

Rack-mounted Lifepo4 Battery

User Manual

(51.2V100Ah-4U)

(51.2V200Ah-6U)

(51.2V300Ah-RACK)



V1.0

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Note

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1 Overview

51.2V100Ah-4U / 51.2V200Ah-RACK / 51.2V300Ah-RACK rack-mounted lithium iron phosphate battery packs are backup power products developed and manufactured. They have the characteristics of high modularization, intelligence, safety and reliability, convenience in use, energy conservation and environmental protection; they are suitable for cabinet installation and can be applied in fields such as backup power for network equipment, backup power for switches, laboratory and household backup power energy storage, etc.

1.1 Product features

- * The battery is manufactured with genuine lithium iron phosphate battery cells, which is safe, reliable and has a long service life;
- * The battery management adopts an intelligent BMS management system, featuring over-discharge protection, over-charge protection, over-current protection, short-circuit protection, high and low temperature protection, charging current limiting and other functions. The intelligent SOC algorithm enables more accurate capacity calculation;
 - * The charge and discharge are managed independently and uploaded to the control terminal equipment through device communication, with real-time battery information upload;
- * Various monitoring methods are available. The battery cell information can be viewed in real time and relevant parameters can be modified through a computer or mobile phone APP (Bluetooth function is optional);
- * Flexible configuration. Multiple modules can be used in parallel to increase the load power and usage time;
- * A passive heat dissipation solution is adopted for zero-noise operation;
- * Good communication compatibility, compatible with mainstream manufacturers and communication protocols in the market.

1.2 Environmental Requirements

The working environment of the battery pack should be free of corrosive, flammable, explosive gases and conductive dust that can damage insulation, and it should be far away from humid and high-temperature environments.

- *Range of environmental temperature, humidity and air pressure
 - Charging environment temperature range: -5℃ to 55℃;
 - Discharge ambient temperature range: -10℃~60℃;
 - Storage and transportation temperature range: -25℃~-45℃;
 - Relative humidity range of work: less than 95% (45℃±2℃);
 - Storage and transportation relative humidity range: less than 95% (45℃±2℃);
 - Atmospheric pressure range: 70kPa~106kPa.

1.3 Main Technical Parameters

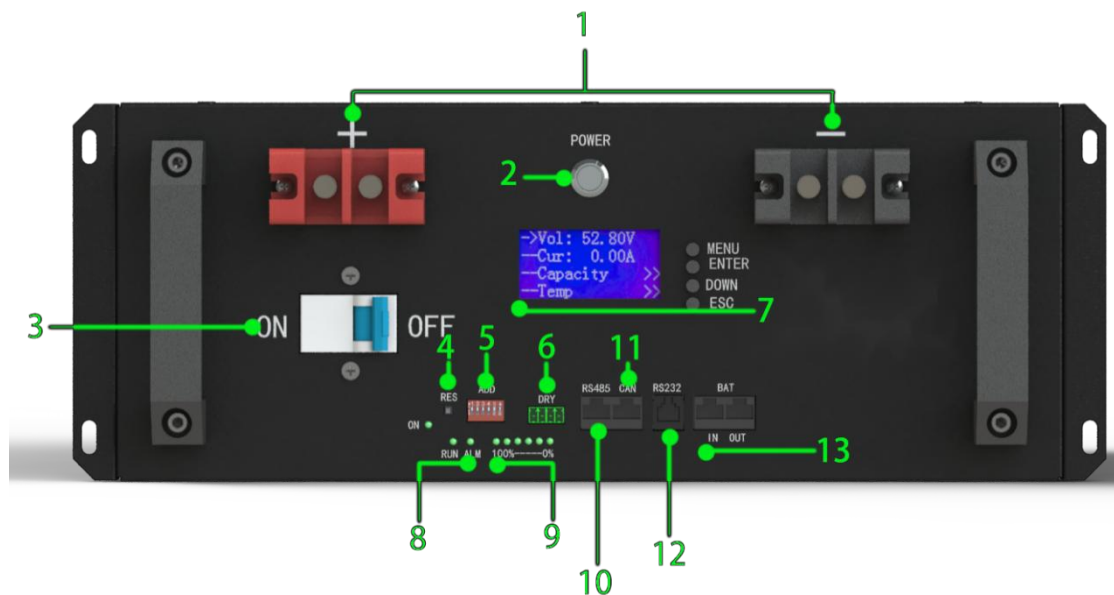
Model	51.2V100Ah-4U	51.2V200Ah-6U	51.2V300Ah-RACK
Battery Type	LiFePO4/LFP		
Configuration	16S1P		
Rated Energy	5.12kWh	10.24kWh	15.36kWh
Nominal Voltage	51.2V		
Working Voltage	44V to 58.4V		
Capacity	100Ah	200Ah	300Ah
Recommended Charge Current	≤20A	≤40A	≤60A
Max. Charge	100A	200A	
Max. Discharge	100A	200A	
Cycle Life (@ 25 °C)	> 6,000 Cycles @ 80% DoD		
Extensibility	Up to 15 batteries in parallel		
Communication	CAN, RS485(WIFI/Bluetooth-choice)		
Dimensions (L*W*H)	480*506*176mm	480*236*660mm	462*750*239mm
Weight	49kg	78kg	110kg
Mounting	Rack mounting		
Ingress Protection	IP20		

