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GENIXGREEN®

User Manual

For low voltage residential storage battery

Content

Preface

Overview

This document introduces energy storage batteries, including product introduction, application scenarios, system maintenance, and related technical data. Before installing and using energy storage products, please carefully read this manual, understand safety information, and be familiar with the functions and characteristics of energy storage products.

Applicable objects

This document is mainly applicable to the following personnel:

- Sales personnel
- System engineer
- Installation and after-sales personnel

Description of battery symbols

	Be careful
	Read the instruction manual
	Scrap batteries should not be thrown into the trash can at will
	Can be recycled and processed by professional institutions before continuing to use
	CE certified
	High voltage danger

01/Safety Precautions

1.1 Declaration

● When installing, operating, and maintaining equipment, it is necessary to read this manual first, follow the markings on the equipment, and follow all safety precautions in the manual. When opening the packaging for a new product for the first time, please check the product and accessories. If there is any damage or missing parts to the product, please contact your local dealer.

● The "precautions" and "prohibitions" in the manual do not represent all safety precautions that should be followed, but only serve as a supplement to safety precautions. Our company does not assume any responsibility for violating general safety operation requirements or violating design, production, and use equipment safety standards.

● The equipment should be used in an environment that meets the design specifications,

otherwise it may cause equipment failure, and the resulting equipment malfunction or component damage, personal safety accidents, property damage, etc. are not within the scope of equipment quality assurance.

● Local laws, regulations, and norms should be followed when installing, operating, and maintaining equipment. All safety precautions stated in the manual are only supplementary to local laws, regulations, and norms. Our company is not responsible for any of the following situations or their consequences:

● Equipment damage caused by extreme weather events such as earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and force majeure;

● Not operating under the usage conditions specified in this manual;

● The installation and use environment does not comply with relevant international, national or regional standards;

● Unauthorized disassembly, modification of products or modification of software codes;

● Failure to follow the operating instructions and safety warnings in the product and documentation;

● Damage caused by you or your authorized third-party transportation;

● Damage caused by storage conditions not meeting product requirements;

● Exceeding the product's service life.

1.2 Precautions

● The battery module should be installed in a cool, dry, ventilated, and safe environment (between 0 ℃ and 45 ℃).

● Please use a dry cloth to clean the battery and inverter.

● If the battery needs to be stored for a long time, please charge and discharge the battery every 3 months.

● All maintenance work needs to be completed by professional personnel.

● The maximum charging and discharging power of the inverter shall not exceed the maximum charging and discharging power supported by the battery module.

● When installing and disassembling equipment, please turn OFF all power before proceeding with relevant operations.

● Please keep batteries away from heat and water sources during use and storage.

● After the installation of the battery and inverter is completed, please take relevant measures to prevent children from approaching.

● Please carefully read the user manual before use.

● Please dispose of discarded batteries in accordance with local regulations.

● It is recommended that the battery be stored in an environment with a temperature range of -20℃-+45℃ and charged regularly according to the table below, with the charging temperature not exceeding 0.5C (C is a measurement of the battery's discharge rate relative to its maximum capacity). After long-term storage, its SOC needs to reach about 50%.

Storage environment temperature	Relative humidity of the storage environment	Storage time	SOC
＜ -20℃	/	Not allowed	/
-20~+35℃	5%~70%	<6 months	20% ≤ SOC < 60%

35~+45℃	5%~70%	≤ 3 months	20% ≤ SOC ≤ 60%
＞ 45℃	/	Not allowed	/
Note: Long-term undervoltage will damage the battery system. When the temperature is higher than 25℃, charge the over-discharge system within seven days. When the temperature is lower than 25℃, charge the over-discharge system within fifteen days. Regularly check whether the battery and its supporting terminals, connecting cables and indicator lights are normal.			

1.3 Prohibitions

● Unauthorized disassembly and modification of batteries are prohibited.

● It is prohibited to engage in any violent behavior that damages the battery, such as throwing, striking, and pounding.

