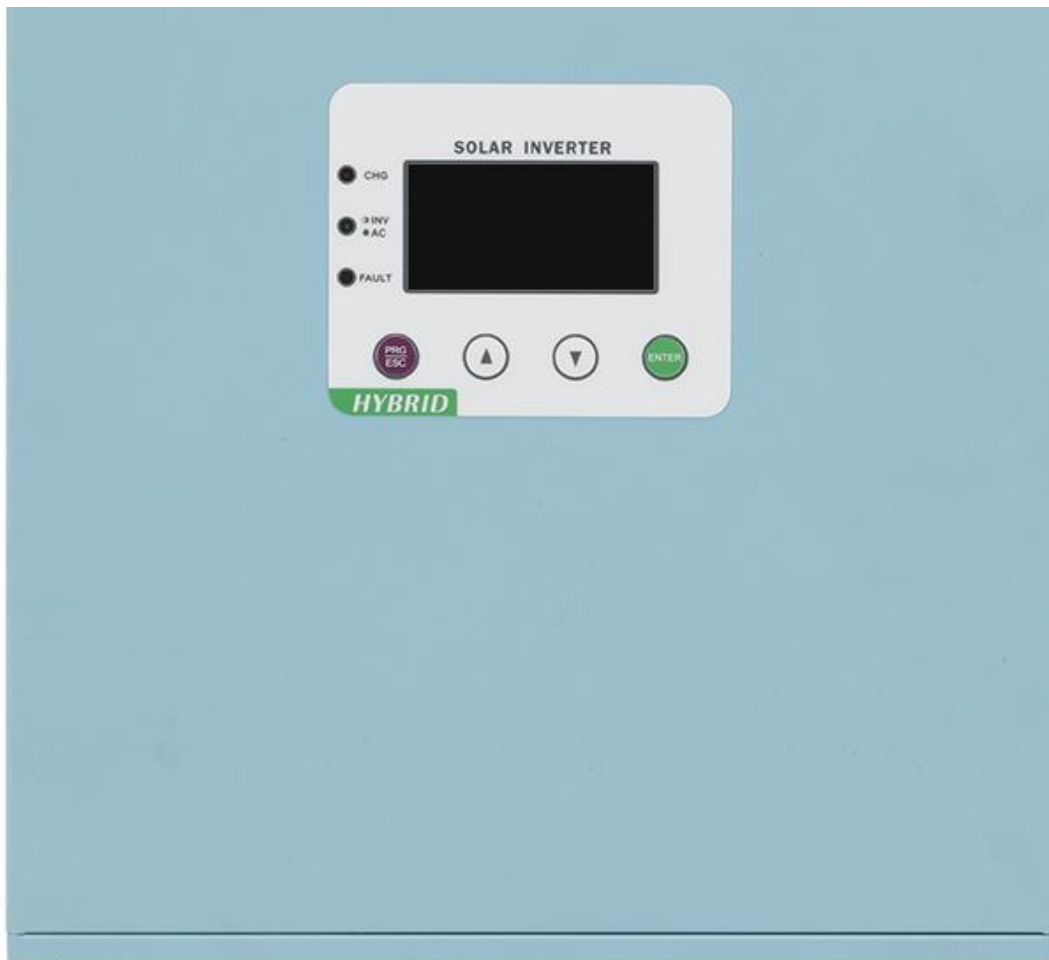


User Manual

5KW/6.6KW Grid-tied and off-grid inverter integrated controller PV INVERTER & CHARGER (V1.1-20240624)



Version: 1.1

Table Of Contents

ABOUT THIS MANUAL	3
Purpose.....	3
Scope.....	3
SAFETY INSTRUCTIONS	3
INTRODUCTION	4
Features	4
Basic System Architecture.....	4
Product Overview	5
INSTALLATION	6
Unpacking and Inspection	6
Mounting the Unit	6
Preparation	7
Terminals named	8
AC Input/Output Connection	8
Battery Connection	8
PV Connection	9
Final Assembly	10
OPERATION	10
Power ON/OFF	10
Operation and Display Panel	11
LED Indicator	11
Function Keys	11
LCD Display Icons	12
LCD Setting	13
LCD Display Setting	13
Fault Reference Code	14
SPECIFICATIONS	15
Table 1 Line Mode Specifications.....	15
Table 2 Inverter Mode Specifications	16
Table 3 Charge Mode Specifications	17
Table 4 General Specifications	17

ABOUT THIS MANUAL

Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

SAFETY INSTRUCTIONS



WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. **CAUTION** – To reduce the risk of injury, only rechargeable batteries such as deep cycle lead-acid or lithium batteries can be charged. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** – Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.

10. Fuses (3 pieces of 40A, 32VDC for 1kW, 4 pieces of 40A, 32VDC for 2kW and 6 pieces for 3kW, 1 piece of 200A, 58VDC for 4kW and 5kW) are provided as over-current protection for the battery supply.
11. **GROUNDING INSTRUCTIONS** -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. **NEVER** cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

OPERATION SECTION

INTRODUCTION

This is a multi-function inverter/charger, combining functions of inverter, MPPT solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

TECHNICAL FEATURE

- **Efficient utilization (MPPT control, maximum utilization of solar energy, high-frequency isolation, reduced losses)**
- **Flexible configuration (photovoltaic/mains/oil engine charging options, battery/mains/oil engine power options, lithium battery/lead-acid battery options)**
- **It can work in AC coupling mode (grid connected anti reverse current) and supports non battery load operation**
- **Good user experience (stylish appearance, beautiful appearance, lightweight, easy to install and debug, convenient wiring, clear identification, large screen display)**
- **Ultra wide voltage and frequency input range, suitable for areas with extremely unstable power grids**
- **Support for WIFI mobile app monitoring methods**

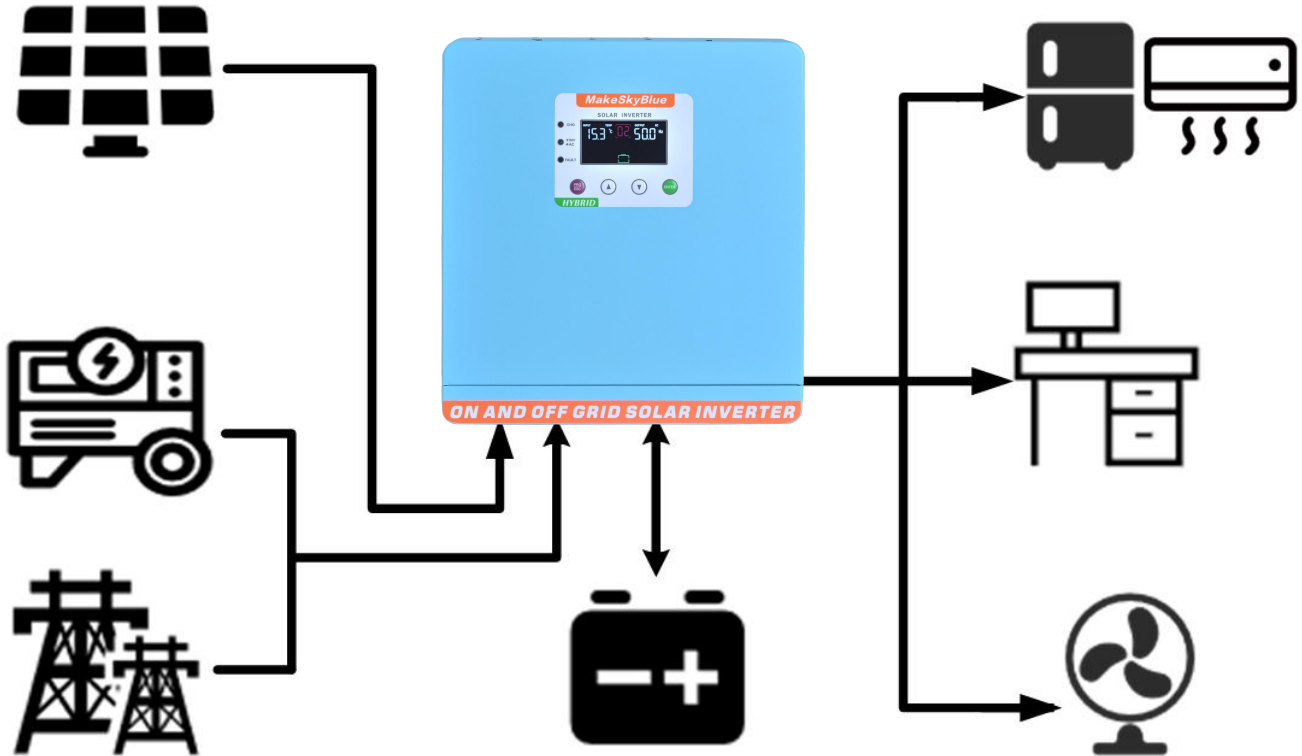
Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also includes following devices to have a complete running system:

- Generator or Utility.
- PV modules (option)

Consult with your system integrator for other possible system architectures depending on your requirements.

