



USER MANUAL



Home Battery Backup

HPS1022-AHL0210, HPS1021-AHL0210

HPS1522-AHL0310, HPS1521-AHL0310

HPS2522-AHL0610, HPS2521-AHL0610

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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 HPS-AHL series Home Battery Backup (hereinafter referred to as "battery backup").

1. Explanation of symbols

To enable users to use the product efficiently and ensure personal and property safety, please read the related words carefully when you encounter the following symbols in the manual.



DANGER

Indicates a high-level hazard that, if not avoided, will result in serious injury or death.



WARNING

Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.



CAUTION

Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an important reminder during the operation which, if ignored, may result in an equipment error alarm.

Tip

Indicates recommendation for reference.



Read through the user manual before any operations.

2. Requirements for professional and technical personnel

- Familiar with related safety regulations of the electrical system after professional training.
- Read this manual carefully and master the related safety precautions.

3. Operations for professional and technical personnel

- Install the battery backup to a specified position.
- Conduct trial operation for the battery backup to ensure proper functionality.
- Perform regular operations and maintenance to ensure stable equipment performance.

4. Safety precautions before installation



DANGER

- When installing the battery backup, end-users must evaluate whether there is arc danger in the operation area.
- Keep the battery backup out of reach of children.

NOTICE

- When receiving the battery backup, 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.
- When installing or moving the battery backup, please follow the instructions in the manual.
- The battery backup is only allowed for stand-alone operation. Connecting multiple units' AC output in parallel or series is prohibited. Otherwise, the battery backup may be damaged.

5. Safety precautions for mechanical installation



DANGER

Before installation, ensure the battery backup has no electrical connection.

NOTICE

- Ensure enough heat dissipation space for the battery backup before installation. Do not install the battery backup in the humid, high salt spray, corrosive, greasy, flammable, explosive, dust accumulative, or other severe environments.
- Ensure the ground is flat and place the battery backup horizontally.

6. Safety precautions for electrical connection



DANGER

Electric shock hazard! High voltage at Utility input and AC output terminals. Do not touch wire connections.



WARNING

Ensure all wirings are secure to prevent overheating due to loose connections.

NOTICE

- The casing of the battery backup must be properly grounded. The cross-sectional area of the grounding wire connected to the protective grounding terminal must not be less than 4mm².
- A fast-acting fuse or breaker, whose rated current is twice the battery backup rated input current, should be used between the external battery and the battery backup. The external and internal lithium batteries can be connected in parallel when their voltage are the same.
- The AC output terminal is only for the load connection. Do not connect it to another power source or utility. Fails to do so will result in damages on the device. Turn off the battery backup before connecting the loads. Then, turn on the battery backup again after connecting the loads successfully.
- 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 battery backup will be damaged.
- The load capacity of the battery backup is constrained by the discharge characteristics of the lithium batteries. The final interpretation rights are reserved by EPEVER.

7. Safety precautions for battery backup operation



WARNING

- The battery backup generates much heat during operation with a high cabinet temperature. Do not touch the unit and keep it far away from the materials and devices that are sensitive to high temperature.
- When the battery backup is working, do not open the battery backup shell for any operation.
- When eliminating the fault that affects the safety performance of the battery backup or disconnecting the DC input, turn off the battery backup switch and operate it after the LCD is completely OFF.

8. Dangerous operations causing an electric arc, fire, or explosion

- Touch the uninsulated ends of potentially live cables.
- Touch the live wiring copper busbars, terminals, or internal components of the battery backup.
- Loose connection of power cables.
- Accidental dropping of screws or other components inside the battery backup.
- Improper operations by untrained non-professional or technical personnel.



DANGER

Once an accident occurs, it must be handled by professionals. Improper operation would cause a more serious accident.

9. Safety precautions for stopping the battery backup

- First, turn off the AC output and disconnect the utility input breakers. Then, turn off the DC switch.
- After the input and output wires are disconnected for ten minutes, the internal conductive modules can be touched.
- No maintenance parts in the battery backup. If maintenance service is required, please get in touch with our after-sales service personnel.



CAUTION

Do not touch or open the shell after the battery backup is powered off within ten minutes.

10. Safety precautions for maintenance

- It is recommended to check the battery backup with testing equipment to ensure there is no voltage or current on the terminals and 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 battery backup may cause personal injury or equipment damage.
- It is recommended to wear an antistatic wrist strap or avoid unnecessary contact with the circuit board.
- If the battery backup remains unused for a long period, ensure the battery's SOC is $\geq 50\%$ and conduct charge-discharge once every three months.



CAUTION

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

Disclaimers

The warranty does not apply to the following conditions:

- Damage caused by improper use or inappropriate environment (such as the humid, high salt spray, corrosion, greasy, flammable, explosive, dust accumulative, or other severe environments).
- The actual current/voltage/power exceeds the limit value of the battery backup.
- Damage caused by working temperature exceeding the rated range.
- Arc, fire, explosion, and other accidents caused by failure to follow the HPS-AHL stickers or manual instructions.
- Unauthorized dismantling or attempted repair.
- Damage caused by force majeure.
- Damage occurred during transportation or handling.
- Damage to the lithium battery caused by improper storage or failure to perform supplementary charging as required during long-term storage.

1 General Information

1.1 Overview

HPS-AHL series, upgrade home battery backup that support utility charging, oil generator charging, solar charging, utility output, inverter output, and energy management. With a built-in LiFePO4 lithium battery, the battery backup can meet customers' energy storage needs.

The system is powered by a Digital Signal Processor (DSP) chip that features an advanced control algorithm, providing high response speed, reliability, and conversion efficiency. It offers multiple charging and output modes tailored to different scenarios. A three-stage charging method -- Bulk Charging, Constant Charging, and Float Charging -- ensures the safety of the battery. The lattice LCD screen displays operational status and comprehensive parameters, while the communication interface adheres to the standard Modbus protocol, enabling users to expand applications and meet diverse monitoring requirements.

The new optimized MPPT tracking technology can fast-track the PV array's Max. power point in various situations and obtain the maximum energy in real time. Adopting the advanced control algorithm, the AC to DC charging process brings the full digital PFC and dual closed-loop voltage-current control. It enables the input power factor close to 1 and improves the control accuracy.

The fully smart digital DC to AC inverting process adopts the advanced SPWM technology, outputs a pure sine wave, and converts the DC power to AC power. It is suitable for household appliances, power tools, industrial equipment, audio systems, and other electronics. Multiple DC output ports can connect different DC loads, including 5VDC/3A port*2 PCS and 12VDC/2A port*2 PCS. In addition, two USB-C dedicated ports (5VDC/3A and 100W PD) meet the fast charging of mobile phones and notebooks.

End-users can choose energy sources according to actual needs to maximize solar energy utilization and flexibly take the Utility as a supplement in the hybrid system. This HPS-AHL home battery backup provides high-quality, high-stability, and high-reliability electric energy to the end-users by improving the solar system's power supply efficiency.

Features

- Circuit breaker on battery output for battery safety
- Advanced MPPT technology, with Max. tracking efficiency higher than 99.5%
- Circuit breaker on PV input for equipment safety
- AC input overload relay for disconnecting from the power grid when the fault occurs
- PFC technology reduces the demand on the power grid capacity
- Bidirectional high-frequency transformer isolation topology

- Load continuous operates at full power for a long time
- Pure sine wave output
- EMC design on AC output to avoid interference with AC load
- Large-sized LCD display for better status monitoring
- Intuitive display of battery SOC via 5-bar indicator lights
- Multiple DC output ports (5VDC/3A ports, 12VDC/2A ports, USB-C ports)
- RS485 communication interface with optional 4G, WiFi, Bluetooth, or TCP modules for remote monitoring
- Built-in LiFePO4 lithium battery
- Comprehensive electronic protection
- Excellent dust-proof performance with separate compartment design

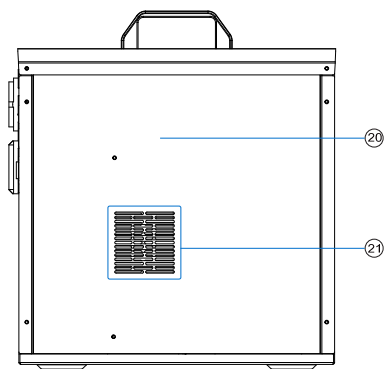
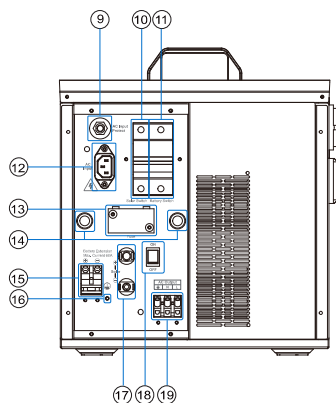
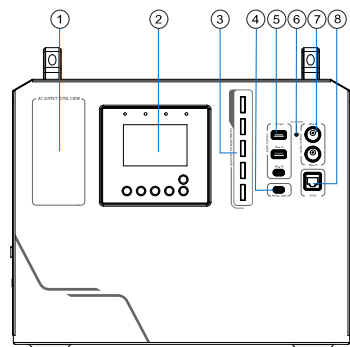
1.2 Naming rules

HPS 25 2 2 - A H L 06 10

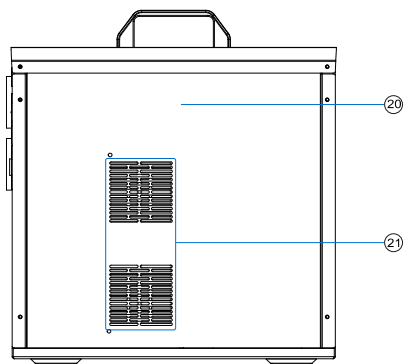
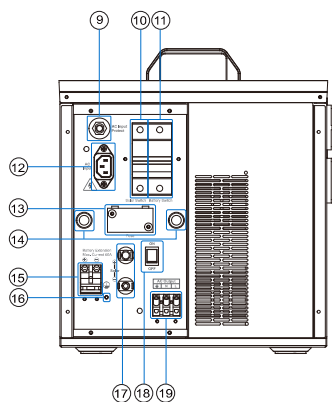
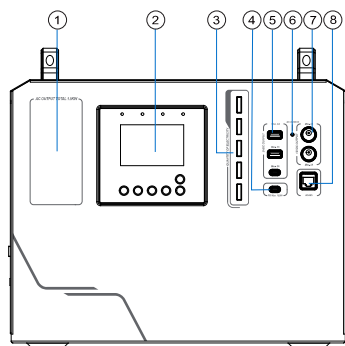
- PV maximum input withstand voltage: 95V
- PV maximum charging current: Value*10A, such as "06" indicates "60A"
- L means PV charges the battery directly
- H means high frequency isolated transformer
- A means asynchronous Utility charging and bypass
- Inverter output voltage:: 2 indicates 220VAC; **1 indicates 110VAC**
- Battery rated voltage: 2 indicates 24V
- Inverter rated power: Value*100W, such as "25" indicates "2500W"
- HPS series home battery backp