2 Appearance Description

2.1 Product appearance



2.2 Panel illustration and interface description

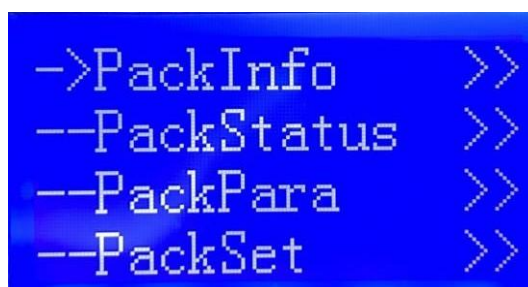


Item	Name	Function
1	Terminals (P+, P-)	Connect to power wires for charging and discharging
2	BMS switch	Control BMS startup and shutdown
3	Circuit breaker	Control the connection of internal and external wiring harnesses of the battery pack.
4	RESET	Reset the battery system

5	ADD	Assign DIP address of each battery
6	DRY CONTACT	Switches to control the external equipment, such as generators, etc.
7	LCD	Display battery pack parameters and communication protocol debugging
8	System run status	Display the current running status of the battery (running, alarm, protection)
9	CHARGE	Battery available capacity indicator
10	RS485	Host port RS485
11	CAN	CAN communication port
12	RS232	Run the reserved interface in parallel

2.3 Display Screen Instructions

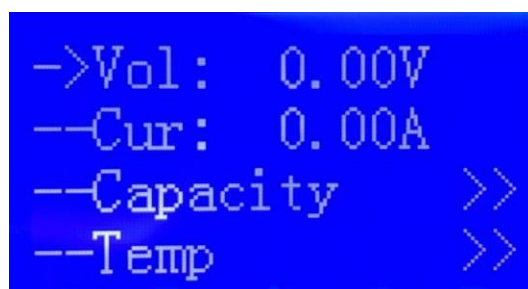
*HOME



Name	Definition
Pack Info (Pack information)	This page allows you to view voltage, current, temperature, and other data.
Pack Status	This page allows you to view the protection status, protection times, and protection flags.
Pack Para (Pack parameters)	This page can set some protection parameters and is currently not open.
Pack Set (Pack settings)	This page allows you to set the host RS485 protocol or CAN protocol for BMS.

Notes:

If there is no cooperation, the system will shut down for one minute.



Vol(Voltage):Battery pack voltage;

Cur(Current):Charging/discharging current.

Capacity:

```
RSOC: 0.00%
ReMain: 0.00AH
FCC: 5.00AH
Cyc:0027
```

RSOC:Rest of state of capacity.

Remain:Remaining capacity of battery pack.

FCC:Full battery capacity.

Cyc:Cycle times.

Temp(Temperature):Display the temperature of all BMS probes.

```
NTC1: 24.9°C
NTC2: 23.4°C
NTC3: 23.4°C
NTC4: 23.6°C
AirTemp: 25.8°C
PCBTemp: 25.0°C
```

CellInfo(Cell information):Check the voltage per section, in mV.

```
--Cell01: 3200mV
--Cell02: 3200mV
--Cell03: 3200mV
--Cell04: 3200mV
```

Pack status

```
->Status:Protect
--Pro_Count >>
--Pro_Status >>
```

Item	Definition
OVP	Over Voltage Protection(single cell)
UVP	Under Voltage Protection(single cell)

POVP	Pack Over Voltage Protection
PUVP	Pack Under Voltage Protection
COTP	Charge Over Temperature Protection
CUTP	Charge Under Temperature Protection
DOTP	Discharge Over Temperature Protection
DUDP	Discharge Under Temperature Protection
COCP	Charge Over Current Protection
DOCP	Discharge Over Current Protection
SCP	Short Circuit Protection
LOCK	Soft Lock

