



HP2000K - HP4000K

High Voltage Stacked Energy Storage



User Manual

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If this product is improved or technically changed without notice.

VERSION	DATE	CONTENT
1.0	2025.01.20	Initial Release

PRECAUTIONS

Warning

1. It is strictly forbidden to place the battery in water or fire, so as to avoid explosion or other dangers, endangering personal safety.
2. Please connect the cables properly during installation, do not reverse the positive and negative poles; do not directly connect the positive and negative poles of the battery with a conductor (such as a wire) to avoid short-circuiting the battery.
3. Do not strike the battery with a needle, hit it with a hammer, step on it hard, or otherwise.
4. During use, when the system needs to be moved or rewired, the power must be completely cut off and the system must be completely shut down, otherwise there will be danger of electric shock.
5. In case of fire, please use dry powder fire extinguisher to extinguish the fire. Using liquid fire extinguisher may cause secondary danger.
6. Under no circumstances, please do not disassemble any part of the system without our company or technical personnel authorized by our company, in order to prevent danger or injury to your personal safety, and the equipment failure caused by this is not covered by the warranty.

Remind

1. The product has been strictly inspected before shipment. If you find that the purchased product has abnormal phenomena such as obvious deformation and odor, please contact us in time.
2. In order to ensure the normal use and safety of the product, the equipment must be reliably grounded before use.
3. In order not to affect the normal use, please ensure that the electrical parameters of the related equipment are compatible and compatible with each other before use.
4. Do not mix batteries from different manufacturers, different types, different models, and old and new batteries.
5. The use environment and storage methods have a certain impact on the service life and reliability of this product, so environmental factors must be fully considered before installation and use to ensure that the system is used in a suitable environment.
6. For long-term storage, the battery needs to be recharged once every 6 months, and the recharged power should exceed the rated capacity by 80%.
7. After the battery is discharged to over-discharge protection, it should be recharged within 24 hours. The theoretical battery discharge time is: $T=C/I$ (T is the discharge time, C is the battery capacity, and I is the total load current.)

Foreword

Manual Description

HP Series lithium iron phosphate battery storage system can provide power storage function for photovoltaic power generation users through series combination. During the day, the excess power of solar energy can be stored in the battery, and at night or when needed, the stored energy is used to power electrical equipment, which can improve the efficiency of solar energy, peak shaving, and emergency power backup.

This user manual system introduces the basic structure, parameters, installation, operation and maintenance of the equipment in detail.

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1. Introduction

1.1 Introduction







The HP Series lithium iron phosphate battery system is a standard battery system unit. Customers can choose a certain quantity of HP Series according to their needs, and form a larger capacity battery pack in series to meet users' long- term power supply needs. The product is especially suitable for applications with high operating temperature, limited installation space and long service life.

1.2 Product Features

The HP Series battery system uses lithium iron phosphate as the battery anode material and is equipped with a high-performance BMS to effectively manage the battery cells. The system has the following characteristics:

- Meet European ROHS regulations, pass CE certification, use the best non-toxic and pollution-free battery;
- The battery anode is made of lithium iron phosphate (LiFePO₄) material, which has good safety performance and long cycle life;
- Adopt high-performance BMS battery management mode, with over-discharge, over-charge, over-current, temperature and other protection functions;
- With charge and discharge automatic management and single cell balance function;
- Fully intelligent design, equipped with a centralized monitoring module, with three remote (telemetry, remote signaling and remote control) functions;
- Flexible configuration, multiple system units connected in parallel can extend the power supply time of the system;
- Self-cooling method, the whole system has extremely low noise;
- The battery has less self-discharge, and it can be recharged for up to 10 months during storage; no memory effect, shallow charging and discharging;
- Wide temperature working range, -20 °C ~ + 60 °C, good cycle life and discharge performance at normal temperature;
- Small battery size and light weight.