1.3 Appearance

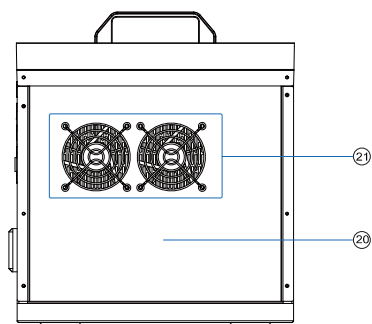
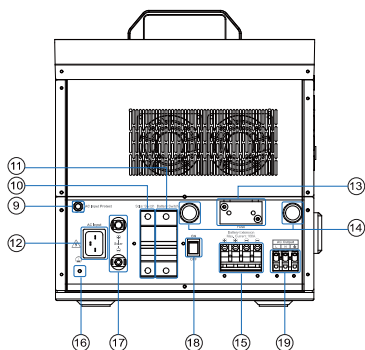
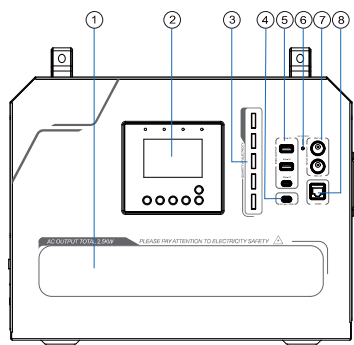
- HPS1022-AHL0210, HPS1021-AHL0210



● HPS1522-AHL0310, HPS1521-AHL0310



● HPS2522-AHL0610, HPS2521-AHL0610



No.	Description	No.	Description
1	AC outlet (refer to the actual product for socket types. See the Section 1.4 Socket description .)	12	AC input port
2	LCD (see Chapter 3 LCD)	13	Expansion battery fuse ⁽⁶⁾
3	Battery SOC indicator ⁽¹⁾	14	Outlet holes*2
4	USB-C port (100W PD)	15	Expansion battery terminal
5	5VDC/3A output port *3	16	Grounding terminal

6	DC output indicator	17	PV input terminals
7	12VDC/2A output port *2	18	Power switch
8	RS485 port ⁽²⁾	19	AC output terminal
9	Utility bypass overload relay ⁽³⁾	20	Battery container ⁽⁷⁾
10	PV input circuit breaker ⁽⁴⁾	21	Cooling fan
11	Battery output circuit breaker ⁽⁵⁾		

(1) Battery SOC indicator: There are 5-bar LED indicators on the front of the HPS-AHL home battery backup, indicating the battery SOC of charging and discharging.

Charging SOC	Discharging SOC	SOC indicator	Location
0-9%	0-4%	● ● ● ● ●	
10%-19%	5%-14%	● ● ● ● ●	
20%-39%	15%-34%	● ● ● ● ●	
40%-59%	35%-54%	● ● ● ● ●	
60%-79%	55%-74%	● ● ● ● ●	
80%-100%	75%-100%	● ● ● ● ●	

Note: Enter the “Set Data Navigation” interface to set the “LED Switch” to “OPEN”. If the “LED switch” is set to “CLOSE”, the battery SOC indicator will not perform the above actions. For specific parameter settings; please refer to Subsection [3.5.1 Parameters list](#).

(2) Pin definition for the RS485 port (RJ45)



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

(3) Specifications for the Utility bypass overload relay

Product Model	Specifications
HPS1022-AHL0210	7.5A/250VAC
HPS1522-AHL0310, HPS2522-AHL0610 HPS1021-AHL0210, HPS1521-AHL0310 HPS2521-AHL0610	15A/250VAC

(4) Specifications for the PV input circuit breaker

Product Model	Specifications
HPS1022-AHL0210, HPS1522-AHL0310 HPS1021-AHL0210, HPS1521-AHL0310	32A/220VDC
HPS2522-AHL0610, HPS2521-AHL0610	63A/125VDC

(5) Specifications for the battery output circuit breaker

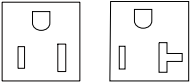
Product Model	Specifications
HPS1022-AHL0210, HPS1021-AHL0210	63A/60VDC
HPS1522-AHL0310, HPS1521-AHL0310	80A/60VDC
HPS2522-AHL0610, HPS2521-AHL0610	125A/60VDC

(6) The expansion battery fuse is used in the positive pole between the expansion battery and the internal battery, aiming to prevent damage to the battery backup due to excessive current when the batteries are connected in parallel. The fuse specification is as follows:

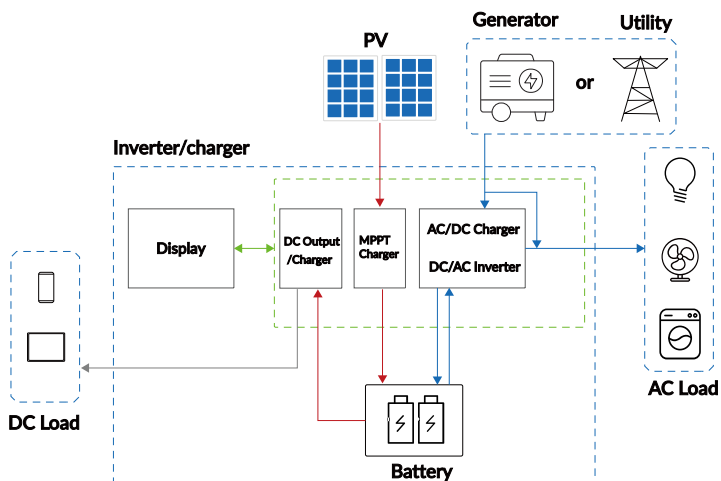
Product Model	Specifications
HPS1022-AHL0210, HPS1021-AHL0210	50A/32VDC
HPS1522-AHL0310, HPS1521-AHL0310	80A/32VDC
HPS2522-AHL0610, HPS2521-AHL0610	125A/32VDC

(7) The built-in battery is strictly prohibited from being replaced by end-users. If replacement is necessary, it must be carried out by professionals. The operation guide video for replacing the battery can be found on the EPEVER official website.

1.4 Socket description

Socket		Applicable Product Model
CN (National Standard of China)		HPS1022-AHL0210 HPS1522-AHL0310 HPS2522-AHL0610
AU (Australian Standard)		
UK (British Standard)		
EU (European Standard)		
SA (South African Standard)		
MX/CO (American Standard)		HPS1021-AHL0210 HPS1521-AHL0310 HPS2521-AHL0610
BR (Brazilian Standard)		HPS1021-AHL0210 HPS1521-AHL0310 HPS2521-AHL0610 HPS1022-AHL0210 HPS1522-AHL0310 HPS2522-AHL0610

1.5 Connection diagram



2 Installation

2.1 Attention

- Please read the manual carefully to familiarize yourself with the installation steps.
- The battery backup does not need to be fixed (placed on the ground directly). And the placed location is required to be no water, flat, strong, and clean.
- Ventilation is highly recommended if mounted in an enclosure.
- Ensure all switches and breakers are disconnected before wiring. Operate the battery backup after checking that all wiring is correct.
- Loose connections and corroded wires may produce high heat that can melt wire insulation, burn surrounding materials, or even cause a fire. Ensure tight connections, use cable clamps to secure cables, and prevent them from swaying in motion.
- Select the system connection cables according to the current density no greater than $5\text{A}/\text{mm}^2$.
- For outdoor using, avoid the direct sunshine and rain infiltration. Do not use the battery backup in humid, high salt spray, corrosion, greasy, flammable, explosive, dust accumulative, or other severe environments.
- After turning off the switch, high voltage still exists inside the battery backup. Do not open or touch the internal modules; wait ten minutes before conducting related operations.
- There is no reverse polarity protection for the external battery. Please ensure the correct polarity before connecting the external battery.
- 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.

2.2 Wire size and circuit breaker

The wiring and installation methods must conform to all national and local electrical code requirements.

2.2.1 Recommended AC output wire size

Model	Wire size
HPS1022-AHL0210	$2.5\text{mm}^2/13\text{AWG}$
HPS1522-AHL0310	$2.5\text{mm}^2/13\text{AWG}$
HPS2522-AHL0610, HPS1021-AHL0210 HPS1521-AHL0310, HPS2521-AHL0610	$4\text{mm}^2/11\text{AWG}$

NOTICE

- Suppose a long distance exists between the PV array, the battery backup, and the battery. In that case, larger wires shall be used to reduce the voltage drop and improve the system's performance.
- The above wire and circuit breaker sizes are for reference only; please choose a suitable wire and circuit breaker according to the actual situation.

2.2.2 Recommended PV wire size

Since the PV output current varies with the PV module's size, connection method, or sunlight angle, the minimum wire size can be calculated by the PV I_{sc} (Max. 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} equals any PV module's I_{sc} . When the PV modules are connected in parallel, the total I_{sc} equals the sum of the PV module's I_{sc} . The PV array's I_{sc} must not exceed the maximum PV input current. For Max. PV input current and Max. PV wire size, please refer to the table below:

Model	Wire Size
HPS1022-AHL0210, HPS1021-AHL0210	4mm ² /11AWG
HPS1522-AHL0310, HPS1521-AHL0310	4mm ² /11AWG
HPS2522-AHL0610, HPS2521-AHL0610	10mm ² /7AWG

NOTICE

When the PV modules are connected in series, the total voltage must not exceed the PV maximum input withstand voltage 95VDC (at minimum operating environment temperature).

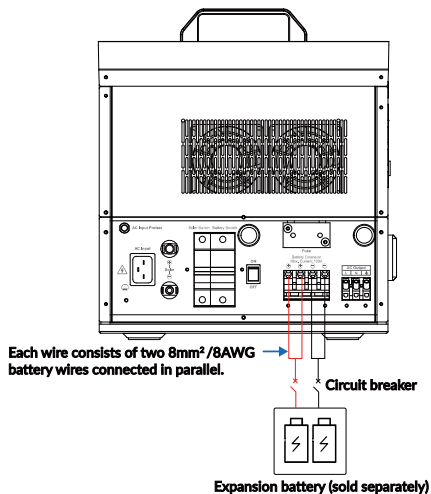
2.2.3 Recommended Utility wire size

Model	Wire Size
HPS1022-AHL0210	2.5mm ² /13AWG
HPS1522-AHL0310	2.5mm ² /13AWG
HPS2522-AHL0610 HPS1021-AHL0210 HPS1521-AHL0310 HPS2521-AHL0610	4mm ² /11AWG

2.2.4 Recommended expansion battery wire and breaker size

Model	Wire Size	Circuit-breaker Size
HPS1022-AHL0210 HPS1021-AHL0210	8AWG	2P-63A/60VDC
HPS1522-AHL0310 HPS1521-AHL0310		2P-80A/60VDC
HPS2522-AHL0610 HPS2521-AHL0610 ⁽¹⁾		2P-125A/60VDC

(1)HPS2522-AHL0610 and HPS2521-AHL0610 are designed with a 4P battery terminals (2P for positive pole, and 2P for negative pole). According to the recommended external battery wire size, two 8mm²/8AWG battery wires connected in parallel is need for each terminal.

