



## Lithium-Iron Phosphate Battery

## 48V/50Ah Product User Manual

Thank you for purchasing this household energy storage battery (48V/50Ah). Please read the information carefully and follow all instructions thoroughly before using this product.

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## 1. Overview

48V/50Ah is a 48V 50Ah household energy storage battery pack with LED visual display, using the new high-energy batteries and advanced battery management system to provide plenty of power to support most appliances found in the home, office, garage/shed or workplace, such as TVs, stereos, video games, lights, fans, laptops, phones and power tools. It can be used on-grid and off-grid in remote villages/districts with inverter and controller and connect with the solar panels on the roof to store the solar energy which can be used at night.

## 2. Appearance

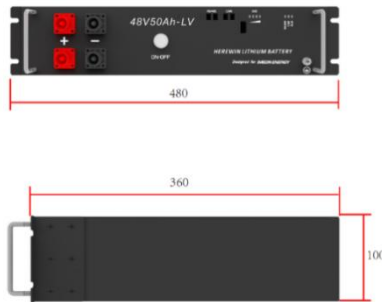


Figure 1 Product Appearance and Size

No.	Items	Specification
1	Shell Material	Metal plate
2	Shell color	Black
3	Battery Dimension (mm) L*H*D	480*100*360

Table 1 Brief Introduction of Product

### 3.General Structure Description



Figure 2 Functional Description of the Front Panel

#### ① SWITCH

The total battery switch, press the switch, turn on the battery output.

#### ② CAPACITY indicator

Four white LEDs perform a four-segment SOC indication, with the LEDs from left to right representing the SOC from low to high. For details on the definition of SOC, see 《Table 2: Correspondence Table between Battery LED and SOC》

#### ③ ALRM indicator

Red LED flashing to show the battery has alarm, and lighting to show the battery is under protection.

#### ④ RS485 indicator

Lighting to show RS485 had connected.

#### ⑤ CAN indicator

Lighting to show CAN had connected.

#### ⑥ CAN port

Follow CAN protocol, for output batteries CAN information. The CAN-1 and CAN-2 ports have the same pin assignments and functions.

#### ⑦ RS485 port

Follow RS485 protocol, for output batteries RS485 information. The RS485-1 and RS485-2 ports have the same pin assignments and functions.





#### ⑧ Battery port+

The output port of battery positive, to connect the positive of the inverter.

#### ⑨ Battery port-

The output port of battery negative, to connect the negative of the inverter.

## 4.List of Accessories

NO.	Name	Quantity	Accessories Picture	Remarks
1#	48V/50Ah battery module	X1		Standard accessories
2#	output positive pole line	X1		Standard accessories, line length:1000mm/ section 25 mm <sup>2</sup> (120A max)
3#	output negative pole line	X1		Standard accessories, line length:1000mm
4#	output communication line	X1		Standard accessories, line length:1000mm




5#	Parallel positive polar line	number of parallel machines - 1		Selection of accessories, line length:350mm
6#	Parallel negative pole line	number of parallel machines - 1		Selection of accessories, line length:350mm
7#	Parallel communication line	number of parallel machines - 1		Selection of accessories, line length:350mm

Table 2 Catalogue of Accessories

**Instructions:**

5 # parallel positive pole line, 6 # parallel negative pole line and 7 # parallel communication line are only needed in parallel operation mode of battery module. Battery module is not needed in single-machine operation mode.

The number of these three cables is equal to the number of battery parallel machines minus one. For example, when users use two modules in parallel, you need to use one 5 # parallel positive polar line, one 6 # parallel negative pole line and one 7 # parallel communication line .

## 5. Electrical Interface

### 1. Battery+, Battery- port

The battery pack has two batteries output interfaces, distributed on the left side of the battery panel, which are Power+ and Power-. These two interfaces belong to the parallel relationship in the internal and electrical connection of the battery. Connected to the inverter, the battery pack can be charged or discharged.

