



All-in-one Energy Storage System

User Manual



ROH5542F-05X1P30C, ROH5542F-10X2P30C

ROH5542F-15X3P30C, ROH5542F-20X4P30C

ROH5542F-25X5P30C, ROH5542F-30X6P30C

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Important Safety Instructions






Please keep this manual for future reference.


This manual contains all the safety, installation and operation instructions for the All-in-one Energy Storage System (hereinafter referred to as "Energy Storage System").

1. Explanation of symbols

To ensure the user's safety of personal and property while using this product, relevant information is provided in the manual and highlighted with the following symbols.

Please read the relevant texts carefully when you encounter the following symbols in the manual.

Symbol	Definition
Tip:	Indicates recommendation for reference.
	IMPORTANT: Indicates an important reminder during the operation, failure to do so may result in an equipment error alarm.
	CAUTION: Indicates a potential risk that could result in equipment damage if not avoided.
	WARNING: Indicates a risk of electric shock which will result in damage to equipment or electric shock/injury to personnel if not avoided.
	WARNING HOT SURFACE: Indicates a danger caused by high temperature, it may cause burns to personnel if not avoided.
	Read the user manual carefully before any operation.

 WARNING	The entire system should be installed and operated by professional and technical personnel!!
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2. Requirements for professional and technical personnel

- Professionally trained.
- Familiar with related safety regulations of the electrical system.
- Read this manual carefully and master the related safety instructions.


3. Professional and technical personnel are allowed to

- Install the Energy Storage System to a specified position.
- Conduct trial operations for the Energy Storage System.
- Operate and maintain the Energy Storage System.



4. Safety instructions before installation


 IMPORTANT	After receiving the Energy Storage System, please check if there is any damage during transportation. If you find any problem, please contact the transportation company, our local distributor or our company in time.
 CAUTION	<ul style="list-style-type: none">• When installing or moving the Energy Storage System, please follow the instructions in the manual.• When installing the Energy Storage System, please evaluate whether there is a risk of electric arc in the operation area.
 WARNING	Keep the Energy Storage System out of reach of children.

5. Safety instructions for mechanical installation



 WARNING	<ul style="list-style-type: none">• Before installation, make sure there is no electrical connection to the Energy Storage System.• Ensure enough heat dissipation space for installing the Energy Storage System. Do not install the Energy Storage System in the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other harsh environments.
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6. Safety instructions for electrical connection

 CAUTION	<ul style="list-style-type: none">• Check whether wiring connections are tight to avoid the danger of heat accumulation caused by loose connections.• The cabinet of the Energy Storage System should be connected to the ground, and the cross-sectional area of the cable connecting the ground terminal to the earth should not be less than 4mm².• A fuse or circuit breaker, whose rated current is twice the rated input current of the Energy Storage System, should be used between the lithium battery and the inverter.• Do not install the Energy Storage System and the lead-acid liquid battery in the closed space. The lead-acid liquid battery generates flammable gas and may cause a fire if the connection terminals spark.
 WARNING	<ul style="list-style-type: none">• Do not connect the AC output terminal to other power sources or Utility. Otherwise, the Energy Storage System will be damaged.• When the AC output terminal connects to the load, the Energy Storage System needs to stop working.


 WARNING	<ul style="list-style-type: none"> • It is strictly forbidden to connect a transformer or a load with a surge power (VA) exceeding the overload power at the AC output terminal. Otherwise, the Energy Storage System will be damaged. • Both the Utility input and AC output are of high voltage, do not touch the wiring connection to avoid electric shock.
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7. Safety instructions for the operation of the Energy Storage System

 WARNING HOT SURFACE	<p>When the Energy Storage System is working, it generates a lot of heat and the cabinet temperature is very high, do not touch it and keep it far away from the materials and equipment that are susceptible to the high temperature.</p>
 CAUTION	<ul style="list-style-type: none"> • When the Energy Storage System is working, do not open its cabinet for any operation. • When troubleshooting faults that affect the safety performance of the Energy Storage System or disconnecting DC input, turn off the power switch of the Energy Storage System and wait until the LCD screen is completely off.

8. The dangerous operations that could cause electric arc, fire and explosion inside the Energy Storage System:

- Touch the end of a potentially live cable that has not been insulated;
- Touch the wiring copper busbars, terminals or internal components of the Energy Storage System that might be electriferous;
- The connection of the power cable is loose;
- Screws and other parts accidentally fall inside the the Energy Storage System;
- Incorrect operation by untrained non-professional personnel.

 WARNING	<p>Once an accident occurs, it must be handled by professionals. Incorrect operation would cause a more serious accident.</p>
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9. Safety instructions for stopping the Energy Storage System

- Firstly, turn off the AC output and disconnect the Utility input, and then turn off the DC switch.
- The internal conductive components should not be touched until the Energy Storage System has been disconnected from the input and output cables for 10 minutes.
- The Energy Storage System does not contain repair parts internally, if you need repair service, please contact our after-sales service personnel.

**WARNING**

It's dangerous to touch or open the cabinet for maintenance when the equipment is powered off within 10 minutes.

10. Safety instructions for the maintenance of the Energy Storage System

- It is recommended to test the Energy Storage System with testing equipment to ensure there is no voltage at the input terminals or no current on the input and output cables.
- When conducting the electrical connection and maintenance, post a temporary warning sign or put up barriers to prevent unrelated personnel from entering the electrical connection or maintenance area.
- Improper maintenance of the Energy Storage System may cause injury to personnel or damage to the equipment.
- To avoid static damage, it is recommended to wear an anti-static wristband or to avoid unnecessary contact with the circuit board.


**CAUTION**

The safety mark, warning label and rating plate on the Energy Storage System should be clearly visible, not removed or covered.

11. Safety instructions for lithium battery


- Lithium batteries must be stored separately and stored in outer packaging to avoid mixed storage with other items, open-air storage and high stacking.
- Move the lithium battery in accordance with the required direction, do not place a battery upside down or tilt it to avoid battery collision.
- Before installing lithium batteries, check whether the packaging is intact. Do not use lithium batteries with damaged packaging.
- When installing lithium batteries, please pay attention to the positive and negative poles, do not short circuit the positive and negative poles of a lithium battery.
- When installing lithium batteries, if a battery drops or is hit by a strong impact, it may cause internal damage in the equipment, and it is strictly forbidden to use it, otherwise there will be a safety risk (may be cell leakage, electric shock, etc.).
- After a lithium battery drops, if there is an obvious damage or abnormal odor, smoke, or fire occurs, evacuate the personnel immediately, call emergency services, and contact the professionals. The professionals can use fire extinguishing facilities to extinguish the fire under safety protection.
- After a lithium battery drops, if the appearance is not obviously deformed or damaged, and there is no abnormal odor, smoke, or fire, contact the professionals to transfer the lithium battery to an open and safe place, or contact a recycling company for disposal.
- Do not perform welding or grinding work around lithium batteries to prevent fire caused by electric sparks or arcs.

- Do not use a damaged lithium battery, which may release flammable gas.
- Do not use a lithium battery whose warranty period has expired. If lithium batteries are out of service life, contact a lithium battery recycling company for disposal.
- Dispose of waste lithium batteries in accordance with local laws and regulations. Do not expose waste lithium batteries to direct sunlight, high temperature, high humidity or corrosive substances. Do not dispose of lithium batteries as household waste. Improper disposal of lithium batteries may result in environmental pollution.
- Please use the lithium batteries within the temperature range specified in this manual.
- When the lithium battery temperature is too high, it will cause the battery deformation, damage and electrolyte overflow and the leakage of toxic gases.
- In the case of electrolyte leakage or abnormal odor, avoid contact with the leaked liquid or gas. Please contact the professionals immediately.
- If a fire occurs, the system should be powered off under safety protection. Use carbon dioxide, FM-200 or ABC dry powder fire extinguishers to extinguish the fire.

 WARNING	<ul style="list-style-type: none"> • Do not expose lithium batteries at high temperatures or around heat sources, such as scorching sunlight, fire sources, transformers and heaters. Lithium battery overheating may cause fire or explosion. • To avoid leakage, overheating, fire or explosion, do not disassemble, alter, or damage lithium batteries, for example, insert foreign objects into batteries, or immerse batteries in water or other liquids. • Do not touch battery terminals with other metal objects, which may cause heat or electrolyte leakage.
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12. Working environment

- Working temperature range: -20°C to +50°C (When the working temperature exceeds 30°C, the charging power and load power will be reduced appropriately. 100% load output is not supported.)
- Storage temperature: -25°C to +60°C (No sharp temperature changing)

 WARNING	<p>Do not use the Energy Storage System in the following environments, and the company shall not be liable for any damage caused by using it in the inappropriate environments.</p> <ul style="list-style-type: none"> • Do not install the Energy Storage System in the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other harsh environments. Avoid direct sunlight and rain infiltration for outdoor installation. • Do not install the Energy Storage System in the closed space with the lead-acid battery. The lead-acid liquid battery generates flammable gas and may cause a fire if the connection terminals spark.
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Disclaimers

The warranty does not apply to the following conditions:

- Damage caused by improper use or inappropriate environments (It is strictly forbidden to install the Energy Storage System in the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other harsh environments).
- The actual current/voltage/power exceeds the limit value of the Energy Storage System.
- Damage caused by working temperature exceeding the rated temperature range.
- Electric arc, fire, explosion and other accidents caused by failure to follow the Energy Storage System labels or manual instructions.
- Unauthorized disassembly and maintenance of the Energy Storage System.
- Damage caused by force majeure such as lightning strikes, rainstorms, mountain torrents and Utility failures.
- Damage occurred during transportation or loading/unloading the Energy Storage System.

1 General Information

1.1 Overview

ROH-F-P30C series is an integrated Energy Storage System that combines lithium battery and off-grid energy storage inverter. With IP20 rating, this product is equipped with 1–6 battery packs as standard configuration (up to 12 battery packs, if the battery pack quantity is more than 6, then customization is needed) and 1 off-grid energy storage inverter. With the energy of 5.12kWh per battery pack, the configuration energy is up to 30.72kWh.

It simultaneously supports multiple Energy Storage Systems (up to 12 units) to expand the application through single phase parallel and three phase parallel, which can output 220VAC for single phase parallel or 380VAC for three phase parallel.

With the power of 5,500W (Note: If selecting the off-grid energy storage inverter of 5,500W, at least 2 lithium battery packs are required for full power running), the off-grid energy storage inverter integrates Utility/oil generators and solar charging, Utility bypass and inverter output, and energy management and control. Adopting advanced DSP control technology to ensure its high quality, stability and reliability. The solar charging adopts optimized MPPT tracking technology, which can track the maximum power point of the PV array in various environments and obtain the maximum energy of the solar panel in real time. It supports two PV inputs (connected separately or connected in parallel) to improve PV utilization. The DC-AC inverter is based on a fully digitalized design and adopts SPWM technology to output pure sine wave, converting DC into AC. Multiple charging modes and AC output modes are optional, and users can use solar energy or Utility flexibly by setting to maximize energy utilization.

The display module adopts a large color dot-matrix touch LCD screen, which clearly displays the operating data and status of the system. With standard Modbus protocol communication port, it's convenient for users to expand applications, suitable for different monitoring needs.

The product is easy to install by stacking each module, and is convenient to move with the universal wheel supporting base. By combining the inverter with different quantities of lithium battery packs, it fully meets the user's demand for high-capacity energy storage power supply.

Features

- A new and fully digital All-in-one Energy Storage System with multiple energy management.
- Modular design, stacked installation, providing easy and independent installation and maintenance.
- Built-in lithium iron phosphate battery with high cycle stability and long life cycle.
- Pure sine wave output.
- Lithium battery communication port to perform the safe charging and discharging.
- Stable self-activation for lithium batteries.
- Lithium battery charging or discharging current limit to achieve parallel connection of multiple equipment.^①
- AC output supports parallel operation (up to 12 units).
- AC output supports single phase and three phase parallel connection.
- PFC technology reduces the demand on the power grid capacity.
- Advanced MPPT technology, with maximum tracking efficiency higher than 99.5%.
- Supports two PV inputs to improve PV utilization.^②
- Supports charging from multiple types of generators.^③
- Maximum Utility charging current settings to flexibly configure Utility charging power.
- One-button control of AC output.
- Supports soft start.
- Large color touch LCD for better monitoring system status in real time.
- With the function of historical data recording, the interval of 15 minutes can be recorded for half a year (the interval time of 1~3600 seconds settable)
- RS485 communication port with optional WIFI, or TCP modules for remote monitoring.
- Comprehensive electronic protections.
- Working temperature ranging from -20°C to +50°C to offer a wider scope of application (When the working temperature exceeds 30°C, the charging power and load power will be reduced appropriately. 100% load output is not supported).

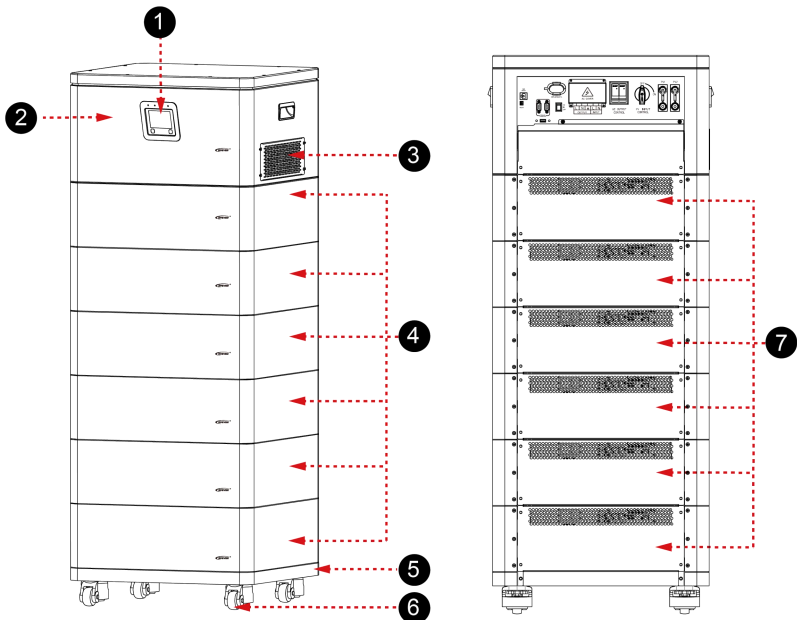
① When the battery charging current > 100A, or the cell temperature < 15°C, or the cell temperature > 45°C, it will automatically enter the charging current limiting mode, and the charging current is limited to 20A.

When the battery charging current is < 3A and 18°C ≤ the cell temperature ≤ 42°C, or the charging current limit time exceeds 30 minutes, it will automatically exit the charging current limiting mode.

- ② The ROH-F-P30C series can achieve single channel and two parallel MPPTs tracking, with the input current ranging from 15A to 30A respectively. When connecting two PV arrays, set the "PV mode" as "SINGLE" when the two PV arrays are independently input; when there are two PV arrays connected in parallel to the Energy Storage System (the PV terminals of the Energy Storage System need to be paralleled externally), set the "PV mode" as "Parallel." The default mode for the product with only one PV input is "SINGLE" (other modes are invalid).
- ③ When using a non-variable frequency generator, the charging current cannot reach the rated power, and it is recommended to use a variable frequency generator. And when using the generator, you need to set the AC input to the generator mode, please refer to the chapter [2.5.1 List](#) for the detailed setting methods.

1.2 Appearance

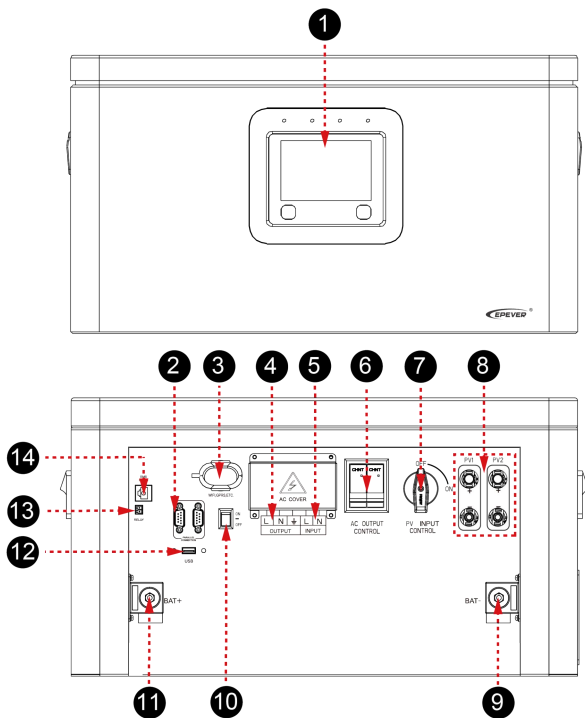
- Overall



Note: The product appearance is illustrated above with ROH5542F-30X6P30C.

No.	Instruction	No.	Instruction
1	LCD (see chapter 2)	5	Base
2	Inverter (off-grid energy storage inverter)	6	Universal wheel x4
3	Detachable cooling fan	7	Back cover (subject to the quantity of lithium battery pack)
4	Lithium battery pack (with optional quantity of 1–12, if the quantity is more than 6, then customization is needed)		

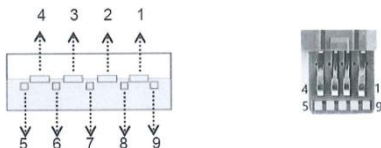
- The Inverter of the Energy Storage System



Note: The inverter appearance is illustrated above with HP5542F-AH1050P30C.

No.	Instruction	No.	Instruction
1	LCD (see chapter 2)	8	PV input terminal
2	Parallel connection port (DB9)	9	Battery negative terminal
3	RS485 communication port (USB-A 3.0, with isolation design) ⁽¹⁾ 5VDC/1.2A	10	Power switch
4	AC output terminal	11	Battery positive terminal
5	AC input terminal	12	USB communication port ⁽²⁾
6	AC output circuit breaker	13	Dry contact port ⁽³⁾
7	DC input switch	14	BMS communication port ⁽⁴⁾

(1) Remote monitoring is achieved by connecting the WIFI or TCP modules via RS485 communication port. The pins of the RS485 communication port (USB-A 3.0 female base) are defined as follows:



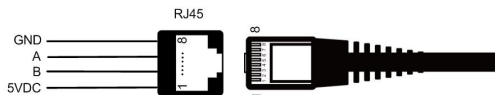
Pin	Definition	Color	Instruction
1	VBUS	Red	Power (5VDC/1.2A)
2/3/7/8/9	Reserved	Reserved	Reserved
4	GND	Black	Power GND
5	RS485-A1	Blue	RS485-A1(to transfer data with cloud platform, APP, PC software, display screen and so on)
6	RS485-B1	Yellow	RS485-B1(to transfer data with cloud platform, APP, PC software, display screen and so on)

(2) The USB communication port is used for communication between the Energy Storage System and the PC terminal, and for the LCD software upgrades.

(3) Dry contact specification: 1A@250VAC

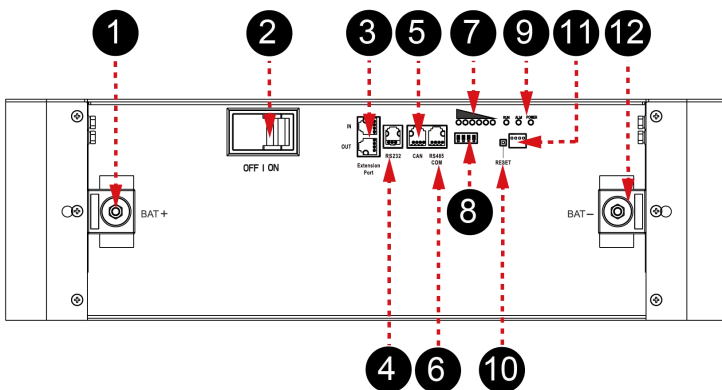
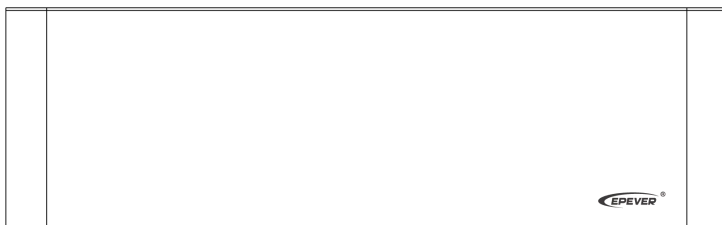
Function: The dry contact port is connected with the oil generator switch in parallel and can turn on/off the oil generator.