1.3 Product Identification Definition

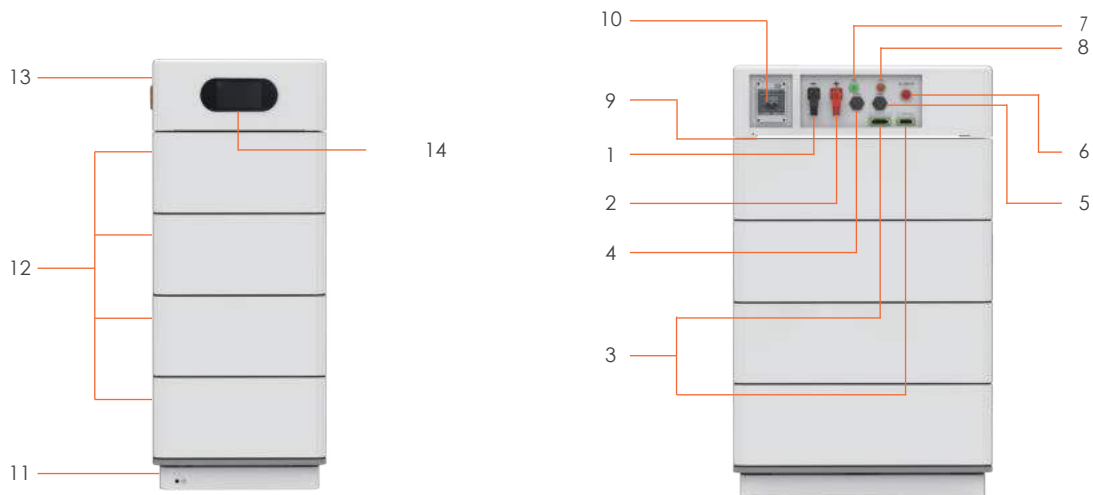
 Voltage of battery is higher than safety voltage, it's dangerous to touch.	 Read manual before operation.	 Please recycle the battery after serving.
 Operate carefully.	 Default battery can't be thrown to trash can.	 CE standards are met.

2. Specifications



Model	HP2000K	HP2500K	HP3000K	HP3500K	HP4000K
Nominal Voltage	204.8V	256V	307.2V	358.4V	409.6V
Nominal Capacity	100Ah				
Charge & Discharge Current	Charge: 40A; Discharge: 100A				
Energy	20.48 kWh	25.6 kWh	30.72 kWh	35.84 kWh	40.96 kWh
Battery Modules	4	5	6	7	8
Chemistry	LiFePO ₄				
Cycle life	5000 Times 80% SOH (8000 Times 60% SOH)				
Rated Output Power	20 kW	25 kW	30 kW	35 kW	40 kW
WIFI	Support Connecting To Routers				
Communication	RS485, Ethernet, CAN				
Waterproof	Splashproof				
Noise Level	< 30dB				
Charge Temperature	-0°C to 55°C (32°F to 131°F)				
Discharge Temperature	-20°C to 60°C (-4°F to 140°F)				
Storage Temperature	0°C to 35°C (32°F to 95°F)				
Altitude	≤3000m				
Warranty	5 Years/10 Years(Optional)				
Certification	IEC62619, IEC62477, VDE, UN38.3, ROHS, MSDS, UL1973 (on going)				
Dimensions(L×W×H)	58×39×91.8cm	58×39×108.9cm	58×39×126cm	58×39×143.1cm	58×39×160.2cm
Weight	~213 kg	~259.5 kg	~306 kg	~352.5 kg	~399kg


2.1 Interface Definition



Item	Name	Definition
1	Negative socket	To connect with Inverter's negative port
2	Positive socket	To connect with Inverter's positive port
3	Wake on battery	Use DC 24V or AC 220V~240V power supply to connect the DC 24V or AC 220V interface in PDU module
4	COM1	Reserve
5	COM2	Communicate to inverter
6	AC Output Switch	The AC output switch controls AC power to the inverter.
7	RUN	Green light, flashing during standby, flashing during charging, and always on when discharging.
8	ALM	Red light, flashing when alarm. Protection is always on. Conditions that trigger protection. Normally recover automatically after lifting.
9	Battery Breathing Light	Multi functional light, breathing when discharging, flowing when charging
10	Air Switch	The circuit breaker automatically cuts power to prevent overloads and short circuits.
11	Chassis	The battery chassis offers a stable and secure platform for mounting the battery.
12	Battery Module	Each module is 51.2V 100Ah
13	PDU	The PDU is the high voltage box to ensure safe containment and distribution of high voltage power
14	Color Screen	The color display screen provides battery data for easy monitoring



