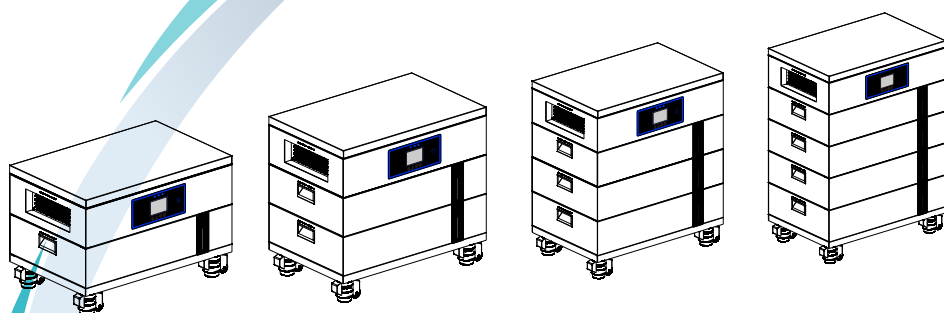


Flat Layer Stacked Energy Storage

10KW+10KWH/20KWH/30KWH/40KWH



USER MANUAL

Please read this manual carefully before installing your set
and retain it for future reference.

Preface

First of all, thank you for purchasing our Energy Storage Controller Inverter Integrated Machine!

This manual introduces the functional characteristics and usage of Energy Storage Controller Inverter Integrated Machine, including product parameters, installation and commissioning, fault maintenance check, etc. Please be sure to read this manual carefully before use.

Attention

- Please read the corresponding warning signs and the corresponding battery type specifications carefully before installing and using the equipment.
- Do not disassemble the equipment, if you need equipment repair and maintenance, please go to the designated maintenance center, if improper operation may lead to electric shock or even fire.
- To reduce the risk of electric shock, disconnect all circuits before performing repairs and maintenance.
- Warning: The battery must be installed by a professional technician.
- For maximum product functionality and efficiency, please configure the cable type as specified in the product.
- Please be careful to use metal tools for loading and unloading work to avoid short circuit and explosion caused by metal conductors.
- Equipment grounding requirements: Please select a permanently fixed place for product wiring!
- Do not short-circuit the AC output and DC input. Do not connect the power supply when the DC input is short-circuited.
- Warning! Only qualified service personnel should service this equipment. If the error persists after the troubleshooting sheet, return this unit to your local dealer or service center for maintenance.

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Chapter 1 Safety Information and Precautions

Safety Definition: In this manual, safety precautions are divided into the following two categories:

-  **Danger:** A situation in which serious injury, or even death, may result from a hazard caused by failure to operate as required;
-  **Caution:** Hazards caused by failure to operate as required, which may result in moderate injuries or minor injuries, and equipment damage;

Please read this chapter carefully when installing, commissioning and maintaining this system, and be sure to follow the safety precautions required by the contents of this chapter. Any injury or loss caused by irregular operation is not the responsibility of our company.

Usage Stage	Security Level	Item
Before installation	 Danger	➤ Do not install the equipment if you find water, missing parts or damaged parts when you open the box!
	 Attention	➤ If the packing list does not match the actual name, please do not install it!
At installation	 Danger	➤ Please install on metal and other flame retardant objects; keep away from combustible materials. Otherwise it may cause fire!
	 Attention	➤ Do not unscrew the fixing bolts of the equipment components at will. ➤ You can't just open the device case! ➤ Please install the equipment in a place with little vibration and avoid direct sunlight.
Wiring time	 Danger	➤ The instructions in this manual must be followed and the work performed by professional electrical engineers, otherwise unexpected dangers can occur!
	 Attention	➤ Pay attention to the markings of the terminals, do not connect the wrong line! Otherwise cause equipment damage! ➤ Please refer to the recommendations in the manual for the wire diameter of the wire used. Otherwise accidents may occur!
Before power on	 Danger	➤ Please confirm whether the voltage level of the input power supply is the same as the rated voltage level of this equipment; whether the wiring of the terminals is correct; and check whether there is a short circuit in the peripheral circuit connected with this equipment and whether the connected lines are tight, otherwise it will cause damage to the equipment! ➤ Any part of the equipment does not need to be tested for voltage resistance, the product has been tested at the factory. Otherwise it will cause an accident!
	 Attention	➤ The wiring of all peripheral accessories must comply with the instructions in this manual and be wired correctly according to the circuit connection method provided in this manual. Otherwise cause an accident!

Usage Stage	Security Level	Item
After power on	 Danger	➤ Do not open the cover after the power is applied. Otherwise there is a risk of electric shock! ➤ Do not touch the equipment and surrounding circuits with wet hands. Otherwise there is a risk of electric shock! ➤ Do not touch any input and output terminals of the device. Otherwise there is a risk of electric shock!
	 Attention	➤ Please do not change the manufacturer's parameters of the equipment at will. Otherwise, damage to the equipment may result!
In operation	 Danger	➤ Non-technical professionals should not test the signal while the equipment is in operation. Otherwise it may cause personal injury or equipment damage!
	 Attention	➤ When the equipment is running, avoid having something fall into the equipment. Otherwise cause damage to the equipment! ➤ Do not start and stop the equipment frequently, otherwise it will cause damage to the equipment!
Maintenance time	 Danger	➤ Do not perform maintenance and repair on the equipment without professional training. Otherwise, personal injury or equipment damage will result! ➤ Please do not carry out maintenance and repair of the equipment with electricity. Otherwise there is a risk of electric shock! ➤ Make sure that the input power of the equipment is disconnected for 10 minutes before implementing maintenance and repair of the equipment, and pay attention to the residual charge on the capacitor when maintenance will cause harm! ➤ All pluggable plug-ins must be plugged in the case of power failure!

Chapter 2 Product Information

2.1 Introduction

The Energy Storage Controller Inverter Integrated Machine combines the functions of inverter, MPPT solar controller and utility charging to provide stable power supply for power-using equipment in areas with no power, lack of power and unstable power. The product is based on a fully digital intelligent design with advanced SPWM technology, outputting pure sine wave, converting DC power into AC power, suitable for AC loads such as household appliances, power tools, industrial equipment, electronic video and audio. LCD screen display design, real-time display of system operation data and operating status. Comprehensive electronic protection function ensures the whole system is safer and more stable.

2.2 Functional Features

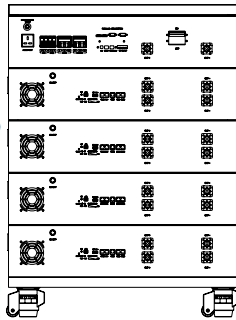
- Pure sine wave inverters;
- Integrated MPPT controller/charger;
- Settable priority of utility and PV power supply;
- Wide PV input voltage;
- Settable battery type, supporting lead-acid and lithium batteries;
- Functions and parameters can be set via the LCD;
- With battery equalization function to optimize battery performance and extend battery life.

2.3 System schematic

The following figure shows the system application scenario of this product. A complete system includes the following parts:

1. Photovoltaic module: Convert light energy into DC electric energy, charge the battery through energy storage inverter, or directly reverse it into AC to power the load.
2. Utility or generator: Connected at the AC input, it can supply power to the load and charge the battery at the same time. If no utility or generator is connected, the system can also operate normally, when the load power is provided by the battery and PV module.
3. Battery: The role of the battery is to ensure the normal use of power for the system load when the solar energy is insufficient and there is no utility power.
4. Household load: It can access various household and office loads, including refrigerators, lamps, TV sets, fans, air conditioners and other AC loads.
5. Energy Storage Controller Inverter Integrated Machine: The energy conversion device of the whole system.