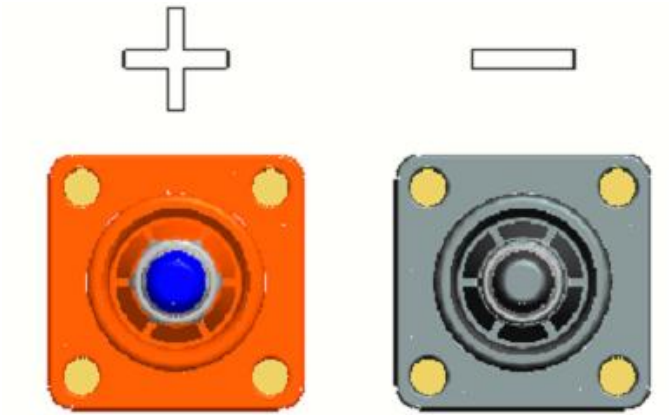


Figure 3 Battery+, Battery- port Interface Pin Distribution Diagram

Table 3 Description of Battery Positive and Negative Pole Output Interface

<b>Battery-, Battery+ port</b>	-	battery output negative pole	negative pole for charging input or discharge output of battery pack	terminal color: black
	-	battery output negative pole	negative pole for charging input or discharge output of battery pack	terminal color: black
	+	battery output positive pole	positive pole for charging input or discharge output of battery pack	terminal color: red
	+	battery output positive pole	positive pole for charging input or discharge output of battery pack	terminal color: red

## 2. Communication port

Two sets of 2PIN sockets are used in the battery pack. RS485 signal is in the socket. RS485-1 and RS485-2 have the same function.

Two sets of 2PIN sockets are used in the battery pack. There are CAN signals in the sockets. CAN-1 and CAN-2 have the same functions.

The CAN\_H and CAN\_L in the socket are connected with the inverter. They follow the CAN protocol and are used to transmit the information and data of the battery. The CAN matching resistor is required to installed on the device side.

RS485A and RS485B in the socket can be connected with PC computer, and follow the RS485 protocol for battery package monitoring or firmware upgrade.




Interface	Type	Pin	Name	Pin Distribution
Communication port	CAN	Pin 1	CAN_H	
		Pin 2	CAN_L	
		Pin 1	CAN_H	
		Pin 2	CAN_L	
	RS485	Pin 1	RS485A	
		Pin 2	RS485B	
		Pin 1	RS485A	
		Pin 2	RS485B	

Table 4: Definition of Circuit Board Communication Interface

**Note:** NC indicates pin overhang.

### 3.LED Indicator

The LED indicator on the battery panel includes CAN operation indicator, RS485 operation indicator, ALARM alarm indicator and power indicator.

CAN Operating Indicator Light: white light, when battery pack is turned on, it will light up; after shutdown, it will be extinguished.

RS485 Operating Indicator Light: white light, when battery pack is turned on, it will light up; after shutdown, it will be extinguished.

ALM alarm light: red light, when the battery has an alarm, it will light; when the alarm is lifted, it will be extinguished.

SOC power indicator light: white light, LED light from bottom to top is LED 1, LED 2, LED 3, LED 4, indicating SOC power from low to high.



Figure 4 Indicator LED distribution diagram

### Distribution of LED Indicators

Table 5 Implications of Electricity Indicators

LED1	LED2	LED3	LED4	SOC Volume of Battery Pack
●	○	○	○	≥25%
●	●	○	○	≥50%
●	●	●	○	≥75%
●	●	●	●	=100%
● represents LED lighting; ○ represents LED extinguishing.				

## 6. Technical Specifications






Table 6 Product Specifications

Basic Parameters	48V/50Ah
Nominal capacity	50Ah
Nominal voltage	48V
Type	LiFeP04
Energy (KWh)	2.4KWh
Charge cut-off voltage (V)	54V
Charge current (A)	Recommended 25A
Discharge current (A)	Recommended 25A
Max. Pulse Current (A)	100A (Peaked@15S)

Discharge cut-off voltage(V)	45V
Working temperature	0°C ~ +50°C charging
	0°C ~ +50°C discharging
Storage temperature	-20°C ~ + 60°C
Max. size(mm) L*H*D	450*100*360 mm(IP20)
Weight (Kg)	25000g±500g
Color	Black
Communication	CAN/RS485

## 7. Battery Single Machine Use

### Safety Warning:

-  1. When the battery is not in use, please turn off the battery in time to avoid excessive discharge of the battery, which will affect the battery life.
-  2. Please connect the battery pack when the power switch of the battery pack is closed.
-  3. After installation, please make sure the connection of wires is correct before turning on the power switch.
-  4. The battery contains high voltage. Do not operate them by non-professionals.
-  5. Please wear insulating gloves and provide necessary protection.

