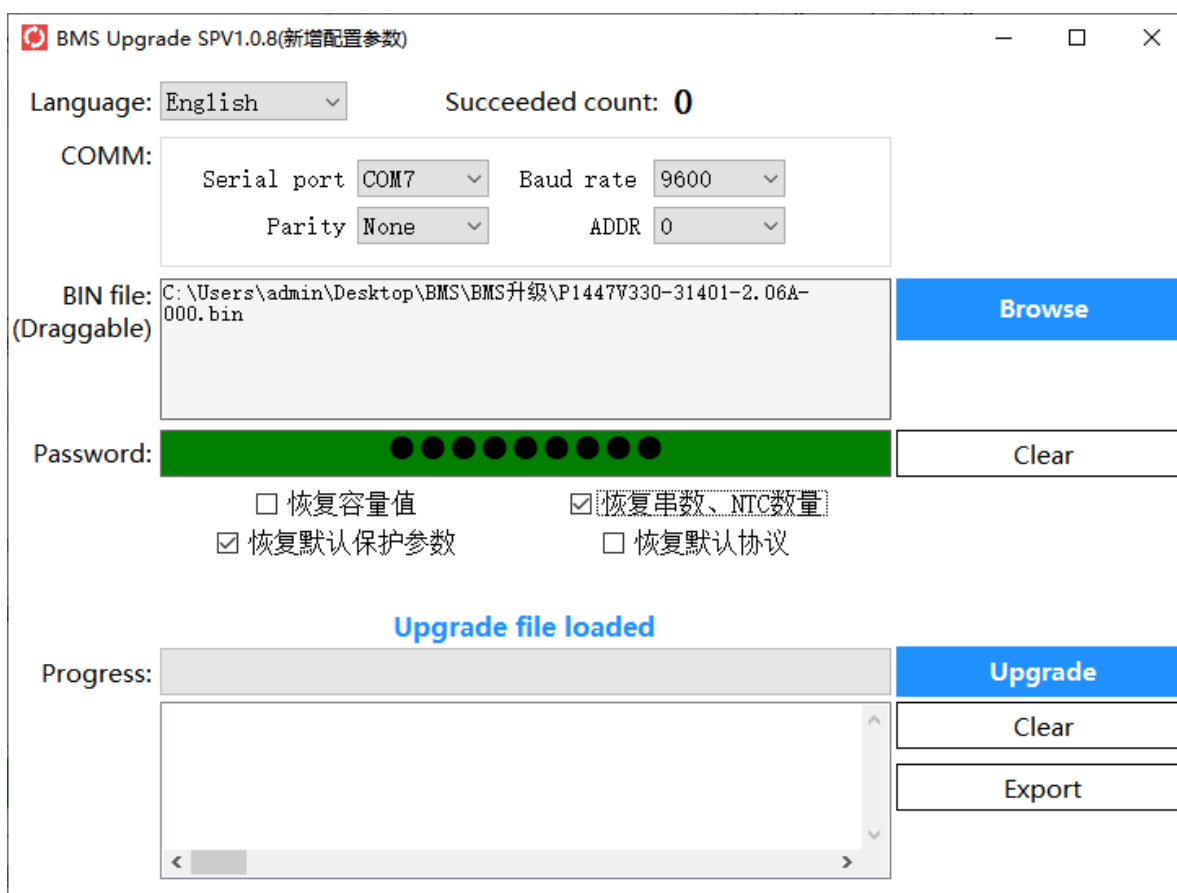


Figure 4.7.1-4

6. Enter the correct password (Password: paceadmin). Click the "Upgrade" button to proceed with the upgrade. The first upgrade will prompt "Upgrade is ready. Are you sure you want to upgrade? ", click "OK" to continue the upgrade (no further prompts will be shown later); click "Cancel" to exit the upgrade. Click "OK" to enter the normal upgrade process. Please ensure the upgrade is completed successfully. Do not disconnect the communication during the process.



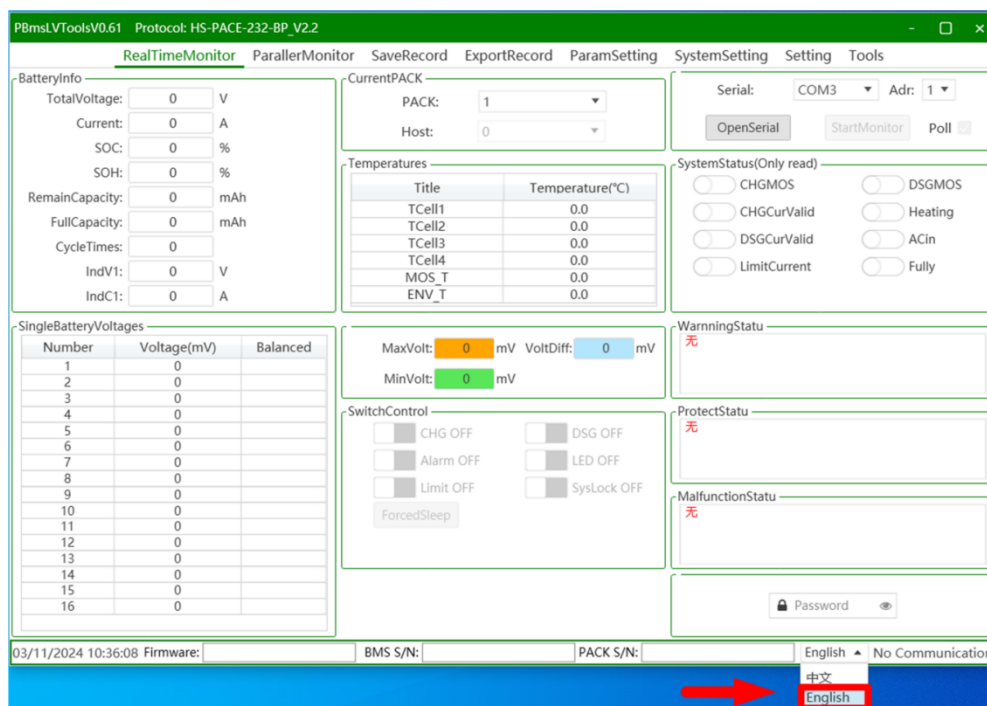
Error handling:

- (1) If there is an error message about the bin file, please confirm whether the selected bin file is correct, or contact the supplier to obtain the correct bin file.
- (2) If there is a response timeout error, please check whether the communication line is properly connected and in good contact.
- (3) If the upgrade process fails, you must repeat the upgrade until it succeeds. If the upgrade is always unsuccessful, please contact our technical department.

