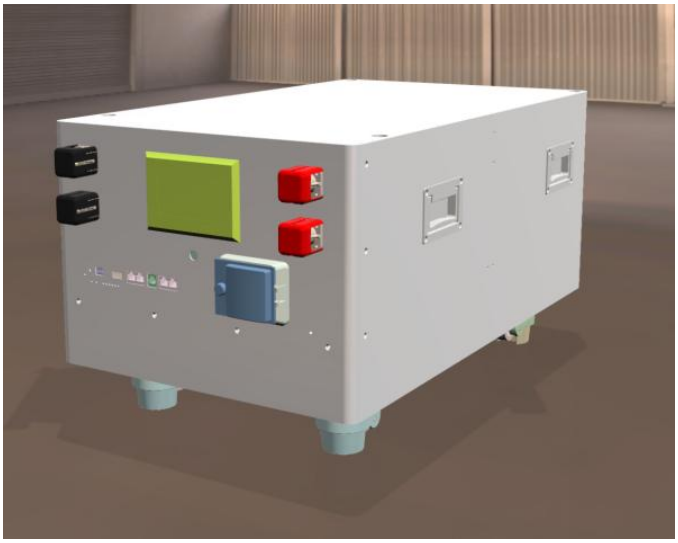
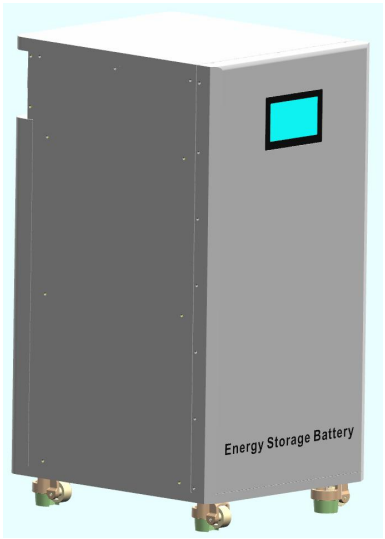
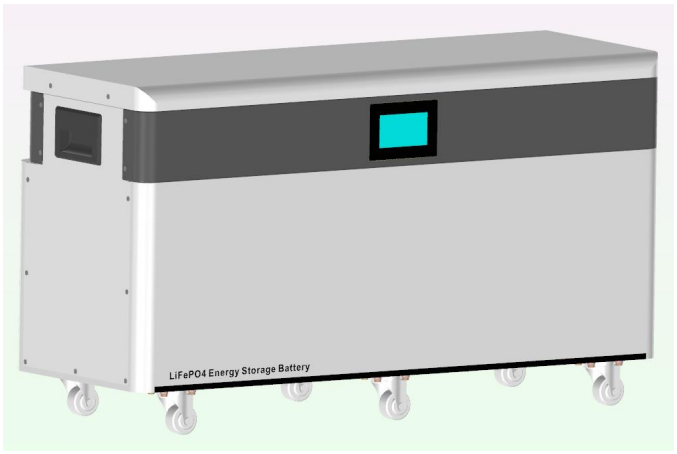
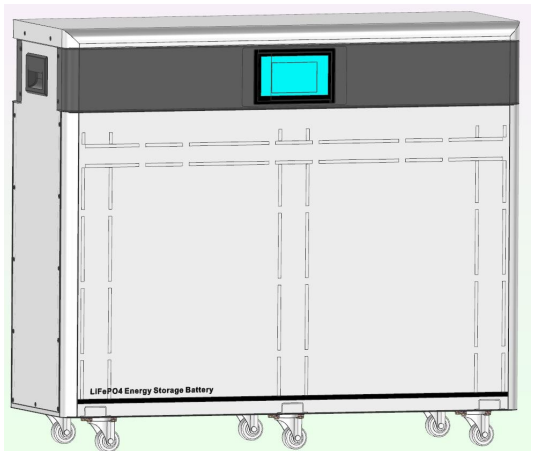
User Manual

Lithium battery energy storage system









Disclaimer: When using and installing the battery pack, please read and abide by the operating instructions carefully. If improper operation causes man-made damage, the warranty claim will be invalid.

⚠ WARNING: Please read the complete documentation before installing or using the battery pack.

If you do not do this or do not follow any instructions or warnings in this document, you may be seriously injured or killed by electric shock, or the battery pack may be damaged

Product specification:

This manual applies to residential lithium iron phosphate energy storage products manufactured by Guangzhou Meritech Power Co.,Ltd

Product Instructions ：

All specifications and instructions contained in this document have been verified to be accurate at the time of printing. However, since continuous improvement is Keheng's goal, we reserve the right to make product modifications at any time.

The images provided in this document are for demonstration purposes only. The details may vary slightly depending on the product version.

