PT8016S Energy Storage System Specification

curriculum VITAC

date	edition	description	edit
2025/05/27	V1.0	editio princeps	Zhou Shien

catalogue

1. Safety Notice

1.1 Scope of Application

This specification document contains critical information, guidelines, operating procedures, and maintenance for the product, applicable to the following model: PT8016S

• Users must comply with the contents of this specification during installation, use, and maintenance.

1.2 Safety Instructions

• Batteries pose potential hazards and require appropriate protective measures during operation and maintenance!

• Improper operation of the test procedures described in this specification may result in serious personal injury and property damage!

• Use the correct tools and protective equipment to handle batteries.

• Battery maintenance must be performed by a person with battery expertise and safety training.

• Non-compliance with the above warnings may lead to a variety of disasters.

2. Product Introduction

2.1 Product Description

The PT8016S is an integrated energy storage system combining photovoltaic power generation, grid charging, and battery storage. Featuring a compact design with built-in wheels at the base, it seamlessly integrates inverter and battery storage while allowing easy repositioning.

2.2 Product Model Naming Rules

ESS - L - 16   F   01 - P8M11   ESS - L - 16   F   01 - P8M11

① ② ③ ④ ⑤ ⑥ Rule Explanation

① ② ③ ④ ⑤ ⑥ Rule Explanation

order number	defined declaration	remarks
1	Product category	ESS stands for Energy Storage System
2	Product voltage level	H: represents high pressure; L represents low pressure
3	Product power	16 representation 16Kwh

4	Product temperature control method	F: stands for air cooling; L: stands for liquid cooling
5	product line	01: Represents the 01 series; can be distinguished size
6	Product feature options	P: stands for PCS; M: stands for MPPT; A: Representing ATS; S: representing STS; number power parameter indicating function

2.3 System Connection Diagram

The diagram below illustrates the system application scenarios of this product. A complete system consists of the following components:

• Photovoltaic modules: Convert light energy into DC power to charge the product, or directly invert it into AC power to supply loads.

• Grid power or generator: Connected to AC input, it can charge batteries while supplying loads. When batteries and photovoltaic modules power the load, the system can typically operate without grid power or a generator.

• Household loads: Supports various home and office appliances, including refrigerators, lighting fixtures, televisions, fans, air conditioners, and other AC-powered devices

• All-in-one machine: The energy conversion unit of the entire system.

The actual application scenario determines the specific system wiring method.

市电 or 发电机

光伏组件

家用负载

一体机

2.4 Product Overview

250 680

① ② ③ ④

⑪ ⑫ ⑬

⑤ ⑥ ⑦ ⑧ ⑨ ⑩

1000 1071
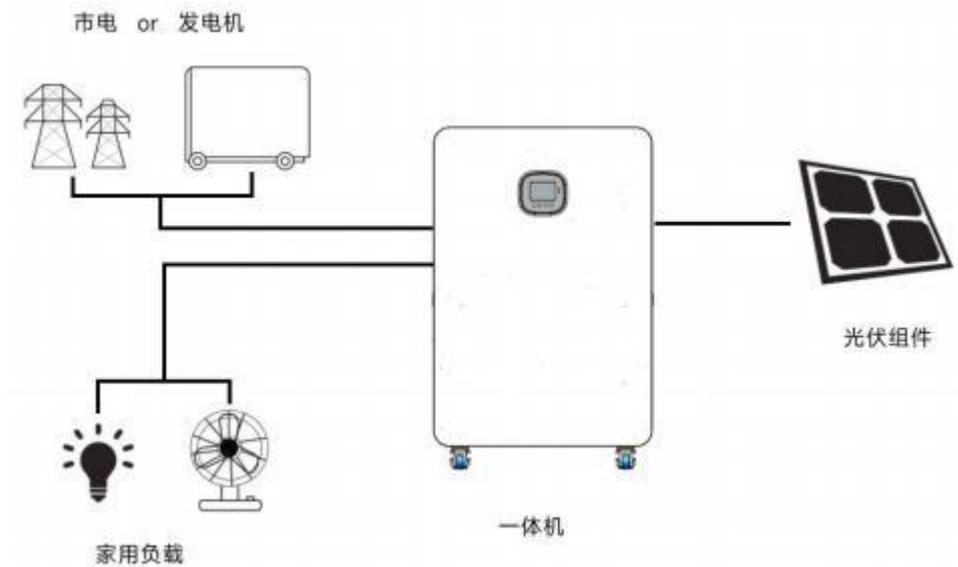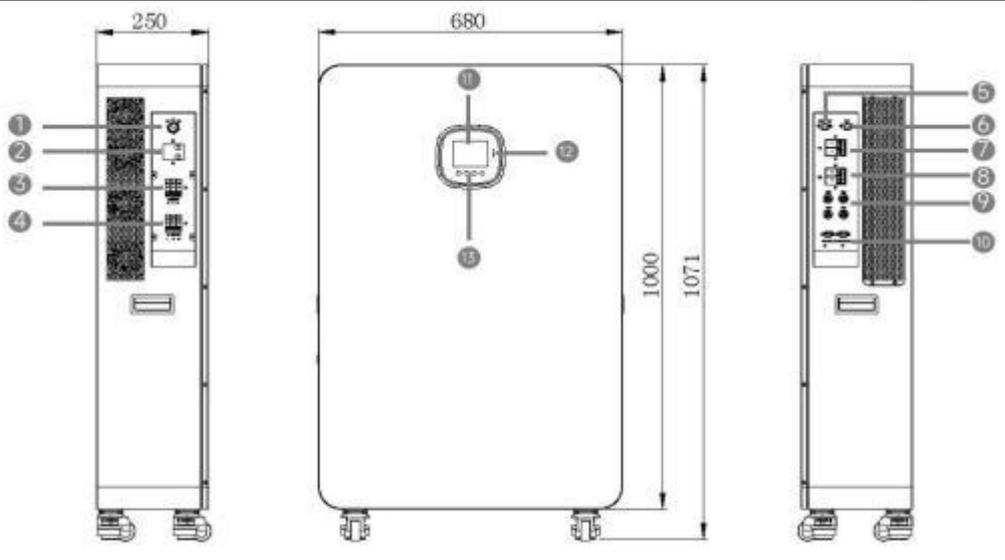
1	System switch	6	WIFI module interface (optional)	11	LCD screen
2	AC entry switch	7	PV1 photovoltaic input switch	12	LED pilot lamp
3	AC input interface (L+N+PE)	8	PV2 photovoltaic input switch	13	key
4	AC output interface (L+N+PE)	9	Photovoltaic input interface PV1/PV2		
5	Communication/Debugging Port	10	Parallel communication port (for parallel modules only)		

2.5 Product Specifications

Battery parameters	
Battery type	LFP,3.2V/314AH
serial mode	1P16S
rated power	16.0768Kwh
rated voltage	51.2V
voltage range	43.2V~58.4(2.7v~3.65v)
charge-discharge rate	≤ 1C
depth of discharge	95%
inverter output	
output rating	8000W
maximum peak power	12000W
rated output voltage	230Vac (single-phase)
rated frequency	50/60Hz
discharge waveform	pure sine wave
switching period	10ms (typical value)
overload protection	After triggering overload protection, the product will resume output after 3 minutes. If the inverter experiences five consecutive overloads, the output will be shut down until the inverter restarts. overload protection (102%<load<110%) +10%: Error. The output will be closed in 5 minutes. (110%<load<125%) +10%: Error occurs and output is closed after 10 seconds. Load> 125% + 10%: Error reported. Output will be closed after 5 seconds.
Photovoltaic input	
MPPT way	2
maximum input power	5500W+5500W
maximum input current	22A+22A
maximum open circuit voltage	500Vdc+500Vdc
PTPT operating voltage range	125~425Vdc

City power/generator input	
input voltage range	90~275Vac
Input frequency range	50/60Hz
side current	63A

| productiveness	
PTPT tracking efficiency	99.9%
maximum efficiency of battery inverter	92%
be in common use	
size	1071*860*250mm
weight	151kg
levels of protection	IP20 is for indoor use only
ambient temperature	-10~55°C,>45°C reduction in capacity
noise	<60dB
cooling-down method	Built-in fan
communication	
debugging interface	RS485/CAN (network port)
External module (optional)	Wi-Fi / GPRS

3. Installation

3.1 Selecting Installation Location and Operation

The PT8016S is designed for indoor use (IP20 protection rating). Before selecting an installation site, users should consider the following factors:

• Choose a flat surface for product installation

• Select a dry and well-ventilated environment for product installation
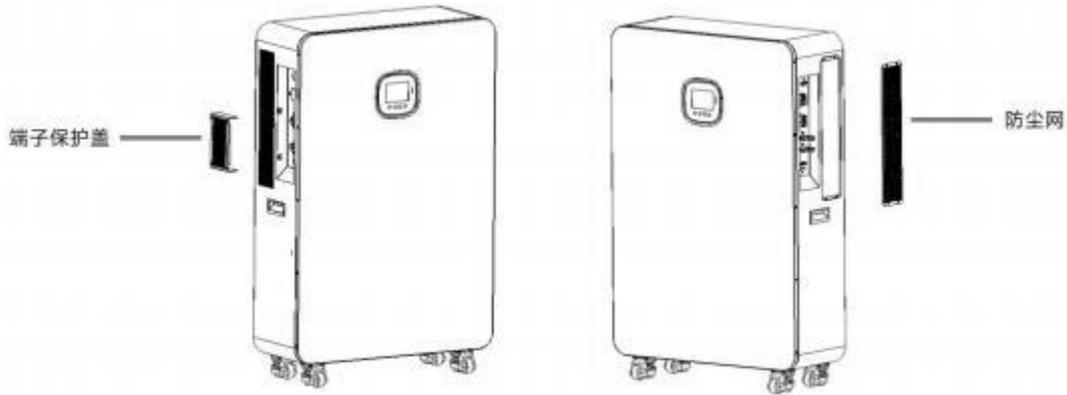
• Ensure sufficient cooling space for the inverter

The ambient temperature should be maintained between-10°C and 55°C (14°F to 131°F) to ensure optimal operation.