This socket will stop output when the mains input changes, and then resume output after 30 seconds

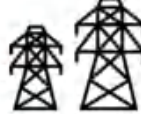


System schematic

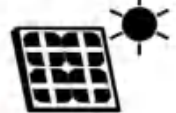
Constant frequency air conditioner



Diesel generator or



Power grid



Solar panel



Inverter interface protection: Over voltage, Over current, External Short Circuit



Battery Protection: Internal Short Circuit, Over voltage, over current, over temp



LiFePO4: Higher safe performance and longer cycle life



6 units in parallel



Flexible Installation: Stack-Mounted



Wide Compatibility: Compatible with leading inverter brands



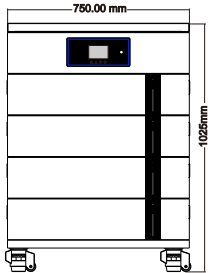
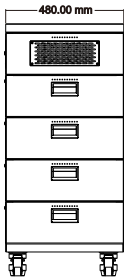
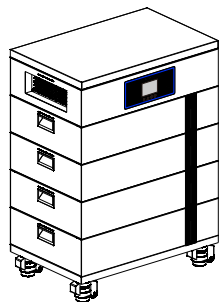
High Scalability



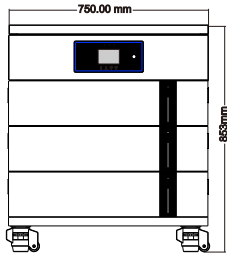
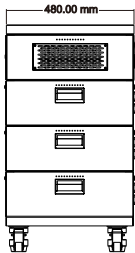
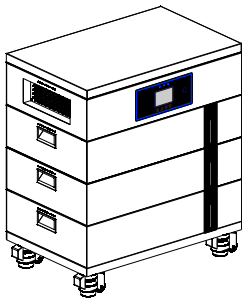
Long Warranty: 3 Years

2.4 Product Size (Unit: mm)

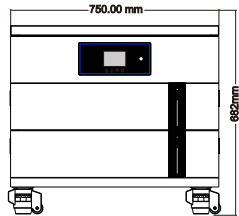
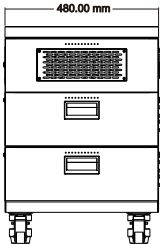
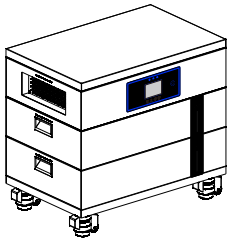
10KW/40KWH
DQ1912D10K



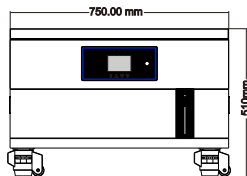
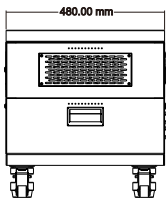
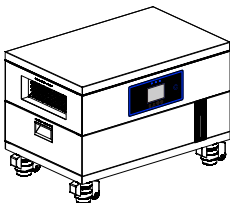
10KW/30KWH
DQ1912C10K



10KW/20KWH
DQ1912B10K

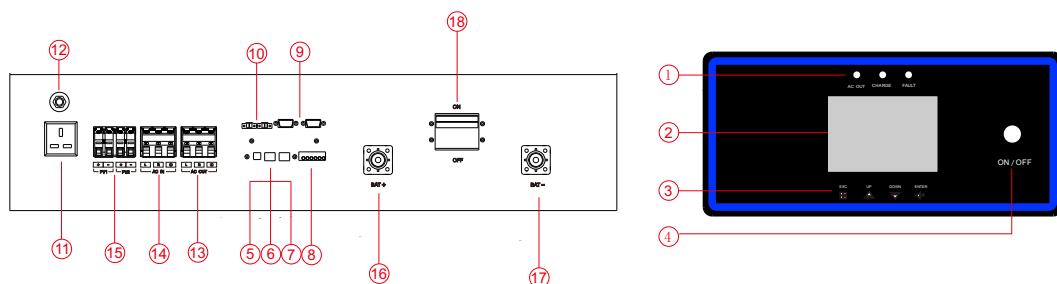


10KW/10KWH
DQ1912A10K



Chapter 3 Energy Storage Inverter Product Introduction

3.1 Interface Description



- | | |
|--|--------------------------------|
| 1. LED indicator | 11.AC230V OUT |
| 2. LCD display | 12. Input Breaker 230VAC |
| 3. Function buttons | 13. Load output interface |
| 4. Switch button | 14. Grid-power input interface |
| 5. USB port | 15. PV connectors |
| 6. RS485-1 | 16. Battery cathode |
| 7. RS485-2/CAN | 17. Battery negative electrode |
| 8. Dry contact port | 18. Inverter switches |
| 9. Parallel port (reserved port) | |
| 10. Current equalization detection port
(for parallel use only) | |

3.2 Dry Contact Signal

N-NO-NC function:

Working principle: This dry node can control the ON/OFF of the diesel generator.

- 1) Normally, NC-N point is connected and the NO-N point is disconnected;
- 2) When the battery voltage reaches the low voltage disconnection point, the relay coil is energized, the NO-N point is connected while NC-N point is disconnected. At this point, NO-N point can drive resistive loads specifications: 125VAC/1A, 230VAC/1A or 30VDC/1A.



IP-GND function:(Optional function, not standard)

Optional function, not standard function;

Working principle: This dry node can control the AC output power ON/OFF of the inverter.

1) IP-GND is disconnected AC output ON;

2) IP-GND is connected AC output OFF;

(CT+)-GND function:(Optional function, not standard)

Optional function, not standard function;

Working principle: By sampling the input line current, self-use function is realized. But need to use our configuration of CT sensors;

Parallel communication port (for parallel use only)

Female connector



Male connector

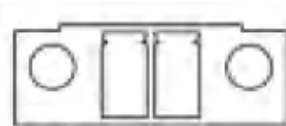


- a) This port is used for parallel communication, through which the parallel modules can communicate with each other.
- b) Each inverter has two DB15 ports, one for the male connector and the other for the female connector.
- c) When connecting, make sure to connect the male connector of the inverter with the female connector of the inverter to be paralleled, or connect the female connector of the inverter to the male connector of the inverter to be paralleled.
- d) Do not connect the male connector of the inverter to its female connector.

Current equalization detection port (for parallel use only)

a) This port is the current equalization detection port, which can be used to detect the current equalization of the parallel module (only applicable to the parallel).

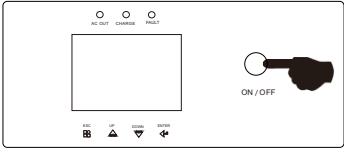
b) Each machine has two current detection ports, the internal parallel relationship, connected to the other need to parallel models, you can choose one connection according to the connection convenience, no special mandatory connection requirements.