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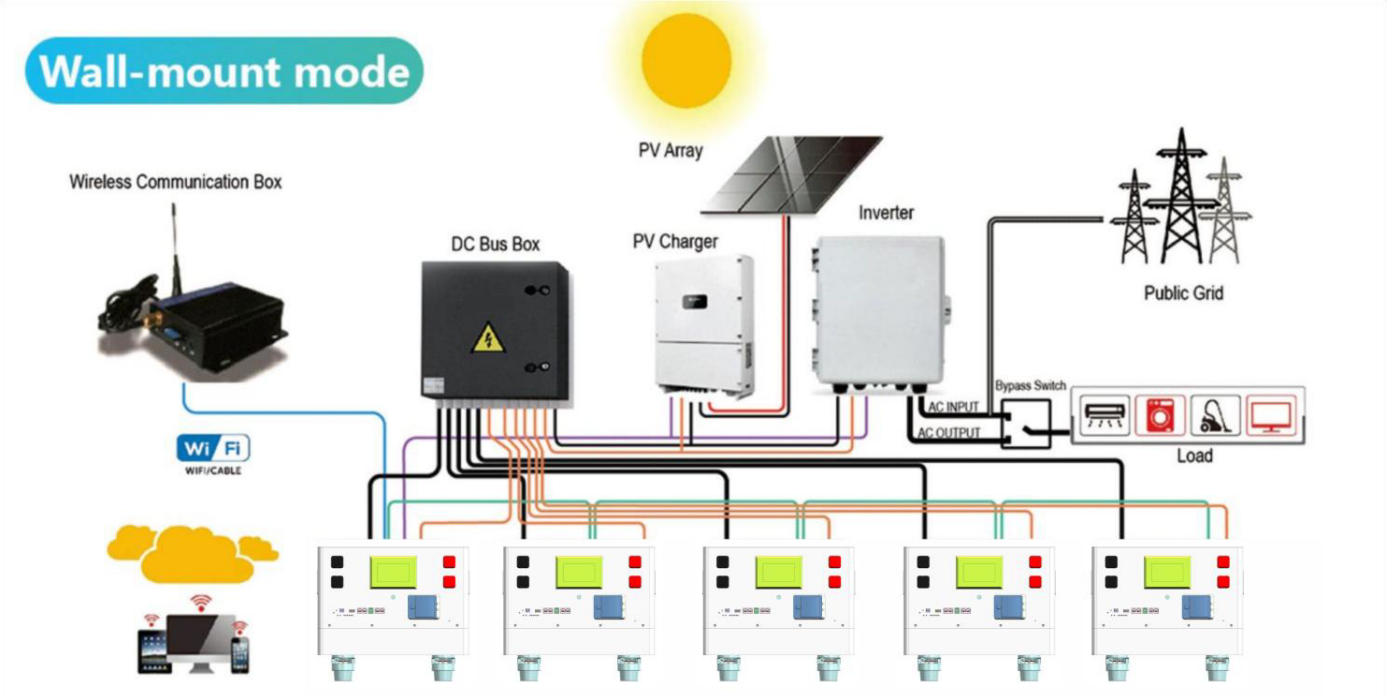
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1. About Battery Pack Applications

This product is mainly combined with inverter, photovoltaic (PV) and related accessories to build residential energy storage system. The system is used to store the power generated by photovoltaic power generation into the connected battery, convert the DC generated by photovoltaic power generation, connect the battery to the transaction current (AC), and provide it to the home grid.



(Note: the actual residential ESS can also include electrical equipment such as power distribution box and meter)

The battery pack is a lithium ion battery, which can store electric energy and output DC current. The battery pack is only electrically connected to the inverter. The electric energy generated by photovoltaic is converted into DC by the inverter and stored in the connected power box. When the power box is needed, the electric energy of the power box is converted into AC through the inverter DC, and transmitted to the home grid to supply power for household appliances.

The main function of the home energy storage system depends on the inverter, and the lithium battery pack is a device that stores electrical energy.

2. Features and functions of household energy storage system:

Self production and sales of electric energy

Use solar and lithium battery packs to reduce dependence on the grid and difficulty in storing electric energy

Electric energy can be stored during the day and used at night

emergency power supply

When the power grid is cut off, it can be seamlessly switched to the lithium battery pack for power supply

Sales of electric energy

The electricity generated by photovoltaic arrays can be stored in a connected battery pack or sold to energy supply companies.

Off grid power supply

Off grid power supply The system can be connected to the diesel generator to ensure uninterrupted power supply

Provide supply in areas without urban power, such as islands and remote mountain areas

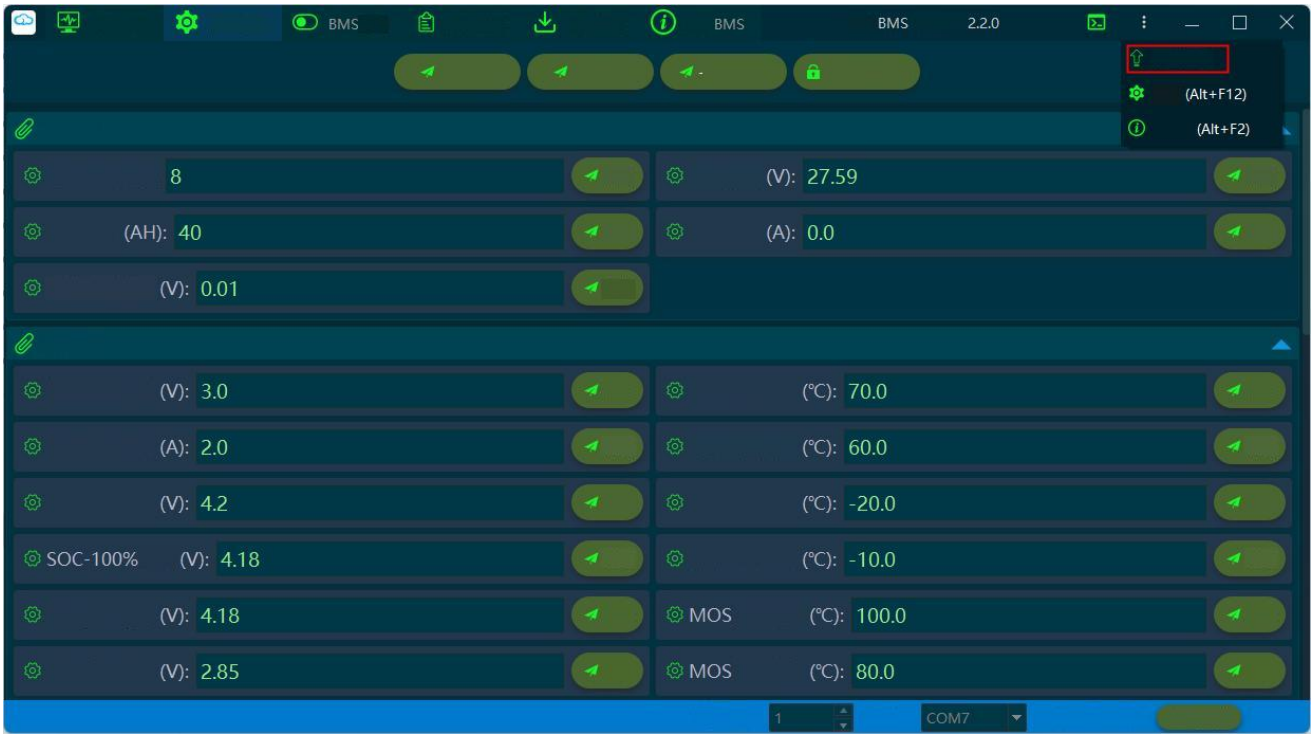
(Note: The system electric energy dispatching management depends on the inverter, and the lithium battery pack is valid for all compatible inverters. The inverter you use does not necessarily include all the above functions)