(4) The Energy Storage System has a built-in BMS-Link module. Connect the lithium battery pack to the BMS communication port of the inverter directly, which can realize the communication between the inverter and the lithium battery BMS. The pins of the BMS communication port (RJ45) are defined as follows:



Pin	Definition	Pin	Definition
1	+5VDC	5	RS485-A
2	+5VDC	6	RS485-A
3	RS485-B	7	GND
4	RS485-B	8	GND

- **Lithium battery pack**



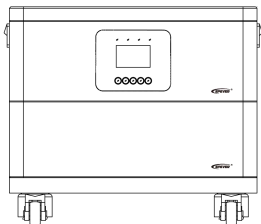
Note: The lithium battery pack appearance is illustrated above with LFP5KWH51.2V-FP30.

No.	Instruction	No.	Instruction
①	Battery positive terminal	⑦	Battery SOC indicator
②	Battery circuit breaker	⑧	Dry contact port
③	Battery parallel communication port (two RJ45 ports)	⑨	Battery status indicator
④	RS232 communication port (reserved port)	⑩	RESET button
⑤	CAN communication port (reserved port)	⑪	DIP switch
⑥	RS485 communication port (for communication between battery and the inverter)	⑫	Battery negative terminal

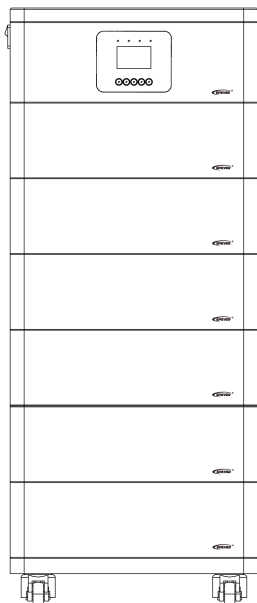
- **Storage energy specification**

The Energy Storage System supports energy expansion ranging from 5.12kWh to 61.44kWh, up to 12 lithium battery packs (equipped with 1–6 lithium battery packs as standard configuration, if the quantity of lithium battery pack is more than 6, then customization is needed).

1 lithium battery pack, 5.12kWh



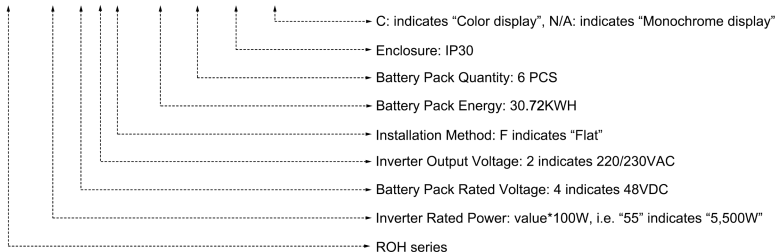
6 lithium battery packs, 30.72kWh



1.3 Naming rules

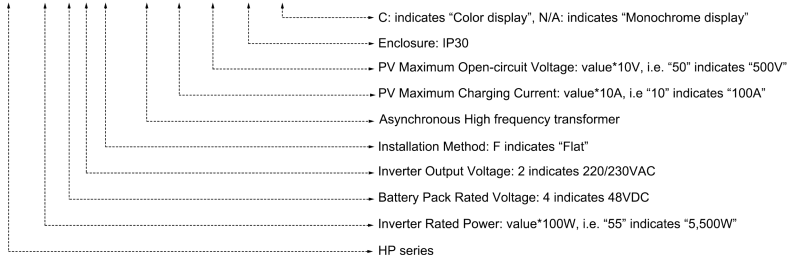
● All-in-one Energy Storage System

ROH 55 4 2 F - 30 X6 P30 C



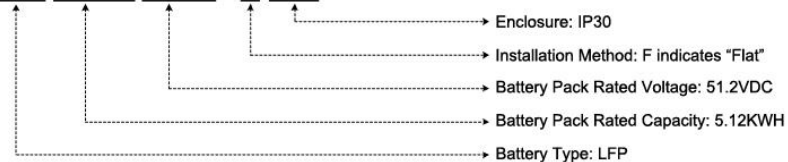
● Inverter of the Energy Storage System

HP 55 4 2 F - AH 10 50 P30 C

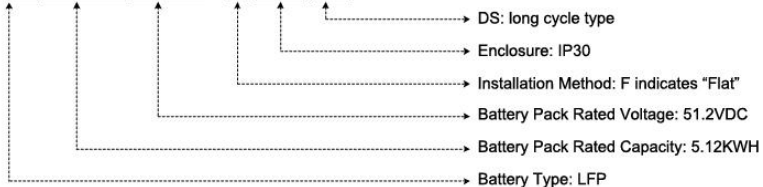


● Lithium battery

LFP 5KWH 51.2V - F P30

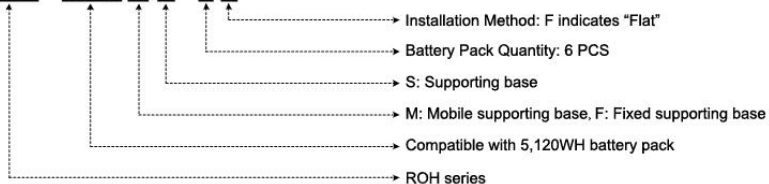


LFP 5KWH 51.2V - F P30 DS

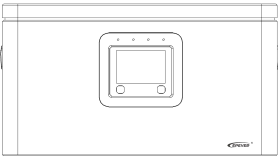




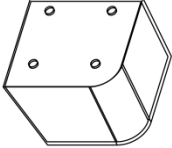
● Base (included accessory)

ROH - 5120 M S - 6 F

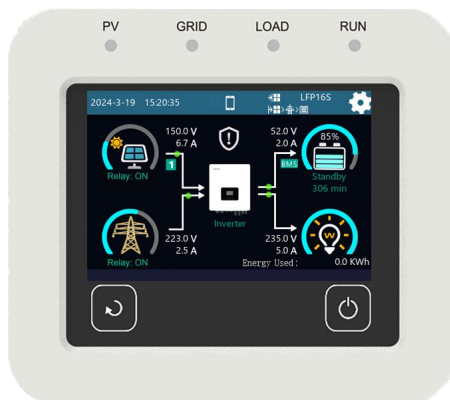


1.4 System components

No.	Name	Picture	Quantity
1	Off-grid energy storage inverter (included accessory)		1 PCS
2	Lithium battery pack (included accessories)		1-6 PCS in parallel (optional quantity)

3	Mobile base for lithium battery pack (included accessory)	 A line drawing of a rectangular mobile base for a lithium battery pack. It features a flat top surface and four small casters or wheels attached to the bottom corners, allowing it to be moved.	1 PCS
4	Fixed bracket for lithium battery pack (Optional accessories)	 A line drawing of a fixed bracket for a lithium battery pack. It is a rectangular frame with a slightly raised back edge. There are four circular holes, one in each of the two front-facing vertical panels, intended for screws to secure a battery pack.	4 PCS

2 Interface



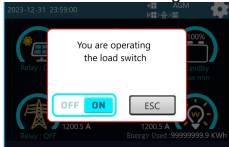


Note: The display screen can be viewed clearly when the angle between the end-user's horizontal sight and the display screen is within 90°. If the angle exceeds 90°, the information on the display screen cannot be viewed clearly.

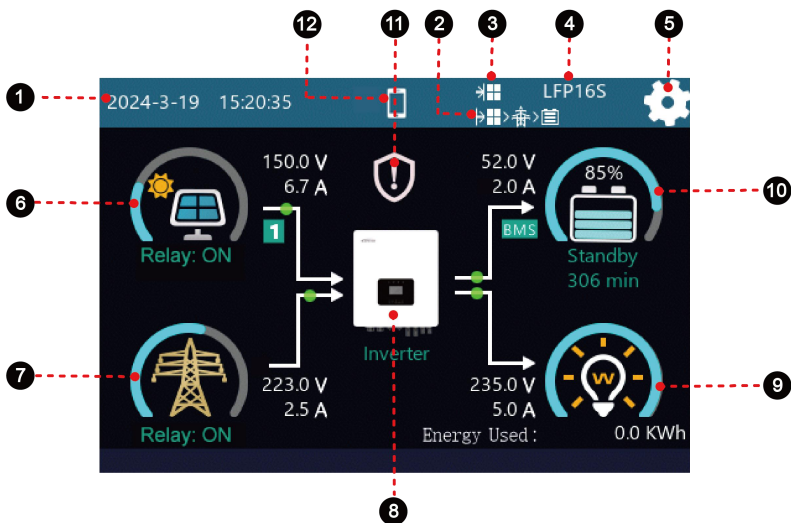
2.1 Indicators

Indicator	Status	Description
PV	Off	No PV input
	Solid green	PV normal
	Flashing green	PV input is DC (DC source) mode.
	Solid red	PV charging fault (PV1/PV2 over voltage)
LOAD	Off	No inverter output
	Solid green	Inverter, charging and bypass are normal
	Solid red	Inverter fault (inverter over current/over voltage/under voltage, output short-circuit/over load)
GRID	Off	No Utility input
	Solid green	Utility normal
	Flashing green (0.5Hz)	Oil generator charging
	Solid red	Utility charging fault (Utility over voltage/over current/under voltage/frequency error)
RUN	Flashing green (0.5Hz)	Normal communication
	Solid red	Communication fault






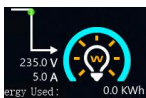



2.2 Buttons

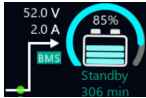






Buttons	Operation	Description
	Click	<ul style="list-style-type: none"> Exit the current interface and return to the home page.
	Click	<ul style="list-style-type: none"> Turn on/off the load switch. Click this button and the following prompt message pops up, click "ON/OFF" to turn on/off the load switch. If set to "OFF", it will automatically return to "ON" after restarting. 

2.3 Home page



No.	Instruction	
①		<p>Displays the system time.</p> <p>Please set the system time correctly before operation.</p>
②		<p>Displays the battery discharge modes. For specific parameter settings, please refer to 2.5.1 List > 5 System.</p> <p> PV > BP > BT</p> <p> PV > BT > BP</p> <p> BP > PV > BT</p>
③		<p>Displays the battery charge modes. For specific parameter settings, please refer to 2.5.1 List > 5 System.</p> <p> Solar</p> <p> Solar > Grid</p> <p> Solar + Grid</p> <p> Grid > Solar</p>
④		<p>Displays the current battery type. For specific parameter settings, please refer to 2.5.1 List > 5 System.</p>
⑤		<p>Parameter settings icon, click to enter the password input interface, and you can customize the system parameters after entering the password correctly, for specific operations, please refer to 2.5 Parameter settings.</p>
⑥		<ul style="list-style-type: none"> Displays PV input voltage and current. The arrow shows the energy flow direction of the PV input (the number icon 1 or 2 on the line indicates the current data of PV module 1 or 2 respectively). The arc indicates the percentage of the current PV generation power to the rated PV power generation. Displays whether the PV module is working: indicates that the PV module is working normally, indicates that the PV module is not working. Displays whether the MPPT of the current PV is working: "Relay: ON" means it is working normally, "Relay: OFF" means it is not working. <p>Click the PV icon to enter the PV real-time data interface, for specific operations, please refer to 2.4.1 PV.</p>

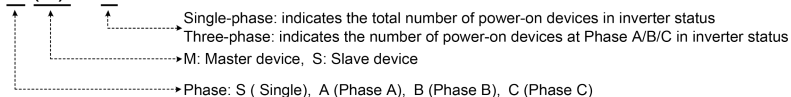
7		<ul style="list-style-type: none"> • Displays utility input voltage and current. • The arrow shows the energy flow direction of the utility input. • The arc  indicates the percentage of current utility consumption power to rated AC output power of the Energy Storage System. • Displays whether the utility is working normally:  indicates that the utility is working normally,  indicates that the utility is not working. • Displays the utility relay status: "Relay: ON" means the utility relay is connected, "Relay: OFF" means the utility relay is disconnected. <p>Click the utility icon to enter the utility real-time data interface. For specific operations, please refer to 2.4.2 Utility.</p>
8		<ul style="list-style-type: none"> • Displays the working status of the Energy Storage System: "Inverter" indicates the inverter working status, "Grid" indicates the utility charging or utility bypass working status). • Displays the parallel status icon (it will be displayed only when there are more than 2 Energy Storage Systems are connected in parallel with successful communication, and will not be displayed on a stand-alone Energy Storage System). ★ <p>Click the Energy Storage System icon to enter the Energy Storage System information interface. For specific operations, please refer to 2.4.3 Energy Storage System.</p>
9		<ul style="list-style-type: none"> • Display the output voltage and current of the load. • The arrow indicates the energy flow direction of the load. • The arc  indicates the percentage of the current load power to the rated load power. • Displays the load status:  indicates that the load is on,  indicates that the load is off. • "Energy Used" indicates the total power consumption of the load (i.e. the cumulative power consumption of the load since the Energy Storage System was first turned on. If the data is cleared, it will be counted again) <p>Click the load icon to enter the load real-time interface. For specific operations, please refer to 2.4.4 Load.</p>

10		<ul style="list-style-type: none"> • Display the battery voltage and current in charging and discharging state. • The arrow indicates the energy flow direction of the battery. • Displays the working status of the battery:  indicates that the battery is charging and discharging normally,  indicates that working in battery-free mode. • BMS indicates that the BMS communication is normal, BMS indicates that BMS fault occurs. (Note: If the BMS communication error occurs or the BMS is not connected, this icon is not displayed, and the "BMS Communication Failure" is displayed.) • Display battery SOC percentage value. • The arc  indicates the battery SOC percentage. • Displays charging status: "Standby, Equalizing, Floating and Boosting." • Displays time: If it is charging or the remaining available discharging time is greater than 999 minutes, MAX is displayed. If the remaining available discharging time is less than or equal to 999 minutes, the specific minutes is displayed. <p>Click the battery icon to enter the battery real-time interface. For specific operations, please refer to 2.4.5 Battery.</p>
11		Indicates that there is no fault in the current system.
		Indicates that a fault has occurred in the current system. Click this icon to view real-time fault. For specific operations, please refer to 2.4.6 Error code .
12		Indicates turning on the 5V power supply of the Energy Storage System's COM port, which can be connected to an external Bluetooth or WiFi module.

Note: When the PV or utility is charging, the equalizing charging is performed at 06:00 on the 28 every month by default (the date can be modified).

★ **Parallel status icon:** it will be displayed only when there are more than 2 Energy Storage Systems are connected in parallel with successful communication, and will not be displayed on a stand-alone Energy Storage System. The naming rules for parallel status icon are as follows:

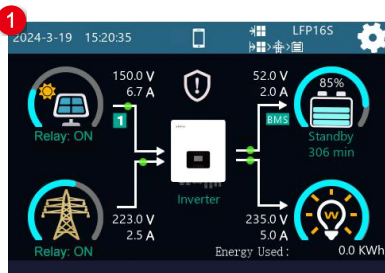
S (S) -- 6




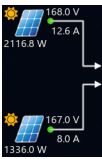

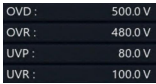
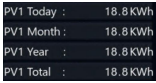
Note: The master and slave devices are randomly defined.

2.4 Real-time data

2.4.1 PV





Touch  on the home page to enter the PV real-time data interface, the information displayed is as follows:

Icon	Description
	<ol style="list-style-type: none"> 1. PV input voltage and current 2. PV energy flow indication 3. PV real-time power <p>Note: If there is only one PV input, it only shows one PV icon here.</p>
	<ol style="list-style-type: none"> 1. Total PV generation power (It won't be displayed if there is only one PV input) 2. PV temperature (sampled by the PV internal heat sink —DC/DC heat sink)
	<p>Swipe up/down in this area to view all the settable parameters of the PV module.</p> <p>For the parameter settings of the PV module, please refer to 2.5.1 List > 1. PV.</p>
	<p>Swipe up/down in this area to view the daily, monthly, annual and total power generation statistics of the PV module.</p>

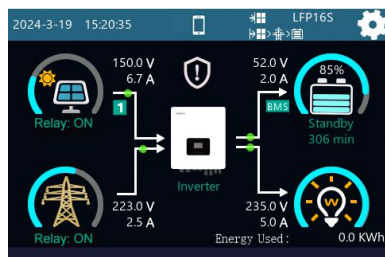
2.4.2 Utility






Touch  on the home page to enter the utility real-time data interface. The information displayed is as follows:

Icon	Description										
	<ol style="list-style-type: none"> Utility input voltage, current and frequency Utility energy flow indication Utility consumption power (with arrow pointed to the Energy Storage System) 										
<table border="1"> <tr><td>OVD :</td><td>265.0 V</td></tr> <tr><td>OVR :</td><td>255.0 V</td></tr> <tr><td>UVD :</td><td>175.0 V</td></tr> <tr><td>UVR :</td><td>185.0 V</td></tr> <tr><td>OFD :</td><td>70.0 Hz</td></tr> </table>	OVD :	265.0 V	OVR :	255.0 V	UVD :	175.0 V	UVR :	185.0 V	OFD :	70.0 Hz	<p>Swipe up/down in this area to view all the settable utility parameters. For the utility parameter settings, please refer to "2.5.1 List > 3. Grid".</p>
OVD :	265.0 V										
OVR :	255.0 V										
UVD :	175.0 V										
UVR :	185.0 V										
OFD :	70.0 Hz										
<table border="1"> <tr><td>Today Consumption :</td><td>0.0 KWh</td></tr> <tr><td>This Month Consumption :</td><td>0.0 KWh</td></tr> <tr><td>This Year Consumption :</td><td>0.0 KWh</td></tr> <tr><td>Total Consumption :</td><td>0.0 KWh</td></tr> </table>	Today Consumption :	0.0 KWh	This Month Consumption :	0.0 KWh	This Year Consumption :	0.0 KWh	Total Consumption :	0.0 KWh	<p>Displays the daily, monthly annual and total electricity consumption statistics of the utility.</p>		
Today Consumption :	0.0 KWh										
This Month Consumption :	0.0 KWh										
This Year Consumption :	0.0 KWh										
Total Consumption :	0.0 KWh										

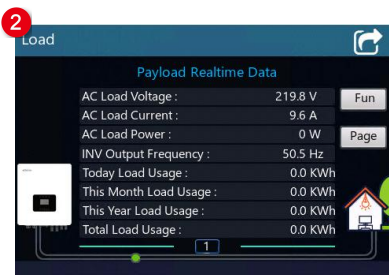
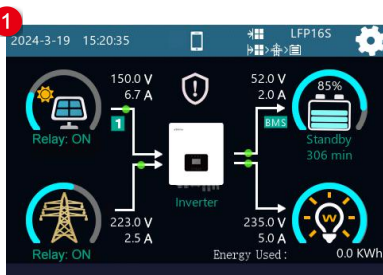
2.4.3 Energy Storage System




Touch  on the home page to enter the Energy Storage System real-time data interface, which displays the current product series, product model, SN, LCD PCB version, LCD firmware version and other product information.

Click  or  to show other parameters.

2.4.4 Load

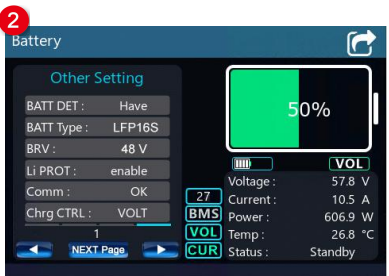
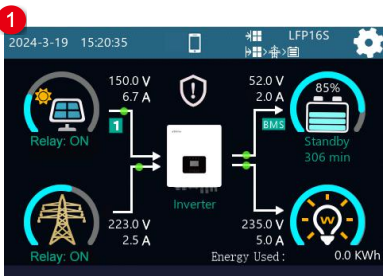



Touch  on the home page to enter the load real-time data interface.