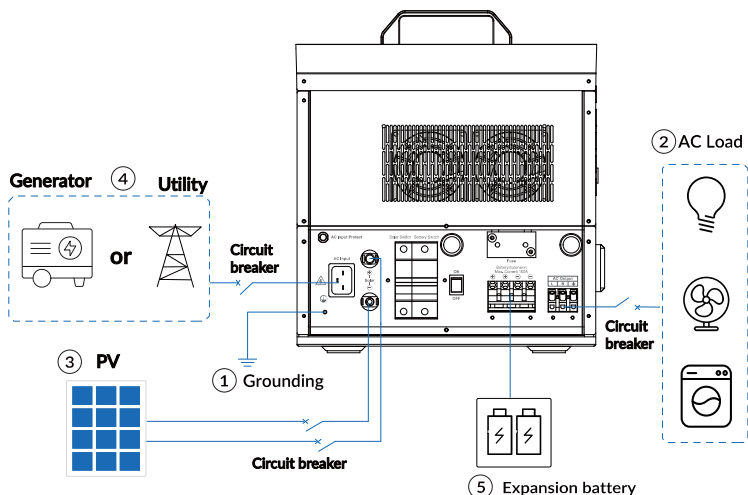


NOTICE

The recommended battery breaker size is selected when the battery terminals are not connected to any additional inverter. The external and internal batteries can be connected in parallel when their voltage are the same (voltage difference range: $\pm 0.3V$).

2.3 Connect the device

Connect the battery backup in the order of "Ground > Load > PV array > Utility or Generator > Optional accessories", and disconnect the battery backup in the reverse order. The following wiring sequence is illustrated in the appearance of "HPS2522-AHL0610." For wiring positions of other models, please refer to the actual product appearance.



2.3.1 Grounding

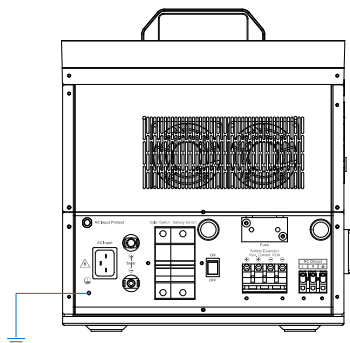
The battery backup has a dedicated grounding terminal, which must be grounded correctly and reliably. The grounding wire size must be consistent with the recommended AC output wire specification. The grounding connection point shall be as close as possible to the battery backup, and the total grounding wire shall be as short as possible.

☒ NO GROUNDING

- ☒ Do not ground the external battery terminals or the positive/negative terminals of the expansion battery.
- ☒ Do not ground the positive/negative terminals of the PV.
- ☒ Do not ground the AC input terminals (L, N) between the battery backup and the household power distribution cabinet.
- ☒ Do not ground the AC output terminals (L, N).

☒ GROUNDING

- ☒ The cabinet of the battery backup is connected to earth through the earth rail, along with the AC input and output's PE (Protective Earth) terminal.



2.3.2 Connect the AC loads



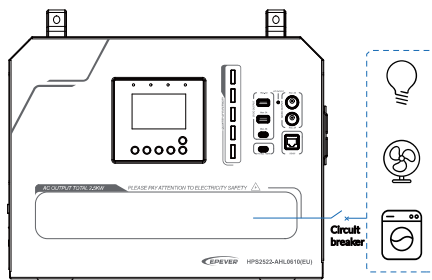
DANGER

Electric shock hazard! When wiring the AC load, please disconnect the circuit breaker and ensure that the poles' leads are connected correctly.

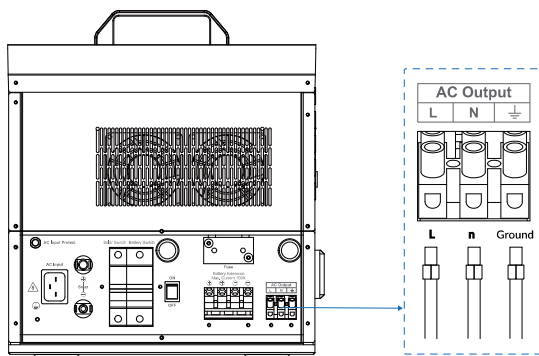
NOTICE

- The AC loads shall be determined by the continuous output power of the battery backup. The AC load's surge power must be lower than the instantaneous surge power of the battery backup, or the battery backup will be damaged.
- If inductive loads such as motors, or a bidirectional transfer switch is connected to the AC output terminal, a separate over-voltage and over-current protector (VA-Protector) needs to be installed at the AC output terminal.
- The total power of all AC outputs must not exceed the rated value of the product silk-screen.

A. Connect the AC loads by AC outlets



B. Connect the AC load by the AC output terminal



Silk-screen	Abbreviation	Name	Color
L	LINE	Live wire	Brown/black
N	Neutral	Neutral line	Blue
	PE	Ground line	Yellowish-green

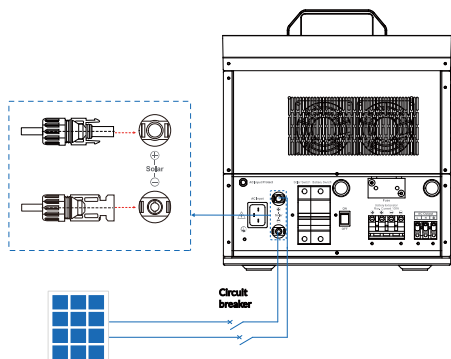
2.3.3 Connect the PV modules

DANGER

Electric shock hazard! The PV array can generate dangerous high voltages. Disconnect the circuit breaker before wiring, and ensure that the positive ("+") and negative ("-") leads are connected correctly.

NOTICE

- If the battery backup is installed in an area prone to frequent lightning strikes, it is recommended to install an external surge arrester for added protection.



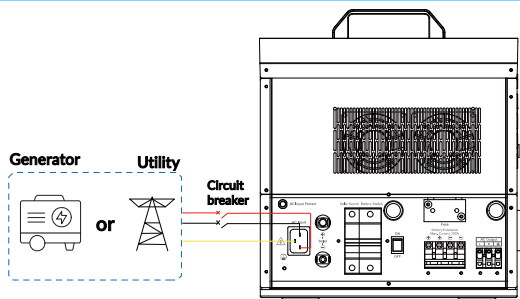
2.3.4 Connect the Utility or generator

⚠ DANGER

Electric shock hazard! The Utility input can generate dangerous high voltages. Disconnect the circuit breaker or fast-acting fuse before wiring, and ensure that the poles' leads are connected correctly.

NOTICE

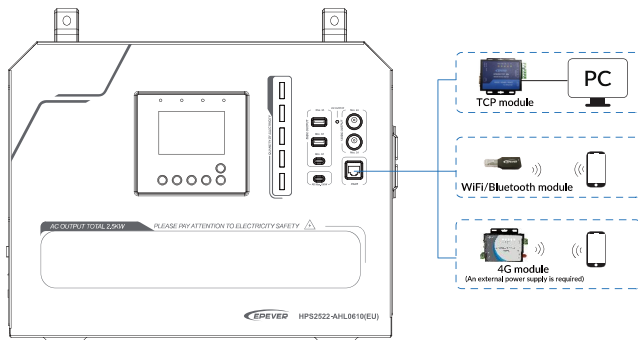
- After the Utility is connected, the PV and battery cannot be grounded. In contrast, the battery backup cover must be grounded reliably (to shield the outside electromagnetic interference effectively and prevent the cover from causing electric shock to the human body).
- There are many types of oil generators with complex output conditions. It is recommended to use a variable-frequency generator. If a non-variable-frequency generator is to be used, it must be tested before use.



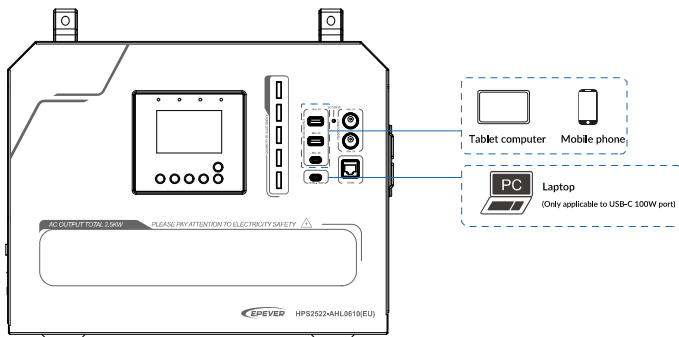
2.3.5 Connect the optional accessories

A. Connect the communication module

Connect the TCP module, WiFi module, Bluetooth module, or 4G module to the RS485 port (when connecting the 4G module, an external power supply is required). End-users can remote monitor the battery backup or modify related parameters on the phone APP. For detailed settings, refer to the user manual of accessories.



B. Connect the mobile phone, or PC



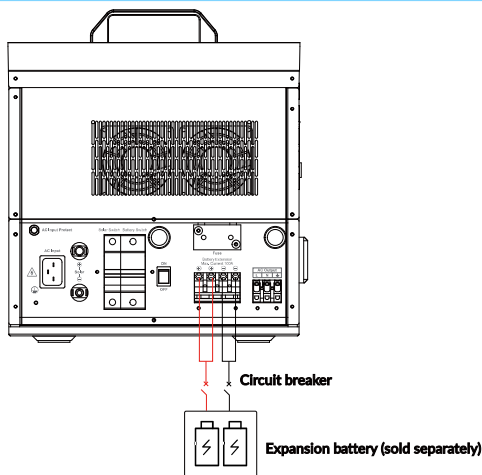
Charging the mobile phone, tablet computer, or laptop by the 5VDC/3A or USB-C (100W PD) port.

Note: Only the USB-C (100W PD) port can charge the laptop.

C. Connect the expansion battery

NOTICE

- Please disconnect the circuit breaker before wiring the external battery and ensure that the leads of the "+" and "-" poles are polarity correctly.
- A circuit breaker must be installed on the external battery side. For selection, please refer to Section 2.2 Wire size and circuit breaker. The external and internal batteries can be connected in parallel when their voltage are the same.
- The battery backup comes with a built-in lithium battery. The expansion battery is an optional accessory and must be purchased separately, with specifications consistent with the built-in battery.



NOTICE

Reversing the polarity of the expansion battery terminals will damage both the expansion battery and the HPS-AHL home battery backup.

2.4 Operate the device

Step 1: Double-check whether the wire connection is correct.

Step 2: Connect the battery circuit breaker.

Step 3: Turn on the battery backup switch. The LCD will be lit ON, which means the battery backup works normally.

NOTICE

- If the battery backup switch is turned on before closing the battery circuit breaker, the system will fail to supply power.
- First close the battery circuit breaker and then turn on the battery backup switch. After the battery backup normally works, connect the PV circuit breaker and the utility input plug. Otherwise, we won't assume any responsibility for not following the operation.



WARNING

The AC output is ON by default after the battery backup is powered. Before connect the battery circuit breaker, ensure the AC output is connected to loads correctly, and no safety hazard exists.

Step 4: Set parameters by the buttons.

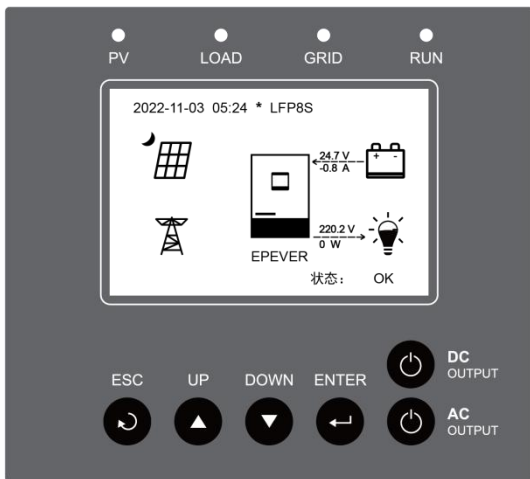
Step 5: Use the HPS-AHL home battery backup.