BMS monitoring system of lithium battery pack：

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

- Real time current, voltage and capacity usage
- Obtain energy consumption data and alarm status record of lithium battery pack
- Modify the functional parameters of lithium battery pack





BMS monitoring system

Bluetooth monitoring system:

Download the mobile APP of this product and operate it through thmonitoring system on the mobile device, including the following:

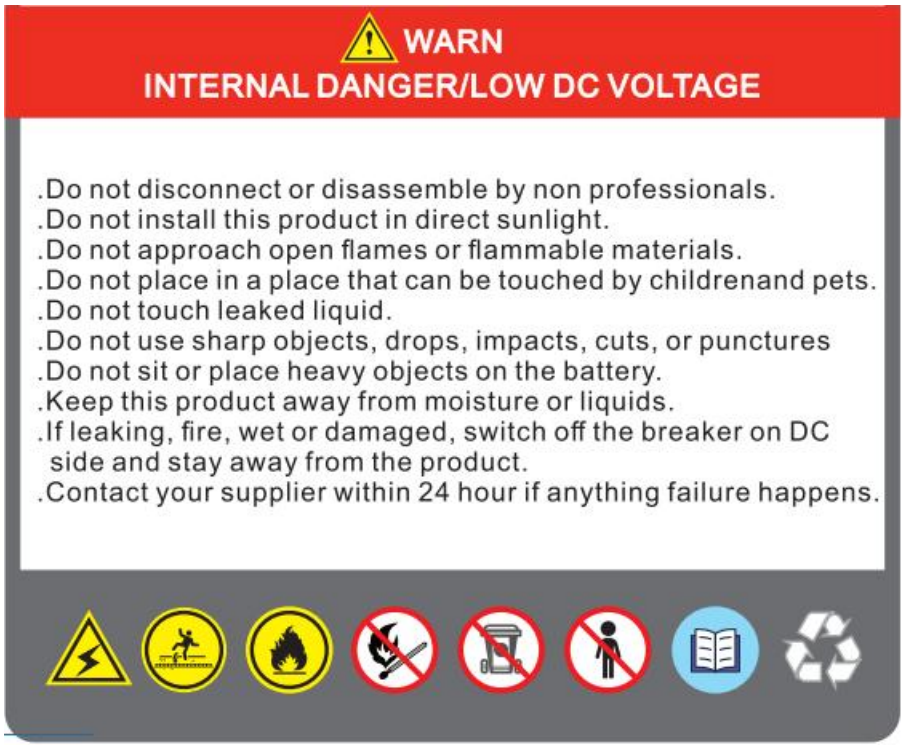
- Real time current, voltage and capacity usage
- Obtain energy consumption data and alarm status record of lithium battery pack
- Modify the functional parameters of lithium battery pack

Please contact KH or local dealers for the above applications and APPs

(Due to different shipping models, the lithium battery pack you purchased may not have all the above functions)

(Note: For the parameter modification authority of BMS and Bluetooth monitoring, we must obtain the modification authority with our company or local dealers and arrange relevant personnel for technical guidance. If any parameter modification without authorization results in instability or damage of product performance, the warranty claim is invalid)