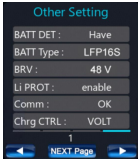


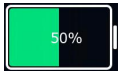
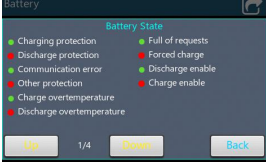
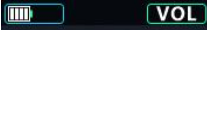



Click **Fun** to display Payload Real-time Data, Setting Parameters To Display and Parallel Real-Time Data in turn.

Click **Page** to display all the information of the current page in turn.

2.4.5 Battery



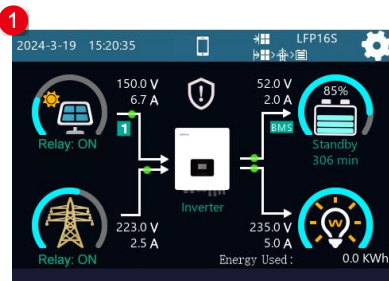
Touch  on the home page to enter the battery real-time data interface. The information displayed is as follows:

Icon	Description
	<ol style="list-style-type: none"> Click  /  to display Other Setting, BMS Data, Voltage Setting, and SOC Setting in turn. Click NEXT Page to display all the information of the current page.
	<p>To display the battery SOC value, click this icon to display the following BMS State interface, for more detailed data definition, please refer to 10.2 Appendix 2 Battery state instruction.</p>  <p>Click Up / Down to display other pages, and click Back to return to the battery real-time data interface.</p>
	<ol style="list-style-type: none"> Indicate whether the current battery protocol supports high current. <ul style="list-style-type: none">  Indicates that the battery protocol does not support high current.  Indicates that the protocol supports high current. Indicates the setting value of "BCCMode." <ul style="list-style-type: none"> VOL Indicates that "BCCMode" is set to "VOL." SOC Indicates that "BCCMode" is set to "SOC."
	<p>Displays real-time data of the battery: voltage, current, power, battery temperature and charging state.</p>




1. The number 27 indicates the current battery protocol.
2. BMS indicates the setting value of "BMS (BMS Enable)," gray indicates disable, and green indicates enable.
3. VOL indicates the setting value of "BMSVolt (BMS Voltage Control)," gray indicates disable, and green indicates enable.
4. CUR indicates the setting value of "BMSCurr (BMS Current Control)," gray indicates that the parameter is set to "Invalid," green indicates that the parameter is set to "BMS."

2.4.6 Error code



If there is no fault in the current system,  will be displayed on the home page.

If there is a fault in the current system,  will be displayed on the home page. Touch this icon to enter the real-time error code interface.

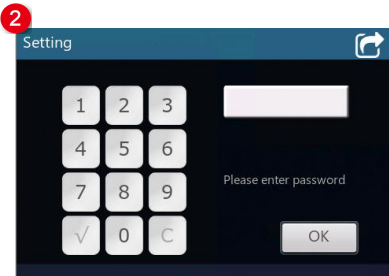
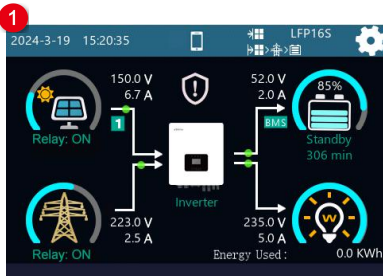
Click **Fun** to display "Real-time Error Code, Historical Error Code" in turn.


Click **Clear** to clear the current fault list (the fault information will be cleared only after the system fault is cleared; otherwise, the real-time fault list will not be cleared).



If there are **Up** or **Down** on the current page, click the button to display the previous page and next page of the current item (i.e. "Historical Error Code").

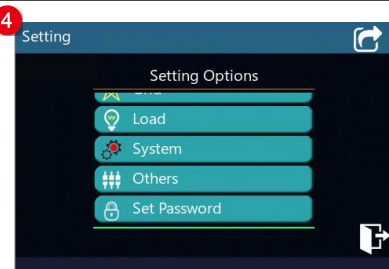
2.5 Parameter settings

2.5.1 List




1. Click  at the upper right corner on the home page.


2. Enter the password input interface, enter the correct password (the initial password is 000000 by default), and click  or  to enter the parameter setting interface.



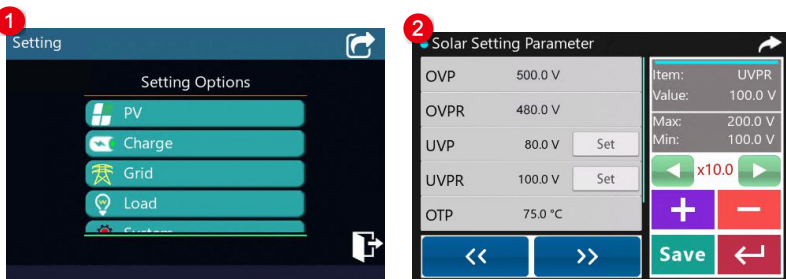
The parameter setting interface includes: PV (PV parameter setting), Charge (battery charge control parameter setting), Grid (Grid parameter setting), Load (Load parameter setting), System (System parameter setting), Others (Other parameters setting) and Set Password.

Swipe up/down on the current interface to select the parameter item to be set, and click it to enter the parameter setting interface.





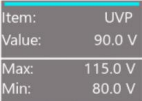





Click  to exit the current interface and return to the home page (after exiting in this way, if you enter the parameter setting interface again within 5 minutes, you do not need to enter the password; if it is beyond 5 minutes, you need to re-enter the password).





Click  to exit the current interface safely and return to the home page (after exiting in this way, you need to re-enter the password to enter the parameter setting interface).

1. PV



Click **PV** on the parameter setting interface to enter the PV parameter setting interface. The following information is displayed:

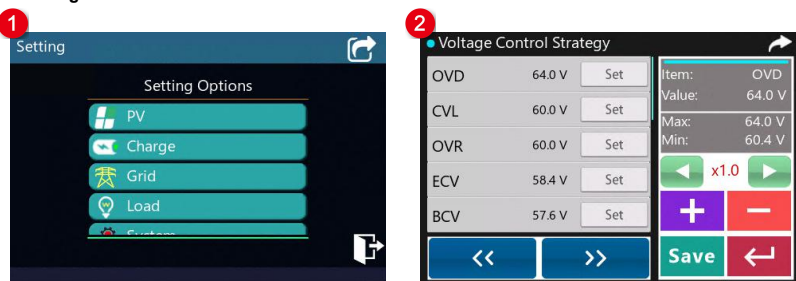
Icon	Description
	<p>Default values and configurable ranges of PV parameters. Swipe up/down to view all the parameters on the current page.</p> <p> indicates that the parameter value can be customized (If the parameter is read-only, there is no  icon).</p>
	<p>Click to display other configurable interfaces except the current interface (Note: The PV configurable parameters are only in the current interface, and there is no response when clicking the button.)</p>
	<p>Click  button to display the parameter name, default value, maximum and minimum configurable value.</p>
	<p> indicates the times of step size, with available values of 0.1 times, 0.5 times, 1 times and 10 times. It varies according to different parameters, please refer to the actual display.</p> <p>After the times of step size is set, click this button   to increase or decrease the current parameter.</p>

	<p>After the parameter setting is complete, click  to confirm the set value.</p> <p>After all the parameters on the current page are set, click  to issue new parameter value, and the following message box will pop up:</p> <div style="border: 1px solid red; padding: 5px; margin: 10px auto; width: fit-content;"> <p>Are you sure to save the modified parameters </p> <p style="text-align: center;"> <input type="button" value="Save"/> <input type="button" value="Close"/> </p> </div> <p>Click Save to complete the parameter issue.</p>
---	--

- **Default value and setting range for PV parameters are listed in the table below:**

Parameter	Default	User define
Solar Setting Parameter		
OVP (Over Voltage Protection Voltage)	500.0V	Read-only
OVPR (Over Voltage Protection Reconnect Voltage)	480.0V	Read-only
UVP (Under Voltage Protection Voltage)	80.0V	User define: 80.0V to (Under Voltage Protection Reconnect Voltage minus 5V)
UVPR (Under Voltage Protection Reconnect Voltage)	100.0V	User define: 100.0V to 200.0V, or (Under Voltage Protection Voltage plus 5V) to 200.0V Note: Take the maximum value between 100.0V and (Under Voltage Protection Voltage plus 5V).
OTP (Over Temperature Protection Temperature)	70.0°C	Read-only. PV Over Temperature Protection Temperature.
OTPR (Over Temperature Protection Reconnect Temperature)	65.0°C	Read-only. PV Over Temperature Protection Reconnect Temperature.

2. Charge



Click **Charge** on the parameter setting interface to enter the battery charge control parameter setting interface. The following information is displayed:

Icon	Instruction															
<table border="1"> <tr> <td>OVD</td> <td>64.0 V</td> <td>Set</td> </tr> <tr> <td>CVL</td> <td>60.0 V</td> <td>Set</td> </tr> <tr> <td>OVR</td> <td>60.0 V</td> <td>Set</td> </tr> <tr> <td>ECV</td> <td>58.4 V</td> <td>Set</td> </tr> <tr> <td>BCV</td> <td>57.6 V</td> <td>Set</td> </tr> </table>	OVD	64.0 V	Set	CVL	60.0 V	Set	OVR	60.0 V	Set	ECV	58.4 V	Set	BCV	57.6 V	Set	<p>Default values and configurable ranges for battery voltage/SOC control parameters. Swipe up/down to view all the parameters on the current page.</p> <p><input type="text" value="Set"/> indicates that the parameter value can be customized (If the parameter is read-only, there is no <input type="text" value="Set"/> icon).</p>
OVD	64.0 V	Set														
CVL	60.0 V	Set														
OVR	60.0 V	Set														
ECV	58.4 V	Set														
BCV	57.6 V	Set														
<p><< >></p>	<p>Click to display the interface of Voltage Control Strategy and SOC Control Strategy.</p>															

Note: For the content and operation methods of the parameter setting area on the right, please refer to "1. PV".

When the BMS is connected successfully, the values in the table below are read from the BMS directly and cannot be modified. If you need to modify the parameter values in the following table, please set "BMSVolt" to "Disable" first, for more details of "BMSVolt", please refer to [5. System](#).

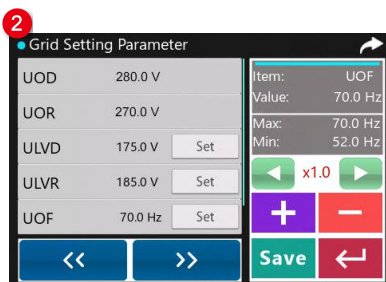
- Default value and setting range for battery charge control parameters are as follows:

Parameter	Default	User define
2.1 Voltage Control Strategy		
OVD (Over Voltage Disconnect Voltage)	59.2V	User define: Charging Limit Voltage < Over Voltage Disconnect Voltage $\leq 16^*N$ Note: N=Rated battery voltage/12.
CLV (Charging Limit Voltage)	58.4V	User define: Equalize Charging Voltage < Charging Limit Voltage < Over Voltage Disconnect Voltage
OVR (Over Voltage Reconnect Voltage)	58.4V	User define: $9^*N \leq$ Over Voltage Reconnect Voltage \leq (Over Voltage Disconnect Voltage minus 0.1^*N) Note: N=Rated battery voltage/12.
ECV (Equalize Charging Voltage)	57.12V	User define: Boost Charging Voltage \leq Equalize Charging Voltage \leq Charging Limit Voltage
BCV (Boost Charging Voltage)	57.12V	User define: Float Charging Voltage \leq Boost Charging Voltage \leq Equalize Charging Voltage
FCV (Float Charging Voltage)	54.4V	User define: Boost Voltage Reconnect Voltage < Float Charging Voltage \leq Boost Charging Voltage
BVR (Boost Voltage Reconnect Voltage)	53.28V	User define: Low Voltage Reconnect Voltage < Boost Voltage Reconnect Voltage < Float Charging Voltage
LVR (Low Voltage Reconnect Voltage)	52.0V	User define: Low Voltage Disconnect Voltage < Low Voltage Reconnect Voltage < Boost Voltage Reconnect Voltage
UVWR (Under Voltage Warning Reconnect Voltage)	51.2V	User define: (Under Voltage Warning Voltage plus 0.1^*N) < Under Voltage Warning Reconnect Voltage \leq Low Voltage Reconnect Voltage Note: N=Rated battery voltage/12.
UVW (Under Voltage Warning Voltage)	49.6V	User define: Discharging Limit Voltage \leq Under Voltage Warning Voltage < (Under Voltage Warning Reconnect Voltage minus 0.1^*N)
LVD (Low Voltage Disconnect Voltage)	46.4V	User define: Discharging Limit Voltage \leq Low Voltage Disconnect Voltage < Low Voltage Reconnect Voltage
DLV (Discharging Limit Voltage)	44.0V	Read-only





AUX OFF (Auxiliary module OFF voltage)	56.0V	Under the charging mode of "Solar > Grid," the utility will stop charging the battery if the battery voltage exceeds this value. User define: (Auxiliary module ON voltage plus $0.2 \cdot N$) \leq Auxiliary module OFF voltage \leq Charging Limit Voltage (N=Rated battery voltage/12)
AUX ON (Auxiliary module ON voltage)	51.0V	Under the charging mode of "Solar > Grid," the utility charges the battery if the battery voltage is lower than this value. User define: Low Voltage Disconnect Voltage \leq Auxiliary module ON voltage \leq (Auxiliary module OFF voltage minus $0.2 \cdot N$) (N=Rated battery voltage/12)
2.2 SOC Control Strategy		
FCP (Full Charging Protection SOC)	100%	It takes effect after the "BCCMode" is set as "SOC." When the battery SOC is higher than or equal to this value, the Energy Storage System will stop charging the battery automatically. User define: (Full Charging Protection Reconnect SOC plus 5%) to 100%, or 80% to 100% Note: Take the maximum value between (Full Charging Protection Reconnect SOC plus 5%) and 80%. When charging to 100% in SOC mode, the battery charging enable is turned off; The BMS reports that the charging enable is turned off, and the BMS icon turns red.
FCPR (Full Charging Protection Reconnect SOC)	95%	It takes effect after the "BCCMode" is set as "SOC." When the battery SOC is lower than this value, the Energy Storage System will charge the battery. User define: 60% to (Full Charging Protection SOC minus 5%)
LPAR (Low Power Alarm Reconnect SOC)	40%	It takes effect after the "BCCMode" is set as "SOC." It cannot be set separately (equal to the "Discharging Protection Reconnect SOC").
LPA (Low Power Alarm SOC)	25%	It takes effect after the "BCCMode" is set as "SOC." User define: 10% to 35%, or 10% to (Discharging Protection Reconnect SOC minus 5%) Note: Take the minimum value between (Discharging Protection Reconnect SOC minus 5%) and 35%. When the battery SOC is lower than "LPA" value, the battery icon turns yellow, warning that the battery level is low.

DPR (Discharging Protection Reconnect SOC)	40%	It takes effect after the "BCCMode" is set as "SOC." User define: (Discharging Protection SOC plus 5%) to 60%, or 20% to 60% Note: Take the maximum value between (Discharging Protection SOC plus 5%) and 20%.
DP (Discharging Protection SOC)	10%	It takes effect after the "BCCMode" is set as "SOC." When the battery SOC is lower than this value, the battery will stop discharging. User define: 0 to 30% Note: When the battery SOC reaches "DP" value, the battery icon turns red, warning that discharging protection occurs.
UAC ON (Utility Charging ON SOC)	30%	It takes effect after the "BCCMode" is set as "SOC." User define: 20% to 50%, or 20% to (Utility Charging OFF SOC minus 10%) Note: Take the minimum value between 50% and (Utility Charging OFF SOC minus 10%).
UAC OFF (Utility Charging OFF SOC)	60%	It takes effect after the "BCCMode" is set as "SOC." User define: (Utility Charging ON SOC plus 10%) to 100%, or 40% to 100%. Note: Take the maximum value between (Utility Charging ON SOC plus 10%) and 40%.
Set SOC	Variable, updated in real time	Read-only. When the BMS is valid and the communication is normal, the real-time SOC value is automatically uploaded to the Energy Storage System.

3. Grid



Click **Grid** on the parameter setting interface to enter the grid parameter setting interface. The following information is displayed:

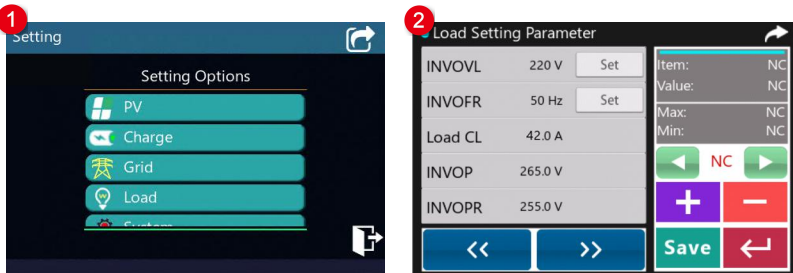
Icon	Description															
<table border="1"> <tr> <td>UOD</td> <td>280.0 V</td> <td></td> </tr> <tr> <td>UOR</td> <td>270.0 V</td> <td></td> </tr> <tr> <td>ULVD</td> <td>175.0 V</td> <td>Set</td> </tr> <tr> <td>ULVR</td> <td>185.0 V</td> <td>Set</td> </tr> <tr> <td>UOF</td> <td>70.0 Hz</td> <td>Set</td> </tr> </table>	UOD	280.0 V		UOR	270.0 V		ULVD	175.0 V	Set	ULVR	185.0 V	Set	UOF	70.0 Hz	Set	<p>Default values and configurable ranges for grid setting parameters.</p> <p>Swipe up/down to view all the parameters on the current page.</p> <p> indicates that the parameter value can be customized (If the parameter is read-only, there is no  icon).</p>
UOD	280.0 V															
UOR	270.0 V															
ULVD	175.0 V	Set														
ULVR	185.0 V	Set														
UOF	70.0 Hz	Set														
 	<p>Click to display other configurable interfaces except the current interface (Note: The Grid configurable parameters are only in the current interface, and there is no response when clicking the button.)</p>															

Note: For the content and operation methods of the parameter setting area on the right, please refer to the introduction of "1. PV".

- Default value and setting range for Grid parameters are listed in the table below:

Parameter	Default	User define
3.1 Grid Setting Parameter		
UOD (Utility Over Voltage Disconnect Voltage)	280.0V	Read-only
UOR (Utility Over Voltage Reconnect Voltage)	270.0V	Read-only
ULVD (Utility Low Voltage Disconnect Voltage)	175.0V	User define: 90.0V to (Utility Low Voltage Reconnect Voltage minus 10V)
ULVR (Utility Low Voltage Reconnect Voltage)	185.0V	User define: (Utility Low Voltage Disconnect Voltage plus 10V) to 220.0V
UOF (Utility Over Frequency Disconnect Frequency)	70.0Hz	In the bypass state, when the actual utility input frequency is higher than this value, the Energy Storage System will be switched to the inverter output state. User define: 52.0Hz to 70.0Hz, or (Utility Under Frequency Disconnect Frequency plus 0.5Hz) to 70.0Hz. Note: Take the maximum value between 52.0Hz and (Utility Under Frequency Disconnect Frequency plus 0.5Hz).
UFD (Utility Under Frequency Disconnect Frequency)	40.0Hz	In the bypass state, when the actual utility input frequency is lower than this value, the Energy Storage System will be switched to the inverter output state. User define: 40.0Hz to 58.0Hz, or 40.0Hz to (Utility Over Frequency Disconnect Frequency minus 0.5Hz). Note: Take the minimum value between 58.0Hz and (Utility Over Frequency Disconnect Frequency minus 0.5Hz).