### 1.Power line connection

Turn off the battery main power switch, use "2 # output positive pole line" to connect the battery output Battery + with the positive pole of the inverter battery port, and use "3 # output negative pole line" to connect the battery output Battery - with the negative pole of the inverter battery port, the red is positive pole and the black is negative pole.

#### Attentions:

Negative and positive poles should not be reversed. Red is positive and black is negative.

When pulling out the battery output line, the lock button on the plug of the output line must be pressed.

### 2.Communication Line Connection

The CAN port on the battery panel is connected to the communication interface of the inverter by using "4 # Output Communication Line".

### 3.Turn on the battery

When ON/OFF is pressed, the switch will lock itself at the press position and wait a few seconds. The output of the battery will be turned on. At this time, the battery can be charged or discharged.

### 4.Turn off the battery

When the ON/OFF of the battery is pressed again, the switch will be reset, the battery will be turned off and the output will be turned off.

Please connect the power terminal when the battery is turned off, make sure the wiring is correct before turning on the power.

## Battery PACK Start-up:

### 1. Start-up step

#### 1.1 Turn off battery PACK power supply

Turn off The button of battery PACK. Press down to turn on, pop-up to turn off. usually, the factory is in a turn off state.

#### 1.2 Wire connection

- a) Connect the DC power wire of battery PACK to PCS.
- b) Connect the CAN communication wires of battery PACK to PCS.

#### 1.3 Start-up

- a) Start-up PCS (Turn on DC and AC switch)
- b) Turn on the ON/OFF button of the battery PACK and the battery PACK will start. It takes 120 seconds to start the system. During the start -up process of battery PACK, relevant commands will be sent to PCs through CAN to maintain effective connection with PCS. At the same time, battery PACK will detect PCS communication commands.

### 2. Start up failure

#### a) Communication failure

When the battery PACK does not receive the PCS communication command within 80 s interval, the battery PACK will turn off its output(power circuit)and wait for the PCS communication connection.

#### b) Start-up surge protection

The test shows that PCS has very large surge current when it starts, especially when it starts for the first time. Our BMS has adopted a lot of processing methods, but sometimes the first boot, BMS may still fail to start.

If BMS fails to start, we can try to restart the system in one of the following two ways:

- ① Let PCS send 0x8848 (ID-0x305, DATA-0000 0000 0000 8848) on the last word of DATA of CAN ID0x305 to restart BMS system.
- ② Release the ON/OFF button of the BMS to off the BMS and press it again later to restart the BMS.

## 8.Parallels Using


### Safety Warning:

1. Parallel connection of the battery pack is only used to prolong the working time of equipment, not to increase the output power of batteries, so the maximum recommended charging current after parallel connection of batteries is limited to 25A, and the maximum recommended discharge current is limited to 25A.
2. Before parallel connection of the battery pack, please measure the output voltage of each batteries. Parallel operation is prohibited if the voltage difference between the batteries exceeds 2.5V. Please charge the battery pack with lower voltage with charger or discharge the battery pack with higher voltage with load until the voltage difference between the battery pack and other batteries is less than 2.5V.
3. Please connect all batteries when the power switch is off.
4. After installation, please make sure the connection is correct before turning on the power switch.
5. When the battery is not in use, please turn off the battery in time to avoid excessive discharge of the battery, which will affect the battery life.
6. Batteries contain high voltage. Do not operate them by non-professionals.
7. Please wear insulating gloves and provide necessary protection.

### 1.Connect inverter

Turn off the battery, use the wires to connect the inverter terminal and battery terminal (red for positive, black for negative)

Use the Communication cable to connect the CAN-1 or CAN-2 interface of the battery pack to the communication port of the device. For the pin definition of the CAN and RS485 port, see 《Table 7: Definition of Communication Port》.

