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5KW 51.2V POWER STACKED LITHIUM BATTERY

User Instruction

This power Stacked mode lifepo4 lithium battery belongs to one of the series of household energy storage products that are independently designed and developed. It has long cycle life, high safety standard BMS software protection and strong housing, exquisite looks, and easy installation, etc. It is widely used in energy storage system with off-grid inverters, on-off grid inverters and hybrid inverters.

Contents

（Revision History）

Ver.No.	Date	Revised Content	Reasons for Change	Reviser	Approver
A0	2023.07.20	First Edition	First Draft	jiazhen.Jiang	
A1	2023.07.20	Second Edition	Add alarm information	jiazhen.Jiang	

1. Symbol Description

	Do not place near open fire or flammable materials.
	A potential hazard exists when the equipment is working. Wear personal protective equipment during operation.
	Warning electric shock. Power off the equipment before any operation.
	Grounding: indicate PE cable connection position.
	Do not place in areas accessible to children.
	Keep the battery away from open fire or ignition sources.
	Read the product and operation manual before operating the battery system.
	Label for Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU).
	The certificate label for CE.
	Recycle label.

2. Safety Precautions

 **Alert**

1) It is important and necessary to read the user manual carefully (and attachment) before installing or using battery. Failure to do so or to follow any instruction or warning in this document can result in electrical shock, serious injury, and death, or damage battery, potentially rendering it unusable.
2) When battery is stored for a long time, it is required to charge once every 6 months, and the SOC should be no less than 50%.
3) After battery module cannot be discharged, it needs to be recharged within 12h.
4) Do not connect power terminal reversely.
5) All power supplies must be disconnected during maintenance.
6) Please contact the supplier within 24 hours if there is something abnormal.
7) Do not use any liquid to clean the battery.
8) Do not expose battery to flammable or irritating chemicals or vapor.
9) Do not paint any part of battery, including any internal or external components.
10) Do not connect battery with PV solar wiring directly.
11) Do not install or use this product beyond provisions of the manual.
12) Direct or indirect damages caused by the above reasons are not covered by warranty claim.

 **Warning**

2.1 Before Connecting

1) Please check the external packaging condition before unpacking. If it is damaged, contact corresponding local retailer.
2) After unpacking, please check the products and spare parts according to spare parts list. If the product is damaged or missing, please contact your local retailer.
3) Connect to specified matching inverter.
4) Before installation, be sure to cut off the grid power and make sure battery switch is on OFF mode.
5) It is prohibited to connect the battery and AC power directly.
6) All electrical wiring must be connected in accordance with local regulations.
7) Please ensure that electrical performance of battery system is compatible with the equipment.
8) The installation onsite shall be equipped with fire-fighting facilities that meet relevant requirements, such as fire sand, dry powder fire extinguisher, etc.

2.2 In Using

1) If battery system needs to be moved or repaired, power must be cut off and battery is completely shut down.

2) It is prohibited to connect battery with different types of battery.
3) Do not connect battery to faulty inverter.
4) In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited
5) Except for personnel from The Company Company or other authorized personnel, batteries shall not be opened, repaired or disassembled.The company shall not bear any liability or responsibility caused by violation of any safety operation or design standard, production standard, equipment safety standards or any other standards or requirements.

3.Introduction

This power Stacked mode lifepo4 lithium battery is a new energy storage product developed and produced by The Company, which can provide reliable power supply for all kinds of equipment or systems.

Figure 3-1

3.1 Features

1) When multiple modules are paralleling connected, module addresses are set automatically.
2) Support for upgrading the battery module from the upper controller through 232 or 485 communication
3) The module is non-toxic, non-polluting and environmentally friendly.
4) Cathode material is made from LiFePO4 with safety performance and long cycle life.
5) Battery management system (BMS) has protection functions including over- discharge, over-charge, over-current and high/low temperature.
6) The system can automatically manage charge and discharge state and balance voltage of each cell.
7) Flexible configuration, multiple battery modules can be connected to expand capacity and power.
8) Adopted self-cooling mode rapidly reduced system entire noise.
9) The module has less self-discharge, up to 6months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.

Functions

Protection and Alarm	Management and monitor
Charge/Discharge End	Cell Balance
Overvoltage Charging Protection	Intelligent Charge Model
Under Voltage Discharging Protection	Charge/Discharge Current Limit
Charge/Discharge Overcurrent Protection	Capacity Retention Calculate
High/Low Temperature Protection	Short Circuit Protection
History Record	Adjustable parameter settings

4. Product Specification

4.1 Size and Weight

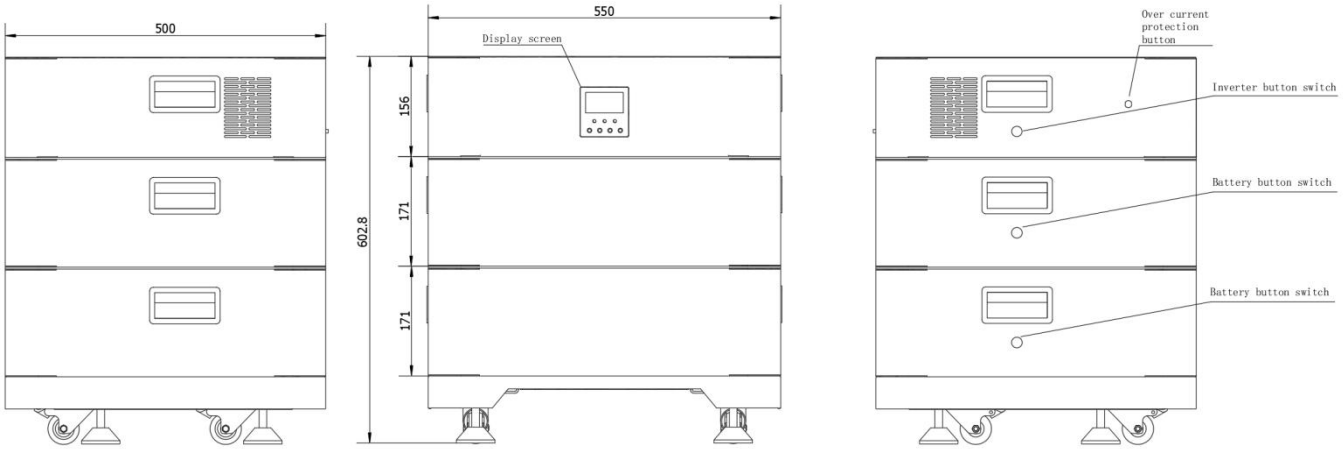
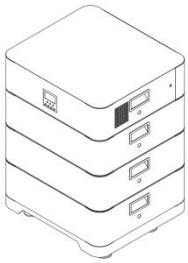
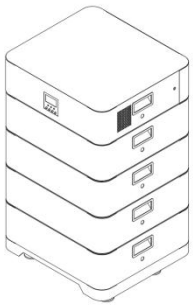


Table 2- 1 Stack Module Device size(with control box module, without inverter module)