4. Load (Load parameter setting)



Click **Load** On the parameter setting interface to enter the load parameter setting interface. The following information is displayed:

Icon	Instruction															
<table border="1"> <tr> <td>INVOVL</td> <td>220 V</td> <td>Set</td> </tr> <tr> <td>INVOFR</td> <td>50 Hz</td> <td>Set</td> </tr> <tr> <td>Load CL</td> <td>42.0 A</td> <td></td> </tr> <tr> <td>INVOP</td> <td>265.0 V</td> <td></td> </tr> <tr> <td>INVOPR</td> <td>255.0 V</td> <td></td> </tr> </table>	INVOVL	220 V	Set	INVOFR	50 Hz	Set	Load CL	42.0 A		INVOP	265.0 V		INVOPR	255.0 V		<p>Default values and configurable ranges for load setting parameters. Swipe up/down to view all the parameters on the current page.</p> <p><input type="text" value="Set"/> indicates that the parameter value can be customized (If the parameter is read-only, there is no <input type="text" value="Set"/> icon).</p>
INVOVL	220 V	Set														
INVOFR	50 Hz	Set														
Load CL	42.0 A															
INVOP	265.0 V															
INVOPR	255.0 V															
<table border="1"> <tr> <td><<</td> <td>>></td> </tr> </table>	<<	>>	<p>Click to display other configurable interfaces except the current interface (Note: The Load configurable parameters are only in the current interface, and there is no response when clicking the button.)</p>													
<<	>>															

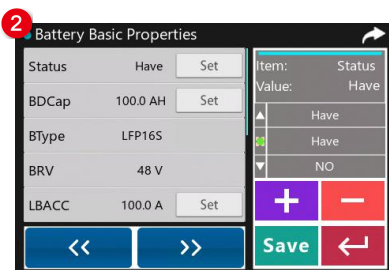
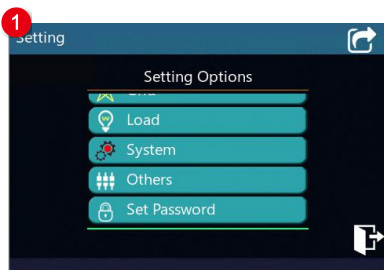
Note: For the content and operation methods of the parameter setting area on the right, please refer to the introduction of "1. PV".

- Default value and setting range for load parameters are listed in the table below:

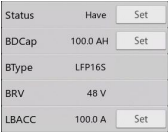








Parameter	Default	User define
4. 1 Load Setting Parameter		
INVOVL (Inverter Output Voltage Level)	220V	User define: 220V / 230V

INVOFR (Inverter Output Frequency Range)	50Hz	User define: 50Hz / 60Hz Note: When the Utility power is connected and the Utility frequency is detected, the output frequency will be in accordance with the Utility frequency in the Utility bypass mode. For stand-alone Energy Storage System, it will take effect immediately after the "INVOFR" is changed. For the parallel connection, you must shut down the Energy Storage System for 10s and then restart it for the modification to take effect (Enter into the "Load Setting Parameter" interface again to check if the settings has taken effect).
Load CL (Load Current Limit)	42.0A	Read-only
INVOP (Inverter Over Voltage Protection Voltage)	265.0V	Read-only
INVOPR (Inverter Over Voltage Protection Recovery Voltage)	255.0V	Read-only
TempUL (Temperature Upper Limit)	85.0°C	Read-only
TempULR (Temperature Upper Limit Recovery)	80.0°C	Read-only

5. System



Click **System** on the parameter setting interface to enter the system parameter setting interface. The following information is displayed:

Icon	Instruction
	<p>Default values and configurable ranges for system setting parameters.</p> <p>Swipe up/down to view all the parameters on the current page.</p> <p> indicates that the parameter value can be customized (If the parameter is read-only, there is no  icon).</p>
	<p>Click to display the setting interface of "Battery Basic Properties, Advanced Battery Properties, Charge and Discharge Management, System Time Setting, and Local Parameters."</p>
	<p>Setting method for parameters with options. Click   to switch options, and a green dot flashes in front of the parameter indicating that the current parameter is selected. Click  to confirm, and click  to issue the new parameter value.</p> <p>For details of setting numerical parameters, please refer to the introduction of "<u>1. PV</u>".</p>

- Default value and setting range for system parameters are listed in the table below:

Parameter	Default	User define
5.1 Battery Basic Properties		
Status (Battery Status)	Have	User define: Have, NO Note: When the parameter value is changed (i.e., the value is changed from "Have" to "NO," or from "NO" to "Have"), the AC output of the Energy Storage System will be cut off for about 3 seconds before resuming normal output.
BDCap (Battery Design Capacity)	100.0 AH	User define: 10.0AH to 2400.0AH
BType (Battery Type)	LFP16S	Read-only
BRV (Battery Voltage)	48 V	Read-only
LBACC (Local Battery Available Charging Current)	100.0A	User define: 5.0A to 100.0A The battery maximum charge current for HP5542F-AH1050P30C.
LBADC (Local Battery Available Discharging Current)	250.0A	User define: 10.0A to 250.0A The battery maximum discharge current for HP5542F-AH1050P30C.

BECT (Battery Equalize Charging Time)	120 m	User define: 10minutes to 180 minutes
BECD (Battery Equalize Charging Date)	28 D	User define: 1–28
BBCT (Battery Boost Charging Time)	120 m	User define: 10minutes to 180 minutes
BTCC (Battery Temperature Compensation Coefficient)	3 mV/°C/2V	User define: 0–9. Note: This option is reserved, which is invalid currently.
5.2 Advanced Battery Properties		
Li PROT (Lithium Battery Protection)	Disable	User define: Disable, Enable Set this value as "Enable," the charge/discharge low temperature limit function is effective.
LTSChrge (Low Temperature Stop Charging Temperature)	0 °C	User define: -20°C to 0°C When the environment or the battery temperature is lower than this value, the Energy Storage System will stop charging the battery.
LTSDischarge (Low Temperature Stop Discharging Temperature)	0 °C	User define: -20°C to 0°C When the environment or the battery temperature is lower than this value, the Energy Storage System will stop discharging.
BATT OTP (Battery Over Temperature Protection)	50.0 °C	User define: (Battery Over Temperature Protection Recovery plus 5°C) to 60°C
BATT OTPR (Battery Over Temperature Protection Recovery)	45.0 °C	User define: 30.0 °C to (Battery Over Temperature Protection minus 5°C)
Chrg (Charging)	Enable	Read-only
Dischrg (Discharging)	Enable	Read-only
PCUP (Phase Current Unbalance Protection)	Disable	User define: Disable, Enable Note: The parameter is only effective when setting three-phase output. After the setting value is changed, it cannot be restored to the default value by factory reset, and must be set manually.

INVPSet (Inverter Phase Setting)	S	<p>User define: S (Single), A (Phase A), B (Phase B), C (Phase C)</p> <p>Note: After the "INVPSet" is changed, the Energy Storage System must be turned off for 10 seconds before restarting. Enter the "System > Advanced Battery Properties" interface again to check if the change has taken effect. After the setting value is changed, it cannot be restored to the default value by factory reset, and must be set manually.</p>
UCD (Unbalanced Current Difference)	5 A	<p>User define: 0A to 6000A</p> <p>Note: The parameter is only effective when setting three-phase output. When "PCUP (Phase Current Unbalance Protection)" is enabled, if current difference between any two phases is higher than set value, the load output will be turned off automatically. After the setting value is changed, it cannot be restored to the default value by factory reset, and must be set manually.</p>
5.3 Charge and Discharge Management		
BACC (Battery Available Charging Current)	100.0A	<p>Read-only (When the BMS is enabled and the BMS communication between the Energy Storage System and the lithium battery is normal, the "BACC" value is read from the BMS. Otherwise, the "BACC" value is equal to the setting value of "LBACC" after each power-on. If "LBACC" is changed without a subsequent restart, the "BACC" value remains the previous value of "LBACC".</p>
BADC (Battery Available	250.0A	<p>Read-only (When the BMS is enabled and the BMS communication between the Energy Storage System and the lithium battery is normal, the "BACC" value is read from the BMS. Otherwise, the "BACC" value is equal to the setting value of "LBACC" after each power-on. If "LBACC" is changed without a subsequent restart, the "BACC" value remains the previous value of "LBACC".</p>
UACC (Utility Available Charging Current)	100.0A	<p>User define: 5.0A to 100.0A</p> <p>The maximum current at the battery end when the utility charges the battery for HP5542F-AH1050P30C.</p>

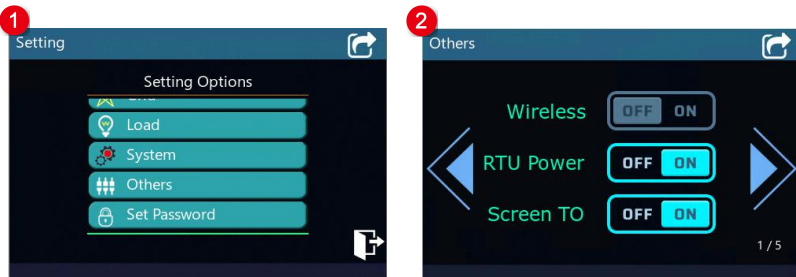
CMode (Charging Mode)	Solar+Grid	User define: Solar (Solar only), Solar > Grid (Solar priority), Solar+Grid, Grid > Solar (Grid priority). Note: For detailed working modes differences, please refer to chapter 5. <u>Working modes.</u>
DMode (Discharge Mode)	PV >BT>BP	User define: PV>BP>BT (i.e. PV>Bypass>Battery), PV>BT>BP (i.e. PV>Battery>Bypass), BP>PV>BT (i.e. Bypass>PV> Battery). Note: For detailed working modes differences, please refer to chapter 5. <u>Working modes.</u>
ACmode (AC Input Mode)	Grid	User define: Grid, Oil When the AC input is an oil generator, set this parameter as "Oil" to improve the charging capability of the Energy Storage System. Note: If the AC input mode does not match with the AC source of the actual input, the normal operation of the Energy Storage System will be affected. After setting, restart the Energy Storage System for the setting to take effect. It is recommended that the rated power of oil generator is greater than 1.5 times the rated power of the Energy Storage System.
PVMode (PV Mode)	Single	User define: Single, Parallel. When two PV arrays are independently input, set the value to "Single." When two PV arrays are connected in parallel as a single input to the Energy Storage System (the PV terminals need to be paralleled externally), set the value to "Parallel." Product with one PV input is "Single" by default (other PV modes are invalid).

BCCMode (Battery Charging Control Mode)	SOC	<p>User define: VOL (Voltage), SOC</p> <p>VOL: The battery voltage control parameters take effect after setting this value as "VOL."</p> <p>SOC: The SOC parameters take effect after setting this value as "SOC."</p> <p>Note: If "SOC" is selected, the battery needs to go through several full charge and discharge cycles, and the battery capacity must be set correctly. If you need to modify the setting values of battery voltage control parameters, you must set the "BMSVolt" to "Disable" first, otherwise the parameters values cannot be modified.</p>
BMSProt (BMS Protocol)	27	Read-only.
BMS (BMS Enable)	Enable	<p>User define: Disable, Enable</p> <p>Set this value as "Enable," the Energy Storage System will communicate with the battery pack normally.</p>
BMSVolt (BMS Voltage Control)	Enable	<p>User define: Disable, Enable</p> <p>Set this value as "Enable," the BMS internal voltage control parameters will be automatically synchronized to the Energy Storage System, and the Energy Storage System will control the battery charging/discharging based on these parameters.</p>
BMSCurr (BMS Current Control)	BMS	<p>User define: Invalid, BMS</p> <p>Set this value as "Invalid," the Energy Storage System controls the charge and discharge according to the value set on the LCD. Set this value as "BMS," the Energy Storage System controls the charge and discharge according to the read BMS value.</p>
BMSFail (BMS Fail Action)	DSP	<p>User define: DSP, Disable</p> <p>DSP: The Energy Storage System works according to the default mode and parameters.</p> <p>Disable: No charging or discharging, equivalent to standby mode.</p>
BCM (Battery Connection Method)	Only	<p>User define: Only, Share</p> <p>This parameter takes effect when the Energy Storage Systems are connected in parallel. Do not set it randomly.</p>

5.4 System Time Setting		
5.5 Local Parameters		
LCD BRT (LCD Brightness)	100%	User define: 50% to 100% It indicates the LCD brightness when operating the LCD.
TODelay (Idle Timeout Delay)	15 S	User define: 6S to 60S When there is no operation on the LCD, and the set "TODelay" time is up, the LCD brightness decreases to the set "LCDSBRT" brightness.
LCDSBRT (Standby LCD Brightness)	50%	User define: 35% to 100% It indicates the LCD brightness when the time of no operation on the LCD exceeds "TODelay" time.
SOT (Screen OFF Time)	30 S	User define: 15S to 60S If the "Screen TO" is set to "ON," the LCD will turn off if time of no operation on the LCD exceeds the "TODelay" time, and then exceeds the "SOT" time.
Com ID (Communication ID)	1	User define: 1–240
Com BPS (Communication Baud Rate)	115200bps	User define: 9600, 19200, 38400, 57600, 115200, 256000
DCT ON (Dry Contract ON Voltage)	44.0V	User define: $9 \times N$ to (Dry Contract OFF Voltage minus $0.2 \times N$). Note: $N = \text{Rated battery voltage} / 12$. When the battery voltage is lower than this value, the dry contact is connected.
DCT OFF (Dry Contract OFF Voltage)	50.0V	User define: (Dry Contract ON Voltage plus $0.2 \times N$) to $17 \times N$. Note: $N = \text{Rated battery voltage} / 12$. When the battery voltage is higher than this value, the dry contact is disconnected.
Switch BMS	Enable	Read-only
Buzz	ON	User define: ON, OFF If set to "ON," the buzzer will go off when an error occurs and will automatically mute when the error is cleared. If set to "OFF," the buzzer will not go off even if an error occurs.
LED	ON	User define: ON, OFF When set to "OFF," the LED indicator is off
HRI (History Record)	60S	User define: 1 second to 3600 seconds

Interval)		Set the interval for historical records (only refers to the voltage, current and other data stored regularly, excluding the historical faults. These historical data can be exported by the Solar Guardian PC software or Website.)
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6. Others (Other parameters setting)



Click **Others** on the parameter setting interface to enter other parameters setting interface. The following information is displayed:

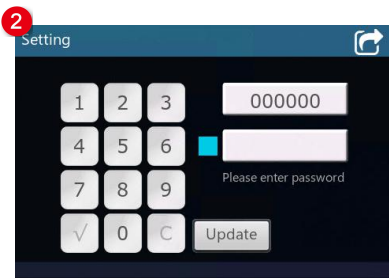
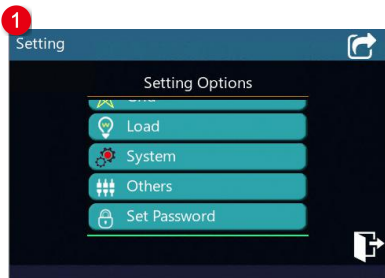
Click  /  to switch the page and set the relevant parameters directly by touching the screen.

- **Default value and setting range for other parameters are listed in the table below:**

Parameter	Default	User define
6. Others		
Wireless	OFF	It cannot be modified (reserved option).
RTU Power (5V power supply for COM port)	ON	User define: OFF, ON Controls the COM port on the Energy Storage System to turn on or off the 5V power supply. The external Bluetooth or WIFI module can only work after it is set to "ON."
Screen TO (Screen Timeout)	ON	User define: ON, OFF LCD backlight switch. When set to "ON," the LCD backlight will turn off after the "TODelay" time plus the "SOT" time is up. When set to "OFF," the LCD backlight will remain on.
Parameter Reset	Normal Mode	User define: Normal Mode, Standby Mode To reset the settings parameters: select "Standby Mode," and then click the "Factory Reset" button to restore some setting parameters to the factory default values (including password settings).

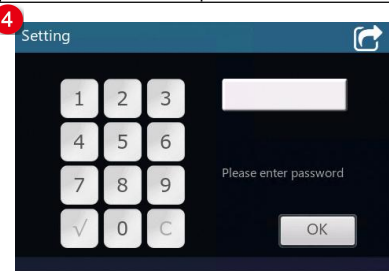
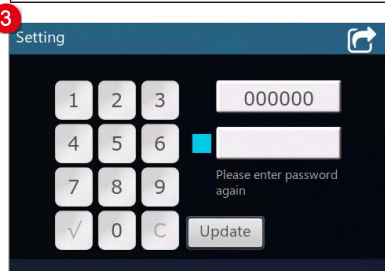
Low Power Mode	ECO Mode	<p>User define: ECO Mode, Normal Mode</p> <p>When set as "ECO Mode," the Energy Storage System will enter the low power mode to reduce the system consumption when certain conditions are met, such as no PV or utility, and the battery voltage drops to the low voltage disconnect voltage. When set as "Normal Mode," the Energy Storage System will not enter the low power mode. If set to "Normal Mode," it will automatically return to "ECO Mode" after restarting.</p>
Manual Equalizer	--	<p>On the "Low Power Mode" interface, press the "Manual Equalizer" button to enter the manual equalization charging state. If the Energy Storage System is restarted at this time, it will automatically exit the manual equalization charging state.</p> <p>Note: This function is irrelevant to the selection of "Low Power Mode", "ECO Mode" or "Normal Mode."</p>
DC Source Characteristic	PV Source	<p>User define: PV Source, DC Source</p> <p>When using a DC power supply instead of a PV array for power supply testing, set this parameter as "DC Source," otherwise the Energy Storage System will not work properly. When set to "DC Source," the PV indicator will flash green; when set to "PV Source," the PV indicator will remain solid green. If set to "DC Source," it will automatically return o "PV Source" after restarting.</p>
Initializing Records	--	<p>On the "DC Source Characteristic" interface, press the "Initializing Records" button to clear historical fault records after approximately 40 seconds.</p> <p>Note: This function is irrelevant to the selection of "DC Source" or "PV Source" for the "DC Source Characteristic."</p>
Clear Statistical Power	Day Month Year	<p>User define: Day Month Year, Total Generation</p> <p>After selecting "Day Month Year" or "Total Generation," press the "Clear" button to clear the corresponding cumulative energy.</p>

7. Set password



1. Click **Set Password** on the parameter setting interface to enter the password modifying interface.

2. Enter the original password, the new password, and click **Update** to enter the interface to re-enter the password.



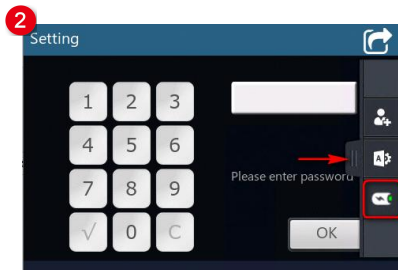
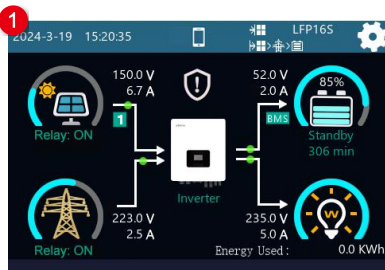
3. Enter the new password again and click **Update** to complete password modifying.


4. Enter the new password and click **OK** to re-enter the parameter setting interface.



Note: The password can be changed to blank or any other digit no more than 6 digits. If the password is blank, no digits will be entered when changing the password.

8. Quick setting of BMS parameters

Note: No administrator password is required for the quick setting of BMS parameters, and you can quickly set BMS related parameters (It is a reserved function and cannot be set currently).



1. Click  at the upper right corner on the home page.

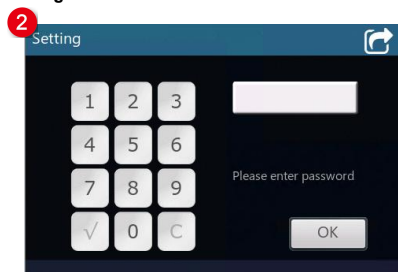
2. Enter the password input interface, click  on the right side of the screen, and then click  to enter the "Quick Setting of BMS Parameters".


2.5.2 Battery work modes

When the system uses a lithium battery pack with BMS and current control at charge/discharge end, and the lithium battery pack can communicate normally with the Energy Storage System, set the parameter values in the following table correctly. The Energy Storage System controls charge/discharge according to the read BMS charge/discharge current value.