2.1.1 Indicator definition and description

Table 2-4: LED working status indication

Status	Normal/ Alarm/ Protection	RUN	ALM	Battery Breathing Light	Description
		●	●		
Shutdown	Dormant	OFF	OFF	OFF	All off
Standby	Normal	F1	OFF	ON	stand by mode
	Alert	F1	F3		Module low voltage
Charge	Normal	ON	OFF	Flowing	-
	Alert	ON	ON		-
	Over charge protection	ON	OFF	ON	-
	Temperature, overcurrent, Fail-safe	OFF	ON	Red light flashing	Stop charging
Discharge	Normal	F3	OFF	Breathing	-
	Aler	F3	F3		-
	Under voltage protection	OFF	OFF	OFF	Stop discharging
	Temperature, over current, short circuit, reverse connection, fail-safe	OFF	ON	Red light flashing	Stop discharging
Lapse	-	OFF	ON	Red light flashing	Stop charging & discharging

Remarks: Flash 1 is short for F1; Flash 2 is short for F2; Flash 3 is short for F3.

Table 2-5: Capacity instructions

Status		Charging			Discharging		
stand by mode		RUN ●	ALM ●	Battery Breathing Light 	RUN ●	ALM ●	Battery Breathing Light 
Battery (%)	SOC ≤ 0%	ON	F3	OFF	OFF	OFF	OFF
	0 < SOC ≤ 25%	ON	OFF	Green light & flowing	F3	OFF	Green light & breathing
	25 < SOC ≤ 50%	ON	OFF	Green light & flowing	F3	OFF	Green light & breathing
	50 < SOC ≤ 75%	ON	OFF	Green light & flowing	F3	OFF	Green light & breathing
	75 < SOC < 100%	ON	OFF	Green light & flowing	F3	OFF	Green light & breathing
	SOC ≥ 100%	ON	OFF	Green light	F3	F3	Green light
● Running lights		ON			F3		

Remarks: Flash 1 is short for F1; Flash 2 is short for F2; Flash 3 is short for F3.

Table 2-6: Flash description

Flashing way	ON	OFF	Remarks
Flashing 1	0.25S	3.75S	F1
Flashing 2	0.5S	0.5S	F2
Flashing 3	0.5S	1.5S	F3

Remarks: Flash 1 is short for F1; Flash 2 is short for F2; Flash 3 is short for F3.

2.1.2 Buzzer action description

When the fault occurs, every 1S will beep 0.25S;

When protecting, every 2S will beep 0.25S (except for overvoltage protection);

When the alarm occurs, every 3S will beep 0.25S (except for overvoltage alarm);

The buzzer function can be enabled or disabled by the host computer. The factory default is disabled.

2.1.3 Button description

When the BMS is in the dormant state, press the button (3~6S) and release it, the protection board is activated, and the LED indicator lights up sequentially for 0.5 seconds from "RUN". When the BMS is in the activated state, press the button (3~6S) and release it, the protection board will be dormant, and the LED indicator will turn on for 0.5 seconds starting from the lowest battery.

When BMS is activated, press the button (6~10S) and release, the protection board is reset, and the LED lights are all the same Lights for 1.5 seconds.

After the BMS is reset, the parameters and functions set by the host computer are still retained. If the original parameters need to be restored, they can be implemented by the "Restore default values" of the host computer, but the related operation records and stored data remain unchanged (such as power, cycle times, Protect records, etc.)