Chapter 4 Operation

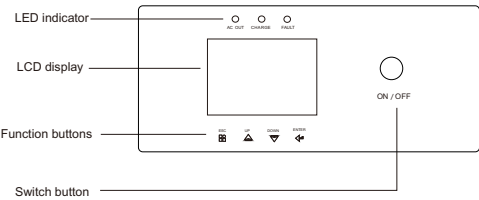
4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected welll simply press power switch to turn on the unit.



4.2 Operation and Display Panel

The operation and the LCD module, shown in the chart below, includes one power switch, four touchable function keys and a LCD display to indicate the operating status and input/output power information.



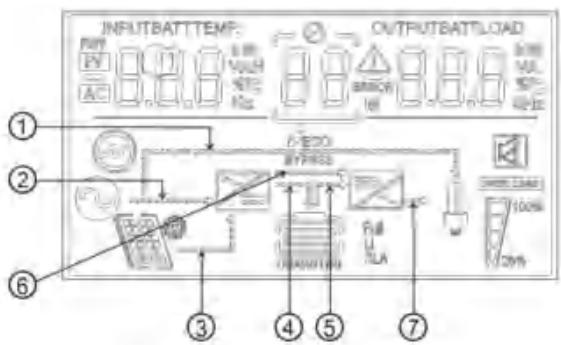
LED indicator

LED indicator		Instruction Information
AC OUT	Green	Steady on: Mains output
		Flash: Inverter output
CHARGE	Yellow	Flash: Fast charging
		Steady on: Floating charge
FAULT	Red	Flash: Fault state

Function button

Function Buttons	Description
ESC	To exit setting mode
UP	Previous choice
DOWN	Next choice
ENTER	To confirm the selection in setting mode or enter setting mode

LCD screen introduction



Icons	Functions	Icons	Functions
	Indicates that the AC input terminal has been connected to the grid		Indicates that the inverter circuit is working
	Indicates that the AC input mode in APL mode (wide voltage range)		Indicates that the machine is in the Mains Bypass mode
	Indicates that the PV input terminal has been connected to the solar panel		Indicates that the AC output is in an overload state
	Indicates that the machine has been connected to the battery:  indicates that the remaining battery is 0%~24%;  indicates that the remaining battery is 25%~49%;  indicates that the remaining battery is 50%~74%;  indicates that the remaining battery is 75%~100%.		Indicates the percentage of AC output loads:  indicates that the load percentage is 0%~24%;  indicates that the load percentage is 25%~49%,  indicates that the load percentage is 50%~74%,  indicates that the load percentage is ≥75%
	Indicates that the battery type of the machine is a lithium battery		Indicates that the buzzer is not enabled

	Indicates that the current battery type of the machine is a lead-acidbattery		Indicates that the machine has an alarm
	Indicates that the battery is in charging state		Indicates that the machine is in a fault condition
	Indicates that the AC/PV charging circuit is working		Indicates that the machine is in setup mode
	Indicates that the AC output terminal has an AC voltage output		The parameters displayed in the middle of the screen: 1. In the non-setup mode, the alarm or fault code is displayed. 2. In the setup mode, the currently set parameter item code is displayed.
	In parallel operation, this icon indicates that this inverter is the host, which is only valid in parallel mode.		
Parameters display on the left side of the screen: input parameters			
	Indicates AC input		
	Indicates PV input		
	This icon is not displayed		
	Display battery voltage, battery charge total current, mains charge power, AC input voltage, AC input frequency, PV input voltage, internal heat sink temperature, software version		
Parameters display on the right side of the screen: Output parameters			
	Indicates output voltage, output current, output active power, output apparent power, battery discharge current, software version; in setup mode, displays the set parameters under the currently set parameter item code		
Arrow display			
	Indicates the grid supplying power to the load		Indicates the charging circuit charging the battery terminal
	Indicates grid supplying power to the charging circuit		Indicates the battery terminal supplying power to the inverter circuit
	Indicates PV module supplying power to the charging circuit		The arrow is not displayed
	Indicates the inverter circuit supplying power to the load		

Real-time data viewing method

On the LCD main screen, press the “UP” and “DOWN” buttons to scroll through the real-time data of the machine.

Page	Parameters on the left side of the screen	Parameters in the middle of the screen	Parameters on the right side of the screen
1	Battery voltage	Fault code	Output voltage
2	Battery voltage collected by BMS (It will be displayed only after BMS communication is normal)		Battery capacity rate obtained by BMS (It will be displayed only after BMS communication is normal)
3	Battery current		Battery output power
4	AC output load current		AC Output active power
5	AC output frequency		AC output apparent power
6	AC input current		AC input voltage
7	AC input frequency		AC input apparent power
8	PV1 Input voltage		PV1 Input power
9	PV heat sink temperature		PV1 Input current
10	PV2 Input voltage		PV2 input power
11	PV heat sink temperature		PV2 Input current
12	Inverter heat sink temperature		Bus voltage
13	Program version 1		Program version 2
14	Rated battery voltage		Output rated power
15	PV rated voltage		PV Rated charging current
16	Machine ID number		Inverter parallel mode

4.3 Setup parameters description

Buttons operation instructions: Press the "SET" button to enter the setup menu and exit the setup menu. After entering the setup menu, the parameter number [00] will flash. At this point, press the "UP" and "DOWN" buttons to select the code of parameter item to be set. Then, press the "ENT" button to enter the parameter editing mode, and the value of the parameter is flashing. Adjust the value of the parameter with the "UP" and "DOWN" buttons. Finally, press the "ENT" button to complete the parameter editing and return to the parameter selection state

Note: in parallel mode, all machines will synchronize the setting parameters of the host (the machine with "M" is displayed on the display screen) before startup. After startup, the setting parameters of any machine will be synchronized to other machines in the system

Parameter no.	Parameter name	Settings	Description
00	Exit setting menu	[00] ESC	Exit the setup menu
01	Output source priority	[01] GID default	Mains priority mode, switching to inverter only when the mains fails.
		[01] BAT	Battery priority mode. Switch to mains power only when the battery is under voltage or lower than the setting value of parameter [16]; Switch to battery discharge only when the battery is fully charged or higher than the setting value of parameter [17].
		[01] PV	PV priority mode, switching to the Mains when the PV fails or the battery is lower than the set value of parameter [16].
		[01] HBR	Hybrid mode, you can set this mode through the [33] setting item.
02	AC output voltage setting	[02] 230V	Allow to set to 200Vac/208Vac/220Vac/230Vac/240Vac, default 230V. The rated output power will be reduced= (Power Rate)*(Vset/230)
03	Output Frequency	[03] 50.0HZ	Bypass self-adaptation; when the mains is connected, it automatically adapts to the mains frequency; when the mains is disconnected, the output frequency can be set through this menu. The default output frequency to 50Hz of the 230V.

