USER MANUAL

Inverter/charger

HP3522-AH1250P20SA
HP3542-AH0650P20SA
HP5542-AH1050P20SA

EN

Table of Contents

Important Safety Instructions

Please keep this manual for future reference.

This manual contains all the safety, installation, and operation instructions for the HP-AHP20SA series inverter/charger (hereinafter referred to as “inverter/charger”).

1. Explanation of symbols

To ensure the user's personal and property safety 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.

⚠ 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

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

3. Operations for professional and technical personnel

- Install the inverter/charger to a specified location.
- Conduct test operations for the inverter/charger.
- Operate and maintain the inverter/charger.

4. Safety precautions before installation

⚠ DANGER

- Keep the inverter/charger out of the reach of children.
- When installing the inverter/charger, end-users must evaluate whether the operation area exists arc danger.

NOTICE

- When receiving the inverter/charger, please check if there is any damage or scratches on the package and thoroughly verify the product model and the accessory list for completeness. If any anomalies (e.g., physical damage, model discrepancies, missing parts) are found, do not unpack the equipment. Please contact your authorized distributor immediately for instructions.
- When installing or moving the inverter/charger, follow the instructions in the manual.

5. Safety precautions for mechanical installation

⚠ DANGER

Before installation, confirm the inverter/charger has no electrical connection.

NOTICE

Ensure enough heat dissipation space for the inverter/charger before installation. Do not install the inverter/charger in humid, salt spray, corrosion, greasy, flammable, explosive, dust accumulative, or other severe environments.

6. Safety precautions for electrical connection

DANGER

- Do not put the inverter/charger close to the flooded lead-acid battery because the spark in the terminals may ignite the hydrogen released by the battery.
- Both the utility input and AC output are of high voltage, do not touch the wiring to avoid electric shock.
- When the AC output terminal connects to the load, the inverter/charger needs to stop working.

WARNING

- Ensure all wirings are secure to prevent overheating due to loose connections.
- The inverter/charger shell should be connected to the ground, and the cross-sectional area of the wire connecting the ground terminal to the earth should not be less than $4mm^2$.
- A fast-acting fuse or breaker should be used between the battery and inverter/charger; whose rated current should be twice of the inverter/charger rated input current.

NOTICE

- Do not connect the AC output terminal to other power sources or utility. Otherwise, the inverter/charger will be damaged.
- It is strictly forbidden to connect a transformer or a load with a surge power (VA) exceeding the overload power at the AC output port. Otherwise, the damage will be caused to the inverter/charger.

7. Safety precautions for inverter/charger operation

WARNING

- The inverter/charger 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 inverter/charger is working, do not open the inverter/charger shell for any operation.
- When eliminating the fault that affects the safety performance of the inverter/charger, please first disconnecting the DC input circuit breaker and AC output circuit breaker, and turn off the inverter/charger switch. Then, 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 device.
- Loose connection of power cables.
- Accidental dropping of screws or other components inside the inverter/charger.
- 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 inverter/charger

- 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.
- The inverter/charger does not contain repair parts internally. If any maintenance service is required, please get in touch with our after-sales service personnel.

⚠ CAUTION

Do not touch or open the shell after the inverter/charger is powered off within ten minutes.

10. Safety precautions for inverter/charger maintenance

- It is recommended to check the inverter/charger 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 inverter/charger may cause personal injury or equipment damage;
- It is recommended to wear an antistatic wrist strap or avoid unnecessary contact with the circuit board.

⚠ CAUTION

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

11. Working temperature

- Ambient temperature: -20℃ to +50℃ (when the working temperature exceeds 30℃, the charging power and load power will be reduced appropriately.)
- Storage temperature: -25℃ to +60℃ (No sharp temperature changing)
- Relative humidity: < 95% (Non-condensing)
- Altitude: < 4,000 meters (If the altitude exceeds 2,000 meters, the actual output power is reduced appropriately.)

Disclaimers

The warranty does not apply to the following conditions:

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

1 General Information

1.1 Overview

The HP-AHP20SA series is an integrated solar utility charging and inverting device. It combines charging from utility power, generators, and solar panels, and provides utility bypass power supply, independent AC inverter output (configurable for single-phase or three-phase settings with parallel capacity expansion), and energy management capabilities. Additionally, it supports parallel operation for multiple units (12 units in standard application, more than 12 units need to be customized) through single-phase parallel connection and three-phase grouping, with 220VAC single phase or 380VAC three phase AC output.

The DSP chip in the product with an advanced control algorithm brings high response speed and conversion efficiency. In addition, this product adopts an industrial design to ensure high reliability and features multiple charging and output modes.

The product adopts the Three-stage charging method (Bulk Charging, Constant Charging, and Float Charging) to ensure battery safety. The 3.5-inch lattice LCD screen shows the operational status and full parameters. Besides, the communication interface with the standard Modbus protocol allows end-users to expand their applications and is suitable for different monitoring requirements.

The new optimized MPPT tracking technology can fast-track the PV array's maximum power point in any sunlight conditions and obtain the maximum energy in real time. Two PV input (connect separately or connect in parallel) is supported, which improves the PV utilization.

The AC to DC charging process adopts the advanced control algorithm 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.

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 inverter/charger provides high-quality, high-stability, and high-reliability electric energy to the end-users by improving the solar system's power supply efficiency.

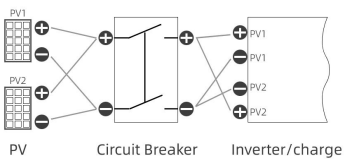
Features

- Full intelligent digital energy storage equipment
- Support battery mode or non-battery mode
- Non-battery mode: simultaneously charging with solar (Main) and Utility (Assist)
- Advanced SPWM technology and pure sine wave output

- Parallel operation in single phase or three phase for 12 units in standard application(1)
- PFC technology reduces the demand on the power grid capacity
- Advanced MPPT technology, with maximum tracking efficiency higher than 99.5%
- HP5542-AH1050P20SA supports two PV inputs to improve PV utilization(2)
- Supports charging from multiple types of generators(3)
- Battery voltage controls the dry contact to turn on/off the external equipment
- Battery charging or discharging current limit to compatible with different types of batteries
- Maximum utility charging current settings to flexibly configure utility charging power
- With the function of historical data recording(4), up to 25,000, the interval of 15 minutes can be recorded for half a year (the interval time of 1 second to 3,600 seconds settable)
- Multiple LED indicators show system status in real-time
- One-button control of AC output
- 3.5-inch LCD display for better status monitoring
- RS485 communication interface with optional WiFi, TCP, or 4G modules for remote monitoring
- With a built-in Bluetooth module, and the inverter/charger can be remotely monitored through the APP
- Three-stage charging method to ensure battery safety
- Lithium battery communication port to perform the safe charging and discharging
- Comprehensive electronic protection
- -20℃ to +50℃ operating temperature range to meets more environment requirements

(1) More than 12 units need to be customized.

(2) Only the HP5542-AH1050P20SA supports two PV input function, which realizes single MPPT tracking or two parallel MPPTs tracking. When two PV arrays are independently input, set the "PV mode" as "ALL SINGLE." When the two PV arrays are paralleled and connected to the Inverter as one, you need to set the mode to “ALL MULTIPLE”, and the wiring diagram is as shown below:



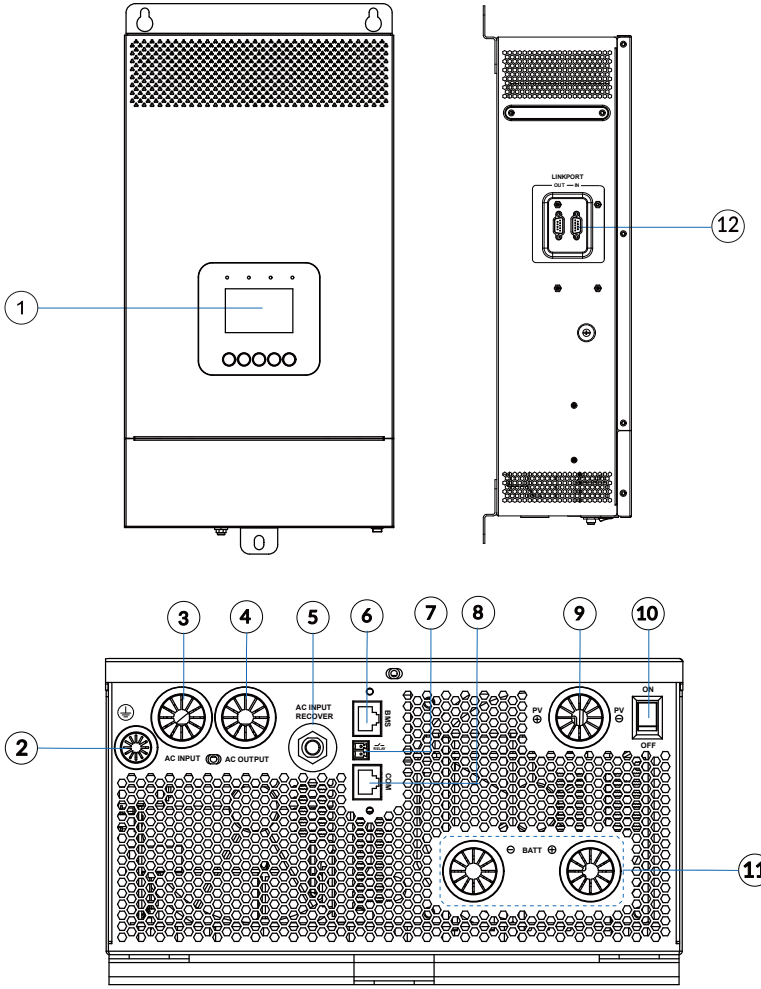
When there is only one PV array, the "PV mode" is "ALL SINGLE" by default, The "ALL MULTIPLE" is invalid.

(3) When connecting a non-inverter generator, the charging current maybe cannot reach the rated power. It is recommended to connect an inverter generator. When using the generator, the “AC Input mode” needs to be set to the “Generator”. For specific setting, refer to Subsection 2.5.1 Parameters list. To reduce the occurrence of overvoltage protection due to distortion of the generator's voltage waveform, it is recommended that the generator's power be at least 1.5 times greater than the rated power of the integrated unit.

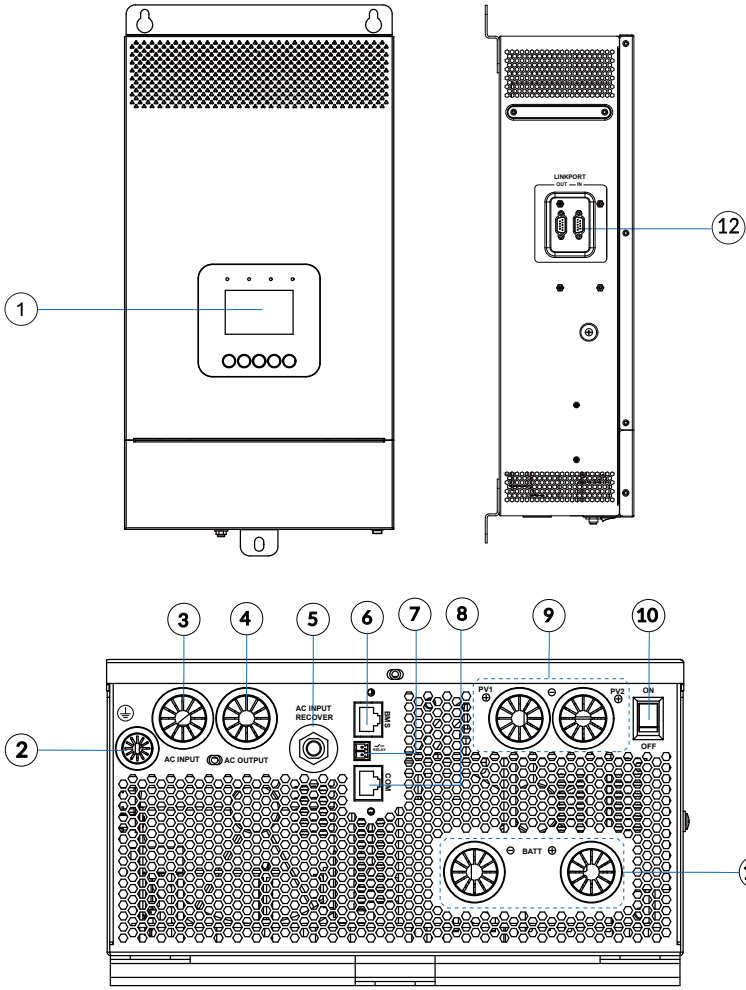
(4) The contents of each historical record include: Year, Month, Day, Hour, Minutes, Seconds, Maximum PV Voltage (V), PV Power (W), Utility Voltage (V), Utility Current (A), Utility Frequency (Hz), Utility Power (W), Load Voltage (V), Load Current (A), Load Power (W), Inverter Frequency (Hz), Battery Voltage (V), Battery Current (A), Battery SOC (%), Battery Temperature (℃), Boost Module Temperature (℃), INV Module Temperature (℃), Maximum BAT Volt (V), Minimum BAT Volt (V).

1.2 Appearance

- **HP3522-AH1250P20SA, HP3542-AH0650P20SA**

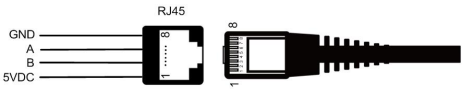


- **HP5542-AH1050P20SA**



No.	Instruction	No.	Instruction
1	LCD (see Chapter 2)	7	Dry contact interface[2]
2	Grounding terminal	8	RS485 port (RJ45, with isolation design)[3] 5VDC/200mA
3	AC input port	9	PV terminals
4	AC output port	10	Power switch
5	Utility over-current protector	11	Battery terminals
6	BMS port (RJ45, with isolation design)[1]	12	Parallel connection interface[4]

(1) This inverter charger integrates BMS-Link module, different lithium battery manufacturers' BMS protocols can be converted into our company's standard BMS protocol. In addition, it realizes the communication between the inverter/charger and the BMS. Pin definition for the BMS 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

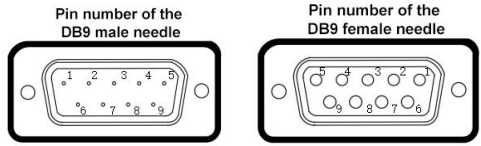
Tip Please go to EPEVER official website to check or download the currently supported BMS manufacturers and the BMS parameters.

(2) Dry contact specification: 1A@125VAC.

Function: The dry contact interface is connected with the generator switch to turn on/off the generator.

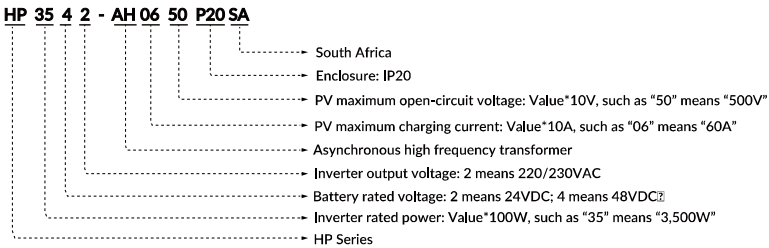
(3) Connecting with the RS485 port, an optional WiFi, TCP, or 4G module can remote control the inverter/charger. Pin definition for the RS485 port is the same as the BMS port, see description in above item (1).

(4) Pin definition for the parallel connection interface:



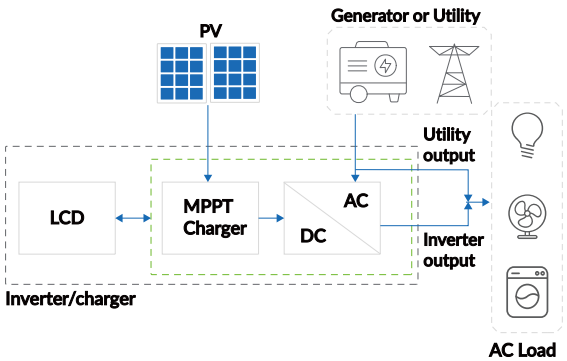
Pin	Definition	Pin	Definition
1	HFS-BUS	4	CAN-L
2	PFS-BUS	5	CAN-H
3	PS-GND	6/7/8/9	Reserved

1.3 Naming rules

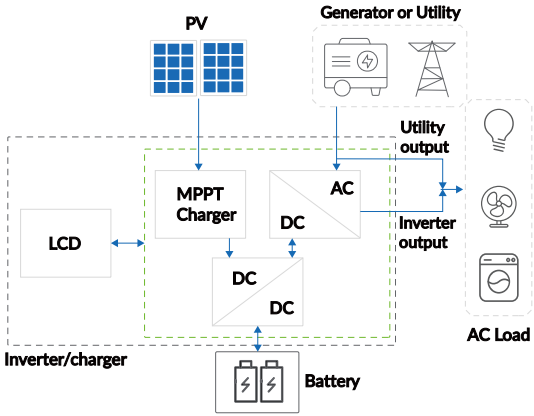


1.4 Connection diagram

- **No-battery mode**



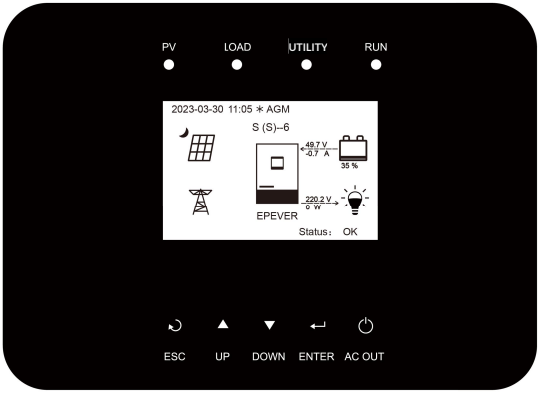
- **Battery mode**



NOTICE

- AC loads shall be determined according to the output power of the inverter/charger. The load exceeding the maximum output power may damage the inverter/charger.
- For different battery types, confirm the relevant parameters before power on.
- There are many types of oil generators with complex output conditions, which must be tested before use. It is necessary to undergo on-site no-load trial operation testing to confirm that the voltage and frequency fluctuations are within the allowable range of the equipment before use.