4.7.2 Installation and Selection of the Host Computer

1. The host computer can directly decompress the entire folder, or install it through the installation program. After the installation is completed, open the decompressed folder, double-click the "PBmsLVTools" software to open it, and change the language from Chinese to English. As shown in the following picture.

名称	修改日期	类型	大小
 PBmsLVTools_V0.61_20240110.exe	2024/3/11 10:02	应用程序	9,319 KB
 PL2303_Prolific_GPS_1013_20090319 (...)	2023/9/15 10:04	ZIP 压缩文件	2,201 KB
 上位机用户手册.docx	2024/3/11 10:32	DOCX 文档	1,462 KB



The screenshot shows the PBmsLVToolsV0.61 software interface. The main window has a green title bar and a menu bar with options: RealTimeMonitor, ParallerMonitor, SaveRecord, ExportRecord, ParamSetting, SystemSetting, Setting, and Tools. The RealTimeMonitor tab is active, displaying various battery parameters and control options.

BatteryInfo:

- TotalVoltage: 0 V
- Current: 0 A
- SOC: 0 %
- SOH: 0 %
- RemainCapacity: 0 mAh
- FullCapacity: 0 mAh
- CycleTimes: 0
- IndV1: 0 V
- IndC1: 0 A

CurrentPACK:

- PACK: 1
- Host: 0

Serial: COM3, **Adr:** 1

SystemStatus(Only read):

- ☐ CHGMOS
- ☐ CHGCurValid
- ☐ DSGCurValid
- ☐ LimitCurrent
- ☐ DSGMOS
- ☐ Heating
- ☐ ACIn
- ☐ Fully

WarningStatus: 无

ProtectStatus: 无

MalfunctionStatus: 无

SwitchControl:

- ☐ CHG OFF
- ☐ Alarm OFF
- ☐ Limit OFF
- ☐ DSG OFF
- ☐ LED OFF
- ☐ SysLock OFF
- ForcedSleep

SingleBatteryVoltages:

Number	Voltage(mV)	Balanced
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	
13	0	
14	0	
15	0	
16	0	

MaxVolt: 0 mV, **VoltDiff:** 0 mV, **MinVolt:** 0 mV

Language: English (dropdown menu with Chinese and English options)

Figure 4.7.2-1

2. Select the serial port and baud rate for communication, then open the serial port and attempt to connect.

Complete the communication settings by selecting COMMSetting:

1. **Link:** Dropdown option, select the communication link (serial port).
2. **Baud Rate:** Dropdown option, select the communication baud rate (9600).
3. **Interval:** Dropdown option, set the interval for reading BMS board data (1).
4. **PACKNUM:** Dropdown option, select the number of battery packs.
5. **StartAddr:** Dropdown option, select the starting address for polling the battery packs.