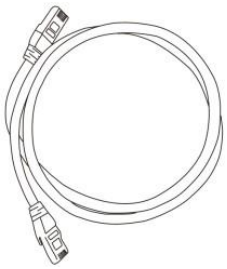
3. Product warning：



4. Goods list:



Battery



COM Cable*1

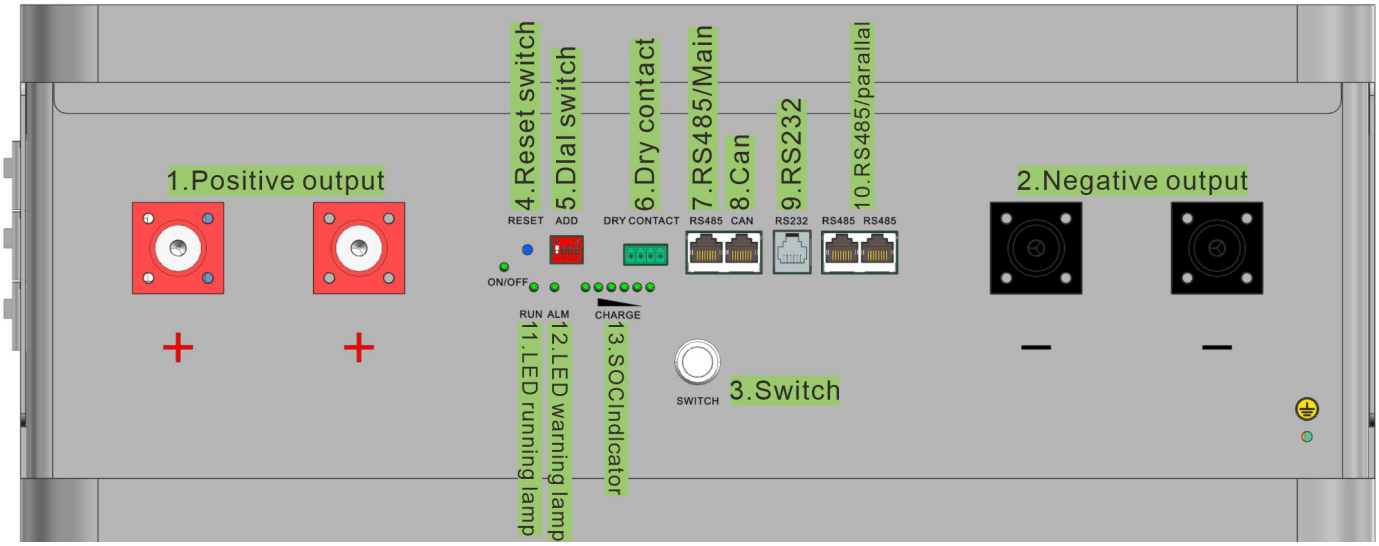


usermanual

Serial No	project	explain
1	Battery	Lithium iron phosphate battery pack
2	COM Cable	Communication serial port connecting line between battery pack and inverter
3	usermanual	User Manual

5. Mounting accessories:

6. Port definition:



Serial No	name
1	（Positive pole of battery pack）
2	（Negative pole of battery pack）
3	（Low-voltage switch）
4	（Reset switch）
5	（Dial switch）
6	（Dry contact）
7	Rs485 Host port
8	Can port
9	232 port
10	Parallel485
11	LED running lamp
12	LED warning lamp
13	Soc indicator

7. scription of reset switch：

When the BMS is in the sleep state, press the key (3~6S) and release it, the battery pack is activated, and the LED indicator lights up for 0.5 seconds from "RUN".

When the BMS is active, press the key (3-6S) and release it. The battery pack is dormant. The LED indicator lights up for 0.5 seconds from the lowest battery level.

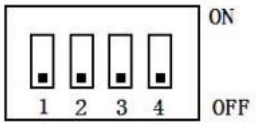
When the BMS is in the active state, press the key (6~10S) and release it, the battery pack is reset, and all LED lights are on for 1.5 seconds at the same time.

8. Intelligent sleep：

The protection board is equipped with intelligent sleep function as standard, and users can choose to open or close the BMS control page of the APP according to their own needs. The purpose of this function is to close the protection board when the protection board is in standby state (the charging and discharging current is less than 1A for 26 consecutive hours) to reduce the energy consumption of the protection board itself to the battery. When the user needs to activate it again, the button can be activated or the charger can be activated.

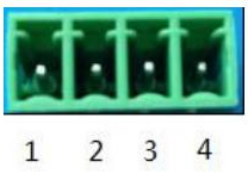
9. Description of DIP switch：

When the battery packs are used in parallel, the addresses of different battery packs can be distinguished by setting the dialer switch on the BMS. It is necessary to avoid setting the addresses to the same. Refer to the following table for the definition of the BMS dialer switch



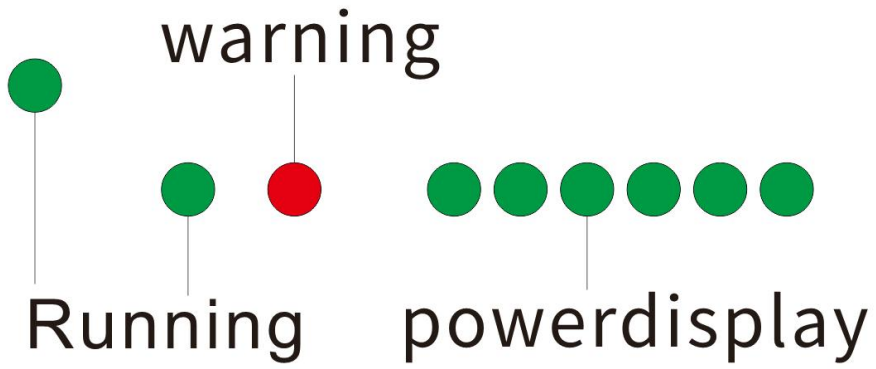
geology	Dial switch position			
	#1	#2	#3	#4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

10. Dry contact:



The protection board is equipped with two dry contacts to control external devices such as alarms and fans. When the BMS detects that the battery is in overtemperature, overcharge, or overdischarge state, the alarm interface can switch the status of the dry contact to drive the buzzer to alarm or drive the fan to cool down. You can select two trigger conditions based on your requirements. After switching the trigger alarm conditions, users need to set the conditions according to their own needs.