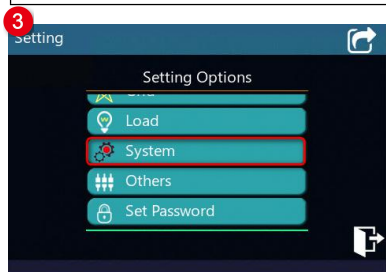
LCD	Parameter	Set value
Battery Basic Properties	BDCap (Battery Design Capacity)	Set it according to the actual battery quantity you are using.
Charge and Discharge Management	BCCMode (Battery Charging Control Mode)	It is set as "SOC" by default. You can set it as "VOL" according to the actual needs, and the Energy Storage System controls charge/discharge according to the set battery voltage or SOC parameters.
	BMS (BMS Enable)	Enable
	BMSVolt (BMS Voltage Control)	Enable
	BMSCurr (BMS Current Control)	BMS

Note: The default factory values for the “BMS (BMS Enable), BMSVolt (BMS Voltage Control) and BMSCurr (BMS Current Control)” are listed in the column of “Set value” in the table above. Under normal circumstances, no additional settings is required. But if you modified the default values of these three parameters, please reset them according to the table above.

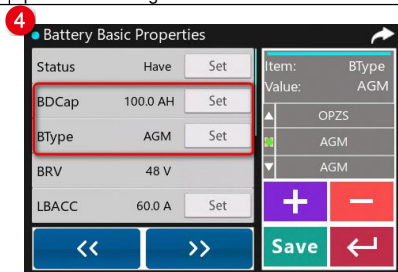


1. Click  at the upper-right corner on the home page.

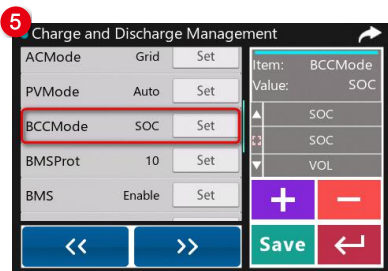
2. Enter the password input interface, enter the correct password (the initial password is 000000 by default), and click to enter the parameter setting interface.



3. Swipe up/down on the current interface, and click **System** to enter the system parameter setting interface.



4. Set "BDCap (Battery Design Capacity) according to the actual battery quantity you are using. After the settings are complete, click **Save** to issue new parameter value.



5. Click **>>** to switch to the "Charge and Discharge Management" interface and set "BCCMode (Battery Charging Control Mode), BMS (BMS Enable), BMSVolt (BMS Voltage Control) and BMSCurr (BMS Current Control)." After the settings are complete, click **Save** to issue new parameter value.



CAUTION

After setting the "BMSCurr (BMS Current Control)" as "Invalid", or the communication between the lithium battery and the Energy Storage System is interrupted, the Energy Storage System will control charging and discharging based on the LCD settings or the read BMS current value before the interrupted communication.

2.5.3 Battery voltage control


After setting the "BAT Set Mode" as "Expert", all battery voltage control parameters can be modified.

Battery type Voltage control parameters	LFP16S	User define
OverVoltDiscnect (Over voltage disconnect voltage)	59.2V	42.8–64V
Charging limit voltage	58.4V	42.8–64V
OverVoltReconnect (Over voltage reconnect voltage)	58.4V	42.8–64V
Equalize Charging Voltage	57.12V	42.8–64V
Boost Charging Voltage	57.12V	42.8–64V
Float Charging Voltage	54.4V	42.8–64V
Boost Voltage Reconnect Voltage	53.28V	42.8–64V
LowVoltReconnect (Low voltage reconnect voltage)	52.0V	42.8–64V
Under Voltage Warning Recover Voltage	51.2V	42.8–64V

Battery type Voltage control parameters	LFP16S	User define
Under Voltage Warning Voltage	49.6V	42.8–64V
LowVoltageDisconnect (Low voltage disconnect voltage)	46.4V	42.8–64V
Discharging Limit Voltage	44.0V	Fixed value

When setting the lithium battery voltage control parameters, the following rules must be obeyed.

- A. Over Voltage Disconnect Voltage < Over Charging Protection Voltage (BMS Circuit Protection Modules) minus 0.2V
- B. Over Voltage Disconnect Voltage > Charging Limit Voltage ≥ Equalize Charging Voltage ≥ Boost Charging Voltage ≥ Float Charging Voltage > Boost Voltage Reconnect Voltage
- C. Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage
- D. Boost Voltage Reconnect Voltage > Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage
- E. Under Voltage Warning Recover Voltage > Under Voltage Warning Voltage ≥ Discharging Limit Voltage
- F. Low Voltage Disconnect Voltage ≥ Over Discharging Protection Voltage (BMS Circuit Protection Modules) plus 0.2V

 CAUTION	<p>The voltage control accuracy of BMS circuit protection module must be at least ±0.2V. The "Over Voltage Disconnect Voltage" shall be lower than the protection voltage of the BMS circuit protection module. In contrast, the "Low Voltage Disconnect Voltage" shall be higher. The increased voltage of the "Over Voltage Disconnect Voltage" and the "Low Voltage Disconnect Voltage" is determined by the control accuracy of the BMS circuit protection module.</p>
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3 Installation

3.1 Attention







Please read the manual carefully to familiarize yourself with the installation steps.

- Before unpacking, check the outer packaging for visible damage such as holes, cracks, or other signs of possible internal damage, and check the equipment model. If there is any packaging defect or the equipment model is not what you requested, do not unpack the product and contact your dealer as soon as possible.
- After unpacking, check if the deliverables are intact and complete, and free from any obvious external damage. If any item is missing or damaged, contact your dealer.
- The installation and usage environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations.
- Ensure that the equipment is installed in a dry and well ventilated area and is protected from dust and condensation.
- Install the equipment in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- Do not install the equipment around flammable and explosive materials.
- Install the equipment at least 2 meters away from the heat source.
- Keep the installation out of reach of children and away from daily working or living areas.
- Ensure the environment around the installation is clean and free from large amounts of infrared radiation, organic solvents and corrosive gases.
- For areas prone to natural disasters such as floods, debris flows, earthquakes and typhoons, take corresponding precautions for installation.

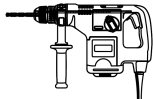

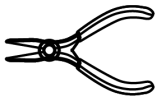

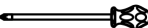
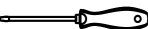














WARNING

- Before installation, make sure there is no electrical connection to the Energy Storage System.
- Risk of explosion! Do not install the Energy Storage System and the lead-acid liquid battery in the same enclosed space, or in an enclosed place where the battery gas may accumulate either!
- Do not install the Energy Storage System at forward tilted, back tilted, side tilted or upside down positions.
- Do not install the Energy Storage System in the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other harsh environments.

	<ul style="list-style-type: none"> If the ambient temperature exceeds the working range of the lithium batteries, the lithium batteries will stop working. Lithium batteries working temperature range: 0°C to +50°C for charging; -20°C to +50°C for discharging (the optimal working temperature is 25±2°C). Frequent exposure to extreme temperatures may reduce the performance and life of lithium batteries.
 CAUTION	<ul style="list-style-type: none"> Keep the lithium battery away from any metal objects, which may cause a short circuit of the lithium battery. Ensure that the surrounding environment is well ventilated. Ensure enough heat dissipation space when installing the Energy Storage System. When the Energy Storage System is working, it generates a lot of heat, and the cabinet temperature is very high. Please do not touch it, and keep it far away from the materials and devices that are susceptible to the high temperature. When moving heavy objects, you should be prepared for load-bearing to avoid being crushed or sprained. <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;">  < 18kg (< 40lbs) </div> <div style="text-align: center;">  18kg–32kg (40lbs–70lbs) </div> <div style="text-align: center;">  32kg–55kg (70lbs–121lbs) </div> <div style="text-align: center;">  or  > 55kg (> 121lbs) </div> </div> <ul style="list-style-type: none"> When moving the equipment by hand, wear protective gloves to avoid injury.

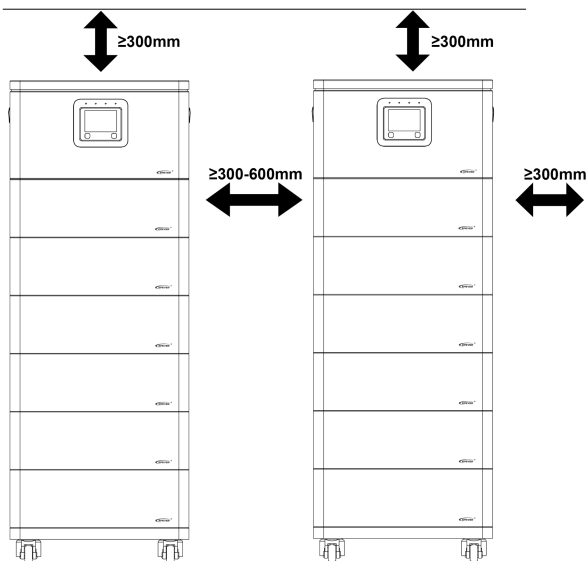
3.2 Preparing installation tools

Type	Installation and protective tools		
Installation			
		 	
			

Type	Installation and protective tools		
Personal protective equipment			
		 	 

3.3 Determining the installation position

During installation, ensure that there are no other devices, flammable or explosive materials around the Energy Storage System. Reserve adequate space for heat dissipation and safety isolation (There should be at least 300mm of space left above and on the left and right sides of the Energy Storage System).



3.4 Installing the Energy Storage System

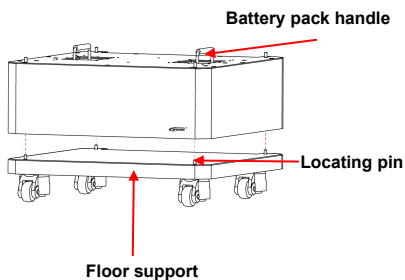
Stack and mount the lithium batteries and inverter on the base from bottom to top. The following installation process is illustrated using the 10.24kWh Energy Storage System as an example. The installation method for other Energy Storage Systems of different energy is the same, for example, with 1 lithium battery pack for the 5.12kWh Energy Storage System, with 2 lithium battery packs for the 10.24kWh Energy Storage System, and 6 batteries packs for the 30.72kWh Energy Storage System.



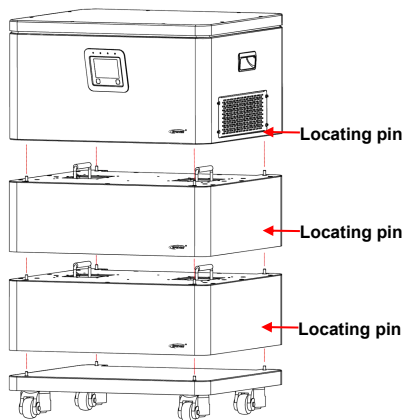
WARNING

Breaking torque of installing the Energy Storage System: M8 \geq 12N.M, M3 \geq 1.2N.M

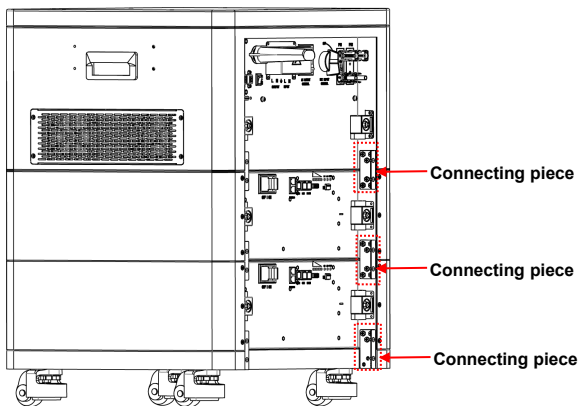
- ① Align the first battery pack with the locating pins on the floor support.



- ② Install the rest battery packs and the inverter from bottom to top.





- ③ After the battery pack and the inverter are stacked, install the connecting pieces on both sides and tighten the screws.



4 Electrical Connection

Attention

 WARNING	<ul style="list-style-type: none">• Before electrical connection, ensure that the inverter power switch, PV input switch, battery circuit breaker and all the switches connected to the Energy Storage System are set to OFF or disconnected. Otherwise, the high voltage of the Energy Storage System may result in electric shocks.• When wiring, do not connect the circuit breaker and ensure the polarities of each component are connected correctly.• Check if the connections are tight after wiring. Loose connectors and corroded cables may generate great heat, melting the cable insulation, burning the surrounding materials and even causing a fire. Ensure the connectors are tightened and secure cables with cable ties to avoid loose connectors caused by cables shaking when moving the application.• Both Utility input and AC output are high voltage. Please do not touch the wiring connection.• When the fan is working, please do not touch it to avoid injury.• Only the lithium battery type that is compatible with this Energy Storage System can be charged.• After turning off the power switch, there is still high voltage inside the Energy Storage System, please do not open or touch the internal components, and wait for 10 minutes before related operations.
 CAUTION	<ul style="list-style-type: none">• Equipment damage caused by incorrect wiring is not covered by the warranty.• Operations related to electrical connections must be performed by a professional electrical technician.• During electrical connection, the operator must wear personal protective equipment.• Although the DC input terminal has reverse polarity protection (only HP5542F-AH1050P30C converter has this function), which only takes effect when no PV or Utility is connected; please follow the operation strictly and do not operate it in error frequently.

4.1 Preparing cables and circuit breakers

The wiring and installation methods should comply with national and local electrical code regulations.

➤ Recommended PV array cable and circuit breaker specifications

Since the PV array output current varies according to the PV module's type, connection method and sunlight angle, the minimum PV cable specifications can be calculated by the PV array I_{sc} (short circuit current). Please refer to the I_{sc} value in the PV module's specifications. When the PV modules are connected in series, the total I_{sc} is equal to any PV module's I_{sc} . When the PV modules are connected in parallel, the total I_{sc} is equal to the sum of all the PV modules' I_{sc} . The PV array's I_{sc} must not exceed the PV maximum input current. For maximum PV input current and maximum PV cable specifications, please refer to the table below:

When two PV arrays are connected separately, the cable and circuit breaker specifications of each PV array are as follows:

Model	Recommended PV array cable specifications	Recommended circuit breaker specifications
HP5542F-AH1050P30C	6mm ² /10AWG	2P—25A

When two PV arrays are connected in parallel, the cable and circuit breaker specifications are as follows:

Model	Recommended PV array cable specifications	Recommended circuit breaker specifications
HP5542F-AH1050P30C	10mm ² /7AWG	2P—50A



CAUTION

When the PV modules are connected in series, the total voltage must not exceed the maximum PV open circuit voltage 500V (at the lowest environment temperature) or 440V (at 25°C).

➤ Recommended Utility cable specifications

Model	Recommended Utility cable specifications	Recommended circuit breaker specifications
HP5542F-AH1050P30C	6mm ² /10AWG	2P—40A

➤ Recommended lithium battery cable and circuit breaker specifications

Model	Lithium battery cable specifications	Recommended circuit breaker specifications
HP5542F-AH1050P30C	27mm ² /3AWG	2P—200A



CAUTION

For the battery, the recommended cable specifications is selected according to the conditions that its terminals are not connected to any additional Energy Storage System.

➤ **Recommended AC output cable specifications**

Model	Recommended load cable specifications	Recommended circuit breaker specifications
HP5542F-AH1050P30C	6mm ² /10AWG	2P—40A

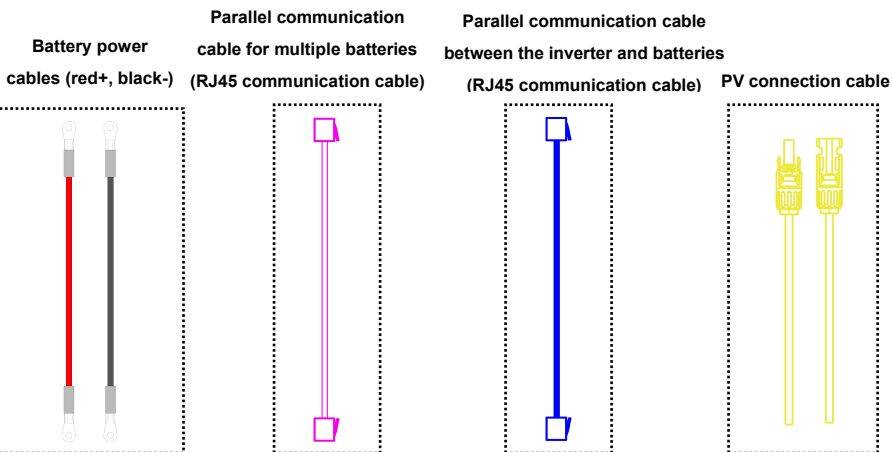


CAUTION

- If there is a long distance between the PV array and the Energy Storage System, larger cables shall be used to reduce the voltage drop and improve the system performance.
- The above specifications for cable and circuit breaker are for reference only, please choose a suitable cable and circuit breaker according to the actual situation.

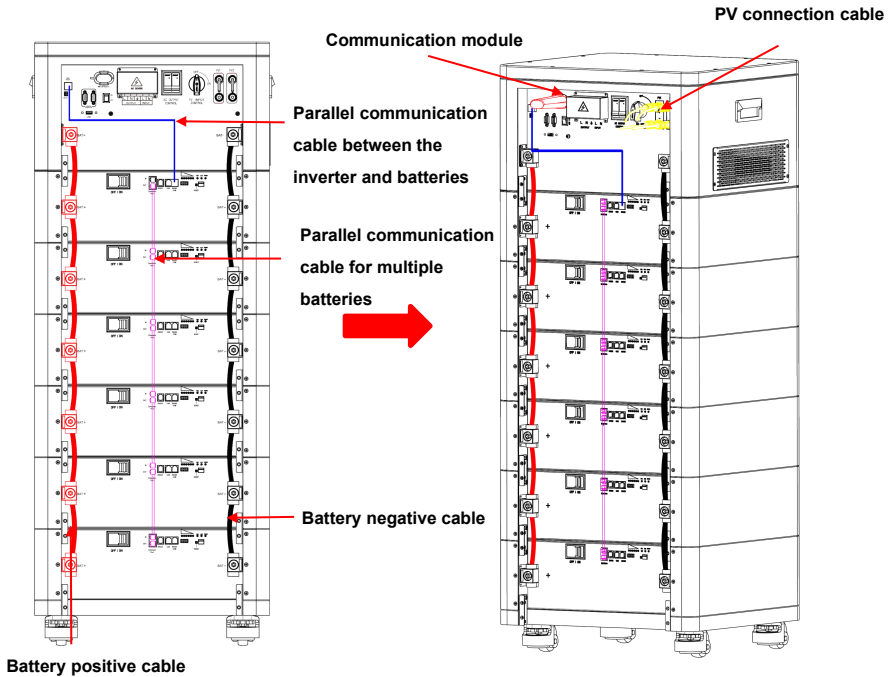
4.2 Internal wiring

- ① Prepare the cables for wiring the Energy Storage System.

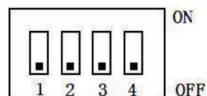


2 Connect the battery power cables (red+, black-) and the parallel communication cables for multiple devices (RJ45 communication cable) in accordance with the following position.

3 Connect the PV connection cable and communication module to the designated position of the Energy Storage System.






④ (Optional) When multiple battery packs are used in parallel, you need to set the communication address of battery pack through the DIP switch of the BMS. The communication address can be set to any number within 1–15 and cannot be repeated. However, there must be a battery pack set to 1 (i.e. the main battery pack) to communicate with the inverter.

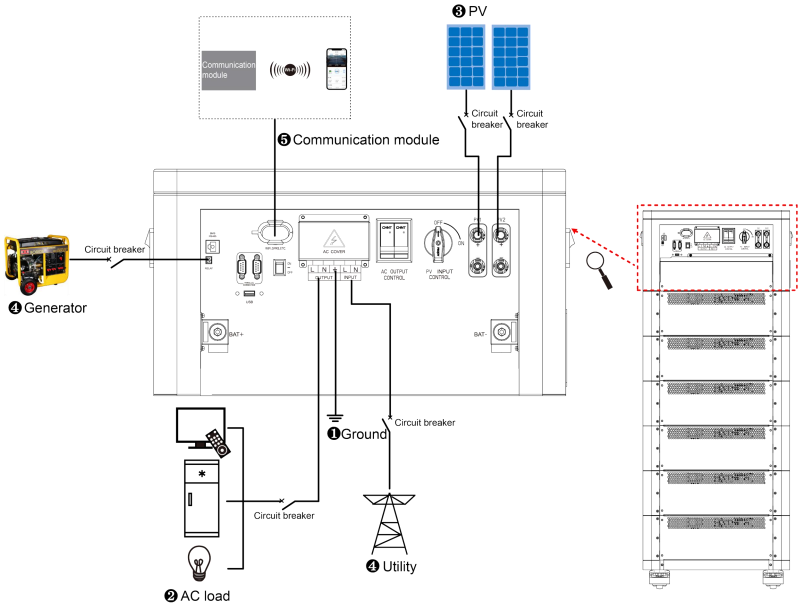


Note: It is recommended to set the lithium battery pack closest to the inverter as 1 for easy wiring.