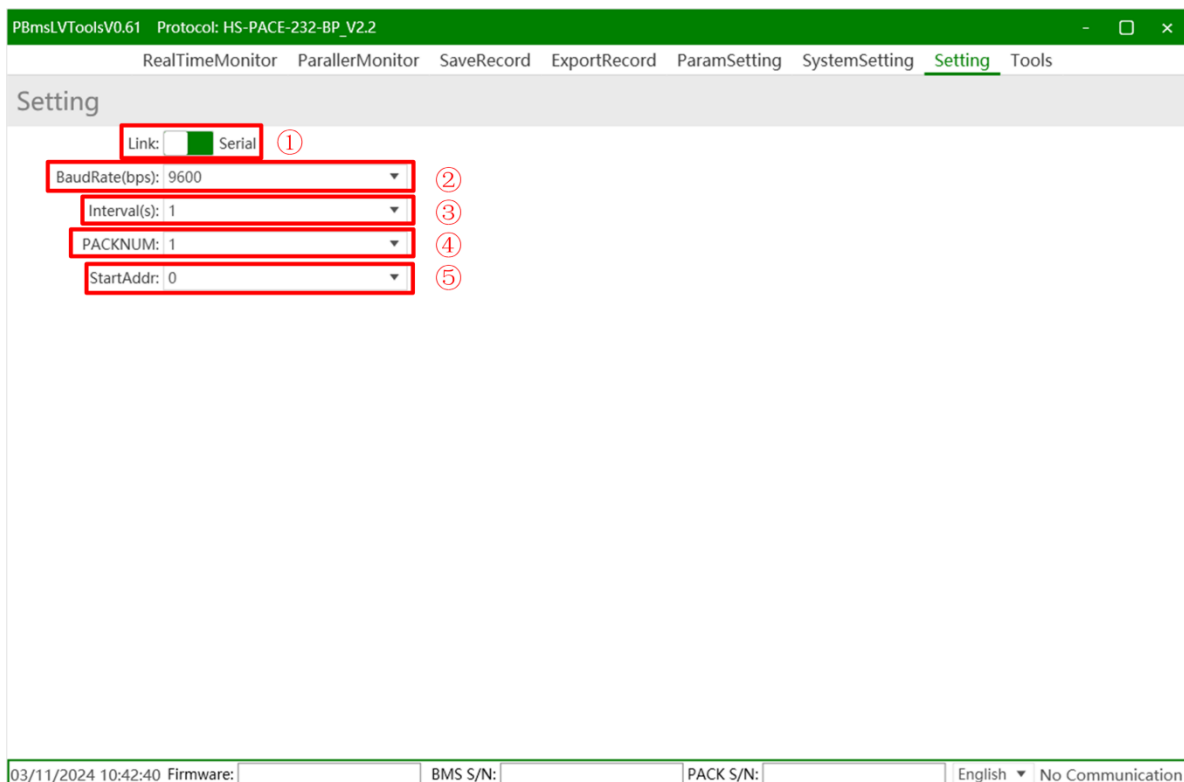


Figure 4.7.2-2

3. Monitoring page operation

After the battery pack is correctly connected to the computer, click button 5 to open the serial port, and then click button 4 to start the monitoring.

Note: When communication is normal, area 9 will display the green "green normal communication characters"; when it shows the red "red abnormal communication characters", please check if the RS232 wiring and COM port selection are correct.

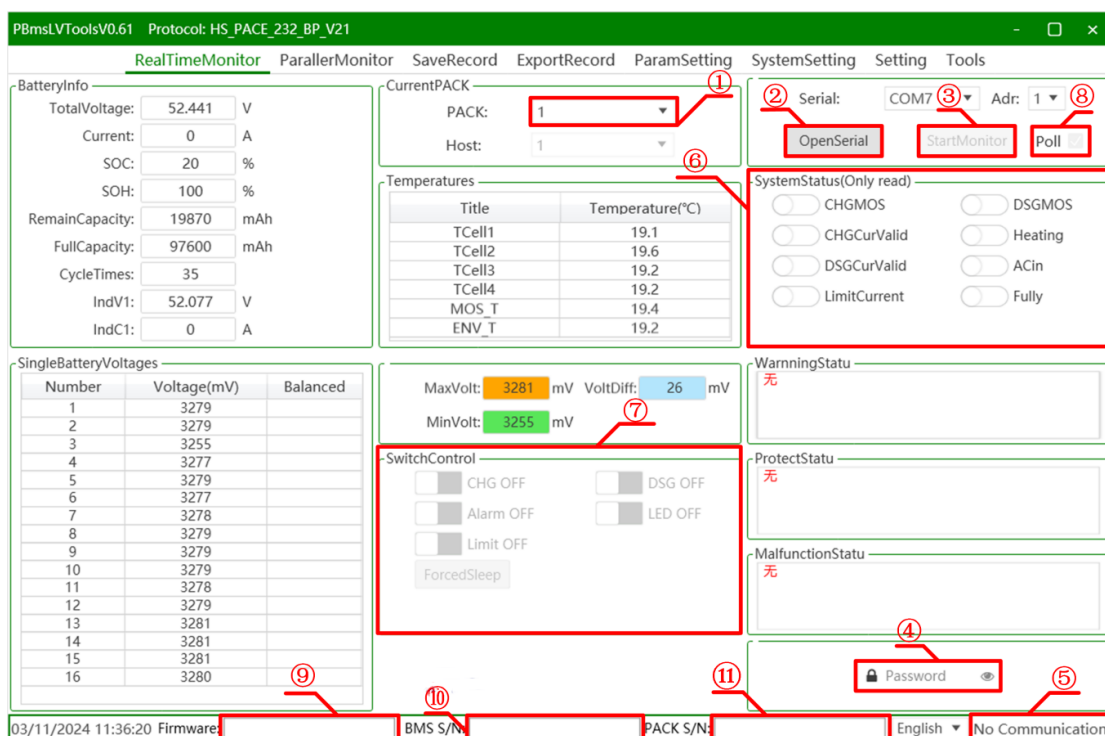


Figure 4.7.2-3

4. Main Function Description:

1. **Current Battery Pack:** Represents the currently selected battery pack. The default is Battery Pack 1. You can select the battery pack you want to view by choosing from the drop-down options.
2. **Open serial:** Opens the serial port to enable battery pack monitoring and parameter modification functions.
3. **Start Monitor:** Reads various information on the BMS, such as voltage, current, temperature, etc.
4. **User privilege:** Enter the password 123456 to obtain management privileges. After that, you can modify the parameters.
5. **Communication status:** Displays whether the current communication is successful. If successful, it will prompt the operation.
6. **System status (Only Read):** View the status of the charging and discharging MOS tubes in the system, or the limitations and functions of the switches.
7. **Control switching:** Switch the functions within the switch box, such as the charging/discharging switch, alarm, LED, etc. Red indicates off, green indicates on.
8. **Poll :** Enable the automatic polling function for multiple parallel-connected packages.
9. **Firmware Version:** The software version number of the BMS.
10. **BMS Serial Number:** The barcode of the BMS board.
11. **Battery Serial Number:** The barcode of the battery pack.

5. After the communication is successful, if there is a fault alarm in the battery pack, you can check it at the indicated position. If there is any abnormality, please contact the supplier and provide the specific problem details.