● It is prohibited to use batteries of different models and manufacturers in parallel.

●Do not place the battery in a high-temperature environment above 60 ℃.

● It is prohibited to short circuit battery P+, P- using metal conductive materials.

● It is prohibited to install batteries in non specified orientations.

● Prohibit connecting battery modules in series.

● Smoking or using open flames near the battery is prohibited.

● Installation or disassembly work is prohibited when the equipment is live.

● During installation, maintenance, dismantling and other operations, it is prohibited for workers to wear metal watches, bracelets, necklaces, rings, and other metal jewelry on their bodies.

1.4 Treatment measures for battery leakage

● Ensure sufficient ventilation and remove all ignition sources.

● Quickly evacuate personnel to a safe area, away from the leakage area and in an upwind direction.

● Use personal protective equipment. Avoid inhaling steam, smoke, gases, and dust.

●Take measures to prevent further leaks or spills while ensuring safety.

● Remove all ignition sources and use fire-resistant tools and riot prevention equipment.

● When a leak occurs, avoid contact with the leaked liquid or gas; Electrolytes are corrosive and contact may cause skin irritation and chemical burns; If in contact with battery electrolyte, the following measures need to be taken.

● Inhalation: Evacuate contaminated areas, immediately transfer to fresh air, and maintain smooth breathing; If breathing is difficult, administer oxygen; If the patient ingests or inhales this substance, mouth to mouth artificial respiration is not allowed; If breathing stops. Perform cardiopulmonary resuscitation immediately; Seek medical assistance immediately.

● Skin contact: Immediately remove contaminated clothing, wash the skin contact area with plenty of water and soap, and seek medical assistance immediately.

● Eye contact: Immediately remove contaminated clothing, wash skin contact areas with plenty of water and soap, and seek medical assistance immediately.

● Accidental ingestion: Do not induce vomiting, do not feed anything from the mouth to unconscious individuals, seek medical assistance immediately.

1.5 Fire handling measures

●If a fire occurs, the system should be powered OFF while ensuring safety.
●If a small fire occurs and the flames do not spread to the high-voltage battery section, carbon dioxide or ABC dry powder fire extinguishers can be used to extinguish the fire.
●When thoroughly inspecting a fire, do not come into contact with any high-voltage components and always use insulated tools for inspection.
●When extinguishing a fire, a breathing mask (compliant with MSHA/NIosh requirements or equivalent) should be worn and full body protective clothing should be worn.
●Prevent fire water from contaminating surface and groundwater systems.

02/Production Introduction

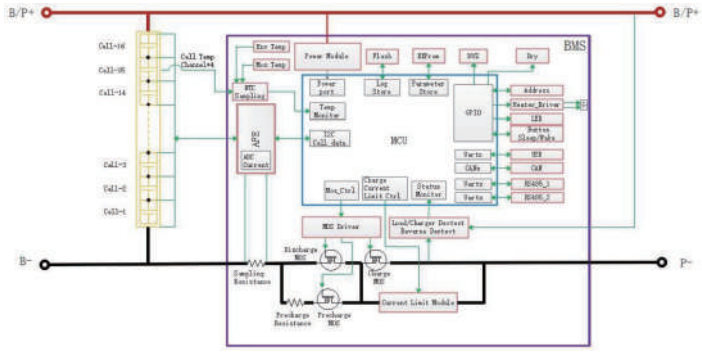
2.1 Function brief introduction

2.1.1 The lithium iron phosphate battery system is a standard battery system unit. Customers can choose a certain number of batteries according to their needs, and form a larger capacity battery pack through parallel connection. Up to 16 units can be connected in parallel to meet the long-term power supply needs of users.
2.1.2 This product is particularly suitable for access network devices, remote exchange stations, mobile communication devices, household energy storage devices, and mixed network inverter devices.