2 Interface



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.

2.1 Indicator

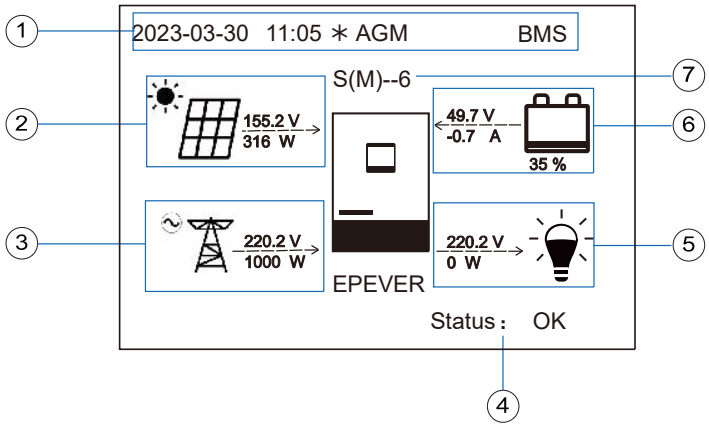
Indicator	Status	Description
PV	OFF	No PV input
	Solid green	PV normal
	Solid red	PV charging fault (PV1/PV2 overvoltage)
LOAD	OFF	No inverter output
	Solid green	Inverter, charging, and bypass are normal
	Solid red	Inverter fault (inverter overcurrent/overvoltage/ undervoltage, output short-circuit, and over load)
Utility	OFF	No utility input
	Solid green	Utility normal
	Flashing green (1Hz)	Oil generator charging

	Solid red	Utility charging fault (Utility overvoltage/ overcurrent/undervoltage/frequency abnormal)
RUN	Flashing green (1Hz)	Normal communication
	Flashing red (1Hz)	Communication fault

2.2 Buttons

Buttons	Operation	Instruction
	Click	• Exit the current interface. • Switch from the "Home page" to the "Main Table Data Information" screen.
	Click	• Browse interface: Up/Down. • Parameters setting interface: Increase or decrease the parameter value per step size.
	Press and hold	Parameters setting interface: Increase or decrease the parameter value per 10 times the step size.
	Click	• Click on the home page to enter the real-time data screen • Click on the parameter browse interface to enter the parameter setting interface. • Confirm the setting parameters.
	Press and hold	Press and hold on the home page to enter the password interface. After verifying the password, enter the parameter browse interface.
	Click	Click on the time or password setting interface to move the cursor left.
	Press and hold	Press and hold on the home page to turn on/off the inverter output, the utility charging, or the utility bypass.

2.3 Home page

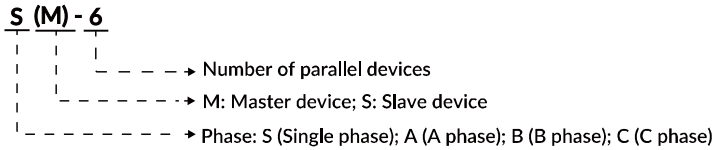


No.	Instruction
1	Display the system time, current battery type, and charging stage. When the BMS communication is normal, the icon BMS will be shown on the far right, while when it is abnormal, the icon BMS will be shown on the same position.
2	PV icon: PV connection is normal. No PV connection (or 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:** On the home page, click the “UP/DOWN” button to select the “Status” bar, and click the “ENTER” button to check the detailed fault.

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/lithium battery real-time SOC (Display the SOC value of the BMS when there is a BMS and the SOC value of the DSP when there is no BMS)
7	Parallel status icon. It shows when there is two or more inverter/chargers connect in parallel successfully, and it will not display on the single inverter/charger.

Note: When the PV array or Utility charges the battery, the equalization charging is performed on the 28th of each month by default (the date can be modified).

- **Parallel status icon naming rule:**

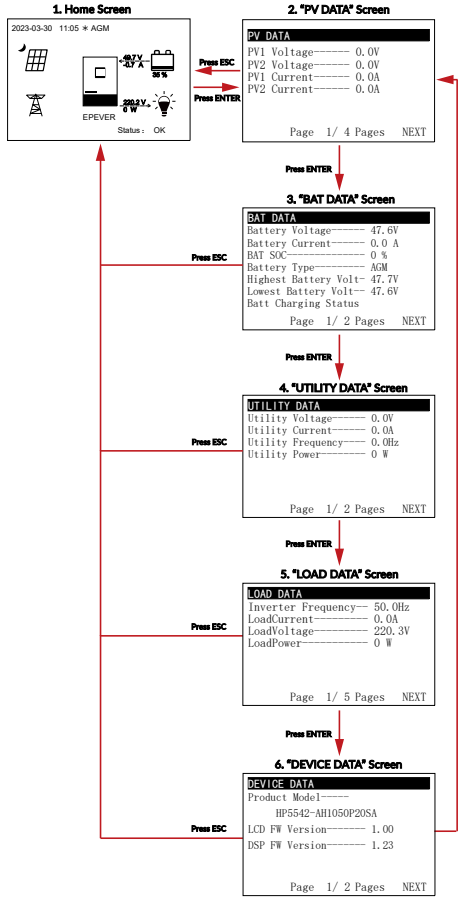


Note: The master and slave units are randomly defined.

2.4 Interface

2.4.1 Real-time data interface

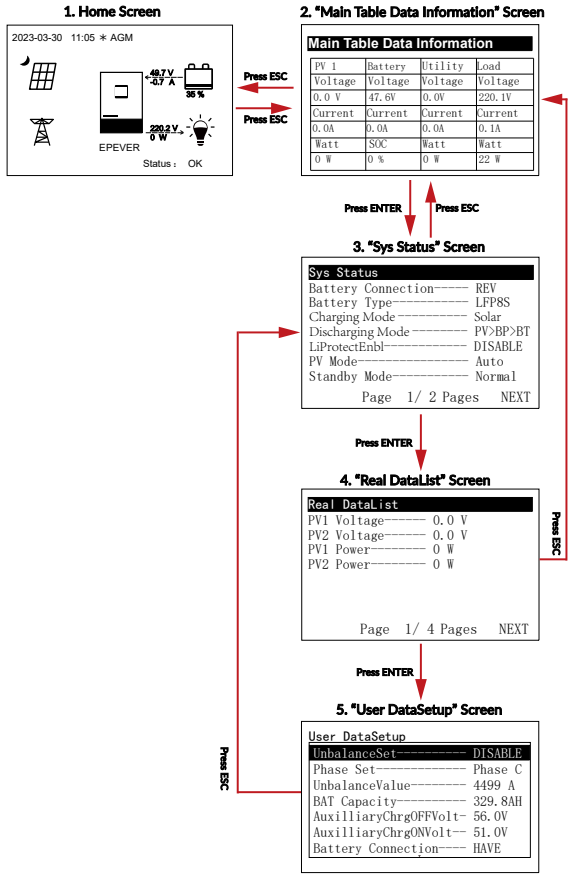
After powering on the inverter/charger, the home page shows up. Click the “ENTER” button to enter the real-time data screen. Click the “ENTER” button to enter the next real-time screen, click the “UP/DOWN” button to browse all parameters on current screen, or click the “ESC” button to return the home page.



Note: The LCD and DSP FM versions shall be subject to the actual display.

2.4.2 User interface

After powering on the inverter/charger, the home page 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.

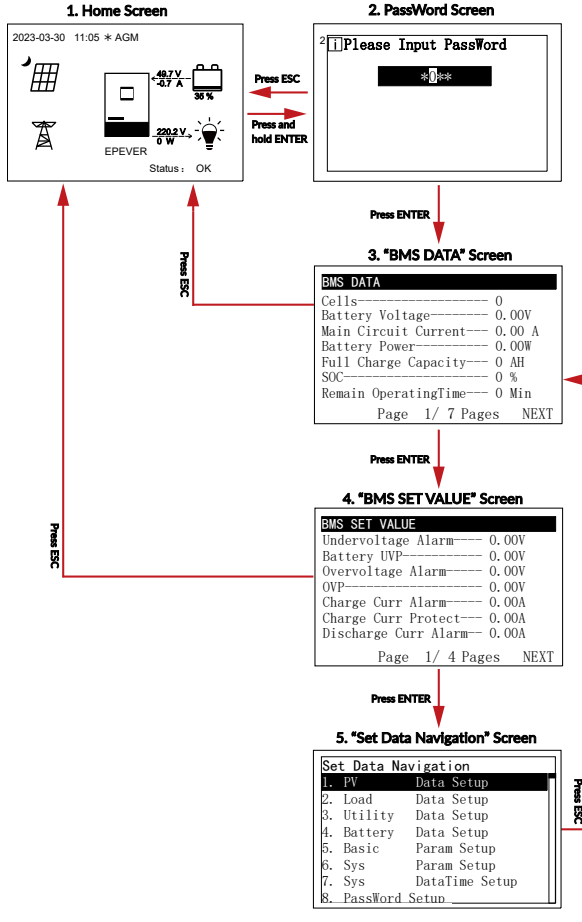


➢ **“User Data Setup” interface**

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 Subsection 2.5.1 Parameters list.

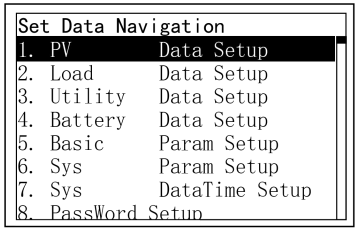
2.4.3 Administrator interface

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



2.5 Parameters setting

2.5.1 Parameters list



Enter the "Set Data Navigation" interface according to Subsection 2.4.3 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 (Except for "Battery Capacity" and "Log Data Interval", these values will be increased/decreased by 100 times the step size). Press the "ENTER" button to confirm.

Parameters	Default	User Define
1. PV Data Setup		
PV UVP (PV Undervoltage Protection)	80.0V	User define: 80.0V to (PV Undervoltage Recovery minus 5V), step size: 0.1V
PV UV Recovery (PV Undervoltage Recovery)	100.0V	User define: 100.0V to 200.0V, or (PV Undervoltage Protection plus 5V) to 200.0V, step size: 0.1V **Note:** Take the maximum value between 100.0V and (PV Undervoltage Protection plus 5V).
2. Load Data Setup		
Inverter Voltage (Inverter Output Voltage)	220V	User define: 220V, 230V
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 in the

		Utility bypass mode. For single inverter/charger, it will take effect immediately after the output frequency is changed. For the parallel connection, you must shut down the inverter/charger for 10s and then restart it for the modification to take effect (Enter into the Load Data Setup page again to check if the change has been changed).
UnbalanceSet (Current Unbalance Set)	DISABLE	User define: DISABLE, ENABLE **Note:** The parameter will only take effect when used in three phase. After restoring to factory settings, the default value is the last modified value.
Phase Set	Single	User define: Single, Phase A, Phase B, Phase C **Note:** After phase set is changed, must turn off the inverter charger for 10 seconds before restarting. Enter into the Load Data Setup page again to check if the change has taken effect. After restoring to factory settings, the default value is the last modified value.
UnbalanceValue (Current Unbalance Value)	5A	User define: HP3522-AH1250P20SA, HP3542-AH0650P20SA: 0–16A HP5542-AH1050P20SA: 0–25A, step size: 1A **Note:** The parameter will only take effect when used in three phase. When "UnbalanSet" is enabled, if current unbalance value between any two phases is higher than set value, the load output will be turned off automatically. After restoring to factory settings, the default value is the last modified value.
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
OV Reconnect Volt (Utility Overvoltage Reconnect Voltage)	255.0V	User define: 220.0V to (Utility Overvoltage Disconnect Voltage minus 10V), step size: 0.1V

UV Disconnect Volt (Utility Undervoltage Disconnect Voltage)	175.0V	User define: 90.0V to (Utility Undervoltage Recovery Voltage minus 10V), step size: 0.1V
UV Recovery Volt (Utility Undervoltage Recovery Voltage)	185.0V	User define: (Utility Undervoltage Disconnect Voltage plus 10V) to 220.0V, step size: 0.1V
OF Disconnect Freq (Utility Overfrequency Disconnect Frequency)	70.0Hz	In the bypass state, when the actual utility input frequency is higher than this value, the inverter/charger will be switched to the inverter output state. User define: 52.0Hz to 70.0Hz, or (Utility Underfrequency Disconnect Frequency plus 0.5Hz) to 70.0Hz, step size: 0.1Hz. **Note:** Take the maximum value between 52.0Hz and (Utility Underfrequency Disconnect Frequency plus 0.5Hz).
UF Disconnect Freq (Utility Underfrequency Disconnect Frequency)	40.0Hz	In the bypass state, when the actual utility input frequency is lower than this value, the inverter/charger will be switched to the inverter output state. User define: 40.0Hz to 58.0Hz, or 40.0Hz to (Utility Overfrequency Disconnect Frequency minus 0.5Hz), step size: 0.1Hz. **Note:** Take the minimum value between 58.0Hz and (Utility Overfrequency Disconnect Frequency minus 0.5Hz).
Max Charging Current (Utility Maximum Charging Current)	60.0A	User define: 5.0A to 60.0A for HP3542-AH0650P20SA, step size: 0.1A Namely, the maximum current at the battery end when the utility charges the battery.
	100.0A	User define: 5.0A to 100.0A for HP5542-AH1050P20SA, step size: 0.1A Namely, the maximum current at the battery end when the utility charges the battery.

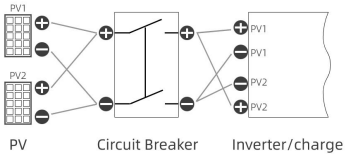
	110.0A	User define: 5.0A to 110.0A for HP3522-AH1250P20SA, step size: 0.1A Namely, the maximum current at the battery end when the utility charges the battery.
4. Battery Data Setup		
BAT Set Mode (Battery set mode)	Smart	User define: Smart (Refer to Subsection 2.5.3), Expert (Refer to Subsection 2.5.4)
Battery Capacity (Battery Capacity)	100.0AH	User define: 10.0AH to 1200.0AH, step size: 0.1AH **Note:** When setting Battery Capacity, press and hold "UP/DOWN" button to increase/decrease the value by 100*step size, namely, 10AH.
Equalization Charge Time (Battery Equalization Charging Time)	120 Min	User define: 10 minutes to 180 minutes, step size: 1 minute
Bulk Charging Time (Battery Bulk Charging Time)	120 Min	User define: 10 minutes to 180 minutes, step size: 1 minute
Battery TCC (Battery Temperature Compensation Coefficient)	3	Unit: mV/℃/2V User define: 0－9, step size: 1 **Note:** This option is reserved, which is invalid currently.
AuxiliaryChrgOFFVolt (Auxiliary Charging OFF Voltage)	56.0V (48V system)	Under certain working modes, the utility will stop charging the battery if the battery voltage exceeds this value. User define: (Auxiliary Charging ON Voltage plus (0.2*N)) ≤ Auxiliary Charging OFF Voltage ≤ Charging Limit Voltage (N=Rated battery voltage/12)
	28.0V (24V system)	
AuxiliaryChrgONVolt (Auxiliary Charging ON Voltage)	51.0V (48V system)	Under certain working modes, the utility will charge the battery if the battery voltage is lower than this value. User define: Low Voltage Disconnect Voltage ≤ Auxiliary Charging ON Voltage ≤ (Auxiliary Charging OFF Voltage minus (0.2*N)) (N = Rated battery voltage/12)
	25.5V (24V system)	

MaxCharginCurrent (Battery Maximum Charging Current)	60.0A	User define: 5.0A to 60.0A for HP3542-AH0650P20SA, step size: 0.1A Namely, the maximum allowable charge current on the battery side.
	100.0A	User define: 5.0A to 100.0A for HP5542-AH1050P20SA, step size: 0.1A Namely, the maximum allowable charge current on the battery side.
	120.0A	User define: 5.0A to 120.0A for HP3522-AH1250P20SA, step size: 0.1A Namely, the maximum allowable charge current on the battery side.
LimitDisChgCurrt (Battery Limit Discharging Current)	175.0A	User define: 10.0A to 175.0A for HP3542-AH0650P20SA, step size: 0.1A Namely, the maximum allowable discharge current on the battery side.
	250.0A	User define: 10.0A to 250.0A for HP5542-AH1050P20SA, step size: 0.1A Namely, the maximum allowable discharge current on the battery side.
	380.0A	User define: 10.0A to 380.0A for HP3522-AH1250P20SA, step size: 0.1A Namely, the maximum allowable discharge current on the battery side.
BMS COM Status (BMS Communication Status)	164	Read-only, 164 indicates abnormal BMS communication, 165 indicates normal BMS communication.
Charge&Discharge Mode (Battery Charge and Discharge Control Mode)	VOLT (Voltage)	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:** If "SOC" is selected, the battery needs to go through several full charge and discharge cycles, and the battery capacity must be set correctly.