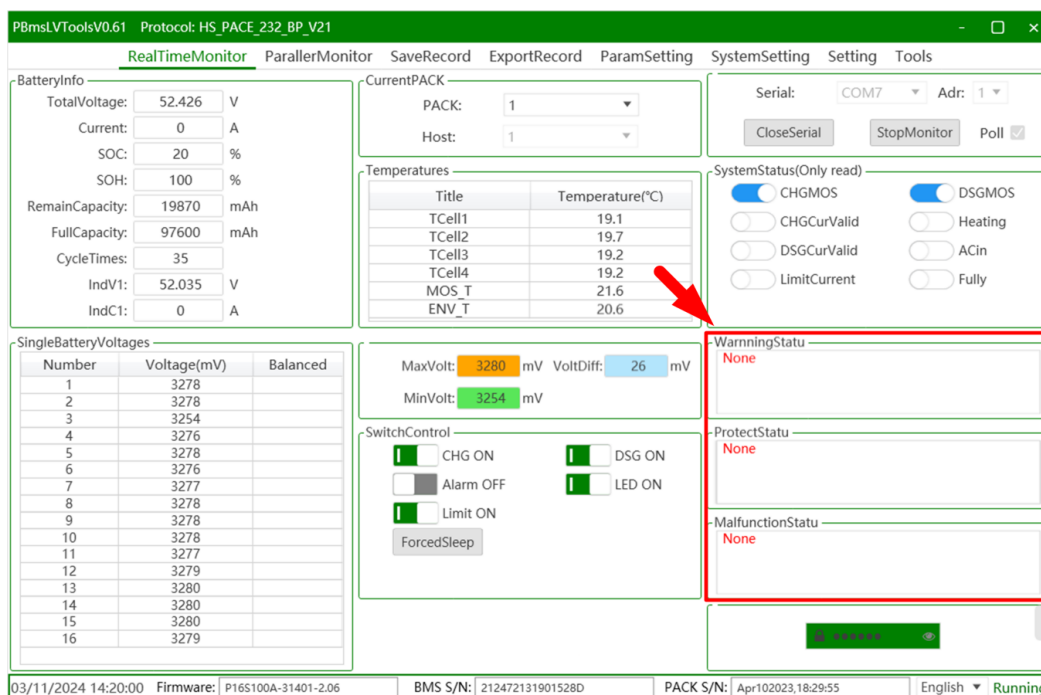


Figure 4.7.2-4

6. If no faults or alerts occur, please enter the administrator password: 123456. (After entering the correct password, the input box will turn green, indicating that you have obtained the administrator privileges.)

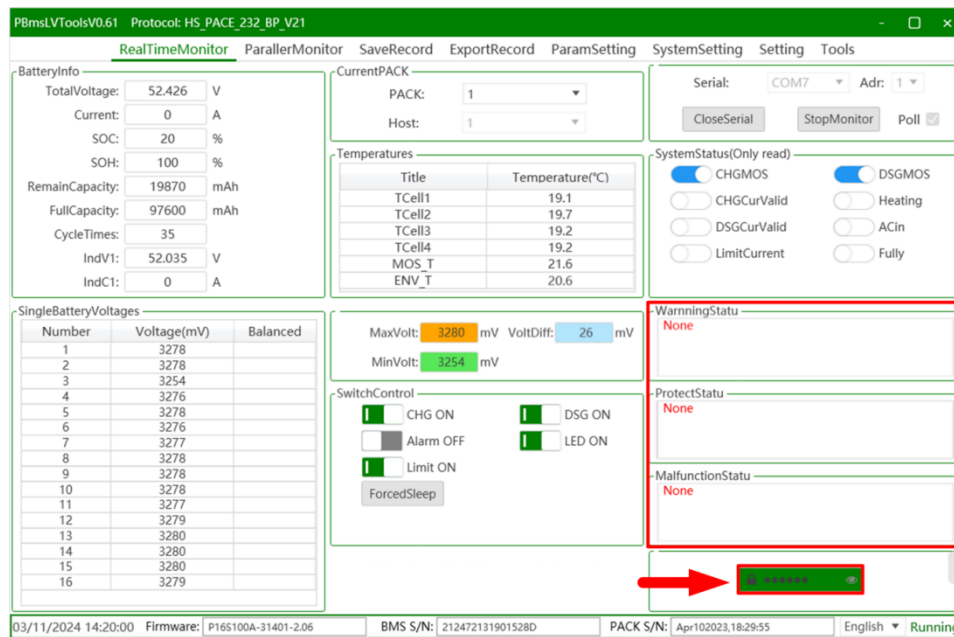


Figure 4.7.2-5

7. Click to enter "System Configuration", and then enter the settings sub-interface. Read the current protocol of the inverter.

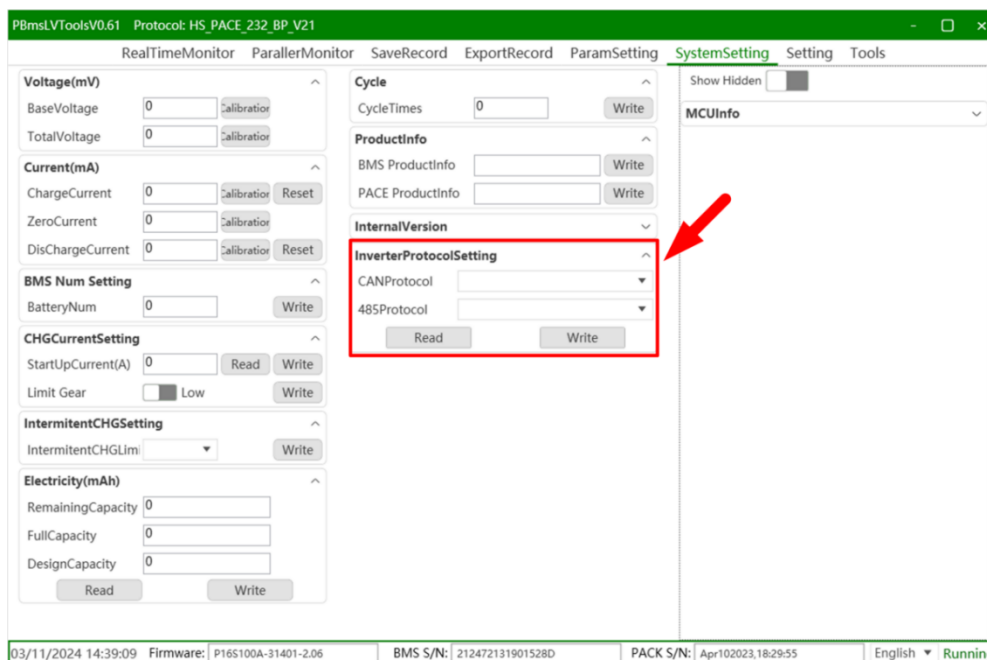


Figure 4.7.2-6

8. Select the inverter protocol to be used, and click "Write". After successful writing, please read it again to ensure that the required protocol has been correctly written.