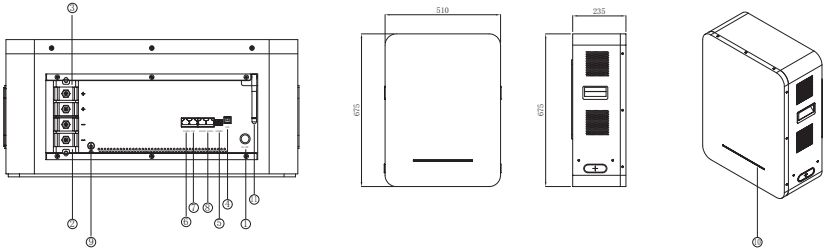
2.2 Product attributes

The positive electrode material of energy storage lithium-ion products is lithium iron phosphate. BMS can effectively manage batteries with better performance. The characteristics of the system are as follows:
●Compliant with European ROHS and certified SGS, using non-toxic, pollution-free and environmentally friendly batteries.
● The anode material is lithium iron phosphate (LiFePO4), which is safer and has a longer service life.
●A battery management system (BMS) with better performance, equipped with overcharge, over discharge, over-current, over temperature, under temperature, and short circuit protection functions.
● The BMS is equipped with a CAN/485 communication interface, which can communicate with computers/inverters, read various parameters of the battery pack, and monitor the status of the battery pack in real time.
● Self management of charging and discharging without the need for on duty personnel to monitor.
● Single core balancing function.
● Flexible configuration allows for parallel use of multiple batteries for longer standby time.
● The system noise is relatively low.
● No memory effect, allowing the battery to be charged and discharged shallowly.
● The working environment has a wide temperature range of -20 ° C to 60 ° C, with good cycle span and discharge performance.
● High energy density, small size, and lighter weight.

2.3 Basic Functional Block Diagram



2.4 Product appearance introduction



External Port Description			
1	Battery switch (ON/OFF)	2	Battery negative port
3	Battery positive port	4	Upper computer USB communication port
5	ADDR	6	Inverter RS485 communication port
7	Inverter CAN communication port	8	Battery parallel RS485 communication port
9	Grounding port	10	LED/LCD display screen (optional)
11	WiFi antenna (optional)	12	Circuit breaker (optional)
13	Rack ear/Foot stands / wheels(optional)		

2.5 Product parameter description

Rated voltage of battery	51.2V	
Rated energy of battery	5.12kWh	10.24kWh
Rated capacity of battery	100Ah	200Ah
Configuration of cells	16S1P	
Working voltage range	44.8V~ 56.8V	
Charging cut-OFF voltage	56.8V	
Discharge cut-OFF voltage	44.8V	
Maximum charging current	100A	150A
Maximum discharge current	100A	150A
Charging temperature range	0℃~ 60℃	
Discharge temperature range	-20℃~ 60℃	
Suggested discharge depth	80%	
Max. number of parallel batteries	16	
Supporting communication methods	RS232/MODBUS/CANBUS	