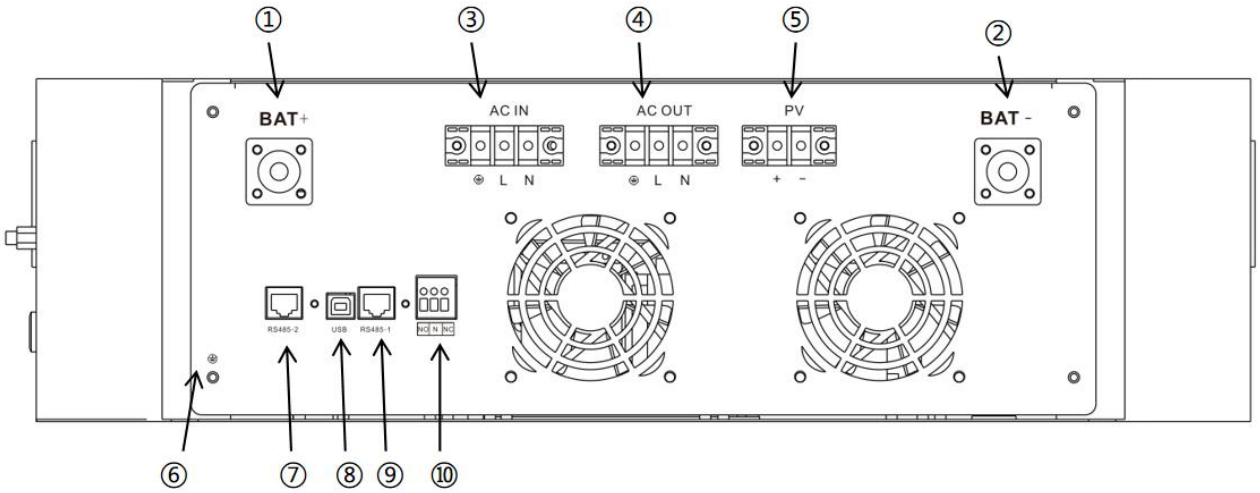
Product	Nominal Voltage	Nominal Capacity	Dimension
Stack Module*2	51.2V	10.24kWh	550×500×602.8mm
Stack Module*3	51.2V	15.36kWh	550×500×773.8mm
Stack Module*4	51.2V	20.48kWh	550×500×944.8mm

4.2 Specification Parameters

Appearance				
Basic parameters	Inverter layer ×1 Battery layer×1	Inverter layer ×1 Battery layer×2	Inverter layer ×1 Battery layer×3	Inverter layer ×1 Battery layer×4
Product size (mm)	550×500×431.8	550×210×602.8	550×210×773.8	550×210×944.8
Product weight (kg)	72	120.2	168.4	216.6
Nominal voltage (V)	51.2			
Nominal capacity (kWh)	5.12	10.24	15.36	20.48
Standard discharge current（A）	100			
Standard charge current（A）	50			
working voltage（V）	43.2-57.6			
AC output voltage (V)	220/230VAC/50HZ or 60HZ			
AC output rated current (A)	24			
Output waveform	Pure sine wave			
Output Rating Power（W）	5000			
AC input voltage (V)	220/230VAC/50HZ or 60HZ			
Input voltage range (V)	170-280VAC/50HZ or 60HZ			
AC input rated current (A)	40			
PV input voltage（V）	120-500			
Photovoltaic input power（W）	5200			
Photovoltaic charging current (A)	22			

communicate	RS485/RS232/CAN
operation temperature （℃）	0～50
storage temperature （℃）	-20～60
ambient humidity	20%-60%
Cooling method	Fan cooled
service life	10 years+

4.3 Equipment interface instruction



①	Battery input positive pole	⑥	Grounding screw hole
②	Battery input negative pole	⑦	RS485 communication port
③	AC input terminal	⑧	USB communication port
④	AC output terminal	⑨	WIFI communication port
⑤	PV terminal	⑩	Dry contact port

Note: Our company will continuously update and upgrade our products. Please refer to the actual products received.

5. Safe Handling of Lithium-iron ESS Batteries Guide

5.1 Solution Diagram

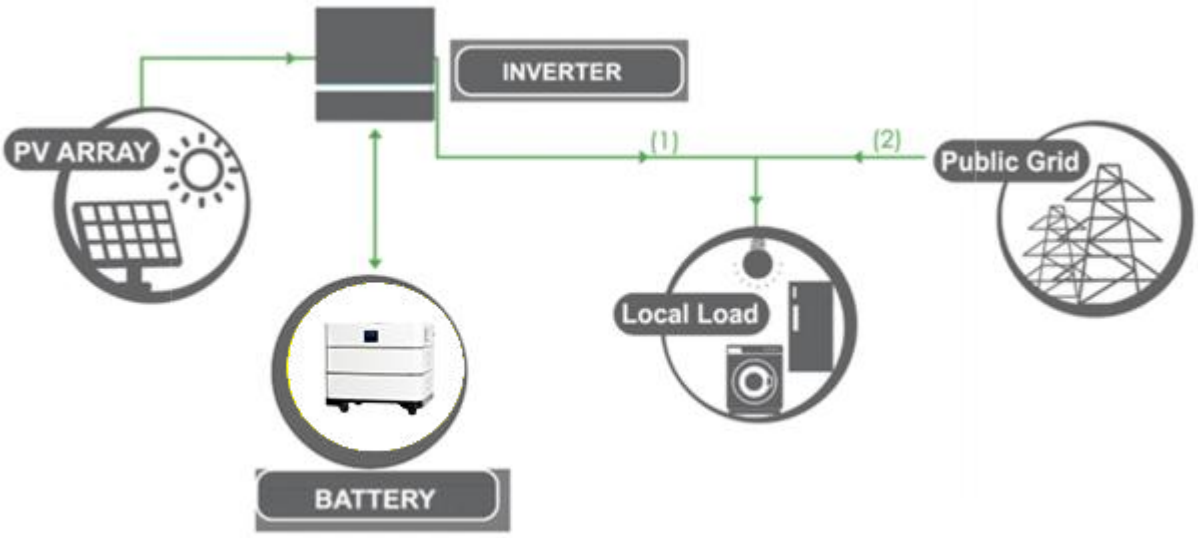


Figure 4-1

5.2Danger Label

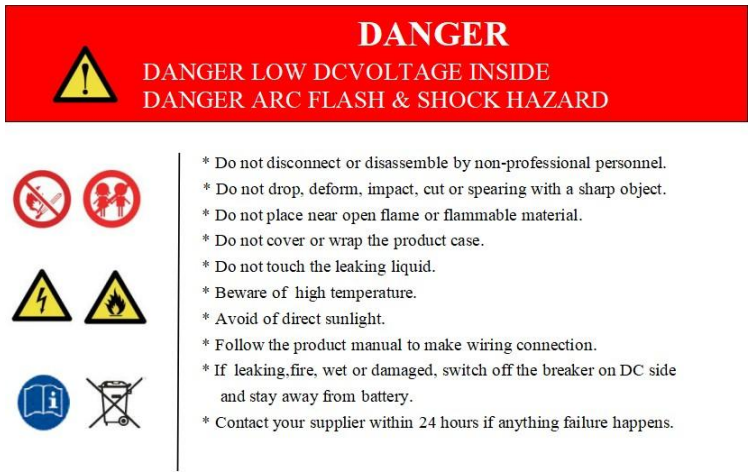


Figure 4-2

5.3Tool

Wire Cutter

Modular Crimping Plier

Screwdriver

Electric drill

Note：
Properly use insulated tools to prevent accidental electric shock or short circuits. If tools are not insulated, cover the entire exposed metal surfaces of available tools with electrical tape except their tips.