Connect the load circuit breaker, the PV circuit breaker, and the utility input plug 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 battery backup will perform normal work according to the set working mode. See Section [3.4 Interface](#).

NOTICE

- When supplying power for different AC loads, turning on the load with a larger impulse current is recommended first. After the load output is stable, turn on the load with a smaller impulse current later.
- If the battery backup cannot work properly or the LCD/indicator shows an abnormality, please refer to Chapter [6 Troubleshooting](#) or contact our after-sales personnel.

3 LCD



Tip

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.

3.1 Indicators

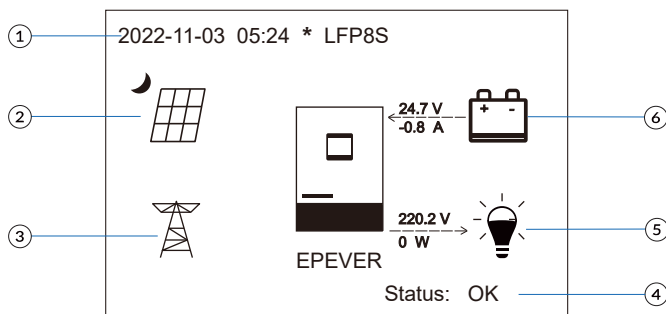
Indicator	Status	Instruction
PV	OFF	No PV input, or PV connection normal but no charging
	Green ON	PV charging normal
	Red ON	PV charging fault
LOAD	OFF	No inverter output
	Green ON	Inverter output normal or the bypass is normal
	Red ON	Inverter fault
GRID	OFF	No utility input or utility fault
	Green ON	Utility charging the battery or supplying power to the load
	Green flashing	Oil generator charging the battery or supplying power to

	(1Hz)	the load
	Red ON	Utility charging fault
RUN	Green flashing (1Hz)	Normal communication
	Red flashing (1Hz)	Communication fault

3.2 Buttons

Buttons	Operation	Instruction
	Click	- Exit the current interface - Switch from the "home screen" to the "Main Table Data Information" screen.
	Click	- Click on the parameter browse interface to scroll up or scroll down - Click on the parameter setting interface to increase or decrease the parameter per step size.
	Press and hold	Press and hold on the parameter setting interface to increase or decrease the parameter per ten times the step size.
	Click	- Click on the Home screen to enter the real-time data screen. - Click on the parameter browse interface to enter the parameter setting interface. - Confirm the setting parameter
	Press and hold	Press and hold on the home screen to enter the password interface. After verifying the password, enter the browse interface of setting parameters.
	Press and hold	Press and hold on the home screen to turn on/off the DC output (USB-C output etc.)
	Press and hold	Press and hold on the home screen to turn on/off the inverter output, the utility charging, or the utility bypass.

3.3 Home screen



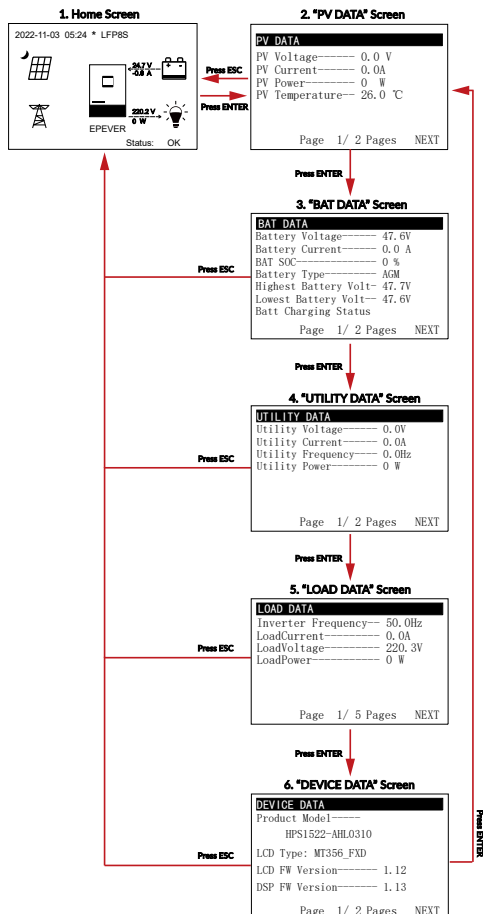
No.	Instruction
1	Display the system time, current battery type, and charging stage. * means a battery voltage control parameter has been modified.
2	PV icon: PV connection is normal. No PV connection (or at night). Actual PV voltage/total PV power
3	Utility icon: Utility connection is normal. No utility connection. Utility input voltage/Utility input power
4	Status: When there are no faults, it displays "OK." When faults occur, it displays the minimum fault code. Note: Long press the "UP" and "DOWN" keys simultaneously on the home page to access the fault details list.
5	Load icon: AC output is normal. No AC output. AC output voltage/AC output power
6	Battery status: The battery is discharging. The battery is being charged. Battery voltage/battery current

Note: If the battery backup is disconnected for a long time, the system time will automatically return to the factory default value. Please set the correct system time before using it again.

3.4 Interface

3.4.1 Real-time data interface

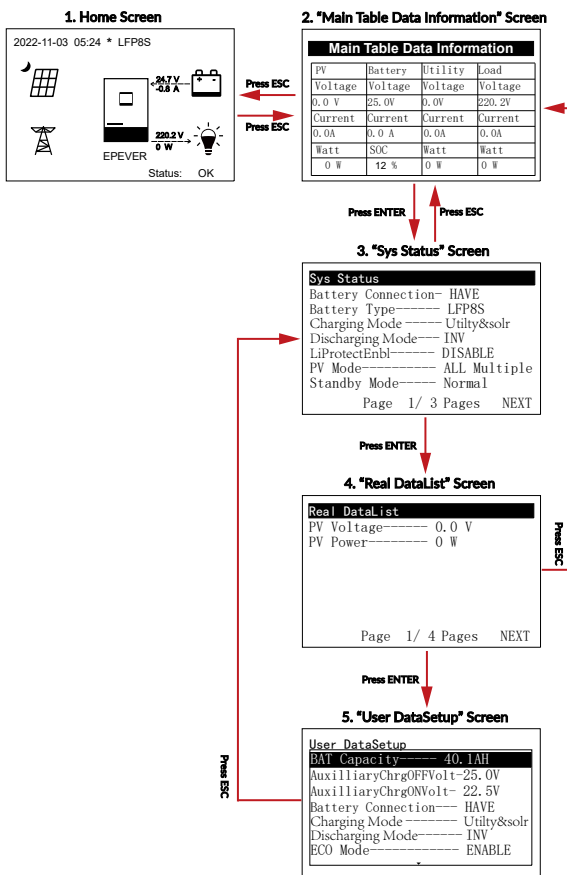
After powering on the battery backup, the home screen shows up. Click the "ENTER" button to enter the real-time data screen (the "PV DATA" screen will be displayed first by default, shown as below diagram), and press the "UP/DOWN" button to view all parameters of the current screen. Click the "ENTER" button to enter the next real-time interface, or click the "ESC" button to return the home screen.



Note: If you press the "UP/DOWN" button to select a module in the "Home Screen," such as selecting the battery icon . And then, short press the "ENTER" button, you will enter the real-time screen of the selected module, such as entering the "BAT DATA" screen first. Pressing the "ENTER" button will display other real-time screens in cycle.

3.4.2 User interface

After powering on the battery backup, the home screen shows up. Click the "ESC" button to enter the "Main Table Data Information" screen. Click the "ENTER" button to enter the next interface, or click the "UP/DOWN" button to browse the current screen display.

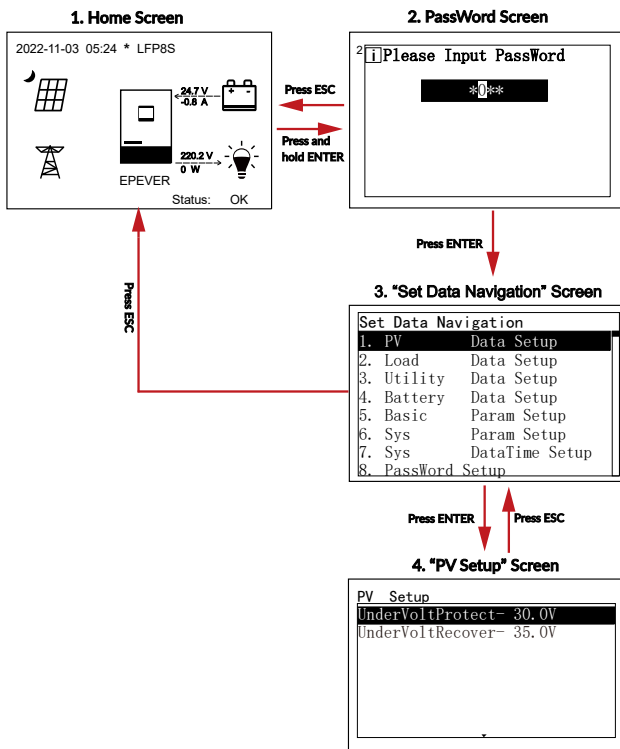


"User Data Setup" interface

The end-users can modify common parameters on the "User Data Setup" interface without inputting the password. The default parameters and setting range refer to chapter 3.5.1 Parameters list.

3.4.3 Administrator interface

After powering on the battery backup, the home screen shows up. Press and hold the "ENTER" button to enter the password interface. Input the password (0000 by default) correctly to check all parameters or modify them.



3.5 Parameters setting

3.5.1 Parameters list

Set Data Navigation	
1. PV	Data Setup
2. Load	Data Setup
3. Utility	Data Setup
4. Battery	Data Setup
5. Basic	Param Setup
6. Sys	Param Setup
7. Sys	DataTime Setup
8. PassWord	Setup

Enter the "Set Data Navigation" interface according to Subsection [3.4.3 Administrator interface](#). Then click the "UP/DOWN" button to select navigation 1–9 for detail settings. Default parameters and setting ranges are shown in the following table.

Note: On the parameter setting interface, click the "UP/DOWN" button to increase/decrease the parameter value by one step size (step size is the minimum unit to modify the parameter). Press and hold the "UP/DOWN" button to increase/decrease the parameter value by ten times the step size. Press the "ENTER" button to confirm.

Parameters	Default	User define
1. PV Data Setup		
PV UVP (PV Undervoltage Protection)	30.0V	Read-only.
PV UV Recovery (PV Undervoltage Recovery)	35.0V	Read-only.
2. Load Data Setup		
Inverter Voltage (Inverter Output Voltage)	220V	User define: 220V/230V HPS1022-AHL0210, HPS1522-AHL0310, HPS2522-AHL0610
	120V	User define: 110V/120V/127V HPS1021-AHL0210, HPS1521-AHL0310, HPS2521-AHL0610
Inverter Output Frequency (Inverter Frequency)	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.