2.6 LED indicator light description

2.6.1Flashing modes in various states

Operation mode	Light(S)	OFF(S)
Flash1	0.5	3.5
Flash2	0.5	0.5
Flash3	0.5	1.5

2.6.2 Definition of flashing mode

	Situation	Running light	Alarm Light	Battery indicator light			
				LED1	LED2	LED3	LED4
Shutdown		OFF	OFF	OFF	OFF	OFF	OFF
Fault	Cell fault	Flash2	Flash2	Flash2	OFF	OFF	OFF
	Charge &discharge MOS fault	Flash2	Flash2	OFF	Flash 2	OFF	OFF
	AFE Fault	Flash2	Flash2	OFF	OFF	Flash 2	OFF
	Current sampling resistor fault	Flash2	Flash2	OFF	OFF	OFF	Flash2
	Voltage fault	Flash2	Flash2	OFF	OFF	OFF	OFF
	Reverse connection fault	Flash2	Flash2	OFF	OFF	OFF	OFF
	Short circuit	Flash2	Flash2	Flash2	Flash2	Flash2	Flash2
Protection	Total voltage over-voltage protection	ON	ON	ON	ON	ON	ON
	Single section over-voltage protection	ON	OFF	ON	ON	ON	ON
	High/Low temperature protection for battery charging	OFF	ON	Flash2	Flash2	OFF	OFF
	Charging over-current protection	OFF	ON	OFF	OFF	Flash2	Flash2
	Total voltage under-voltage protection	Flash1	ON	OFF	OFF	OFF	OFF
	Single section undervoltage protection	Flash1	OFF	OFF	OFF	OFF	OFF
	High/low temperature protection during cell discharge	ON	OFF	Flash2	Flash2	OFF	OFF
	Discharge overcurrent protection	ON	OFF	OFF	OFF	Flash2	Flash2
Standby	Normal	Flash1	OFF	According to the power indicator			
	Alarm	Flash1	Flash3				
Charge	Normal	ON	OFF	According to the battery indicator (the highest LED on the battery indicator flashes 2)			
	Alarm	ON	Flash3				
Discharge	Normal	Flash 3	OFF	According to the power indicator			
	Alarm	Flash3	Flash3				

2.6.3 Definition of battery indicator

At standby/discharge:

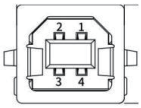
Capacity	LED1	LED2	LED3	LED4
0%	OFF	OFF	OFF	OFF
1%~24%	ON	OFF	OFF	OFF
25%~49%	ON	ON	OFF	OFF
50%~74%	ON	ON	ON	OFF
75%~100%	ON	ON	ON	ON

At Charge:

Capacity	LED1	LED2	LED3	LED4
0%~24%	Flash2	OFF	OFF	OFF
25%~49%	ON	Flash 2	OFF	OFF
50%~74%	ON	ON	Flash 2	OFF
75%~100%	ON	ON	ON	Flash 2

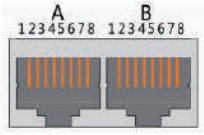
2.7 BMS Communication Network Port Definition Description

USB Interface definition :(Upper computer terminal)



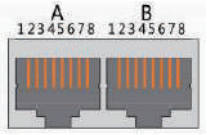
	Definition description	
X7 Communication port	PIN 1	VBUS
	PIN 2	D-
	PIN 3	D+
	PIN 4	GND

RS485-1/CAN Interface definition:(Inverter terminal)



	Definition description			Definition description		
X1 Communication port definition	B Part CAN Interface	PIN1	NC(Empty)	A Part RS-485-1 Interface	PIN1	RS485-1B
		PIN2	CGND		PIN2	RS485-1A
		PIN3	NC(Empty)		PIN3	RS485-GND
		PIN4	CANH		PIN4	RS485-1B
		PIN5	CANL		PIN5	RS485-1A
		PIN6	NC(Empty)		PIN6	RS485-GND
		PIN7	NC(Empty)		PIN7	NC(Empty)
		PIN8	NC(Empty)		PIN8	NC(Empty)

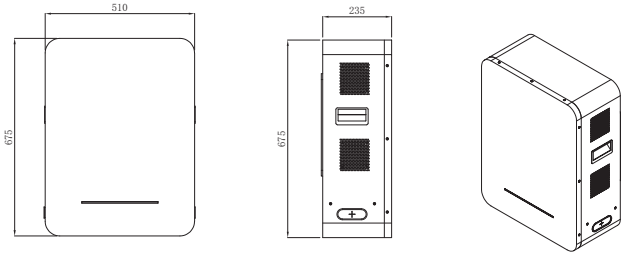
RS485-2 Interface definition:(Battery parallel terminal)



	Definition description			Definition description		
X2 Communication port	A Part RS485-2 Interface	PIN1	RS485-2B	B Part RS485-2 Interface	PIN1	RS485-2B
		PIN2	RS485-2A		PIN2	RS485-2A
		PIN3	P-GND		PIN3	P-GND
		PIN4	NC(Empty)		PIN4	NC(Empty)
		PIN5	NC(Empty)		PIN5	NC(Empty)
		PIN6	P-GND		PIN6	P-GND
		PIN7	RS485-2A		PIN7	RS485-2A
		PIN8	RS485-2B		PIN8	RS485-2B