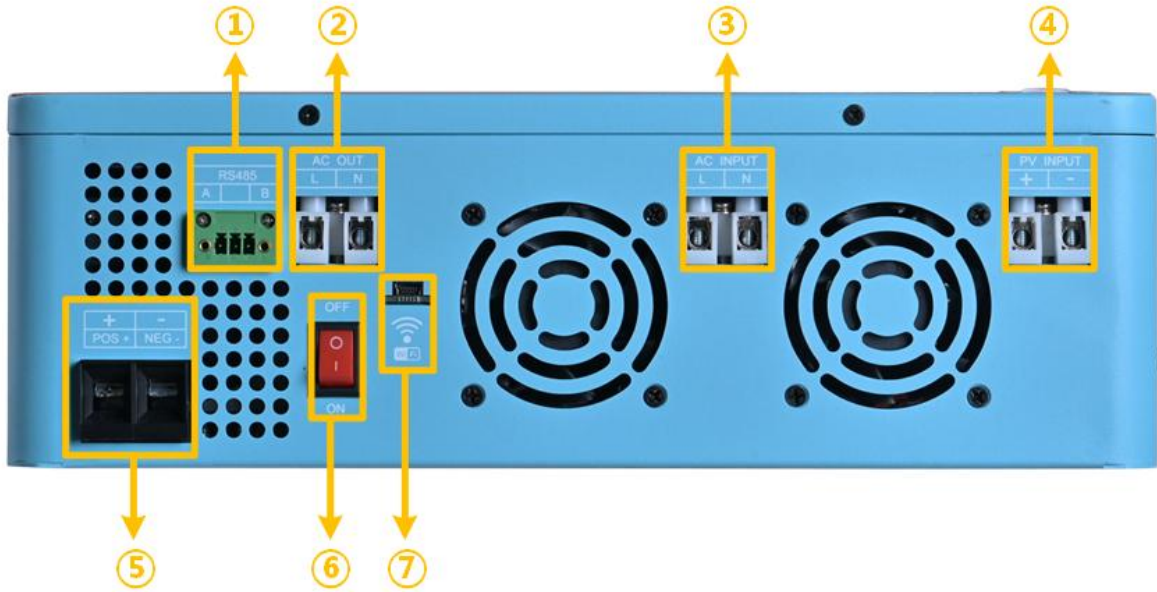
This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner



Hybrid Power System

Product Overview:

At the bottom:



序号	说明
①	RS485接口接电池BMS通信。 注意：A、B不要接反
②	AC输出接口，接家庭负载。
③	AC输入接口，接并网离网控制盒（接电网）。
④	PV输入接口，接太阳能电池板。 注意：“+”、“-”不要反接
⑤	电池接口，接蓄电池。 注意：“+”、“-”不要反接
⑥	机器开关
⑦	WIFI接口，接上WIFI模块后，可通过APP享受远程服务

Right side:



序号	说明
①	BMS接口，接电池BMS通信。
②	COM接口，接其他需要通信的设备（如充电桩）。
③	Backup box接口，接并离网控制盒。
④	PE接口，接地线。

INSTALLATION

Unpacking and Inspection

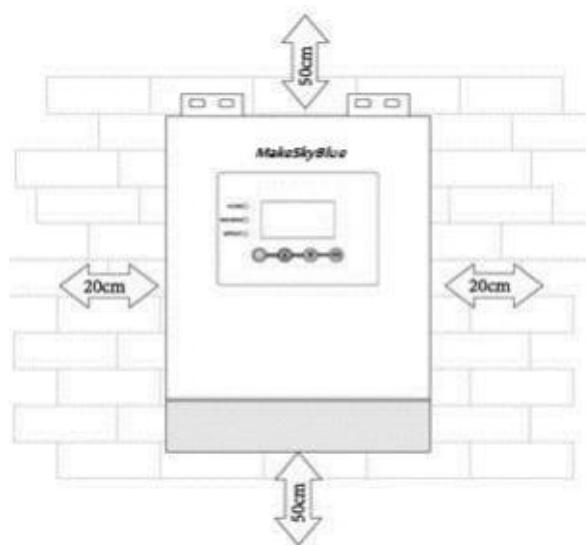
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The unit x 1
- User manual x 1
- Fixed plax 2

Mounting the Unit

Consider the following points before selecting where to install:

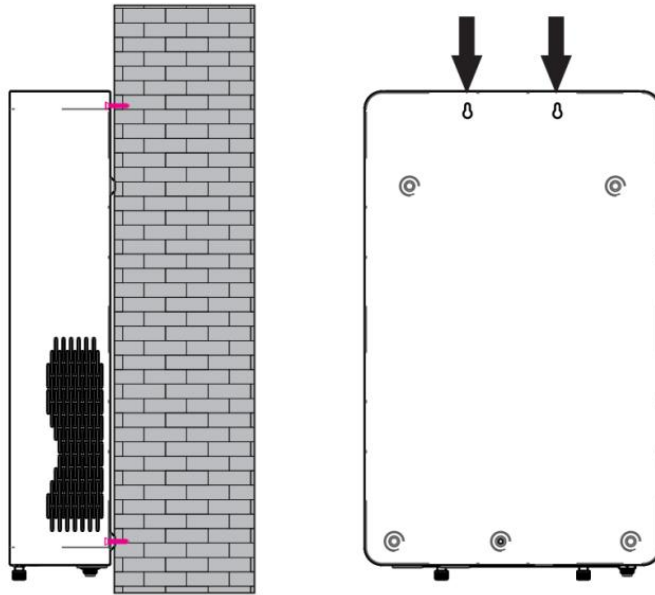
- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.





**SUITABLE FOR MOUNTING ON CONCRETE OR OTHER
NON-COMBUSTIBLE SURFACE ONLY.**

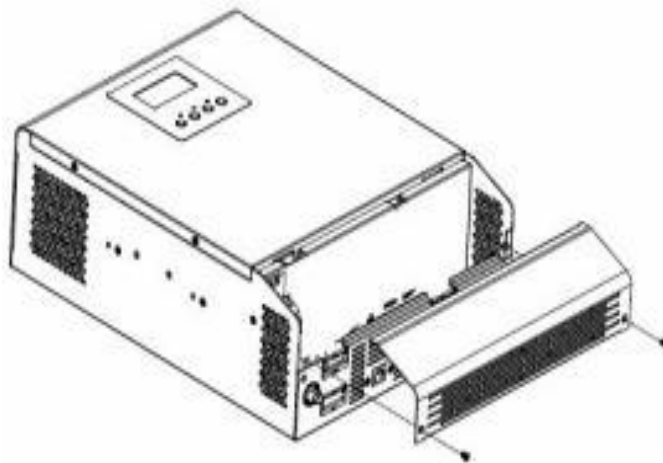
Install the unit by screwing three screws. It's recommended to use M4 or M5 screws.



Connected and Operated

Preparation

Before connecting all wirings, please take off bottom cover by removing two screws as shown below.



AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 10A for 1KVA, 20A for 2KVA, 32A for 3KVA, 40A for 4KVA and 50A for 5KVA.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect input and output connectors.

Battery Connection

CAUTION!! For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (yellow-green) first.

PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.

As shown in the following figure:

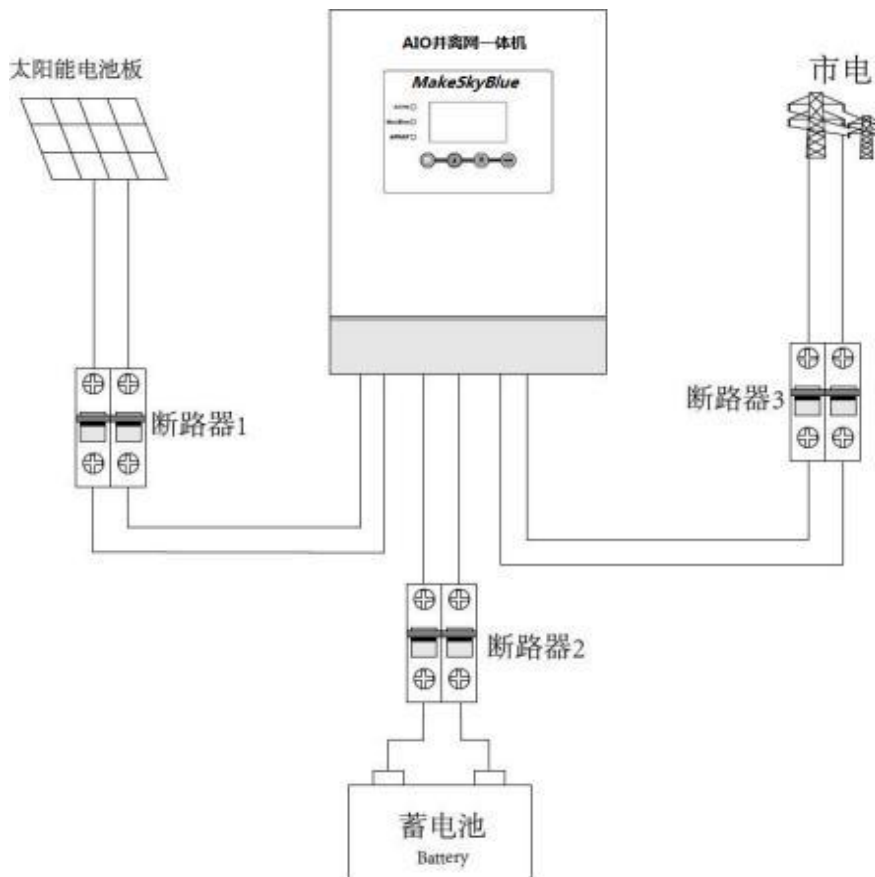
Before selecting a suitable solar module, please refer to the following requirements:

- 1.The open circuit voltage (Voc) of the solar module shall not exceed the maximum open circuit voltage of the inverter (<500VDC).
- 2.The open circuit voltage (Voc) of the solar module should be higher than the minimum input voltage of the inverter PV (>150VDC).