Parameter no.	Parameter name	Settings	Description
04	AC Input Voltage Range	[04] APL	Wide mains input voltage range of 230Vac machine: 90~280Vac; Frequency range: 47~ 55Hz (50Hz); 57Hz ~ 65Hz (60Hz);
		[04] UPS default	Narrow mains input voltage range of 230Vac machine: 170~280Vac; Frequency range: 47~ 55Hz (50Hz);57Hz ~ 65Hz (60Hz);
		[04] GEN	Diesel generators input, need to set this mode, at this time: Narrow Ac input voltage range of 230Vac machine: 90~280Vac Frequency range: 40~ 70Hz
05	Power saving mode	[05] DIS default	Power saving mode disabled.
		[05] ENA	After the power saving mode is enabled, if the load is null or less than 25W, the inverter output is turned off after a delay for a certain period of time. When the load is more than 50W, the inverter automatic restart.
06	Charger source priority	[06] SNU default	PV and Mains hybrid charging; PV charging is a priority, and when the PV energy is insufficient, the Mains charging supplements. When the PV energy is sufficient, the Mains charging stops. Note: Only when the Mains bypass output is loaded, the PV charging and the mains charging can work at the same time. When the inverter works, only the PV charging can be started.
		[06] OUO	Mains priority charging; only when the mains charging fails, the PV charging is started.
		[06] OSO	PV priority charging; only when the PV charging fails, the mains charging is started.
		[06] NUC	Only PV charging, with the Mains charging not activated.
07	Max total charging current	[07] 80A default	Maximum total charging current setting. setting range:0~150A.

Parameter no.	Parameter name	Settings	Description
08	Max PV charger current	[08] 80A default	Max PV charger current. Setting range: 0~150A;
09	Max AC charger current	[09] 60A default	setting range: 0~120A
10	Battery fully charging current setting	[10] 3A default	When the battery type is lead-acid, when the battery voltage is greater than or equal to the floating charge value, and the charging current is less than the setting value, the battery is considered to be fully charged and the charging is stopped; If the battery type is lithium battery, when the battery voltage is greater than or equal to the constant voltage charging value and the charging current is less than the set value, the battery is considered to be fully charged and the charging is stopped.
11	Battery Type	[11] USE	User-defined; all battery parameters can be set.
		[11] Sld	Sealed lead-acid battery; constant-voltage charge voltage: 57.6V, floating charge voltage: 55.2V.
		[11] Fld	Vented lead-acid battery; constant-voltage charge voltage: 58.4V, floating charge voltage: 55.2V.
		[11] GEL default	Colloidal lead-acid battery; constant-voltage charge voltage: 56.8V, floating charge voltage: 55.2V.
		[11] LF14/LF15/LF16	Lithium iron phosphate battery LF14/LF15/LF16, corresponding to 14strings ,15 strings and 16 strings of lithium iron phosphate battery; for 16 strings, default constant-voltage charge voltage is 56.8V; for 15 strings, default constant-voltage charge voltage is 53.2V; for 14 strings, default constant-voltage charge voltage is 49.2V; allow adjustable.
		[11] N13/N14	Ternary lithium battery; which is adjustable. The default constant voltage charging voltage of N13 is 53.2V, and the default constant voltage charging voltage of N14 series is 57.6V.

Parameter no.	Parameter name	Settings	Description
12	Battery boost charge voltage	[12] 57.6V default	Boost charge voltage setting; the setting range is 48V~58.4V, with step of 0.4V; it is valid for user-defined battery and lithium battery.
13	Battery floating charge voltage	[13] 55.2V default	Floating charge voltage, setting range: 48V~58.4V, step: 0.4V.
14	Battery boost charge time	[14] 120 default	Boost charge maximum time setting, which means the maximum charging time to reach the set voltage of parameter [12] during constant-voltage charging. The setting range is 5min~900min, with a step of 5 minutes. It is valid for user-defined battery and lithium battery.
15	Battery recharge recovery point	[15] 52V default	After the battery is fully charged, the inverter stops charging, and restarts charging when the battery voltage is lower than the voltage value.
16	Battery Power to Utility Setpoint	[16] 46V default	When the parameter [01] =Bat, the battery voltage is lower than the set value, and the output is switched from the inverter to the mains. Setting range: 44V~52V.
17	Utility to Battery Power Setpoint	[17] 57.6V default	When the parameter [01] =Bat, the battery voltage is higher than the set value, and the output is switched from the mains to the inverter. Setting range: 48V~60V.
18	Battery under voltage alarm	[18] 44V default	Battery undervoltage alarm point; when the battery voltage is lower than the point, an undervoltage alarm is given (01 fault), and the output is not turned off; the setting range is 40V~52V, with a step of 0.4V.
19	Battery over discharge voltage (delay off)	[19] 42V default	Over-discharge voltage; when the battery voltage is lower than this judgment point, delay the time set by parameter [22] and turn off inverter output. Setting range is 40V~48V, with a step of 0.4V.

Parameter no.	Parameter name	Settings	Description
20	Battery over discharge voltage (immediately)	[20] 42V default	Battery discharge limit voltage; when the battery voltage is lower than the point, the output is turned off immediately (02 fault); the setting range is 40V~52V, with a step of 0.4V. It is valid for user-defined battery and lithium battery.
21	Battery voltage recovery point after over discharge protection (02 fault)	[21] 52V default	When the battery over discharge protection disconnects the inverter output, the battery voltage must be greater than this value to restore the inverter AC output.
22	Battery over discharge delay time	[22] 5S default	Over-discharge delay time; when the battery voltage is lower than the parameter [19], the inverter output will be turned off after the time set by this parameter is delayed. The setting range is 5S~55S, with a step of 5S.
23	RS485-2 /CAN communication	[23] DIS default	RS485-2 Disable the BMS communication. However, our PC and remote monitoring protocol can continue to be used.
		[23] RS485	RS485-2 port for BMS communication.
24	BMS protocol Settings	When the setting Program [23] is RS485, the corresponding lithium battery manufacturer brand needs to be selected for communication	
		PLN=PYLONTECH, PCE=PACE, GXU=GOTION, DAQ, AOG=ALLGRAND, OLT=OLITER, XWD=SUNWODA, CFE, MIT=FOXESS, VOL=WHEELAND	
25	SOC discharge alarm (Optional when BMS is enabled)	[25] 15% default	After the BMS of the setting item [23] is enabled, the machine will alarm 07 if the battery capacity rate is lower than this value, and the alarm will be cleared if the battery capacity rate is higher than 5% of this value.

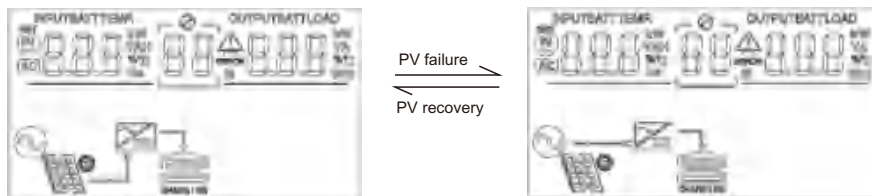
Parameter no.	Parameter name	Settings	Description
26	SOC switching mains (optional when BMS is enabled)	[26] 10% default	After the BMS of the setting item [23] is enabled, the machine will switch to the mains when the battery capacity rate is lower than this value and the mains power is available.
27	SOC switching inverter (optional when BMS is enabled)	[27] 100% default	After the BMS of the setting item [23] is enabled, it takes effect in battery priority mode. If the battery capacity rate is higher than this value, the machine will switch from the mains to the inverter mode.
28	SOC discharge cut off (optional when BMS is enabled)	[28] 5% default	After the BMS of the setting item [23] is enabled, if the battery capacity rate is lower than this value, the machine will report 08 fault and cut off the power supply or output.
29	SOC charging cut off (optional when BMS is enabled)	[29] 100% default	After the BMS of the setting item [23] is enabled, when the battery capacity rate is higher than this value, the inverter considers the battery to be full. If the battery priority mode is adopted at this time, the machine will switch the battery back from the mains.
30	Buzzer alarm	[30] DIS default	Alarm beep is enabled when the status of the main input source changes or the inverter fails.
		[30] ENA	Buzzer is silent
31	AC output mode (can be set in the standby mode only)	[31] SIG default	When single inverter is used, the default is SIG mode.
		[31] PAL	In parallel operation with single phase. Please refer to 8.3 Wiring Diagram.
		[31] 3P1/3P2/3P3	In split phase operation with three phase. Please refer to 8.4 Wiring Diagram.
		All connected P1-phase inverters are set to "3P1" ; All connected P2-phase inverters are set to "3P2" ; All connected P3-phase inverters are set to "3P3" ; When the parameter [02] setting item=230: AC output line voltage difference is 120 degrees (P1-P2/P1-P3/P2-P3), each line voltage is $230 \times 1.732 = 398\text{Vac}$; Each phase voltage is 230Vac (L1-N; L2-N; L3-N).	