BMS Invalid Action	DSP Auto	User define: DSP Auto, NoAction **DSP Auto**: The inverter/charger works according to the default mode and parameters. **NoAction**: No charging and discharging, equivalent to standby mode.
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 inverter/charger will stop charging the battery. User define: (Full Charge Protection Recovery SOC plus 5%) to 100%, or 80% to 100%, step size: 1% **Note:** Take the maximum value between (Full Charge Protection Recovery SOC plus 5%) and 80%.
Full Charge Recovery (Full Charge Protection Recovery SOC)	95%	It takes effect after the “Charge&Discharge Mode” is set as “SOC”. When the battery SOC is lower than this value, the inverter/charger 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 cannot be set separately (equals the "Discharging Recovery"). It takes effect after the “Charge&Discharge Mode” is set as “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% or (Discharging Protection SOC plus 5%) to (Discharging Recovery minus 5%), step size: 1%. **Note:** The lower limit takes the maximum value between 10% and (Discharging Protection SOC plus 5%), and the upper limit takes the minimum value between 35% and (Discharging Recovery minus 5%).
Discharging Recovery (Discharging Protection Recovery SOC)	40%	It takes effect after the “Charge&Discharge Mode” is set as “SOC”. User define: (Low Battery Alarm SOC plus 5%) to 60%, or 20% to 60%, step size: 1% **Note:** Take the maximum value between (Low

		Battery Alarm SOC plus 5%) and 20%.
Discharge Protection (Discharging Protection SOC)	10%	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 10% or (Low Battery Alarm SOC minus 5%), step size: 1% **Note:** The upper limit takes the minimum value between 10% and (Low Battery Alarm SOC minus 5%).
AuxiliaryChargingON (Utility Auxiliary Charging ON SOC)	30%	It takes effect after the "Charge&Discharge Mode" is set as "SOC". User define: 20% to 50%, or 20% to (Utility Auxiliary Charging OFF SOC minus 10%), step size: 1% **Note:** Take the minimum value between 50% and (Utility Auxiliary Charging OFF SOC minus 10%).
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 plus 10%) to 100%, or 40% to 100%, step size: 1% **Note:** Take the maximum value between (Utility Auxiliary Charging ON SOC plus 10%) and 40%.
SOC BAT Capacity (SOC Battery Capacity)	Not fixed, and updated in real time	Read-only. (After the BMS is connected, this value will read from the BMS)
LimitChgTemp (Limit Charge Temperature)	0.0℃	User define: -20℃ to 0℃, step size: 0.1℃ When the environment or the battery temperature is lower than this value, the inverter/charger will stop charging the battery.
LimitDisChgTem (Limit Discharge Temperature)	0.0℃	User define: -20℃ to 0℃, step size: 0.1℃ When the environment or the battery temperature is lower than this value, the inverter/charger will stop discharging.
OTP (Battery Over Temperature Protection)	50.0℃	User define: (Battery Over Temperature Protection Recovery plus 5℃) to 60℃, step size: 0.1 ℃

OTP Recovery (Battery Over Temperature Protection Recovery)	45.0℃	User define: 30℃ to (Battery Over Temperature Protection minus 5℃), step size: 0.1 ℃
Equalization Date (Equalization Charging Date)	28	User define: 1—28, step size: 1
Manual Equalize	OFF	User define: OFF, ON This parameter is for manual equalizing charging. When set to "ON", the inverter/charger enters the manual equalizing charging working mode. After the inverter/charger restarts, the default value is restored to "OFF," indicating that the inverter/charger is charged periodically according to the set equalization charging cycle.
SOC Calibration	--	Press the ENTER button to reset, the SOC will be automatically recalculated.
Reset Learned SOC	--	Press the ENTER button to reset the self study AH.
5. Basic Param Setup		
Battery Connection (Battery Have or Not)	HAVE	User define: HAVE, NO, REV **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 will be cut off for about 3 seconds before resuming normal output.
Charging Mode	Utlty&solr	User define: Solar, SolarPrior (Solar priority), Utlty&solr (Utility & solar), UtltyPrior (Utility priority). **Note:** For detailed working modes, refer to Chapter 4.
Discharging Mode	PV > BT > BP	User define: PV > BP > BT (namely, PV > Bypass > Battery), PV > BT > BP (namely, PV > Battery > Bypass), BP > PV > BT (namely, Bypass > PV > Battery). **Note:** For detailed working modes, refer to Chapter 4.

LiProtectEnbl (Lithium Battery Protection Enable)	DISABLE	User define: DISABLE, ENABLE Set this value as "ENABLE," the charge/discharge low temperature limit function is effective.
PV Mode	ALL SINGLE	User define: ALL SINGLE, ALL MULTIPLE, When two PV arrays are independently input, the value shall be set to "ALL SINGLE." When two PV arrays are connected in parallel as a single input to the inverter/charger, the value needs to be set to "ALL MULTIPLE." The wiring diagram is as shown below:  Product with one PV input is “ALL SINGLE” by default (other PV modes are invalid).
Standby Mode	Normal	User define: Normal, Standby When set as "Standby," the inverter charger will enter standby mode and the AC output will be stopped. After modifying the parameter and restarting the inverter/charger, the parameter will be restored to the default value (the previous modified value will not be saved).
Equalization Charging	DISABLE	User define: DISABLE, ENABLE This parameter is for automatic equalizing charging. Set this value as "ENABLE," the inverter/charger performs the equalize charging automatically. After modifying the parameter and restarting the inverter/charger, the parameter will be restored to the default value (the previous modified value will not be saved).

LowConsumptionMode	ENABLE	User define: DISABLE, ENABLE When set as "ENABLE," the inverter/charger will enter the low power consumption mode when certain conditions are met, such as no PV and utility, and the battery voltage drops to the “Low Voltage Disconnect Voltage”. After modifying the parameter and restarting the inverter/charger, the parameter will be restored to the default value (the previous modified value will not be saved).
Calibration Mode	OFF	User define:OFF; ON. **Note:** This option is reserved, which is invalid currently.
Factory Reset	--	Factory Set (After setting the "Standby Mode" as "Standby," some settings can be restored to the factory state.) **Note:** For other parameters, only the last modified values will be saved and cannot be restored to the factory state. Please refer to the parameter description for details. After setting, restart the inverter/charger for the setting to take effect.
Clear Fault	--	Press the “ENTER” button to exit the current fault state and resume normal operation. **Note:** The historical fault records will not be cleared.
Load	OPEN	User define: CLOSE, OPEN. Open or close the loads. This parameter and the load output switch are of the same control. To change the state of either one, the other will be changed too. After modifying the parameter and restarting the inverter/charger, the parameter will be restored to the default value (the previous modified value will not be saved).
PVDCInputSource	DISABLE	User define: DISABLE, ENABLE When using a DC power to replace the PV array for power supply testing, it is necessary to set the "PV DC Input Source" as "ENABLE." Otherwise, the inverter/charger cannot work properly. After modifying the parameter and restarting the inverter/charger, the parameter will be restored to the default value (the previous modified value will

		not be saved).
ResetEnergyStatistic (Reset Energy Statistics)	--	Press the ENTER button to clear all accumulated charge and discharge energy.
Dry Contact ON Volt (Dry Contact ON Voltage)	44.0V (48V system) 22.0V (24V system)	User define: 0V to (Dry Contact OFF Voltage minus 0.1*N), step size: 0.1V. **Note:** N=Rated battery voltage/12. When the battery voltage is lower than this value, the dry contact is connected.
Dry Contact OFF Volt (Dry Contact OFF Voltage)	50.0V (48V system) 25.0 (24V system)	User define: (Dry Contact ON Voltage plus 0.1*N) to Overvoltage Disconnect Voltage, step size: 0.1V. **Note:** N = Rated battery voltage/12. When the battery voltage is higher than this value, the dry contact is disconnected.
AC Input mode	Utility	User define: Utility, Generator When the AC input is a generator, this parameter needs to be set to "Generator" to improve the charging capability. **Note:** If the AC input mode does not match the AC source of the actual input, the normal operation of the inverter/charger will be affected. After setting, restart the inverter/charger for the setting to take effect.
BATT Input Mode	Shared	User define: Shared, Independent This parameter takes effect when the inverter/chargers are connected in parallel. If each inverter/charger is connected to the same battery pack, this value needs to be set to "Shared" mode. If each inverter/charger is connected to a separate battery pack, this value needs to be set to "Independent" mode.
6. Sys Param Setup		
Backlight Time	30S	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 **Note:** "LCD Backlight" is superior to “Backlight Time”.
BaudRate	115200	User define: 115200, 9600, 19200, 38400, 57600
COM ID	1	User define: 1—254, step size: 1
Log Data Interval	60S	User define: 1 second to 3,600 seconds, step size: 1 second **Note:** When setting this value, press and hold the “UP/DOWN” button to increase/decrease the value by 100*step size, namely, 100 seconds. Set the time interval of the historical data (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.)
Language	ENGLISH	User define: ENGLISH, CHINESE
Bluetooth	VALID	User define: INVALID, VALID.
Temperature Unit	℃	User define: ℃, ℉
BMS Communication	INVALID	User define: INVALID, VALID Set this value as "VALID," the inverter/charger will communicate with the battery or temperature sensor normally.
BMS Protocol	0	User define: 0—240, step size: 1 **Note:** Refer to the Lithium battery protocol file. No. 32 BMS protocol is reserved for the optional EPEVER RTS-D47K temperature sensor. When No. 32 is selected and the sensor is connected, "RTS" shows in the upper right corner of the display, indicating normal communication. No "RTS" is shown when no sensor is connected, and Err74 fault is reported.
BMS Com Method (BMS Communication Method)	RS485	Read-only.
Indicator	OPEN	User define: OPEN, CLOSE

		Turn on/off the PV/LOAD/UTILITY/RUN indicators.
BMS Voltage Control	DISABLE	User define: DISABLE, ENABLE Set this value as "ENABLE," the BMS internal control parameters will be automatically synchronized to the inverter/charger, and the inverter/charger will control the battery charging/discharging based on these parameters.
BMS Curr Control Way (BMS Current Control Method) (See Subsection 2.5.2 Battery work modes for details)	INVALID	User define: INVALID, BMS, VIRTUAL_BMS Set this value as "INVALID," the inverter/charger controls the charge and discharge according to the value set on the LCD. Set this value as "BMS," the inverter/charger controls the charge and discharge according to the read BMS value. Set this value as "VIRTUAL_BMS", the inverter/charger controls the charge and discharge according to the charge-discharge current value calculated by the MAP table, which is preset in the inverter/charger.
Log Data Reset	--	Press the ENTER button to clear the voltage, current and other data stored regularly, excluding the historical faults. **Note:** After pressing the ENTER button, the flashing LED light will become steady or turn off, and then the inverter/charger will restart, indicating that the reset is complete.
BATT Dischage Kx (Battery Charge/Discharge Coefficient)	3C	User define: 1C, 3C This value can be obtained by viewing the battery label. It takes effect only when the "BMS Curr Control Way" is set as "VIRTUAL_BMS." When this parameter is set to "3C," the inverter/charger controls the charge and discharge according to the minimum value between 3 × Battery Capacity and MaxCharginCurrent/LimitDisChgCurrt (which are set on the LCD).

MAP TEMP Select (MAP Temperature Select)	Default	User define: Default (25℃), BMS_ET (BMS environment temperature), BMS_C_MaxT (BMS cell maximum temperature), BMS_C_MinT (BMS cell minimum temperature), RS485, DSP The MAP table calculates the charging and discharging current values based on the temperature and SOC value of the lithium battery. When the lithium battery has BMS function and supports temperature upload, set “MAP TEMP Select” as "BMS_ET, BMS_C_MaxT, or BMS_C_MinT" according to the uploaded temperature. The “BMS_ET, BMS_C_MaxT, and BMS_C_MinT” take effect only when the “BMS Curr Control Way” is set as “VIRTUAL_BMS”. When the lithium battery only has a protection board, set “MAP TEMP Select” as “RS485” (A smart remote temperature sensor is needed). Otherwise; select "default (25℃)." “DSP” means the inverter/charger’s temperature by default.
ManualChageEnable (Manual Charge Enable)	ENABLE	User define: ENABLE, DISABLE Under the normal BMS communication, if the "ManualChageEnable" is set to "ENABLE," the lithium battery charging is allowed. If the "ManualChageEnable" is set to "DISABLE," the lithium battery charging is not allowed.
7. Sys DataTime Setup (See Subsection 2.5.5)		
8. Password Setup (See Subsection 2.5.6)		
9. Bat Control Data Setup (This will take effect when setting the "BAT Set Mode" as "Smart.")		
BAT Set Mode (Battery Set Mode)	Smart	Read-only.
Level	48V (48V system)	Read-only.
	24V (24V system)	

Battery Type	AGM	**48V battery type**: AGM, GEL, FLD, LFP15S, LFP16S, LNCM13S, LNCM14S
		24V battery type: AGM, GEL, FLD, LFP8S, LNCM6S, LNCM7S
Bulk Charging Volt (Bulk Charging Voltage)	57.6V (48V system)	Read-only. **Note:** They are determined by the battery type and cannot be modified.
	28.8V (24V system)	
Float Charging Volt (Float Charging Voltage)	55.2V (48V system)	
	27.6V (24V system)	
LV Recovery Volt (Low Voltage Recovery Voltage)	50.4V (48V system)	
	25.2V (24V system)	
LV Disconnect Volt (Low Voltage Disconnect Voltage)	44.4V (48V system)	
	22.2V (24V system)	
9. Bat Control Data Setup (This will take effect when setting the "BAT Set Mode" as "Expert" first)		
BAT Set Mode (Battery Set Mode)	Expert	Read-only.
Level	48V (48V system)	Read-only.
	24V (24V system)	
Battery Type	AGM	**48V battery type**: AGM, GEL, FLD, LFP15S, LFP16S, LNCM13S, LNCM14S

		24V battery type: AGM, GEL, FLD, LFP8S, LNCM6S, LNCM7S
OV Disconnect Volt (Overvoltage Disconnect Voltage)	64.0V (48V system)	User define: Overvoltage Recovery Voltage plus 0.1*N or Charging Limit Voltage < Overvoltage Disconnect Voltage ≤ 16*N, step size: 0.1V **Note:** Take the maximum value between Overvoltage Recovery Voltage plus 0.1*N and Charging Limit Voltage.
	32.0V (24V system)	
Charging Limit Volt (Charging Limit Voltage)	60.0V (48V system)	User define: Equalization Charging Voltage < Charging Limit Voltage < Overvoltage Disconnect Voltage, step size: 0.1V
	30.0V (24V system)	
OV Recovery Volt (Overvoltage Recovery Voltage)	60.0V (48V system)	User define: 42.8V ≤ Overvoltage Recovery Voltage < (Overvoltage Disconnect Voltage minus 0.1*N), step size: 0.1V. **Note:** N = Rated battery voltage/12.
	30.0V (24V system)	User define: 21.4V ≤ Overvoltage Recovery Voltage < (Overvoltage Disconnect Voltage minus 0.1*N), step size: 0.1V. **Note:** N = Rated battery voltage/12.
Equalization Volt (Equalization Charging Voltage)	58.4V (48V system)	User define: Bulk Charging Voltage ≤ Equalization Charging Voltage ≤ Charging Limit Voltage, step size: 0.1V
	29.2V (24V system)	
Bulk Charging Volt (Bulk Charging Voltage)	57.6V (48V system)	User define: Float Charging Voltage ≤ Bulk Charging Voltage ≤ Equalization Charging Voltage, step size: 0.1V
	28.8V (24V system)	
Float Charging Volt (Float Charging Voltage)	55.2V (48V system)	User define: Bulk Recovery Voltage < Float Charging Voltage ≤ Bulk Charging Voltage, step size: 0.1V
	27.6V (24V system)	

Bulk Recovery Volt (Bulk Recovery Voltage)	52.8V (48V system)	User define: Low Voltage Recovery Voltage < Bulk Recovery Voltage < Float Charging Voltage, step size: 0.1V
	26.4V (24V system)	
LV Recovery Volt (Low Voltage Recovery Voltage)	50.4V (48V system)	User define: Low Voltage Disconnect Voltage < Low Voltage Recovery Voltage < Bulk Recovery Voltage, step size: 0.1V
	25.2V (24V system)	
UV AlarmRecoveryVolt (Undervoltage Alarm Recovery Voltage)	48.8V (48V system)	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.
	24.4V (24V system)	
UV Alarm Voltage (Undervoltage Alarm Voltage)	48.0V (48V system)	User define: 42.8V ≤ Undervoltage Alarm Voltage < (Undervoltage Alarm Recovery Voltage minus 0.1*N), step size: 0.1V **Note:** N = Rated battery voltage/12.
	24.0V (24V system)	User define: 21.4V ≤ 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)	44.4V (48V system)	User define: 42.8V ≤ Low Voltage Disconnect Voltage < Low Voltage Recovery Voltage, step size: 0.1V
	22.2V (24V system)	User define: 21.4V ≤ Low Voltage Disconnect Voltage < Low Voltage Recovery Voltage, step size: 0.1V
Discharge Limit Volt (Discharging Limit Voltage)	42.4V (48V system)	Read-only.
	21.2V (24V system)	

Note: Except for some parameters (such as "Inverter Frequency, Phase Set, Factory Reset, and AC Input mode") that need the inverter/charger to be restarted to take effect after modification, the

rest of the parameter settings will take effect immediately without restart.