Pack Settings



RS485	CAN BUS
RS485 - PYLON	CAN - Pylon
RS485 - GROWATT	CAN - VicTron
RS485 - Voltronic	CAN - GOODWE
RS485 - LXP	CAN - GROWATT
RS485 - DEYE	CAN - LXP
RS485 - INVT	CAN - DEYE
RS485 - SRNE	CAN - SOFAR
RS485 - OTHER	CAN - GINLONG
...	CAN - SMA
	CAN - MUST
	CAN - OTHER
	...

2.4 Reset switch

When BMS is dormant, press the button (3~6S) and release, the battery pack is activated and the LED indicator is from "RUN" Start lighting up for 0.5 seconds.

When BMS is active, release the button (3~6S), the battery pack is dormant and the LED indicator is

from the minimum The light starts to turn for 0.5 seconds.

When the BMS is active, press the button (6~10S) and release, the battery pack is reset, and all the LED lights are lit at the same time 1.5 Seconds.

Battery pack dormancy and wake-up:

Dormancy

When any of the following conditions is met, the system enters low-power mode:

The monomer or overall over release protection is not removed within 30 seconds.

Press the key (3~6S) and release the button.

The lowest monomer voltage is lower than the dormant voltage, and the duration reaches the dormancy delay

time (while satisfying the no communication, No protection, no equilibrium, no current).

Standby time exceeds 24 hours (no communication, no charge and discharge, no city power).

Force the shutdown through the upper computer software.

Before entering the sleep mode, make sure that the input terminal is not connected to the external voltage, otherwise it will be unable to enter the low power consumption mode.

After the BMS is reset, it still retains the parameters and functions set by the upper computer.

If it needs to restore to the initial parameters, it can be achieved through the "restore default value" of the upper computer, but the relevant operation records and stored data remain unchanged (such as electricity, cycle times, protection records, etc.).

Waken

When the system is in the low power consumption mode and any of the following conditions are met, the system will exit the low power consumption mode and enter the normal operation mode:

- 1) When connected to the charger, the output voltage of the charger shall be greater than 48V.
- 2) Press the key (3-6S) and release it.
- 3) Activated via RS485 port.

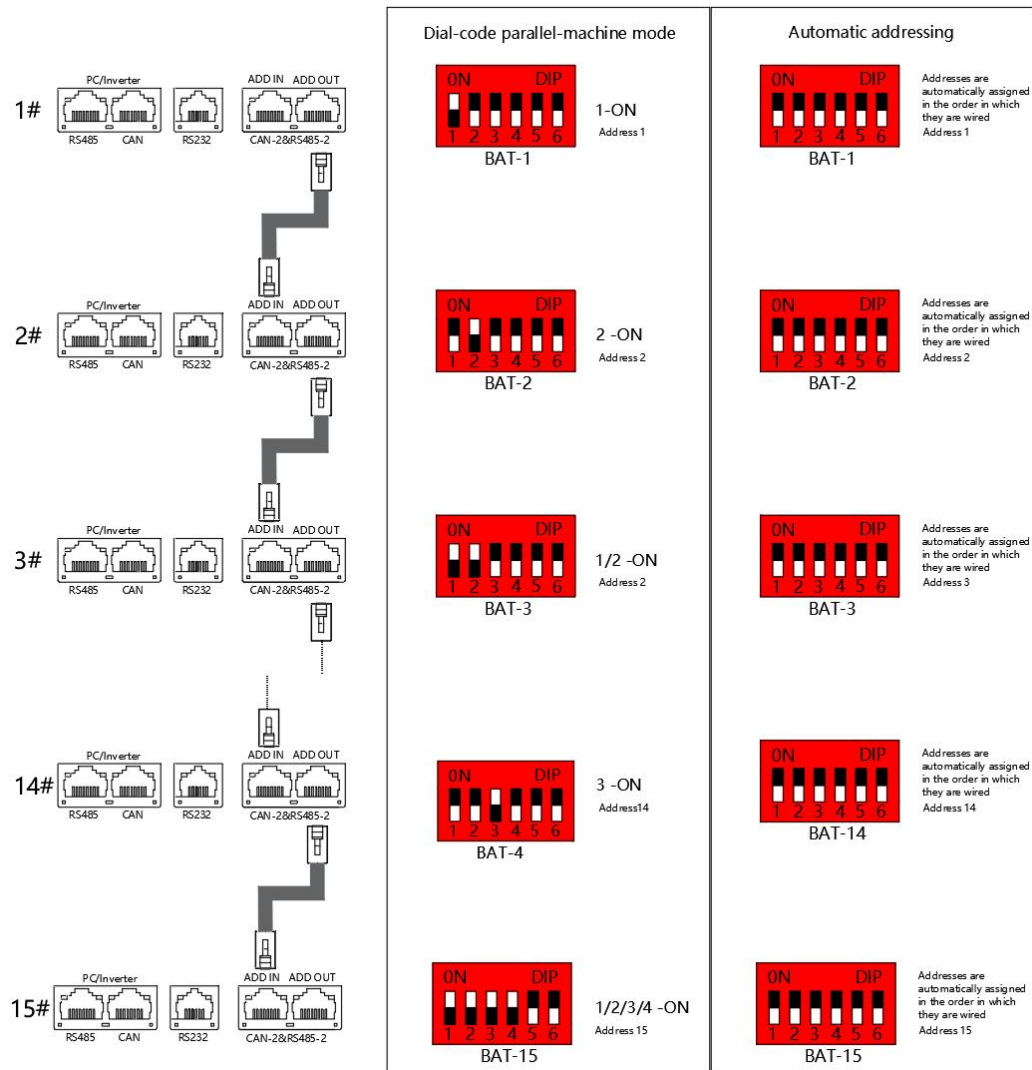
Note:

After the single or overall over discharge protection, it enters the low power consumption mode, wakes up regularly every 4 hours, and starts the charging and discharging MOS. If it can be charged, it will exit the sleep state and enter into normal charging; If automatic wake-up fails to charge for 10 consecutive times, it will not automatically wake up again.

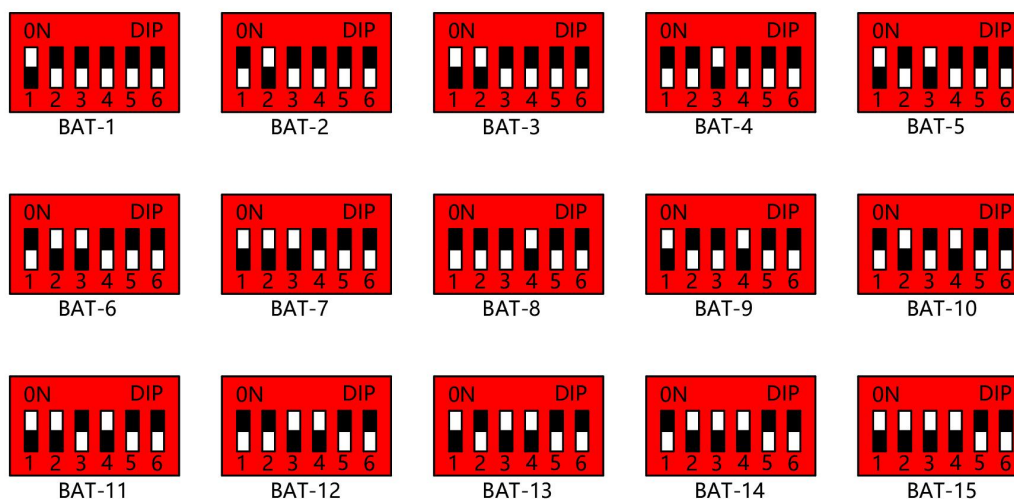
When the system defines that the recovery voltage is not reached after 2 days of standby (set value of standby time) after the end of charging, the charging is forced to resume until the end of recharging.

2.5 Dial switch

It is equipped with automatic addressing function for multiple units, and manual code setting is also available. Detailed function description can be found in the following figure.

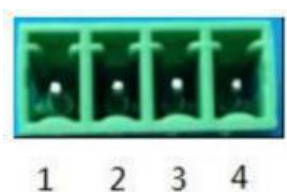


Illustration



Address	DIP Switch Position					
	#1	#2	#3	#4	#5	#6
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	ON	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF

2.6 Dry node



BMS can provide one way of dry contact signals, which are all passive switches, regardless of

polarity.

Switches to control the external equipment, such as generators, etc.