11. Running indicator



LED meter I：

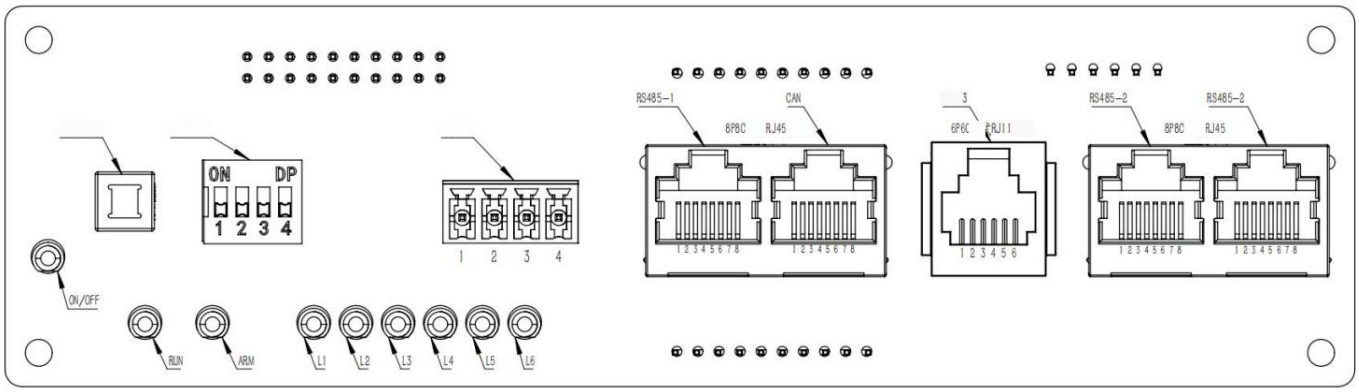
Display status during discharge or static state (★: FLASH, ● : ON, ◎ : OFF)						
	SOC	LED1	LED2	LED3	LED4	LED5
	0%~9%	●	◎	◎	◎	◎
	10%~19%	●	◎	◎	◎	◎
	20%~39%	●	●	◎	◎	◎
	40%~59%	●	●	●	◎	◎
	60%~79%	●	●	●	●	◎
	80%~100%	●	●	●	●	●
Display status during charging (★: FLASH, ● : ON, ◎ : OFF)						
	SOC	LED1	LED2	LED3	LED4	LED5
	0%~19%	★	◎	◎	◎	◎
	20%~39%	★	★	◎	◎	◎
	40%~59%	★	★	★	◎	◎
	60%~79%	★	★	★	★	◎
	80%~100%	★	★	★	★	★

LED meter 2

(status)	(Normal, alarm, or Protection)	ON/OFF	RUN	ALM	L1	L2	L3	L4	L5	L6	(Instructions)
(Power Off)	(normal)	OFF									
Balance	(normal)	ON	(flicker)	OFF	(Battery based display)					OFF	
(charging)	(normal)	ON	(flicker)	OFF	(Battery based display)					OFF	
	(Over current, over temperature, over voltage, charging failure)	ON	(flicker)	(flicker)	(Battery based display)					OFF	
(discharge)	(normal)	ON	(flicker)	OFF	(Battery based display)					OFF	
	(Over current, over temperature, under voltage, discharge failure)	ON	(flicker)	(flicker)	(Battery based display)					OFF	
(Other alarm)	(Password not changed \ short circuit \ temperature	ON	(flicker)	(flicker)	(Battery based display)					OFF	

12. Communication description:

Protection board Factory standard interface board for users to use LED indicator, reset switch, dip switch, dry contact, communication and other functions. The LED indicator can help the user judge the current BMS working status and the remaining battery power; The reset button can be pressed to reset the BMS when the user fails to use the BMS. The dip switch can be used to set the address when the BMS is used in parallel, and supports a total of 16 addresses from 0 to 15. Dry contact user control of external devices such as alarms and fans; CAN and RS485-1 are used for communication between BMS and inverter. RS485-2 is used to connect battery packs in parallel and communicate with the upper computer, The panel interface is described as follows.



Panel interface diagram

(Interface board Interface definition)

(Definition of a dry contact interface)		
(Pin number)	**(Pin definition)**	**(remark)**
1	COM1	
2	S1	
3	COM2	
4	S2	
CAN RS485-1	(Interface definition of CAN and RS485-1)	
(Pin number)	**(Pin definition)**	**(remark)**
1、8	RS485- B1	
2、7	RS485-A1	
3、6	GND	
4、5	NC	
1、2、3、6、8	NC	
4	CANL	
5	CANH	
7	GND	
(Reserved interface definition)		
(Pin number)	**(Pin definition)**	**(remark)**
1-6	NC	
RS485-2	**(Interface definition of RS485-2)**	
(Pin number)	**(Pin definition)**	**(remark)**
1	RS485- B2	
2	RS485-A2	
3	GND	
4	NC	
5	NC	
6	GND	
7	RS485-A2	
8	RS485-B2	

ⓘ Both CAN and RS485 interfaces are responsible for communication with the inverter, which is determined according to the adaptive inverter. See CAN/RS485 interface definition table.

13. Weak current switch



When the switch is pressed, the battery pack has voltage output, the switch is reset, and the battery pack has no voltage output.