5.4 Safety Gear

It is recommended to wear the following safety gear when dealing with battery pack.

Insulated Gloves

Safety Goggles

Safety Shoes

6. Installation and operation

6.1 Installation Location

Make sure that installation location should meet the following condition:

1) The area should be completely water-proof.
2) The floor should be flat and level.
3) No flammable or explosive materials.
4) The ambient temperature is within the range from 0℃ to 45℃.
5) The temperature and humidity are maintained at a constant level.
6) There is just a little dust and dirt in the area.
7) The distance from heat source should be more than 2 meters.
8) The distance from air outlet of inverter is more than 0.5 meters.
9) Installation areas should avoid direct sunlight.
10) No forced ventilation requirement for battery module, but please avoid installing in a closed area. Ventilation shall avoid high salinity ≤ 30%, humidity ≤ 85% and ambient temperature of 0 ~ 45 ℃.

6.2 Installation Direction

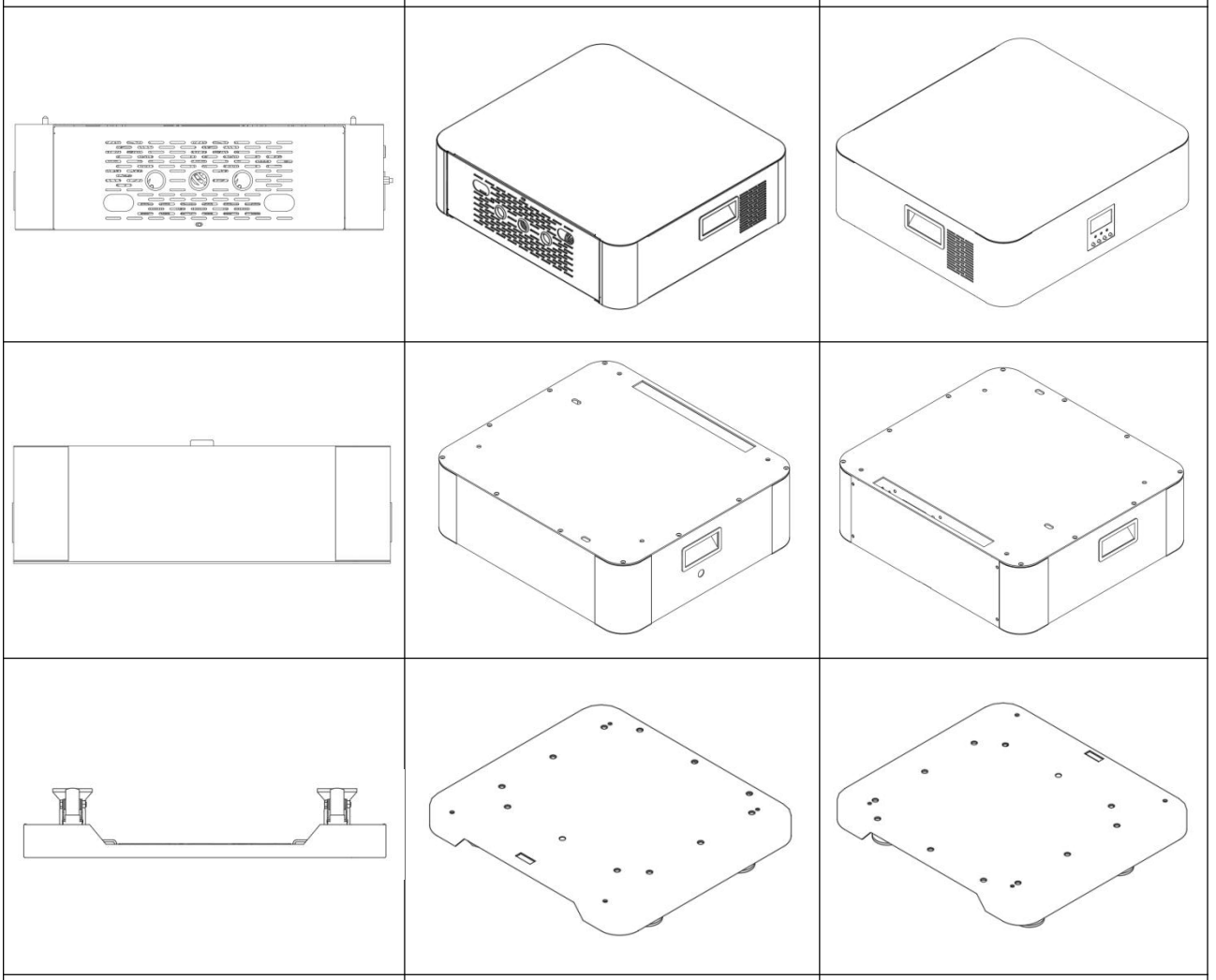
Upside down	Sidelong	Sidelong
		
NOT allowed	NOT allowed	NOT allowed

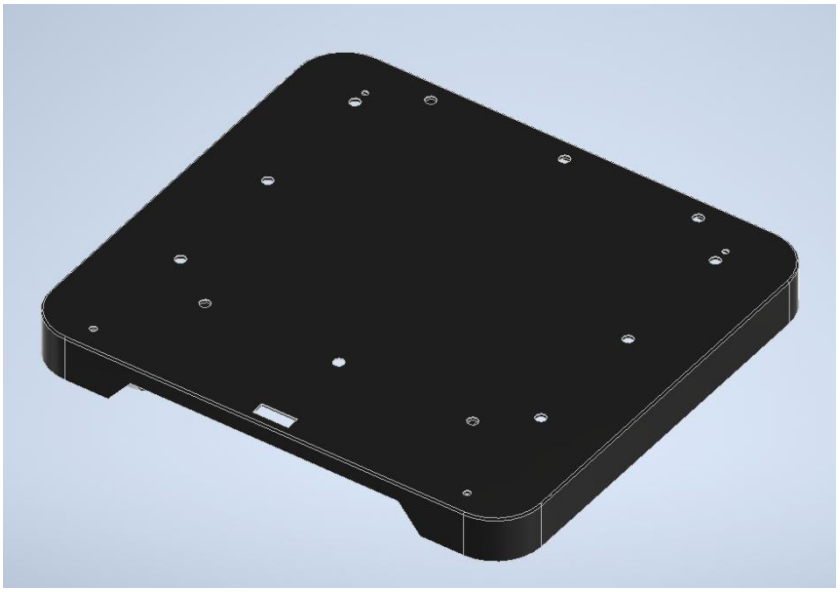
Figure 6-2

6.3 Installation Steps

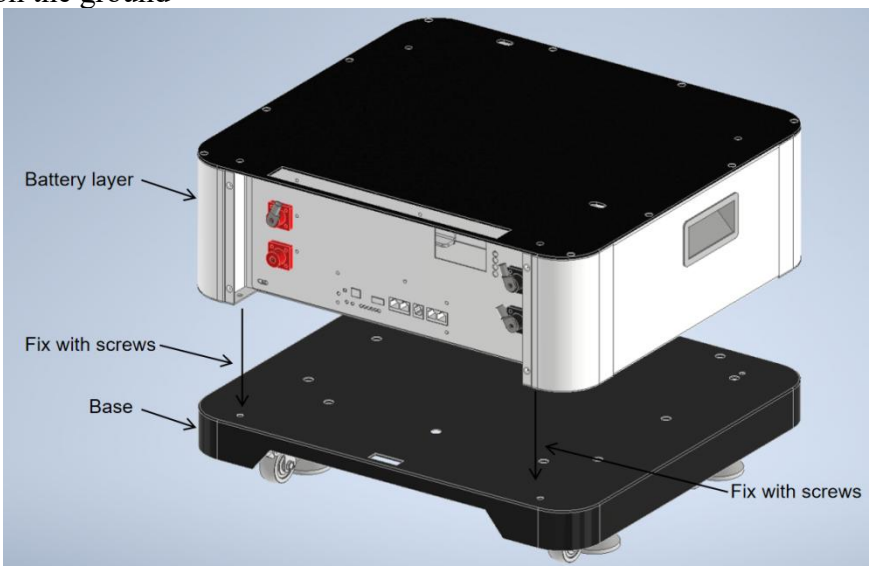
Warning

1) Follow local electric safety and installation policy, a suitable breaker between battery system and inverter is required.
2) All installation and operation must follow local electric standard and requirements.
3) When battery modules are paralleled, the system should be powered off before installation operation

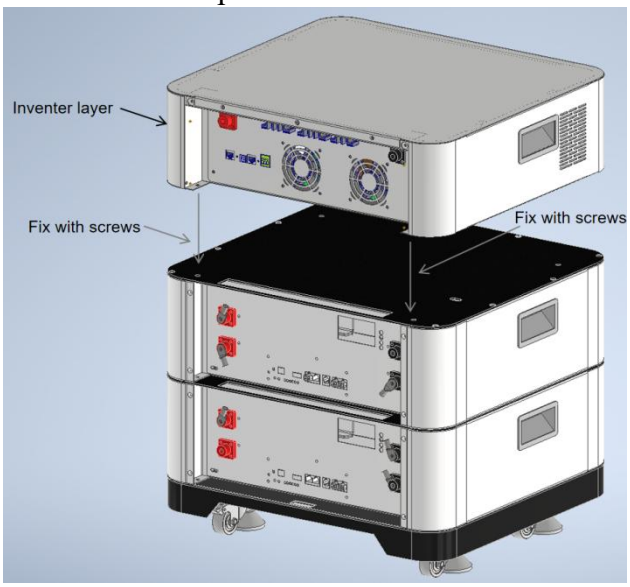
6.4 Assembly steps



1. Place the base on the ground



2. Remove the panel，adjust the direction, place the battery layer on the base, and lock it with a cross M6 * 10 triple combination screw，remove the panel



3. Adjust the direction, place the inverter layer on the battery layer, and lock it with a cross M6 * 10 triple combination screw

4. Install using the accessories provided with the product as shown in the picture

5. Replacing the panel

6.5 System turns on

Warning: Double check all the power cables and communication cables. Make sure the voltage of the inverter/PCS is same level with the battery system before connection. Check all the power switches are OFF.

System turns on step:

1) Check all cables are connected correctly. Check grounding is connected.
2) If necessary, turn on the switch at inverter`s battery side or between inverter and battery. If possible, turn on AC or PV power source to wake up inverter.
3) Open protect cover of Power switch. And turn on power switch.
4) Switch all the battery racks' Isolating Switch to on position.
5) Press the battery START button in turn, turn on the START metal button of the slave battery firstly, and finally turn on the START button of the master battery .
6) If no alarm ,the battery system will be ready for charging and discharge with PCS.

6.6 System turns off