Table7: Definition of Communication Port			
Pin of RJ45	CAN port	RS485 port	
Pin 1	CAN_H	RS485_A	
Pin 2	CAN_L	RS485_B	
Pin 3	NC	NC	
Pin 4	NC	NC	
Pin 5	NC	NC	
Pin 6	NC	NC	
Pin 7	NC	NC	
Pin 8	NC	NC	
The CAN-1/RS485-1 and CAN-2/RS485-2 ports have the same pin assignments and functions.			

## 1.Parallel Parameter Setting of the Battery

Set up the battery pack that needs to be connected in parallel to the BMS software on the PC computer via RS485.

Configure[BMS Address] parameter for each battery. The address of each battery is not duplicated. The address of each battery is defined as 0 for the host and the address of 1 ~ 7 for the slave.

## 2.Communication Line Connection

The communication ports that need to be connected in parallel will be connected in parallel using the “7# parallel communication line” to connect the communication port of one of the battery to the next adjacent group of battery port, and the communication ports of all battery modules will be connected in this order.

The wiring method is detailed in "48V/50Ah parallel wiring diagram".


The communication interface of the device end should be equipped with CAN matching resistor.

### 3. Power line connection

Before parallel connection of power lines, make sure that the power switch of each battery is turned off.

Each battery has two positive and two negative extreme ports. One of the positive poles of the battery module is connected to the positive pole of the next group of adjacent battery by using the "5 # parallel positive pole line", and one of the negative poles of the battery module is connected to the negative pole of the next group of adjacent battery by using the "6 # parallel negative pole line". The positive ports of all battery modules are parallel in sequence, and the negative ports of all battery modules are connected in parallel. Finally, the positive and negative ports of a group of battery modules are connected to the inverters by using "2 # output positive pole line" and "3 # output negative pole line".

The wiring method is detailed in "48V/50Ah parallel wiring diagram".

 The parallel connection of battery packs is only used to prolong the working time of the equipment, not to increase the output power of the battery, so the maximum recommended charging current of the battery packs after parallel connection is limited to 25A and the recommended maximum discharge current is limited to 25A.

### 4. Turn on the battery

When ON/OFF is pressed, the switch will lock itself at the press position and wait a few seconds, the output of the battery will be turned on. At this time, the battery can be charged or discharged.

### 5. Turn off the battery

When the ON/OFF of the battery is pressed again, the switch will be reset, the battery will be turned off and the output will be turned off.



### 6.48V/50Ah Parallel Connection Diagram

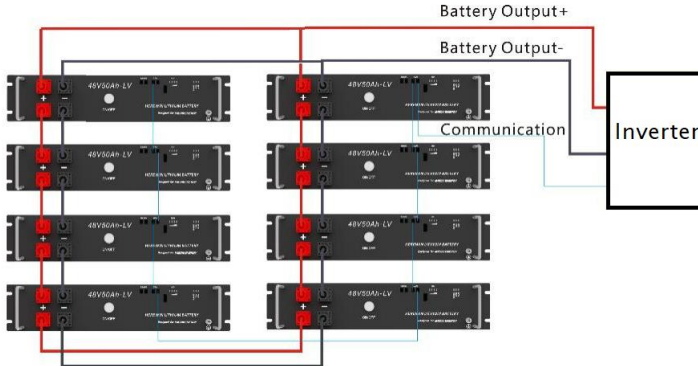


Figure 5 - Battery Parallel Connection Diagram (25A by batteries)

Note: Minimum space of 25mm and heat dissipation between each battery is necessary to provide ventilation.

## 9. Charging instructions

1. The charging current and charging voltage must not exceed the maximum value specified in this user manual.
2. The charging temperature must not exceed the charging temperature range specified in this user manual.
3. It is forbidden to charge the battery for a long time. It is forbidden to reverse charge the battery.
4. The charging parameter setting of the charger should meet the requirements of the technical specifications of this product.
5. Use current, voltage, and temperature ranges beyond the technical specifications of the product, which may cause problems with charge, discharge, mechanical, and safety performance of the battery.