• After selecting the location, adjust the bottom casters.

200mm   200mm
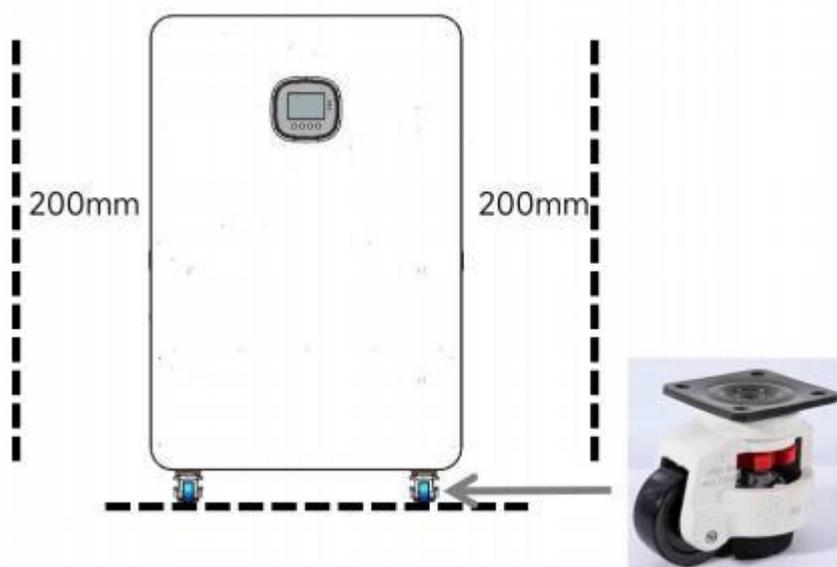
旋转红色齿轮,使支撑柱接触地面。

3.2 Removal and Installation of Terminal Cover and Dust Cover

• In areas with poor air quality, dust filters may become clogged by airborne particles when using the device. Regular disassembly and cleaning of the dust filter is recommended to prevent reduced airflow velocity inside the product, which could trigger the over-temperature protection failure (19/20 fault), potentially affecting power supply and reducing the product's lifespan.

4. Wiring

4.1 Single-phase mode
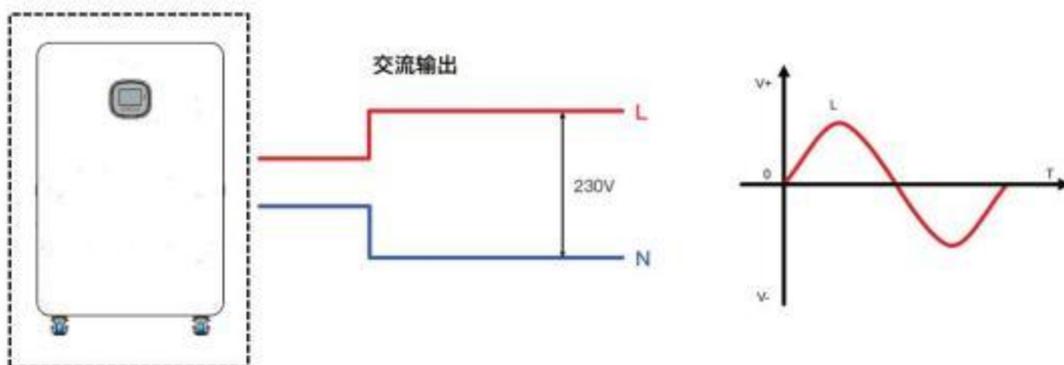
• AC output phase voltage (L-N): 200~240Vac, 230Vac by default

• Users can adjust the output voltage through the settings menu. For details, refer to Chapter 5.2.

• Output voltage corresponds to parameter setting 38. The output voltage can be set within the range of 200V to 240V.

单相：L+N+PE

utility grid

单相：L+N+PE

AC Load

注意:

串联的光伏板的开路电压必须低于500V，过压会导致逆变器损坏。因配置不当而造成的损坏自负。

单相模式
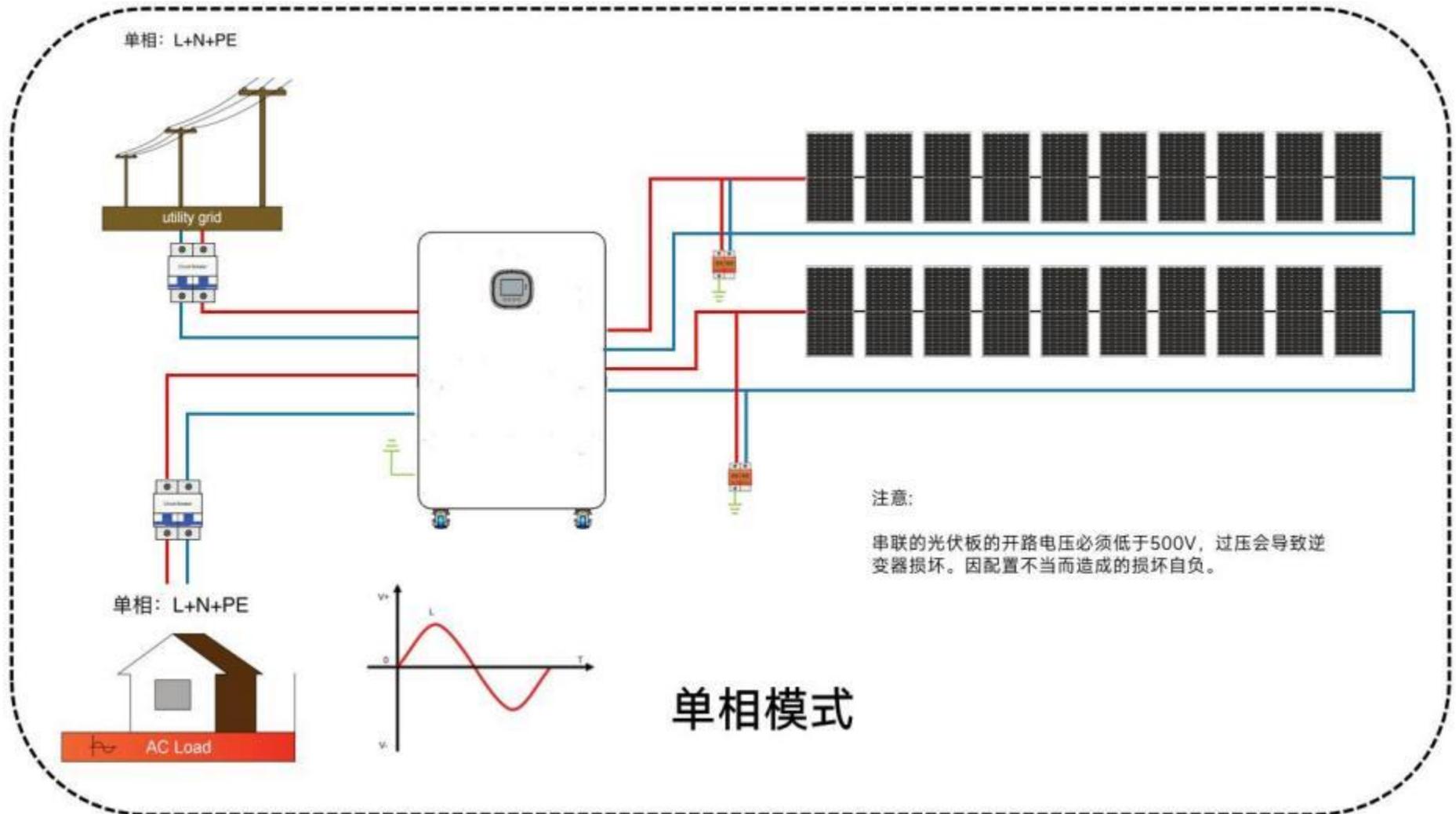
4.2 Cable and Circuit Breaker Selection

• Photovoltaic input

Wire diameter	maximum input current	circuit breaker specification
5mm2/ 10 AWG	22A	2P-25A (included in the product)

• AC input

pattern	Wire diameter	maximum input current	circuit breaker specification
uniphase	13mm2/6AWG (L/ N)	63A	2P-63A (User-owned)

• AC output

pattern	Wire diameter	maximum input current	circuit breaker specification
uniphase	13mm2/6AWG (L/ N)	63A	2P-63A (User-owned)

• PV input terminal selection: MC4-pin PV connector (male/female, user-supplied)
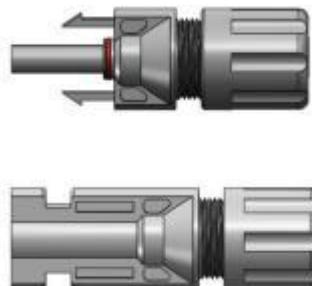
• AC input and AC output terminals

1. Use a wire stripper to remove the 6-8mm insulation layer from the cable (the user must provide the tool).

2. Install a cable clamp at the cable's end (the clamp must be provided by the user)
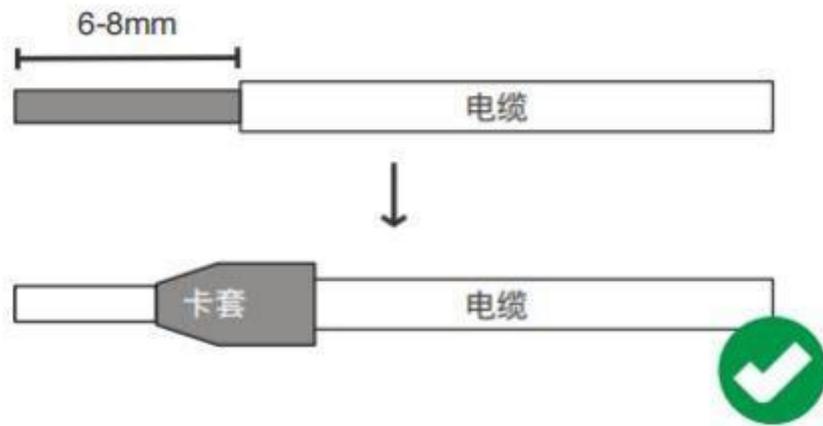
The wire diameter is provided for reference only. When the distance between the photovoltaic array and the product is long, using thicker wires can reduce voltage drop and improve system performance.