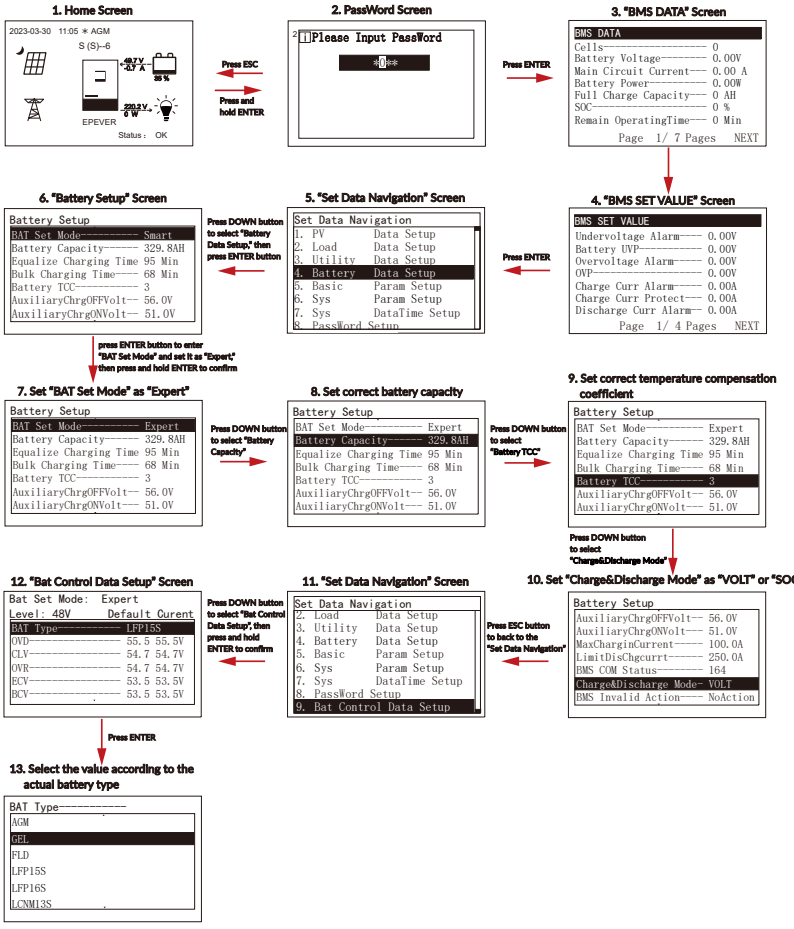
2.5.2 Battery work modes

The following table lists the recommended working mode and setting process for different application scenarios. According to your current battery status (such as whether it is a lithium-ion battery pack, whether it has BMS function, whether it has current control function at the end of charge and discharge, etc.), you can reasonably set the parameters to ensure that the battery works in the optimal performance, so as to ensure the safe operation of the system for a long time.

No.	Scenario	Recommended Working Mode	Setting Process
1	Non-lithium battery pack	The inverter/charger controls charging and discharging based on the LCD settings.	See Figure 1 "Setting process for non-lithium battery pack "
2	1. Lithium battery pack with BMS and current control function at the end of charge and discharge 2. Normal communication	The inverter/charger controls charging and discharging based on the read BMS values.	See Figure 2 "Setting process for lithium battery pack with BMS and current control function"
3	1. Lithium battery pack with BMS, but without current control function at the end of charge and discharge 2. Normal communication	The inverter/charger controls charging and discharging based on the pre-set MAP table.	See Figure 3 "Setting process for lithium battery pack with BMS, without current control function"
4	1. Lithium battery pack with protective board only (no BMS) 2. No communication (A smart remote temperature sensor is recommended in this scenario.)	The inverter/charger controls charging and discharging based on the pre-set MAP table.	See Figure 4 "Setting process for lithium battery pack with protective board only"

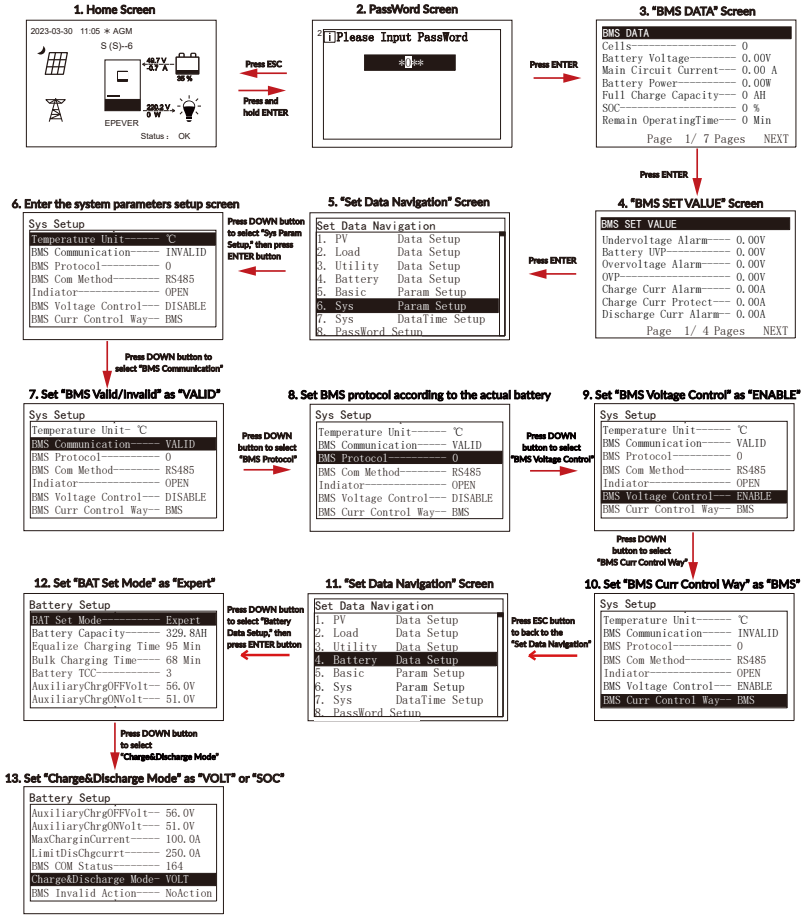
- **Figure 1 Setting process for non-lithium battery pack**

When the system adopts non-lithium battery packs (such as AGM, GEL, or FLD batteries), follow the flowchart below to set parameters correctly. Set “Battery Capacity, Battery TCC, Battery Type” correctly, and set “Charge&Discharge Mode” as “VOLT” or “SOC”. Then, set the battery voltage control parameters or SOC control parameters. The inverter/charger will control charging and discharging based on the LCD settings.



- **Figure 2 Setting process for lithium battery pack with BMS and current control function**

When the system adopts a lithium battery pack with BMS and current control function at the end of charge and discharge, and the lithium battery pack can communicate with the inverter/charger normally, follow the flowchart below to set parameters correctly. Set BMS protocol correctly, set "BMS Communication" as "VALID," set "BMS Voltage Control" as "ENABLE," set "BMS Curr Control Way" as "BMS," and set "Charge&Discharge Mode" as "VOLT" or "SOC". Then, set the battery voltage control parameters or SOC control parameters. The inverter/charger controls charging and discharging based on the read BMS values.



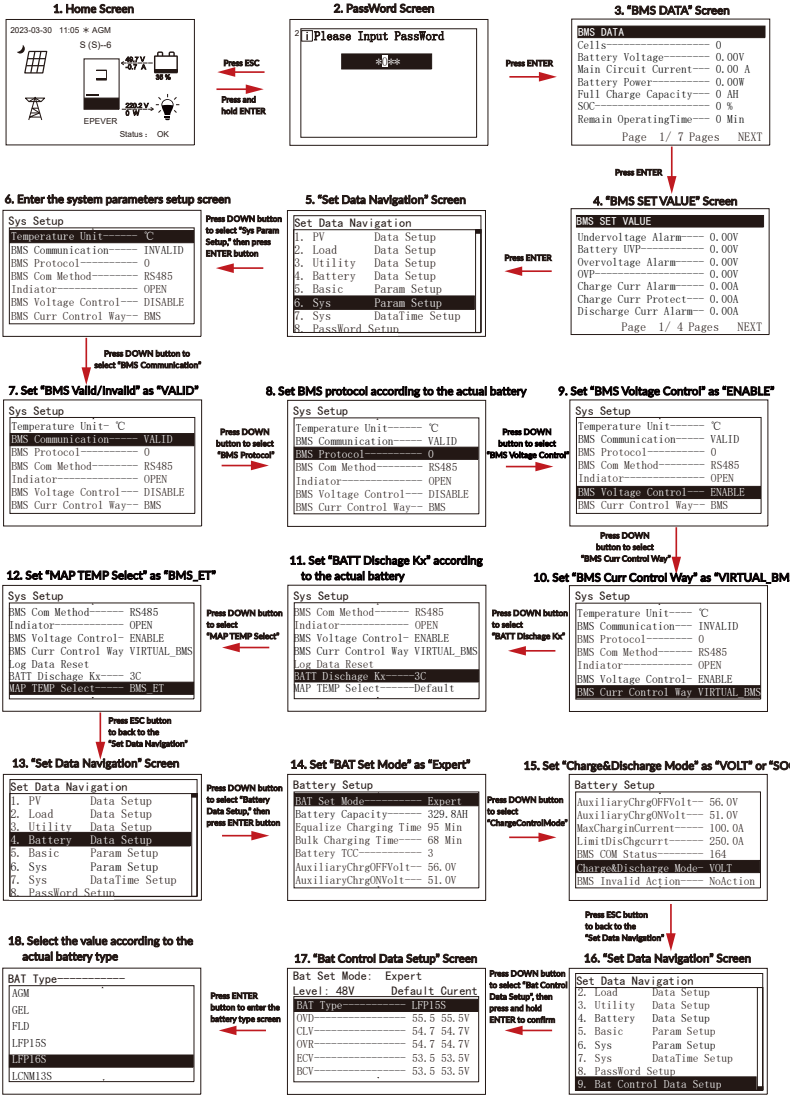
Tip	Please go to EPEVER official website to download the currently supported BMS manufacturers and the BMS parameters.

NOTICE

- The inverter/charger will control charging and discharging based on the LCD settings after setting the “BMS Curr Control Way” as “INVALID,” or the communication between battery and inverter/charger fails.
- The inverter/charger controls charging and discharging based on the pre-set MAP table after setting the “BMS Curr Control Way” as “VIRTUAL_BMS”.
- Due to the different charging and discharging characteristics and voltage consistency of lithium batteries from different manufacturers, it is necessary for professionals to guide the use of VIRTUAL_BMS for charging and discharging.

- **Figure 3 Setting process for lithium battery pack with BMS, without current control function**

When the system adopts a lithium battery pack with BMS, while without current control function at the end of charge and discharge, and the lithium battery pack can communicate with the inverter/charger normally, follow the flowchart below to set parameters correctly. Set BMS protocol and “BATT Dischage Kx” (viewing the battery label) correctly, set ”BMS Communication” as “VALID,” set “BMS Voltage Control” as “ENABLE,” set “BMS Curr Control Way” as “VIRTUAL_BMS,” set “MAP TEMP Select” as “BMS_ET,” set “Battery Type” correctly, and set “Charge&Discharge Mode” as “VOLT” or “SOC”. And then set the battery voltage control parameters or SOC control parameters. The inverter/charger controls charging and discharging based on the pre-set MAP table.

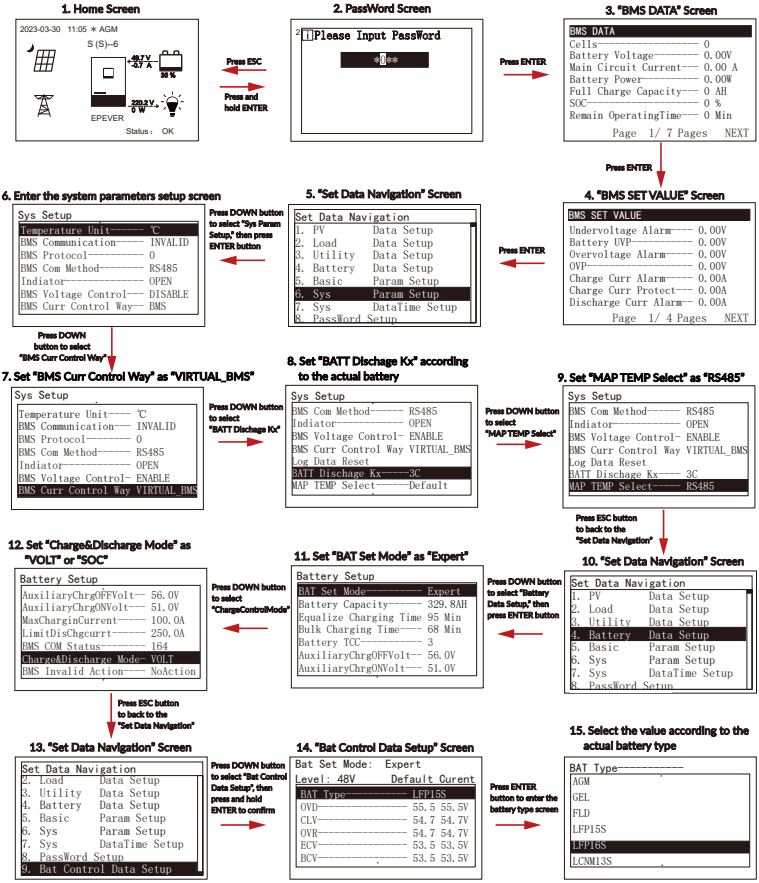


NOTICE

- The inverter/charger will control charging and discharging based on the LCD settings after setting the “BMS Curr Control Way” as “INVALID”.
- Due to the different charging and discharging characteristics and voltage consistency of lithium batteries from different manufacturers, it is necessary for professionals to guide the use of VIRTUAL_BMS for charging and discharging.
- The MAP table controlling the battery charge and discharge is only related to parameters of “BMS Curr Control Way, BATT Dischage Kx, Battery Type, and MAP TEMP Select”.

- **Figure 4 “Setting process for lithium battery pack with protective board only”**

When the system adopts a lithium battery pack with protective board only, and the lithium battery pack cannot communicate with the inverter/charger normally (A smart remote temperature sensor is recommended in this scenario.), follow the flowchart below to set parameters correctly. Set “BATT Dischage Kx” (viewing the battery label) correctly, set “BMS Curr Control Way” as “VIRTUAL_BMS,” set “MAP TEMP Select” as “RS485” (A smart remote temperature sensor is needed. Otherwise; select "default (25℃)."), set “Battery Type” correctly, and set “Charge&Discharge Mode” as “VOLT” or “SOC”. And then set the battery voltage control parameters or SOC control parameters. The inverter/charger controls charging and discharging based on the pre-set MAP table.



NOTICE

- The inverter/charger will control charging and discharging based on the LCD settings after setting the "BMS Curr Control Way" as "INVALID".
- Due to the different charging and discharging characteristics and voltage consistency of lithium batteries from different manufacturers, it is necessary for professionals to guide the use of VIRTUAL_BMS for charging and discharging.
- The MAP table controlling the battery charge and discharge is only related to parameters of "BMS Curr Control Way, BATT Dischage Kx, Battery Type, and MAP TEMP Select".

2.5.3 Battery voltage control parameters (Smart)

After setting the "BAT Set Mode" as "Smart," the battery voltage control parameters are determined by the battery type and cannot be modified. To modify them, set the "BAT Set Mode" as "Expert" first.

2.5.4 Battery voltage control parameters (Expert)

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

1) Lead-acid battery voltage control parameters

The parameters are measured in the condition of 24V/25℃.