2.7 LED display

One running indicator (Green)

One warning indicator (Red)

Six capacity indicators (Green)

							
RUN	ALARM	SOC					

LED Working Status Indication

Status	Normal/Alarm/Protection	ON/ OFF	RUN	ALM	SOC						Remark
											
OFF	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
STANDBY	Running	Bright	Flash 1	OFF	Indicating based on the remaining capacity						Standby
	Alarm	Bright	Flash 1	Flash 3							Low Voltage
Charge	Normal/Alarm/Protection	Bright	Bright	OFF	Indicating based on the remaining capacity (the maximum power indicator LED flashes 2)						The maximum power indicator LED flashes (flash 2), and the ALM does not flash during overcharge alarm.
	Alarm	Bright	Bright	Flash 3							
	Overcharge Protection	Bright	Bright	OFF	Bright	Bright	Bright	Bright	Bright	Bright	If there is no mains power, the indicator light turns to standby mode.
	Temperature, Over-Current, Failure Protection	Bright	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Bright	Flash 3	OFF	Indicating based on the remaining capacity						
	Alarm	Bright	Flash 3	Flash 3							
	Under-Voltage Protection	Bright	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
	Temperature, Over-Current, Short Circuit, Reverse	Bright	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging

	Connection and Failure Protection										
Fault		OFF	OFF	Bright	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharging

Flash Mode	ON	OFF
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

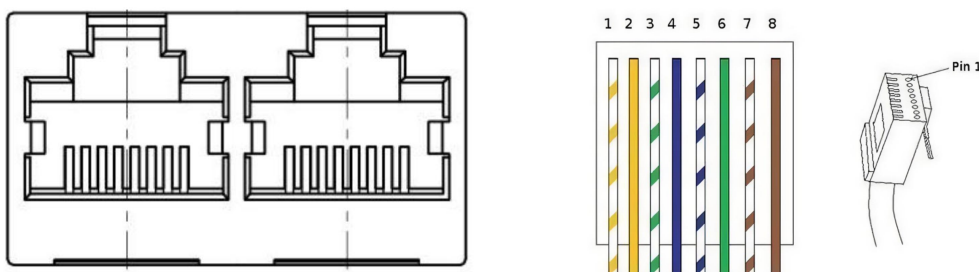
2.8 Communication Instructions

RS485 communication

With dual RS485 interfaces, you can view the battery pack information. The default baud rate is 9600bps. If it is necessary to communicate with the monitoring equipment through RS485, the monitoring equipment, as the host, polls data according to the address, and the address setting range is 2~15.

CAN communication

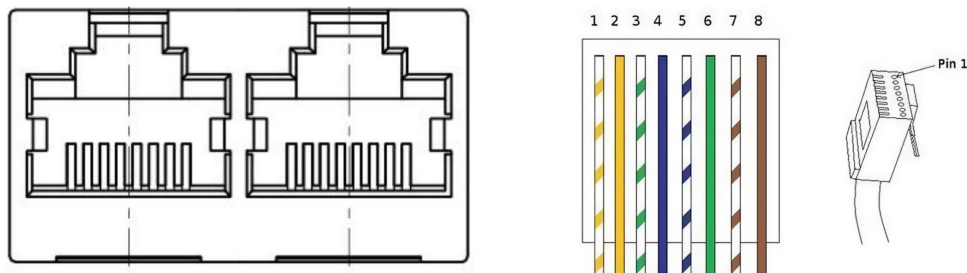
CAN communication, baud rate 250K.



RS485-CAN

RS485-8P8C Vertical RJ45 Socket		CAN-8P8C Vertical RJ45 Socket	
RJ45-Pin	Definition	RJ45-Pin	Definition
1、8	RS485-B1	1、2、3、6、8	NC
2、7	RS485-A1	4	CANL
3、6	GND	5	CANH
4、5	NC	7	GND

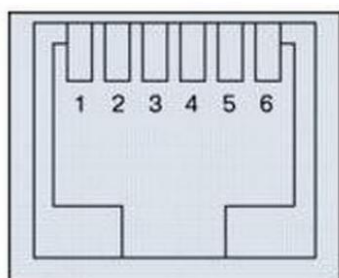
RS485 and CAN Port



Parallel *2

RS485-8P8C Vertical RJ45 Socket		CAN-8P8C Vertical RJ45 Socket	
RJ45-Pin	Definition	RJ45-Pin	Definition
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
4	CAN-H	4	CAN-H
5	CAN-L	5	CAN-L
6	GND	6	GND
3	IN	3	OUT