4.3 AC Input and Output Wiring
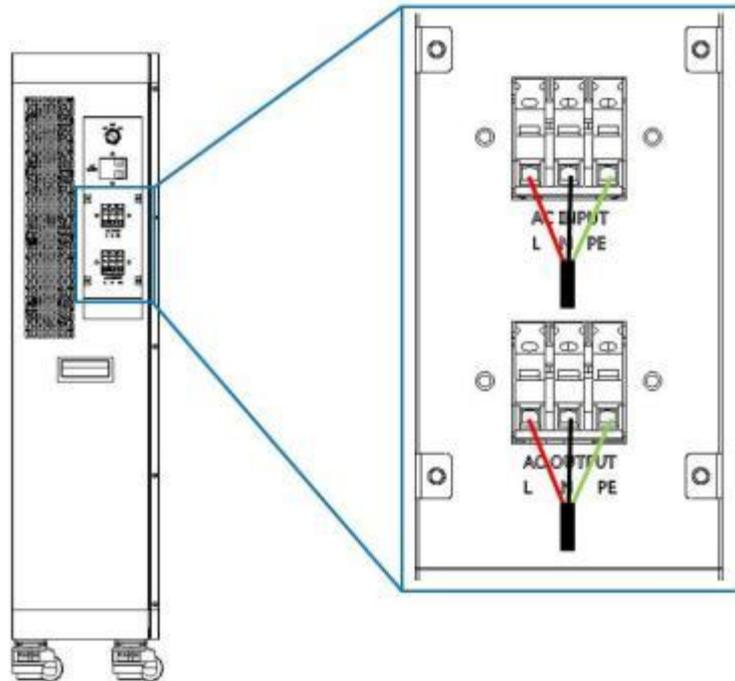
• Before connecting AC inputs and outputs, disconnect the circuit breaker to avoid electric shock hazards. Do not operate under live conditions.

• Ensure the cables used meet the required specifications, as those that are too thin or of poor quality may pose serious safety risks.

4.4 Photovoltaic Input Wiring

接好线的MC4连接器按丝印指示插入接口
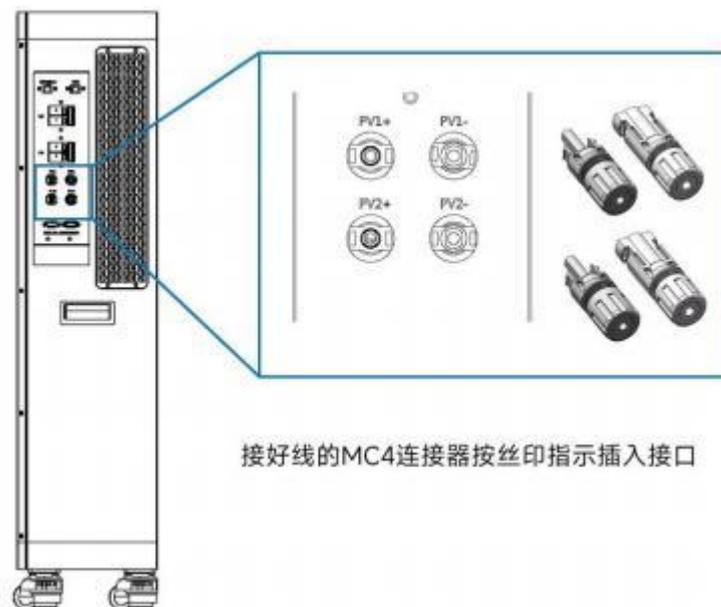
• Before connecting the photovoltaic system, disconnect the circuit breaker to prevent electric shock. Do not operate under live conditions.

• Ensure the open-circuit voltage of the connected PV modules does not exceed the inverter's maximum open-circuit voltage of 500V, otherwise the product may be damaged.

4.5 Product Launch

After confirming reliable wiring and correct sequence, reposition the terminal cover to its original position.

• Step 1: Turn the power switch clockwise to PCS mode

• Step 2: Close the circuit breakers for photovoltaic, AC input, and AC output in sequence

• Step 3: Start the loads in ascending order of power

5. Operation

5.1 Operation Interface

The operation and display interface of the product includes 1 LCD screen, 3 indicator lights, and 4 buttons.
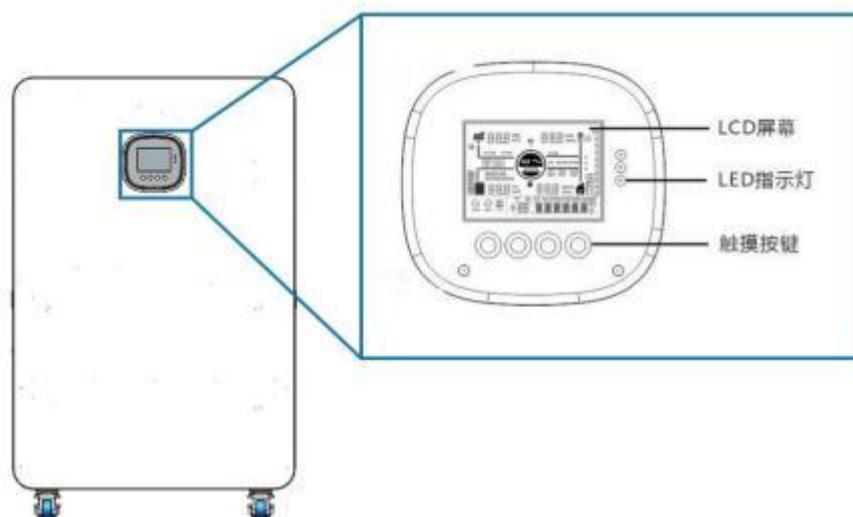
• key

key	description
SET	Go to/Exit Settings Menu
UP	Go to the next option
DOWN	Go to the previous option
✓	Confirm or enter the selection in the settings menu

• LED indicator light

pilot lamp	pigment	description
AC/INV	Huang	Always On: mains bypass output Flicker: Inverter Output
CHARGE	hispid arthraxon	Chang Liang: Charging complete Flicker: Charging
FAULT	red	flashover fault

Display interface
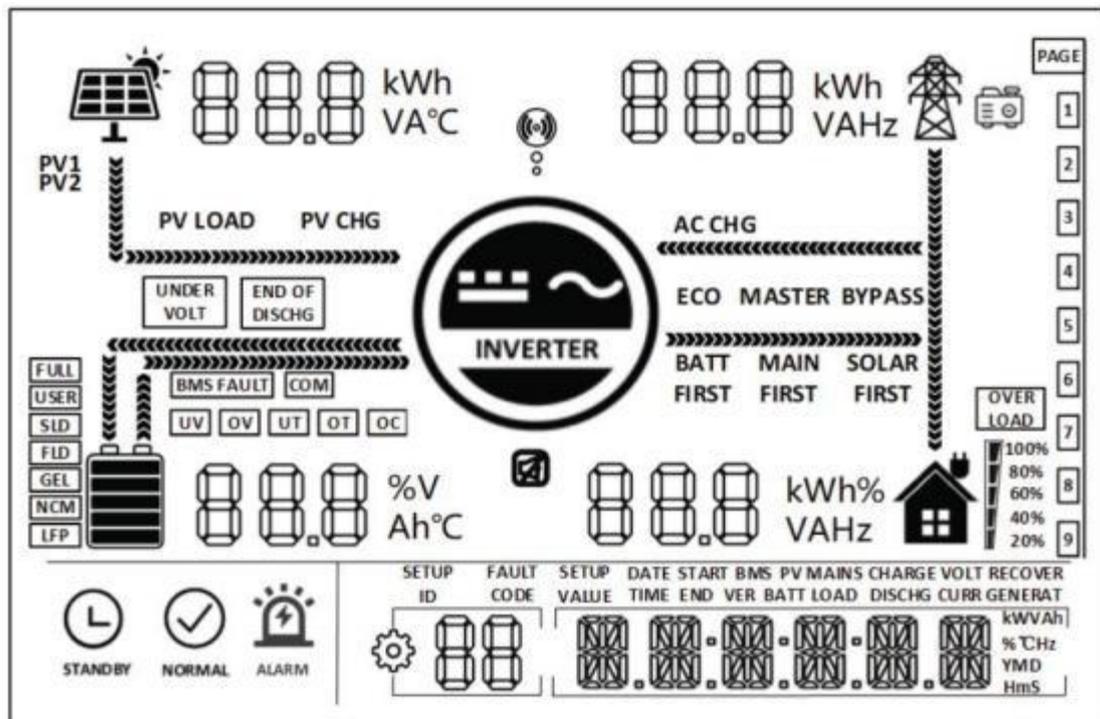
icon	description	icon	description
	indicates photovoltaic panels		indicates mains power
	indicate battery		inductive generator
	Indicates the inverter is operating.		indicates load
	indicates the inverter is communicating with the data collector Communicate		The buzzer is muted.