Battery Type / Voltage Control Parameters	AGM	GEL	FLD	User Define
Overvoltage Disconnect Voltage	32.0V	32.0V	32.0V	21.4－32V
Charging Limit Voltage	30.0V	30.0V	30.0V	21.4－32V
Overvoltage Recovery Voltage	30.0V	30.0V	30.0V	21.4－32V
Equalization Charging Voltage	29.2V	--	29.6V	21.4－32V
Bulk Charging Voltage	28.8V	28.4V	29.2V	21.4－32V
Float Charging Voltage	27.6V	27.6V	27.6V	21.4－32V
Bulk Recovery Voltage	26.4V	26.4V	26.4V	21.4－32V
Low Voltage Recovery Voltage	25.2V	25.2V	25.2V	21.4－32V
Undervoltage Alarm Recovery Voltage	24.4V	24.4V	24.4V	21.4－32V
Undervoltage Alarm Voltage	24.0V	24.0V	24.0V	21.4－32V
Low Voltage Disconnect Voltage	22.2V	22.2V	22.2V	21.4－32V
Discharging Limit Voltage	21.2V	21.2V	21.2V	Read-only.

The parameters are measured in the condition of 48V/25℃.

Battery Type / Voltage Control Parameters	AGM	GEL	FLD	User define
Overvoltage Disconnect Voltage	64.0V	64.0V	64.0V	42.8－64V

Charging Limit Voltage	60.0V	60.0V	60.0V	42.8—64V
Overvoltage Recovery Voltage	60.0V	60.0V	60.0V	42.8—64V
Equalization Charging Voltage	58.4V	--	59.2V	42.8—64V
Bulk Charging Voltage	57.6V	56.8V	58.4V	42.8—64V
Float Charging Voltage	55.2V	55.2V	55.2V	42.8—64V
Bulk Recovery Voltage	52.8V	52.8V	52.8V	42.8—64V
Low Voltage Recovery Voltage	50.4V	50.4V	50.4V	42.8—64V
Undevoltage Alarm Recovery Voltage	48.8V	48.8V	48.8V	42.8—64V
Undervoltage Alarm Voltage	48.0V	48.0V	48.0V	42.8—64V
Low Voltage Disconnect Voltage	44.4V	44.4V	44.4V	42.8—64V
Discharging Limit Voltage	42.4V	42.4V	42.4V	Read-only.

The following rules must be obeyed when setting the Lead-acid battery voltage control parameters.

A. Overvoltage Disconnect Voltage > Charging Limit Voltage ≥ Equalization Charging Voltage ≥ Bulk Charging Voltage ≥ Float Charging Voltage > Bulk Recovery Voltage

B. Overvoltage Disconnect Voltage > Overvoltage Recovery Voltage

C. Low Voltage Recovery Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage

D. Undervoltage Alarm Recovery Voltage > Undervoltage Alarm Voltage ≥ Discharging Limit Voltage

E. Bulk Recovery Voltage > Low Voltage Recovery Voltage

2) Lithium battery voltage control parameters

Battery Type / Voltage Control Parameters	LFP	
	LFP8S	User Define
Overvoltage Disconnect Voltage	29.6V	21.4—32V
Charging Limit Voltage	29.2V	21.4—32V
Overvoltage Recovery Voltage	29.2V	21.4—32V
Equalization Charging Voltage	28.5V	21.4—32V
Bulk Charging Voltage	28.5V	21.4—32V
Float Charging Voltage	27.2V	21.4—32V
Bulk Recovery Voltage	26.6V	21.4—32V
Low Voltage Recovery Voltage	26.0V	21.4—32V
Undervoltage Alarm Recovery Voltage	25.6V	21.4—32V
Undervoltage Alarm Voltage	24.8V	21.4—32V
Low Voltage Disconnect Voltage	23.2V	21.4—32V
Discharging Limit Voltage	22.0V	Read-only.

Battery Type / Voltage Control Parameters	LFP		
	LFP15S	LFP16S	User Define
Overvoltage Disconnect Voltage	55.5V	59.2V	42.8—64V
Charging Limit Voltage	54.7V	58.4V	42.8—64V
Overvoltage Recovery Voltage	54.7V	58.4V	42.8—64V
Equalization Charging Voltage	53.5V	57.1V	42.8—64V
Bulk Charging Voltage	53.5V	57.1V	42.8—64V
Float Charging Voltage	51.0V	54.4V	42.8—64V
Bulk Recovery Voltage	49.9V	53.2V	42.8—64V
Low Voltage Recovery Voltage	48.7V	52.0V	42.8—64V

Undervoltage Alarm Recovery Voltage	48.0V	51.2V	42.8—64V
Undervoltage Alarm Voltage	46.5V	49.6V	42.8—64V
Low Voltage Disconnect Voltage	43.5V	46.4V	42.8—64V
Discharging Limit Voltage	41.2V	44.0V	Read-only.

Battery Type / Voltage Control Parameters	LNCM		
	LNCM6S	LNCM7S	User Define
Overvoltage Disconnect Voltage	25.8V	30.1V	21.4—32V
Charging Limit Voltage	25.5V	29.7V	21.4—32V
Overvoltage Recovery Voltage	25.5V	29.7V	21.4—32V
Equalization Charging Voltage	24.8V	28.9V	21.4—32V
Bulk Charging Voltage	24.8V	28.9V	21.4—32V
Float Charging Voltage	24.0V	28.0V	21.4—32V
Bulk Recovery Voltage	23.5V	27.5V	21.4—32V
Low Voltage Recovery Voltage	22.2V	25.9V	21.4—32V
Undervoltage Alarm Recovery Voltage	21.6V	25.2V	21.4—32V
Undervoltage Alarm Voltage	21.0V	24.5V	21.4—32V
Low Voltage Disconnect Voltage	21.4V	22.4V	21.4—32V
Discharging Limit Voltage	18.6V	21.7V	Read-only.

Battery Type / Voltage Control Parameters	LNCM		
	LNCM13S	LNCM14S	User Define
Overvoltage Disconnect Voltage	55.9V	60.2V	42.8—64V
Charging Limit Voltage	55.2V	59.5V	42.8—64V
Overvoltage Recovery Voltage	55.2V	59.5V	42.8—64V
Equalization Charging Voltage	53.8V	57.9V	42.8—64V

Bulk Charging Voltage	53.8V	57.9V	42.8—64V
Float Charging Voltage	52.0V	56.0V	42.8—64V
Bulk Recovery Voltage	51.0V	55.0V	42.8—64V
Low Voltage Recovery Voltage	48.1V	51.8V	42.8—64V
Undervoltage Alarm Recovery Voltage	46.8V	50.4V	42.8—64V
Undervoltage Alarm Voltage	45.5V	49.0V	42.8—64V
Low Voltage Disconnect Voltage	42.8V	44.8V	42.8—64V
Discharging Limit Voltage	40.3V	43.4V	Read-only.

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

A. Overvoltage Disconnect Voltage < Over Charging Protection Voltage (BMS Circuit Protection Modules) minus 0.2V

B. Overvoltage Disconnect Voltage > Charging Limit Voltage ≥ Equalization Charging Voltage ≥ Bulk Charging Voltage ≥ Float Charging Voltage > Bulk Recovery Voltage

C. Overvoltage Disconnect Voltage > Overvoltage Recovery Voltage

D. Bulk Recovery Voltage > Low Voltage Recovery Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage

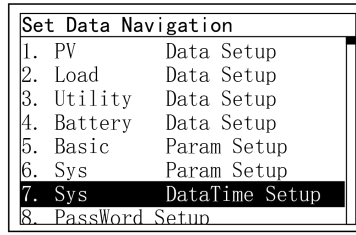
E. Undervoltage Alarm Recovery Voltage > Undervoltage Alarm Voltage ≥ Discharging Limit Voltage

F. Low Voltage Disconnect Voltage ≥ Over Discharging Protection Voltage (BMS Circuit Protection Modules) plus 0.2V

NOTICE

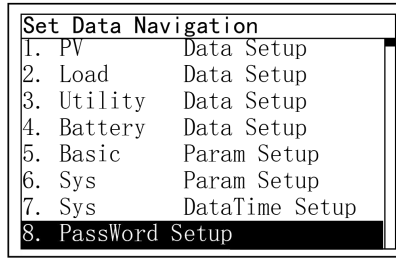
The BMS circuit protection module's voltage control accuracy must be at least ±0.2V. The [Overvoltage Disconnect Voltage] shall be lower than the protection voltage of the BMS circuit protection module. In contrast, the [Low Voltage Disconnect Voltage] shall be higher. The increased voltage of the [Overvoltage Disconnect Voltage] and the [Low Voltage Disconnect Voltage] is determined by the control accuracy of the BMS circuit protection module.

2.5.5 Time setting



Enter the "Set Data Navigation" interface according to Subsection 2.4.3 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 right, click the "AC OUT" button to move left, and click the "UP/DOWN" button to adjust the value. After the time setting is completed, move the cursor back to the first digit and click the "ENTER" to confirm. The system time will be updated if the setting value complies with the range.

2.5.6 Password modifying



Enter the "Set Data Navigation" interface according to Subsection 2.4.3 Administrator interface. Then click the "UP/DOWN" button to select "8 PassWord Setup", and click the "ENTER" button to enter the password modifying interface. Click the "ENTER" button to move right, click the "AC OUT" button to move left, and click the "UP/DOWN" button to adjust the value. After the password is modified, move the cursor back to the first digit and 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 OUT" button on the password inputting page; the password will be automatically reset to "0000."

3 Single Installation

3.1 Attention

- Please read the manual carefully to familiarize yourself with the installation steps.
- Be very careful when installing the batteries, especially flooded lead-acid batteries. Please wear eye protection, and have fresh water available to rinse if contact with battery acid.
- Keep the battery away from any metal objects, which may cause a short circuit of the battery.
- Combustible and harmful gases may come out from the battery during charging. Ensure the ventilation condition is good.
- This inverter/charger is wall-mounted. Consider whether the wall's bearing capacity can meet the requirements.
- Ventilation is highly recommended if mounted in an enclosure. Never install the inverter/charger in a sealed enclosure with flooded batteries! Battery fumes from vented batteries will corrode and destroy the inverter/charger circuits.
- The inverter/charger can work with lead-acid and lithium batteries within its control scope.
- Ensure all switches and breakers are disconnected before wiring. You operate the inverter/charger 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 5A/mm^2.
- The inverter/charger is for indoor installation only. Do not install the inverter/charger in a harsh environment such as humid, salt spray, corrosion, greasy, flammable, explosive, or dust accumulative.
- After turning off the switch, high voltage still exists inside the inverter/charger. Do not open or touch the internal devices; wait ten minutes before conducting related operations.
- Although the DC input terminal has reverse polarity protection, which only take effect without PV and Utility connection; please do not operate it in error frequently.
- The inverter/charger has anti-reverse protection circuit at the PV input terminal.
- 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.

NOTICE

- The short-circuit current of the PV array must comply with the "PV Maximum Short-circuit Current" in Chapter 8 Technical Specifications. The reverse connection time should not exceed 5 minutes, avoid frequent operations in fault.
- The PV array must first be connected to a 500VDC or above circuit breaker with arc extinguishing function, and then connected to the inverter/charger. If the PV is reversed, disconnect the external circuit breaker first, and then disconnect the PV array terminal (such as the MC4 terminal) or the PV input terminal of the inverter/charger. Otherwise, an electric arc will be generated, causing damage to the PV array or the inverter/charger.

3.2 Wire size and circuit breaker

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

➢ **Recommended PV wire and breaker 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 Isc (Max. short circuit current). Please refer to the Isc value in the PV module's specifications. When the PV modules are connected in series, the total Isc equals any PV module's Isc. When the PV modules are connected in parallel, the total Isc equals the sum of the PV module's Isc. The PV array's Isc 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	PV Wire Size	Circuit Breaker
HP3522-AH1250P20SA HP3542-AH0650P20SA	4mm^2/11AWG	2P -- 20A (with arc extinguishing function)

When two PV arrays are connected independently, the wire and circuit breaker size of each PV array are as follows:

Model	PV Wire Size	Circuit Breaker
HP5542-AH1050P20SA	4mm^2/11AWG	2P -- 20A (with arc extinguishing function)

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

Model	PV Wire Size	Circuit Breaker
HP5542-AH1050P20SA	10mm^2/7AWG	2P -- 40A (with arc extinguishing function)

NOTICE

When the PV modules are connected in series, the total voltage must not exceed the max. PV open circuit voltage 440V (at 25℃).

➢ **Recommended Utility wire size**

Model	Utility Wire Size	Circuit Breaker
HP3522-AH1250P20SA HP3542-AH0650P20SA	6mm²/10AWG	2P -- 25A
HP5542-AH1050P20SA	10mm²/7AWG	2P -- 40A

➢ **Recommended battery wire and breaker size**

Model	Battery Wire Size	Circuit Breaker
HP3542-AH0650P20SA	20mm²/4AWG	2P -- 125A
HP5542-AH1050P20SA HP3522-AH1250P20SA	35mm²/2AWG	2P -- 200A

NOTICE

The recommended battery breaker size is selected when the battery terminals are not connected to any additional inverter.

➢ **Recommended load wire size**

Model	Load Wire Size	Circuit Breaker
HP3522-AH1250P20SA HP3542-AH0650P20SA	6mm²/10AWG	2P -- 25A
HP5542-AH1050P20SA	7mm²/9AWG	2P -- 40A

NOTICE

- The wire size is only for reference. Suppose a long distance exists between the PV array, the inverter/charger, 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.

3.3 Mounting the inverter/charger

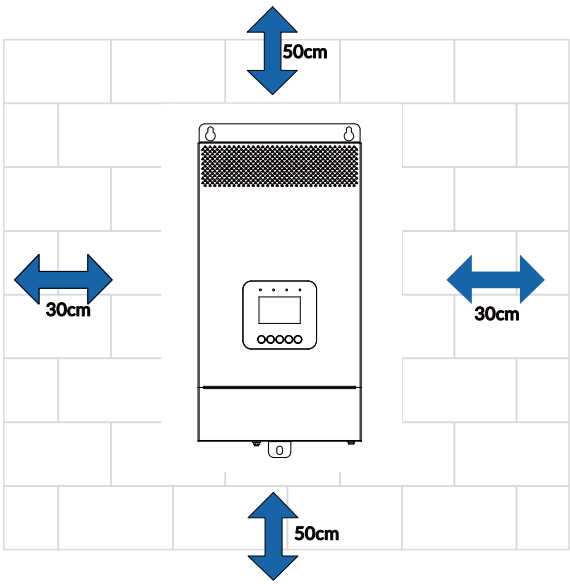
DANGER

- Risk of explosion! Never install the inverter/charger in a sealed enclose with flooded batteries!
- Do not install the inverter/charger in a confined area where the battery gas can accumulate.

NOTICE

- The inverter/charger can be fixed to the concrete and solid brick walls, while it cannot be fixed to the hollow brick wall.
- The inverter/charger requires at least 30cm of clearance right and left, and 50cm of clearance above and below.

Step 1: Determine the installation location and heat-dissipation space. The inverter/charger requires at least 30cm of clearance right and left, and 50cm of clearance above and below.



Step 2: According to the installation position marked with the mounting plate 1, drill two M10 holes with an electric drill.

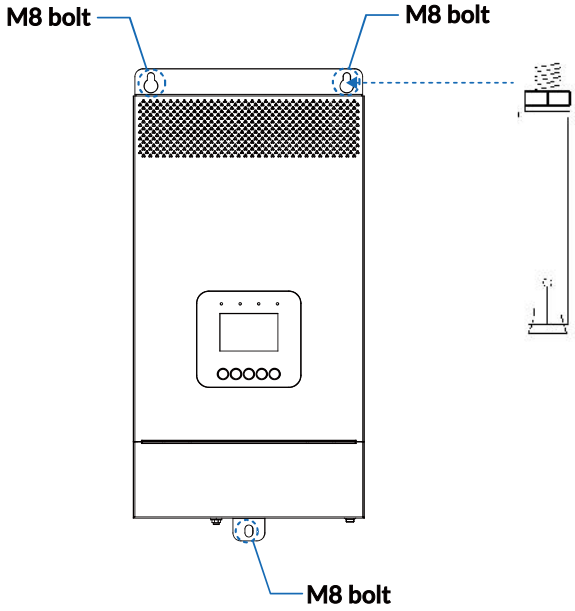
Step 3: Insert the screws of the M8 bolts and the steel pipes into the two M10 holes.

Step 4: Install the inverter/charger and determine the installation position of the M10 hole (located at the bottom of the inverter/charge).

Step 5: Remove the inverter/charger and drill an M10 hole according to the position determined in **Step 4**.

Step 6: Insert the screw of the M8 bolt and the steel pipe into the M10 hole.