The following is an example of a 380Wp solar panel configuration system.

After considering the above two parameters, the recommended configuration is shown in the table below. For other specifications of components, the number of series and parallel connections is determined based on the open circuit voltage not exceeding 500V and the optimal working voltage of 360V.

Solar panel parameters - 380Wp - Vmp: 40.1Vdc - Imp: 9.49A - Voc:48.82Vdc - Isc: 9.99A	method	Number	output power
	Range (8 boards in series -10 boards in series)		
	8 boards in series	8	3040W@321V
	9 boards in series	9	3420W@361V
	10 boards in series	10	3800W@401V
	8 boards in series and 2 sets in parallel	16	6080W@321V
	9 boards in series and 2 sets in parallel	18	6840W@361V



Utility AC, battery, solar panel input will require the installation of circuit breaker, circuit breaker specifications are as follows:

Breaker1:	PV Input	5KW 16A
		6.6KW 32A
Breaker2:	Battery Input	5KW 120A
		6.6KW 150A
Breaker3:	Grid AC Input	5KW 32A
		6.6KW 45A

Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws.

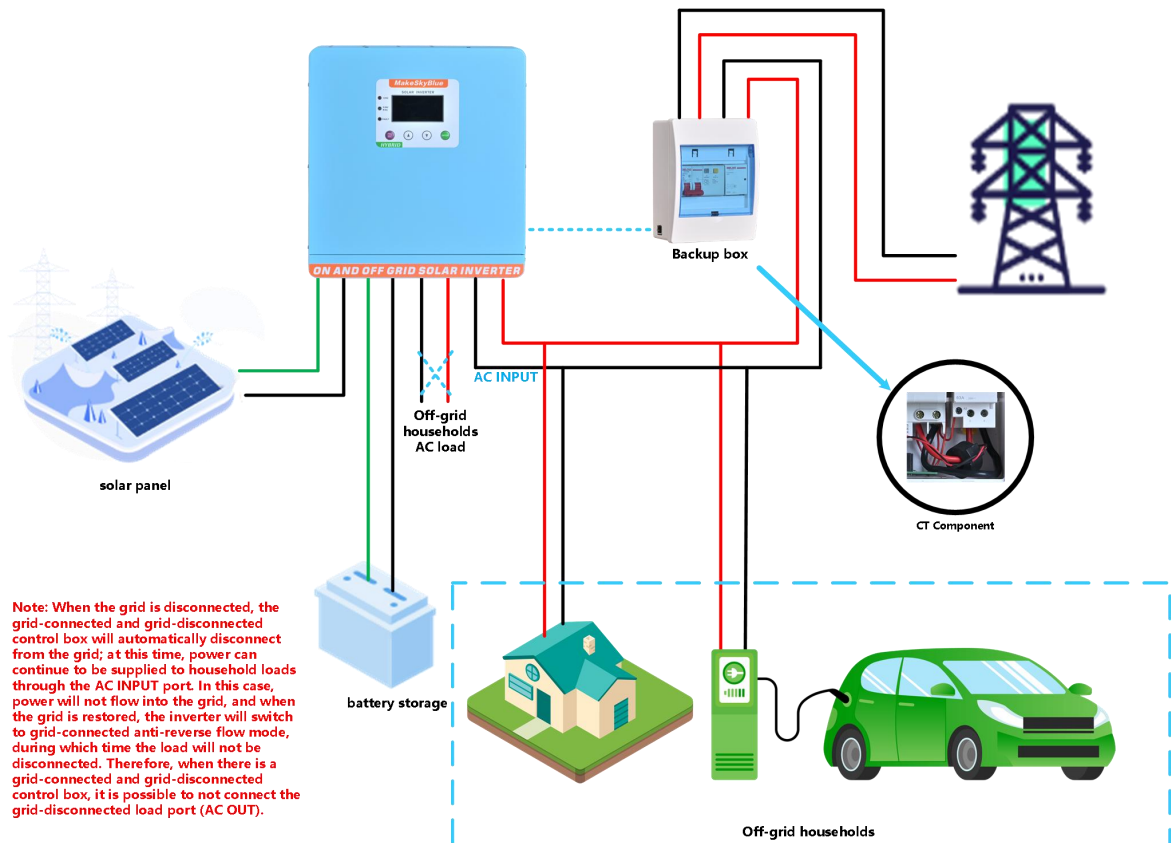
OPERATION

Power ON/OFF



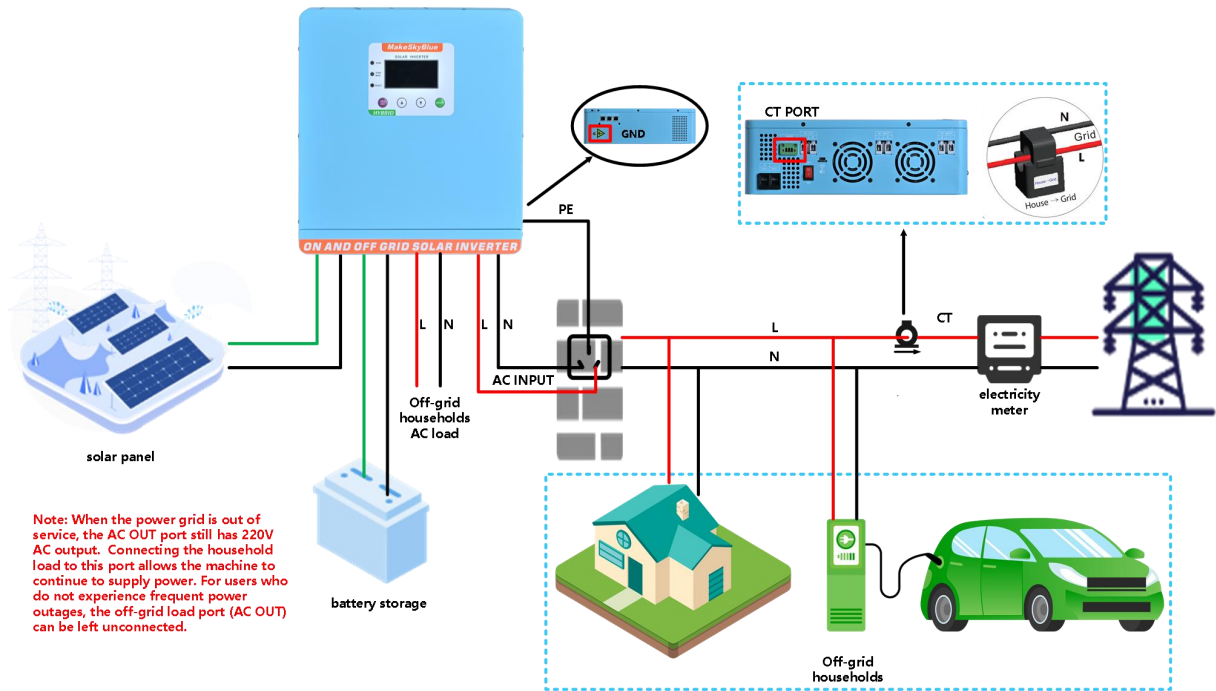
Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

Backup Box Connection:



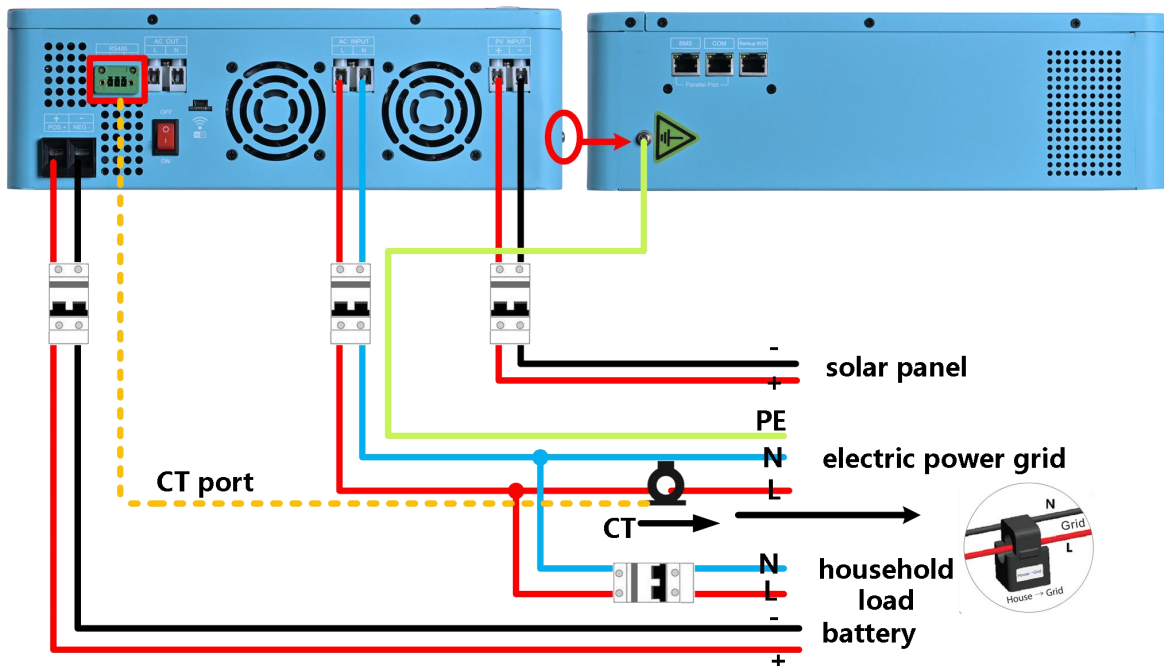
Note: When the grid is disconnected, the grid-connected and grid-disconnected control box will automatically disconnect from the grid; at this time, power can continue to be supplied to household loads through the AC INPUT port. In this case, power will not flow into the grid, and when the grid is restored, the inverter will switch to grid-connected anti-reverse flow mode, during which time the load will not be disconnected. Therefore, when there is a grid-connected and grid-disconnected control box, it is possible to not connect the grid-disconnected load port (AC OUT).