》》》》》》》》》》》》》》	indicates the direction of electric current flow

Symbol	Description	Symbol	Description
STANDBY	indicates the inverter is in standby mode	NORMAL	indicates the inverter is operating normally
ALARM	indicates a failure		Set the display options
	indicates 80% to 100% of the rated power		Indicates the battery SOC is between 80% and 100%
	indicates a load power of 60% to 79%		indicates the battery SOC at 60% to 79%
	indicates 40% to 59% of the rated power		indicates the battery SOC at 40% to 59%
	indicates 20% to 39% of the rated power		indicates the battery SOC between 20% and 39%
	indicates 5% to 19% of the rated power		Indicates the battery SOC is between 5% and 19%.
UNDER VOLT	indicates battery under-voltage	END OF DISCHG	indicates battery over-discharge
OVER LOAD	overload indication	BMS FAULT	indicates a BMS failure
COM	indicates a system communication error	UV	indicates insufficient system voltage
OV	overvoltage of system	UT	indicates the system temperature is too low
OT	Indicates the system temperature is too high.	OC	overcurrent signal
FULL	Indicates the battery is full	USER	indicates the user-defined battery type
SLD	indicates sealed lead-acid battery	FLD	open lead-acid battery
GEL	lead-acid battery with gel electrolyte	NCM	indicates ternary lithium-ion battery
LFP	LFP lithium-ion battery	ECO	Indicates energy-saving mode
PV LOAD	indicates photovoltaic power generation under load	PV CHG	It shows that photovoltaic energy is charging the battery.
Acc hG	indicates that the AC input power is charging the battery	MAIN FIRST	Indicates that the inverter's output mode is mains power priority.
BYPASS	indicates the inverter's output mode as bypass	SOLAR FIRST	Indicates the inverter's output mode as PV priority
BATT FIRST	Set the inverter output mode to battery priority		
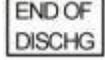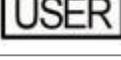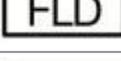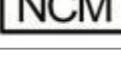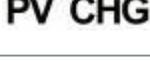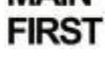
View real-time parameters

On the main screen, press the UP/DOWN keys to view real-time data during inverter operation.
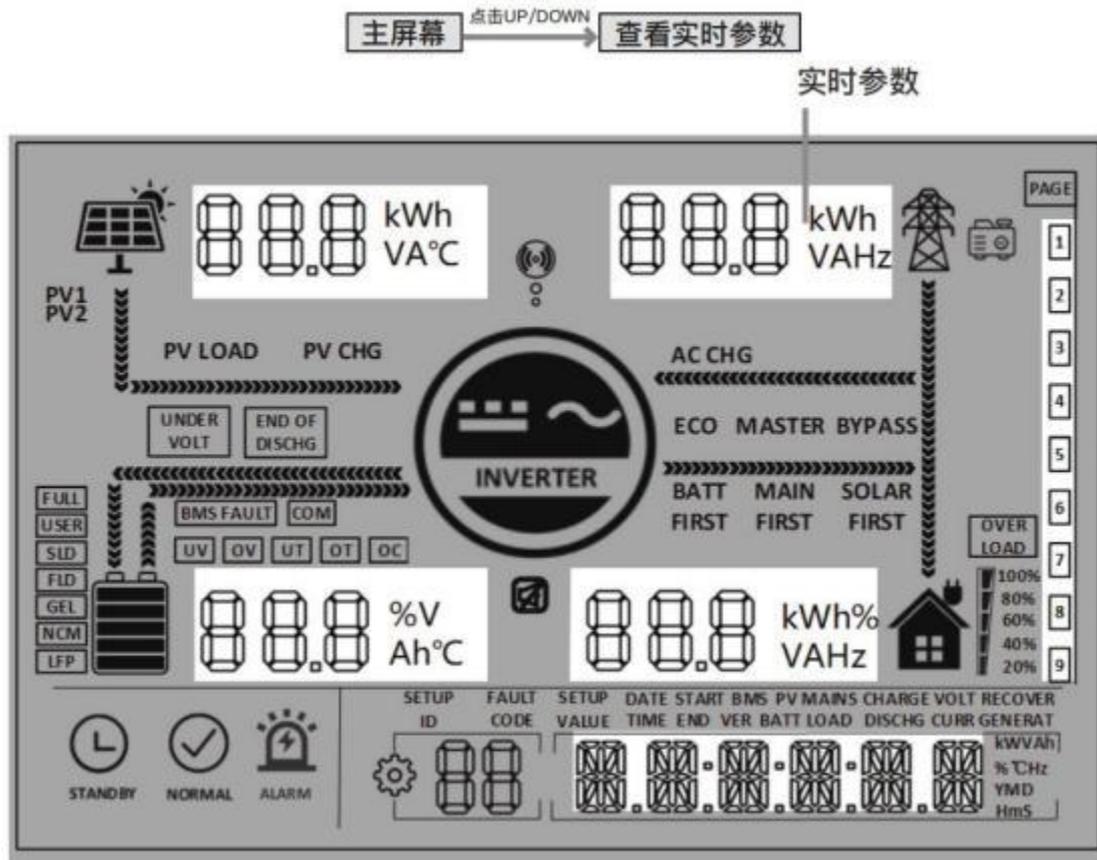
page number	Photovoltaic side	Battery side	AC input side	load side	General Information
1	input voltage of photovoltaic	cell voltage	city mains input voltage	single-phase voltage	present time
2	input current of photovoltaic	battery current	city mains input current	monophase current	current date
3	input power of photovoltaic	cell voltage	charging power / generating power	single-phase active power	Total photovoltaic power generation
4	daily photovoltaic generation	battery current	Daily charging capacity of municipal power	apparent single-phase power	Total electricity consumption under load
5	Photovoltaic side radiator temperature	radiator temperature	power frequency	frequency of inverter	RS485 address
6	rated open circuit voltage	rated voltage of battery	busbar voltage	output rating	software release
7	maximum photovoltaic charging current	maximum battery charging current	maximum mains charging current	output active power	parallel mode display
8	/	/	/	output apparent total power	/

5.2 Settings
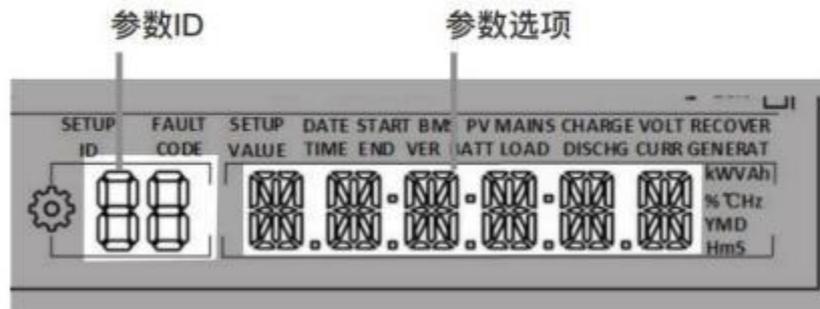
ID	参数含义	选项	描述
电压设置逻辑:	【15】 < 【12】 < 【04】 < 【14】 < 【35】 < 【37】 < 【05】 < 【09/11】		
00	退出	ESC	退出设置菜单
01	交流输出模式	UTI 默认	光伏能量优先与负载配合，光伏能量不足时，电网电源与光伏混合负载，光伏能量充足时与负载配合，多余能量给蓄电池充电，电网电源仅在蓄电池过放电时开始充电（06 设置为 "OSO（仅光伏）"，电网电源不会充电），蓄电池仅在离网时放电。
		SbU	逆变优先。仅当电池电压低于参数第4项的设定值时，切换至市电带载。当电池电压高于参数第5项的设定值或者充满，由市电切换回逆变带载。
		SOL	光伏优先。当光伏无效或者电池电压低于第4项的设定值时，切换至市电。
		SUB	太阳能优先充电，太阳能不足时，电网能源和太阳能混合充电（如果 06 设置为 "OSO（仅 PV）"，电网能源将不充电），电网带负载，当太阳能足够充电时，多余的能源不足以负载，多余的太阳能和电网将混合负载，蓄电池仅在离网时放电。