## 10. Storage

1. The battery pack storage temperature must be in the range of  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ .
2. For long-term storage of the battery pack, it must be recharged once for more than one months. It must be placed in an environment with a temperature of  $23 \pm 5^{\circ}\text{C}$  and a humidity of 5-85 % RH. Recommended storage voltage is 48.75~51.09V.

## 11. Transport

The battery should be packed in a box under the state of charge (15~30% state of charge) for transportation. During transportation, it should be protected from severe vibration, shock or extrusion to prevent sun and rain. It should be applied to cars, trains, ships and airplanes. Wait for ordinary transportation.

## 12. Warnings and Precautions

Please read the following precautions carefully before use to ensure proper use and installation. The company is not responsible for any problems arising from violations of the following matters.

### **Danger !**

- ⚠ Do not put the battery into fire or heat the battery;
- ⚠ Do not put the battery into the water or wet it; soak the liquid, such as sea water, beverages, beer, etc.;
- ⚠ Do not use or store batteries near heat sources such as fire or heaters;
- ⚠ The parameters of the charger should meet the requirements of the

technical specifications of this product;

- ▲ Do not reverse the positive and negative poles;
- ▲ Do not connect the battery directly to a wall outlet or a car cigarette lighter socket;
- ▲ Do not pierce the battery case with nails or other sharp objects, and prohibit hammering or pedaling the battery;
- ▲ Direct soldering of battery terminals is prohibited;
- ▲ Do not disassemble the battery in any way;
- ▲ Do not charge the battery under fire or extreme heat;
- ▲ Do not strike, throw or subject the battery to mechanical shocks;
- ▲ Do not short-circuit the positive and negative terminals of the battery with wires or other metal objects. Do not transport or store the battery with necklaces, hair clips or other metal objects.

### **Warning !**

- ▲ Normal discharging temperature range is 0°C to 50°C. Under 5°C, battery capacity will drop dramatically, which will result in reduced usage time;
- ▲ Normal charging temperature range is 0°C to 50°C;
- ▲ Do not charge the battery under 0°C;
- ▲ Do not use in temperature above 50°C;
- ▲ Do not use the battery of upside down;
- ▲ Do not reverse charge and discharge terminal;
- ▲ Do not put into water;
- ▲ Do not place the battery in a microwave or pressure vessel;
- ▲ Do not use a damaged battery;

⚠ The battery may be damaged during the transportation process due to impact or the like. If the battery is found to have any abnormal characteristics, such as damage to the battery plastic seal, damage to the outer casing, smell of electrolyte gas, electrolyte leakage, etc., the battery shall not be used;

⚠ Do not use if the battery emits odor, heat, deformation, discoloration or any other abnormality; if the battery is being used or charged, immediately stop using it from the power off; if the battery leaks or emits an odor, immediately away from the fire source to avoid fire. Or explosion;

⚠ If the electrolyte leaks into the eyes, do not rub it, rinse with water or seek medical attention immediately. If left untreated, your eyes will be hurt.

### **Precautions !**

⚠ Do not use batteries in extremely hot environments, such as in direct sunlight or in hot days. Otherwise, the battery will overheat and may catch fire (ignition), which will affect the performance of the battery and shorten the battery life;

⚠ Use the battery only on the specified device;

⚠ If the battery leaks and the electrolyte gets on the skin or clothing, immediately wash the affected area with running water, otherwise it may cause skin irritation;

⚠ Read the battery unit manual to properly install and use the battery;

⚠ If the battery output terminal is dirty, wipe it off with an eraser or a dry cloth before use. When the battery is electrically connected to the device, the electrical connection point needs to be reliable and firm, and the screw needs to be tightened. Otherwise, the contact may be poor, which may cause energy loss. In severe cases, it may cause safety problems.

## 13.Safety tools



**Insulated gloves**



**Safety goggles**



**Safety shoes**

Equipment placement conditions :

1. Place location must be dry ;
- 2.Place location must be flat ;



Shenzhen Herewin Technology Co., Ltd.

#### **14. Manufacturer information**

**Manufacturer:** SHENZHEN HEREWIN TECHNOLOGY CO., LTD.

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**Brand website:**[www.herewin.com](http://www.herewin.com)

**Please visit:** [www.herewin.com](http://www.herewin.com) to learn about the latest product information.

This manual is subject to change without notice.