4.8 Battery Fault Handling

If the battery system malfunctions, it may trigger automatic shutdown or partial function abnormalities. Troubleshoot using the methods below. If unresolved, contact the after-sales service center immediately.



Caution : When contacting after-sales service, prepare the following information for efficient troubleshooting:

1. Battery information: e.g., serial number, software version, installation date, failure occurrence time, failure frequency;
2. Installation environment: e.g., weather conditions (provide photos/videos if possible);
3. Usage history: e.g., operation frequency/duration, charge cycles, maintenance records; simultaneously specify service type (on-site repair, factory return repair, or usage guidance).

Fault Alarm Handling Table

Fault Name	Troubleshooting Methods
Charging High-Temperature Alarm	Check the installation environment temperature to ensure the battery system's installation temperature meets the battery's operating temperature range; Turn off the battery and restart it after the temperature returns to normal.
Discharging High-Temperature Alarm	
Charging Low-Temperature Alarm	Check the installation environment temperature to ensure the battery system's installation temperature meets the battery's operating temperature range; Turn off the battery and restart it after the temperature returns to normal.
Discharging Low-Temperature Alarm	
MOSFET High-Temperature Alarm	Check the installation environment temperature to ensure the battery system's installation temperature meets the battery's operating temperature range; Turn off the battery and restart it after the temperature returns to normal.
High-Temperature Alarm	Check the installation environment temperature to ensure the battery system's installation temperature meets the battery's operating temperature range; Turn off the battery and restart it after the temperature returns to normal.
Ambient Low-Temperature Alarm	
Single Cell Overvoltage Alarm	Let the battery stand for 0.5 hours, then restart charging immediately. If the problem persists, please contact the after-sales service center.
Single Cell Undervoltage Alarm	
Total Voltage Overvoltage Alarm	Let the battery stand for 0.5 hours, then restart charging immediately. If the problem persists, please contact the after-sales service center.
Total Voltage Undervoltage Alarm	
Charging Overcurrent Alarm	If it does not recover after 5 minutes, restart the system. If the problem persists, please contact the after-sales service center.
Discharging Overcurrent Alarm	
SOC Alarm	Restart the battery and then charge it. If the problem persists, please contact the after-sales service center.

Table 4.8

 **Warning :** If any fault other than those listed in Table 4.7 occurs, please contact the after-sales service center directly.

4.9 Inspection and Maintenance

 **Caution :** Maintenance personnel for energy storage equipment must hold an Electrician Special Operation Certificate (China) or equivalent electrician license energy storage systems with proficiency in operational specifications, and possess comprehensive electrical safety protection and emergency response capabilities.

 **Warning :**

- 1.If issues potentially affecting the battery system are detected, contact after-sales service immediately; do not attempt disassembly.
- 2.If exposed copper wiring is observed, do not touch to avoid high-voltage hazards; immediately contact after-sales service; disassembly is strictly prohibited.
- 3.For other emergencies, contact after-sales service promptly for operational guidance or await on-site handling by technicians.

Maintenance Content	Maintenance Cycle
Check if the installation of the battery system is loose; if so, tighten the corresponding parts	Once every 6 months
Check if the outer shell is damaged; if so, touch up the paint or contact the after-sales service center	Once every 6 months
Check if the exposed wires are worn; if so, replace the corresponding cables	Once every 6 months
Check if there is any debris accumulation around the battery to avoid affecting the battery's heat dissipation	Once every 6 months
Check for water or pests to prevent long-term intrusion into the battery	Once every 6 months
If the battery has not been used for a long time, it must be charged to at least 50% SOC each time	Once every 6 months

Table 4.9

05 Warranty Services

5.1 Warranty Period

Provided that the product is used correctly, the warranty period shall be in accordance with the agreement stipulated in the business contract.

5.2 Warranty Scope

During the warranty period, the company will provide free repair or replacement for any malfunction caused by defects in the product itself. The customer shall allow a reasonable response time for the company to carry out repairs. Replaced products shall be disposed of by the company. The customer must present valid proof of purchase and ensure that the product trademark is clearly visible; otherwise, the company reserves the right to decline warranty coverage.

5.3 Disclaimer Statement

Under the following circumstances, the company shall have the right to decline warranty coverage but may still provide paid repair services.

1. The product has exceeded the warranty period.
2. Valid proof of purchase cannot be provided.
3. Damage caused during transportation or handling.
4. Damage resulting from improper installation, modification, or repairs performed by unauthorized personnel.
5. Damage caused by operation under abnormal conditions or in unsuitable environments.
6. Malfunction or damage resulting from the use of non-Naton components or software.
7. Failures caused by force majeure, such as fire, earthquake, or flood.

06 Appendix

Appendix A-Logo Description

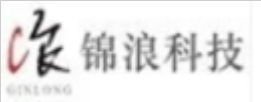
Identification Instructions

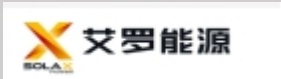
	Please read the endorsed documentation carefully
	Danger. Risk of electric shock!
	Hazardous Substance Labeling
	CE certification
UN38.3	Transportation Safety Certification
	Flammability risk
	Keep the battery away from open flame or ignition sources.
	Recycling
	The danger of voltages. Danger to life due to high voltages in the energy storage system
	This marking indicates that this product should not be disposed with other household wastes

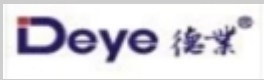
Appendix B

Multi Inverter protocol support.