2.1.4 Sleep and wake

2.1.5 Sleep

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

- (1) Single or overall over-discharge protection has not been released within 60 seconds.
- (2) Press the button (3~6S), and release the button.
- (3) The minimum cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time (at the same time, no communication, no protection, no balance, no current).
- (4) Standby time exceeds 24 hours (no communication, no charge and discharge, no mains).
- (5) Force shutdown by PC software.

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

2.1.6 Wake

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


- Connect the charger. The output voltage of the charger must be greater than system voltage.
- Press the button (3~6S), and release the button.

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


Note: After single or overall, over- discharge protection, it enters low power consumption mode, and wakes up at regular intervals every 4 hours to turn on charge and discharge mode. Can be charged, it will exit hibernation and enter normal charging; if it cannot be charged after 10 consecutive automatic wake up, it will no longer to wake up.

When the system is defined as the end of charging, the recovery voltage is not reached after 2 days of standby (standby time set value), and the charging is forcibly resumed until the end of recharging.

2.1.7 COM1

Illustration	Pin Number	Pin definition	Remarks
	/	Ethernet interface	The BMS connects to the gateway display and uploads the monitoring

2.1.8 COM2

Illustration	Pin Number	Pin definition	Remarks
 COM2	1	485A1	Standby
	2	485B1	Standby
	3	485A3	Standby
	4	CHGCAN_H	Inverter
	5	CHG CAN_L	Inverter
	6	485B3	Standby
	7	VE CAN_H	Test
	8	VE CAN_L	Test

2.2 Battery Management System (BMS)

2.2.1 Low Voltage Protection

Discharge low voltage protection:

When discharging, the voltage of any single cell is lower than the protection value, the over discharge protection will be started, the battery buzzer alarm. When the voltage of all cells is recovered to the range of released value, the protection is removed.

Charging Over Voltage Protection:

During charging, when the total voltage of battery pack or the voltage of any single cell reaches the protection value, the system stops charging. When the total voltage and the single voltage return to the released value range, the protection will be released.

2.2.2 Current Protection

Charging Over Current Protection:

When the charging current is more than the protection value, the battery buzzer will alarm and the system will stop charging. The protection will release after the system delays the rated time.



Discharging Over Current Protection:

When the discharge current is more than the protection value, the battery buzzer will alarm and the system will stop discharging. The protection will release after the system delays the rated time.

Note: The buzzer alarm setting can be manually closed on the computer, and it is off by default.

2.2.3 Temperature Protection

Charge low/high temperature protection:

During charging, when the battery temperature exceeds the range of 0°C~+60°C, the system starts the charging temperature protection, stops charging, recovering to the rated return value, and then the protection is released.

Discharge low/high temperature protection:

During charging, when the battery temperature exceeds the range of -20°C~+60°C, the system starts the charging temperature protection, stops charging, recovering to the rated return value, and then the protection is released.

2.2.4 Other Protection

Short circuit protection:

When the battery system detects any external short circuit, the BMS short circuit protection will be triggered



Release of Short Circuit Protection

When any of below conditions achieved, the protection will be released:

- (1) When charging starts;
- (2) When load has been removed..

Note: The max. discharge current of battery should be bigger than max. working current required for load.

3. Installation and configuration

3.1 Installation&Preparation

Safety Regulation

Only the personnel who have received the electrical system training and fully mastered the electrical knowledge can install this system. Always follow the safety regulations listed below and local safety regulations during installation.

- All circuits with external voltage less than 48V connected to the power system must meet SELV requirements defined in IEC60950.
- If operating inside the cabinet, make sure that the power system is not active. The battery shall also be shut down.
- The cables shall be arranged reasonably and protected to avoid touching these cables when operating the power equipment.
- It is recommended to wear the following safety gear when dealing with the battery pack.



Insulated glove



Safety shoes



Safety goggles

3.1.1 Environment Requirement

Working Temperature: -20°C ~ +60°C

Storage Temperature: -10°C ~ +35°C

Relative Humidity: 5% ~ 85%RH

Altitude: <4000m

Working environment: there is no conductive dust and corrosive gas, and the following conditions are met:

- The installation site shall be far away from the sea to avoid salt water and high humidity environment.
- The ground is flat and level.
- There are no inflammables and explosives in the accessories of the installation point.
- The ideal ambient temperature is 15°C ~ 30°C.
- Keep away from dust and dirty areas.