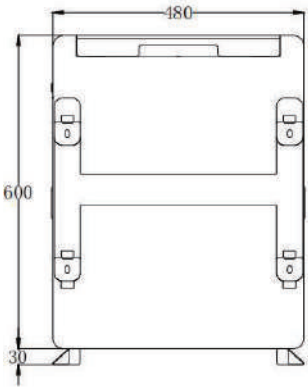
2.8 Product dimension

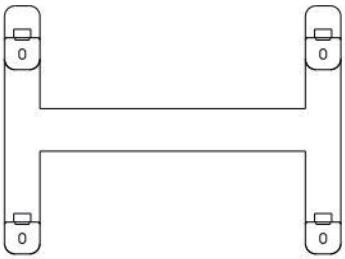
*The battery sizes of different models are different, please confirm with the salesperson.



2.9 Fixed hole size diagram

*The battery sizes of different models are different, please confirm with the salesperson.





Expansion screw M8 * 12, quantity 4PCS

03/Product Installation

3.1 Pre installation inspection of products

Before signing for the installation of the product, please carefully check the following contents:

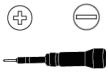
● Check if there is any damage to the outer packaging, such as holes, deformation, cracks, or other signs that may cause damage to the equipment inside the packaging. If there is any damage, do not open the packaging and contact your dealer.

● Check if the battery model is correct. If there is any discrepancy, do not open the packaging and contact your dealer.

● Check if the type and quantity of deliverables are correct, and if there is any damage to the appearance. If there is any damage, please contact your dealer.

3.2 Preparation of installation tools

The illustrated tools are for reference only, please refer to the actual product.

 Impact drill (drill bit set)	 Insulation torque socket wrench	 Rubber hammer	 Cross shaped insulated torque screwdriver
 Multimeter	 Steel tape	Level ruler	Cable tie
 T-shaped hook	 Diagonal pliers	 Manual Forklift	 Electric forklift
Personal protective tools			
 Insulated gloves	 Protective gloves	 Goggles	 Anti-dust masks
 Insulated shoes	 Reflective vest	 Safety hat	/

3.3 Installation requirements

3.3.1Installation environment requirements

- Batteries should not be installed in environments with high temperature, humidity, or corrosion.
- Please avoid installing water pipes, cables, etc. inside the wall to avoid danger during drilling.
- The installation position should be away from the range that children can reach, and should be avoided from being installed in easily accessible positions.
- Battery installation should avoid direct sunlight, rain, snow, and other installation environments. It is recommended to install it in a covered installation location.
- The battery protection level meets the requirements for indoor installation, and the installation environment temperature and humidity must be within a suitable range.

● Please ensure that the device indicator lights and all labels are easy to view, and the wiring terminals are easy to operate.

● Stay away from strong magnetic field environments and avoid electromagnetic interference.

3.3.2 Installation carrier requirements

● The installation carrier must not be flammable materials and must have fire resistance.

● Please ensure that the installation carrier is sturdy and reliable, capable of carrying the weight of the battery.

3.3.3 Requirements for installation and handling angles

● Recommended installation angles for inverters: vertical (with feet facing downwards) and horizontal (with indicator lights facing upwards).

● Do not invert, tilt, or tilt the inverter beyond the angle.