14. Installation steps

1. Select a flat ground and place the battery pack with the gimbal wheel on the ground (as shown in Figure 1）



Figure Ⅰ

2. Connect the power cord according to the sequence of the wiring diagram (as shown in Figure 2),

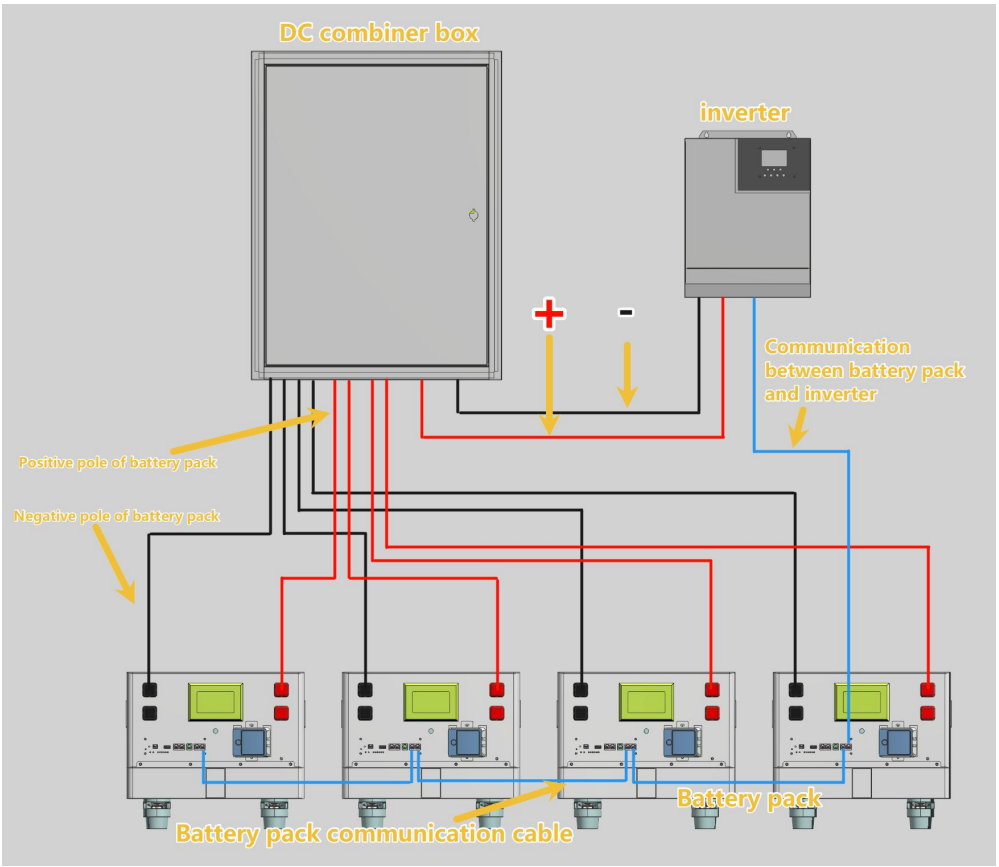
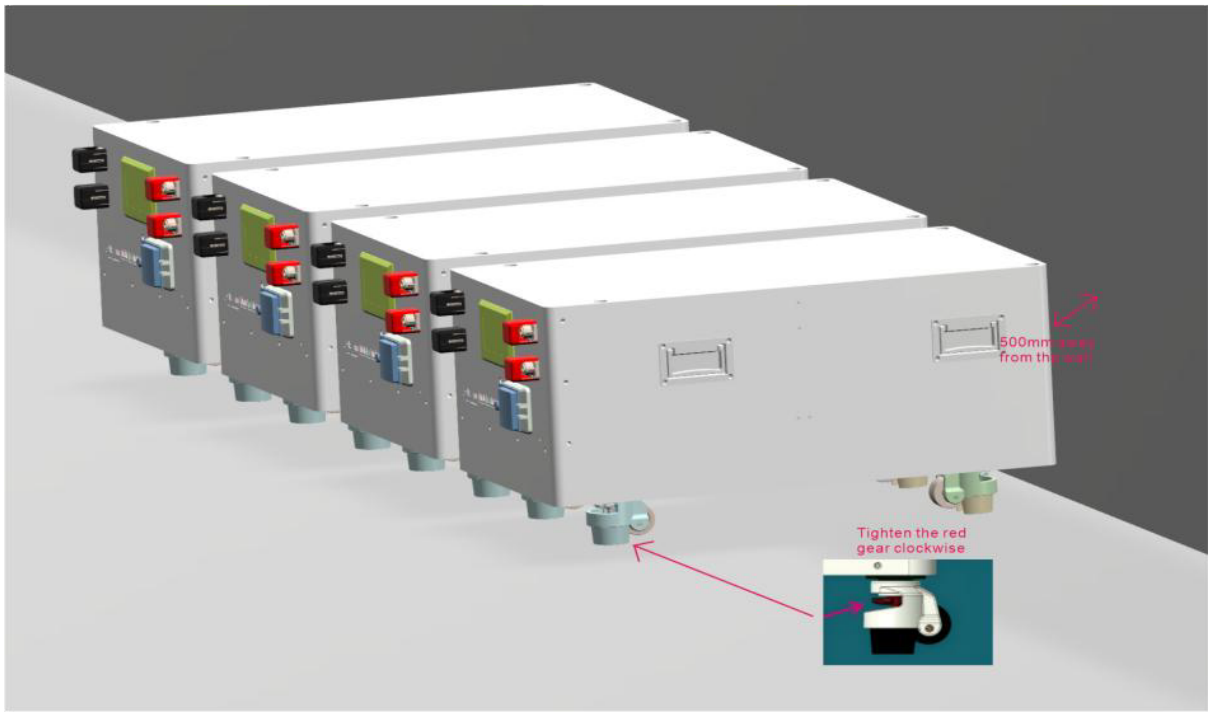