3.1.2 Tools

The tools and meters that may be used in Table 3- 1:

Table 3-1 Tools

Name	
Screwdriver/Slotted screwdriver /Phillips screwdriver	multimeter
Torque wrench	Clamp meter
Diagonal pliers	Insulation tape
Needle-nose pliers	thermometer
Wire cutter	Anti-static bracelet
Wire stripping pliers	Tie
Electric drill	Tape measure

3.1.3 Technical preparations

Electrical interface check

Devices connected directly to the battery can be user equipment, power supplies, or other power devices.

- Confirming whether the user's photovoltaic power generation equipment, power supply or other power supply equipment has a direct current output interface, and measuring whether the output voltage of the direct current interface meets the voltage range requirements in 2.2 performance parameter table.
- Confirming that the maximum discharge current capacity of the DC interface of the user's photovoltaic power generation equipment, power supply or other power equipment should be greater than the maximum charging current of the product used in the performance parameter table. For the maximum charging current of the product used, the DC interface of the user's photovoltaic power generation equipment should have a current limiting function to ensure the normal operation of the user equipment first.
- Make sure that the maximum operating current of the battery-powered user equipment (inverter DC input) should be less than 2.2 The maximum discharge current of the product used in the performance parameter table.

Security check

It is strictly prohibited to place flammable, explosive and other dangerous materials next to the battery. Fire equipment should be available near the equipment, such as portable dry powder fire extinguishers. Where necessary, an automatic fire protection system should be provided.

3.1.4 Unpacking inspection

- When the equipment arrives at the installation site, it must be loaded and unloaded in accordance with regulations to prevent sunlight and rain. Before unpacking, check the total number of pieces according to the shipping list attached to each packing box, and check whether the appearance of the packing box is intact;

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- Handle with care during unpacking to protect the surface coating of objects;
- When opening the packaging box, the installer should first read the technical documents and check the list, and check whether the items are complete and intact according to the configuration table and packing list. If the internal packaging is damaged, it must be checked and recorded. The packing list is as follows:

Part Name	Specification	Quantity	Picture
PDU	1000V	1	
Battery Module	51.2V 100Ah	n (4,5,6,7,8)	
Positive line	Red /25mm ² /1000mm	1	
Negative line	Black /25mm ² /1000mm	1	
Host and inverter Communication line	Black/L1500mm /	1	

3.1.5 Engineering coordination

Note the following before construction:

- **Power cord specifications**
Power cord specifications should meet the maximum discharge current requirements of each product.
- **Installation space and load**
Ensure that the battery has sufficient installation space, and that the case and bracket where the battery is installed have sufficient load-bearing capacity.
- **wiring**
Make sure the power wires are routed properly. Not easy to short circuit, water and corrosion.