Default setting: CANBUS – Victron, RS485–Pylon.

NO	Type	Inverter	Protocol
1	CAN	Pylon 	PYLON CAN LV V1.3–2019.03.01
2	CAN	DEYE/Sunsynk 	PYLON CAN LV V1.3–2019.03.01
3	CAN	Growatt 	Growatt CAN LV V1.09–2020.10.22
4	CAN	Victron 	Victron CAN 2021.01.07
5	CAN	Luxpower 	Luxpowertek CAN V1.0–2020.02.11
6	CAN	SMA 	SMA CAN V2.0
7	CAN	Goodwe 	GoodWe CAN Inverter LV V1.7–2020.02.28
8	CAN	Studer 	STUDER CAN V1.02–2018.06.14
9	CAN	Sofar 	SofarSolar CAN inverter V6
10	CAN	Ginlong/Solis 	GINLONG CAN LV V1.0–2019.12.28
11	CAN	TBB_LITHIUM 	TBB CAN V1.05–2021.04.20
	CAN		TBB CAN V1.1–2021.10.21
12	CAN	Daneng 	DANENG CAN V10–2022.10.10
13	CAN	Aiswei 	AISWEI CAN V1.0

14	CAN	SAJ		SAJ CAN V1.9-2022.06.30
15	CAN	Sorotec		Sorotec CAN Inverter V1.22-2017.11.28
16	CAN	MUST		MUST CAN V2.0.2-2021.06.02
17	CAN	Megarevo		PYLON CAN LV V1.3-2019.03.01
18	CAN	Schneider		Schneider can2.0
19	CAN	Afore		Afore Communication protocol CAN
20	CAN	Solax		PYLON CAN LV V1.3-2019.03.01

1	RS485	Pylon		PYLON RS485 LV-BPB V3.5-2019.08.07
2	RS485	DEYE/Sunsynk		PYLON RS485 LV-BPB V3.5-2019.08.07
3	RS485	Growatt		Growatt RS485 V2.01-2019.02.13
4	RS485	Voltronic		Voltronic RS485 Inverter V1.0-2018.09.11
5	RS485	Phocos		Phocos RS485 2021.04.07
6	RS485	Luxpower		Luxpowertek RS485 inverter V0.3-2020.07.06
7	RS485	SRNE		WOW RS485 Modbus V1.3-2017.06.27
8	RS485	Sorotec		Sorotec RS485 Inverter V1.22-2017.11.28
9	RS485	Hypon		HYPONTECH RS485 Modbus V2.0-2023.06.29

10	RS485	SUNPLAIN		Communication protocol for 8-11KW energy storage inverters
11	RS485	Epever		Lithium Battery BMS-Link Communication Address Table V1.6
12	RS485	TALENT		B Communication Protocol from Inverter to BMS
13	RS485	ELTEK		BatteryModbusDataDefinitions (REV14)
14	RS485	Techfine		PYLON 485 Communication Protocol V3.5
15	RS485	SMKSOLAR		Lithium Battery Agreement GT Version 24 Year 7 1.0 Version
16	RS485	Gospower		PYLON 485 Communication Protocol V3.5
17	RS485	AOHAI		PYLON 485 Communication Protocol V3.5
18	RS485	SUNGERY		PYLON 485 Communication Protocol V3.5

PBmsLToolsV1.84

RealTimeMonitor ParallerMonitor SaveRecord ExportRecord ParamSetting SystemSetting Setting Tools Test Encryption Commun

Voltage(mV)

BaseVoltage 0 Calibration

TotalVoltage 0 Calibration

Current(mA)

ChargeCurrent 0 Calibration Reset

ZeroCurrent 0 Calibration

DisChargeCurrent 0 Calibration Reset

BMS Num Setting

BatteryNum 0 Write

CHGCurrentSetting

StartUpCurrent(A) 0 Read Write

Limit Gear ☐ Low Write

IntermitentCHGSetting

IntermitentCHGLim Write

Electricity(mAh)