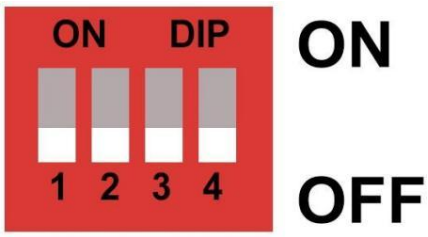
When failure or before service, must turn the battery storage system off:

1) Turn off inverter or power supply on DC side.
2) Turn off the switch between PCS and battery system.
3) Switch Isolating Switch to off position. (Switch off the slave battery firstly, finally switch off the master battery)

Note:

1) One battery system shall just have one master, all the others are slaves. (The one on the extreme side connected to inverter is the master battery.)
2) It is forbidden to switch off the Isolating Switch during charging and discharging.

7. Dial Code Switch Settings (parallel connection needed)

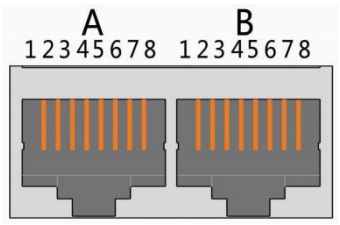


When the battery packs are connected in parallel, the dial code switch of each battery can be used to distinguish different Pack addresses. The hardware address can be set through the dial code switch on the board. The definition of the dial code switch refer to the following table

ADD	Dial switch position			
	#1	#2	#3	#4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

7.1 Battery communication port

a)RS485/CAN main communication

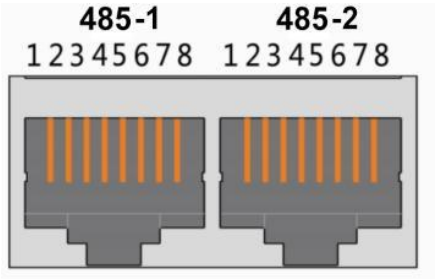


If you need to communicate with the monitoring device through RS485 or Can, the monitoring device will be used as the host, and the address setting range of other batteries will be 2~16 according to the polling data of the address.

The product adopts isolated communication design, supports RS485/CAN communication mode, RS485 communication default baud rate is 9600bps, the default baud rate of CAN communication is 500Kbps；

RS485 & CAN use 8P8C vertical RJ45 socket			
RS485 PIN	Define	CAN PIN	Define
1, 4	RS485-B1	3, 6	NC(empty)
2, 5	RS485-A1	1, 5	CANL
7, 8	NC(empty)	4, 8	CANH
3, 6	GND	2, 7	GND

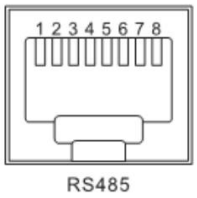
b)RS485-1 and RS485-2 communication for parallel connection



With dual RS485 interfaces, the default baud rate is 9600bps. If you need to communicate the batteries in parallel with the monitoring device or inverter, you need to connect each battery with RS485-1 and RS485-2 ports, so the host battery can read the information of each battery. All pins of 485-1 and 485-2 connectors are parallel, so the interface definition is identical.

7.2 Inverter port

a)RS485 communication function



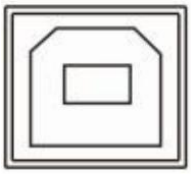
There are two communication ports RS485-1 and RS485-2 and also two functions:

① RS485 communication with lithium battery BMS can be conducted directly through this port RS485-2 (need to be customized);

② RS485-1 is connected to the selected RS485 to WiFi /GPRS communication module independently developed by our company After the selected module is equipped, the reverse control all-inone machine of our company can be connected through mobile APP, and the operating parameters and status of the reverse control all-in-one machine can be checked through the mobile APP.