Parameter no.	Parameter name	Settings	Description
32	Rs485 ID setting	[32] 1 default	Parallel mode needs to be set in the range of 1-6, the ID cannot be repeated. When the power is first turned on, it will be automatically distributed. Single mode setting range 1-254.
33	Mixed mode (available for some models, Hybrid mode available)	[33] GID	It is allowed to connect to the grid, and the surplus electricity is generated by the grid.
		[33] LOD	Anti-countercurrent, self-use according to the load power, do not input current to the mains.
34	N-PE connection switchover is enabled	[34] DIS default	Do not automatically connect the N wire to the PE wire under any working conditions.
		[34] ENA	When there is no mains input off the grid, the neutral line automatically connects to the PE. When the bypass has mains input, the neutral line is automatically disconnected from the PE.
35	Automatic battery activation	[35] DIS	When the battery is dormant or not connected, the PV or mains does not automatically activate the battery to turn on the battery output.
		[35] ENA default	When the battery is dormant or not connected, the PV or mains automatically activates the battery to turn on the battery output.

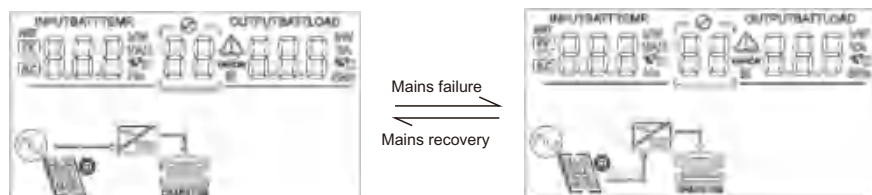
Chapter 5 Operating Mode Description

5.1 Charging mode

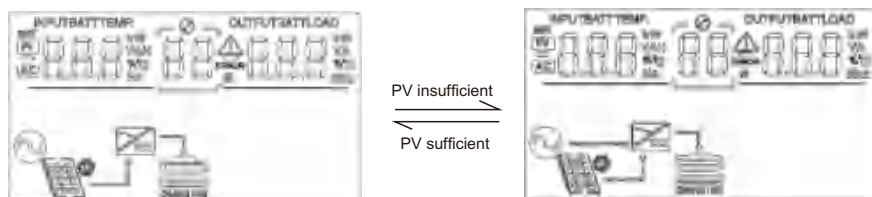
1) PV priority: PV module will charge the battery preferentially, and the battery is charged by the Mains only when the PV system fails. During the day, solar energy is fully used to charge, while at night, it converts to the Mains. This can maintain battery level, and is ideal for areas where the grid is relatively stable and electricity price is relatively high.



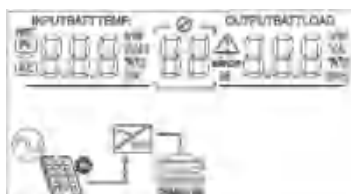
2) Mains priority: The Mains supply is preferentially used to charge the battery. Only when the Mains fails, the PV charging can be activated.



3) Hybrid charging: PV and mains hybrid charging. PV MPPT charging is a priority, and when PV energy is insufficient, the mains supply supplements. When the PV energy is sufficient again, the mains stops charging. This is the fastest charging mode, suitable for the areas where power grid is unstable, providing sufficient backup power supply at any time.



4) Only Solar: Only PV charging, without Mains charging. This is the most energy-efficient way in which battery is charged only by solar panels, and is usually used in areas with good lighting conditions.

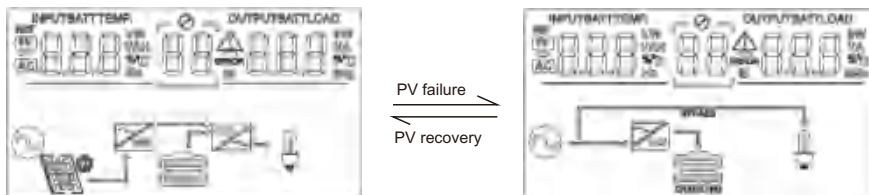


5.2 Output mode

➤ PV priority mode:

Switch to mains supply when the PV charging fails. This mode maximizes the use of solar energy while maintaining battery power, suitable for use in the areas with relatively stable grid.

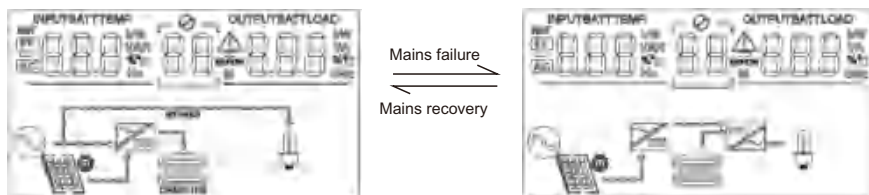
Power supply priority: Solar—» Utility—» Battery.



➤ Mains priority mode:

Switch to inverter only when the mains fails (when there was mains power, switch to mains power for charging and power supply). Then, the unit is equivalent to a backup UPS, suitable for areas with unstable grid. Switching does not affect PV charging.

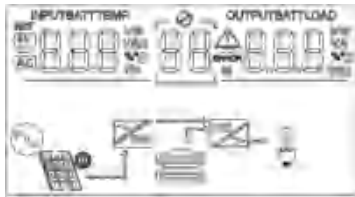
Power supply priority: Utility—» Solar—» Battery



➤ Battery priority mode:

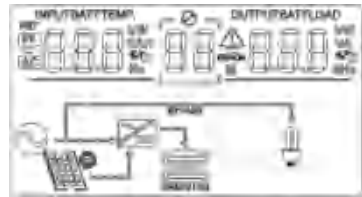
Switch to mains supply only when the battery discharge undervoltage is lower than the set point (item 16). When the charging battery is higher than the set point of (17 setting item), switch to the battery discharge mode. This can cycle the battery charge and discharge. This mode maximizes the use of DC power and is used in the area with stable grid. Switching does not affect PV charging.

Power supply priority: Solar—» Battery—» Utility.



Battery
undervoltage

→
←
Battery
recovery



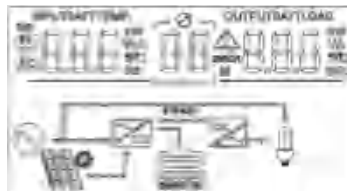
➤ Hybrid model:

LOD: Inverter power generation energy only to the load (generation power $\leq$ Load power).