ID	参数含义	选项	描述
02	交流输出频率	50.0 60.0 默认	在旁路模式下，交流输出频率将适应市电频率，其他情况下输出将遵循预设值。
03	交流输入电压范围	UPS 默认	当输出电压为220/230V，输入电压范围为170~280V
		APL	当输出电压为220/230V，输入电压范围为90~280V，频率范围变为40~70Hz 仅在离网模式才可以设置， 混合并网模式（34设置项），自动变为ups
04	电池转市电电压点	43.6	参数01项为SBU或SOL时，当电池电压低于该设置值，输出由逆变切换至市电，设置范围40V~52V
05	市电转电池电压点	56.8	参数01项为SBU或SOL时，当电池电压高于该设置值，输出由市电切换至逆变，设置范围48V~60V
06	电池充电模式	SNU 默认	当同时使用光伏电源和市电为蓄电池充电时，先使用光伏电源充电，当光伏电源不足时，再使用市电充电。只有在旁路模式下，才能同时使用光伏电源和市电为蓄电池充电，逆变器运行期间只能启用光伏充电模式。
		OSO	仅在光伏充电模式下，请勿启用市电充电模式
07	电池充电电流	60	ASP4880S180-H，设置范围0~180A ASP48100S200-H，设置范围 0~200A
08	电池类型	USER	用户自定义，可设置所有电池参数
		SLd	密封铅酸电池
		FLd	开口铅酸电池
		GEL 默认	胶体铅酸电池
		LI4/LI5/LI6	磷酸铁锂电池 LI4/ LI5/ LI6，对应磷酸铁锂电池14串、15串、16串
		NI3/NI4	三元锂电池，NI3/NI4，对应三元锂电池13串、14串
		NOB	无电池
09	电池提升充电电压	57.6	设置范围 48V~58.4V，步进 0.4V，电池类型为自定义和锂电池时有效
10	提升充电持续时间	120	指恒压充电时电压达到参数09设定电压的持续充电时间，设置范围 5min~900min，步进5分钟，

ID	参数含义	选项	描述
11	电池浮充电压	55.2	设置范围48V~58.4V，步进0.4V，在BMS通讯成功后不可设置该参数
12	电池过放电压（延时关机）	42	当电池电压低于该判断点，且触发参数第13项的值后关闭逆变输出，设置范围40V~48V，步进0.4V，
13	电池过放延时时间	5	电池电压低于参数第12项，且触发本参数设定的延时时间后关闭逆变输出，设置范围5S~50S，步进5S，
14	电池欠压报警点	44	电池电压低于该判断点时，设备将欠压告警，输出不关机，设置范围40V~52V，步进0.4V，
15	电池放电限制电压	40	电池电压低于该参数项的数值时，输出立即关闭。设置范围40V~52V，步进0.4V，电池类型为自定义和锂电池时有效
16	电池均衡充电	dIS 默认	禁止均衡充电
		ENR	允许均衡充电，仅在电池类型为开口铅酸电池和密封铅酸电池以及自定义有效
17	均衡充电电压	58	设置范围48V~58V，步进0.4V，仅在电池类型为开口铅酸电池和密封铅酸电池以及自定义时有效
18	均衡充电时间	120	设置范围5min~900min，步进5分钟，仅在电池类型为开口铅酸电池和密封铅酸电池以及自定义有效
19	均衡充电延时时间	120	设置范围5min~900min，步进5分钟，仅在电池类型为开口铅酸电池和密封铅酸电池以及自定义有效
20	均衡充电间隔时间	30	设置范围0~30days，步进1天，仅在电池类型为开口铅酸电池和密封铅酸电池以及自定义有效
21	均衡充电启停	dIS 默认	立即启动均衡充电
		ENR	立即停止均衡充电
22	节能模式（仅支持单机模式）	dIS 默认	禁止节能模式
		ENR	启用节能模式，当负载功率低于50W时，逆变器的输出将在5分钟延迟后关闭。当负载超过50W时，逆变器会自动重新启动。
23	过载自动重启动	dIS	禁止过载自动重启动，如果发生过载关闭输出，机器不再恢复开机
		ENR 默认	允许过载自动重启动，如果发生过载关闭输出，机器延时3分钟后重新启动输出。累计5次后，不再恢复开机

ID	参数含义	选项	描述
24	过温自动重启动	dIS	禁止过温自动重启动，如果发生过温关闭输出机器不再打开输出
		ENA 默认	允许过温自动重启动，如果发生过温关闭输出，当温度降下来之后会重启打开输出
25	蜂鸣器报警	dIS	禁止蜂鸣器报警
		ENA 默认	允许蜂鸣器报警
26	模式转换提醒	dIS	禁止在主要输入源的状态发生变化时报警提示
		ENA 默认	允许在主要输入源的状态发生变化时报警提示
27	逆变过载切换至旁路	dIS	逆变过载时禁止自动切市电带载
		ENA 默认	逆变过载时自动切换至市电
28	市电充电电流	60	ASP4880S180-H, 设置范围0~100A ASP48100S200-H, 设置范围0~120A
30	RS485通讯地址	Id: 1	RS485通讯地址设置范围：1~254 并机模式下范围为：1～6
31	交流输出模式 （仅待机模式下可设置）	[31] SIG 默认	单机使用设置项
		[31] PAL	单相并机使用设置项
		[31] 3P1/3P2/3P3	三相并机使用设置项
		连接至 P1 的所有机器屏幕需要设置为"3P1"；连接至 P2 的所有机器屏幕设置为"3P2"；连接至 P3 的所有机器屏幕设置为"3P3" 1) 假设当[38]设置项设置的输出电压为230Vac(S 系列机型)：此时，（P1-P2，P1-P3，P2-P3）间电压相位相差 120 度，P1 相的火线L1 与 P2 相的火线 L2 之间的电压为 230*1.732=398Vac，同理 L1-L3，L2-L3 间线电压为 398Vac；L1-N，L2-N，L3-N 间的电压为 230Vac。	
32	RS485通讯功能	SLA 默认	启用PC及远程监控协议
		485	启用基于RS485通信的BMS通信功能
		CAN	启用基于CAN通信的BMS通信功能
33	BMS通讯	当32项设置为485或BMS时，需在33项选择对应的通讯协议	
		PAC=沛城，RDA=瑞达，AOG=奥冠，OLT=欧力特，HWD=欣旺达，DAQ=大秦，WOW=硕日，PYL=派能，UOL=未蓝	

ID	参数含义	选项	描述
34	并网功能	dIS 默认	禁止此功能
		ON GRd	并网功能，光伏优先充电，在满足负载用电需求后的剩余电能将反馈给电网（设置为这一选项时，设置项都被固定为：01项为UTI，03项为UPS，06项为SNU》）
35	电池欠压恢复点	52	当电池欠压后，电池电压需要大于此设置值恢复电池逆变交流输出，设置范围：44V~54.4V
37	电池充满后重新充电电压点	52	电池充满后，逆变器停止充电，当电池电压低于此电压值时，重新恢复充电，设置范围：44V~54V
38	交流输出电压	220	设置范围：200/208/220/230/240Vac
39	充电电流限制（启动BMS时）	LC SET	最大电池充电电流不大于设置值【07项】
		LC BMS 默认	最大蓄电池充电电流不大于BMS最高值
		LC INV	最大蓄电池充电电流不大于逆变器的逻辑判断值
40	定时市电充电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00
41	定时市电充电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
42	定时市电充电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00
43	定时市电充电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
44	定时市电充电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00
45	定时市电充电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
46	分时段市电充电/带载功能	dS 默认	禁止此功能
		ENA	允许分时段市电充电/带载功能后，供电模式将变为SBU，并在设置的充电时段或电池过放后切入市电进行充电；若同时使能了定时放电功能，系统供电模式将变为UTI，仅在设置的充电时段切入市电充电，在设置的放电时段或市电掉电时切换至电池逆变供电（仅限于纯离网模式）
47	定时市电放电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00
48	定时市电放电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
49	定时市电放电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00
50	定时市电放电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
51	定时市电放电开始/时间设置	00:00:00	设置范围：00:00:00~23:59:00

ID	参数含义	选项	描述
52	定时市电放电结束/时间设置	00:00:00	设置范围：00:00:00~23:59:00
53	定时市电放电功能/时间设置	dIS 默认	禁止此功能
		ENA	允许分时段电池放电功能后，供电模式将切换为UTI，系统仅在设置的放电时段或市电掉电时切换至电池逆变供电
54	当前日期	00:00:00	年/月/日 设置范围：00:01:01~99:12:31
55	当前时间	00:00:00	设置范围：00:00:00~23:59:59
57	停止充电电流	2	充电电流小于该设置值时停止充电（单位：A）
58	放电告警 SOC 设置	15	当容量小于该设置值时，SOC 告警（单位：%，仅在 BMS 通信 正常时有效）
59	放电截至 SOC 设置	5	当容量小于该设置值时，停止放电（单位：%，仅在 BMS 通信 正常时有效）
60	充电截止 SOC 设置	100	当容量大于该设置值时，停止充电（单位：%，仅在 BMS 通信 正常时有效）
61	切换市电 SOC 设置	10	当容量小于该设置值时，切换至市电（单位：%，仅在 BMS 通信 正常时有效）
62	切换逆变输出 SOC 设置	100	当容量大于该设置值时，切换至逆变输出模式（单位：%，仅在 BMS 通信 正常时有效）
63	N-PE连接自动切换功能	dIS 默认	不允许自动切换N-PE连接
		ENA	允许自动切换N-PE连接

5.3 AC Output Mode

The AC output mode corresponds to parameter settings 01 and 34, allowing users to configure manually.

• City power priority 01 UTI (default)
The system prioritizes mains power. When solar power is available, both mains and solar power can supply the load simultaneously. The battery only supplies the load when mains power is unavailable (priority: mains> solar> battery).