● Requirements and prohibitions for product packaging, handling, and placement

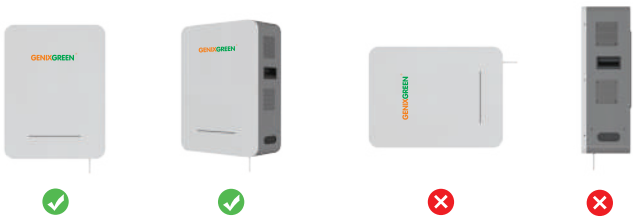
● Battery handling requirements

A. During transportation and handling, battery modules and their components should be protected from damage:

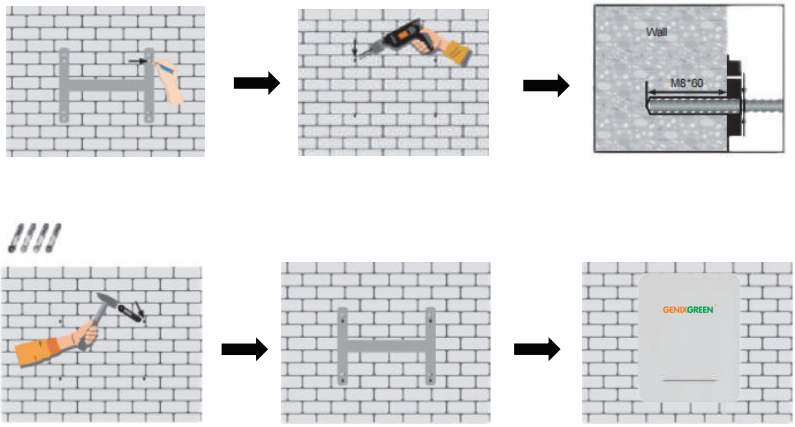
B. During transportation, consider the weight of the battery module system and carefully lift the battery modules and components;

C. Do not collide, pull, drag or step on the battery module, and do not put unrelated objects in contact with any part of the battery module;

● The installation angle of the battery is as follows.



- Schematic diagram of battery installation process

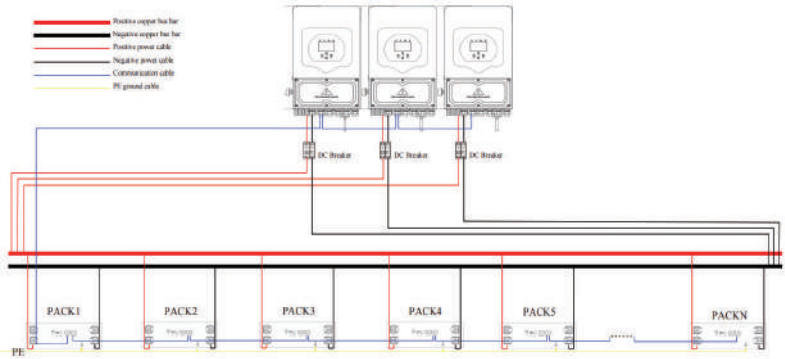


04/Battery Parallel Operation

4.1 Battery parallel connection

4.1.1The parallel connection method for multiple batteries is quite unique, with P+/P-wiring requiring the use of loop connection, and the 485 parallel communication port requiring the use of daisy chain connection (using a Category 5 standard network cable is sufficient).

4.4.2 When multiple batteries are connected to the inverter in parallel, only PACK1 battery is responsible for communication with the inverter. Therefore, the communication network port of the inverter needs to be connected to the corresponding network port of PACK1 battery, otherwise communication with the inverter cannot be achieved.



Note: It is recommended to match the copper busbar according to the maximum power of the inverter module.

4.2 Power line specifications

The specifications and length of the P+P- parallel power line wire should be consistent, and the power line model should be matched according to the maximum power of the inverter.

5kW Inverter	10kW Inverter	15kW Inverter
6AWG	4AWG	2AWG

4.3 Interface communication and dialing instructions

4.3.1 USB Communication

The USB interface adopts the TYPE B port, through which the BMS can communicate with the upper computer and monitor various information of the battery on the upper computer, including battery voltage, current, temperature, status, SOC, SOH, and battery production information. The default baud rate is 115200bps.