DIP Switch Communication ID	#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

4.3 External wiring

Connect the Energy Storage System in the order of “①Ground > ②Load  > ③PV  > ④ Utility  or Generator > ⑤Optional accessories (communication modules),” and disconnect the Energy Storage System in the reverse order.

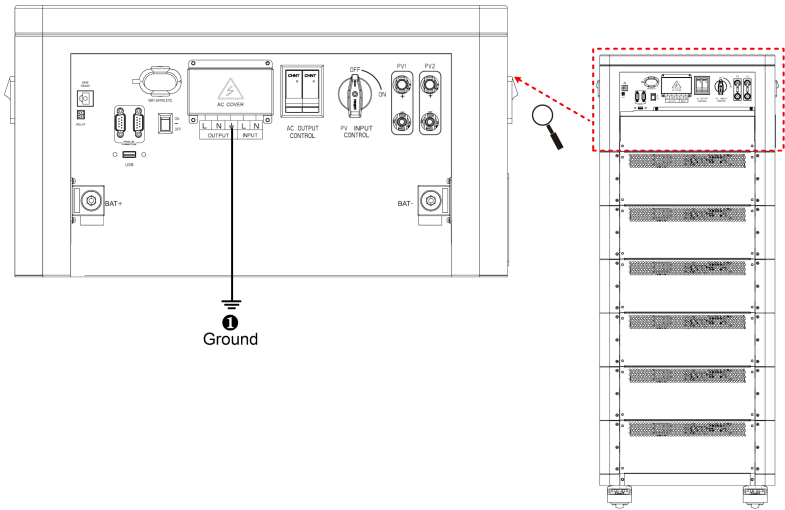


1. Grounding

The grounding terminal of the Energy Storage System must be grounded correctly and reliably, and the cross-sectional area of the grounding cable is required to be consistent with the recommended load cable specifications, and the grounding connection point shall be as close as possible to the Energy Storage System, and the shorter the grounding cable, the better.

<input checked="" type="checkbox"/> No grounding	<input checked="" type="checkbox"/> Do not ground the battery terminals.
	<input checked="" type="checkbox"/> Do not ground the PV terminals.
	<input checked="" type="checkbox"/> Do not ground the AC input L or N terminals between the Energy Storage System and the household power distribution cabinet.

	<input checked="" type="checkbox"/> Do not ground the AC output L or N terminals.
<input checked="" type="checkbox"/> Grounding	<input checked="" type="checkbox"/> The cabinet is connected to earth through the earth rail, along with the AC input and output's PE (Protective Earth) terminal.

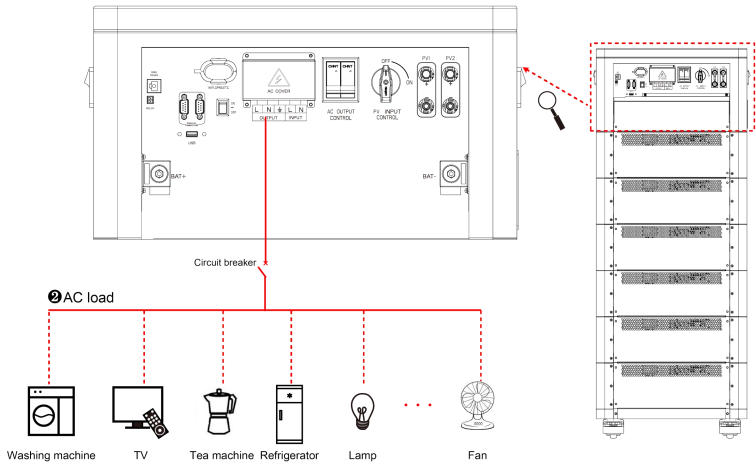


2. Connect the AC loads





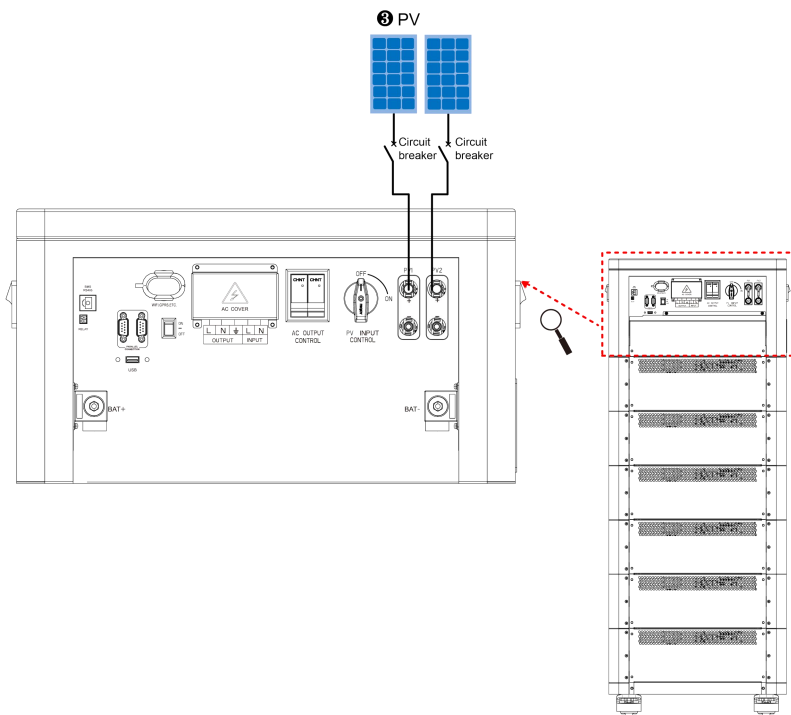
WARNING

- Risk of high voltage! The AC output can generate very high voltage, disconnect the circuit breaker before wiring and ensure that the poles' leads are connected correctly.
- The AC loads shall be determined by the continuous output power of the Energy Storage System. The AC load's surge power must be lower than the instantaneous surge power of the Energy Storage System, otherwise the Energy Storage System will be damaged.
- If inductive loads such as motors, or a bidirectional transfer switch is connected to the AC output terminal, a separate overvoltage and overcurrent protector (VA-Protector) needs to be installed at the AC output terminal.





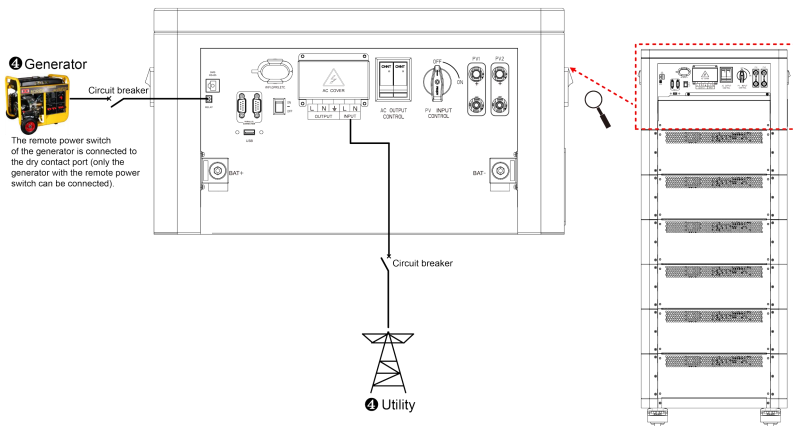
3. Connect the PV modules

 WARNING	<ul style="list-style-type: none"> • Risk of high voltage! The PV array can generate very high voltage, disconnect the circuit breaker before wiring, and ensure that the leads of "+" and "-" poles are connected correctly. • Do not ground the PV positive or negative poles; otherwise, the Energy Storage System will be damaged.
 CAUTION	<p>If the Energy Storage System is used in an area with frequent lightning strikes, then an external surge arrester must be installed at the PV input and Utility input terminals.</p>



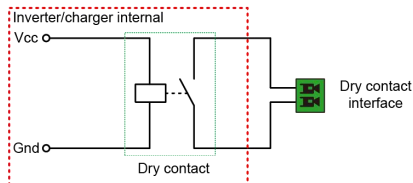
4. Connect the Utility or generator

 <p>WARNING</p>	<ul style="list-style-type: none"> • Risk of high voltage! The Utility input can generate very high voltage, disconnect the circuit breaker or fast-acting fuse before wiring and ensure that the poles' leads are connected correctly. • If the Utility is connected, the PV and battery cannot be grounded. In contrast, the Energy Storage System cabinet must be grounded reliably to shield the outside electromagnetic interference effectively and prevent the cabinet from causing electric shock to the human body.
 <p>CAUTION</p>	<p>There are various types of oil generators with complex output situations. It is recommended to use the variable frequency oil generator. If a non-variable frequency oil generator is used, actual testing is required before use..</p>



Dry contact interface:

- ✧ The dry contact interface can turn on/off the oil generator and is connected parallel with the oil generator's switch.

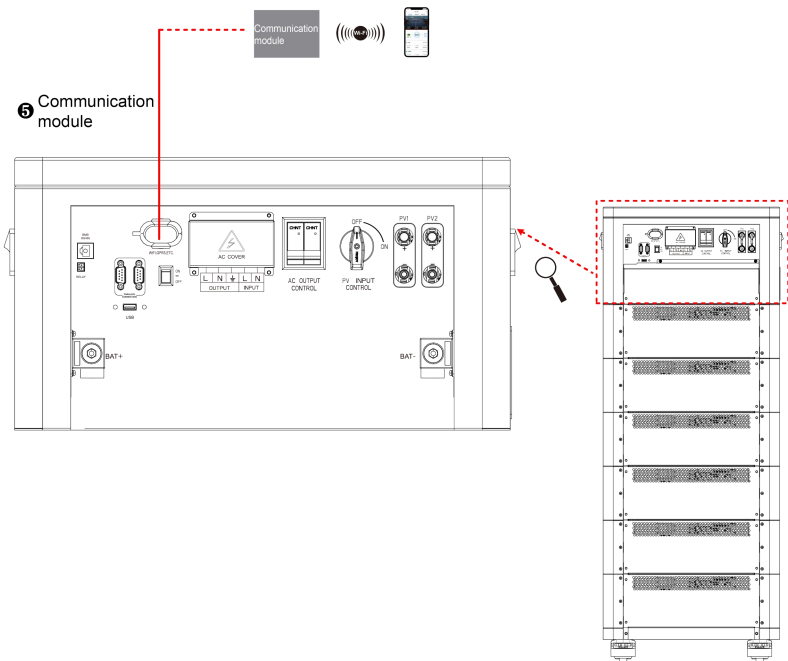


- ✧ Working principle:

When the battery voltage reaches the Dry Contact ON Voltage, the dry contact is connected. Its coil is energized. The dry contact can drive loads of no more than 125VAC/1A, 30VDC/1A. The default values of the Dry Contact ON Voltage and the Dry Contact OFF Voltage of the Energy Storage System are different, subject to battery types. Please refer to chapter "[2.5.1 List > 5. System](#)" for the details of Dry Contact ON Voltage and the Dry Contact OFF Voltage.

5. Connect optional accessories (communication modules)

Connect the WIFI module, or TCP module to the RS485 com. port. End-users can remotely monitor the Energy Storage System or modify its related parameters on the APP by phone. For detailed setting methods, please refer to the instructions on cloud APP, WIFI or TCP modules in user manual.



Note: For specific communication module models supported by this system, please refer to the attached accessory list.

4.4 Commissioning

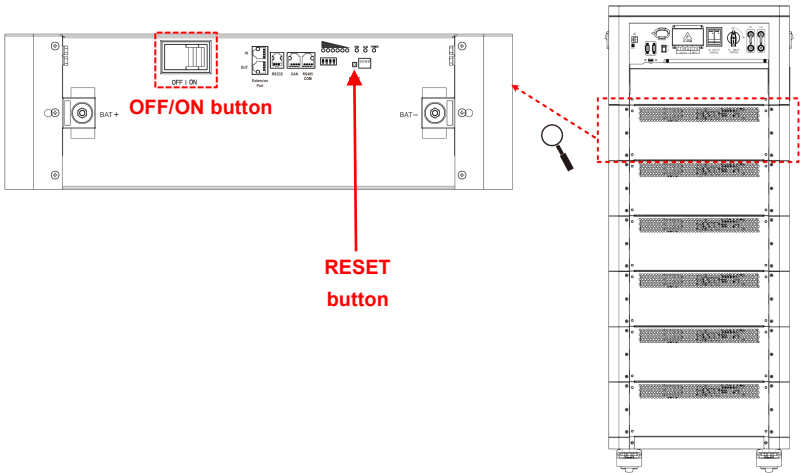
Step 1: Check the wiring. Ensure that the positive and negative wiring of the lithium battery and PV module are connected correctly, that the Utility wiring is connected correctly, that the parallel communication cables for the lithium batteries are connected correctly, and that the communication cables between the lithium batteries and the inverter are connected correctly.


Step 2: Check the communication ID of each battery pack, ensure there is no repeated communication ID and the communication ID of the lithium battery pack connected to the inverter is set as 1.

Step 3: Switch the OFF/ON button of each lithium battery pack to ON. Ensure that all lithium battery packs are in the inactive state (i.e. the lithium battery indicators are all off). Note: Do not connect the battery circuit breaker directly when the lithium battery is in active state, otherwise the battery over

current protection will occur.

Step 4 (Optional): Press the “RESET” button on the battery pack 1 (i.e. the battery pack with communication ID “1”) as illustrated below. And other battery packs will self-activate.

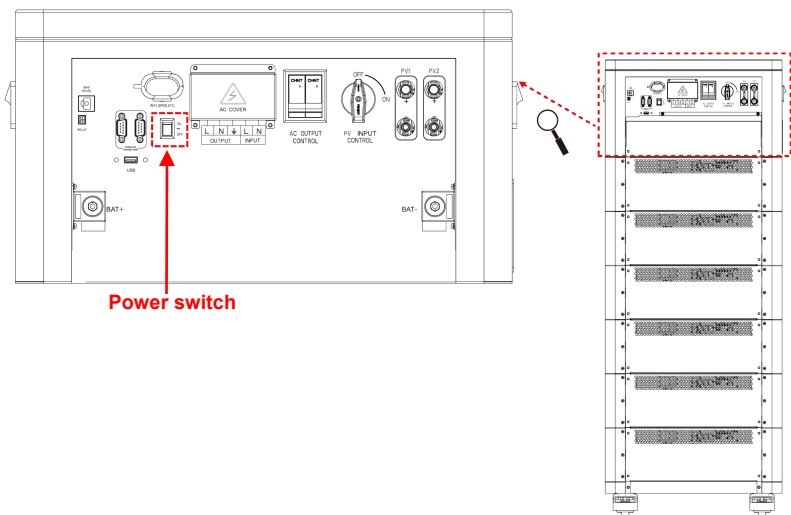


 CAUTION	<ol style="list-style-type: none">1. Activation of lithium battery packs takes more than 40 seconds, please wait for the activation to complete before proceeding to the next step.2. When multiple lithium battery packs are used in parallel, the communication ID of each lithium battery pack cannot be repeated, and the communication ID of the lithium battery pack connected to the inverter must be set to 1, otherwise the communication will fail.
---	--


IMPORTANT: Based on the lithium battery pack with the lowest voltage, the lithium battery pack with a voltage difference of less than 1.5V will be automatically integrated into the system, and the lithium battery pack with a voltage difference of more than 1.5V cannot be incorporated into the system. If the voltage difference is more than 1.5V, the battery pack needs to be charged, and when the voltage difference is less than 0.5V, the battery pack will be automatically integrated into the system.

Step 5: Turn on the power switch of the Energy Storage System, the LCD will be lit, indicating the normal system running (the whole system can also be activated by Step 5 when skipping Step 4).

Note: After the LCD is lit, the BMS icon on the screen displays red during the BMS initialization and green after the initialization is completed; the entire initialization process lasts a few minutes.




Step 6: Set parameters by the buttons.

 CAUTION	<p>For detailed parameters setting, please refer to chapter 2.5 Parameters settings. Please consult relevant technical personnel if you have any question before setting.</p>
---	--

Step 7: Use the Energy Storage System.

Connect the load circuit breaker, the PV array circuit breaker and the Utility circuit breaker in sequence. After the AC output is normal, turn on the AC loads one by one. Do not turn on all the loads simultaneously to avoid protection action due to a large transient impulse from the current. The Energy Storage System will perform normal work according to the set working mode. The system running status can be viewed on the LCD screen, see chapter [2.4. Interface](#) for more details.

 CAUTION	<ul style="list-style-type: none"> When supplying power for different AC loads, it is recommended to turn on the load with larger impulse current first. After the load output is stable, turn on the load with smaller impulse current later. If the Energy Storage System cannot work properly or the LCD/indicator shows an abnormality, please refer to chapter 7 Troubleshooting or contact our after-sales personnel.
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4.5 Lithium battery sleep and wake up

4.5.1 Sleep

When any of the following conditions is met, the lithium battery will enter low power mode (sleep mode):

Note: Before entering sleep mode, the conditions of no external communication, no charger, and the battery discharge current less than 2A should be met at the same time.

- 1) Individual or total overdischarge protection has not been removed within 30 seconds.
- 2) Press the "RESET" button twice, for the 1st time, there is no time limit; for the 2nd time, press the button for 3–6 seconds and then release (Note: under parallel operation, it is required to press the "RESET" button of "battery pack 1" twice).
- 3) The standby time exceeds the set time (24H).

4.5.2 Wake up

When the lithium battery is in low power mode and any of the following conditions is met, it will exit low power mode and enter normal operation mode:

- 1) When it is connected to charger and the charger output voltage is greater than 48V (and the sleep duration is more than 1 minute)..
- 2) Press the "RESET" button on "Battery pack 1" and then release.
- 3) RS485 communication is activated (it is activated after the communication between the lithium battery packs and the inverter is normal).


5 Working Modes

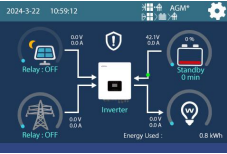
5.1 Abbreviation


Abbreviation	Description
P _{PV}	PV power
P _{LOAD}	Load power
V _{BAT}	Battery voltage
LVD	Low Voltage Disconnect Voltage
LVR	Low Voltage Reconnect Voltage
DP	Discharging Protection SOC
DPR	Discharging Protection Reconnect SOC
AUX OFF	Auxiliary module OFF voltage (i.e.Utility charging OFF voltage)
AUX ON	Auxiliary module ON voltage (i.e. Utility charging ON voltage)
UAC OFF	Utility Charging OFF SOC
UAC ON	Utility Charging ON SOC
LBACC	Local Battery Available Charging Current
SOC	The battery charging state, which indicates the ratio of the current storage capacity dividing the maximum storage capacity. This value is automatically read from the BMS and displayed on the "BAT DATA" interface.
PV>BP>BT	Discharging Mode: PV > Bypass > Battery
PV>BT>BP	Discharging Mode: PV > Battery > Bypass
BP>PV>BT	Discharging Mode: Bypass > PV > Battery

5.2 Battery mode

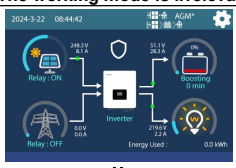

5.2.1 Scenario A: Both PV and Utility are not available.

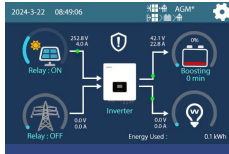
<p>(A)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>The working mode is irrelevant to the charging mode and discharging mode.</p>  <p> $V_{BAT} \geq LVR$ $/ SOC \geq DPR$ $V_{BAT} \leq LVD$ $/ SOC \leq DP$ </p> <ul style="list-style-type: none"> ① When any of the following conditions is met, the battery supplies the load. <ul style="list-style-type: none"> • The battery voltage is greater than or equal to the LVR value. • The battery SOC is greater than or equal to the DPR value.
---	---

		<p>② When any of the following conditions is met, the battery stops supplying the load.</p> <ul style="list-style-type: none"> • The battery voltage is lower than or equal to the LVD value. • The battery SOC is lower than or equal to the DP value.
--	---	---

<p style="text-align: center;"> CAUTION</p>	<ul style="list-style-type: none"> • Set the "BCCMode" as "VOL," the working mode is determined by the battery voltage value. • Set the "BCCMode" as "SOC," the working mode is determined by the battery SOC. Before setting the "ChargeControlMode" as "SOC," set the "BCCMode" as "VOL" first, the SOC control mode will be more accurate after a full charge-discharge cycle. • For the setting of the "BCCMode," please refer to Chapter <u>2.5.1 List</u>.
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5.2.2 Scenario B: PV is available, but the Utility is not available.