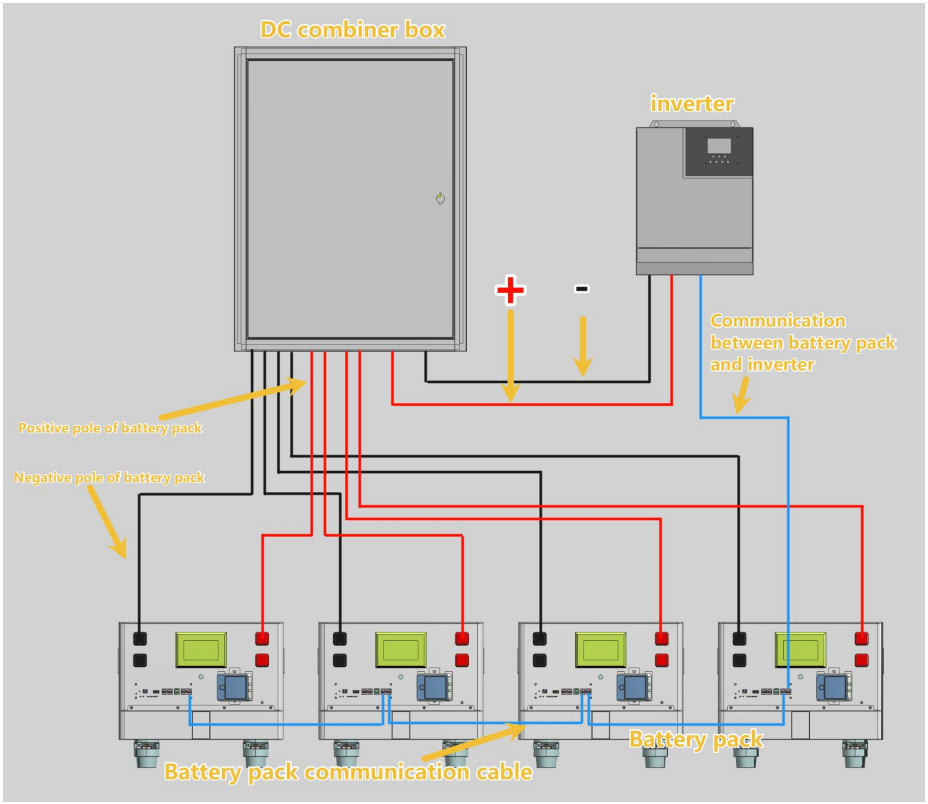
Figure Ⅱ

3. After connecting the wiring harness, check the harness and conduct a power on test to confirm that the function is normal; Push the battery to a suitable position away from the wall (note: the side of the wiring is against the wall; it is recommended to be 50mm away from the wall), and then tighten the red gear of the casters at the bottom of the battery case clockwise (as shown in Figure 3）



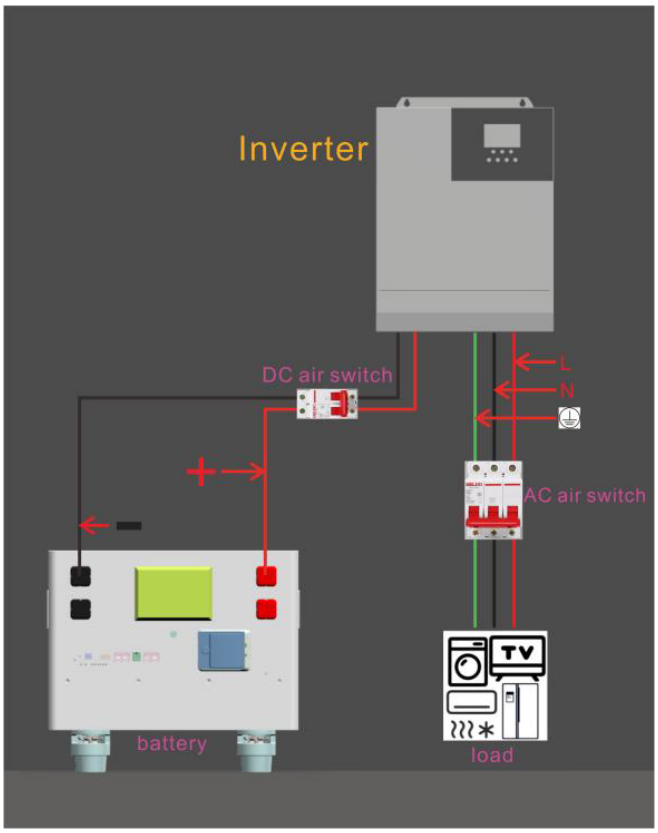
FigureIII

15. Example of parallel connection



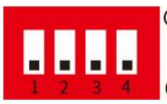
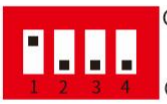
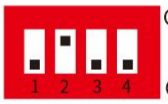
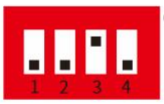
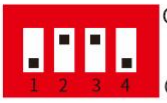
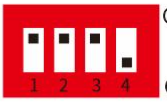
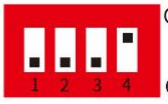
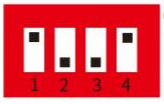
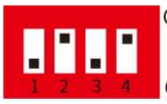
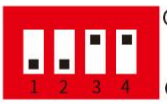
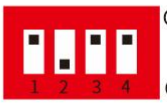
When there are more than four parallel units, it is recommended to add a DC combiner box on the output power supply line to ensure the stability and safety of the current when the battery pack is outputting high power