Parallel RS485 Port



RS232 通讯接口

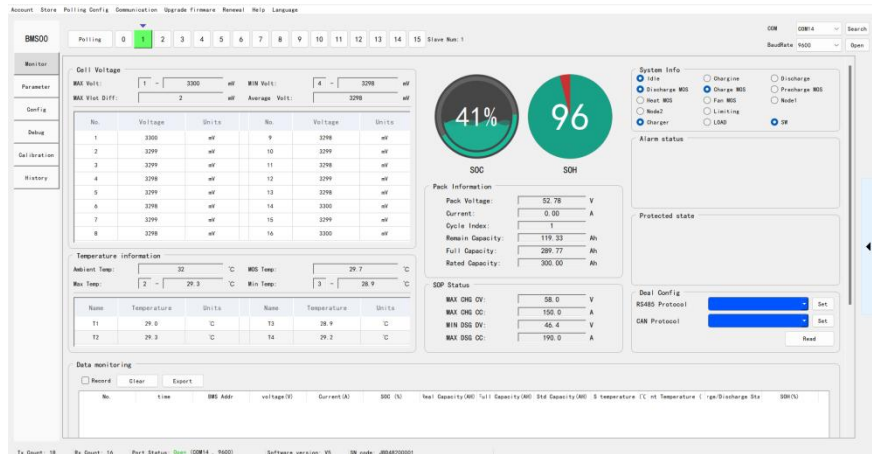
RS232-RJ11-6P6C	
引脚说明 Feet instructions	定义 definition
2	NC
3	TX
4	RX
5	GND

2.9 Computer Monitoring Instructions

With this application, you can monitor system operations from your PC device, including the following:

Real-time current, voltage, and capacity usage.

Obtain energy consumption data and alarm status records of lithium battery pack.



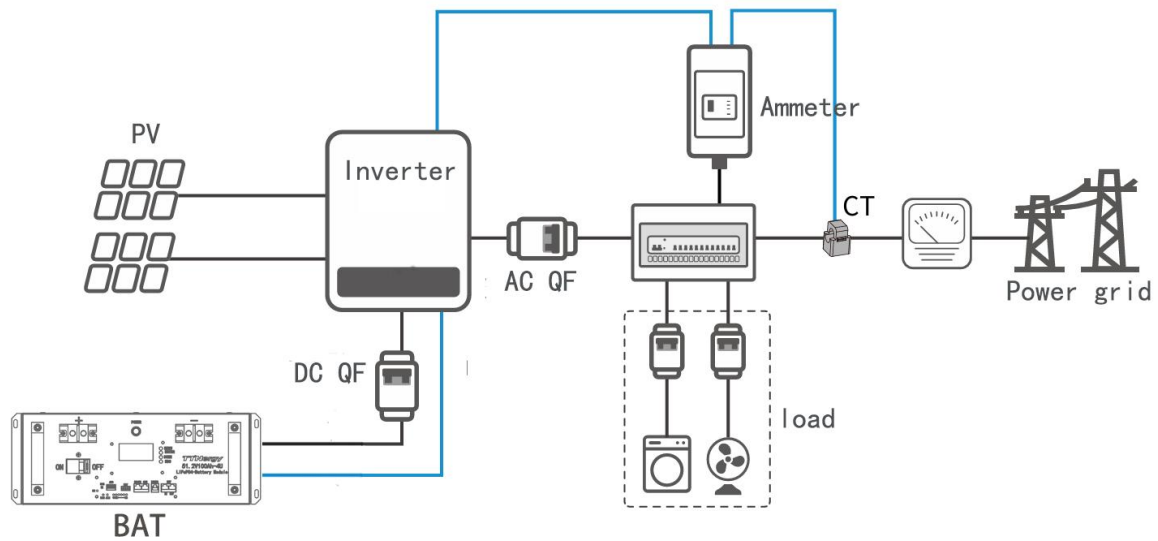
Note: the parameter modification authority of BMS must be obtained with the company or the local distributor, and arrange relevant personnel to provide technical guidance. Any unauthorized modification of parameters that results in instability or damage to product performance, which will invalidate the warranty claim.



3 Packing List

No.	Item	Picture	Quantity
1	Battery Pack		1pcs
2	Power Wires (,Black*1pcs & Red*1pcs)		2pcs
3	Communication cable 30cm		1pcs
4	User Manual		1pcs

4 System operation schematic diagram



Work Diagram

The system operates according to the diagram above. Under the set conditions, it uses the photovoltaic power or the mains power to input into the inverter or UPS. Then, through the battery pack for energy storage, it supplies power to the equipment at night or when the mains power is interrupted, achieving the backup power function and the uninterruptible power supply function.