<p>(B)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p style="text-align: center;">The working mode is irrelevant to the charging mode and discharging mode.</p> <div style="display: flex; justify-content: space-between;"> <div data-bbox="264 662 512 837">  </div> <div data-bbox="543 662 937 837"> <p>① When the PV power is greater than the load power, PV charges the battery and supplies extra power to the load.</p> </div> </div> <p style="text-align: center;">$P_{PV} > P_{LOAD} \parallel P_{PV} \leq P_{LOAD}$</p> <div style="display: flex; justify-content: space-between;"> <div data-bbox="264 880 512 1055">  </div> <div data-bbox="543 880 937 1055"> <p>② When the PV power is lower than or equal to the load power, the PV will not charge the battery, the battery will cut in to supply power to the load together with the PV.</p> </div> </div> <p style="text-align: center;">$V_{BAT} \geq LVR \parallel V_{BAT} \leq LVD$ $/ SOC \geq DPR \parallel / SOC \leq DP$</p>
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③ When any of the following conditions is met, the PV and the battery stop supplying power to the load, PV charges the battery only.

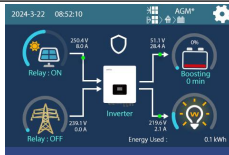
- The battery voltage is lower than or equal to the LVD value.
- The battery SOC is lower than or equal to the DP value.

Note: When the battery voltage is greater than or equal to the LVR value, or the battery SOC is greater than or equal to the DPR value, the system returns to working mode ②.

5.2.3 Scenario C: Both PV and Utility are available.

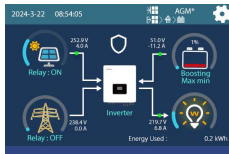
Charging Mode: “Solar”

Discharging Mode: “PV>BP>BT” or “PV>BT>BP”



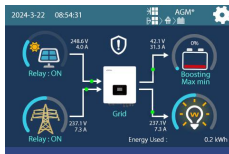
$$P_{PV} > P_{LOAD} \quad \parallel \quad P_{PV} \leq P_{LOAD}$$

① When the PV power is greater than load power, the PV charges the battery and supplies extra power to the load.



$$V_{BAT} \geq LVR \quad \parallel \quad V_{BAT} \leq LVD \\ / \quad SOC \geq DPR \quad \parallel \quad SOC \leq DP$$

② When the PV power is lower than or equal to the load power, the PV will not charge the battery, the battery will cut in to supply power to the load together with the PV.





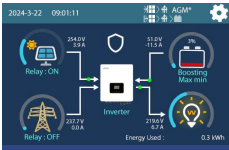
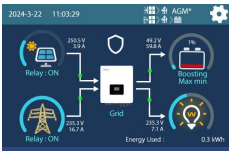
③ When any of the following conditions is met, the Utility supplies power to the load and the PV charges the battery.

- The battery voltage is lower than or equal to the LVD value.
- The battery SOC is lower than or equal to the DP value.

Note: When the battery voltage is greater than or equal to the LVR value, or the battery SOC is greater than or equal to the DPR value, the system returns to working mode ②.

(C-1)
 PV
 Utility

(C-2) PV <input checked="" type="checkbox"/> Utility <input checked="" type="checkbox"/>	Charging Mode: “Solar”	Discharging Mode: “BP>PV>BT”
		The Utility supplies power to the load, and the PV charges the battery.

(C-3) PV <input checked="" type="checkbox"/> Utility <input checked="" type="checkbox"/>	Charging Mode: “Solar prior”	Discharging Mode: “PV>BP>BT” or “PV>BT>BP”
		<ol style="list-style-type: none"> ① When the PV power is greater than the load power, the PV charges the battery and supplies extra power to the load.
	$P_{PV} > P_{LOAD} \quad \parallel \quad P_{PV} \leq P_{LOAD}$	<ol style="list-style-type: none"> ② When the PV power is lower than or equal to the load power, the PV will not charge the battery, the battery will cut in to supply power to the load together with the PV.
		<ol style="list-style-type: none"> ③ When any of the following conditions is met, the Utility supplies power to the load and charges the battery together with the PV. <ul style="list-style-type: none"> • The battery voltage is lower than or equal to the AUX ON value. • The battery SOC is lower than or equal to the UAC ON value.
	$V_{BAT} \geq AUX\ OFF \quad \parallel \quad V_{BAT} \leq AUX\ ON$ $/ SOC \geq UAC\ OFF \quad \parallel \quad / SOC \leq UAC\ ON$	
		
	Note: When the battery voltage is greater than or equal to the AUX OFF value, or the battery SOC is greater than or equal to the UAC OFF value, the system returns to working mode ②.	

Charging Mode: "Solar prior"

Discharging Mode: "BP>PV>BT"



$$P_{PV} > LBACC * V_{BAT} \quad \Bigg\| \quad P_{PV} \leq LBACC * V_{BAT}$$



$$V_{BAT} \geq AUX\ OFF \quad \Bigg\| \quad V_{BAT} \leq AUX\ ON \\ / SOC \geq UAC\ OFF \quad \Bigg\| \quad / SOC \leq UAC\ ON$$



(C-4)

PV
Utility

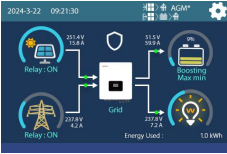
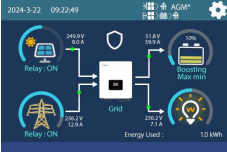
① When the PV power is greater than the ($LBACC * V_{BAT}$), the Utility and PV supply power to the load, and the PV charges the battery at the same time.

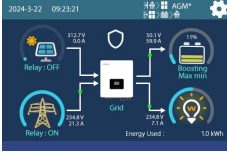
② When the PV power is lower than or equal to the ($LBACC * V_{BAT}$), the Utility supplies power to the load and the PV charges the battery.

③ When any of the following conditions is met, the Utility supplies power to the load and charges the battery together with the PV.


- The battery voltage is lower than or equal to the **AUX ON** value.
- The battery SOC is lower than or equal to the **UAC ON** value.

Note: When the battery voltage is greater than or equal to the **AUX OFF** value, or the battery SOC is greater than or equal to the **UAC OFF** value, the system returns to working mode ②.

<p>(C-5)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Utly & solr”</p>	<p>Discharging Mode: No impact under any mode.</p>
	 <p>$P_{PV} > LBACC * V_{BAT} \quad \parallel \quad P_{PV} \leq LBACC * V_{BAT}$</p>	<p>① When the PV power is greater than the ($LBACC * V_{BAT}$), the Utility and PV supply power to the load, and the PV charges the battery simultaneously.</p>
		<p>② When the PV power is lower than or equal to the ($LBACC * V_{BAT}$), the Utility and PV charge the battery, and the Utility supplies power to the load.</p>

<p>(C-6)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Utlyprior”</p>	<p>Discharging Mode: No impact under any mode.</p>
		<p>The Utility supplies power to the load and charges the battery simultaneously.</p>



5.2.4 Scenario D: The PV is not available, but the Utility is available.



<p>(D-1)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Solar”</p>	<p>Discharging Mode: “PV>BT>BP”</p>
	 <p>$V_{BAT} \geq LVR \quad \parallel \quad V_{BAT} \leq LVD$ $/ \quad SOC \geq DPR \quad \parallel \quad SOC \leq DP$</p>	<p>① When any of the following conditions is met, the battery supplies the load.</p> <ul style="list-style-type: none"> The battery voltage is greater than or equal to the LVR value. The battery SOC is greater than or equal to the LER value.

		<p>② When any of the following conditions is met, the Utility supplies power to the load.</p> <ul style="list-style-type: none"> • The battery voltage is lower than or equal to the LVD value. • The battery SOC is lower than or equal to the DP value.
--	--	---


<p>(D-2)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Solar”</p>	<p>Discharging Mode: “PV>BP>BT” or “BP>PV>BT”</p> <p>The Utility supplies power to the load.</p>
---	--------------------------------------	---

<p>(D-3)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Solar prior”</p> <p> $V_{BAT} \geq AUX\ OFF \Bigg \Bigg V_{BAT} \leq AUX\ ON$ $/SOC \geq UAC\ OFF \Bigg \Bigg SOC \leq UAC\ ON$ </p>	<p>Discharging Mode: “PV>BT>BP”</p> <p>① When any of the following conditions is met, the battery supplies the load.</p> <ul style="list-style-type: none"> • The battery voltage is higher than or equal to the AUX OFF value. • The battery SOC is greater than or equal to the UAC OFF value. <p>② When any of the following conditions is met, the Utility supplies power to the load and charges the battery simultaneously.</p> <ul style="list-style-type: none"> • The battery voltage is lower than or equal to the AUX ON value. • The battery SOC is lower than or equal to the UAC ON value.
---	--	---

<p>(D-4)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Solar prior”</p>	<p>Discharging Mode: “PV>BP>BT” or BP>PV>BT”</p>
	 <p> $V_{BAT} \geq AUX\ OFF$ $SOC \geq UAC\ OFF$ </p> <p> $V_{BAT} \leq AUX\ ON$ $SOC \leq UAC\ ON$ </p>	<p>① When any of the following conditions is met, the Utility supplies power to the load.</p> <ul style="list-style-type: none"> The battery voltage is higher than or equal to the AUX OFF value. The battery SOC is greater than or equal to the UAC OFF value.
	<p>② When any of the following conditions is met, the Utility supplies power to the load and charges the battery simultaneously.</p> <ul style="list-style-type: none"> The battery voltage is lower than or equal to the AUX ON value. The battery SOC is lower than or equal to the UAC ON value. 	

<p>(D-5)</p> <p>PV <input checked="" type="checkbox"/></p> <p>Utility <input checked="" type="checkbox"/></p>	<p>Charging Mode: “Utly & solr”</p>	<p>Discharging Mode: No impact under any mode.</p>
		<p>The Utility supplies power to the load and charges the battery simultaneously.</p>
	<p>Charging Mode: “Utlyprior”</p>	<p>Discharging Mode: No impact under any mode.</p>
	<p>The Utility supplies power to the load and charges the battery simultaneously.</p>	


6 Protections

No.	Protections	Instruction
1	PV current/power limiting protection	The PV input power cannot exceed 2 times the rated PV power.
2	PV short circuit protection	When the PV is not charging and a short circuit occurs, the Energy Storage System will not be damaged.
3	Utility input over voltage protection	When the Utility voltage exceeds the set value of "UOD (Utility over voltage disconnect voltage)," the Utility will stop charging and supplying the load.
4	Utility input under voltage protection	When the Utility voltage is lower than the set value of "ULVD (Utility low voltage disconnect voltage)," the Utility will stop charging and supplying the load.
5	Battery reverse polarity protection (only the HP5542F-AH1050P30C inverter has this function)	<p>When the battery polarity is reversed, the Energy Storage System will not be damaged and will resume to normal operation after correcting the cable error.</p> <p> CAUTION: The Energy Storage System will be damaged when the PV/Utility is connected correctly and the battery polarity is reversed.</p>
6	Battery over voltage protection	When the battery voltage exceeds the "OVD (Over Voltage Disconnect Voltage)," the PV/Utility will stop charging the battery to protect the battery from overcharging.
7	Battery over discharge protection	When the battery voltage is lower than the "LVD (Low Voltage Disconnect Voltage)," the battery will stop discharging to protect the battery from overdischarging.

No.	Protections	Instruction		
8	Load output short circuit protection	<p>The load output is turned off immediately when a short circuit occurs. And then, the output is recovered automatically after a delay time of 5s, 10s, and 15s separately (if the recovery is less than 3 times within 5 minutes, it will be recounted). The Energy Storage System stops working after the 4th protection and can resume working after resetting or restarting. Clear the short circuit fault in time because it may damage the Energy Storage System permanently if it is not cleared for a long time.</p> <p>Note: For resetting, please refer to "2.4.6 Error Code," click "Clear" to clear the current fault list and resume normal working state.</p>		
9	Device overheating protection	<p>When the internal temperature overheats, the Energy Storage System will stop charging/discharging. The Energy Storage System will resume charging/discharging when the internal temperature is normal and the protection time lasts for more than 20 minutes.</p>		
10	HP5542F-AH1050P30C Inverter overload protection (No utility)	5,665W≤P<6,600W	6,600W≤P<7,700W	P≥7,700W
		Protect after 30 seconds	Protect after 10 seconds	Protect immediately
<p>Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The Energy Storage System stops working after the 4th protection and can resume working after resetting or restarting.</p>				
11	HP5542F-AH1050P30C Utility bypass overload protection (No battery mode)	6,050W≤P<6,985W	6,985W≤P<8,085W	P≥8,085W
		Protect after 30 seconds	Protect after 10 seconds	Protect immediately
<p>Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The Energy Storage System stops working after the 4th protection and can resume working after resetting or restarting.</p>				

No.	Protections	Instruction	No.	Protections
12	HP5542F-AH1050P30C Utility bypass overload protection (Battery mode)	8,550W≤P<9,485W	9,485W≤P<10,585W	P≥10,585W
		Protect after 30 seconds	Protect after 10 seconds	Protect immediately
		Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The Energy Storage System stops working after the 4th protection and can resume working after resetting or restarting.		

7 Troubleshooting

 CAUTION	<p>After the Energy Storage System is powered on, the meter displays the boot interface all the time (unable to enter the home interface) and the red "RUN" indicator flashes. It means the communication with the Energy Storage System is abnormal. When the above fault occurs, check whether the communication cable is disconnected. If not, don't hesitate to contact our after-sales engineer.</p>
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7.1 Battery faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	Battery Overvoltage	Er04	--	--	Disconnect the Utility and PV connection, and check whether the battery voltage is too high. Verify if the actual battery voltage matches the rated battery voltage; or check if the set value of "OVD (Over Voltage Disconnect Voltage)" is inconsistent with the battery specifications. After the battery voltage drops below the set value of "OVR (Over Voltage Reconnect Voltage)," the alarm will automatically be cleared.
2	Battery Undervoltage	Er05	--	--	Disconnect the loads connection, and check whether the battery voltage is too low. After the battery is charged and its voltage is restored beyond the "LVR (Low Voltage Reconnect Voltage)," it will automatically return to normal, or use other methods to charge the battery.
3	Battery Over Temperature	Er11	--	--	Ensure the battery is installed in a cool and well-ventilated place, check that the battery actual charging and discharging current does not exceed the set values of "LBACC (Local Battery Available Charging Current)" and "LBADC (Local Battery Available Discharging Current)." It resumes normal charge and discharge control when the battery cools down below the "BATT OTPR (Battery Over Temperature Protection Recovery)."

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
4	Battery Overcurrent	Er37	--	--	Check if the battery actual charging/discharging current exceeds the set values of "LBACC (Local Battery Available Charging Current)" and "LBADC (Local Battery Available Discharging Current)."
5	Battery Cable Disconnected	Er39	--	--	Check whether the battery connection is normal, and whether the BMS protection occurs.
6	Battery Undervoltage Alarm	Er50	--	--	Check if the battery voltage is lower than the "UVW (Under Voltage Warning Voltage)."
7	Battery Connection Failed	Er56	--	--	Check if the battery connection is normal and the BMS communication of the lithium battery is normal.

7.2 PV faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	PV Module 1 Over Temperature	Er13	PV indicator green on	--	Ensure the Energy Storage System is installed in a cool and well-ventilated place.
2	PV Module 2 Over Temperature	Er14			
3	PV1 Overvoltage	Er15	PV indicator red on	Intermittent beeps	Check if the PV open-circuit voltage is too high (greater than 500V). The alarm is cleared when the PV open-circuit voltage is below 490V.
4	PV1 Overcurrent	Er17	PV indicator green on	--	Turn off the Energy Storage System first, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
5	PV2 Overvoltage	Er18	PV indicator red on	Intermittent beeps	Check if the PV open-circuit voltage is too high (greater than 500V). The alarm is cleared when the PV open-circuit voltage is below 490V.
6	PV2 Overcurrent	Er20	PV indicator green on	--	Turn off the Energy Storage System first, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
7	PV Module Hardware Fault	Er30			
8	PV1 Temp Sensor Disconnected	Er43			
9	PV2 Temp Sensor Disconnected	Er44			
10	PV1 Pre-Charge Timeout	Er52	PV indicator green on	--	Turn off the Energy Storage System first, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
11	PV2 Pre-Charge Timeout	Er53			

7.3 Inverter faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	Inverter Output Overcurrent	Er02	LOAD indicator red ON	Intermittent beeps	Check if the total load power exceeds the "Inverter Rated Power (please refer to Chapter 9 <u>Specifications</u>)," disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
2	Inverter Output Overvoltage	Er07	LOAD indicator red ON	Intermittent beeps	Check if the inverter output exceeds "Over Voltage Protection (Please refer to <u>2.4.4 Load</u> ", click "Fun" to enter "Setting Parameters To Display" to view this parameter value. Disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
3	Inverter Over Temperature	Er10	--	--	Ensure the Energy Storage System is installed in a cool and well-ventilated place.
4	Inverter Hardware Overvoltage	Er22	--	--	Disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
5	Inverter Hardware Overcurrent	Er23			
6	Inverter Voltage OFFSET Error	Er32			
7	Inverter Current OFFSET Error	Er35			

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
8	Inverter Temp Sensor Disconnected	Er45	LOAD indicator green ON	--	Turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
9	Inverter Output Undervoltage	Er49	LOAD indicator red ON	Intermittent beeps	Check if the total load power exceeds the "Inverter Rated Power (please refer to Chapter 9 <u>Specifications</u>)," disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.

7.4 Utility faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	Utility Overvoltage	Er08	GRID indicator red on	Intermittent beeps	Check if the Utility voltage is beyond "UOD (Utility Over Voltage Disconnect Voltage)," disconnect the Utility input completely and turn off the Energy Storage System. Wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
2	Utility Overcurrent	Er09	GRID indicator red on	Intermittent beeps	Check if the total load power exceeds the "Inverter Rated Power (please refer to Chapter 9 Specifications)," disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
3	Utility Undervoltage	Er25	GRID indicator red on	--	Check if the utility voltage is lower than "ULVD (Utility Low Voltage Disconnect Voltage)," disconnect the utility input completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
4	Utility Pre-charge Timeout	Er28	GRID indicator green on	--	Check if the utility frequency is within the range between "UFD (Utility Under Frequency Disconnect Frequency)" and "UOF (Utility Over Frequency Disconnect Frequency)", disconnect the utility input completely and turn off the Energy Storage System. Wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
5	Utility Relay Adhesion	Er29			
6	Utility Frequency Error	Er31	GRID indicator red on	Intermittent beeps	

7.5 Load faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	Load Current OFFSET Error	Er33	--	--	Disconnect the load completely and turn off the Energy Storage System, wait for 5 minutes and then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
2	Load Over Load	Er48	LOAD indicator red on	Intermittent beeps	
3	Overload Lockdown	Er55			

7.6 Other faults for single Energy Storage System

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	DC Bus Overvoltage	Er00	--	--	Disconnect the Energy Storage System completely. Wait for 5 minutes and connect the battery only, then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
2	DC Bus Undervoltage	Er06			
3	Ambient Over Temperature	Er12	--	--	Ensure the Energy Storage System is installed in a cool and well-ventilated place.
4	Battery or Bus Hardware Overvoltage	Er21	--	--	Disconnect the Energy Storage System completely. Wait for 5 minutes and connect the battery only, then turn on Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
5	High Volt Bus Hardware Overcurrent	Er24			
6	High Volt Bus Current Abnormal	Er36			

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
7	Boost Drive Error	Er38	--	--	Disconnect the Energy Storage System completely. Wait for 5 minutes and connect the battery only, then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.
8	Auxiliary Power Supply Abnormal	Er40			
9	Environment Temp Sensor Disconnected	Er42			
10	Low Temperature Charging Limit	Er46	--	--	Check whether the ambient temperature is lower than the set "LTSCrg (Low Temperature Stop Charging Temperature)" and "LTSDischrg (Low Temperature Stop Discharging Temperature)."
11	Low Temperature Discharging Limit	Er47			
12	EEProm Abnormal	Er54	--	--	Disconnect the Energy Storage System completely. Wait for 5 minutes and connect the battery only, then turn on the Energy Storage System to check if it resumes normal operation. If it is still abnormal, please contact our technical support.