市电可用

市电不可用
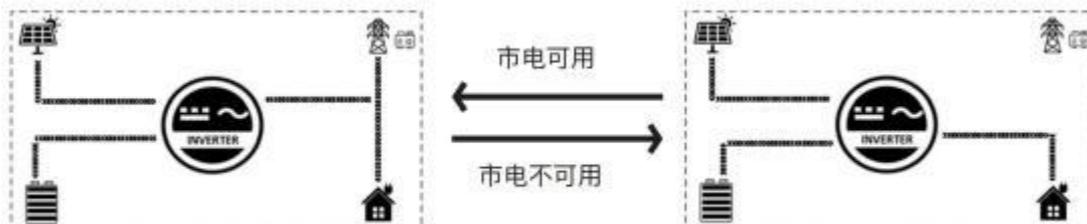
• Photovoltaic and mains power hybrid load

In UTI mode, when the battery is not connected or fully charged, both photovoltaic and mains power supply the load (priority: PV> mains> battery).
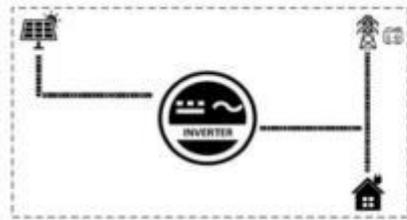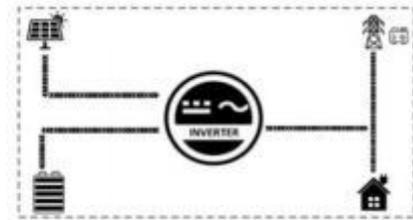
电池未接入　　　　　　　　　　　　　　　电池已充满

• Photovoltaic power generation takes priority for output "5BL"

Solar power supplies priority to the load. If solar power fails, it switches to mains power with the load. This mode maximizes solar power utilization while maintaining battery charge, suitable for regions with relatively stable power grids. (Priority: Solar> Mains> Battery)

光伏可用

光伏不可用
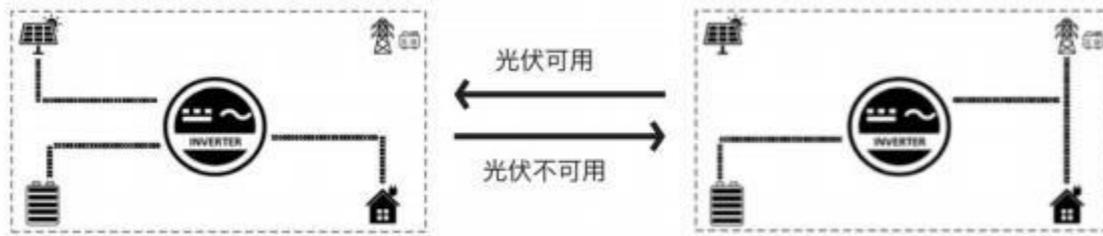
• Inverter output mode OI SbU ""

Photovoltaic systems will prioritize power supply to loads. When PV generation is insufficient or unavailable, batteries will supplement the load power supply. When the battery voltage reaches parameter 04 (battery switching to mains voltage), the system will switch to mains power. This mode maximizes DC power utilization and is suitable for grid-stable regions. (Priority: PV> Battery> Mains)

电池可用

电池欠压

5.4. Battery Charging Mode

• Hybrid charging "5H" (default)

The system charges batteries simultaneously using both solar power and grid electricity, with solar power taking priority and grid electricity serving as a backup when solar output is insufficient. This is the fastest charging method, ideal for areas with limited power supply, providing users with sufficient backup power. (Priority: Solar> Grid)
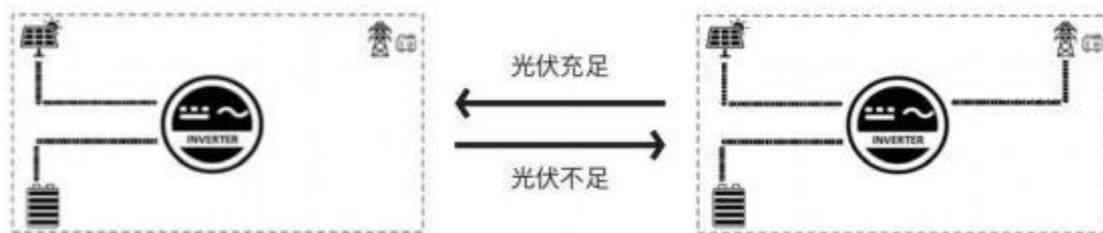
• Photovoltaic charging 050 only

Charging the battery exclusively with photovoltaic power without switching to mains electricity is the most energy-efficient method. All battery power is derived from solar energy, typically employed in regions with favorable solar radiation conditions.
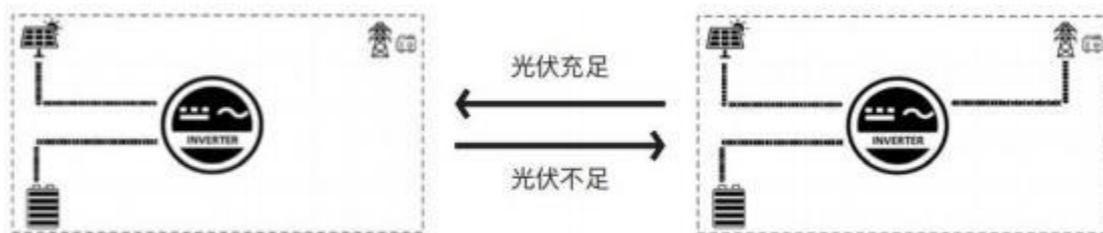
5.5 Time-sharing charging and discharging function

The PT8016S features time-of-use charging and discharging capabilities, allowing users to configure different charging/discharging periods based on local peak and off-peak electricity rates for optimal utilization of grid power and solar energy. When grid electricity prices are high, the battery inverter supplies power to the load; when grid electricity is cheaper, it can be used to power and charge the load, maximizing electricity cost savings. Users can enable/disable time-of-use charging/discharging functions in settings menu items 46 and 53, with specific charging/discharging periods configured in parameters 40-45 and 47-52. Below is a case study to help users understand this feature.

Before using this feature for the first time, set the local time and date in parameters 54 and 55. Users can then set the corresponding time periods based on local peak and off-peak electricity pricing.

峰谷电价收费示意图

分时段市电充电、带载功能

拥有3个可定义设置的时段，用户可以在00:00～23:59范围内自由设置市电充电/带载时段，在用户设置的时间段内，若有光伏能量输出，将会优先利用光伏能量，若无光伏能量输出或者光伏能量不足时，将会启用市电作为补充。

分时段电池放电功能

拥有3个可定义设置的时段，用户可以在00:00～23:59范围内自由设置电池放电时段，在用户设置的时间段内，逆变器将优先进行电池逆变来带载，若电池电量不足，逆变器将会自动切换至市电，确保负载稳定运行。
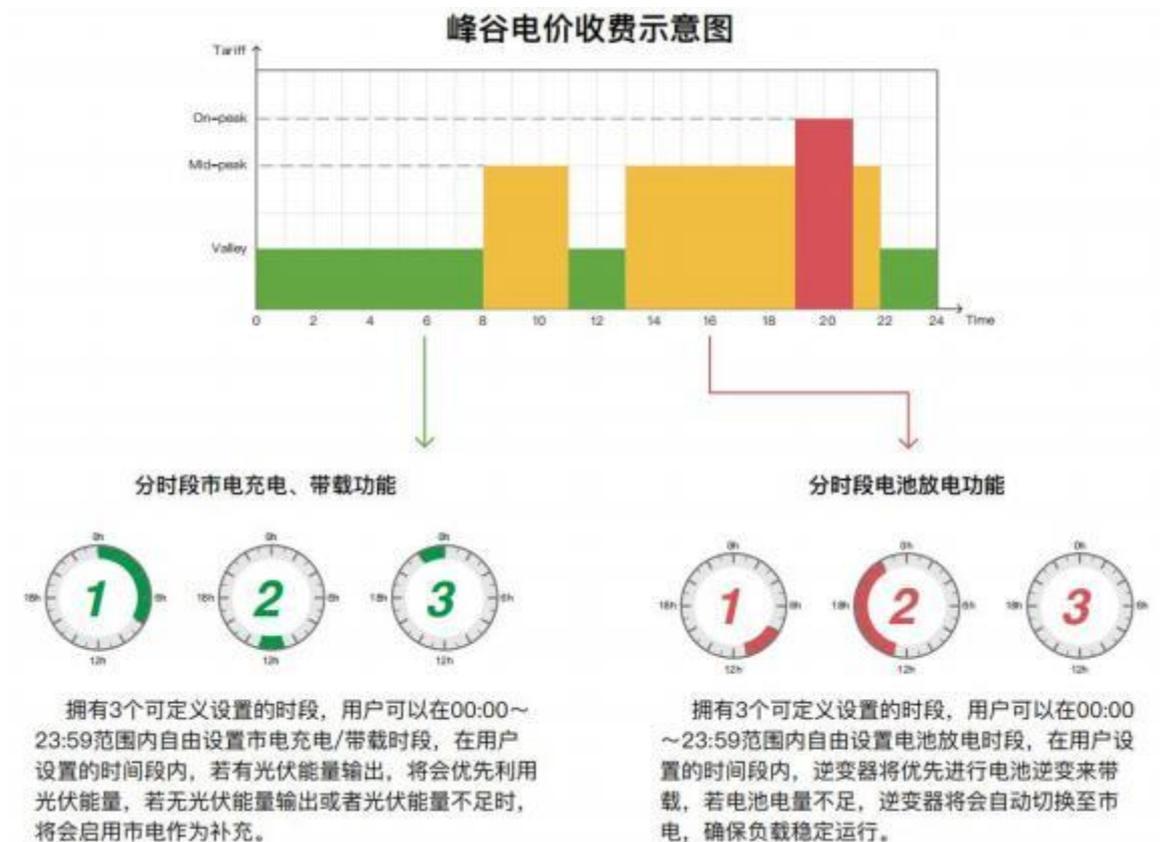
5.6 Battery Parameters