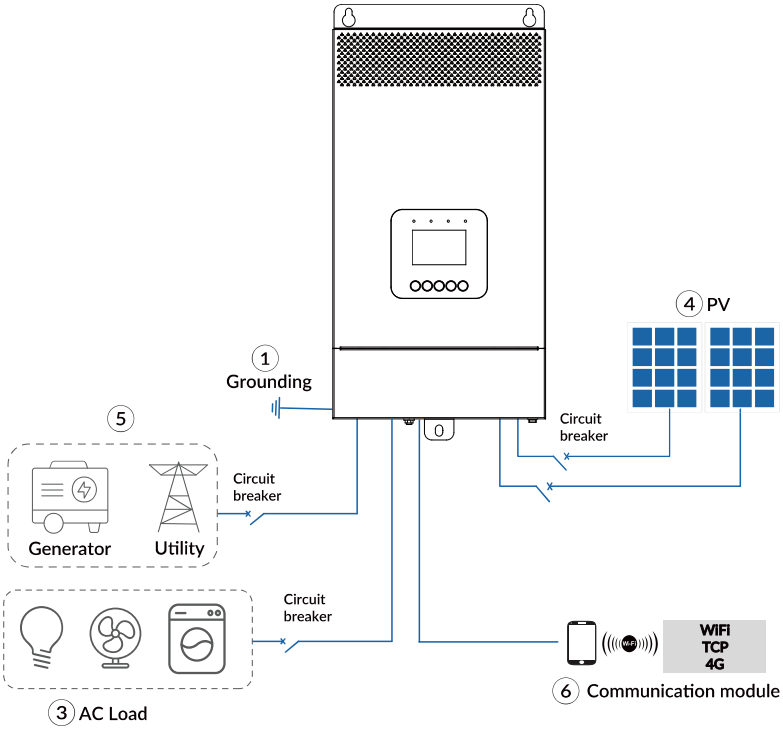
Step 7: Install the inverter/charger and secure the nuts with a sleeve.



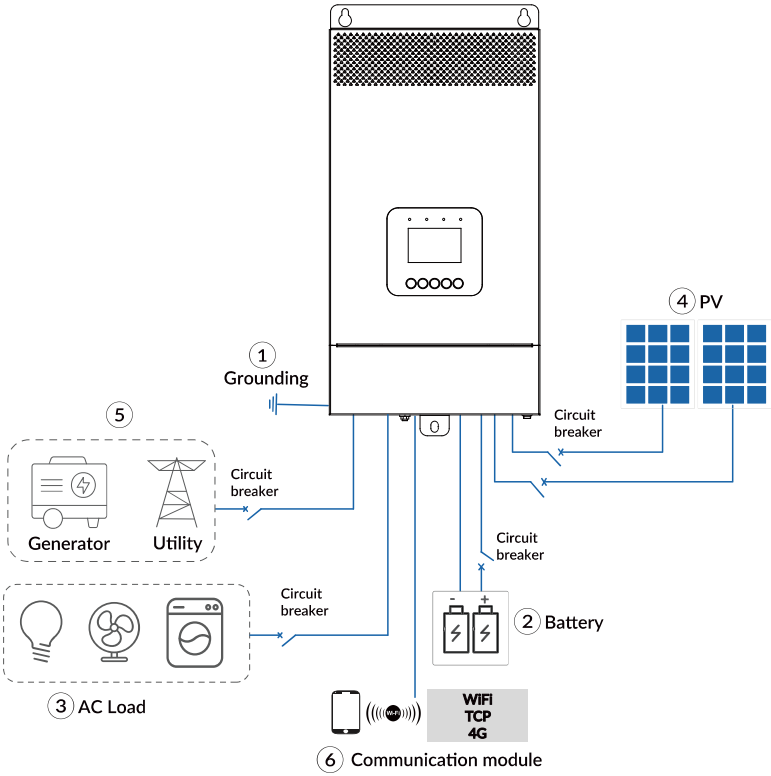
3.4 Wiring the inverter/charger

Connect the inverter/charger in the order of ① Grounding > ② Battery > ③ Load > ④ PV array > ⑤ Utility or generator > ⑥ Optional accessories, and disconnect the inverter/charger in the reverse order. The following wiring sequence is illustrated in the appearance of "HP5542-AH1050P20SA". For wiring positions of other models, please refer to the actual product appearance.

- **No-battery mode**



- **Battery mode**



3.4.1 Grounding

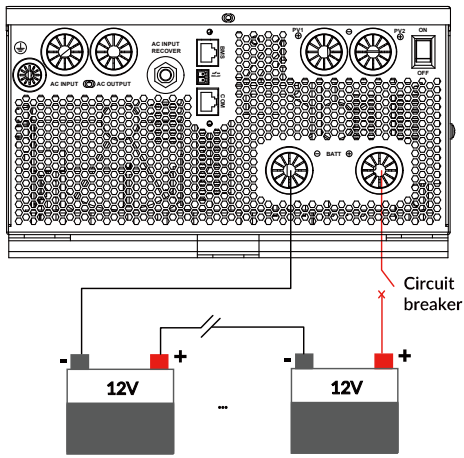
The inverter/charger has a dedicated grounding terminal, which must be grounded reliably. The grounding wire size must be consistent with the recommended load wire size. The grounding connection point shall be as close as possible to the inverter/charger, and the total grounding wire shall be as short as possible.

☒ NO GROUNDING	☒ Do not ground the battery terminals . ☒ Do not ground the PV terminals. ☒ Do not ground the AC input L or N terminals between the inverter/charger and the household power distribution cabinet. ☒ Do not ground the AC output L or N terminals.
☑ GROUNDING	☑ The cabinet case and the PE terminal of AC input and output must be firmly grounded through the earth rail.

3.4.2 Connecting the battery

NOTICE

- Please disconnect the circuit breaker before wiring and ensure that the leads of "+" and "-" poles are polarity correctly.
- A circuit breaker must be installed on the battery side. Please refer to Subsection 3.2 Wire size and circuit breaker for selection.



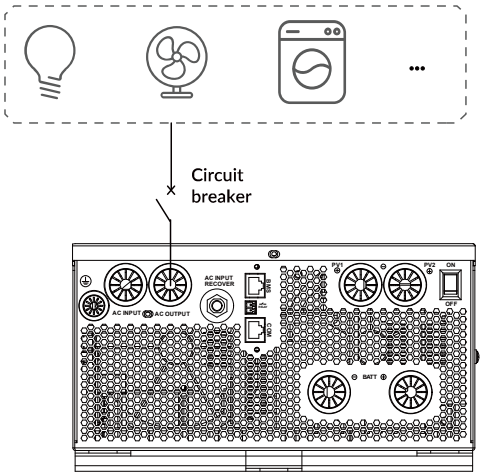
3.4.3 Connecting the AC load

DANGER

High voltage! 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 inverter/charger. The AC load's surge power must be lower than the instantaneous surge power of the inverter/charger, or the inverter/charger 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.



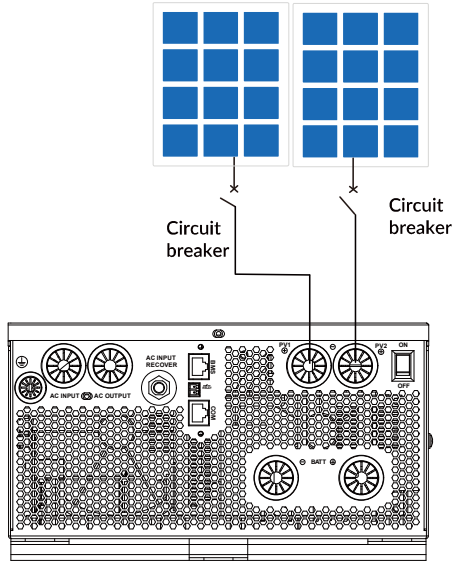
3.4.4 Connecting the PV modules

DANGER

- High voltage! Electric shock hazard! The PV array can generate dangerous high-voltage! Disconnect the circuit breaker before wiring, and ensure that the leads of "+" and "-" poles are connected correctly.
- It is forbidden to connect the positive and negative poles of the PV with the ground; otherwise, the inverter/charger will be damaged.

NOTICE

Suppose the inverter/charger is used in an area with frequent lightning strikes. In that case, install an external surge arrester at the PV input and utility input terminals is a must.



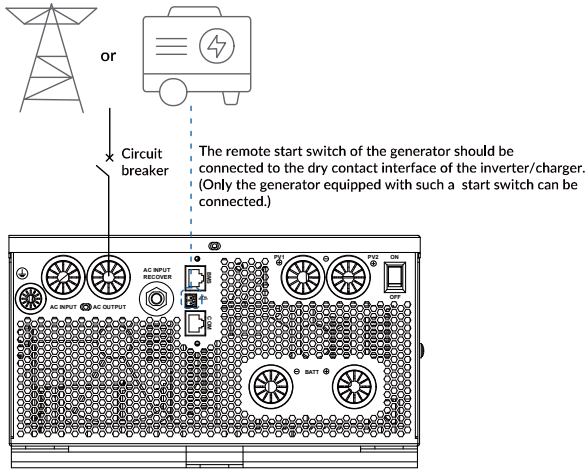
3.4.5 Connecting the Utility or generator

DANGER

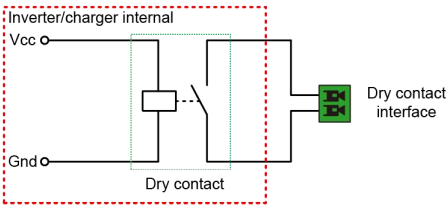
- High voltage! Electric shock hazard! The utility input can generate very high voltage. Disconnect the circuit breaker or fast-acting fuse before wiring and ensure that the poles' leads are connected correctly.
- After the utility is connected, the PV and battery cannot be grounded. In contrast, the inverter/charger cover must be grounded reliably to shield the outside electromagnetic interference effectively and prevent the cover from causing electric shock to the human body.

NOTICE

There are various types of oil generators with complex output conditions. It is recommended to use the inverter oil generator. If non-inverter oil generators are used, they must be tested in practice before use.



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



Working principle:

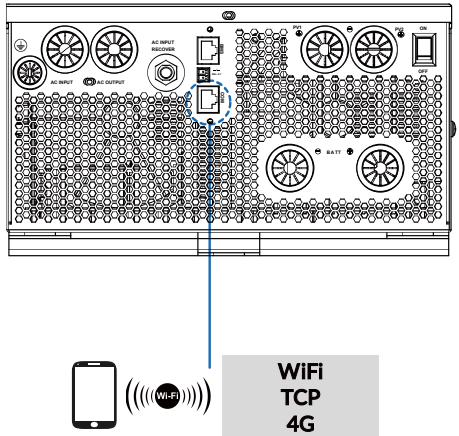
When the battery voltage ≤ the Dry Contact ON Voltage, the dry contact is connected. Its coil is energized. The dry contact can drive loads of no more than 125VAC /1A, 30VDC/1A. According to different battery types of the inverter charger, the default values of the Dry Contact ON Voltage and the Dry Contact OFF Voltage are different. Please refer to the Subsection 2.5.1 Parameters list for details.

3.4.6 Connecting the optional accessories

Connect the communication module

End-users can remote monitor the inverter/charger or modify parameters on the phone APP after connecting the WiFi module, TCP module, or 4G module to the RS485 interface on the

inverter/charger. For detailed setting methods, please refer to the instructions on cloud APP, WiFi, TCP, or 4G communication modules in user manual.



Communication module

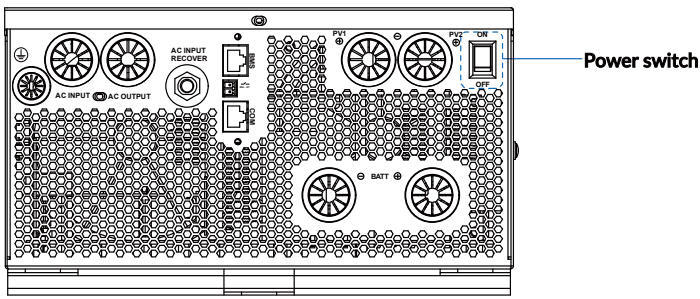
Note: For the specific communication modules supported, please refer to the accessories list file.

3.5 Operate the inverter/charger

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

Step 2: Connect the battery circuit breaker.

Step 3: Turn on the power switch. The LCD will be lit, which means the system running is normal.



NOTICE

- Please connect the battery circuit breaker first. After the inverter/charger normally works, connect the PV array and utility circuit breakers later. Otherwise, we won't assume any responsibility for not following the operation.
- The AC output is ON by default after the inverter/charger is powered. Before turning on the power switch, ensure the AC output is connected to loads correctly, and no safety hazard exists.

Step 4: Set parameters by the buttons.

NOTICE

For detailed parameters setting, please refer to Section 2.5 Parameters setting. Please consult relevant technical personnel if you have any question before setting.

Step 5: Use the inverter/charger.

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 inverter/charger will perform normal work according to the set working mode. See Section 2.4 Interface.

NOTICE

- 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 inverter/charger cannot work properly or the LCD/indicator shows an abnormality, please refer to Chapter 6 Troubleshooting or contact our after-sales personnel.

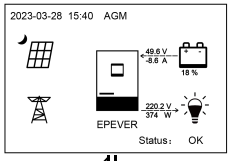
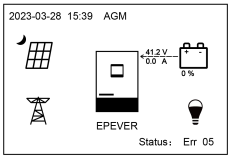
4 Working Mode

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
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.
PV > BP > BT	Discharging Mode: PV > Bypass > Battery
PV > BT > BP	Discharging Mode: PV > Battery > Bypass
BP > PV > BT	Discharging Mode: Bypass > PV > Battery

4.2 Battery mode

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

	Regardless of the input and output sources, the working mode is as follows.
(A) **PV ☒** **Utility ☒**	 $V_{BAT} \geq LVR$ /SOC ≥ DPR $V_{BAT} \leq LVD$ / SOC ≤ DP 
	① Any of the following is satisfied, the battery supplies the load. • The battery voltage is greater than or equal to the LVR value. • 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.

NOTICE

- Set the "Charge Control Mode" as "VOLT," the working mode is determined by the battery voltage value.
- Set the "Charge Control 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 when the "Charge Control Mode" is set to "VOLT."
- For setting the "Charge Control Mode", refer to Subsection 2.5.1 Parameters list.

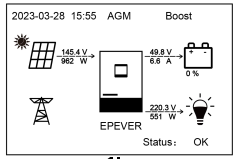
4.2.2 Scenario B: PV is available, but the Utility is not available.

Regardless of the input and output sources, the working mode is as follows.

(B)

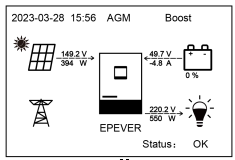
PV ☑

Utility ☒



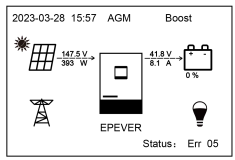
$P_{PV} > P_{LOAD}$ ⇅ $P_{PV} \leq P_{LOAD}$

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



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

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

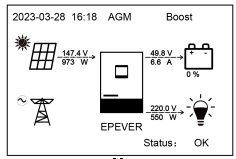
- The battery voltage is lower than or equal to the LVD value.
- The battery SOC is lower than or equal to the DP value.

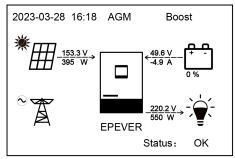
Note: When the battery voltage is greater than or equal to the LVR value, or the battery SOC is greater than or equal to the DPR value, the working mode returns to state ②.

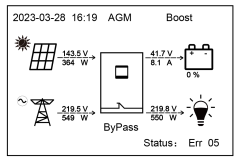
4.2.3 Scenario C: Both PV and Utility are available.

<table>
<tr><td></td><td>Charging Mode: "Solar"</td><td>Discharging Mode: "PV > BP > BT" or "PV > BT > BP"</td></tr>
<tr><td rowspan="4">(C-1)

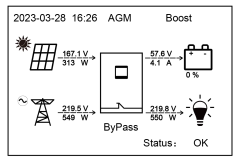
PV ☑

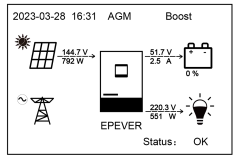
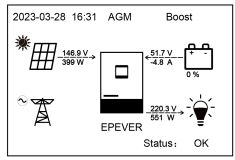
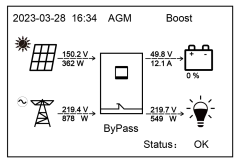
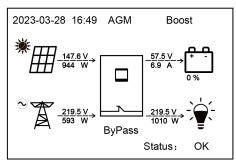
Utility ☑</td><td> 

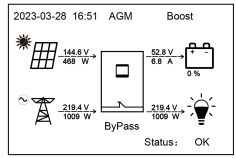
$P_{PV} > P_{LOAD}$ ‖ $P_{PV} \leq P_{LOAD}$</td><td>① When the PV power is greater than load power, the PV charges the battery and supplies extra power to the load.</td></tr>
<tr><td> 

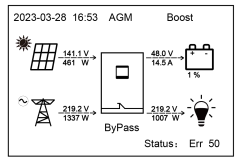
$V_{BAT} \geq$ LVR /SOC≥ DPR ‖ $V_{BAT} \leq$ LVD /SOC ≤ DP</td><td>② When the PV power is lower than or equal to the load power, the PV will not charge the battery, the battery will cut in to supply power to the load together with the PV.</td></tr>
<tr><td> 
</td><td>③ Any of the following is satisfied, the Utility supplies power to the load and the PV prioritizes charging 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.</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td rowspan="2">(C-2)

PV ☑

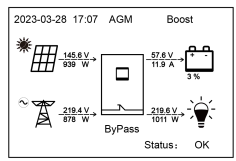
Utility ☑</td><td>Charging Mode: "Solar"</td><td>Discharging Mode: "BP > PV > BT"</td></tr>
<tr><td> 
</td><td>The Utility supplies power to the load, and the PV charges the battery only.</td></tr>
</table>

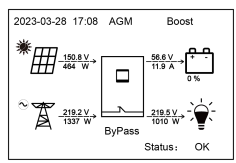
	Charging Mode: "Solar prior"	Discharging Mode: "PV > BP > BT" or "PV > BT > BP"
(C-3) PV ☑ Utility ☑	 $P_{PV} > P_{LOAD}$ ⇅ $P_{PV} \le P_{LOAD}$	① When the PV power is greater than the load power, the PV charges the battery and supplies extra power to the load.
	 $V_{BAT} \ge AOF$ / $SOC \ge UCF$ ⇅ $V_{BAT} \le AON$ / $SOC \le UCO$	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 Any of the following is satisfied, 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 AON value. • The battery SOC is lower than or equal to the UCO value.
	Note: When the battery voltage is greater than or equal to the **AOF** value, or the battery SOC is greater than or equal to the **UCF** value, the working mode returns to state ②.	
(C-4) PV ☑ Utility ☑	**Charging Mode: "Solar prior"**	**Discharging Mode: "BP > PV > BT"**
	 $P_{PV} > MCC*V_{BAT}$ ⇅ $P_{PV} \le MCC*V_{BAT}$	① When the PV power is greater than the (**MCC***V_{BAT}), the Utility and PV supply power to the load, and the PV charges the battery at the same time.