3. Utility Data Setup

OVD (Utility Overvoltage Disconnect Voltage)	265.0V	User define: (Utility Overvoltage Reconnect Voltage plus 10V) to 285.0V, step size: 0.1V HPS1022-AHL0210/HPS1522-AHL0310/HPS2522-AHL0610
	140.0V	User define: (Utility Overvoltage Reconnect Voltage plus 10V) to 140.0V, step size: 0.1V HPS1021-AHL0210, HPS1521-AHL0310, HPS2521-AHL0610
OV Reconnect Volt (Utility Overvoltage Reconnect Voltage)	255.0V	User define: 235.0V to (Utility Overvoltage Disconnect Voltage minus 10V), step size: 0.1V HPS1022-AHL0210, HPS1522-AHL0310, HPS2522-AHL0610
	130.0V	User define: 120.0V to (Utility Overvoltage Disconnect Voltage minus 10V), step size: 0.1V HPS1021-AHL0210, HPS1521-AHL0310, HPS2521-AHL0610
UV Disconnect Volt (Utility Undervoltage Disconnect Voltage)	175.0V	User define: 175.0V to (Utility Undervoltage Recovery Voltage minus 10V), step size: 0.1V HPS1022-AHL0210, HPS1522-AHL0310, HPS2522-AHL0610
	90.0V	User define: 90.0V to (Utility Undervoltage Recovery Voltage minus 10V), step size: 0.1V HPS1021-AHL0210, HPS1521-AHL0310, HPS2521-AHL0610
UV Recovery Volt (Utility Undervoltage Recovery Voltage)	185.0V	User define: (Utility Undervoltage Disconnect Voltage plus 10V) to 200.0V, step size: 0.1V HPS1022-AHL0210, HPS1522-AHL0310, HPS2522-AHL0610
	100.0V	User define: (Utility Undervoltage Disconnect Voltage plus 10V) to 110.0V, step size: 0.1V HPS1021-AHL0210, HPS1521-AHL0310, HPS2521-AHL0610

OF Disconnect Freq (Utility Overfrequency Disconnect Frequency)	70.0Hz	User define: (Utility Underfrequency Disconnect Frequency plus 0.5Hz) to 70.0Hz, step size: 0.1Hz Note: In the bypass state, when the actual utility input frequency is higher than this value, the battery backup will be switched to the inverter output state.
UF Disconnect Freq (Utility Underfrequency Disconnect Frequency)	40.0Hz	User define: 40.0Hz to (Utility Overfrequency Disconnect Frequency minus 0.5Hz), step size: 0.1Hz Note: In the bypass state, when the actual utility input frequency is lower than this value, the battery backup will be switched to the inverter output state.
Max Charging Current (Utility Maximum Charging Current)	60.0A	Namely, the maximum current at the battery end when the utility charges the battery. User define: 0A to 60.0A, step size: 0.1A (HPS2522-AHL0610, HPS2521-AHL0610)
	30.0A	User define: 0A to 30.0A, step size: 0.1A (HPS1522-AHL0310, HPS1521-AHL0310)
	20.0A	User define: 0A to 20.0A, step size: 0.1A (HPS1022-AHL0210, HPS1021-AHL0210)

4. Battery Data Setup

BAT Set Mode (Battery set mode)	Expert	Read-only.
Battery Capacity (Battery Capacity)	100.0AH	User define: 0AH to 200.0AH, step size: 0.1AH (HPS2522-AHL0610, HPS2521-AHL0610)
	60.0AH	User define: 0AH to 120.0AH, step size: 0.1AH (HPS1522-AHL0310, HPS1521-AHL0310)
	40.0AH	User define: 0AH to 80.0AH, step size: 0.1AH (HPS1022-AHL0210, HPS1021-AHL0210)
Bulk Charging Time (Battery Bulk Charging Time)	120 Min	User define: 10 minutes to 180 minutes, step size: 1 minute
AuxiliaryChrgOFFVolt (Auxiliary Charging OFF)	25.0V	Under certain working modes, the utility will stop charging the battery if the battery voltage exceeds this value.

Voltage)		User define: 21.4V to 30.0V, step size: 0.1V Note: (Auxiliary Charging ON Voltage plus $0.2 \times N$) to Charging Limit Voltage (N = Rated battery voltage/12)
AuxiliaryChrgONVolt (Auxiliary Charging ON Voltage)	22.5V	Under certain working modes, the utility will charge the battery if the battery voltage is lower than this value. User define: 21.0V to 29.6V, step size: 0.1V Note: Low Voltage Disconnect Voltage to (Auxiliary Charging OFF Voltage minus $0.2 \times N$) (N = Rated battery voltage/12)
MaxCharginCurrent (Battery Maximum Charging Current)	60.0A	Namely, the maximum allowable charge current on the battery side. User define: 0A to 60.0A, step size: 0.1A (HPS2522-AHL0610, HPS2521-AHL0610)
	30.0A	User define: 0A to 30.0A, step size: 0.1A (HPS1522-AHL0310, HPS1521-AHL0310)
	20.0A	User define: 0A to 20.0A, step size: 0.1A (HPS1022-AHL0210, HPS1021-AHL0210)
LimitDisChgCurrt (Battery Limit Discharging Current)	100.0A	User define: 10.0A to 100.0A, step size: 0.1A (HPS2522-AHL0610, HPS2521-AHL0610)
	108.0A	User define: 10.0A to 108.0A, step size: 0.1A (HPS1522-AHL0310, HPS1521-AHL0310)
	72.0A	User define: 10.0A to 72.0A, step size: 0.1A (HPS1022-AHL0210, HPS1021-AHL0210)
Charge&Discharge Mode (Battery Charge and Discharge Control Mode)	SOC	User define: VOLT, SOC VOLT: The battery voltage control parameters take effect after setting this value as "VOLT." SOC: The SOC parameters take effect after setting this value as "SOC." Note: Each time the battery backup is powered on, an initial SOC value is approximated according to the internal algorithm, and this initial SOC value is not the true SOC value. The true SOC value is obtained by setting the correct battery capacity and learning through multiple charge and discharge cycles.

FullChargeProtection (Full Charge Protection SOC)	100%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." When the battery SOC is higher than or equals to this value, the battery backup will stop charging the battery. User define: (Full Charge Protection Recovery SOC plus 5%) to 100%, step size: 1% Note: The minimum value of this parameter can be set to 80%.
Full Charge Recovery (Full Charge Protection Recovery SOC)	90%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." When the battery SOC is lower than this value, the battery backup will charge the battery. User define: 60% to (Full Charge Protection SOC minus 5%), step size: 1%
LowBattAlarmRecovery (Low Battery Alarm Recovery SOC)	40%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." It cannot be set separately (equals the "Discharging Protection Recovery SOC").
Low Battery Alarm (Low Battery Alarm SOC)	25%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." User define: 10% to 35%, step size: 1%
Discharging Recovery (Discharging Protection Recovery SOC)	40%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." User define: 20% to 60%, step size: 1%
Discharge Protection (Discharging Protection SOC)	0%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." When the battery SOC is lower than this value, the battery will stop discharging. User define: 0% to 5%, step size: 1%
AuxiliaryChargingON (Utility Auxiliary Charging ON SOC)	30%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." User define: 20% to 50%, step size: 1%
AuxiliaryChargingOFF (Utility Auxiliary Charging OFF SOC)	60%	It takes effect after the "Charge&Discharge Mode" is set as "SOC." User define: (Utility Auxiliary Charging ON SOC) to 100%, step size: 1%

LimitChgTemp (Limit Charge Temperature)	0.0℃	When the environment or the battery temperature is lower than this value, the battery backup will stop charging the battery. User define: 0℃ to 10.0℃, step size: 0.1℃
LimitDisChgTem (Limit Discharge Temperature)	-20.0℃	When the environment or the battery temperature is lower than this value, the battery backup will stop discharging. User define: -20.0℃ to 0℃, step size: 0.1℃
OTP (Battery Over Temperature Protection)	55.0℃	User define: (Battery Over Temperature Protection Recovery plus 5℃) to 55.0℃, step size: 0.1℃
OTP Recovery (Battery Over Temperature Protection Recovery)	50.0℃	User define: 30.0℃ to (Battery Over Temperature Protection minus 5℃), step size: 0.1℃

5. Basic Param Setup

Battery Connection (Battery Have or Not)	HAVE	Only the "HAVE" mode is valid.
Charging Mode	Utlty & solr	User define: Solar, SolarPrior, Utlty & solr(Utility & solar). Note: For detailed working modes, refer to Section 4.2 Battery modes .
Discharging Mode	INV (Inverter)	User define: INV (Inverter), Bypass Note: For detailed working modes, refer to Section 4.2 Battery modes .
LiProtectEnbl (Lithium Battery Protection Enable)	ENABLE	User define: DISABLE, ENABLE (Set this value as "ENABLE," the charge/discharge low temperature limit function is effective.)
PV Mode	ALL MULTIPLE	User define: Auto, ALL SINGLE, ALL MULTIPLE Note: This parameter is invalid for current system.
Standby Mode	Normal	User define: Normal, Standby (Set this value as "Standby," the AC output will be stopped.)
ECO Mode	ENABLE	User define: DISABLE, ENABLE (Set this value as "ENABLE," the battery backup will enter the low

		power consumption mode when certain conditions are met, such as no PV and utility, or low battery voltage, etc.)
Calibration Mode	OFF	User define: OFF, ON Note: This parameter is invalid for current system.
Fault Reset	--	Exit the current fault state and resume normal operation (the parameter will not clear the historical fault records).
Load	OPEN	User define: CLOSE, OPEN Open or close the loads. This parameter and the load output switch are the same control quantity, change the state of one of them, the other will change with it.
DisCharge Enable	OPEN	User define: CLOSE, OPEN
ResetEnergyStatistic (Reset Energy Statistics)	--	Press the "ENTER" button to clear all accumulated charge and discharge energy.
AC Input Mode	Grid	User define: Grid, Generator When the AC input is a generator, this parameter needs to be set to "Generator" to improve the charging capability.
DCLoadOpen/Close	Open	Read-only.
Factory Reset	--	Press the "ENTER" button to return the control parameters to the factory settings.

6. Sys Param Setup

Backlight Time	Always	User define: 6S, 30S, 60S, Always
Buzzer Alarm	ON	User define: OFF, ON (If set to "ON," the buzzer will sound when an error occurs and will keep silence when the error is cleared. If set to "OFF," the buzzer will not sound even if an error occurs.)
LCD Backlight	ON	User define: OFF, ON (The "BckLightOnOff" has priority over "Back Light Time")
BaudRate	115200	User define: 115200, 9600, 19200, 38400, 57600
COM ID	1	User define: 1~254, step size: 1

Bluetooth	VALID	User define: INVALID, VALID To control the built-in Bluetooth module.
Temperature Unit	°C	User define: °C, °F
Indicator	OPEN	User define: OPEN, CLOSE Open or close the battery SOC indicator and the system status indicator.