3.2 Equipment installation

Table 3-2 Installation steps

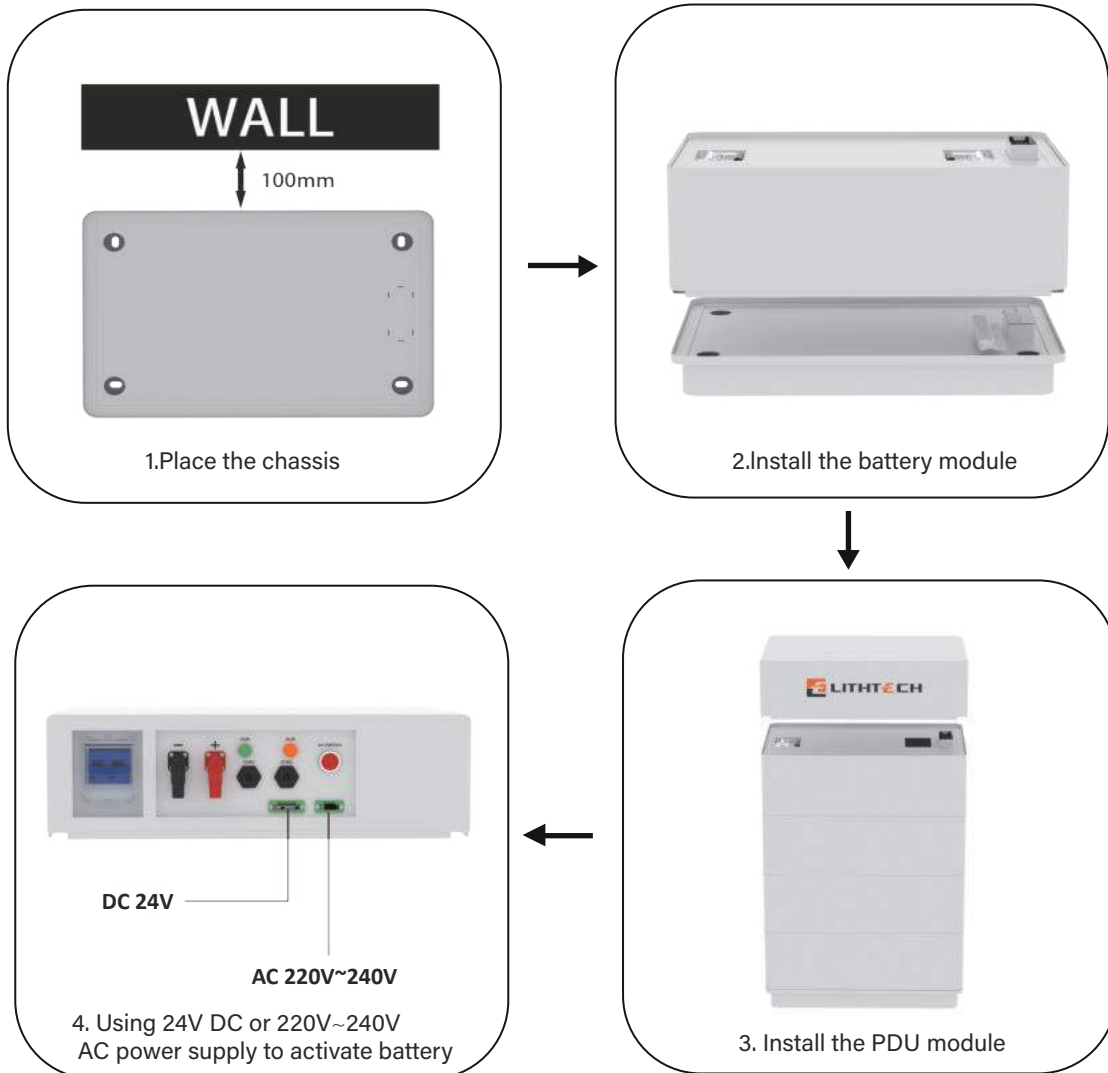
Step1	Preparation for installation	Make sure all the button/switch are off in PDU module
Step2	Mechanical installation	<ol style="list-style-type: none"> 1.Determine the location to install battery 2.Place the chassis 3.Install the battery module 4.Install the PDU module
Step3	Activate battery	Use DC24V or AC220V~240V power supply to connect the DC24V or AC220V interface in PDU module, and the battery would be activated
Step4	Battery system self-test	1.Press the Sw key for 3 seconds.
		2. BMS system power-up activation
		3.Check system output voltage.
		4.Shut down the system.
Step5	Connect the inverter	1.Connect the positive and negative poles between
		2.Cmunication interface connection.

3.2.1 Preparation for installation

- Equipment and tools ready for installation.

Check the case to ensure that the LED light is in the "off" state to ensure no-power operation.