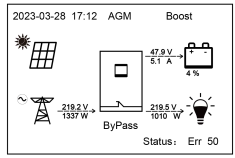
<table>
<tr><td></td><td> 

$V_{BAT} \geq AOF$ / $SOC \geq UCF$ ⇅ $V_{BAT} \leq AON$ / $SOC \leq UCO$
 
</td><td>② When the PV power is lower than or equal to the (MCC*V_{BAT}), the Utility supplies power to the load and the PV charges the battery.
③ Any of the following is satisfied, 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 AON value.
• The battery SOC is lower than or equal to the UCO value.</td></tr>
<tr><td></td><td colspan="2">Note: When the battery voltage is greater than or equal to the AOF value, or the battery SOC is greater than or equal to the UCF value, the working mode returns to state ②.</td></tr>
<tr><td>(C-5)

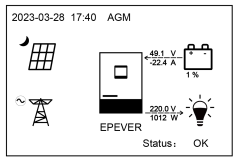
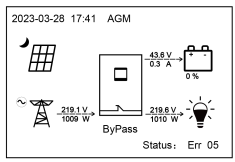
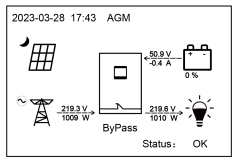
PV ☑

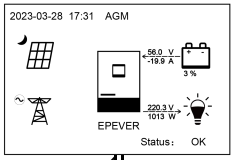
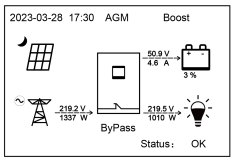
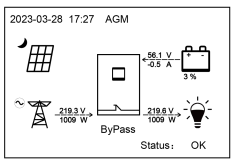
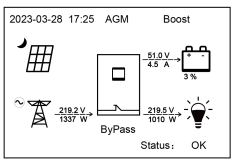
Utility ☑</td><td>Charging Mode: "<u>Utly & solr</u>"
 

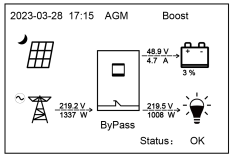
$P_{PV} > MCC*V_{BAT}$ ⇅ $P_{PV} \leq MCC*V_{BAT}$
 
</td><td>Discharging Mode: No impact under any mode
① When the PV power is greater than the (MCC*V_{BAT}), the Utility and PV supply power to the load, and the PV charges the battery simultaneously.
② When the PV power is lower than or equal to the (MCC*V_{BAT}), the Utility and PV charge the battery, and the Utility supplies power to the load.</td></tr>
</table>

(C-6) PV ☑ Utility ☑	**Charging Mode: "Utltyprior"** 	**Discharging Mode: No impact under any mode** The Utility supplies power to the load and charges the battery simultaneously.

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

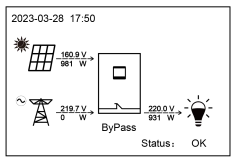
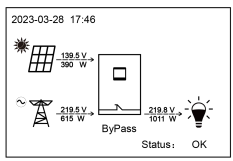
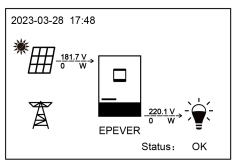
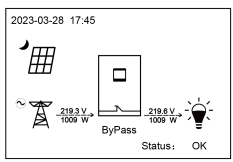
(D-1) PV ☒ Utility ☑	**Charging Mode: "Solar"**  $V_{BAT} \geq LVR$ / $SOC \geq DPR$ ‖ $V_{BAT} \leq LVD$ / $SOC \leq DP$ 	**Discharging Mode: "PV > BT > BP"** ① Any of the following is satisfied, the battery supplies the load. • The battery voltage is greater than or equal to the LVR value. • The battery 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.
(D-2) PV ☒ Utility ☑	**Charging Mode: "Solar"** 	**Discharging Mode: "PV > BP > BT" or "BP > PV > BT"** The Utility supplies power to the load.

	Charging Mode: "Solar prior"	Discharging Mode: "PV > BT > BP"
(D-3) PV ☒ Utility ☑	 $V_{BAT} \geq AOF$ / $SOC \geq UCF$ ‖ $V_{BAT} \leq AON$ / $SOC \leq UCO$ 	① Any of the following is satisfied, the battery supplies the load. • The battery voltage is higher 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 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.
	Charging Mode: "Solar prior"	**Discharging Mode: "PV > BP > BT" or "BP > PV > BT"**
(D-4) PV ☒ Utility ☑	 $V_{BAT} \geq AOF$ / $SOC \geq UCF$ ‖ $V_{BAT} \leq AON$ / $SOC \leq UCO$ 	① Any of the following is satisfied, the Utility supplies power to the load. • 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 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.

(D-5) PV ☒ Utility ☑	**Charging Mode: "Utly & solr" or "Utltyprior"**	**Discharging Mode: No impact under any mode**
		The Utility supplies power to the load and charges the battery simultaneously.

4.3 No-battery mode

Note: Under the no-battery mode, the "Charging Mode" and "Discharging Mode" settings will not take effect.

PV ☑ Utility ☑	 $P_{PV} > P_{LOAD}$ $P_{PV} \leq P_{LOAD}$ 	① When the PV power is greater than the load power; the PV supplies power to the load. **Note:** In this mode, the Utility still keep a minimum power input. When the PV power is lower than the load power, the Utility can replenish the power supply at any time to avoid device shutdown. ② When the PV power is lower than or equal to the load power, the PV and the Utility supply power to the load together.
PV ☑ Utility ☒		Only the PV supplies power to the load.
PV ☒ Utility ☑		Only the Utility supplies power to the load.

5 Protections

NOTICE

- The total short-circuit current of each PV array must be less than the "PV Maximum Short-circuit Current" (see Chapter 8 Technical Specifications), and the reverse connection time should not exceed 5 minutes. Frequent incorrect wiring is strictly prohibited as it may damage the inverter/charger.
- The PV input terminals must first be connected to a DC circuit breaker with an arc extinguishing function capable of handling 500VDC or higher, and then, connect the PV input terminals to the inverter/charger. If the PV array is reversely connected, it is essential to first disconnect the external circuit breaker, followed by the PV standard terminals, or the PV connection terminals of the inverter/charger. Otherwise, it may result in arcing damage to the PV standard terminals or the inverter/charger.
- The inverter/charger will be damaged when the PV/Utility is correct connected and the battery is reversed connected.

No.	Protections	Description
1	PV limit current/power	When the PV output current/power exceeds the PV maximum input current/power of the inverter/charger, the inverter/charger will obtain energy from the PV array at its maximum input current/power. When the maximum open-circuit voltage of the PV array is < 360V, excessive power connection to PV panels is allowed (up to twice the maximum input power of the PV panel); when the maximum open-circuit voltage of the panel is ≥ 360V, the maximum input power of the PV array must not exceed 1.2 times that of the PV panel.
2	PV short circuit	When the PV is not charging, a short circuit in the PV array will not damage the inverter/charger.
3	PV reverse polarity	In case of PV reverse polarity, the inverter/charger will not be damaged and will resume operation after correcting the wiring error.
4	Utility input overvoltage	When the utility voltage exceeds the set value of “Utility Overvoltage Disconnect Voltage”, the utility will stop charging and supplying the load.
5	Utility input undervoltage	When the utility voltage is lower than the set value of “Utility Undervoltage Disconnect Voltage”, the utility will stop charging

		and supplying the load.			
6	Battery reverse polarity	In case of battery reverse polarity, the inverter/charger will not be damaged and will resume operation after correcting the wiring error.			
7	Battery overvoltage	When the battery voltage goes higher than the [Overvoltage Disconnect Voltage], the PV/Utility will automatically stop charging the battery to prevent overcharging damage.			
8	Battery over-discharge	When the battery voltage goes lower than the [Low Voltage Disconnect Voltage], the battery will automatically stop discharging to prevent over-discharging damage.			
9	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 inverter/charger stops working after the 4th protection and can resume working after resetting or restarting. Clear the fault in time because it may damage the inverter/charger permanently. **Note:** Resetting operation--See Subsection 2.4.3 Administrator interface to enter the "5. Basic Param Setup" screen, and then click the UP/DOWN button to locate the "Clear Fault" menu. Click the ENTER button to exit the current fault state and resume normal operation.			
10	Device overheating	When the internal temperature overheats, the inverter/charger will stop charging/discharging. The inverter/charger will resume charging/discharging when the internal temperature is normal.			
11	HP3522-AH1250P20SA HP3542-AH0650P20SA Inverter overload (no Utility)	3,605W ≤ P < 4,550W	4,550W ≤ P < 5,250W	5,250W ≤ P < 7,000W	P ≥ 7,000W
		Protect after 30s	Protect after 10s	Protect after 5s	Protect immediately

<table>
<tr><td></td><td></td><td colspan="4">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">HP3522-AH1250P20SA
HP3542-AH0650P20SA
Utility bypass overload (no-Battery mode)</td><td>3,850W ≤ P < 4,795W</td><td>4,795W ≤ P < 5,495W</td><td>5,495W ≤ P < 7,000W</td><td>P ≥ 7,000W</td></tr>
<tr><td>Protect after 30s</td><td>Protect after 10s</td><td>Protect after 5s</td><td>Protect immediately</td></tr>
<tr><td colspan="4">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
<tr><td rowspan="3">13</td><td rowspan="3">HP3522-AH1250P20SA
HP3542-AH0650P20SA
Utility bypass overload (Battery mode)</td><td>5,350W ≤ P < 6,295W</td><td>6,295W ≤ P < 6,995W</td><td>6,995W ≤ P < 8,500W</td><td>P ≥ 8,500W</td></tr>
<tr><td>Protect after 30s</td><td>Protect after 10s</td><td>Protect after 5s</td><td>Protect immediately</td></tr>
<tr><td colspan="4">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
<tr><td rowspan="3">14</td><td rowspan="3">HP5542-AH1050P20SA
Inverter overload
(no Utility)</td><td colspan="2">5,665W ≤ P < 6,600W</td><td colspan="2">6,600W ≤ P < 7,700W</td><td>P ≥ 7,700W</td></tr>
<tr><td colspan="2">Protect after 30s</td><td colspan="2">Protect after 10s</td><td>Protect after 5s</td></tr>
<tr><td colspan="5">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
</table>

<table>
<tr><td rowspan="3">15</td><td rowspan="3">HP5542-AH1050P20SA
Utility bypass overload (no-Battery mode)</td><td>6,050W ≤ P < 6,985W</td><td>6,985W ≤ P < 8,085W</td><td>P ≥ 8,085W</td></tr>
<tr><td>Protect after 30s</td><td>Protect after 10s</td><td>Protect after 5s</td></tr>
<tr><td colspan="3">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
<tr><td rowspan="3">16</td><td rowspan="3">HP5542-AH1050P20SA
Utility bypass overload (Battery mode)</td><td>8,550W ≤ P < 9,485W</td><td>9,485W ≤ P < 1,0585W</td><td>P ≥ 1,0585W</td></tr>
<tr><td>Protect after 30s</td><td>Protect after 10s</td><td>Protect after 5s</td></tr>
<tr><td colspan="3">Note: The output is recovered automatically after a delay time of 5s, 10s, and 15s separately. The inverter/charger stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
</table>

6 Troubleshooting

NOTICE

After the inverter/charger 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 with the inverter/charger is abnormal. When the above fault occurs, check whether the communication cable is disconnected. If not, please contact our after-sales engineer.

6.1 Battery faults

Error code(1)	Fault/Status	Indicator	Buzzer	Solution
Err4	Battery Overvoltage	--	--	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 "Overvoltage Disconnect Voltage" is inconsistent with the battery specifications. After the battery voltage drops below the set value of "Overvoltage Recovery Voltage", the alarm will automatically be cleared.
Err5	Battery Undervoltage			Disconnect the loads connection, and check whether the battery voltage is too low. After the battery voltage is charged and restored to above the "Low Voltage Recovery Voltage", it will automatically return to normal, or use other methods to charge the battery.
Err11	Battery Over Temperature			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 setting values of "Battery Maximum Charging Current " and "Battery Limit Discharging Current." It resumes normal work when the battery cools down to below the "Battery Over Temperature Protection Recovery."

Err37	Battery Overcurrent			Check that the battery actual charging and discharging current does not exceed the setting values of "Battery Maximum Charging Current " and "Battery Limit Discharging Current."
Err39	Battery Cable Disconnected			Check whether the battery connection is normal, and whether the BMS protection occurs.
Err50	Battery Undervoltage Alarm			Check if the battery voltage is lower than the “Undervoltage Alarm Voltage”
Err56	Battery Connection Failed			Check if the battery connection is normal and the BMS communication of the lithium battery is normal.

(1)The fault/status code is displayed in the "Status" column at the bottom right corner of the LCD. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

6.2 PV faults

Error code(1)	Fault/Status	Indicator	Buzzer(2)	Solution
Err15	PV1 Overvoltage	PV indicator solid red	Intermittent beeps	Check if the PV open-circuit voltage is too high (greater than 500 V). The alarm is released when the PV open-circuit voltage is below 490 V.
Err17	PV1 Overcurrent	PV indicator solid green	--	Turn off the inverter/charger first, wait for 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.

Err18	PV2 Overvoltage	PV indicator solid red	Intermittent beeps	Check if the PV open-circuit voltage is too high (greater than 500 V). The alarm is released when the PV open-circuit voltage is below 490 V.
Err20	PV2 Overcurrent	PV indicator solid green	--	Turn off the inverter/charger first, wait for 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err30	PV HARD FAULT (PV Hardware Fault)			
Err43	PV1TSD (PV1 Temperature Sensor Disconnected)			
Err52	PV1 PCTO (PV1 Pre-charge Timeout)	PV indicator solid green	--	Turn off the inverter/charger first, wait for 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err53	PV2 PCTO (PV2 Pre-charge Timeout)			

(1)The fault/status code is displayed in the "Status" column at the bottom right corner of the LCD. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

(2)Set the "Buzzer Alarm" as "ON," the buzzer will sound when a fault occurs. After the fault is eliminated, the buzzer will automatically mute. If the "Buzzer Alarm" is set as "OFF," even if a fault occurs, the buzzer will not sound.

6.3 Inverter faults

Error code[1]	Fault/Status	Indicator	Buzzer[2]	Solution
Err2	Inverter Output Overcurrent	LOAD indicator solid red	Intermittent beeps	Check if the load actual power exceeds the rated power (namely, the inverter/charger's continuous output power), disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err7	Inverter Output Overvoltage	LOAD indicator solid red	Intermittent beeps	Disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err10	Inverter Over Temperature	--	--	Ensure the inverter/charger is installed in a cool and well-ventilated place.
Err22	Inverter Hardware Overvoltage	--	--	Disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err23	Inverter Hardware Overcurrent			
Err32	Inverter Voltage OFFSET Error			
Err35	Inverter Current OFFSET Error	--	--	Disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it

				resumes normal. If it is still abnormal, please contact our technical support.
Err45	Inverter Temp Sensor Disconnected	LOAD indicator solid green	--	Turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err49	Inverter Output Undervoltage	LOAD indicator solid red	Intermittent beeps	Check if the load actual power exceeds the rated power (namely, the inverter/charger's continuous output power), disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err60	Boost Module Over Temperature	--	--	Ensure the inverter/charger is installed in a cool and well-ventilated place.

(1)The fault/status code is displayed in the "Status" column at the bottom right corner of the LCD. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

(2)Set the "Buzzer Alarm" as "ON," the buzzer will sound when a fault occurs. After the fault is eliminated, the buzzer will automatically mute. If the "Buzzer Alarm" is set as "OFF," even if a fault occurs, the buzzer will not sound.