CT Connection:

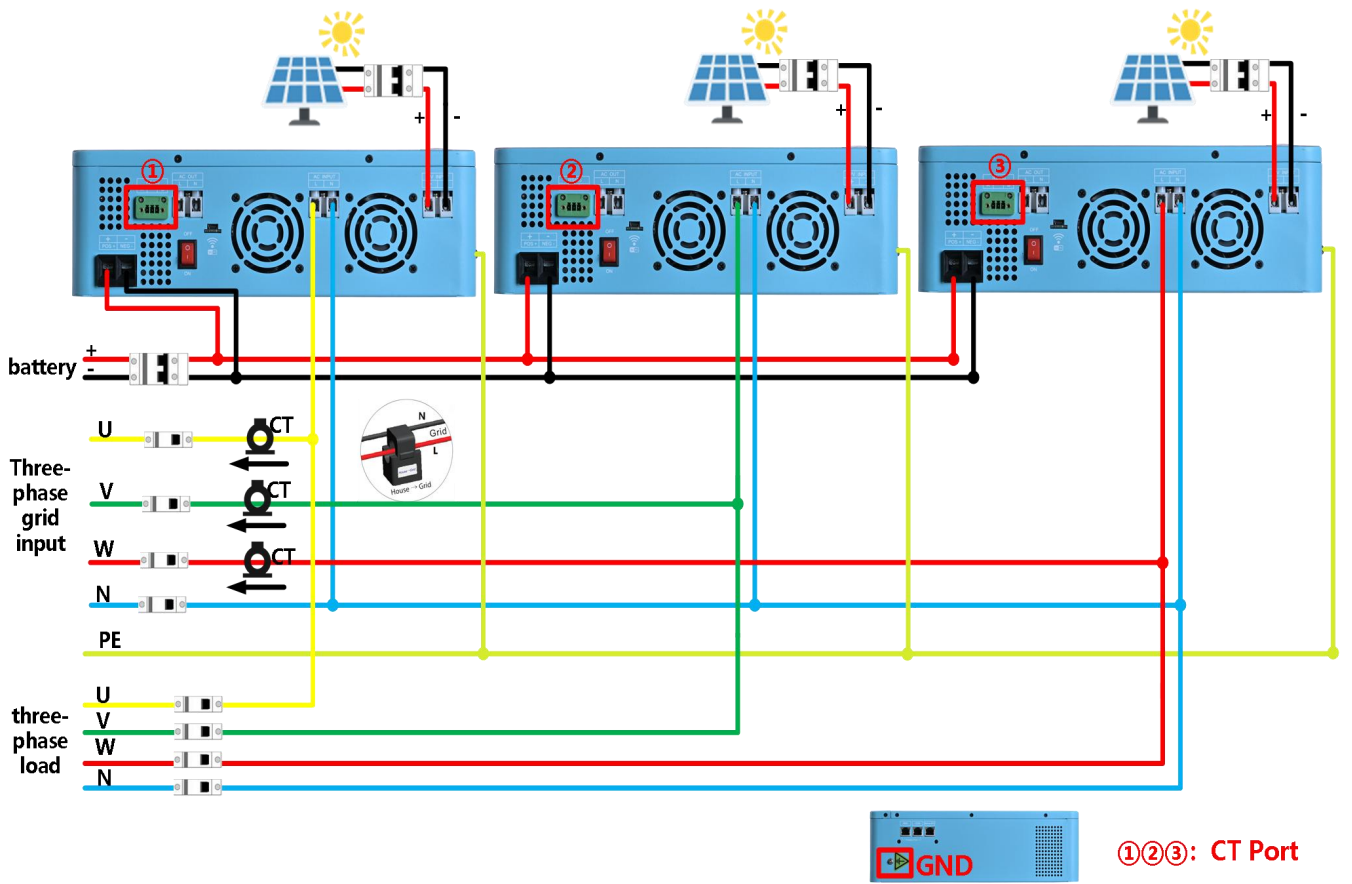


Single-phase CT Connection:

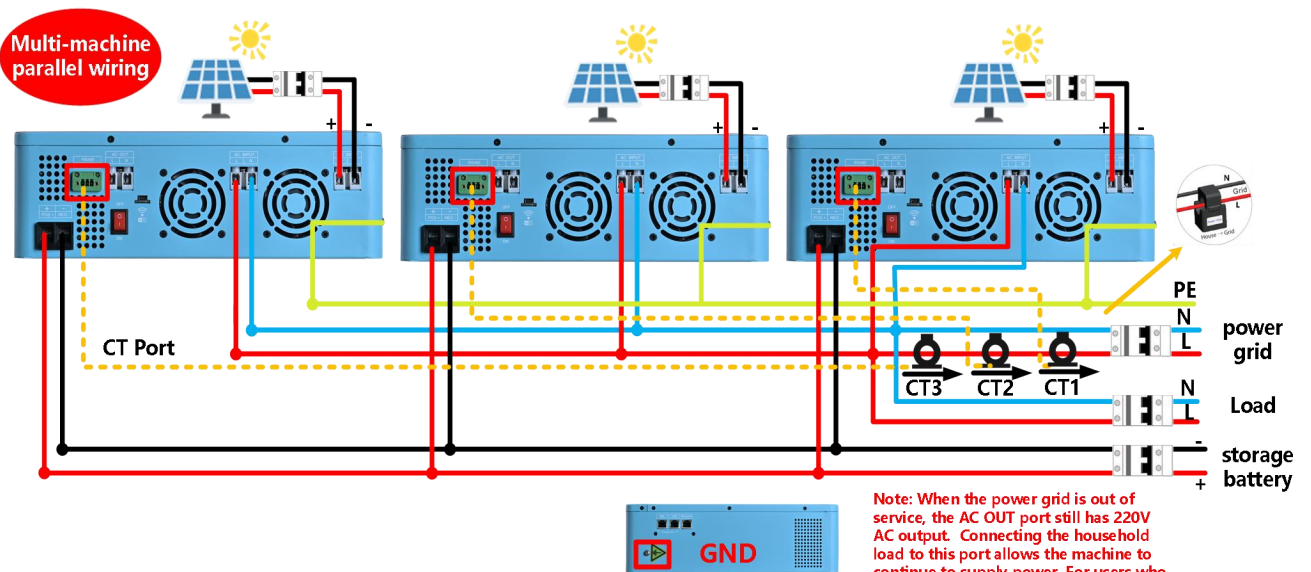
Note: When the power grid is out of service, the AC OUT port still has 220V AC output. Connecting the household load to this port allows the machine to continue to supply power. For users who do not experience frequent power outages, the off-grid load port (AC OUT) can be left unconnected.



three-phase CT Connection:



Multi-machine parallel wiring:






Note: When the power grid is out of service, the AC OUT port still has 220V AC output. Connecting the household load to this port allows the machine to continue to supply power. For users who do not experience frequent power outages, the off-grid load port (AC OUT) can be left unconnected.

Operation and Display Panel



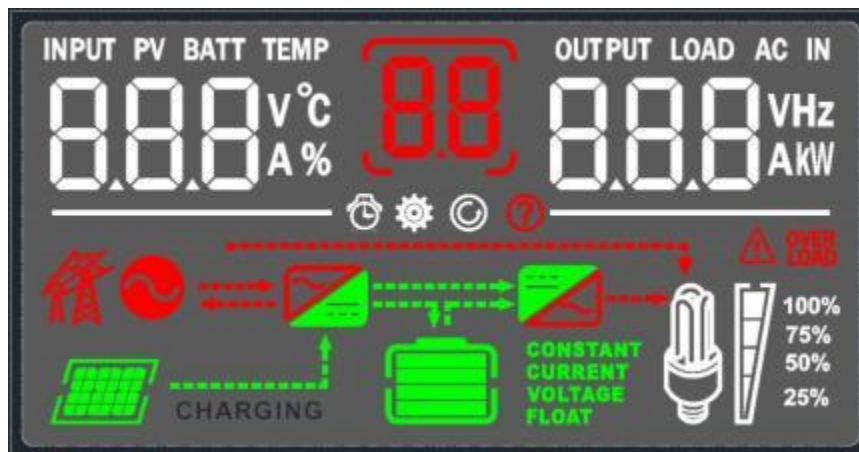
LED Indicator











LED Indicator		Messages	
 CHG	RED	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery.
 FAULT	Yellow	Solid On	Fault occurs in the inverter .
		Flashing	Warning condition occurs in the inverter.