Note: mixed load, mains and photovoltaic are loaded together, photovoltaic is not enough to supplement the mains

GID: Inverter power generation energy directly connected to the grid (generation power may be greater than the load power).

Note: photovoltaic power generation is sufficient load power, excess grid-connected power generation



Chapter 6 Battery type parameters

6.1 For Lead-acid Battery

Parameter \ Battery Type	Sealed lead acid battery (SLD)	Colloidal lead acid battery (GEL)	Vented lead acid battery (FLD)	User-defined (User)
Over voltage disconnection voltage	60V	60V	60V	36~60V (Adjustable)
Battery fully charged recovery point (setup item 15)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Boost charge voltage	57.6V	56.8V	58.4V	36~60V (Adjustable)
Floating charge voltage	55.2V	55.2V	55.2V	36~60V (Adjustable)
Undervoltage alarm voltage (01 fault)	44V	44V	44V	36~60V (Adjustable)
Undervoltage alarm voltage recovery point (01 fault)	Undervoltage alarm voltage+0.8V			
Low voltage disconnection voltage(02 fault)	42V	42V	42V	36~60V (Adjustable)
Low voltage disconnection voltage recovery point (02 fault)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Discharge limit voltage	40V	40V	40V	36~60V (Adjustable)
Over-discharge delay time	5s	5s	5s	1~3s (Adjustable)
Boost charge duration	120 minutes	120 minutes	120 minutes	10~600 minutes (Adjustable)

6.2 For Lithium Batter

Battery Type Parameter	Ternary lithium battery (N13)	Ternary lithium battery (N14)	Lithium iron phosphate battery (Lf16)	Lithium iron phosphate battery (LF15)	Lithium iron phosphate battery (Lf14)
Overvoltage disconnection voltage	60V	60V	60V	60V	60V
Battery fully charged recovery point(setup item 15)	50.4V (Adjustable)	54.8V (Adjustable)	53.6V (Adjustable)	50.4V (Adjustable)	47.6V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Undervoltage alarm voltage(01 fault)	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)
Undervoltage alarm voltage recovery point (01fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage(04 fault)	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault) (setup item 35)	46V (Adjustable)	49.6V (Adjustable)	52.8V (Adjustable)	49.6V (Adjustable)	46V (Adjustable)
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)

Chapter 7 Detailed parameters

Model	DQ1912A10K-01	DQ1912B10K-01	DQ1912C10K-01	DQ1912D10K-01
Rated Power	10KW			
Single Module Nominal Voltage	51.2V			
Module Capacity	200AH			
Number of Battery Modules (Optional)	1	2	3	4
System Energy	10kWh	20kWh	30kWh	40kWh
AC Output Voltage	230VAC			
AC Output Frequency	50/60Hz			
AC Input Voltage Range	170-280VAC			
AC Input Frequency	50/60Hz			
Maximum AC innut current charging current	60A/150A			
Maximum PV Voltage	500VDC			
MPPT Voltage Range	120-450VDC			
PV Charge Current	150A			
Temperature For Operation	-20±50℃			
Temperature For Storage	-30±70℃			
Humidity	5%~95%			
Altitude	≤2000m			
Cycle Life	≥4000 Cycles			
Installation	Stack			
Protection	Built-in smart BMS, Breaker			
Communication Port	RS485			
Dimension (W*D*H,mm)	750*480*510	750*480*682	750*480*853	750*480*1025
Warranty Period	3 Year			

Chapter 8 Failure codes and countermeasures Fault code

Failure codes and countermeasures Fault code

Models	Fault name	Whether it affects the output or not	Description
【01】	Battery under voltage warning	Yes	If the battery voltage is lower than “battery under voltage alarm” setting, the battery was in the undervoltage state.
【02】	Battery under voltage protection	Yes	When the battery voltage was low, turn off the output to stop the battery discharge protection.
【03】	Average battery discharge current over current protection	Yes	If the average battery discharge current exceeds the maximum input battery current for 1 minute, turn off the output to stop the battery discharge protection.
【04】	Instantaneous battery discharge over current protection	Yes	If the instantaneous value of the battery discharge current is greater than the maximum instantaneous value of the device, turn off the output to stop the battery discharge protection.
【05】	Battery not connected	Yes	Battery not connected warning.
【06】	Battery over voltage	Yes	When the selected battery type or set battery voltage is exceeded, turn off the output to stop the battery charging protection.
【07】	BMS low battery talarm	Yes	BMS alarm low battery (Set BMS enablement to work)
【08】	BMS low battery protection	Yes	The BMS battery capacity rate is low. Disable the output to stop the battery discharge protection. (Set BMS enablement to work)

【9】	Bypass overload protection	Yes	If the mains is overloaded, turn off the AC output and stop the mains charging.
【10】	Battery output overload protection	Yes	If the battery discharge inverter is overloaded, turn off AC output and stop battery discharge protection.
【11】	Battery inverter output short circuit	Yes	If the AC output of the battery inverter discharge is short circuiting, turn off the AC output and stop the battery discharge protection.
【12】	The AC output of the battery inverter over circuit	Yes	If the AC output of the battery inverter discharge is over circuit, turn off the AC output and stop the battery discharge protection.
【13】	The DC component of the battery inverter voltage is abnormal	Yes	If the DC component of the battery inverter voltage is abnormal, turn off the AC output and stop the battery discharge protection.
【14】	Bus over voltage software sampling protection	Yes	Internal battery boost, boost bus voltage overvoltage software protection, turn off AC output and charge.
【15】	Bus over voltage hardware sampling protection	Yes	Internal battery boost, boost bus voltage overvoltage hardware protection, turn off AC output output and charge.
【16】	Bus under voltage protection	Yes	Internal battery boost, boost bus voltage undervoltage protection, turn off AC output output and charge.
【17】	Bus short circuit protection	Yes	Internal battery boost, boost bus voltage short-circuit protection, turn off AC output output and charge.

【18】	The PV input voltage is over voltage	Yes	The solar input voltage exceeds the maximum allowable input voltage protection.
【19】	-	-	-
【20】	PV over current protection	No	Solar charging overcurrent hardware protection, turn off solar charging.
【21】	-	-	-
【22】	The PV heat sink is overheated. Procedure	No	If the temperature of the solar charging radiator is too high, turn off the solar charging.
【23】	The AC heat sink is overheated. Procedure	Yes	If the temperature of the heat sink is too high, turn off the AC charging or battery inverter discharge.
【24】	The temperature of the main transformer is overheated	Yes	If the internal main transformer temperature is too high, turn off the AC charging or battery inverter discharge.
【25】	Ac input relay short circuit	Yes	Ac input relay short-circuit protection prevents the inverter AC output from being pumped back into the bypass AC input.
【26】	-	-	-
【27】	Fan failure	Yes	If the fan is blocked or fails, disable the inverter output and charging functions.
【28】	-	Yes	-
【29】	-	-	-
【30】	Type detection error	Yes	The model is not set before delivery, and the model identification is wrong.
【31】	-	-	-
【32】	-	-	-
【33】	Parallel control can communication is faulty	Yes	In parallel mode, CAN communication is lost, AC output and charging are turned off.