3.2.2 Mechanical installation



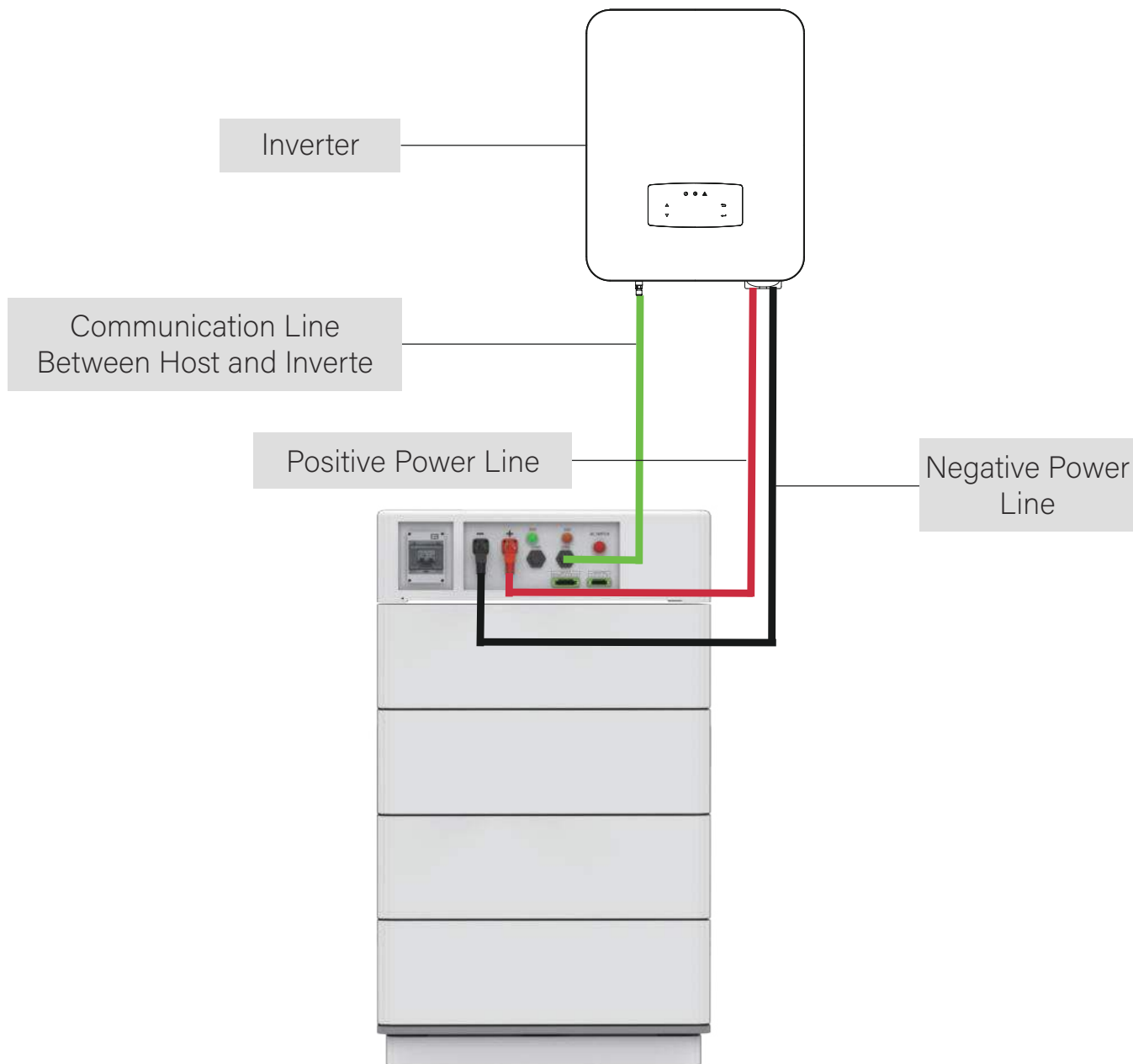
3.2.3 Electrical installation

Before connecting the power supply, it is recommended to use a multimeter to measure the on-off and short circuit of the cable, confirm the positive and negative poles, and label the cable.