5 Installation

5.1 Installation Instructions

- *The installation personnel should undergo strict training and obtain relevant certifications. Only after mastering the correct operation methods and safety precautions can they start working on installation, operation and maintenance;
- *When installing the product, local laws and regulations should be followed;
- *During the installation process, appropriate insulating protective gear and tools should be used.
- *During the installation process, avoid dropping or colliding with the battery pack;
- *It is strictly prohibited to disassemble the battery without authorization. Only maintenance engineers who have received professional training can carry out the repair work;
- *No flammable or explosive substances are allowed to be present, and corresponding fire-fighting equipment should be provided;
- *The installation surface should be hard and flat. Avoid installing it in areas exposed to direct sunlight, rain or moisture;
- *Before installation, please assess the connection cables between all the devices in the system to ensure that the current carrying capacity of the cables meets the requirements of the system.

5.2 Installation Preparation

After opening the box, check the battery pack and accessories against the packing list to ensure there are no omissions, deformations or damages. Before removing the packaging materials, make sure all the accessories are complete. If the equipment is damaged or does not match the sales contract, please record it and contact the after-sales service or the dealer immediately.

Installation tools preparation

Tools			
Installation	Knife 	Measuring tape 	Socket wrench (10/16mm) 
	Rubber mallet 	Cross Screwdriver 	Hammer drill (12mm) 
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

The installation, operation and maintenance of the lithium battery energy storage system must be carried out by trained and qualified professionals. Before installation and use, please read the safety precautions and relevant operating carefully. Strictly follow the following safety rules and local safety rules, otherwise it may cause personal injury or damage to the product!

*Ensure that the load equipment connected to the battery system is in good condition with no defects;

*Ensure that the power system is off and the battery system is also off before installation;

*All cables must have the corresponding insulation level, please ensure that the cables are not exposed;

*Ensure that the battery and power system grounding is reliable;

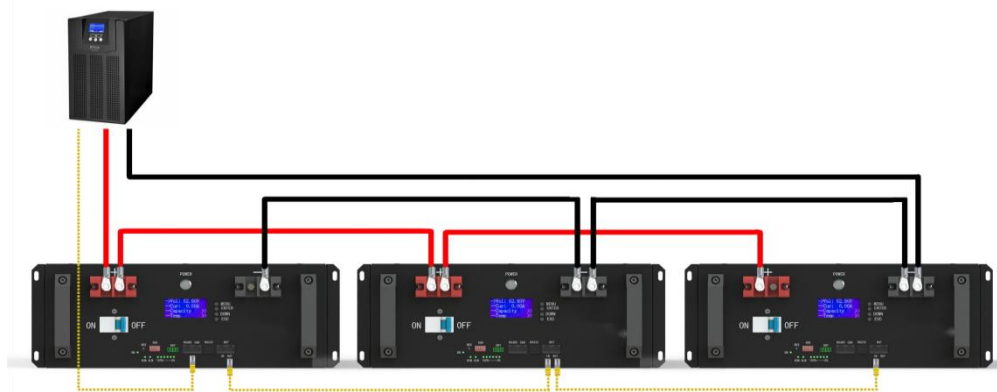
*The temperature and humidity of the installation site conform to the working scope of the product, and the environment is free of metal dust or corrosive gas.

5.3 Installation

The battery pack can operate independently or in parallel. The maximum number of parallel connections is 15. When installing multiple units, it is recommended to place the battery packs inside the cabinet, as shown in the figure below.



- *As shown in the system operation diagram, circuit breakers should be installed between each component of the system;
- *Before connecting the wiring harness, please ensure that the mains power, photovoltaic system and battery pack are all in a power-off and off-state;
- *The wiring installation is reasonable. All connection points have been inspected and found to be safe and reliable. The wire harness shows no cracks and the wire cores are not exposed;
- *The battery pack can only be used in parallel, not in series;
- *The battery pack is configured in the pre-charging mode. Due to the capacitive load, please turn on the battery pack switch first, and then start the load equipment。



Please select the appropriate wiring harness specifications based on the power load of the equipment.