【34】	Parallel control can communication is faulty	Yes	In parallel mode, CAN communication is lost, AC output and charging are turned off.
【35】	Parallel mode is faulty	Yes	In parallel mode, the system has inconsistent machine parallel mode [31] Settings.
【36】	Parallel current sharing fault	Yes	In parallel mode, the AC output of the battery inverter differs greatly from the non-uniform current output of each machine. Turn off the AC output and charge.
【37】	Parallel ID setting error	Yes	In parallel mode, the RS485 addresses repeatedly conflict. The fault stops the AC output and charge. After the host automatically reallocates the address, the fault is cleared and the host enters the parallel.
【38】	Inconsistent Battery in parallel mode	Yes	In parallel mode, the battery voltage input of each machine varies greatly
【39】	Inconsistent AC input source in parallel mode	Yes	Inconsistent AC input source in parallel mode
【40】	The parallel mode synchronization fails	Yes	Parallel mode, hardware synchronization signal reception failure, stop parallel and AC output.
【41】	Inconsistent system firmware version in parallel mode	Yes	If the program version is inconsistent in the parallel system, stop the parallel and AC output.
【42】	The parallel communication cable is faulty	Yes	The parallel communication line is faulty. Stop the parallel and AC output.
【43】	Serial number error	Yes	The serial number is not set before the factory, or the factory serial number is set repeatedly in the system.

【49】	BMS communication error	No	Check whether the communication line is connected correctly and whether BMS is set to the corresponding lithium battery communication protocol
【50】	BMS other alarm	No	Check the BMS fault type and troubleshoot lithium battery problems
【51】	BMS battery over temperature alarm	No	BMS alarm lithium battery over temperature
【52】	BMS battery over current alarm	No	BMS alarm lithium battery over current
【53】	BMS battery over voltage alarm	No	BMS alarm lithium battery over voltage
【54】	BMS battery low voltage alarm	No	BMS alarm lithium battery low voltage
【55】	BMS battery low temperature alarm	No	BMS alarm lithium battery low temperature

Trouble Shooting

Fault code	Faults	Handling measures
/	No display on the screen	Check if the battery air switch or the PV air switch has been closed; if the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
【06】	Rechargeable battery overvoltage protection	Measure if the battery voltage exceeds rated. If it exceeds, the battery needs to be discharged until the voltage is below the overvoltage recovery point of the battery.
【01】 【02】	Battery under voltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
【27】	Fan failure	Check if the fan is not turning or blocked by foreign object.

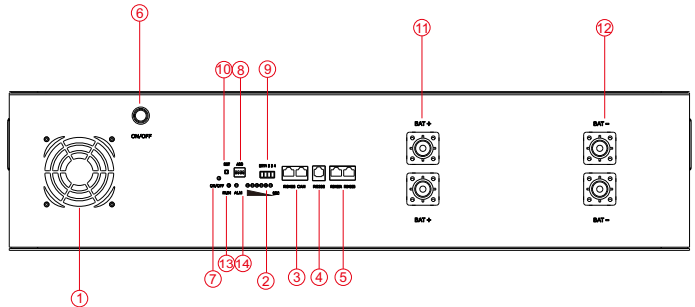
【22】 【23】	Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
【09】 【10】	Bypass overload protection, inverter overload protection	1.Reduce the use of power equipment; 2.Restart the unit to resume load output.
【11】	Inverter short circuit protection	1.Check the load connection carefully and clear the short-circuit fault points; 2.Re-power up to resume load output.
【18】	PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
【05】	Battery missed alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.
【40】 【42】	Parallel connection fault	Check whether the parallel line is not connected well, such as loose or wrong connection.
【37】	Parallel ID setting error	Check whether the setting of parallel ID number is repeated.
【36】	Parallel current sharing fault	Check whether the parallel current sharing line is not connected well, such as loose or wrong connection.
【39】	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface.
【41】	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent.

Note: If you encounter a product fault that cannot be solved by the methods in the above table, please contact our after-sales service department for technical support, and do not disassemble the equipment yourself.

Chapter 9 Storage Battery Introduction

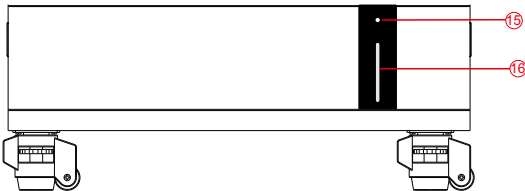
9.1 Appearance is introduced

- 1.Cooling fan
2. SOC indicator
3. 485/CAN Communication port
4. RS232 port
5. Battery parallel port
6. Master switch
7. Switch indicator light
8. DIP switch
9. Dry contacts
10. Reset
11. Battery cathode
12. Battery negative terminal
13. Running indicator
14. Fault indicator
15. LED switch
16. Electroluminescent strip



Electroluminescent strip:

1. The color of the battery indicator is displayed by a mixture of green and red light according to the SOC value;
2. The higher the SOC value, the more green the proportion and the less red the indicator will be, and the lower the SOC value, the more red the proportion will be, the less green the indicator will be;
3. Pure green when SOC is 100%; A SOC of 0% shows a solid red.



9.2 LED indicator description

LED operating status indication

State	Normal/ Alarm/ Protection	ON/OFF	RUN	ALM	Power Indicator LED						Illustrate
											
Shutdown	Dormancy	no	no	no	no	no	no	no	no	no	Completely extinguished
Standby	Normal	Continuous	Twinkle 1	no	According to the indication of the power level						Standby state
	Alarm	Continuous	Twinkle 1	Twinkle 3							Module low voltage
Charge	Normal	Continuous	Continuous	no	According to the battery level indication (the maximum LED flashes 2)						The maximum battery LED flashes (flashes 2), and the ALM does not flash when the overcharge alarm is alarmed
	Alarm	Continuous	Continuous	Twinkle 3							
	Overcharge protection	Continuous	Continuous	no	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	If there is no mains power, the indicator light will turn to standby
	Temperature, overcurrent, fail-safe	Continuous	no	Continuous	no	no	no	no	no	no	Stop charging
Discharge	Normal	Continuous	Twinkle 3	no	According to the indication of the power level						
	Alarm	Continuous	Twinkle 3	Twinkle 3							
	Undervoltage protection	Continuous	no	no	no	no	no	no	no	no	Stop discharging
	Temperature, overcurrent, short circuit, reverse polarity, failure protection	Continuous	no	Continuous	no	no	no	no	no	no	Stop discharging
lapse		no	no	Continuous	no	no	no	no	no	no	Stop charging and discharging

Capacity indication

State		Charge					
Capacity indicator		L6	L5	L4	L3	L2	L1
							
Electricity	0~17%	no	no	no	no	no	Twinkle 2
	18~33%	no	no	no	no	Twinkle 2	Continuous
	34~50%	no	no	no	Twinkle 2	Continuous	Continuous
	51~66%	no	no	Twinkle 2	Continuous	Continuous	Continuous
	67~83%	no	Twinkle 2	Continuous	Continuous	Continuous	Continuous
	84~100%	Twinkle 2	Continuous	Continuous	Continuous	Continuous	Continuous
Running indicator 		Continuous					