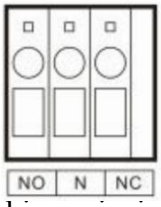
③ Such as shown in the figure: pin 1 is 5V power supply; pin 2 is GND, pin 7 is RS485-A and pin 8 is RS485-B.

b)USB communication function



This port is a USB communication port, which can be used for USB communication with the selected upper computer software of our company (Need to apply for). To use this port, the corresponding “USB to serial port chip CH340T driver” should be installed in the computer.

c)Dry node function



Working principle: this dry node can control the switch of diesel generator to charge the battery.

① Under normal conditions, in this terminal, NC-N point is closed and NO-N point is opened;
② when the battery voltage reaches the low-voltage disconnection voltage point, the coil of the relay is energized and NO-N point is closed and NC-N point opened. At this time, NO-N point can drive resistive loads 125VAC/1A, 230VAC/1A and 30VDC/1A.

8. LED instructions

State	Normal / Alarm / Protection	ON/ OFF	RUN	ALM	SOC Indication LEDs						Instructions
		●	●	●	●	●	●	●	●	●	
Power Off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All off
Standby	Normal	ON	flash1	OFF	Indication by SOC						Standby
	Alarm	ON	flash1	Flash3							Cell low voltage
Charge	Normal	ON	ON	OFF	Indication by SOC (The top SOC Led Flash 2)						Maximum power LED flash(flash 2),ALM does not flash for over-charge warning
	Alarm	ON	ON	Flash3							
	Over Charge Protection	ON	ON	OFF	ON	ON	ON	ON	ON	ON	If no mains supply, LED as standby
	Temperature. Over-current Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close charge
Discharge	Normal	ON	Flash3	OFF	Indication by SOC						
	Alarm	ON	Flash3	Flash3							
	Under Discharge Protection	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close discharge
	Temperature. Over-current. Short Circuit Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close discharge
Fault		OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Close charge Close discharge

Description of capacity indicator

State		Charge						Discharge					
Capacity indicator light		L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
electricity (%)	0 ~ 16.6%	OFF	OFF	OFF	OFF	OFF	flash 2	OFF	OFF	OFF	OFF	OFF	ON
	16.6 ~ 33.2%	OFF	OFF	OFF	OFF	flash 2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2 ~ 49.8%	OFF	OFF	OFF	flash 2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8 ~ 66.4%	OFF	OFF	flash 2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4 ~ 83.0%	OFF	flash 2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0~100%	flash 2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Running light ●		ON						flash(flash 3)					

LED Flashing Instructions

Flash way	ON	OFF
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

Note:

The LED indicator alarm can be enabled or disabled through the host computer. The factory default is enabled.

8.1 Buzzer Action Description

When a fault occurs, the phone rings for 0.25 seconds every 1S.
For protection, chirp every 2S 0.25s (except for over voltage protection);
For alarms, the alarm is emitted every 3 seconds for 0.25 seconds (except for over voltage alarms).
The buzzer function can be enabled or disabled by the host computer. It is disabled by default.

8.2 Switch Operation

When the BMS is in sleep state, press the button (3 to 6S) and release it. The protection board will be activated, and the LED indicators will turn on for 0.5 seconds from "RUN".

When the BMS is in the active state, press the button (3~6S) and release it, the protection board will sleep, and the LED indicator will be lit for 0.5 seconds from the lowest power indicator.

When the BMS is in the active state, press the button (6-10s) and release it. The protection panel will be reset and all LED lights will be on for 1.5 seconds at the same time.
After the BMS is reset, the parameters and functions set by the upper computer are still retained. If the parameters need to be restored to the initial parameters, you can use the Restore Default value of the upper computer to achieve, but the relevant running records and stored data remain unchanged (such as power, cycle times, protection records, etc.).

8.3 Dormancy

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

1） Cell or Pack over-discharge protection has not been released within 30s.
2） Press the button for 3S-6S and then release it.
3） The lowest monomer voltage is lower than the sleep voltage, and the duration reaches the resting delay time (at the same time, no communication, no protection, no equalization, no current).
4） Standby time more than 24 hours (without communication, no charge and discharge, no mains power).
5） Through the upper computer software forced shutdown.

Before entering hibernation, make sure there is no charger access, otherwise you will not be able to enter the low-power mode.

8.4 Awaken

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

1） Connect the charger, and the output voltage of the charger shall be greater than 48V.
2） Press the button (3S-6S) and release the button.

9. Operation Guide for Inverter LCD Screen

9.1 Operation and display panel

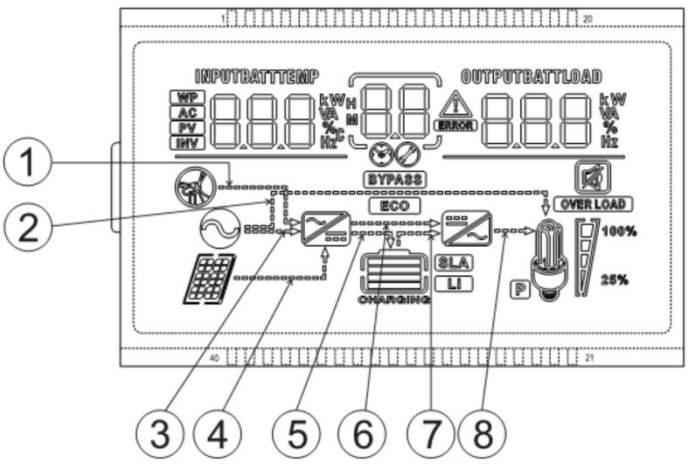
9.2Introduction to operation keys

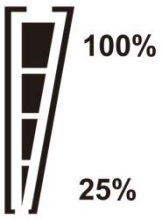
Function Key	Description
SET	Enter/exit setting menu
UP	Last option
DOWN	Next option
ENT	Confirm/enter option under setting menu

9.3Introduction to indicator light

Indicator light	Color	Description
AC/INV	Yellow	Constant on: mains supply output
		Flashing: inverter output
CHARGE	Green	Flashing: battery in charge
		Constant on: charge completed
FAULT	Red	Constant on: fault state

9.4Introduction to LCD screen



Icon	Function	Icon	Function
	Indicating that AC input end has been connected to power grid		Indicating that inverter circuit is in working.
	Indicates that the AC input mode in APL mode (wide voltage range)		Indicating that the machine is in mains supply bypass work mode
	Indicating that PV input end has been connected to solar battery panel		Indicating that AC output is in overload state
	Indicating that machine has been connected to battery, indicating 0%~24% battery remaining capacity indicating 25%~49% battery remaining capacity indicating 50%~74% battery remaining capacity indicating 75%~100% battery remaining capacity		Indicating percentage of AC output load, indicating 0%~24% load percentage, indicating 25%~49% load percentage, indicating 50%~74% load percentage, indicating ≥75% load percentage
	Indicating that present battery type of the machine is lithium battery		Indicating that buzzer is not enabled
	Indicating that current battery type of machine is lead-acid battery		Indicating alarm of machine
	Indicating that the battery is in charge state.		Indicating that the machine is in fault state.
	Indicating that AC/PV charge circuit is in working		Indicating that the machine is in setting mode.
	Indicating that AC output end has AC voltage output		Middle parameter display of screen, 1. In non-setting mode, displaying alarm or fault code; 2. In setting mode, displaying code of parameter item under current setting.
Parameter display at left side of screen: input parameter			
	Indicating AC input		
	Indicating PV input		
	Indicating inverter circuit		
	The icon is not displayed		
	Displaying battery voltage, total charge current of battery, charge power of mains supply, AC input voltage, AC input frequency, PV input voltage, temperature of internal radiator, software version		
Parameter display at right side of screen: output parameter			
	Indicating output voltage, output current, output active power, output apparent power, battery discharge current, software version; under setting mode, displaying the setting parameter under the parameter item code set currently		
Arrow display			
①	The arrow is not displayed	⑤	Indicating charge from charge

			circuit to battery end
②	Indicating power grid power supply to load	⑥	The arrow is not displayed
③	Indicating power grid power supply to charge circuit	⑦	Indicating power supply from battery end to inverter circuit
④	Indicating PV power supply to charge circuit	⑧	Indicating power supply from inverter circuit to load