7.7 BMS communication faults

No.	Fault/Status	Error code	Indicator	Buzzer	Solution
1	BMS Overvoltage	Er66	--	--	Check the BMS communication status or BMS setting parameters.
2	BMS Charging Temp Abnormal	Er68			
3	BMS Undervoltage	Er69			
4	BMS Discharging Temp Abnormal	Er71			
5	BMS Communication Failure	Er74			

8 Maintenance

To maintain long-term working performance, it is recommended to have the following items inspected twice a year.

- Make sure the airflow around the Energy Storage System is not blocked and remove dirt or debris from the fan.
- Check whether the exposed cables have been damaged by sunlight, friction with other surrounding objects, dryness, insects or rodents, etc., repair or replace the cables if necessary.
- Verify whether the indicator and display are consistent with the actual operation of the Energy Storage System, and note that corrective action should be taken in case of inconsistency or error.
- Check terminals for signs of corrosion, insulation damage, high temperature or burning/discoloration, tighten terminal screws.
- Check for signs of dirt, insect nesting and corrosion and clean up as required.
- If the lightning arrester has failed, replace it in time to avoid lightning damage to the Energy Storage System or even other equipment.



WARNING

Risk of electric shock! Make sure that the power supply of the Energy Storage System is disconnected when performing the above operations, and wait for 10 minutes for the power in the capacitor to be discharged before performing the corresponding checks or operations!

9 Specifications

Model		ROH5542F-05X1P30C	ROH5542F-10X2P30C
Utility Input	Utility Voltage	176VAC to 264VAC (Default), 90VAC to 280VAC (Configurable)	
	Utility Frequency	45Hz to 65Hz	
	Maximum Utility Charging Current	100A	
	Switch Response Time	Switch Response Time–Inverter to Utility: 10ms Switch Response Time–Utility to Inverter (when the load power is higher than 100W): 20ms	
Inverter Output	Inverter Rated Power (@35°C)	5,500W	
	3-second Transient Surge Output Power	8,500W	
	Inverter Output Voltage	220/230VAC±3%	
	Inverter Frequency	50/60Hz±0.2%	
	Output Voltage Waveform	Pure sine wave	
	Load Power Factor	0.2–1($V_A \leq$ Rated output power)	
	THDu (Total Harmonic Voltage Distortion)	≤ 3% (48V resistive load)	
	Maximum Load Efficiency	92%	
	Maximum Inverter Efficiency	94%	
Solar Controller	PV Maximum Open-circuit Voltage	500V (At the lowest operating environment temperature) 440V (At 25°C)	
	MPPT Voltage Range	85VDC to 400VDC	
	MPPT Input Channels	2 ways	
	PV Maximum Input Current	2 ways, 2*15A	
	PV Maximum Input Power	2*3,000W	

	PV Maximum Charging Current	100A	
	MPPT Maximum Efficiency	≥ 99.5%	
Battery	Battery Type	LFP	
	Battery Pack	5.12KWH, 51.2V/100AH	
	Battery Pack Quantity	1	2
	Battery Rated Voltage	51.2VDC	
	Battery Energy	5.12KWH	10.24KWH
	Battery Work Temperature Range	Charging: 0°C to +50°C, discharging: -20°C to +50°C	
Others	No-load Losses	<1.0 A (Test condition: Utility, PV and Load are not connected, AC output is ON, fan stops, @48V input)	
	Standby Current	<0.8A (Test condition: Utility, PV and Load are not connected, AC output is OFF, fan stops, @48V input)	
	Installation Method	Flat stacking	
Environment Parameters	Work Temperature Range	-20°C to +50°C (When the environment temperature exceeds 30°C, the actual output power is reduced appropriately)	
	Storage Temperature Range	-25°C to +60°C	
	Enclosure	IP30	
	Relative Humidity	< 95% (N.C.)	
	Altitude	<4,000M (If the altitude exceeds 2,000 meters, the actual output power is reduced appropriately)	
Mechanical Parameters	Dimension (Length x Width x Height)	530mm*500mm*556mm	530mm*500mm* 718mm
	Converter Net Weight	37.8Kg	37.8Kg
	Total Net Weight	95.3Kg (Mobile Bracket) 87.9Kg (Fixed Bracket)	143.1Kg (Mobile Bracket) 135.7Kg (Fixed Bracket)

Model		ROH5542F-15X3P30C	ROH5542F-20X4P30C
Utility Input	Utility Voltage	176VAC to 264VAC (Default), 90VAC to 280VAC (Configurable)	
	Utility Frequency	45Hz to 65Hz	
	Maximum Utility Charging Current	100A	
	Switch Response Time	Switch Response Time–Inverter to Utility: 10ms Switch Response Time–Utility to Inverter (when the load power is higher than 100W): 20ms	
Inverter Output	Inverter Rated Power (@35°C)	5,500W	
	3-second Transient Surge Output Power	8,500W	
	Inverter Output Voltage	220/230VAC±3%	
	Inverter Frequency	50/60Hz±0.2%	
	Output Voltage Waveform	Pure sine wave	
	Load Power Factor	0.2–1($V_A \leq$ Rated output power)	
	THDu (Total Harmonic Voltage Distortion)	≤ 3% (48V resistive load)	
	Maximum Load Efficiency	92%	
	Maximum Inverter Efficiency	94%	
Solar Controller	PV Maximum Open-circuit Voltage	500V (At the lowest operating environment temperature) 440V (At 25°C)	
	MPPT Voltage Range	85VDC to 400VDC	
	MPPT Input Channels	2 ways	
	PV Maximum Input Current	2 ways, 2*15A	
	PV Maximum Input Power	2*3,000W	
	PV Maximum Charging Current	100A	
	MPPT Maximum Efficiency	≥ 99.5%	

Battery	Battery Type	LFP	
	Battery Pack	5.12KWH, 51.2V/100AH	
	Battery Pack Quantity	3	4
	Battery Rated Voltage	51.2VDC	
	Battery Energy	15.36KWH	20.48KWH
	Battery Work Temperature Range	Charging: 0°C to +50°C, discharging: -20°C to +50°C	
Others	No-load Losses	< 1.0 A (Test condition: Utility, PV and Load are not connected, AC output is ON, fan stops, @48V input)	
	Standby Current	< 0.8A (Test condition: Utility, PV and Load are not connected, AC output is OFF, fan stops, @48V input)	
	Installation Method	Flat stacking	
Environment Parameters	Work Temperature Range	-20°C to +50°C (When the environment temperature exceeds 30°C, the actual output power is reduced appropriately)	
	Storage Temperature Range	-25°C to +60°C	
	Enclosure	IP30	
	Relative Humidity	< 95% (N.C.)	
	Altitude	<4,000M (If the altitude exceeds 2,000 meters, the actual output power is reduced appropriately)	
Mechanical Parameters	Dimension (Length x Width x Height)	530mm*500mm* 880mm	530mm*500mm*1,042mm
	Converter Net Weight	37.8Kg	37.8Kg
	Total Net Weight	190.9Kg (Mobile Bracket) 183.5Kg (Fixed Bracket)	238.7Kg (Mobile Bracket) 231.3Kg (Fixed Bracket)

Model		ROH5542F-25X5P30C	ROH5542F-30X6P30C
Utility Input	Utility Voltage	176VAC to 264VAC (Default), 90VAC to 280VAC (Configurable)	
	Utility Frequency	45Hz to 65Hz	
	Maximum Utility Charging Current	100A	
	Switch Response Time	Switch Response Time–Inverter to Utility: 10ms Switch Response Time–Utility to Inverter (when the load power is higher than 100W): 20ms	
Inverter Output	Inverter Rated Power (@35°C)	5,500W	
	3-second Transient Surge Output Power	8,500W	
	Inverter Output Voltage	220/230VAC±3%	
	Inverter Frequency	50/60Hz±0.2%	
	Output Voltage Waveform	Pure sine wave	
	Load Power Factor	0.2–1(VA ≤ Rated output power)	
	THDu (Total Harmonic Voltage Distortion)	≤ 3% (48V resistive load)	
	Maximum Load Efficiency	92%	
	Maximum Inverter Efficiency	94%	
Solar Controller	PV Maximum Open-circuit Voltage	500V (At the lowest operating environment temperature) 440V (At 25°C)	
	MPPT Voltage Range	85VDC to 400VDC	
	MPPT Input Channels	2 ways	
	PV Maximum Input Current	2 ways, 2*15A	
	PV Maximum Input Power	2*3,000W	
	PV Maximum Charging Current	100A	
	MPPT Maximum Efficiency	≥ 99.5%	

Battery	Battery Type	LFP	
	Battery Pack	5.12KWH, 51.2V/100AH	
	Battery Pack Quantity	5	6
	Battery Rated Voltage	51.2VDC	
	Battery Energy	25.6KWH	30.72KWH
	Battery Work Temperature Range	Charging: 0°C to +50°C, discharging: -20°C to +50°C	
Others	No-load Losses	< 1.0 A (Test condition: Utility, PV and Load are not connected, AC output is ON, fan stops, @48V input)	
	Standby Current	< 0.8A (Test condition: Utility, PV and Load are not connected, AC output is OFF, fan stops, @48V input)	
	Installation Method	Flat stacking	
Environment Parameters	Work Temperature Range	-20°C to +50°C (When the environment temperature exceeds 30°C, the actual output power is reduced appropriately)	
	Storage Temperature Range	-25°C to +60°C	
	Enclosure	IP30	
	Relative Humidity	< 95% (N.C.)	
	Altitude	<4,000M (If the altitude exceeds 2,000 meters, the actual output power is reduced appropriately)	
Mechanical Parameters	Dimension (Length x Width x Height)	530mm*500mm*1,205mm	530mm*500mm*1,367mm
	Converter Net Weight	37.8Kg	37.8Kg
	Total Net Weight	286.5Kg (Mobile Bracket) 279.1Kg (Fixed Bracket)	334.3Kg (Mobile Bracket) 326.9Kg (Fixed Bracket)

10 Appendix

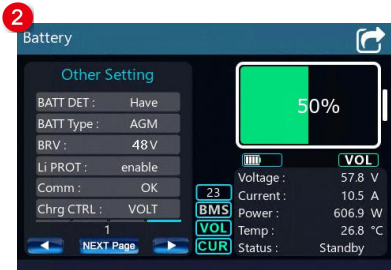
10.1 Appendix 1 Abbreviations index


LCD	Abbreviations	Full name
Solar Setting Parameter	OVP	Over Voltage Protection Voltage
	OVPR	Over Voltage Protection Reconnect Voltage
	UVP	Under Voltage Protection Voltage
	UVPR	Under Voltage Protection Reconnect Voltage
	OTP	Over Temperature Protection Temperature
	OTPR	Over Temperature Protection Recovery Temperature
Voltage Control Strategy	OVD	Over Voltage Disconnect Voltage
	CLV	Charging Voltage Limit Voltage
	OVR	Over Voltage Reconnect Voltage
	ECV	Equalize Charging Voltage
	BCV	Boost Charging Voltage
	FCV	Float Charging Voltage
	BVR	Boost Voltage Reconnect Voltage
	LVR	Low Voltage Reconnect Voltage
	UVWR	Under Voltage Warning Recovery Voltage
	UVW	Under Voltage Warning Voltage
	LVD	Low Voltage Disconnect Voltage
	DLV	Discharging Voltage Limit Voltage
	AUX OFF	Auxiliary module OFF voltage
	AUX ON	Auxiliary module ON voltage
SOC Control Strategy	FCP	Full Charging Protection SOC
	FCPR	Full Charging Protection Recovery SOC
	LPAR	Low Power Alarm Recovery SOC
	LPA	Low Power Alarm SOC
	DPR	Discharging Protection Recovery SOC
	DP	Discharging Protection SOC
	UAC ON	Utility Charging ON SOC
	UAC OFF	Utility Charging OFF SOC
	Set SOC	Set SOC


Grid Setting Parameter	UOD	Utility Over Voltage Disconnect Voltage
	UOR	Utility Over Voltage Reconnect Voltage
	ULVD	Utility Low Voltage Disconnect Voltage
	ULVR	Utility Low Voltage Reconnect Voltage
	UOF	Utility Over Frequency Disconnect Frequency
	UFD	Utility Under Frequency Disconnect Frequency
Load Setting Parameter	INVOVL	Inverter Output Voltage Level
	INVOFR	Inverter Output Frequency Range
	Load CL	Load Current Limit
	INVOP	Inverter Over Voltage Protection Voltage
	INVOPR	Inverter Over Voltage Protection Recovery Voltage
	TempUL	Temperature Upper Limit
	TempULR	Temperature Upper Limit Recovery
Battery Basic Properties	Status	Battery Status
	BDCap	Battery Design Capacity
	BType	Battery Type
	BRV	Battery Voltage
	LBACC	Local Battery Available Charging Current
	LBADC	Local Battery Available Discharging Current
	BECT	Battery Equalize Charging Time
	BECD	Battery Equalize Charging Date
	BBCT	Battery Boost Charging Time
BTCC	Battery Temperature Compensation Coefficient	
Advanced Battery Properties	Li PROT	Lithium Battery Protection
	LTSCrg	Low Temperature Stop Charging Temperature
	LTSDisrg	Low Temperature Stop Discharging Temperature
	BATT OTP	Battery Over Temperature Protection
	BATT OTPR	Battery Over Temperature Protection Recovery
	Chrg	Charging
	Disrg	Discharging
	PCUP	Phase Current Unbalance Protection
	INVPSet	Inverter Phase Setting
UCD	Unbalanced Current Difference	
Charge and Discharge Management	BACC	Battery Available Charging Current
	BADC	Battery Available Discharging Current
	UACC	Utility Available Charging Current
	CMode	Charging Mode

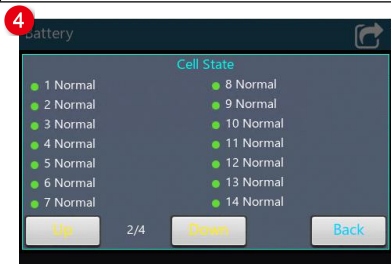
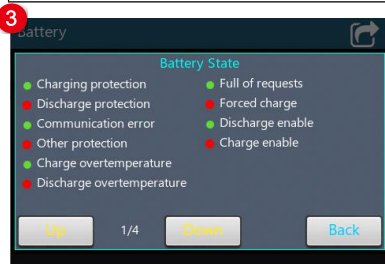
	DMode	Discharge Mode
	ACmode	AC Input Mode
	PVMode	PV Mode
	BCCMode	Battery Charging Control Mode
	BMSProt	BMS Protocol
	BMS	BMS Enable
	BMSVolt	BMS Voltage Control
	BMSCurr	BMS Current Control
	BMSFail	BMS Fail Action
	BCM	Battery Connection Method
Local Parameters	LCD BRT	LCD Brightness
	TODelay	Idle Timeout Delay
	LCDSBRT	Standby LCD Brightness
	SOT	Screen Off Time
	Com ID	Communication ID
	Com BPS	Communication Baud Rate
	DCT ON	Dry Contract ON Voltage
	DCT OFF	Dry Contract OFF Voltage
	Switch BMS	Switch BMS
	HRI	History Record Interval
Others	Wireless	Wireless
	RTU Power	RTU Power
	Screen TO	Screen Timeout
	Parameter Reset	Parameter Reset
	Low Power Mode	Low Power Mode
	Manual Equalizer	Manual Equalizer
	DC Source Characteristic	DC Source Characteristic
	Initializing Records	Initializing Records
Clear Statistical Power	Clear Statistical Power	

10.2 Appendix 2 Battery state instruction



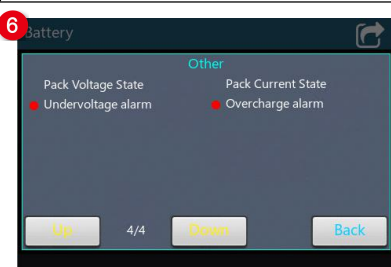
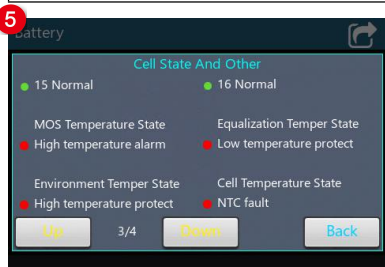
1. Touch the battery icon  on the home page to enter the battery real-time data interface.

2. Touch the battery SOC icon  on the battery real-time data interface to enter the battery state interface.



3. The first page shows the "Battery State."

4. Click **Down** button to show the "Cell State" on the second page.



5. Click **Down** button to show the "Cell State And Other" on the third page.

6. Click **Down** button to show the "Other" on fourth page.

The detailed data of each interface is as follows:

LCD	English display	Description
Battery State	Charging protection	Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off charging.
	Discharge protection	Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off discharging.
	Communication Error	The communication between BMS-Link and lithium battery BMS fails (such as wrong protocol selection, mismatched communication cables, etc.). Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off charging and discharging.
	Other protection	Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off the charging and discharging.
	Charge overtemperature	Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off charging.
	Discharge overtemperature	Green means this state has not occurred, red means this state has occurred. After showing red, the Energy Storage System turns off discharging.
	Full of requests Forced charge	Green means this state has not occurred, red means this state has occurred.
	Discharge Enable	Green means discharging is enabled. Red means discharging is disabled. After showing red, the Energy Storage System turns off discharging.
	Charge Enable	Green means charging is enabled. Red means charging is disabled. After showing red, the Energy Storage System turns off charging.
Cell State	1 Normal to 14 Normal	If it is detected that the current single battery cell is normal or there is no battery cell, it will display green; if the current battery cell is abnormal, the display will turn red.
Cell State And Other	15 Normal to 16 Normal	The abnormal status of a single battery cell includes: Undervoltage alarm, Overvoltage alarm, Undervoltage protect, Overvoltage protect, and Cell detection. After reading the undervoltage alarm or protection of the single cell, the Energy Storage System turns off discharging.

		After reading the overvoltage alarm or protection of the single cell, the Energy Storage System turns off charging.
	MOS Temperature State	Normal display is green, abnormal display is red. Abnormal status includes: High temperature alarm, Low temperature alarm, High temperature protect, Low temperature protect, NTC fault. The Energy Storage System turns off charging and discharging.
	Environment Temper State	
	Equalization Temper State	
	Cell Temperature State	
Other	Pack Voltage State Undervoltage alarm	Normal display is green, abnormal display is red. Abnormal status includes: Undervoltage alarm, Overvoltage alarm, Undervoltage protect, Overvoltage protect. After reading the BMS under-voltage alarm or protection, the Energy Storage System turns off discharging. After reading the BMS over-voltage alarm or protection, the Energy Storage System turns off charging.
	Pack Current State Overcharge alarm	Normal display is green, abnormal display is red. Abnormal status includes: Overrelease alarm, Overcharge alarm, Overdischarge protection, Overcharge protection. After reading the BMS over-discharge alarm or protection, the Energy Storage System turns off discharging. After reading the BMS overcharge alarm or protection, the Energy Storage System turns off charging.

Any changes without prior notice!

Version number: V1.0

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