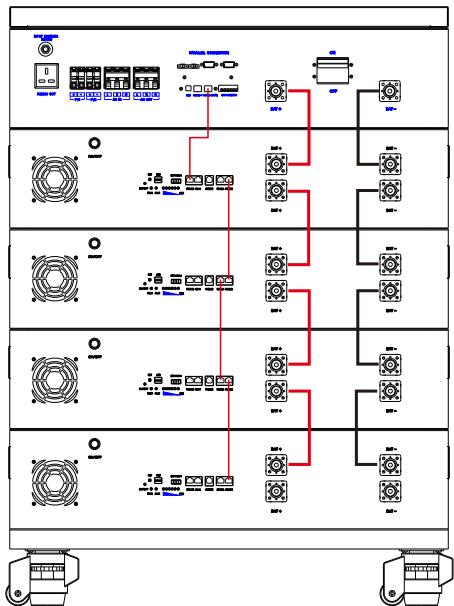
State		Discharge					
Capacity indicator		L6	L5	L4	L3	L2	L1
							
Electricity	0~17%	no	no	no	no	no	Continuous
	18~33%	no	no	no	no	Continuous	Continuous
	34~50%	no	no	no	Continuous	Continuous	Continuous
	51~66%	no	no	Continuous	Continuous	Continuous	Continuous
	67~83%	no	Continuous	Continuous	Continuous	Continuous	Continuous
	84~100%	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Running indicator 		Twinkle 3					

LED Twinkle Status

Status	On	Off
Twinkle 1	0.25s	3.75s
Twinkle 2	0.5s	0.5s
Twinkle 3	0.5s	1.5s

Connecting Signal Line

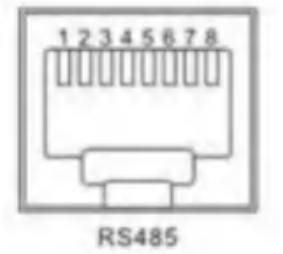
The signal line delivered with the product together shall be used to connect RS485 interface for each battery module. The communication port of the inverter needs to be connected to the RS485 interface.



Lithium battery communication and setting

Connect the end of RJ45 of battery to BMS communication port of inverter. Make sure the lithium battery BMS port connects to the inverter is Pin to Pin, the inverter BMS(RS485-2/CAN) port pin and RS485-1 port pin assignment shown as below:

No.	BMS port (RS485-2/CAN)	RS485-1 port (Reserve)
1	RS485-B	RS485-B
2	RS485-A	RS485-A
3	—	--
4	CAN-H	--
5	CAN-L	--
6	—	--
7	5V	5V
8	GND	GND



9.3 Protection and Maintenance

Protections provided

No.	Protections	Description
1	PV current/ power limiting protection	When charging current or power of the PV array configured exceeds the PV rated, it will charge at the rated.
2	PV night reverse-current protection	At night, the battery is prevented from discharging through the PV module because the battery voltage is greater than the voltage of PV module.
3	Mains input over voltage protection	When the mains voltage exceeds 140V, the mains charging will be stopped and switched to the inverter mode.
4	Mains input under voltage protection	When the mains voltage is lower than or 85V , the mains charging will be stopped and switched to the inverter mode.
5	Battery over voltage protection	When the battery voltage reaches the overvoltage disconnection point, the PV and the mains will be automatically stopped to charge the battery to prevent the battery from being overcharged and damaged.
6	Battery low voltage protection	When the battery voltage reaches the low voltage disconnection point, the battery discharging will be automatically stopped to prevent the battery from being over-discharged and damaged.
7	Load output short circuit protection	When a short circuit fault occurs at the load output terminal for more than 200 milliseconds, the AC output is immediately turned off.
8	Heat sink over temperature protection	When the internal temperature is too high, the all-in-one machine will stop charging and discharging; when the temperature returns to normal, charging and discharging will resume.
9	Overload protection	Output again 3 minutes after an overload protection, and turn the output off after 5 consecutive times of overload protection until the machine is re-powered. For the specific overload level and duration, refer to the technical parameters table in the manual.
10	PV reverse polarity protection	When the PV polarity is reversed, the machine will not be damaged.

11	AC reverse protection	Prevent battery inverter AC current from being reversely input to Bypass.
12	Bypass over current protection	Built-in AC input overcurrent protection circuit breaker.
13	Battery input over current protection	When the discharge output current of the battery is greater than the maximum value and lasts for 1 minute, the AC input would switched to load.
14	Battery input protection	When the battery is reversely connected or the inverter is short-circuited, the battery input fuse in the inverter will blow out to prevent the battery from being damaged or causing a fire.
15	Charge short protection	When the external battery port is short-circuited in the PV or AC charging state, the inverter will protect and stop the output current.
16	CAN communication loss protection	In parallel operation, an alarm will be given when CAN communication is lost.
17	Parallel connection error protection	In parallel operation, the equipment will be protected when the parallel line is lost.
18	Parallel battery voltage difference protection	In parallel operation, the equipment will be protected when the battery connection is inconsistent and the battery voltage is greatly different from that detected by the host.
19	Parallel AC voltage difference protection	In parallel operation, the equipment will be protected when the AC IN input connection is inconsistent.
20	Parallel current sharing fault protection	In parallel operation, the running equipment will be protected when the load difference of each inverter is large due to improper connection of current sharing line or device damage.
21	Synchronization signal fault protection	The equipment will be protected when there is a fault in the guidance signal between parallel buses, causing inconsistent behavior of each inverter.

Maintenance

In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.

1. Make sure that the airflow around the unit is not blocked and remove any dirt or debris from the heat sink.
2. Check that all exposed wires are damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc., and the wires shall be repaired or replaced if necessary.
3. Verify for the consistency of indication and display with the operation of the device. Please pay attention to the display of any faults or errors, and take corrective actions if necessary.
4. Check all wiring terminals for corrosion, insulation damage, signs of high temperature or burning/discoloration, and tighten the screws.
5. Check for dirt, nesting insects and corrosion, and clean up as required.
6. If the arrester has failed, replace in time to prevent lightning damage to the unit or even other equipment of the user

The company does not assume any liability for damage caused by:

- a) Improper use or use in improper site.
- b) Open circuit voltage of the PV module exceeds the maximum allowable voltage rated.
- c) Temperature in the operating environment exceeds the limited operating temperature range.
- d) Disassemble and repair the all-in-one solar charge inverter without permission.
- e) Force majeure: Damage that occurs in transportation or handling of the all-in-one solar charge inverter.



Danger of electric shock! When doing the above operations, make sure that all power supplies of the all-in-one machine have been disconnected, and all capacitors have been discharged, and then check or operate accordingly!

Warranty Card

CUSTOMER Information

*Contact Name _____
*Phone Number _____ *Email _____
Company Name _____
*Address _____
*State _____ Zip Code _____

PRODUCT Information

*Module Type _____
*Serial Number _____
*Purchase Date _____
*Faulty Description _____

- | | | | |
|----------------------------|-----|----|------|
| 1) Can the battery boot? | Yes | or | No ? |
| 2) Can battery charged? | Yes | or | No ? |
| 3) Can battery discharged? | Yes | or | No? |
| 4) Red light on? | Yes | or | No? |
| 5) Running light on? | Yes | or | No? |

INSTALLER Information

*Installer Name _____
Staff Number _____
*Installing Date _____

Please fill the form carefully, and the items marked with “*” are necessary, Thank you!

*Customer Signature _____ *Provider Signature _____
*Date _____