RemainingCapacity 0

FullCapacity 0

DesignCapacity 0

Read Write

Cycle

CycleTimes 0 Write

ProductInfo

BMS ProductInfo Write

PACK ProductInfo Write

InverterProtocolSetting

CANProtocol

485Protocol

Read Write

TestModel

TestModel

TestWatchdog

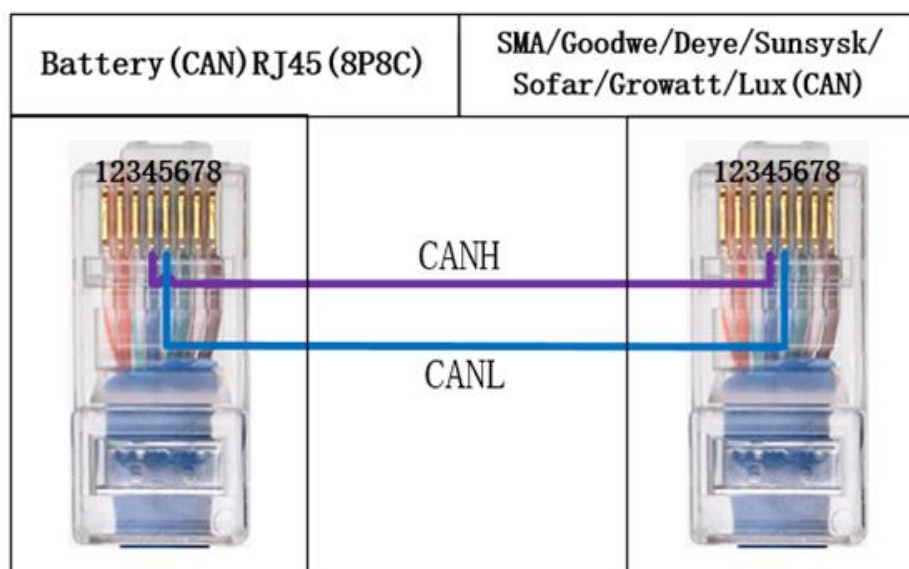
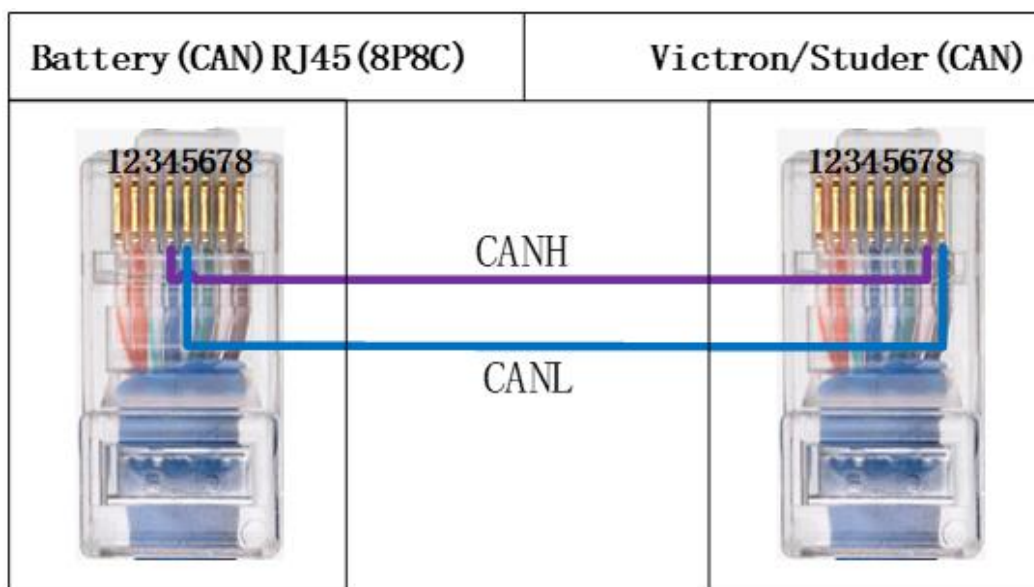
5/16/2025 10:41:53 AM Firmware: P16S100A-31922-1.73A BMS S/N: 319221240190125P PACK S/N: EN Running

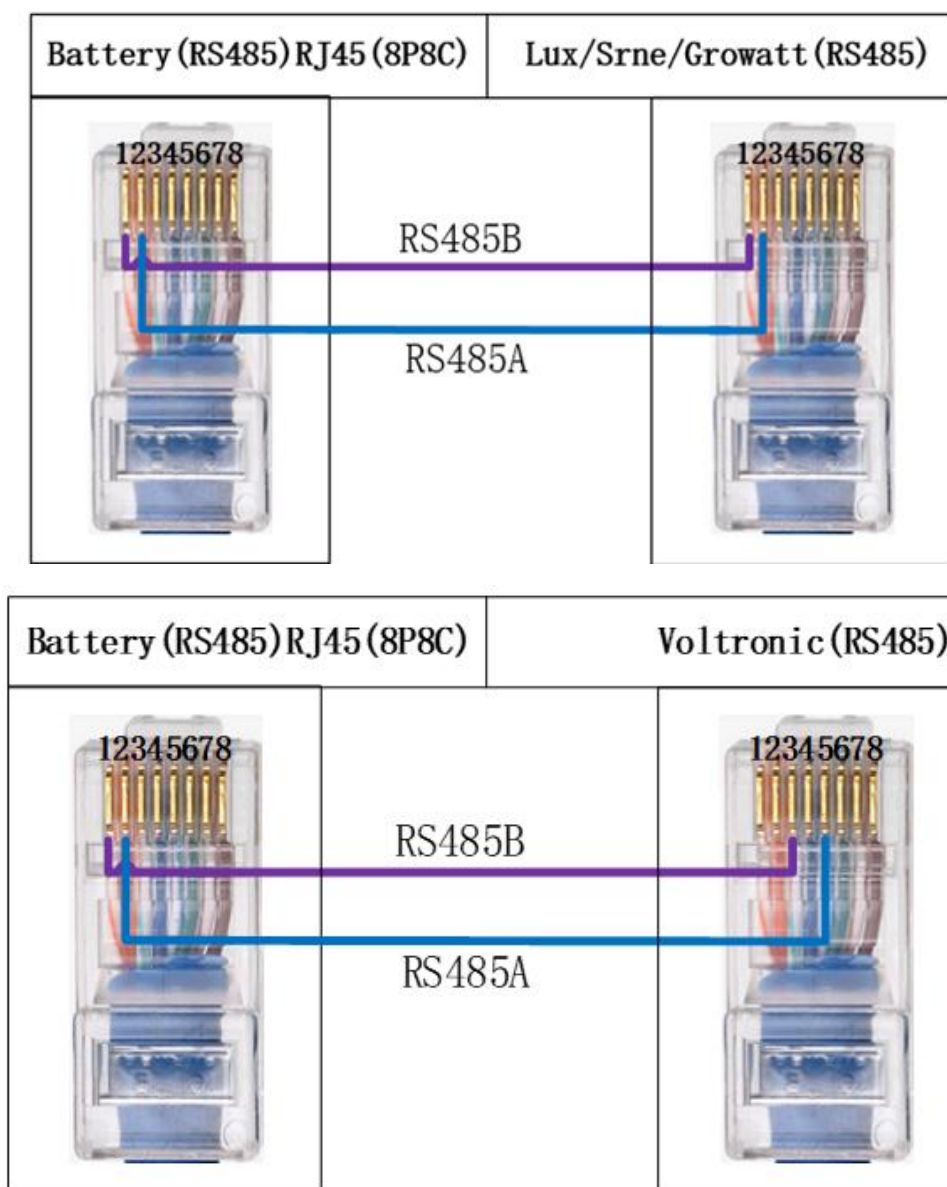
Remark:

- Please ask your sales team to provide password for host computer software administration enter.