Function Keys

Function Key	Description
PRG/ESC	To enter setting mode or exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode

LCD Display Icons

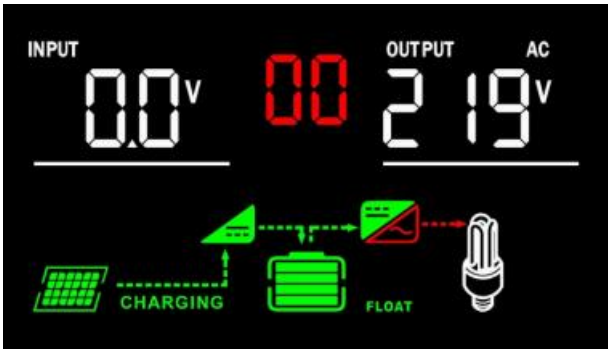




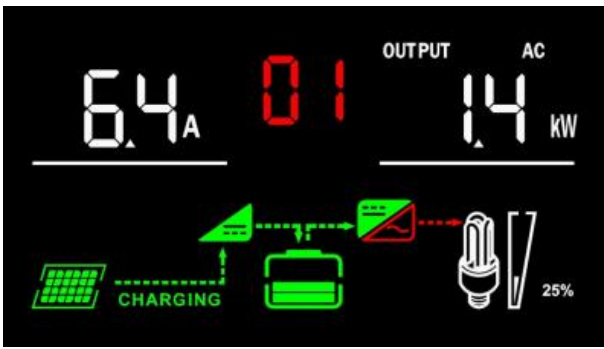




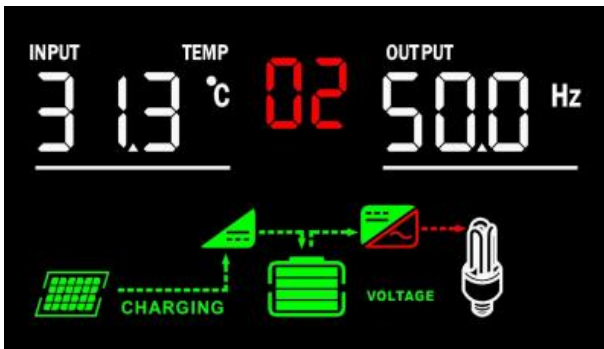






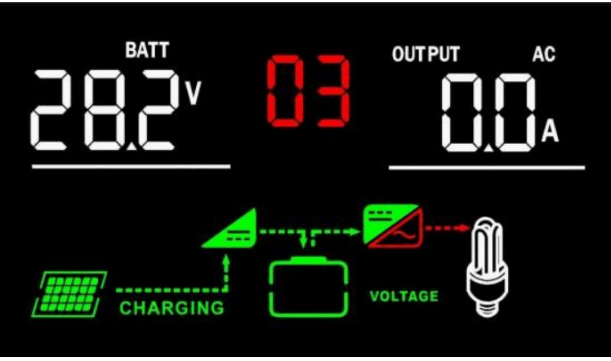




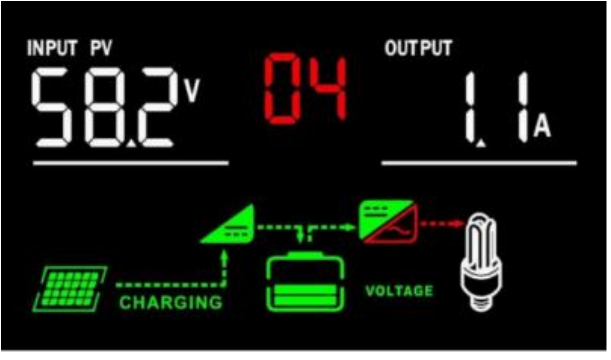




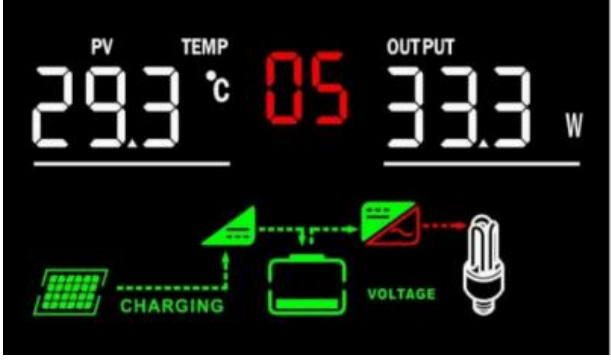




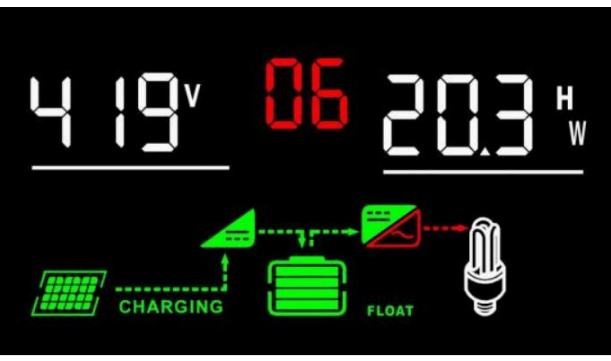




Icon	Function description
Input Source Information	
PV	Indicates the PV input
	Indicates the AC input
	Indicate input voltage, input current, PV voltage, battery voltage and charger current.
Configuration Program and Fault Information	
	Indicates the setting programs Indicates the warning and fault codes
Output Information	
	Indicate output voltage, output frequency, load in Watt .
Battery charging and load identification	
	Battery charging label
Load Information	
	Indicates overload
	Indicates the load
	Indicates unit connects to the PV panel.
	Indicates the utility /MPPT charger circuit is working.
	Indicates the DC/AC inverter circuit is working.

LCD Setting

After pressing and holding PRG button for 1 seconds, the unit will enter setting mode.

Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

Code	Home screen	Icon	Note
0			Represents an input AC voltage of 0V
			00 represents that the current page is page 0
			The AC voltage representing the output of the all-in-one machine is 219V
			The green icon indicates that a photovoltaic MPPT is charging, FLOAT indicates that it is currently in a floating charging state, and the link on the icon indicates that it is currently powered by the battery through inverter
1			The displayed 6.4A represents the current inverter output 6.4A AC current value
			The representative is currently displaying page 1
			1.4kW represents the current output power of 1.4kW for the load
			The CHG red LED light flashes, indicating that charging is currently in progress; The flashing INV green indicator light indicates that the machine is currently supplying power to the load in an inverter manner
2			The current inverter temperature is 31.3 °C
			Represented as currently displaying page 2
			The current output frequency of the inverter is 50Hz
			Indicates that currently responsible for power supply through inverter from batteries




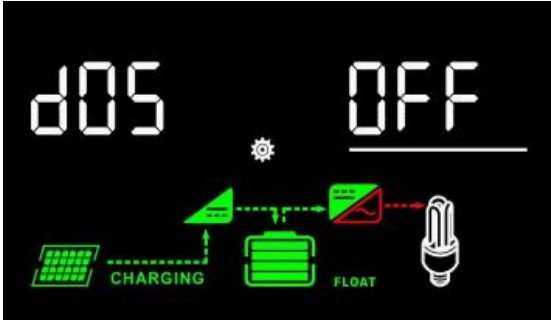
3			The current voltage of the battery is 28.2V
			Represented as currently displaying page 3
			DC current of the battery inside the machine
			The VOLTAGE at the bottom shows that the current charging operation is in the constant voltage equalization stage
4			The current voltage of the solar panel is 58.2V
			04 is currently displayed as page 4
			Representative photovoltaic panel current display value 1.1A
			VOLTAGE shows that the current charging operation is in the constant voltage equalization stage
5			The current working temperature of solar MPPT is 29.3 °C
			05 is currently displayed as page 5
			The current generation power of solar energy is 33.3W
			The VOLTAGE at the bottom shows that the current charging operation is in the constant voltage equalization stage
6			Represents the current high-voltage value of 419V in the inverter
			06 is displayed as the current display page 6
			Represents the cumulative power generation of 20.3WH. If this value exceeds 1KWH, it will automatically display KWH as the unit
			The FLOAT at the bottom shows that the current charging operation is in the floating charging stage

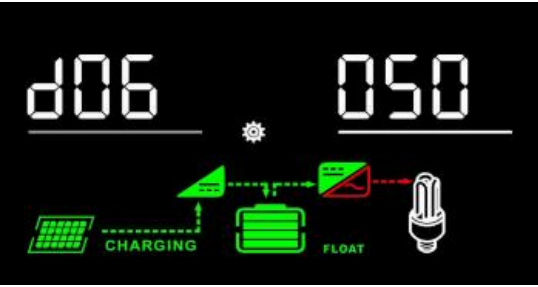
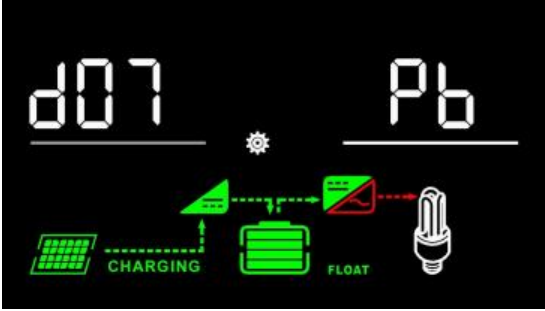

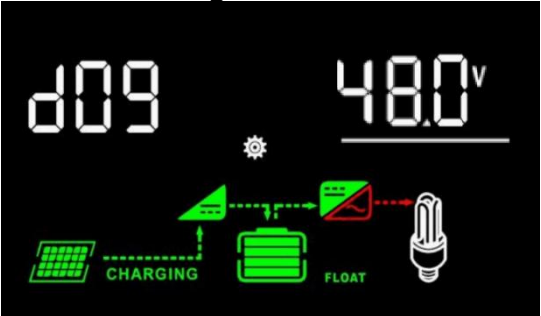
7			Represents the current battery SOC display
			07 is displayed as the current display page 7
			Represents the current battery SOH display
			The FLOAT at the bottom shows that the current charging operation is in the floating charging stage