7. Sys DataTime Setup (See Subsection 3.5.3)

8. Password Setup (See Subsection 3.5.4)

9. Bat Control Data Setup

BAT Set Mode (Battery Set Mode)	Expert	Read-only.
Level	24V	Read-only.
Battery Type	LFP8S	Read-only.
OV Disconnect Volt (Overvoltage Disconnect Voltage)	30.0V	User define: (Charging Limit Voltage and Overvoltage Recovery Voltage plus $0.1 \times N$) < Overvoltage Disconnect Voltage $\leq$ 30.0V, step size: 0.1V Note: N = Rated battery voltage/12.
Charging Limit Volt (Charging Limit Voltage)	28.9V	User define: Bulk Charging Voltage < Charging Limit Voltage < Overvoltage Disconnect Voltage (max. value can be set as 29.0V), step size: 0.1V
OV Rcovery Volt (Overvoltage Recovery Voltage)	28.9V	User define: Bulk Charging Voltage $\leq$ Overvoltage Recovery Voltage < Overvoltage Disconnect Voltage minus $0.1 \times N$, step size: 0.1V Note: N = Rated battery voltage/12.
Equalization Volt (Equalization Charging Voltage)	28.8V	Read-only.
Bulk Charging Volt (Bulk Charging Voltage)	28.8V	User define: Float Charging Voltage $\leq$ Bulk Charging Voltage < Charging Limit Voltage, step size: 0.1V

Float Charging Volt (Float Charging Voltage)	27.6V	User define: Bulk Recovery Voltage < Float Charging Voltage ≤ Bulk Charging Volt, step size: 0.1V
Bulk Recovery Volt (Bulk Recovery Voltage)	26.4V	User define: Low Voltage Recovery Voltage < Bulk Recovery Voltage < Float Charging Voltage, step size: 0.1V
LV Recovery Volt (Low Voltage Recovery Voltage)	25.6V	User define: (Low Voltage Disconnect Voltage plus 0.1N) < Low Voltage Recovery Voltage < Bulk Recovery Voltage, step size: 0.1V
UV AlarmRecoveryVolt (Undervoltage Alarm Recovery Voltage)	24.4V	User define: (Undervoltage Alarm Voltage plus 0.1*N) ≤ Undervoltage Alarm Recovery Voltage ≤ Low Voltage Recovery Voltage, step size: 0.1V. Note: N = Rated battery voltage/12.
UV Alarm Voltage (Undervoltage Alarm Voltage)	24.0V	User define: Low Voltage Disconnect Voltage < Undervoltage Alarm Voltage ≤ (Undervoltage Alarm Recovery Voltage minus 0.1*N), step size: 0.1V. Note: N = Rated battery voltage/12.
LV Disconnect Volt (Low Voltage Disconnect Voltage)	23.5V	User define: Discharging Limit Voltage ≤ Low Voltage Disconnect Voltage < Undervoltage Alarm Voltage, step size: 0.1V
Discharge Limit Volt (Discharging Limit Voltage)	21.0V	Read-only.

3.5.2 Time setting

Set Data Navigation	
1. PV	Data Setup
2. Load	Data Setup
3. Utility	Data Setup
4. Battery	Data Setup
5. Basic	Param Setup
6. Sys	Param Setup
7. Sys	DateTime Setup
8. PassWord Setup	

Enter the "Set Data Navigation" interface according to Subsection [3.4.3 Administrator interface](#). Then click the "UP/DOWN" button to select "7. Sys Data Time Setup", and click the "ENTER" button to enter the system time setting interface. On the system time setting interface, click the "ENTER" button to move the cursor right and left, and click the "UP/DOWN" button to adjust the value. After the time setting is completed, click the "ENTER" to confirm. The system time will be updated if the setting value complies with the range.

3.5.3 Password modifying

Set Data Navigation	
1. PV	Data Setup
2. Load	Data Setup
3. Utility	Data Setup
4. Battery	Data Setup
5. Basic	Param Setup
6. Sys	Param Setup
7. Sys	DateTime Setup
8. PassWord Setup	

Enter the "Set Data Navigation" interface according to Subsection [3.4.3 Administrator interface](#). Then click the "UP/DOWN" button to select "8. Pass Word Setup", and click the "ENTER" button to enter the password modifying interface. Click the "ENTER" button to move the cursor right and left, and click the "UP/DOWN" button to adjust the value. After the password is modified, click the "ENTER" button to confirm.

Note: The default password is "0000", which is set to prevent non-professional operations. Please memorize the new password after modifying it. If forgetting the password, press and hold the "AC OUTPUT" button on the password inputting page; the password will be automatically reset to "0000."

4 Working Modes

4.1 Abbreviation

Abbreviation	Instruction
P _{PV}	PV power
P _{LOAD}	Load power
V _{BAT}	Battery voltage
LVD	Low Voltage Disconnect Voltage
LVR	Low Voltage Recovery Voltage
DP	Discharging Protection SOC
DPR	Discharging Protection Recovery SOC
FCV	Float Charging Voltage
AOF	Auxiliary Charging OFF Voltage (namely, Utility Charging OFF Voltage)
AON	Auxiliary Charging ON Voltage (namely, Utility Charging ON Voltage)
UCF	Utility Auxiliary Charging OFF SOC
UCO	Utility Auxiliary Charging ON SOC
MCC	Battery Maximum 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" screen.

NOTICE

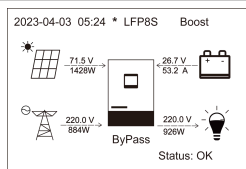
- Set the "Charge&Discharge Mode" as "VOLT"; the working mode is determined by the battery voltage value.
- Set the "Charge&Discharge Mode" as "SOC," the working mode is determined by the battery SOC. The battery SOC value will be more accurate after a full charge-discharge cycle.
- For setting the "Charge&Discharge Mode", refer to Subsection [3.5.1 Parameters list](#).

4.2 Working mode

4.2.1 Scenario A: Both PV and Utility are available.

	Charging Mode: "Solar"	Discharging Mode: "Inverter"
	2023-04-03 20:32 * LFP8S Boost $P_{PV} > P_{LOAD}$ $\parallel$ $P_{PV} \leq P_{LOAD}$	① When the PV power is greater than load power, the PV charges the battery and supplies extra power to the load.
(A-1)	2023-04-03 20:33 * LFP8S Boost	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.
PV ☒	$\begin{matrix} V_{BAT} \geq LVR \\ /SOC \geq DPR \end{matrix} \parallel \begin{matrix} V_{BAT} \leq LVD \\ /SOC \leq DP \end{matrix}$	
Utility ☒	2023-04-03 20:34 * LFP8S Boost	③ Any of the following is satisfied, 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 working mode returns to state ②.		

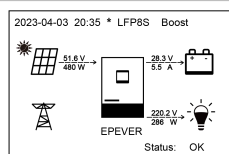
(A-2) PV ☒ Utility ☒	Charging Mode: "Solar" Discharging Mode: "Bypass" 2023-04-03 05:24 * LFP8S Boost PV: 71.5 V, 1428W → Battery: 26.7 V, 53.2 A Utility: 220.0 V, 884W → Load: 220.0 V, 928W ByPass Status: OK In this mode, the PV charges the battery, while the Utility supplies power to the load through bypass.
(A-3) PV ☒ Utility ☒	Charging Mode: "Solar prior" Discharging Mode: "Bypass" 2023-04-03 05:24 * LFP8S Boost PV: 71.5 V, 1428W → Battery: 26.7 V, 53.2 A Utility: 220.0 V, 884W → Load: 220.0 V, 928W ByPass Status: OK $V_{BAT} \geq AOF \quad \parallel \quad V_{BAT} \leq AON$ $/SOC \geq UCF \quad \parallel \quad /SOC \leq UCO$ ① Any of the following is satisfied, the Utility and PV charge the battery, and the Utility supplies power to the load simultaneously. ● The battery voltage is greater than or equal to the AOF value. ● The battery SOC is greater than or equal to the UCF value. ② Any of the following is satisfied, the Utility and PV charge the battery, and the Utility supplies power to the load simultaneously. ● The battery voltage is lower than or equal to the AON value. ● The battery SOC is lower than or equal to the UCO value.
(A-4) PV ☒ Utility ☒	Charging Mode: "Utly & solr" Discharging Mode: "Bypass" 2023-04-03 05:24 * LFP8S Boost PV: 71.5 V, 1428W → Battery: 26.7 V, 53.2 A Utility: 220.0 V, 884W → Load: 220.0 V, 928W ByPass Status: OK $P_{PV} > P_{LOAD} + MCC \cdot V_{BAT} \quad \parallel \quad P_{PV} \leq P_{LOAD} + MCC \cdot V_{BAT}$ ① When the PV power is greater than the "load power plus (MCC*battery voltage)," the PV charges the battery and supplies extra power to the load.



② When the PV power is lower than or equal to the “load power plus (MCC*battery voltage),” the Utility will cut in to supply power to the load together with the PV, and the PV charges the battery simultaneously.

4.2.2 Scenario B: PV is available, but the Utility is not available.

Regardless of the charging mode and discharging mode, the working mode is as follows.



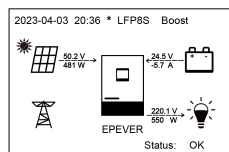
① When the PV power is greater than the load power, the PV charges the battery and supplies extra power to the load.

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

(B)

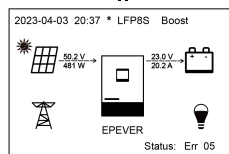
PV ☒

Utility ☐



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.

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

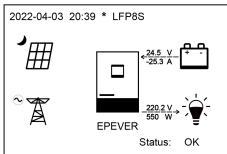
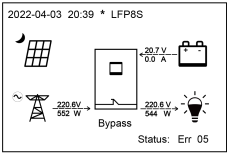
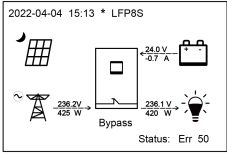


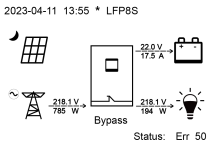
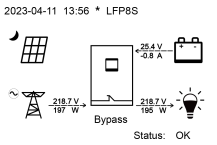
③ Any of the following is satisfied, the PV and the battery stop supplying power to the load. The PV charges the battery only.

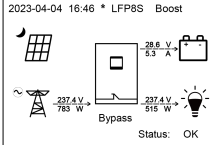
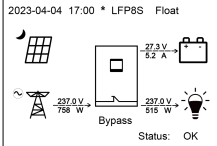
- The battery voltage is lower than or equal to the LVD value.
- The battery SOC is lower than or equal to the DP value.

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 working mode returns to state ②.

4.2.3 Scenario C: The PV is not available, but the Utility is available.

	Charging Mode: "Solar"	Discharging Mode: "Inverter"
(C-1) PV ☒ Utility ☒	 2022-04-03 20:39 * LFP8S 24.5 V 25.3 A 220.2 V 550 W EPEVER Status: OK $\begin{matrix} V_{BAT} \geq LVR \\ /SOC \geq DPR \end{matrix} \quad \begin{matrix} V_{BAT} \leq LVD \\ /SOC \leq DP \end{matrix}$  2022-04-03 20:39 * LFP8S 24.0 V 43.7 A 236.2 V 425 W Bypass Status: Err 05	① Any of the following is satisfied, the battery supplies the load. - No under voltage protection occurs, the battery voltage is greater than or equal to the LVD value. - After under voltage protection occurs, the battery voltage is greater than or equal to the LVR value. - No SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DP value. - After SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DPR value. ② Any of the following is satisfied, the Utility supplies power to the load. - The battery voltage is lower than or equal to the LVD value. - The battery SOC is lower than or equal to the DP value.
(C-2) PV ☒ Utility ☒	 2022-04-04 15:13 * LFP8S 236.2 V 425 W 236.1 V 420 W Bypass Status: Err 50	The Utility supplies power to the load.