Measuring method:

- **Cable on/off:** select the buzzer of the multimeter, and use the probe to measure the two ends of the same color cable. If the buzzer sounds, it means the cable is available.

- **Short circuit judgment:** select the resistance gear of the multimeter and measure the positive and negative poles at the same end with the probe. If the resistance shows infinite, it means the cable is available.
- **Positive and negative poles:** after the power line is connected visually, the positive and negative poles of the battery shall be respectively connected to the positive and negative poles of the opposite equipment.



4. Using, maintenance and troubleshooting

4.1 Battery system use and operation instructions

After completing the electrical installation, turn on the battery system as follows:

1. Refer to the description of dial switch in 2.3. 1, make preparations before starting the battery pack, and then press SW key for 3 seconds, run light and SOC light will be on after self inspection.



Pay attention :

After pressing the SW key, if it is found that the battery status indicator on the front panel is on red continuously; please check "4.2 alarm description". If the fault cannot be eliminated, please contact the dealer in time.

1. Use a voltmeter to measure whether the two voltages at the battery access end of the circuit breaker are over 45V, and check whether the voltage polarity is consistent with the inverter input polarity; if the voltage output at the battery access end of the circuit breaker is over 45V, then the battery has started to work normally;
2. After confirming that the output voltage and polarity of the battery are correct, turn on the inverter; turn off the Circuit breaker switch.
3. Check the status of the indicator light (communication indicator light and battery access status indicator light) between the inverter and the battery. if it is normal, the connection between the battery and the inverter is completed. If the indicator light is different Often, please refer to the inverter manual to find out the reason or contact the dealer.

Table 4-1 Battery and inverter power matching table

Hybrid Inverter	Off grid inverter	HP Series	
EPS (Backupport) AC output power	AC output power	Battery Module	Total energy (kWh)
≤ 20 kW		4	20.48
≤ 25 kW		5	25.60
≤ 30 kW		6	30.72
≤ 35 kW		7	35.84
≤ 40 kW		8	40.96

Using requirements	Charge	a. Continuous charging current $\leq 0.4C$ b. If the battery capacity indication is empty, please charge within 48 hours after the power is discharged.
	Discharge	c. Continuous discharging current $\leq 1C$ d. It is recommended that the maximum discharge depth (DOD) of the pack should not exceed 90%

4.2 Alarm Description and Solution

In case of protection action or fault of the system, the alarm signal will be given through the working status indicator light of the front panel, and the specific alarm category can be queried through the network management system. If there are any abnormal faults affecting the output, such as voltage over-voltage, charging over-current, under voltage protection, temperature protection, etc., please handle according to Table 4-2.

Table 4-2 Main alarm and protection

State	Alarm category	Alarm indication	Solution
Charging state	Cell overvoltage	ALM Red light is always on	Stop charging and find out the cause of the fault
	Charge overcurrent	ALM Red light is always on	Stop charging and find out the cause of the fault
	Charging temperature alarm	ALM Red light is always on	Stop charging
Discharging state	Discharge overcurrent alarm	ALM Red light is always on	Stop discharging and find out the cause of the fault
	Discharging temperature alarm	ALM Red light is always on	Stop discharging
	Total voltage undervoltage alarm	ALM Red light is always on	Charge
	Cell Voltage Under-voltage alarm	ALM Red light is always on	Charge

4.3 Analysis and solution of common faults

Common faults and solutions are shown in table 4-3:

Table 4-3 Common faults and solutions

No.	Fault	Causal analysis	Solutions
1	No response of indicator light after power on	Power switch is broken	Power switch
2	No DC output red light on	Battery data status is abnormal	Network management connect with background reading battery information
3	DC power supply time is too short	Reduced battery capacity	Replace a battery
4	Battery cannot be fully charged	Charging voltage is too low	Adjust charging voltage to 54V
5	The power cord port sparked at the moment of power on, and the red light was on	Short circuit in power supply wiring	Turn off the battery, check the cause of the short circuit and solve it

In case of special technical difficulties or questions, please contact the seller in time.

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