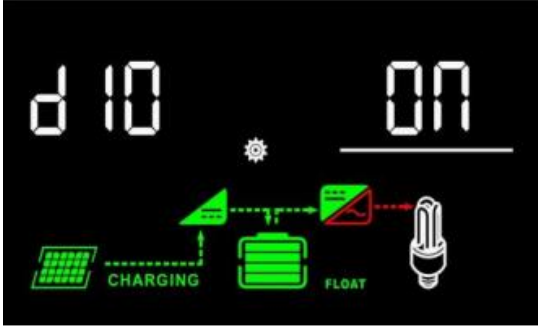
CODE	Setting	Option
d01	<p>Set the working mode of the machine</p>	<p>Working in Solar->Grid->Storage mode: This mode implies that solar power is given priority for discharging, and when solar power is insufficient, the grid supplements it. After a power outage, both the storage and solar power supply the load.</p> <p>When the grid is available: In this mode, 10 minutes after the battery voltage reaches the value set by parameter d12, it enters the discharging mode. If the battery voltage falls below 2V of the value set by parameter d12, it enters the charging mode.</p> <p>When the grid is unavailable: The storage inverter supplies power to the load. When the battery voltage drops below d11, the inverter output is stopped. In situations where there is sufficient photovoltaic power, this mode allows the maximum battery charging voltage to reach the setting parameter d15.</p>
		<p>Working in grid priority mode: In this mode, the solar energy or power grid ensures that the battery is always in a fully charged state. When the power grid loses power, it immediately switches to inverter operation.</p> <p>When there is a power grid present: after the battery voltage reaches the value set by the d15 (cut-off voltage) parameter for 10 minutes, it enters the discharge mode; If the battery voltage is lower than the value set by the d15 parameter by 2V, enter charging mode.</p> <p>When there is no power grid present: the energy storage inverter supplies power to the load. When the battery voltage is below d11, the inverter output stops.</p>

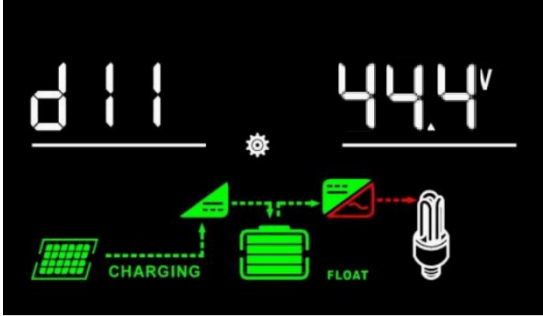
		SBU	<p>Working in solar energy ->energy storage ->grid mode: This mode means that solar energy is preferentially discharged. When solar energy is insufficient, energy storage is supplemented, and when energy storage is insufficient, the grid is supplemented; After the power grid loses power, energy storage and solar energy are used to supply power to the load.</p> <p>When there is a power grid present:</p> <p>① When photovoltaic is present: the battery voltage reaches the value set by parameter d12 for 10 minutes and enters discharge mode; If the battery voltage is lower than the value set by parameter d11, enter charging mode;</p> <p>② When there is no photovoltaic system, if the battery voltage is lower than the value set by the d11 parameter, enter charging mode; After charging to the d15 set value, maintain no discharge and wait until the next photovoltaic operation. This mode relies on the parameter values of d11, d12, and d15 to switch and interact between the power grid and inverter.</p> <p>When there is no power grid present: the energy storage inverter supplies power to the load. When the battery voltage is below d11, the inverter output stops. Under sufficient photovoltaic conditions, changing the mode allows the maximum battery charging voltage to reach the d15 setting parameter.</p>
		ONI	<p>Working in pure inverter priority mode only:</p> <p>After the battery voltage reaches the value set by the d15 parameter for 10 minutes, it enters the discharge mode; If the battery voltage is below d11, enter charging mode.</p>
		NBU	<p>Working in battery-free AC coupling mode:</p> <p>In this mode, the machine can be powered by solar panels and the grid without connecting to the battery. If the solar panel can provide 1kW at this moment and the load requires 2kW, the missing 1kW will be provided by the grid to the load. If the load power becomes 500W at this moment, the grid will not supply power to the load, and the energy source of the load will be entirely supplied by solar energy. At this time, the excess 500W will not flow into the grid, and the grid is in a grid-connected state of anti-reverse flow.</p>

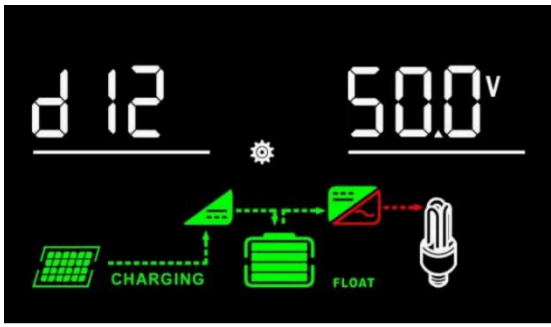
Note: All the above working modes (except UTI mode) will prioritize providing energy to the load once solar energy has energy input. Regardless of the load power, when the power of solar energy far exceeds the load power, it will not flow into the grid and rely on the grid, but will not reverse flow to the grid.

d02	<p>Set the allowable input range of grid voltage for the machine</p> 	WID	Wide voltage range input(90-270VAC)
		NOR	Normal voltage range input(160-240VAC)
d03	<p>Set the AC voltage output by the machine</p> 	110V	This corresponds to machines with 110/120V AC output, which can only be set for machines with 110V/120V specifications that are shipped from the factory
		120V	
		208V	This corresponds to machines with 220/240V AC output, which can only be set for machines with 220V/240V specifications that are shipped from the factory.
		220V	
		230V	
		240V	
<p>Attention: This option cannot forcibly modify machines with 220/240V specifications to 110/120V AC output, as it may cause high temperature rise during machine operation and cause malfunctions!</p>			
d04	<p>Set the AC frequency of the machine output</p> 	Output AC frequency: 50Hz	
		Output AC frequency: 60Hz	
d05	<p>Set the energy-saving mode of the machine</p> 	OFF	Turn off energy-saving mode
		ON	Enable energy-saving mode

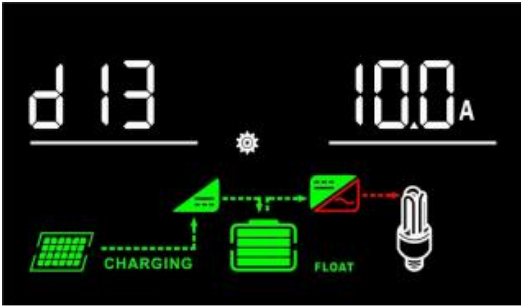
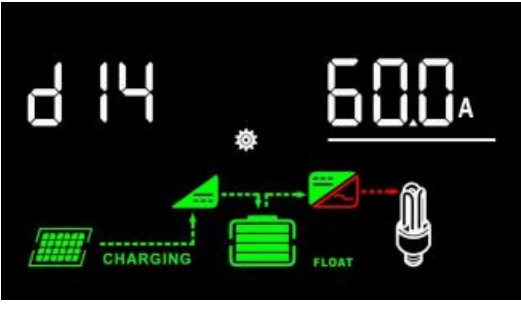
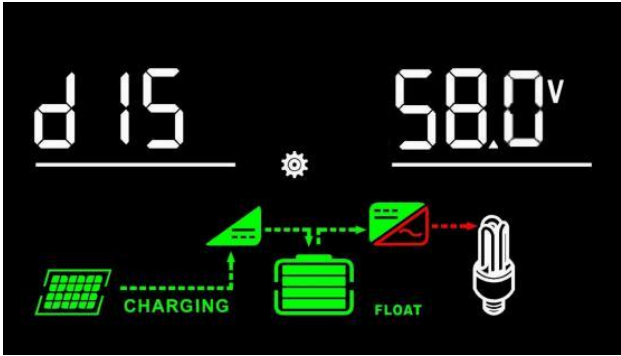
d06	<p>Set the charging priority of the machine</p> 	CS0	Priority solar charging
		CUT	Priority charging for mains electricity
		SNU	Solar energy and power grid charge batteries together
		OS0	Using only solar energy to charge the battery
d07	<p>Set the type of battery that the machine is connected to</p> 	Pb	Working with lead-acid batteries (this setting will activate the float charging mode)
		Li	Working with lithium batteries (this setting will prohibit floating charging mode, and the maximum cut-off voltage of the battery is restricted in parameter d15)
d08	<p>Set the maximum output power of the inverter</p> 		This parameter is bound to the factory and machine specifications, and cannot be modified by the user. It only prompts the user for the current machine specification parameters. Taking the figure as an example: At this time, the maximum output power of the inverter is 4kW
d09	<p>Set the rated voltage of the machine's battery</p> 		This parameter is bound to the factory and machine specifications, and cannot be modified by the user. It only prompts the user for the current machine specification parameters, with the right side representing the rated voltage of the 48V battery.