Parameters, Battery Type	lithium iron phosphate			Customize
	L16	L15	L14	USER
over-break voltage	60V	60V	60V	60V
balanced charging voltage	-	-	-	40~60V adjustable
Increase the charging voltage	56.8V	53.2V	49.2V	40~60V adjustable
floating charge voltage	56.8V	53.2V	49.2V	40~60V adjustable
undervoltage alarm voltage	49.6V	46.4V	43.2V	40~60V adjustable
under-voltage breaking voltage	48.8V	45.6V	42V	40~60V adjustable
discharge limiting voltage	46.4V	43.6V	40.8V	40~60V adjustable
overextended delay time	30s	30s	30s	Set 1 to 30 seconds
equilibrium charging duration	-	-	-	Settable from 0 to 600 minutes
equilibrium charge cycle	-	-	-	Setable from 0 to 250 days
Increase the charging cycle	Settable for 120 minutes	120 meters can be set	120 meters can be set	Settable from 10 to 600 minutes

When no communication is established with the BMS, the inverter will charge based on the battery voltage and preset charging curve. When communication occurs, the inverter will execute a more complex staged charging process according to the BMS's instructions.

电压

提升充电电压 - - - - -

电池重新充电电压点

提升充电

维持充电

时间

电流

提升充电

维持充电

时间

阶段1
恒流

阶段2
恒压
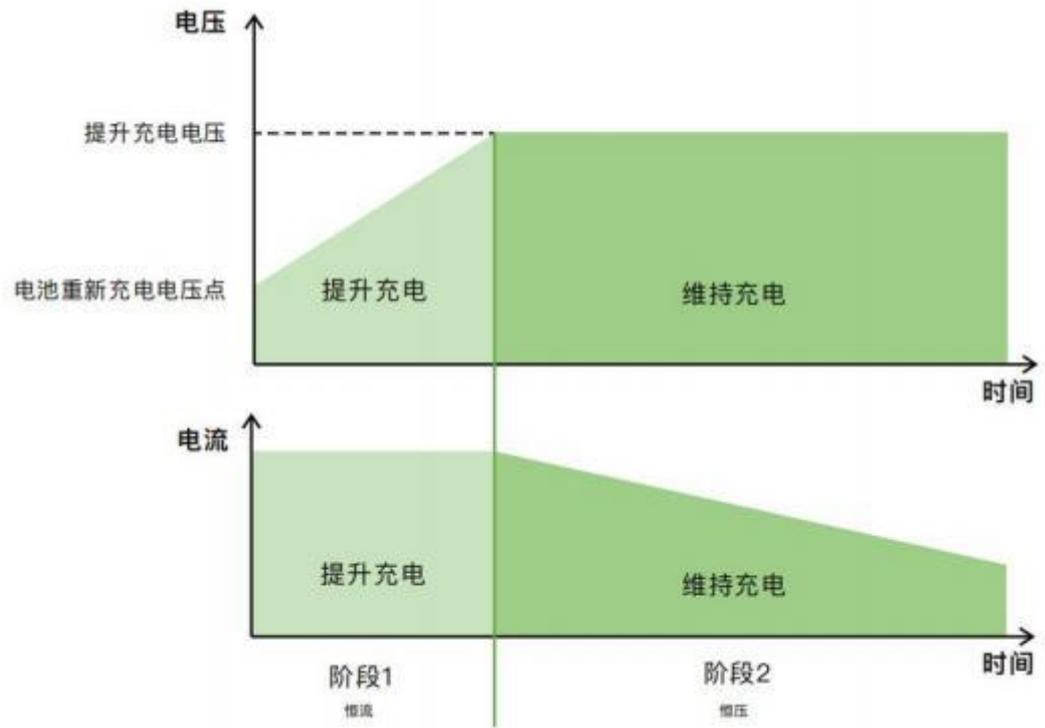
6. Communication

6.1WIFI module (optional)

The Wi-Fi port connects to the Wi-Fi/GPRS data acquisition module, allowing users to monitor the inverter's operational status and parameters via the mobile app.

RJ45	定义
Pin 1	5V
Pin 2	GND
Pin 3	/
Pin 4	/
Pin 5	/
Pin 6	/
Pin 7	RS485-A
Pin 8	RS485-B
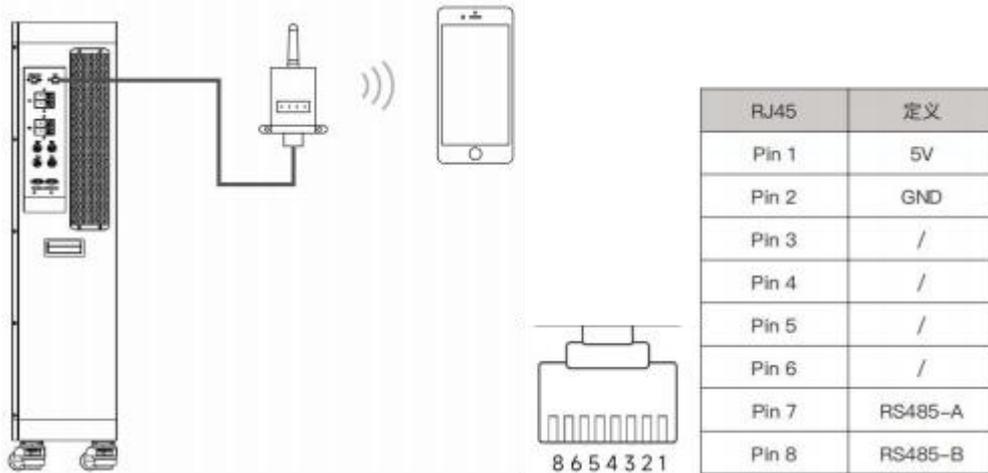
6.2 RS485/CAN Communication Ports

The RS485/CAN communication port is typically used for debugging, monitoring, and updating the battery BMS program.

RJ45	定义
Pin 1	RS485-B
Pin 2	RS485-A
Pin 3	GND
Pin 4	NC
Pin 5	NC
Pin 6	GND
Pin 7	RS485-A
Pin 8	RS485-B
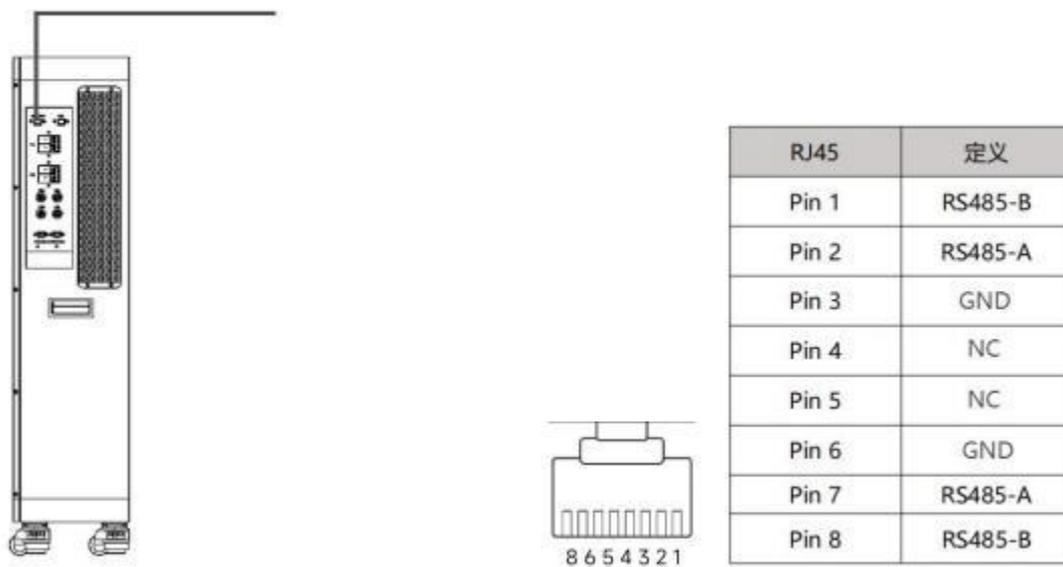
7. Fault Codes and Solutions