- Different inverters the pin assignment is not the same, please contact inverter supplier for detailed RJ45 cables of pin assignment.

Connector pin configurations for the above-mentioned inverter manufacturers are listed below:





Appendix C-Emergency handling

When the battery drops or is subjected to a strong impact

- During installation, if the battery falls or is subjected to strong impact, it may cause internal damage. Do not continue to use it.
- If there is a noticeable odor, damage, smoke or fire, immediately evacuate the personnel and promptly call the police. Professional personnel should use fire-fighting equipment to extinguish the fire and handle the situation under the condition of ensuring safety.
- If there is no obvious deformation or damage to the appearance and no noticeable odor, smoke or fire occurs, contact professional personnel to transfer the battery to an open and safe place, or contact the company for recycling treatment.

When a flood occurs

- Ensure personal safety first, then immediately cut off the power supply of the system.

- If any part of the battery is submerged in water, do not touch it to avoid electric shock. Evacuate the scene and report it in time.
- The flooded battery has a risk of electrolyte contamination. It cannot be reused and needs to be recycled and scrapped by a professional institution.

When there is smoke or fire

- When there is a large amount of smoke in the storage room for batteries, it is strictly prohibited to open the door and enter to prevent the risk of explosion and inhalation of toxic gases by personnel.
- During the extinguishing process, all firefighters should wear full heat-insulating fireproof suits, wear fire-fighting filtering respirators or air respirators, fire helmets and masks, and insulated protective equipment such as insulated shoes. Use inert gas or Class D dry powder fire extinguishers. It is forbidden to use water-based fire extinguishing agents (initially).
- After extinguishing the fire, continuous water spraying for cooling is still required. Wait until the battery temperature cools to within $\pm 10^{\circ}\text{C}$ of the room temperature, and monitor for several hours to ensure there are no signs of temperature rise before removing.

When electrocuted

- Set up warning tapes to isolate the scene and ensure that people stay away from the power source.
- Do not directly touch the victim until they have been disconnected from the power source. Avoid getting yourself electrocuted. Wear professional insulating gloves and shoes, and use insulating tools to separate the victim from the power source.
- If the injury is severe, immediately call the emergency number. Have the victim lie flat, monitor changes in their consciousness, breathing, and heartbeat. For those with severe injuries, no breathing, or no heartbeat, trained personnel with certification should perform cardiopulmonary resuscitation until medical personnel arrive.

When the battery bulges

- Immediately stop using and disconnect the power supply. Stop charging and discharging, and disconnect the power source of the device. Do not attempt to charge, freeze or puncture the battery. If you notice the device is overheating or smoking, place it in a fireproof container (metal box/sandbox) and keep it away from the device.
- For handling methods based on the degree of battery bulging:
 - (1) Slight deformation, no heating – safely remove and send to the recycling point
 - (2) Shell rupture/leaking – isolate and hand over to the hazardous waste agency for handling
 - (3) Accompanied by high temperature/smoke – place in the sandbox for monitoring, use water to cool down and sound the alarm.

All operations should prioritize personal safety. If unsure, evacuate immediately and contact professionals.

Appendix D-Exceptional Situation Explanation

1. What should be done if the battery pack fails to function properly after being connected to the power supply?

Answer: The most straightforward method is to connect to the host computer. Through the host computer, the fault phenomenon can be detected. Information such as alerts, protection, and faults can be displayed on the host computer interface, allowing for a rough analysis of the cause. This can also provide necessary references for further testing.

2. Under what circumstances will RS232 communication fail?

Answer: The following steps can be taken to eliminate this problem:

- 1) Ensure that at least one indicator light on the battery pack is on or flashing, indicating that the battery pack is in normal operation.
- 2) Confirm that the upper computer software selects the correct COM port (refer to the device manager).
- 3) Confirm that the RS232 communication line is fully inserted into the corresponding communication interface of the battery pack.

3. Under what circumstances will RS485 be unable to perform parallel battery communication?

Answer: The possible causes of parallel battery communication failure are as follows: First, confirm whether the parallel RS485 communication ports are properly connected. Then, ensure that the address dialing position of the battery pack is correct, and make sure that the RS485 terminal plug is in the correct position.

4. What is the fault alarm mechanism?

A: The battery pack has a fault alarm function, which can be checked through the upper computer software.

Faults include:

- 1) Sampling fault: Communication failure between the analog front-end and the main control chip. When the fault occurs, the charging and discharging function is turned off, and the fault alarm can be automatically cleared after the fault is eliminated.
- 2) Temperature NTC fault: Mainly detects whether the temperature NTC is short-circuited or disconnected. When the fault occurs, the charging and discharging function is turned off, and the fault alarm can be automatically cleared after the fault is eliminated.
- 3) Unit fault: The voltage difference between the unit is greater than 1V, or the difference between the total voltage detected and the total voltage of the unit is greater than 5V, or the minimum voltage is less than 0.5V. A broken voltage sampling line also reports the same fault. When the fault is cleared, the fault alarm can be automatically cleared.

After the battery is connected to the system, it exhibits overcurrent protection or short-circuit protection. This is not a problem of the battery pack, but rather an excessive capacity load of the electrical equipment. Charging can eliminate the alarm or extend the pre-charging circuit delay time of the battery pack.



User Manual

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