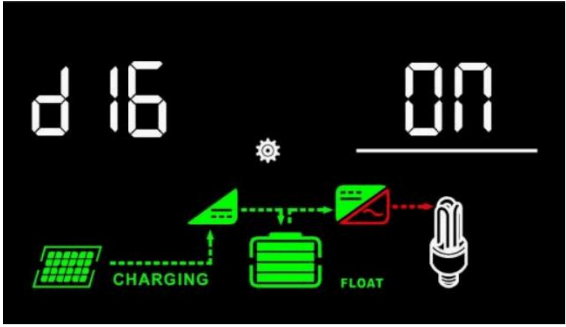
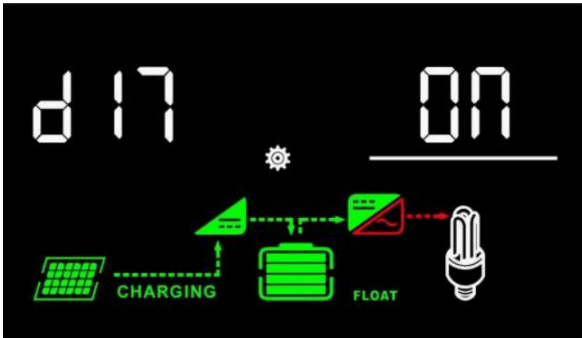

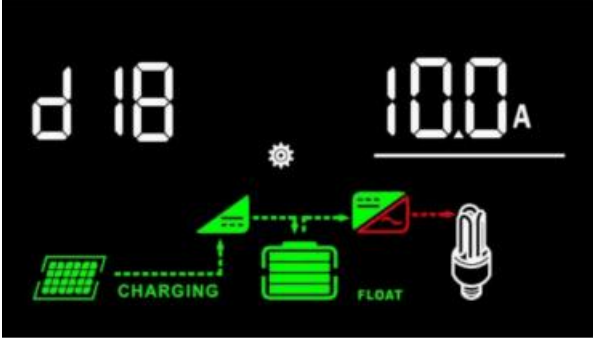

d10	<p style="text-align: center;">Restore factory defaults</p> 	OFF	Do not restore manufacturer default settings
		ON	Restore vendor default settings

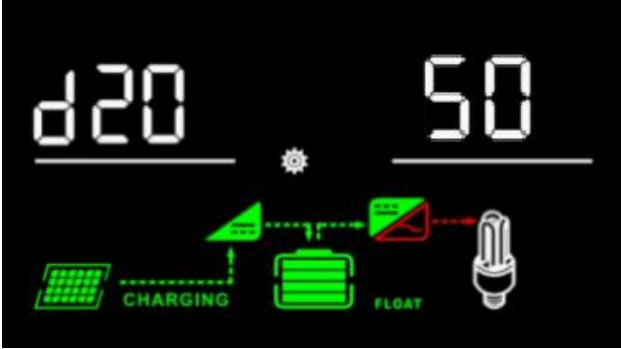

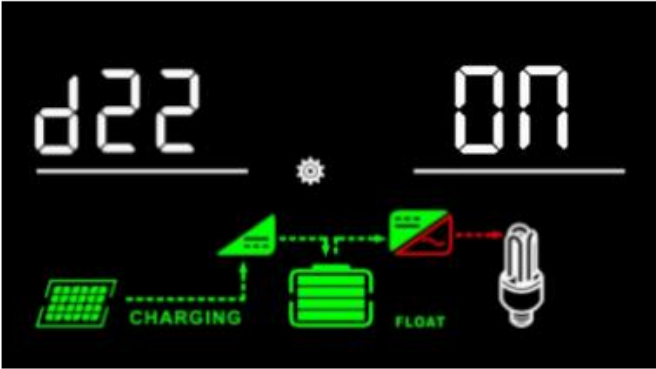

d11	<p style="text-align: center;">Set the minimum battery voltage for the machine</p> 	<p>The significance of this parameter is that, taking the figure as an example, when the inverter is working and the battery voltage is below 44.4V, the machine will automatically switch to the power grid. At this time, the load will be taken over by the power grid, and the inverter will enter a standby state. The battery will no longer release energy to the outside.</p>	
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d12	<p style="text-align: center;">Set the starting discharge voltage of the machine's battery</p> 	<p>The significance of this parameter is that, taking the figure as an example, when the inverter is in standby mode, although the load is supported by the power grid, when the solar MPPT is charged or the mains is charged, and the battery voltage is raised to above 50V, the machine will automatically switch back to the inverter. At this time, the load will be taken over by the inverter, and the battery or solar energy will jointly provide energy to the load. The excess energy of the solar energy will be stored in the battery.</p>	
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Attention:The d11-d12 parameter is associated with the machine priority working mode, and the two working modes "SOL" and "SBU" in parameter setting d01 depend on the d11-d12 parameter value to run!!! In order to prevent users from setting these two parameters incorrectly, the machine will check the user's parameters and must maintain a difference of 4-5V between the two parameters, otherwise it will cause the machine to switch back and forth multiple times between the inverter and the power grid. As we know from the above, the combination of d11-d12 parameters can maximize the battery life and reduce the deep discharge of the battery. However, it fully utilizes the advantages of solar power generation to obtain the optimal state of solar power generation and provide it for loads that require energy. Due to the fact that the battery always maintains a portion of its energy, when the power grid collapses and a power outage occurs, there is still final energy in the battery to maintain the load, achieving the goal of continuous power supply.

<p>d13</p>	<p>Set the charging current value of the machine's power grid to the battery</p> 	<p>Taking the figure as an example, the charging current of the battery from the machine's power grid is 10A (must be less than the machine's rated current)</p>
<p>d14</p>	<p>Set the current value of the machine's solar energy to charge the battery</p> 	<p>Taking the figure as an example, the current value charged by the solar energy to the battery is 60A (must be less than the rated current of the machine)</p>
<p>d15</p>	<p>Set the cut-off voltage value for fully charging the battery</p> 	<p>This is the voltage value at which the battery is fully charged, i.e. the final constant voltage value, and the final constant voltage holding voltage for lithium and lead-acid batteries. When parameter d07 is selected as lead-acid battery, this parameter exists as an average recharge, and the floating recharge will automatically run according to the predetermined 13.8/cycle. (Users can modify the float charging voltage parameters through the mobile app)</p> <p>When parameter d07 is selected as a lithium battery, this parameter exists as the final average charging value, and the battery voltage will ultimately remain constant at this 58V to balance the voltage of each string of cells in the lithium battery.</p> <p>Users can modify this value to adapt to any current battery voltage parameter!</p>

<p>d16</p>	<p>Zero current mode in grid connected state (anti reverse current)</p> 	<p>ON</p>	<p>When the zero current mode is enabled under grid connection, the inverter will output as much power as the load uses. If the load exceeds the output power of the inverter, the difference will be compensated by the grid.</p>
<p>d17</p>	<p>System on/off status</p> 	<p>ON</p>	<p>Currently on</p>
<p>d17</p>	<p>System on/off status</p> 	<p>OFF</p>	<p>Currently off</p>
<p>d18</p>	<p>Inverter maximum current setting</p> 	<p>The maximum output current setting of the inverter is usually set to be lower than the rated current of the machine for the AC side, and must be less than the rated current of the machine. Taking the example of Figure 1, the maximum current output to the load by the inverter is 10A (10AX220V=2200W). This parameter can be used to control the output power of the inverter when the machine is in grid-connected anti-reverse flow mode.</p>	
<p>d19</p>	<p>Charging SOC settings</p> 	<p>Charging SOC setting: When the battery SOC capacity is below the set threshold, the battery begins to charge. Taking the figure as an example: When the SOC is below 40%, the battery begins to charge (with a setting range of 0-90 and a setting value less than the discharge SOC, usually the discharge SOC is reduced by 10)</p>	

d20	<p style="text-align: center;">Discharge SOC setting</p> 	<p>Discharge SOC setting refers to the discharge of the battery when its SOC capacity exceeds the threshold. Taking the figure as an example: When the SOC is above 50%, the battery begins to discharge (setting range 0-100)</p>				
D21	<p style="text-align: center;">Setting up the machine for charging and discharging</p> 	<p>When set to 1, the system enters the charging mode; when set to 2, the system enters the discharging mode (this parameter automatically resets to zero after the charging or discharging process is complete).</p>				
D22	<p style="text-align: center;">Switch setting of remote and off-grid control box</p> 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 15%;">ON</td> <td>Turn on the remote and off-grid control box</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td>Close the remote and off-grid control box</td> </tr> </table>	ON	Turn on the remote and off-grid control box	OFF	Close the remote and off-grid control box
ON	Turn on the remote and off-grid control box					
OFF	Close the remote and off-grid control box					
D23	<p style="text-align: center;">Anti-reverse flow start zero</p> 	<p>Taking the figure as an example, this parameter represents that the inverter will only turn on the anti-reverse flow protection after detecting that the load power exceeds 40W; if it is less than 40W, the anti-reverse flow protection will not be activated, which means that the anti-reverse flow protection only supplements the part of the load power that is greater than 40W. Purpose: To facilitate users in adjusting the zero point of the anti-reverse flow protection, thereby eliminating the deviation power that may be discharged to the grid due to sensor accuracy errors. (20`200W)</p>				

Summary of fault list for the integrated machine of parallel and off grid inverter control:

FaultCode/ Error code	Fault Event	Explanation / Possible cause	What to do
E0	Input voltage undervoltage protection	The input voltage of the power grid is too low	If the power grid needs to choose a wider range, you can set d02 to WID. If the problem cannot be solved after setting d02 to WID, you need to check if the input voltage is too low.
E1	Input voltage overvoltage protection	The input voltage of the power grid is too high	If the power grid needs to choose a wider range, you can set d02 to WID. If the problem cannot be solved after setting d02 to WID, you need to check if the input voltage is too high.
E2	Input overlocking protection	Input voltage exceeds the set frequency range	<p>For a 50Hz system, the input voltage frequency range is 45Hz~55Hz.</p> <p>For a 60Hz system, the input voltage frequency range is 55Hz~65Hz.</p> <p>If the system is greater than 65Hz, an overfrequency fault will be reported, and the power grid frequency needs to be checked.</p>
E3	Input underfrequency protection	Input voltage is less than the set frequency range	<p>For a 50Hz system, the input voltage frequency range is 45Hz~55Hz.</p> <p>For a 60Hz system, the input voltage frequency range is 55Hz~65Hz.</p> <p>If the system is less than 45Hz, an overfrequency fault will be reported, and the power grid frequency needs to be checked.</p>