7.1 Fault Codes

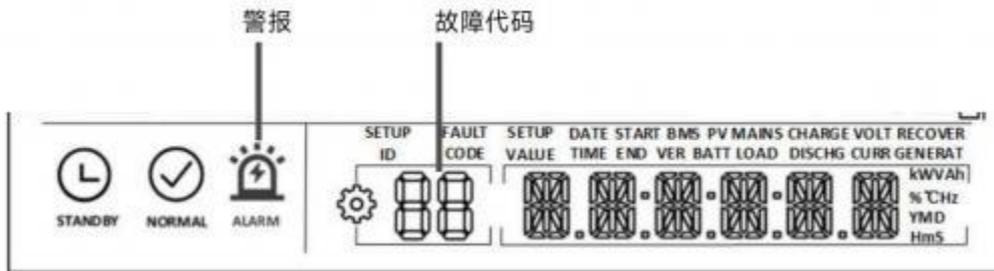| fault code	meaning	Will it affect the output?	description
01	BatVoltLow	yes	battery under-voltage alarm
02	BatOverCurrSw	yes	Software protection of average current overcurrent in battery discharge
03	BatOpen	yes	Battery not detected
04	BatLowEod	yes	battery under-voltage stop discharge alarm
05	BatOverCurrHw	yes	hardware protection of battery over current
06	BatOverVolt	yes	overcharge protection
07	BusOverVoltHw	yes	busbar overvoltage hardware protection
08	BusOverVoltSw	yes	busbar overvoltage software protection
09	PvVoltHigh	yes	PV overvoltage crowbar
10	PvBoostOCSw	deny	Boost overcurrent software protection
11	PvBoostOCHw	deny	Boost overcurrent hardware protection
12	SpiCommErr	yes	SPI Communication Failure Between Master and Slave Chips
13	OverloadBypass	yes	side path overload protection
14	OverloadInverter	yes	inverter overload protection
15	AcOverCurrHw	yes	hardware protection of inverter overcurrent
16	AuxDSpReqOffPWM	yes	chip request shutdown failure
17	InvShort	yes	inverter short circuit protection
18	Bussoftfailed	yes	bus soft start fault
19	OverTemperMppt	deny	PV radiator over temperature protection
20	OverTemperInv	yes	Overtemperature Protection of Inverter Radiator
21	FanFail	yes	Fan malfunction

22	EEPROM	yes	memory fault

fault code	meaning	Will it affect the output?	description
23	ModelNumErr	yes	Incorrect device configuration
24	Busdif	yes	bus voltage imbalance
25	BusShort	yes	busbar short circuit
26	Rly short	yes	Invert the AC output and reverse it to the bypass AC output
28	LinePhaseErr	yes	Incorrect phase of mains power input
29	BusVoltLow	yes	bus voltage low protection
30	BatCapacityLow1	yes	Battery capacity rate below 10% alert (activated after successful BMS communication)
31	BatCapacityLow2	deny	Battery capacity rate below 5% alert (activated after successful BMS communication)
32	BatCapacityLowStop	yes	Battery low capacity shutdown (activated after successful BMS communication)
33	CtrlCanCommErr	yes	parallel control can communication failure
34	CanCommFault	yes	parallel computer can communication failure
35	ParaAddrErr	yes	Invalid parallel machine ID (communication address)
37	ParaShareCurrErr	yes	parallel flow fault
38	ParaBattVoltDif	yes	Parallel operation mode with significant battery voltage difference
39	ParaAcSrcDif	yes	In parallel mode, the mains power input source is inconsistent
40	ParaHwSynErr	yes	Parallel mode, hardware synchronization signal failure
41	InvDcVoltErr	yes	Abnormal DC component of inverter voltage
42	SysFwVersionDif	yes	The versions of the concurrent program are inconsistent
43	ParaLineContErr	yes	parallel connection fault
44	Serial number error	yes	No serial number is set for the factory
45	Phase merging unit configured incorrectly	yes	[31] Incorrect setting
58	BMSComErr	deny	BMS communication failure
59	BMSErr	deny	BMS report an error
60	BMSUnderTem	deny	BMS Low Temperature Alert (activated after successful BMS communication)
61	BMSOverTem	deny	BMS Overtemperature Alert (Active after successful BMS communication)
62	BMSOverCur	deny	BMS Overcurrent Alert (Active after successful BMS communication)
63	BMSUnderVolt	deny	BMS Under-voltage Alert (Active after successful BMS communication)
64	BMSOverVolt	deny	BMS Overvoltage Alert (Active after successful BMS communication)

7.2 Troubleshooting

hitch code	meaning	cause	resolvent
/	No display on screen	No power input or settings are enabled Backup bottom switch	Check if the battery or PV circuit breaker is closed; verify the switch is in the "ON" position; press any button on the screen to exit sleep mode.
1	battery under-voltage	The battery voltage is lower than the parameter setting [14]. the value	Charge the battery until its voltage exceeds the threshold specified in parameter [14].
3	Battery not connected	The battery is not connected, or the lithium battery BMS is in discharge protection mode.	Check if the battery is properly connected; verify the battery circuit breaker is closed; ensure the lithium-ion battery's BMS is functioning properly.
4	battery over-discharge	The battery voltage is below parameter 12 value set in	Manual reset. Turn off the power and restart the automatic reset: charge the battery to raise its voltage above the value set in parameter [35]
6	overvoltage protection of rechargeable battery	The battery is overvoltage.	Turn off the power manually and restart. Check if the battery voltage exceeds the limit. If it does, discharge the battery until the voltage drops below the overvoltage recovery point.
13	side pass overload (software detection)	The bypass output power or current is overloaded for a certain period of time.	Reduce the load power and restart the device. For more details, refer to item 11 in the Protection Features.
14	Inverter overload (software detection)	The inverter's output power or current experiences overload within a specified time period.	
19	The radiator temperature of the photovoltaic input is too high. Software detection	The temperature of the heat sink for the photovoltaic input exceeds 90°C for 3 seconds.	When the radiator temperature drops below the over-temperature recovery threshold, the system resumes normal charging and discharging.
20	The inverter output heatsink temperature is too high Software detection	The inverter output radiator temperature exceeds 90°C for 3 seconds	
21	Fan malfunction	Hardware detects fan failure	After power-off, manually rotate the fan to check for foreign body obstruction.

| 26 | AC input relay short circuit | The AC output relay is stuck. | Shut down and restart manually. If the issue reoccurs after restarting, contact after-sales service to repair the device. |
| 28 | phase fault of mains power input | The AC input phase is inconsistent with the AC output phase. | Ensure the phase of the AC input matches the phase of the AC output. For example, if the output is split-phase mode, the input must also be split-phase mode. |

• If the product issue listed above cannot be resolved, contact our after-sales service for technical support. Do not attempt to disassemble the device yourself.

8. Protective Functions and Product Maintenance

8.1 Protection Functions

No	defencive function	explain
1	photovoltaic current limiting protection	When the configured photovoltaic array charging current or power exceeds the inverter's rated current or power, it will charge at the rated current or power.
2	photovoltaic overvoltage protection	If the photovoltaic voltage exceeds the hardware's maximum allowable limit, the system will trigger a fault and halt the photovoltaic boost to deliver a sine wave AC output.
3	night anti backflow protection	At night, when the battery voltage exceeds that of the photovoltaic modules, the battery will prevent discharging to the modules.
4	overvoltage protection of mains power supply	When the mains voltage exceeds 280Vac per phase, the mains charging will stop and the system will switch to inverter output.
5	city power input under voltage protection	When the mains voltage drops below 170Vac per phase, the charging will stop and the system will switch to inverter output.
6	battery overvoltage protection	When the battery voltage reaches the overvoltage cutoff point, it automatically stops charging from both PV and mains power to prevent damage from overcharging.
7	battery under-voltage protection	When the battery voltage reaches the low-voltage cutoff point, it automatically stops discharging to prevent damage from over-discharge.
8	battery overcurrent protection	When the battery current exceeds the hardware's allowable range, the machine will shut down the output and stop discharging the battery.
9	AC output short circuit protection	When a short circuit occurs at the load output, the AC voltage will be immediately cut off and reactivated after one minute. If the load remains short-circuited after three attempts, the short circuit must first be resolved manually, followed by a power-on restart to restore normal output.
10	over temperature protection of radiator	When the inverter's internal temperature becomes too high, it will stop charging and discharging. Once the temperature returns to normal, the inverter will resume these operations.
11	overload protection	After triggering overload protection, the inverter will resume output after 3 minutes. If five consecutive overloads occur, the output will be shut down until the inverter restarts. (102%<load<110%) ± 10%: Error. The output will be turned off in 5 minutes. (110%<load<125%) ± 10%: Error occurs and output is disabled after 10 seconds. Load>125%±10%: Error reported. Output will be disabled after 5 seconds.
12	AC reverse flow protection	Prevent battery inverter AC from backflowing to bypass AC input
13	bypass flow protection	built-in AC overcurrent protection circuit breaker

14	bypass wiring error protection	When the phase of the two bypass inputs differs from the phase of the inverter's phase division, the machine will prevent switching to bypass mode to avoid load power loss or short circuit during the process.

8.2 Maintenance

To maintain optimal long-term performance, it is recommended to perform the following items twice a year;

1. Ensure the airflow around the product remains unobstructed;

2. Inspect all exposed wires for insulation damage caused by sun exposure, friction with surrounding objects, decay, or damage from insects or rodents. Repairs or replacements should be performed when necessary.

3. Verify that the instructions and displays are consistent with the device operation. Note any faults or error displays and take corrective actions when necessary.

4. Inspect all terminal blocks for corrosion, insulation damage, or signs of high-temperature exposure, burning, or discoloration, and tighten the terminal screws.

5. Inspect for dirt, nesting insects, and corrosion, and clean the dust screen regularly as required.

6. If the product remains unused for an extended period, it should be charged at least once a month.

• Before performing any inspection or operation, ensure the product is disconnected from all power sources and that the capacitors are fully discharged to avoid the risk of electric shock.

The company shall not be liable for damages caused by the following reasons:

1. Damage caused by improper use or incorrect application.

2. The open-circuit voltage of the photovoltaic module exceeds the maximum allowable voltage.

3. Damage caused by exceeding the specified operating temperature range

4. Unauthorized personnel disassemble or repair the product.

5. Damage caused by force majeure: Damage occurring during transportation or product handling.