(C-3)	Charging Mode: "Solar prior"	Discharging Mode: "Bypass"
PV ☒	 2023-04-11 13:55 * LFP8S 218.1 V → 218.1 V 785 W → 164 W Bypass Status: Err 50	① Any of the following is satisfied, the Utility supplies power to the load and charges the battery simultaneously. • The battery voltage is lower than or equal to the AON value. • The battery SOC is lower than or equal to the UCO value.
Utility ☒	$V_{BAT} \leq AON$ $/SOC \leq UCO$ $V_{BAT} \geq AOF$ $/SOC \geq UCF$  2023-04-11 13:56 * LFP8S 218.1 V → 218.1 V 785 W → 164 W Bypass Status: OK	② Any of the following is satisfied, the Utility supplies power to the load only and stops charging the battery. • The battery voltage is higher than or equal to the AOF value. The battery SOC is greater than or equal to the UCF value.

(C-4)	Charging Mode: "Utly & solr"	Discharging Mode: "Bypass"
PV ☒	 2023-04-04 16:46 * LFP8S Boost 237.4 V → 28.6 V 783 W → 5.3 A Bypass Status: OK	When the battery backup is in the boost charging status, or when the battery backup enters the float charging status and the battery voltage is lower than or equal to the FCV value; the Utility supplies power to the load and charges the battery simultaneously.
Utility ☒	 2023-04-04 17:00 * LFP8S Float 237.0 V → 27.3 V 758 W → 5.2 A Bypass Status: OK	
Note: The battery backup will return to the boost charging status when it exits from the floating charging status.		

4.2.4 Scenario D: Both PV and Utility are not available.

	Regardless of the charging mode and discharging mode, the working mode is as follows.	
(D) PV ☒ Utility ☒	2023-04-03 20:40 * LFP8S  24.2 V -25.7 A 20.1 V -460 W EPEVER Status: OK $\begin{array}{c} V_{BAT} \geq LVR \\ / SOC \geq DPR \end{array} \parallel \begin{array}{c} V_{BAT} \leq LVD \\ / SOC \leq DP \end{array}$ 2023-04-03 20:41 * LFP8S  20.9 V 0.0 A EPEVER Status: Err 05 <td> ① Any of the following is satisfied, the battery supplies the load. ● No under voltage protection occurs, the battery voltage is greater than or equal to the LVD value. ● After under voltage protection occurs, the battery voltage is greater than or equal to the LVR value. ● No SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DP value. ● After SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DPR value. ② Any of the following is satisfied, the battery stops supplying the load. ● The battery voltage is lower than or equal to the LVD value. ● The battery SOC is lower than or equal to the DP value. </td>	① Any of the following is satisfied, the battery supplies the load. ● No under voltage protection occurs, the battery voltage is greater than or equal to the LVD value. ● After under voltage protection occurs, the battery voltage is greater than or equal to the LVR value. ● No SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DP value. ● After SOC low-energy disconnect occurs, the battery SOC is greater than or equal to the DPR value. ② Any of the following is satisfied, the battery stops supplying the load. ● The battery voltage is lower than or equal to the LVD value. ● The battery SOC is lower than or equal to the DP value.

5 Protections

No.	Protections	Instruction
1	PV limit current/power	When the PV array's actual charging current/power exceeds its rated current/power, it will charge the battery as per the rated current/power.
2	PV reverse polarity	Fully protect against PV reverse polarity, correct the wire connection to resume normal operation. If the PV open-circuit voltage $\geq 95V$, the battery backup will be damaged.
3	Night reverse charging	Prevent the battery from discharging through the PV module at night.
4	Utility input overvoltage	When the utility voltage exceeds the setting value of "Utility Over Voltage Disconnect Voltage", the utility stops charging the battery and supplying the load.
5	Utility input undervoltage	When the utility voltage is lower than the setting value of "Utility Low Voltage Disconnect Voltage", the utility stops charging the battery and supplying the load.
6	Utility overcurrent	When the actual Utility current triggers the protection strategy of the "AC input overload relay", the "AC input overload relay" is disconnected. The Utility input is recovered after the user reset the "AC input overload relay" manually. When the Utility supplies the load and charges the battery, the actual Utility input current exceeds the "Max. Utility Input Current" setting value, the overload protection strategy will be triggered.
7	Battery polarity reverse	The HPS-AHL home battery backup has reverse connection protection functionality for the lithium battery. But avoid these situations: (1) During maintenance, if the PV is properly connected and powered on, a reverse-connected lithium battery will damage the battery backup. (2) A reverse-connected expansion battery will damage the battery backup.
8	Battery overvoltage	When the battery voltage goes higher than the [Over Voltage Disconnect Voltage], the battery backup will stop charging the battery to protect the battery from being over-charged.

9	Battery over-discharge	When the battery voltage goes lower than the [Low Voltage Disconnect Voltage], the battery backup will stop discharging the battery to protect the battery from being over-discharged.		
10	Battery low/high temperature	The battery backup reserves a battery temperature sensor port. The battery will stop discharging when its temperature is higher than 50°C or lower than -20°C, and it will resume discharging when its temperature is normal. The battery will stop charging when its temperature is higher than 50°C or lower than 0°C, and it will resume charging when its temperature is normal. This function ensures battery safety and extends the battery life.		
11	Load output short circuit	The output is turned off immediately in the occurrence of short-circuiting. And then, the output is recovered automatically after a delay time of 5s, 10s, and 15s separately (less than three times recovery within 5 minutes, it will be recounted). The battery backup stops working after the 4th protection and can resume working after resetting or restarting. Clear the fault in time because it may damage the battery backup.		
12	Load output overload (HPS1022-AHL0210, HPS1021-AHL0210)	Load power	Working time	Note
		$P_{LOAD} < 1,010W$	Always ⁽¹⁾	The battery backup performs the protection strategy after reaching the working time. And then, it will recover the load output after a delay time. The battery backup stops working after the 4th protection and can resume working after resetting or restarting.
		$1,010W \leq P_{LOAD} < 2,000W$	4 seconds ⁽²⁾	
		$P_{LOAD} \geq 2,000W$	Immediately ⁽³⁾	
	Load output overload (HPS1522-AHL0310, HPS1521-AHL0310)	$P_{LOAD} < 1,515W$	Always ⁽¹⁾	
		$1,515W \leq P_{LOAD} < 3,000W$	4 seconds ⁽²⁾	
		$P_{LOAD} \geq 3,000W$	Immediately ⁽³⁾	
	Load output overload (HPS2522-AHL0610, HPS2521-AHL0610)	$P_{LOAD} < 2,525W$	Always ⁽¹⁾	
		$2,525W \leq P_{LOAD} < 5,000W$	4 seconds ⁽²⁾	
		$P_{LOAD} \geq 5,000W$	Immediately ⁽³⁾	

13	Device overheating	When the internal temperature overheats, the battery backup will stop charging/discharging. The battery backup will resume charging/discharging when the internal temperature recovers normal.
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- (1) The battery backup works always without protection occurs.
- (2) Recover the load output after a delay time of 4 seconds.
- (3) Trigger the protection strategy immediately.

6 Troubleshooting

NOTICE

After the HPS-AHL home battery backup is powered on, the meter displays the boot screen all the time (unable to enter the home screen) and the red "RUN" indicator flashes. It means the communication is error. When the above fault occurs, check whether the communication cable is disconnected. If not, don't hesitate to contact our after-sales engineer.

6.1 Battery faults

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer	Solution
Err4	BAT OVP (Battery Overvoltage Protection)	--	--	Disconnect the utility and PV sides, and check whether the expansion battery voltage is too high. Or check if the "over voltage disconnect voltage" setting value is too low. After the battery voltage is lower than the "over voltage reconnect voltage" setting value, the alarm will be automatically cleared.
Err5	BAT UVP (Battery Undervoltage Protection)			Wait until the battery voltage resume to or above the "low voltage reconnect voltage."
Err11	BAT OTP (Battery Over Temperature Protection)			Ensure the battery backup is installed in a cool and well-ventilated place. It resumes normal work when the battery cools down to below the "Battery Over Temperature Protection Recovery."
Err37	BAT OCP (Battery Overcurrent Protection)			Check that the battery actual charging and discharging current does not exceed the setting values of "Battery Max. charging current " and "Battery limit discharging current."
Err50	BAT UNDERVOLT WARN (Battery Undervoltage Warning)	--	--	Check whether the expansion battery voltage is lower than the "low voltage disconnect voltage." Reduce the use of loads or supply power to the battery through the Utility or PV in time.

Err56	BAT FTA (Battery Fail to Activate)			Check the internal battery status by a professional personnel.
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(1)The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

6.2 PV faults

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer ⁽²⁾	Solution
Err13	PV1 OTP (PV1 Over Temperature Protection)	PV indicator green on	--	Ensure the battery backup is installed in a cool and well-ventilated place.
Err15	PV1 OVP (PV1 Overvoltage Protection)	PV indicator red on	Intermittent beeps	Check if the PV open-circuit voltage is too high (greater than 100 V). The alarm is released when the PV open-circuit voltage is below 95 V.
Err16	PV1 UVP (PV1 Undervoltage Protection)	--	--	Check if the PV open-circuit voltage is lower than the "PV under voltage protect voltage" setting value, or whether the PV capacity is insufficient. The alarm is released when the PV open-circuit voltage is restored to the "PV under voltage recover voltage" or above.
Err17	PV1 OCP (PV1 Overcurrent Protection)	PV indicator green on	--	Turn off the battery backup first, wait for 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err30	PV HARD FAULT (PV Hardware Fault)	PV indicator red on	Intermittent beeps	Turn off the battery backup first, wait for 5 minutes and then turn on the battery backup to check if it resumes normal.

Err43	PV1TS NC (PV1 Temperature Sensor No Connection)	PV indicator green on	--	If it is still abnormal, please contact our technical support.
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(1) The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

(2) Set the "BuzzerAlert" parameter as "ON"; the buzzer beeps after an error occurs. After the error is cleared, the buzzer is automatically silent. If the "BuzzerAlert" parameter is set as "OFF," the buzzer will not beep even if there is an error.

6.3 Inverter faults

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer ⁽²⁾	Solution
Err2	INV OCP (Inverter Overcurrent Protection)	LOAD indicator red ON	Intermittent beeps	Check if the load actual power exceeds the continuous output power, disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err7	INV OVP (Inverter Overvoltage Protection)	LOAD indicator red ON	Intermittent beeps	Disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err10	INV OTP (Inverter Over Temperature protection)	--	--	Ensure the battery backup is installed in a cool and well-ventilated place.

Err22	HARD INV OVP (Inverter Hardware Overvoltage Protection)	LOAD indicator red ON	Intermittent beeps	Disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err23	HARD INV OCP (Inverter Hardware Overcurrent Protection)			
Err32	INV VOLT OFFSET ERR (Inverter Voltage Offset Error)	--	--	
Err35	INV CURR OFFSET ERR (Inverter Current Offset Error)	--	--	Disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err45	ITS NC (Inverter Temperature Sensor No Connection)	LOAD indicator green ON	--	Turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err49	INV UVP (Inverter Undervoltage Protection)	LOAD indicator red ON	Intermittent beeps	Check if the load actual power exceeds the continuous output power, disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.

(1) The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

(2) Set the "BuzzerAlert" parameter as "ON"; the buzzer beeps after an error occurs. After the error is cleared, the buzzer is automatically silent. If the "BuzzerAlert" parameter is set as "OFF," the buzzer will not beep even if there is an error.