Real-time data view method

In LCD main screen, press keys “UP” and “DOWN” to turn page and view different realtime data of the machine.

Page	Left Parameter of Screen	Middle Parameter of Screen	Right Parameter of Screen
1	Battery input voltage	Fault code	Output voltage
2	PV temperature		PV output KW
3	PV input voltage		PV output current
4	Input battery current		Output battery current
5	Input battery KW		Output battery KW
6	AC input frequency		AC output load frequency
7	AC input voltage		AC output load current
8	Input voltage		Output load KVA
9	INV temperature		INV output load KW
10	APP software version		Bootloader software version
11	Model Battery Voltage Rating		Model Output Power Rating
12	Model PV Voltage Rating		Model PV Current Rating

9.5Setting parameter

Key operation description: to enter setting menu and exit from setting menu, please press key“SET”. After entering the setting menu, parameter number 【00】shall flash. At this time, press keys “ UP ”and “ DOWN ” to select the parameter item code to be set. Afterwards, press key“ ENT” to enter parameter editing state. At this moment, the parameter value can flash. The parameter values are adjusted through keys “UP” and “DOWN”. In the end, press key“ENT” to complete parameter editing and return to parameter selection state.

No. of Parameter	Name of Parameter	Setting Option	Description
00	Exit	[00] ESC	
01	Work priority mode	[01] SOL	At photovoltaic priority mode, when the photovoltaics is invalid or the battery values are lower than the parameter 【04】setting value, it shall switch to AC power.
		[01] UTI default	At AC priority mode, it switches to inverter only when the AC power is invalid.
		[01] SBU	At inverter priority mode, it switches to AC power only when battery is undervoltage or lower than the setting value of parameter 【04】.
02	Output frequency	[02] 50.0 default	At bypass self-adaption, it automatically adapts to AC frequency in case of AC power; without AC power, the output frequency can be set via the menu. For 230V machine, it is 50Hz by defaul.
		[02] 60.0	
03	AC input Voltage range	[03] APL	90~280V wide range input AC voltage range of 230V machine
		[03] UPS default	170~280V narrow range input AC voltage range

			of 230V machine
04	Battery to bypass	[04] 43.6V default	When parameter【01】=SOL/SBU, the battery voltage is lower than the set value, the output is switched to mains or generator from battery. The setting range is 40V~52V.
05	Bypass to battery	[05] 57.6V default	When parameter【01】=SOL/SBU, battery voltage is higher than the set value, the output is switched to battery from mains or generator at 48V~60V setting range.
06	Charge mode	[06] CSO	For photovoltaics priority charge, the AC charge is started only when photovoltaics is invalid.
		[06] CUB	For AC priority charge, the photovoltaics charge is started only when AC is invalid.
		[06] SNU default	In case of mixed charge from photovoltaics and AC power, priority is given to photovoltaic charge. In case of insufficient photovoltaic energy, the AC charge is used for supplement. In case of sufficient photovoltaic charge, stop charge from AC power. Note: photovoltaic charge and AC charge can be performed at the same time only when AC bypass is output All-in-one solar charge inverter 22 under load. When inverter works, only photovoltaic charge can be started.
		[06] OSO	Only photovoltaic charge, no AC charge is started.
07	Maximum Charge current	[07] 60A default	Setting range 0~80A;
08	Battery type	[08] USE	For user-defined, all battery parameters can be set.
		[08] SLd	Sealed lead-acid battery, constant voltage charge voltage 57.6V, float charge voltage 55.2V.
		[08] FLd	For vented lead-acid battery, charge voltage at constant voltage is 58.4V and float charge voltage is 55.2V
		[08] GEL default	For gel lead-acid battery, charge voltage at constant voltage is 56.8V and float charge voltage is 55.2V.
		[08] L14/L15/L16	Lithium iron phosphate battery L14/L15/L16 corresponds to lithium iron phosphate battery 14 strings/15 strings/16 strings;16 string/15 string/14 string default constant The voltage charging pressure is 56.8V, 53.2V, 49.6V, which are adjustable.
		[08] N13/N14	Ternary lithium battery; which is adjustable.
09	Boost charge voltage	[09] 56.8V default	The setting range of boost charge voltage is 48V~58.4V with 0.4V step. It is valid in case of a self-defined or a lithium battery.
10	Boost charge maximum time	[10] 120 default	Boost maximum charge time setting means setting of maximum charge time of voltage when the voltage reaches parameter 【09】 from 5min~900min at 5-minute step. It is valid in case of a self-defined or a lithium battery.

11	Float voltage	[11] 55.2V default	48V~58.4V setting range of float voltage at 0.4V step is valid in case of a self-defined battery.
12	Overdischarge voltage	[12] 42V default	So as to overdischarge voltage, when the battery voltage is lower than the judgement point, after delaying for the parameter 【13】 setting time, turn off the inverter output. 40V~48V voltage setting range at 0.4V step is valid in case of a self-defined battery and lithium battery.
13	Overdischarge delay time	[13] 5S default	So as to overdischarge delay time, when the battery voltage is lower than parameter 【12】, the inverter output is turned off after delaying the time set with the parameter. 5S~50S setting range at 5S step is valid in case of a self-defined and lithium battery.
14	Battery undervoltage alarm point	Battery undervoltage alarm point	So as to battery undervoltage alarm point, when the battery voltage is lower than the judgement point, an undervoltage alarm is given out and no turnoff is output. 40V~52V setting range at 0.4V step is valid in case of a self-defined and lithium battery.
15	Battery discharge limiting voltage	[15] 40V default	So as to battery discharge limiting voltage, when the battery voltage is lower than the judgement point, the output is turned off immediately. 40V~52V setting range at 0.4V step is valid in case of a self-defined and lithium battery.
16	Equalizing charge	[16] DIS	No equalizing charge is permitted.
		[16] ENA default	When equalizing charge is enabled, only vented lead-acid battery and sealed lead-acid are valid.
17	Equalizing Charge voltage	[17] 58.4V default	So as to equalizing charge voltage, 48V~58.4V setting range at 0.4V step is valid in case of a vented lead-acid battery and sealed lead-acid battery.
18	Equalizing charge time	[18] 120 default	So as to equalizing charge time, 5min~900min setting range at 5min step is valid in case of a vented lead-acid battery and sealed lead-acid battery.
19	Equalizing charge delay	[19] 120 default	For equalizing charge delay, 5min~900min setting range at 5min step is valid in case of a vented lead-acid battery and sealed lead-acid battery.
20	Equalizing charge derating time	[20] 30 default	For equalizing charge derating time, 0~30days setting range at 1-day step is valid in case of a vented lead-acid battery and sealed lead-acid battery.
21	Equalizing charge enabling	[21] ENA	Start equalizing charge immediately.
		[21] DIS default	Stop equalizing charge immediately.
22	Energy saving mode	[22] DIS default	No energy-saving mode
		[22] ENA	After enabling the energy-saving mode, in case of empty or small load, the output is turned off after output delaying of inverter for a certain period of