6.4 Utility faults

Error code[1]	Fault/Status	Indicator	Buzzer[2]	Solution
Err8	Utility Overvoltage	UTILITY indicator solid red	Intermittent beeps	Check if the utility voltage exceeds the "Utility Overvoltage Disconnect Voltage," then disconnect the AC input and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err9	Utility Overcurrent	UTILITY indicator solid red	Intermittent beeps	Check if the load actual power exceeds the "Inverter Rated Power (see Chapter 8 Technical Specifications)," disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support. Check if the utility voltage is lower than the "Utility Undervoltage Disconnect Voltage," disconnect the utility input and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err25	Utility Undervoltage	UTILITY indicator solid red	--	
Err28	Utility Pre-charge Timeout	UTILITY indicator solid green	--	Check if the utility frequency in between the "Utility Under Frequency Disconnect Frequency" to "Utility Over

Err29	Utility Relay Adhesion	UTILITY indicator solid green	--	Frequency Disconnect Frequency," disconnect the utility input and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err31	Utility Frequency Error	UTILITY indicator solid red	Intermittent beeps	

(1)The fault/status code is displayed in the "Status" column at the bottom right corner of the LCD. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

(2)Set the "Buzzer Alarm" as "ON," the buzzer will sound when a fault occurs. After the fault is eliminated, the buzzer will automatically mute. If the "Buzzer Alarm" is set as "OFF," even if a fault occurs, the buzzer will not sound.

6.5 Load faults

Error code(1)	Fault/Status	Indicator	Buzzer(2)	Solution
Err33	Load Current OFFSET Error	--	--	Disconnect the load completely and turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err48	Load Over Load	LOAD indicator solid red	Intermittent beeps	
Err55	Overload Lockdown	LOAD indicator solid red	Intermittent beeps	

(1)The fault/status code is displayed at the "Status" column at the bottom right corner of the LCD interface. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

(2)Set the "Buzzer Alarm" as "ON"; the buzzer will sound when a fault occurs. After the error is eliminate, the buzzer will automatically mute. If the "Buzzer Alarm" is set as "OFF," even if a fault occurs, the buzzer will not sound.

6.6 Other faults for single inverter/charger

Error code[1]	Fault/Status	Indicator	Buzzer	Solution
Err0	DC Bus Overvoltage	--	--	Turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err6	DC Bus Undervoltage			
Err12	Ambient Over Temperature	--	--	Ensure the inverter/charger is installed in a cool and well-ventilated place.
Err21	Battery or Bus Hardware Overvoltage	--	--	Turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err24	High Volt Bus Hardware Overcurrent			
Err36	High Volt Bus Current Abnormal			
Err38	Boost Drive Error			
Err40	Auxiliary Power Supply Abnormal			
Err42	Environment Temp Sensor Disconnected	--	--	Turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to check if it resumes normal. If it is still abnormal, please contact our technical support.
Err46	Low Temperature Charging Limit	--	--	Check whether the ambient temperature is lower than the set "Charge low temperature limit" and "Discharge low temperature limit."
Err47	Low Temperature Discharging Limit			
Err54	EEprom Abnormal	--	--	Turn off the inverter/charger. Wait 5 minutes and then turn on the inverter/charger to

				check if it resumes normal. If it is still abnormal, please contact our technical support.

(1)The fault/status code is displayed at the "Status" column at the bottom right corner of the LCD interface.When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

6.7 BMS faults

Error code(1)	Fault/Status	Indicator	Buzzer	Solution
Err66	BMS Overvoltage	--	--	Check the BMS communication status or BMS setting parameters. **Note:** If the BMS protocol number is set to 32, please check whether the temperature sensor is properly connected.
Err68	BMS Charging Temp Abnormal			
Err69	BMS Undervoltage			
Err71	BMS Discharging Temp Abnormal			
Err74	BMS Communication Failure			

(1)The fault/status code is displayed in the “Status” column at the bottom right corner of the LCD. When multiple faults occur simultaneously, the LCD only displays the fault code with the smallest value.

7 Maintenance

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

- Make sure the well ventilation and heat dissipation of the inverter/charger and clear up dirt and fragments on the fan.
- Check for damage to exposed wires caused by sun exposure, friction with surrounding objects, dry rot, or insect and rodent activity. Repair or replace damaged wires as 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.
- Check for signs of corrosion, insulation damage, high temperature or burning/discoloration on the terminal screws. Tighten terminal screws to the suggested torque.
- Check for dirt, nesting insects, and corrosion, and clean up in time as required.
- Check and confirm that the lightning arrester is in good condition. Replace a new one in time to avoid damaging the inverter/charger and other equipment.

⚠ DANGER

Electric shock hazard! Make sure that the power supply of the inverter/charger 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.

8 Technical Specifications

Model	HP3522-AH1250P20SA
Utility Input	
Utility Voltage	176VAC to 264VAC (Default) 90VAC to 285VAC (Configurable)
Utility Frequency	45Hz to 65Hz
Maximum Utility Charging Current	110A
Switch Response Time	Inverter to Utility: 10ms Utility to Inverter (when the load power is higher than 100W): 20ms
Inverter Output	
Inverter Rated Power (@30℃)	3,500W
3-second Transient Surge Output Power	7,000W
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% (24V resistive load)
Maximum Load Efficiency	91%
Maximum Inverter Efficiency	93%
Parallel Function	Yes, 12 units in standard, 16 units at most

Solar Controller	
PV Maximum Open-circuit Voltage	500V (At minimum operating environment temperature) 440V (At 25℃)
MPPT Voltage Range	85V to 400V
PV Maximum Input Power	4,000W
Number of MPPTs	1
PV Maximum Input Current	One way, 16A
PV Maximum Short-circuit Current	One way, 18A
PV Maximum Charging Current	120A
MPPT Maximum efficiency	≥ 99.5%
Battery	
Battery Rated Voltage	24VDC
Battery Work Voltage Range	21.6VDC to 32.0VDC
Battery Maximum Charging Current	120A
Others	
No-load Losses	< 1.2A
	Test condition: Utility, PV and Load are not connected, AC output is ON, fan stops, @24V input
Standby Current	< 0.9A
	Test condition: Utility, PV and Load are not connected, AC output is OFF, fan stops, @24V input
Work Temperature Range	-20℃ to +50℃ (> 30℃ derating)

Storage Temperature Range	-25℃ to +60℃
Enclosure	IP20
Relative Humidity	< 95% (N.C.)
Altitude	< 4,000m (> 2,000 meters derating)
Mechanical Parameters	
Dimension (L × W × H)	590mm × 288mm × 163mm
Mounting Size (L × W)	568mm × 245mm
Mounting Hole Size	Φ9mm/Φ10mm
Net Weight	14.0kg

Model	HP3542-AH0650P20SA	HP5542-AH1050P20SA
Utility Input		
Utility Voltage	176VAC to 264VAC (Default) 90VAC to 285VAC (Configurable)	
Utility Frequency	45Hz to 65Hz	
Maximum Utility Charging Current	60A	100A
Switch Response Time	Inverter to Utility: 10ms Utility to Inverter (when the load power is higher than 100W): 20ms	
Inverter Output		
Inverter Rated Power (@30℃)	3,500W	5,500W
3-second Transient Surge Output Power	7,000W	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%	
Parallel Function	Yes, 12 units in standard, 16 units at most	
Solar Controller		
PV Maximum Open-circuit Voltage	500V (At minimum operating environment temperature) 440V (At 25℃)	

MPPT Voltage Range	85V to 400V	
PV Maximum Input Power	4,000W	6,000W
Number of MPPTs	1	2
PV Maximum Input Current	One way, 13A	Two ways, 2 × 15A
PV Maximum Short-circuit Current	One way, 15A	Two ways, 2 × 18A
PV Maximum Charging Current	60A	100A
MPPT Maximum efficiency	≥ 99.5%	
Battery		
Battery Rated Voltage	48VDC	
Battery Work Voltage Range	43.2VDC to 60.0VDC	
Battery Maximum Charging Current	60A	100A
Others		
No-load Losses	< 0.8A	< 1.1A
	Test condition: Utility, PV and Load are not connected, AC output is ON, fan stops, @48V input	
Standby Current	< 0.6A	< 0.75A
	Test condition: Utility, PV and Load are not connected, AC output is OFF, fan stops, @48V input	
Work Temperature Range	-20℃ to +50℃ (> 30℃ derating)	
Storage Temperature Range	-25℃ to +60℃	
Enclosure	IP20	
Relative Humidity	< 95% (N.C.)	

Altitude	< 4,000m (> 2,000 meters derating)	
Mechanical Parameters		
Dimension (L × W × H)	534mm × 288mm × 163mm	590mm × 288mm × 163mm
Mounting Size (L × W)	512mm × 245mm	568mm × 245mm
Mounting Hole Size	Φ 9mm/ Φ 10mm	
Net Weight	12.0kg	14.8kg

Reference:

1. Derating coefficient of inverter output

   Total Derating Coefficient = $K_T \times K_A \times LDF$

   In the formula: K_T = Derating coefficient of inverter/charger with respect to ambient temperature; K_A = Derating coefficient of inverter/charger with respect to altitude.

2. Recommended value for the derating coefficient of inverter/charger with respect to temperature (K_T)

Ambient Temperature (Unit: ℃)	Derating Coefficient of Inverter Output With Respect to Temperature (K_T)		
	0.95 Times Battery Rated Voltage	Battery Rated Voltage	1.2 Times Battery Rated Voltage
25	1.00	1.00	1.00
30	1.00	1.00	1.00
35	1.00	1.00	1.00
40	1.00	0.95	0.85
45	0.85	0.80	0.75
50	0.70	0.65	0.60

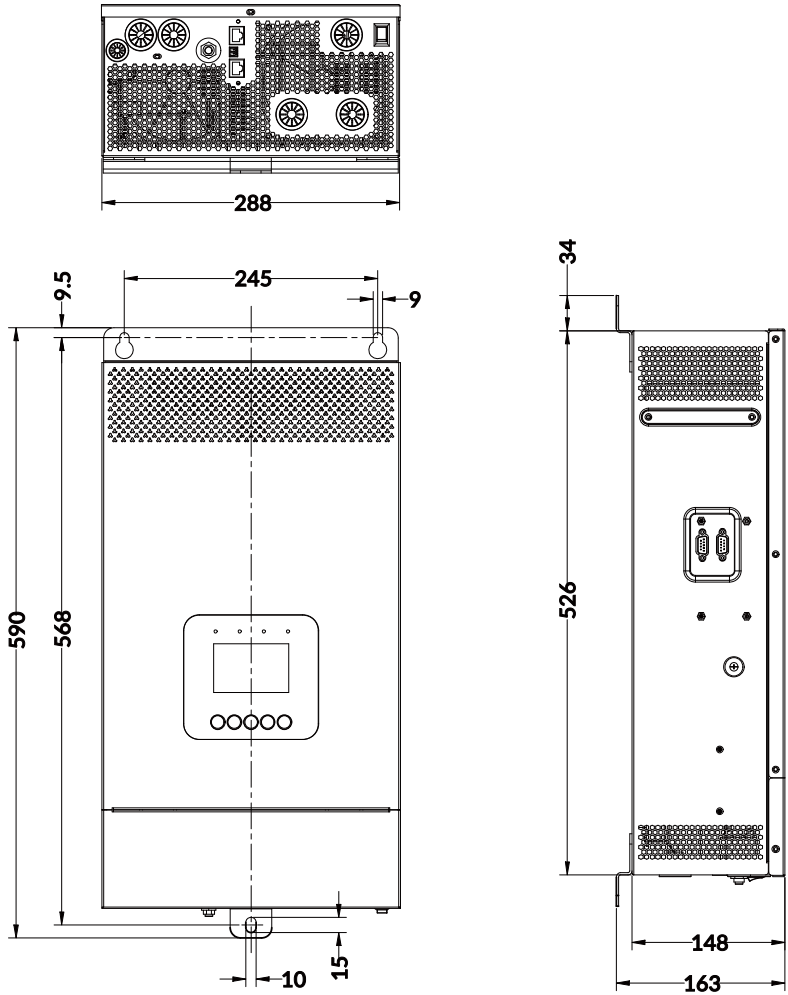
3. Recommended value for the derating coefficient of inverter/charger with respect to altitude (K_A)

Altitude (Unit: Meter)	Derating Coefficient of Inverter Output With Respect to Altitude (K_A)
1,000	1.00
1,500	0.95
2,500	0.85
3,000	0.80
3,500	0.75
4,000	0.70

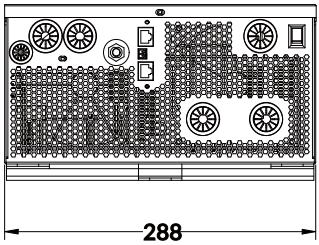
4. Please refer to the relevant technical materials of the actual load to obtain the load power factor (LDF). For the LDF range of each model in the HP-AHP20SA series, please refer to the parameter table.

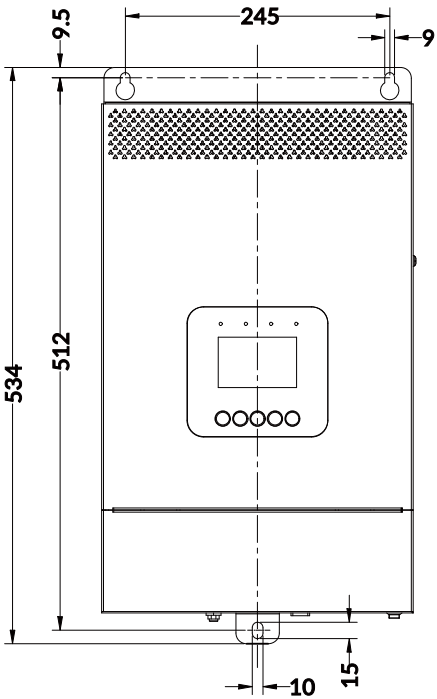
9 Dimensions

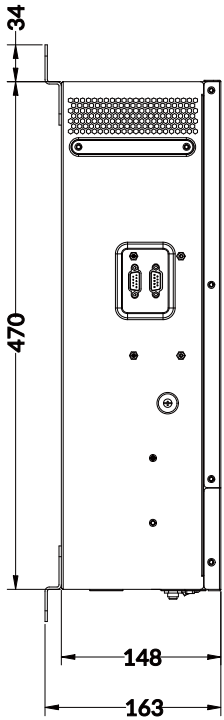
Model: HP3522-AH1250P20SA **Unit: mm**



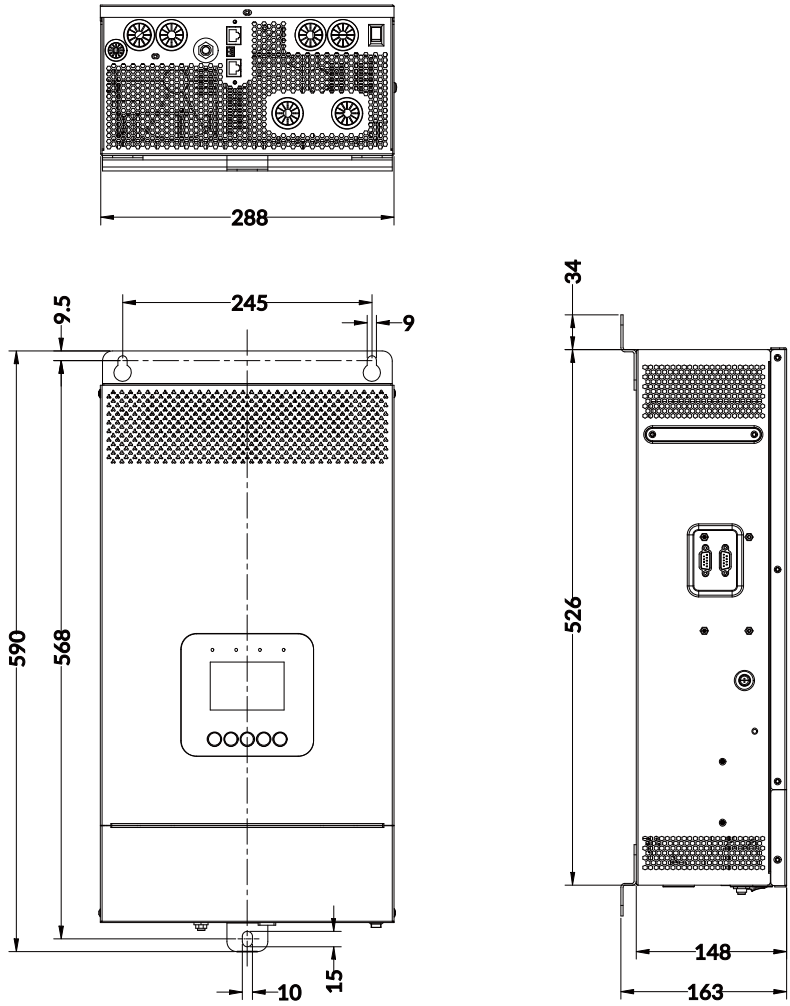
Model: HP3542-AH0650P20SA **Unit: mm**







Model: HP5542-AH1050P20SA **Unit: mm**



Any changes without prior notice! Version number: V1.4

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