Example of single parallel machine



It is recommended to add DC circuit breaker on the line connecting battery and inverter

16. Example of parallel dialing address

Example of parallel dialing				
 stand-alone	 1	 2	 3	 4
 5	 6	 7	 8	 9
 10	 11	 12	 13	 14

tool：



Wire cutter



Crimping modular plier



Screwdriver

The following safety equipment is recommended for operation



Insulating gloves



Safety goggles



Safety shoes

The battery pack cable is connected to the inverter through a ring terminal, and the installer can directly connect to the positive and negative poles of the product when wearing protective gloves.

Power cable connection steps:

1. Confirm that the inverter power is turned off and the photovoltaic line is turned off. Confirm that the battery pack power has been turned off.
2. The ring terminal of the wiring cable is connected to the positive and negative poles of the inverter DC terminal.
3. The negative circular terminal on the other end is connected to the negative terminal of the battery pack.
4. The other end of the positive circular terminal is connected to the positive terminal of the battery pack.

⚠ Warning: The power box and inverter must be turned off before installing the power cable.

Procedure for disconnecting the power cable:

1. Close the PV input circuit breaker.
2. Turn off the inverter switch.
3. Press the power button to turn off the battery pack.
4. Remove the ring terminal of the negative power cord.
5. Remove the ring terminal of the positive power cord.
6. Remove the connecting ring terminal of the power cable.

⚠ Warning: Follow the steps strictly. And make sure the interface is in good contact.

⚠ Warning: The installation and disconnection of the wiring cables should be operated by qualified installers, and the user must not operate in private.

⚠ Warning: The power cables may transmit large currents. Please make sure that the children cannot touch the power Cable.

⚠ Warning: The power-on and power-off actions of the POWER button are not emergency operations for security incidents. If there is a safety problem in the home energy storage system, please disconnect the leakage switch and isolation switch (in the distribution box) in time. (Confirmation required).

17. System operation

The inverter provides control and monitoring functions through application programs. During normal operation, the battery pack is controlled by the inverter, and the power button of the battery pack shall be kept open.

⚠ Warning: Do not try to use third-party tools and diagnostic tools to communicate with Power Box between Power Box and the inverter.

Troubleshooting

If the system is not working properly, please perform the following steps：

⚠ Warning: The battery pack and inverter cannot be repaired by users, but must be repaired by certified installers.

⚠ Warning: If the failure of the battery pack causes the shutdown and cannot be solved in time, please report to KH or its authorized service partner in time. If it is not reported to KH or its authorized service partner within 2 weeks after the failure, the warranty is invalid.

If the connection between the battery pack and the inverter does not respond

- Check whether the battery pack is powered on and whether there is voltage output at the output terminal
- Whether the battery pack operation indicator is normal. If there is an alarm, refer to the LED operation table to check the alarm type
- Close all input and output circuit breakers of the battery pack and inverter
- Cut off all input and output circuit breakers in the distribution box
- Reboot matching.

ⓘ (Note: If the communication between the battery pack and the inverter does not match, please contact KE or KH authorized dealer for technical assistance)

18. technical support:

If you need further help, please contact the KH service team through the support phone in your region

Please provide the following information when contacting KH

- Customer Name
- Your effective way (phone, mobile phone or email) can let KH contact you.
- Specification and model of battery pack
- A brief overview of the problem

19. How to deal with emergencies：

If your health or safety is threatened, please start from the following two steps before handling the following other suggestions:

1. Please contact the fire department or other emergency teams immediately.
2. Notify all people who may be affected to ensure that they can evacuate the area.

⚠ The following recommended actions can only be performed under safe conditions.

In case of fire：

- Turn off the inverter.
- Press the power button to turn off the battery pack.
- Cut off all input and output circuit breakers in the distribution box.
- Acceptable types of extinguishers include: water, carbon dioxide and ABC extinguishers.

ⓘ Avoid using Type D (flammable metal) extinguishers.

In case of flood:

- If any part of the battery, inverter or electric wire is immersed in water, please keep away from water.
- Turn off the inverter.
- Press the power button to turn off the battery pack.
- Cut off all input and output circuit breakers in the distribution box.
- Make sure there is no electrical connection to the power box.
- If possible, protect the system by finding and stopping the water source and pumping the water away.
- Please contact KH technical support or KH authorized dealer for assistance.

20. When the battery pack is not in use:

The battery pack is a lithium ion battery product and should not be stored for a long time. No matter why the product is closed or not used, please note:

See the table below for storage requirements of power box.

Storage temperature	Short term storage less than 1 month	-10℃~+45℃
	Long term storage shall not exceed 3 months	0℃~+45℃

ⓘ Before the expiration of product storage, the battery shall be fully charged and discharged, and the final charging SOC shall be kept at about 50%.

If the battery is stored for a long time, it is recommended to charge it every three months to prevent over discharge of the battery.

21.Handling of Cells

Prohibition of cells immersion into liquid such as water

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

Prohibition of use of damaged cells

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

It is forbidden to short circuit the positive and negative poles of the battery, otherwise it will cause short circuit inside the battery pack and damage the battery pack.