			time. After the rocker switch is pressed to “OFF” state and then to“ON” state, the inverter restore the output.
23	Automatic restart after overload	[23] DIS	When the automatic restart after overload is disabled, if the output is turned off upon overload, the machine shall not restore turnon.
		[23] ENA default	When the automatic restart after overload is enabled, if the output is turned off upon overload, output is restarted by the mains after 3min delay. The machine shall not restarted after 5 times of restarts.
24	Automatic restart after overtemperature	[24] DIS	When automatic restart after overtemperature is disabled, if the output machine is turned off upon overtemperature, no output is turned on.
		[24] ENA default	When automatic restart after overtemperature is enabled, if the output is turned off upon overtemperature, the output can be turned on after the machine cools down.
25	Buzzer alarm	[25] DIS	Disabling alarm
		[25] ENA default	Enabling alarm
26	Mode conversion reminding	[26] DIS	No alarm prompt in case of any change in main input source
		[26] ENA default	Alarm prompt is enabled if state of main input source is changed.
27	Inverter overload to bypass	[27] DIS	No automatic switching to AC power in case of inverter overload
		[27] ENA default	Automatic switching to AC power in case of inverter overload
28	AC maximum charge current	[28] 60A default	AC Out 230Vac Setting range 0~60A
30	RS485 Address setting	[30] 1 default	RS485 communication address setting range 1 ~ 254, (refer to Number [32] is valid when set as SLA)
32	RS485 communication	[32] SLA default	RS485 port for PC and remote monitoring protocol.
		[32] BMS	RS485 port for BMS communication.
		[32] CAN （customized）	CAN port for CAN communication.
33	BMS communication protocols	When [32] setting item = BMS, you need to select the corresponding lithium battery manufacturer's brand for communication	
		AC=PACE, RDA=RITAR, AOG=ALLGRAND, OLT=OLITER, HWD=SUNWODA, DAQ=DYNESS, WOW=SRNE, PYL=PYLONTECH, UOL=VILION	
34	Hybrid power to load and on-grid setting	[34] DIS default	Disable this function.
		[34] Lod	Hybrid power to load mode, in which the PV is only charged first in utility mode and the remaining energy is supplied to the load and not fed into the grid.
		[34] Grd	On-grid function, in utility mode, the PV is charged first and the remaining energy is supplied to the load and fed into the grid.
	Low-voltage	[35] 52V default	When the battery low voltage disconnects the

35	disconnect battery voltage recovery point （fault 04）		inverter output, the battery voltage needs to be greater than this setting to restore the battery inverter AC output.
36	Maximum PV charging current	[36] 80A default	Maximum PV charging current setting: 0~100A.
37	Battery fully charged recovery point	[37] 52V default	After the battery is fully charged, it needs to be lower than this set voltage before it can be recharged
38	AC output Voltage setting	[38] 230Vac default	S series models: allow to set to 200 / 208 / 220 / 230 / 240Vac, default 230Vac. AC output power = (Rated Power)*(Setting voltage/230)
39	Charging current limiting method	[39] BMS default	This mode only takes effect when the inverter communicates successfully with the lithium battery BMS (Battery Management System), and the following options can be set: [SET] When this option is selected, the inverter charging current adopts the value set in item [07], in which case item [07] can be set to any value from 0 to the maximum charging current. [BMS] When this option is selected, the charging limit current transmitted by BMS and the value set in [07] will be compared, and the smaller value will be taken as the current charging current, in this case, the charging current that can be set in [07] can not be greater than the the charging limit current of BMS. After [INV] is selected, it will compare the inverter internal current limit value with the value set in item [07], and take the smaller of them as the current charging current. At this time, charging current can be set in item [07] can not be greater than the inverter internal current limit value, and the logic for the inverter internal current limit value is: 1. When the battery SOC>98%, the charging current is reduced to 1/16 of the rated charging current value of the inverter. 2. When the battery SOC>95%, the charging current is reduced to 1/8 of the rated charging current of the inverter. 3. When the battery SOC>90%, the charging current is reduced to the inverter rated charging current value 1/4. 4. When battery SOC>85%, the charging current is reduced to the inverter rated charging current 1/2.
57	Stop charging	[57] 2A default	Stop charging when the charging current is less

	current		than the set value.
58	Discharging alarm SOC setting	[58] 15% default	SOC alarm when capacity is less than this setting. (Valid when BMS communication is normal)
59	Stop discharging SOC setting	[59] 5% default	Discharge stops when the capacity is less than this setting value. (Valid when BMS communication is normal)
60	Stop charging SOC setting	[60] 100% default	When the capacity is greater than this setting value, charging stops. (Valid when BMS communication is normal)
61	Switching to mains SOC setting	[61] 10% default	When the capacity is less than this setting value, switch to mains power. (Valid when BMS communication is normal)
62	Switch to inverter output SOC setting	[62] 100% default	When the capacity is greater than this setting, switch to inverter output mode. (Valid when BMS communication is normal)