4.3.2 RS485 communication

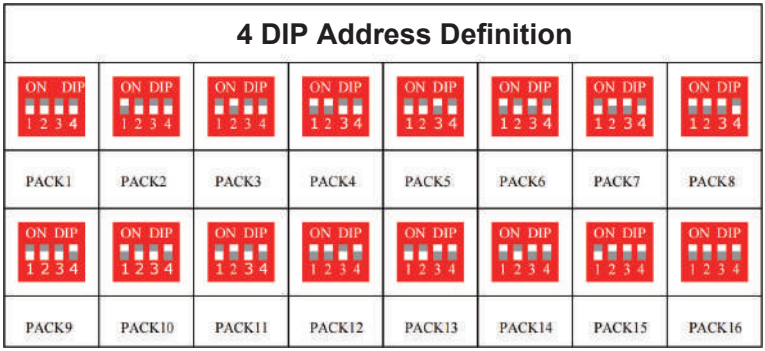
The RS485 interfaces of BMS are all RJ45 network ports, and the single port RS485 is mainly used for data exchange between battery packs and inverters; (Note: If there is a dual port RS485, it is parallel communication between battery packs)

4.3.3 CAN communication

The CAN communication interface of BMS has the ability to interact data between the battery pack and inverter, with a default baud rate of 500K and a communication interface of RJ45 network port. (Note: If there is a dual port IN/OUT, it is CAN parallel communication between battery packs, and the end slave OUT needs to be connected to the PLUG-RJ45 crystal head)

4.3.4 ADDR settings

ADDR is used for master-slave and address allocation during battery parallel operation. PACK1 is the master bit (address 0), and only the battery master will communicate with the inverter.



05/Connection Between Battery And Inverter

5.1 Connection between battery module and inverter

5.1.1The battery module P+/P - is connected to the inverter BAT+/BAT - and reverse connection is strictly prohibited.

5.1.2 Connect the battery and inverter communication network port with the correct communication network cable.

5.1.3 First turn on the battery switch and wait for all batteries to turn on successfully before turning on the inverter switch.

5.2 Inverter settings

5.2.1 Complete the battery type, operating mode, and other settings according to the inverter user manual. If the inverter displays correct battery information and there are no alarms related to BMS communication faults, it indicates that the communication between the battery module and the inverter is successful.

5.2.2 Other settings can be set according to the inverter manual according to actual needs.

Note: If a circuit breaker is installed, the circuit breaker should be opened first, then the battery switch, and finally the inverter switch.

5.3 Protocol selection method between battery module and inverter

5.3.1 Method 1: The default inverter for the battery module at the factory

Step 1: Select the cable used by the default inverter based on the label on the communication cable. Connect the RJ45 connection port (CAN/RS485) on the battery end and the RJ45 connection port (CAN/RS485) on the inverter end with a cable.

Step 2: Turn on the battery module and inverter, and wait for them to work properly. The battery is configured to communicate with the communication ports of Voltronics, Growatt Inverter (RS485 Port), Solis, DEYE, Growatt, Luxpower, Sofar, TBB inverters (CAN Port)according to the factory's preset configuration. The battery will automatically select the default inverter communication.

Step 3: After successful communication between the battery and the inverter, the battery status will be displayed on the inverter, including voltage, current, SOC, temperature, etc.

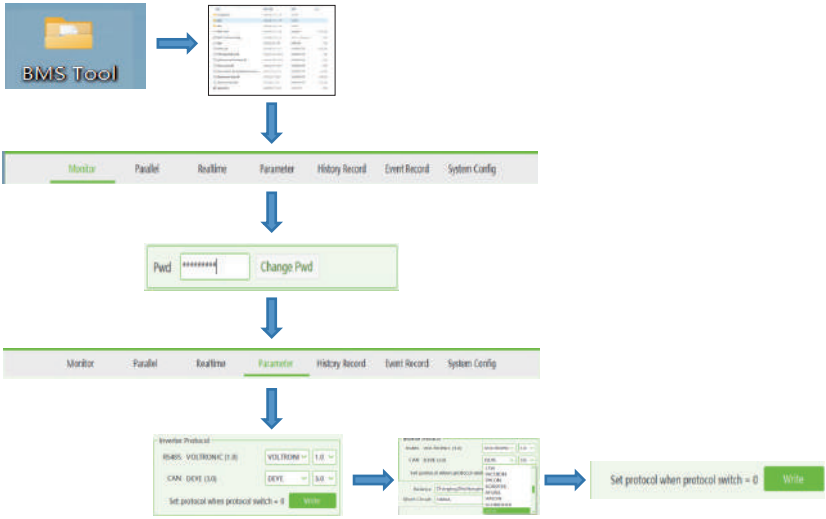
5.3.2 Method 2: Battery module (protocol selection) When communicating with other brands of frequency converters, such as:

Solis, Growatt, Megarevo, INVT, Victron, SOLAX, SMA,etc.

Step 1: Turn on the battery, ensure that the BMS is turned on normally and not in a sleep state. Insert the communication cable of the delivered USB-B into the battery communication port, and the USB-A end into the computer;

Step 2: Extract the BMS monitoring software package to the current computer (whsB mhdro soft.net framework version 2.0 or higher). This software does not require independent installation. Simply double-click on the main program icon (BMS exe. file) when the environment is satisfactory to run and use. Enter password: **green1234** (green space indicates correct password).

Step 3: Click "Parameter Information" at the top of the system page, click the "Read" button to read the battery parameters. Select the "Protocol Type" for the inverter protocol. Click the "Write" button to set the protocol. The system will display that the operation is successful and the protocol selection is complete (please refer to the following image).



Step 4: Select the cable used by the inverter based on the label on the communication cable. Insert the RJ45 connector (CAN/RS485) on the battery end and the RJ45 connector on the inverter end into the interfaces on both sides. Restart the battery and inverter. The battery will automatically communicate with the inverter based on the selected protocol.

5.3.3 Method 3: The battery module is equipped with a WiFi module as an optional function, can select the inverter protocol on APP. Please refer to the APP operation instructions for specific operations.

06/Communication Protocol Compatible Inverter List

RS485 Communication Protocol		
Protocol abbreviation	Protocol Name	Compatible with Inverter brands
Local	Local Protocol	
Voltronic	Voltronic Protocol	MOTOMA/Opti_Solar/Darfon/Phocos
Growatt	Growatt protocol	Sunk/Sacolar/SMK
SOLAX	SOLAX Protocol	
LTW	LTW Protocol	
PACE	PACE Protocol	
MUST	MUST Protocol	
SRNE	SRNE Protocol	PC
Baykee	Baykee Protocol	
SMK	SMK Protocol	
AFORRE	AFORRE Protocol	
GENIXGREEN	GENIXGREEN Protocol	
BITTA	BITTA	
STONE	STONE	
PYLONTECH	PYLONTECH Protocol	
EPEVER	EPEVER Protocol	

CAN Communication Protocol		
Protocol abbreviation	Protocol Name	Compatible with Inverter brands
Local	Local Protocol	
GOODWE	GOODWE Protocol	SOLARFAM
Growatt	Growatt Protocol	
SOLAX	Solax Protocol	
Sofar	Sofar Protocol	
DEYE	DEYE Protocol	
MUST	MUST Protocol	
LTW	LTW Protocol	
Victron	Victron Protocol	
PYLONTECH	PYLONTECH Protocol	DEYE/TBB/Luxpower/INVT/Sunsynk/Megarevo/ CHINT/LIVOLTEK/Hoymiles
SOROTEC	SOROTEC Protocol	
Afore	Afore Protocol	
SCHNEIDER	SCHNEIDER Protocol	
GENIXGREEN	GENIXGREEN Protocol	
Inhenergy	Inhenergy Protocol	
SMA	SMA Protocol	Sorotec/Studer
Solis	Solis Protocol	
DONEERGY	DONEERGY Protocol	
SENERGY	SENERGY Protocol	
SUNWAYS	SUNWAYS Protocol	
Studer	Studer Protocol	
INVT	INVT Protocol	