6 Maintenance

6.1 Daily maintenance

- (1) During normal operation, the battery pack can be checked for its temperature and voltage through the upper computer or device communication to ensure they are within the normal range;
- (2) If you notice that the wiring harness is overheating, the interface screws are loose, or the wiring harness is damaged, please immediately cut off the power supply for maintenance or replacement. If it continues to overheat for a long time, please assess whether the wiring harness specifications meet the requirements and then replace it;
- (3) If you find that the SOC (State of Charge) of the battery pack deviates significantly, please use the upper computer to check the battery-related information and perform the calibration;
- (4) If there is dust or other debris on the battery, please promptly use compressed air to clean it;

Daily maintenance items

ON	Maintenance Contents	Operation method	Notes for Attention
1	Check the connection screws for the positive and negative poles, and confirm if there is any loosening of the screws.	Put on insulating gloves, hold the positive and negative wire insulating sleeves, and gently shake them.	When conducting the inspection, please wear insulating gloves to prevent electric shock.
2	Check for any alarm or fault information	By viewing through the LED and display screen, check whether there are any alarm or fault information in the above information.	If there is any fault information, it should be promptly reported and dealt with.
3	Check whether the output voltage of the battery is normal.	Use a multimeter for testing	
4	Viewing of battery pack historical information	Use the upper computer or control terminal equipment to view the historical alarm and fault records of the battery group and conduct analysis.	If you encounter any malfunctions or frequent alarms, please promptly notify the after-sales technical staff.

6.2 Regular maintenance

Regular maintenance items

Cycle	Project	Solution for handling the issue
	Visual inspection	If there is any deformation, leakage or damage to the appearance, disconnect the abnormal battery, take a photo and replace it.
Three months	Appearance is clean	Use compressed air or a cloth for cleaning. Please be cautious of the risk of electric shock during the cleaning process.
	Connection status	Check the wiring harnesses and screws of all components of the system. If any are loose or damaged, replace them immediately and handle the issue accordingly.
Six months		Check whether the output voltage of the battery is consistent with the received voltage at the device end. If not, promptly inspect whether there is any abnormality in the connecting cables.
		Perform SOC calibration on the battery pack, charge the battery pack to the battery protection level, then discharge the battery pack to the protection level, and perform SOC calibration again.
		Export historical records through the host computer, and analyze whether there are any abnormalities in the cell voltage, temperature and current.

6.3 Fault diagnosis

During the use of the battery pack, if any malfunction occurs, please refer to the following table for troubleshooting. The troubleshooter should possess relevant professional knowledge and skills. The work should be carried out by at least two people. There should be certain on-site firefighting capabilities. If the problem cannot be resolved, please contact the after-sales personnel promptly.

Fault phenomenon	Inspection content
Cannot turn on the machine	a. Long press "Reset" to restart.; b. Check if the switch is damaged.
Unable to communicate	a. Check if the battery is turned on.; b. Check whether the physical connections of the cables and connectors are reliable.; c. Is the definition of the communication pins for the

	corresponding equipment correct;
Unable to charge or discharge	a.Check if the battery is turned on.; b.Check if the BMS fault indicator light is on and review the fault information.; c.Check if the battery circuit breaker is turned on; d.Check whether the charging and discharging parameters of the inverter or UPS are in line with the battery parameters requirements.。

7. Packaging, Transportation, Storage

(1) The battery pack is packaged as a whole to ensure that the product is not damaged by any harmful gases, chemical pollution, moisture or mechanical forces during handling, transportation and storage; the packaging box has been marked with the product name, model specification, production date, quantity, batch number, etc.;

(2) During the transportation process, items should be handled with care and not subjected to external violent impacts; when transporting, they should be placed according to the directions indicated on the packaging boxes to avoid product vibration and inversion;

(3) The battery pack should be stored in a dry warehouse, avoiding direct sunlight and rain exposure. The recommended storage environment temperature is $25 \pm 5^{\circ}\text{C}$, and the humidity is $65 \pm 20\%$ RH. Products stored for more than 6 months should undergo a capacity verification test and be recharged. Products stored for more than 1 year need to be re-inspected. Only those that pass the inspection can be used.

Equipment warranty card

Dear users: . In order to better serve you, please read, fill in and keep this warranty card carefully after purchasing the products.

product name		specifications and models	
Warranty date		order number	
user name		contacts	
contact number		date of purchase	
user address			
maintenance record	date	Fault cause and handling situation	

- Warranty instructions

If the product has quality problems and needs to be repaired, please send the warranty card and the purchased product properly back to our company to provide the after-sales maintenance department.

For quality problems not caused by the quality of the company's products, such as improper use, improper storage, unauthorized dismantling, the company will charge the maintenance cost.