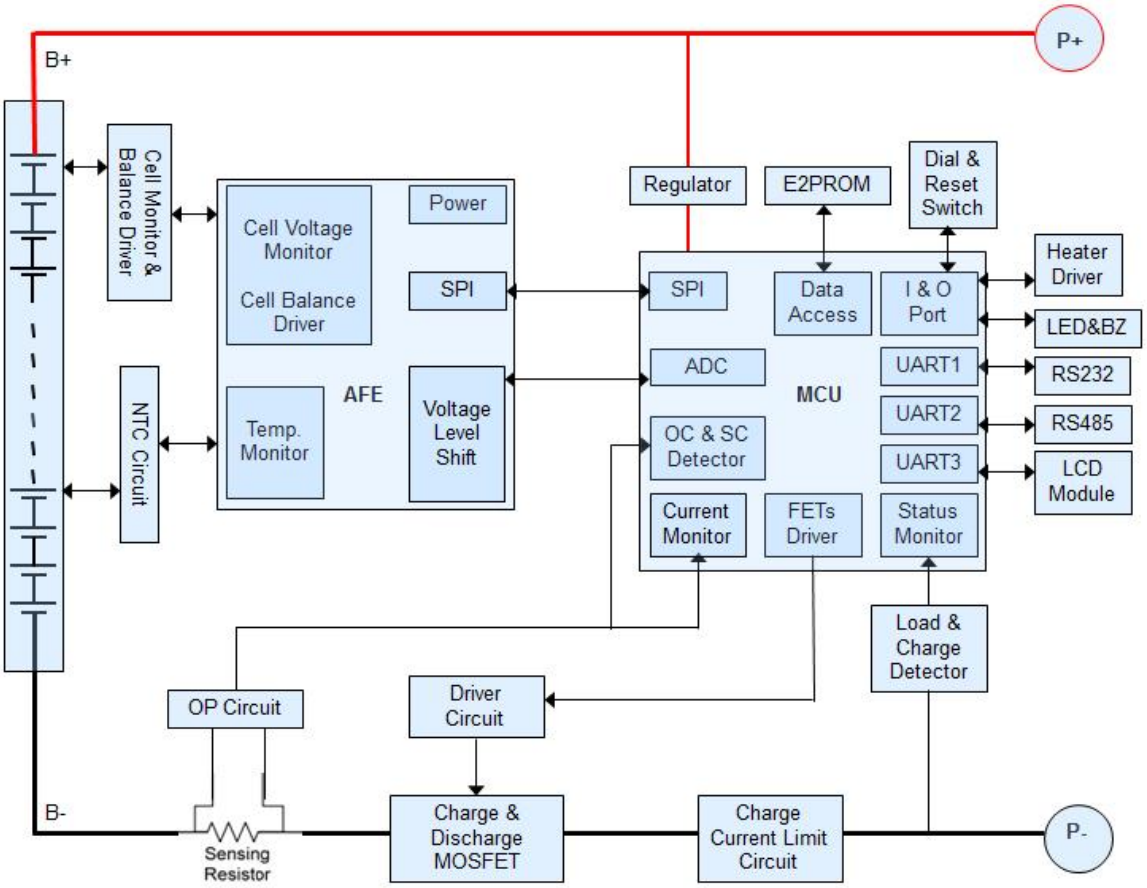
10.Inverter meaning of fault code

Fault Code	Fault Name	Affecting output or not	Note
【01】	BatVoltLow	No	Battery undervoltage alarm
【02】	BatOverCurrSw	Yes	Average overcurrent software protectionforbattery discharge
【03】	BatOpen	Yes	No connection alarm of battery
【04】	BatLowEod	Yes	Stop discharge alarm for battery undervoltage
【05】	BatOverCurrHw	Yes	Battery overcurrent hardware protection
【06】	BatOverVolt	Yes	Charge overvoltage protection
【07】	BusOverVoltHw	Yes	Bus overvoltage hardware protection
【08】	BusOverVoltSw	Yes	Bus overvoltage software protection
【09】	PV VoltHigh	No	PV overvoltage protection
【10】	PV OCSw	No	PV overcurrent software protection
【11】	PV OCHw	No	PV overcurrent hardware protection
【12】	bLineLoss	No	AC power failure
【13】	OverloadBypass	Yes	Bypass overload protection
【14】	OverloadInverter	Yes	Inverter overload protection
【15】	AcOverCurrHw	Yes	Inverter overcurrent hardware protection
【16】	-	-	-
【17】	InvShort	Yes	Inverter short-circuit protection
【18】	-	-	-
【19】	OverTemperMppt	No	PV radiator overtemperature protection
【20】	OverTemperInv	Yes	Overtemperature protection of inverter radiator
【21】	FanFail	Yes	Fan fault
【22】	EEPROM	Yes	Memory faul
【23】	ModelNumErr	Yes	Inaccurate model setting
【26】	RlyShort	Yes	Inverted AC Output Backfills to Bypass AC Input
【29】	BusVoltLow	Yes	Bus undervoltage protection
【30】	BatCapacityLow1	No	Battery capacity below 10% alarm (valid when

			BMS is enabled）
【31】	BatCapacityLow2	No	Battery capacity below 5% alarm (valid when BMS is enabled)
【32】	BatCapacityLowStop	Yes	Battery low capacity shutdown (valid when BMS is enabled)
【58】	BMS communication error	No	Check whether the communication cable is connected correctly and whether item [33] is set to the corresponding lithium battery communication protocol
【60】	BMS battery low-temperature alarm	No	Li-ion battery BMS low-temperature alarm
【61】	BMS battery over-temperature alarm	No	Li-ion battery BMS over-temperature alarm
【62】	BMS battery over-current alarm	No	Li-ion battery BMS over-current alarm
【63】	BMS battery under-voltage alarm	No	Li-ion battery BMS under-voltage alarm
【64】	BMS battery over-voltage alarm	No	Li-ion battery BMS over-voltage alarm

11.BMS

11.1 BMS System Schematic Diagram



11.2 BMS Parameter

No.	Item		51.2V 100Ah
1	Power Consumption	Low power consumption mode	≤100μA
2	Over charge Protection	Over charge detection voltage	3.65V
		Over charge release voltage	3.38V
3	Over discharge protection	Over discharge detection voltage	2.7V
		Over discharge release voltage	2.95V
4	Over current protection	Charging over current detection current (detection time)	55A (1S)
		Discharging over current detection current 1 (detection time)	110A 1S
		Discharging over current detection current 2(detection time)	≥150A 100ms
5	Temp. Protection	Detection temperature	65±2℃
6	Balance	Balance voltage	3.45V

12.Emergency Situations

12.1 Battery Leakage

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below

1) Inhalation: Evacuate contaminated area and seek medical aid.
2) Contact with eyes: Rinse eyes with flowing water for 15 minutes and seek medical aid.
3) Contact with skin: Wash affected area thoroughly with soap water and seek medical aid.

   Ingestion: Induce vomiting and seek medical aid.

12.2 On Fire

NO WATER!

Only dry powder fire or carbon dioxide extinguisher can be used; if possible, move the battery module to a safe area before it catches fire.

12.3 Wet Batteries

If the module is wet or submerged in water, do not let people access it, then contact us or an authorized dealer for technical support. Cut off all power switch on inverter side.

12.4.Damaged Batteries

Damaged batteries are dangerous and must be handled with utmost care. They are not fit for use and may pose a danger to people or property. If the module seems to be damaged, pack it in its original container, then return it to authorized dealer.

 **Warning**

Damaged batteries may leak electrolyte or produce flammable gas.

13.Remarks

13.1 Recycle and Disposal

In case a battery (normal condition or damaged) needs disposal or needs recycling, it shall follow the local recycling regulation (Suggest Regulation (EC) Nº 1013/2006 among European Union) to process, and using the best available techniques to achieve a relevant recycling efficiency.

Parts List(2 battery layers+1 inverter layer)

Item	Part Name	Description	Unit	Quantity
1	Inverter communication network cable	RJ45 network cable0.5m	PCS	1
2	Parallel communication network cable	RJ45 network cable0.5m	PCS	1
3	Parallel positive wire	Red 6AWG line 0.15m	PCS	1
4	Negative parallel wire	Black 6AWG line 0.15m	PCS	1
5	Positive inverter connection line	Red 6AWG 0.18m	PCS	1
6	Negative inverter connection line	Black 6AWG 0.42m	PCS	1
7	Fix screw	M6*10	PCS	6
8	Ground wire	1.5M yellow green line	PCS	1

Maintenance Record

Dear user.thank you for selecting our product,Please fill in and keep the warranty card for better services.

Attn:_____Product No.:_____

Tel:_____E-mail:_____

Purchase Date:_____

Address:_____

Maintenance Record			
Date of repair	Content	Maintenance Personnel	Note