6.4 Utility faults

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer ⁽²⁾	Solution
Err8	AC OVP (AC Overvoltage Protection)	GRID indicator red on	Intermittent beeps	Check if the utility voltage is normal (i.e. within the "Utility work voltage range"), disconnect the AC input completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err9	AC OCP (AC Overcurrent Protection)	GRID indicator red on	Intermittent beeps	Check if the load actual power exceeds the continuous output power, disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err25	AC UVP (AC Undervoltage Protection)	GRID indicator red on	--	
Err28	AC PRECHG OUT (AC Pre-charge timeout)	GRID indicator green on	--	Disconnect the AC input completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err29	AC RELAY Adhesion (AC Relay Adhesion. Namely, AC relay abnormal)			
Err31	AC FREQ ERR (AC Frequency Error)	GRID indicator red on	Intermittent beeps	

(1)The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

(2)Set the "BuzzerAlert" parameter as "ON"; the buzzer beeps after an error occurs. After the error is cleared, the buzzer is automatically silent. If the "BuzzerAlert" parameter is set as "OFF," the buzzer will not beep even if there is an error.

6.5 Load faults

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer ⁽²⁾	Solution
Err3	LAOD CURR OFFSET ERR (Load current offset error)	--	--	Disconnect the load completely and turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err48	OVERLOAD (Overload)	LOAD indicator red ON	Intermittent beeps	
Err55	OVERLOAD LOCK (Overload lock)			

(1)The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

(2)Set the "BuzzerAlert" parameter as "ON"; the buzzer beeps after an error occurs. After the error is cleared, the buzzer is automatically silent. If the "BuzzerAlert" parameter is set as "OFF," the buzzer will not beep even if there is an error.

6.6 Others

Error code ⁽¹⁾	Fault/Status	Indicator	Buzzer	Solution
Err0	BUS OVP (DC Bus Overvoltage Protection)	--	--	Turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err6	BUS UVP (DC Bus Undervoltage Protection)			

Err12	AMBIENT OTP (Ambient Over Temperature Protection)			Ensure the battery backup is installed in a cool and well-ventilated place.
Err21	HARD OVP (Hardware Overvoltage Protection)			
Err24	BAT CHG OCP (Battery Charge Overcurrent Protection)			
Err36	CHG CURR OFFSET ERR (Charge Current Offset Error)			Turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err38	PUSH DRV ERR (Push Driver Error)			
Err40	APS ERR (Auxiliary Power Supply Error)			
Err41	RTS NC (Remote Temperature Sensor No Connection)			Check whether the remote temperature sensor is connected normally.
Err42	ATS NC (Ambient Temperature Sensor No Connection)			Turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err46	LIMITCHG (Low Temperature Limit Charging)	--	--	Check whether the ambient temperature is lower than the set "Charge low temperature limit" and "Discharge low temperature limit."
Err47	LIMITDISCHG (Low temperature Limit Discharging)			

Err54	EEP ERR (EEPROM Error)			Turn off the battery backup. Wait 5 minutes and then turn on the battery backup to check if it resumes normal. If it is still abnormal, please contact our technical support.
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(1)The error code is displayed at the "Status" bar in the lower right corner of the LCD interface. If multiple errors exist, only the minimum error code will be displayed.

7 Maintenance

The following inspections and maintenance tasks are recommended at least twice yearly for best performance.

- Make sure no block on airflow around the battery backup. Clear up dirt and fragments on the radiator.
- Check all the wired cables to ensure insulation is not damaged for serious solarization, frictional wear, dryness, insects or rats, etc. Repair or replace some wires if necessary.
- Check and confirm that LED or LCD is consistent with the required. Pay attention to any troubleshooting or error indication. Take necessary corrective action.
- Confirm that all the terminals have no corrosion, insulation damage, high temperature, or burnt/discolored sign. Tighten terminal screws to the suggested torque.
- Check for dirt, nesting insects, and corrosion. If so, clear up in time.
- Check and confirm that the lightning arrester is in good condition. Replace a new one in time to avoid damaging the battery backup and other equipment.
- If the battery backup is not used for a long time; please keep the battery SOC $\geq 50\%$. Charge and discharge the battery every 3 months.



DANGER

Electric shock hazard! Make sure that the power supply of battery backup is disconnected when performing the above operations. Wait for 10 minutes for the power in the capacitor to be discharged before performing the corresponding checks or operations.

8 Technical Specifications

Model	HPS1022-AHL0210	HPS1522-AHL0310	HPS2522-AHL0610
PV Input (DC)			
Maximum Input Power	520W	780W	1,560W
Maximum Open-circuit Voltage	95V		
Maximum Charging Current	20A	30A	60A
MPPT Voltage Range	24V to 76V		
MPPT Input Channels	One way		
AC Input (AC)			
Rated Input Voltage	220V/230V		
Input Voltage Range	175V to 285V		
Breakdown Voltage	290V		
Maximum Operating Current (Charging plus Bypass)	7A @220V	10A @220V	15A @220V
Rated Input Frequency	50Hz/60Hz		
Switch Time	Switch Time-Utility to Inverter: ≤20ms Switch Time-Inverter to Utility: ≤20ms		
DC Output			
DC Output (*2)	12V= 2A, Max. 24W/port, Total 48W		
USB-A Output (*2)	5V= 3A, Max. 15W/port, Total 30W		
USB-C Output (*1)	5V= 3A, Max. 15W		

USB-C Output (*1)	5/9/12/15V= 3A, 20V= 5A, Max. 100W		
DC Output Switch	HAVE		
AC Output (AC)			
Rated Output Power (@25℃)	1,000W	1,500W	2,500W
Transient Surge Output Power	1,800W	2,700W	4,500W
Rated Output Voltage	220V/230V ± 3%		
Rated Output Frequency	50Hz/60Hz ± 0.2%		
THDu	≤ 3% (Resistive load)		
Output Voltage Waveform	Pure sine wave		
Battery			
Battery Type	LFP8S2P	LFP8S3P	LFP8S1P
Voltage Range	21.0VDC to 30.0VDC		
Rated Voltage	25.6VDC		
Maximum Continuous Charging Current	40A	60A	100A
Maximum Continuous Discharging Current	72A	108A	100A
Operating Temperature	Discharging Mode: -20℃ to 50℃ Charging Mode: 0℃ to 50℃		
Normalal Capacity	40Ah	60Ah	102Ah
Cell Dimension	Diameter: 40.0 + 0.5/- 0mm Height: 136.25 ± 0.5mm	Diameter: 40.0 + 0.5/- 0mm Height: 136.25 ± 0.5mm	Length: 160.0 ± 0.8mm Height: 118.5 ± 0.5mm Width: 50.1 ± 0.5mm

Cycle Life	2,000 times ⁽¹⁾		5,000 times ⁽²⁾
Environmental Parameters			
Operating Temperature	-20℃ to 50℃ ⁽³⁾ (when the environment temperature exceeds 30℃, the charging power and load power will be reduced appropriately; working of full load is not supported.)		
Ingress Protection	IP30		
Mechanical Parameters			
Dimension (L × W × H)	385mm × 307mm × 345mm (With floor mats and handles)	385mm × 307mm × 345mm (With floor mats and handles)	427mm × 325.4mm × 368mm (With floor mats and handles)
Weight	20.0kg	24.0kg	37.0kg
Others			
Display	Monochrome LCD, English interface		
Communication Method	Bluetooth, RS485 (WiFi optional)		
AC Input Overload Relay	HAVE		

(1) $25 \pm 2^{\circ}\text{C}$, charging at 0.5C, discharging at 1C, 90%DOD (SOC range: 100% to 10%), cycle to 80% of nominal capacity.

(2) $25 \pm 2^{\circ}\text{C}$, charging at 0.5C, discharging at 0.5C, capacity $\geq 80\%$.

(3) The actual output power is reduced with the temperature: From 30℃ to 50℃; the actual output power will be reduced by 5% for each 1℃ increase.

Model	HPS1021-AHL0210	HPS1521-AHL0310	HPS2521-AHL0610
PV Input (DC)			
Maximum Input Power	520W	780W	1,560W
Maximum Open-circuit Voltage	95VDC		
Maximum Charging Current	20A	30A	60A
MPPT Voltage Range	24VDC – 76VDC		
MPPT Input Channels	One way		
AC Input (AC)			
Rated Input Voltage	120V		
Input Voltage Range	90V to 140V		
Maximum Operating Current (Charging plus Bypass)	15A @120V		
Rated Input Frequency	50Hz/60Hz		
Switch Time	Switch Time-Utility to Inverter: ≤20ms Switch Time-Inverter to Utility: ≤20ms		
DC Output			
DC Output (*2)	12V= 2A, Max. 24W/port, Total 48W		
USB-A Output (*2)	5V= 3A, Max. 15W/port, Total 30W		
USB-C Output (*1)	5V= 3A, Max. 15W		
USB-C Output (*1)	5/9/12/15V= 3A, 20V= 5A, Max. 100W		
DC Output Switch	HAVE		
AC Output (AC)			

Rated Output Power (@25℃)	1,000W	1,500W	2,500W
Transient Surge Output Power	1,800W	2,700W	4,500W
Rated Output Voltage	120V ± 3%		
Rated Output Frequency	60Hz/50Hz ± 0.2%		
THDu	≤ 5% (Resistive load)		
Output Voltage Waveform	Pure sine wave		
Battery			
Battery Type	LFP8S2P	LFP8S3P	LFP8S1P
Voltage Range	21.0VDC – 30.0VDC		
Rated Voltage	25.6VDC		
Maximum Continuous Charging Current	40A	60A	100A
Maximum Continuous Discharging Current	72A	108A	100A
Operating Temperature	Discharging Mode: -20℃ to 50℃ Charging Mode: 0℃ to 50℃		
Normalal Capacity	40Ah	60Ah	102Ah
Cell Dimension	Diameter: 40.0 ± 0.5/- 0mm Height: 136.25 ± 0.5mm	Diameter: 40.0 ± 0.5/- 0mm Height: 136.25 ± 0.5mm	Length: 160.0 ± 0.8mm Height: 118.5 ± 0.5mm Width: 50.1 ± 0.5mm
Cycle Life	2,000 times ⁽¹⁾		5,000 times ⁽²⁾
Environmental Parameters			
Operating	-20℃ to 50℃ ⁽³⁾ (when the environment temperature exceeds 30℃, the		

Temperature	charging power and load power will be reduced appropriately; working of full load is not supported.)		
Ingress Protection	IP30		
Mechanical Parameters			
Dimension (L × W × H)	385mm × 307mm × 345mm (With floor mats and handles)	385mm × 307mm × 345mm (With floor mats and handles)	427mm × 325.4mm × 368mm (With floor mats and handles)
Weight	20.0kg	24.0kg	37.0kg
Others			
Display	Monochrome LCD, English interface		
Communication Method	Bluetooth, RS485 (WiFi optional)		
AC Input Overload Relay	HAVE		

(1) $25 \pm 2^{\circ}\text{C}$, charging at 0.5C, discharging at 1C, 90%DOD (SOC range: 100% to 10%), cycle to 80% of nominal capacity.

(2) $25 \pm 2^{\circ}\text{C}$, charging at 0.5C, discharging at 0.5C, capacity $\geq 80\%$.

(3) The actual output power is reduced with the temperature: From 30°C to 50°C ; the actual output power will be reduced by 5% for each 1°C increase.

Any changes without prior notice! Version number: V2.0



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