<p>E4</p>	<p>Grid switching back and forth</p>	<p>Too many times of switching back and forth between the power grid and inverter, which is the most common problem encountered during energy storage work (the root cause is poor battery characteristics)</p>	<p>1: Due to battery reasons, if the battery carries a large load below the d11 parameter, it will automatically switch to the power grid for operation. At this time, if photovoltaic charging continues, the battery voltage will quickly rise, causing it to exceed the d12 parameter again. The machine will switch back to inverter operation from the power grid, causing frequent switching more than 8 times within an hour.</p> <p>2: If the battery performance is relatively poor, such as lead-acid batteries, and it needs to load a large amount of power, it is recommended to use SOL mode, and set the d11 parameter to the lowest and d12 parameter to the highest to reduce the switching frequency.</p> <p>3: Replace with a better performing lithium battery to solve the problem. After the fault code appears, the current state will be locked for one hour, and it will automatically recover. The current state may cause a shutdown.</p> <p>4: The general user may think that the battery is charged, but they do not know that they are seeing a virtual high voltage on the load. At this time, the voltage will sharply drop, causing machine protection. After machine protection, the load will be disconnected, and the battery voltage will quickly rise, causing them to see a false voltage that indicates that the battery is charged. This situation occurs on many lead-acid batteries.</p>
<p>E5</p>	<p>Inverter short circuit</p>	<p>The inverter has a short circuit fault</p>	<p>Please disconnect the link between the load and the inverter, carefully check the short-circuit points on the load, and connect the inverter output to the load through an air switch, which also has a protective effect.</p>
<p>E6</p>	<p>Inverter overload</p>	<p>Inverter has overcurrent/overload fault</p>	<p>1. When the inverter is operating in off grid mode, please check if the load terminal is overloaded and if the load current is too high.</p>

			<p>2. When the inverter is operating in charging mode, please check if the charging current is set too high or if there is a short circuit condition at the battery end.</p> <p>3. When the inverter is operating in grid connection mode, please check if the grid connection current is set too high.</p>
E7	Inverter bus overvoltage	Abnormal mains voltage	Check the external AC input voltage. If the mains voltage is too high, it will cause the machine to malfunction. Please disconnect the connection to the external AC voltage.
E8	PV1 input overvoltage	The working voltage of the solar panel connected to PV1 end is too high	Please check the working voltage of the solar panel, and the recommended open circuit voltage of 400V is the best.
E9	PV2 input overvoltage	The working voltage of the solar panel connected to the PV2 end is too high	Please check the working voltage of the solar panel, and the recommended open circuit voltage of 400V is the best.
EA	PV1 overcurrent protection	PV1 port has overcurrent	Please check the working voltage of the solar panel. The recommended value is 400V open circuit voltage, which is the best. At the same time, check if there is any misconnection or damage at the PV end
EB	PV2 overcurrent protection	PV2 port has overcurrent	Please check the working voltage of the solar panel. The recommended value is 400V open circuit voltage, which is the best. At the same time, check if there is any misconnection or damage at the PV end
EC	Charging overcurrent protection	When charging, the battery current exceeds the machine's rated current	Please check if the battery is damaged and if the battery port is short circuited.
ED	Charging overvoltage protection	Battery terminal voltage too high	Please check if the D15 parameter is set too high or if the battery port voltage is too high.

EE	Battery voltage protection	The battery voltage exceeds the set parameters or the battery is out of charge	<p>1. The battery may have been disconnected from the machine, check the grounding wire, and the lithium battery may have been disconnected from the BMS.</p> <p>2. The battery has been discharged or cannot carry a large load, and needs to be replaced with a battery with better performance.</p>
EF	INV over temperature protection	The machine temperature has exceeded 85 °C	Pay attention to ventilation and heat dissipation. Please use the correct installation method and wait for the machine to self cool and recover.
EG	MPPT1 over temperature protection	The temperature of MPPT1 machine has exceeded 85 °C	Pay attention to ventilation and heat dissipation. Please use the correct installation method and wait for the machine to self cool and recover.
EH	MPPT2 over temperature protection	The temperature of MPPT2 machine has exceeded 85 °C	Pay attention to ventilation and heat dissipation. Please use the correct installation method and wait for the machine to self cool and recover.
EI	BMS malfunction	Battery BMS malfunction	The BMS link has been disconnected, please reconnect.

Attention: Display "99" as normal state

Selection Table of Integrated Machine for Parallel and Off grid Inverter Control:

model	AIO 3K/24V	AIO 3K/48V	AIO 4K/48V	AIO 5KW/48V	AIO 6KW/48V
Photovoltaic side input					
Photovoltaic input voltage range	110-450VDC	110-450VDC	110-450VDC	110-450VDC	110-450VDC
Maximum input voltage	450VDC	450VDC	450VDC	450VDC	450VDC
Maximum input power of photovoltaic system	3000W	3000W	4000W	5000W	6000W
Maximum photovoltaic charging current	100A	100A	100A	100A	100A
storage battery					
pattern	Pb/Li	Pb/Li	Pb/Li	Pb/Li	Pb/Li
Rated input voltage	24VDC	48VDC	48VDC	48VDC	48VDC
Direct cell voltage range	20.4-29.2V(Li), 20-30V(Pb)	46.4-58.8V(Li), 38.4-60V(Pb)	46.4-58.8V(Li), 38.4-60V(Pb)	46.4-58.8V(Li), 38.4-60V(Pb)	46.4-58.8V(Li), 38.4-60V(Pb)
Maximum charging current	100A	130A	130A	130A	130A
Floating impulse voltage	27.6V(Pb),Li batteries are determined by the user	53.5V(Pb),Li batteries are determined by the user	53.5V(Pb),Li batteries are determined by the user	53.5V(Pb),Li batteries are determined by the user	53.5V(Pb),Li batteries are determined by the user
Average charging voltage	28.8V(Pb),Li batteries are determined by the user	56.5V(Pb),Li batteries are determined by the user	56.5V(Pb),Li batteries are determined by the user	56.5V(Pb),Li batteries are determined by the user	56.5V(Pb),Li batteries are determined by the user
equipment protection					
Battery overvoltage protection	possess	possess	possess	possess	possess
overload protection	possess	possess	possess	possess	possess
Short Circuit Protection	possess	possess	possess	possess	possess
Over Temperature Protection	possess	possess	possess	possess	possess
Basic parameters					
Dimensions height/width/depth	380/252/103mm	380/252/103mm	380/252/103mm	350/300/100mm	350/300/100mm
weight	6.3kg	6.3kg	6.8kg	9.5kg	9.7kg

noise	≤48dB	≤48dB	≤48dB	≤48dB	≤48dB
Use temperature range	-20°C~+55°C	-20°C~+55°C	-20°C~+55°C	-20°C~+55°C	-20°C~+55°C
storage temperature	-15°C~+60°C	-15°C~+60°C	-15°C~+65°C	-15°C~+65°C	-15°C~+65°C
Use humidity range	0~90% No condensation	0~90% No condensation	0~90% No condensation	0~90% No condensation	0~90% No condensation
Using altitude	≤6000m	≤6000m	≤6000m	≤6000m	≤6000m
AC side input					
rated voltage	230Vac	230Vac	230Vac	230Vac	230Vac
Voltage range	170-270Vac (UPS) , 90-280Vac(APL)	170-270Vac (UPS) , 90-280Vac(APL)	170-270Vac (UPS) , 90-280Vac(APL)	170-270Vac (UPS) , 90-280Vac(APL)	170-270Vac (UPS) , 90-280Vac(APL)
Maximum input voltage	280VAC	280VAC	280VAC	280VAC	280VAC
Rated input frequency	50Hz/60Hz (self-adaption)	50Hz/60Hz (self-adaption)	50Hz/60Hz (self-adaption)	50Hz/60Hz (self-adaption)	50Hz/60Hz (self-adaption)
Frequency range	40-65Hz	40-65Hz	40-65Hz	40-65Hz	40-65Hz
Conversion range	10ms(UPS) 20ms(APL)	10ms(UPS) 20ms(APL)	10ms(UPS) 20ms(APL)	10ms(UPS) 20ms(APL)	10ms(UPS) 20ms(APL)
Maximum AC charging current	60A	60A	60A	60A	60A
Inverter output parameters					
rated output capacity	3KW	3KW	4KW	5KW	6.6KW
rated output voltage	230VAC/208VAC/ 240VAC	230VAC/208VAC/ 240VAC	230VAC/208VAC/ 240VAC	230VAC/208VAC/ 240VAC	230VAC/208VAC/ 240VAC
Voltage accuracy	±5%	±5%	±5%	±5%	±5%
Rated output frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
frequency accuracy	±2%	±2%	±2%	±2%	±2%
Output waveform distortion rate (THD)	≤3% (100%Linear Load)	≤3% (100%Linear Load)	≤3% (100%Linear Load)	≤3% (100%Linear Load)	≤3% (100%Linear Load)
Power factor	1.0	1.0	1.0	1.0	1.0
Maximum efficiency	95.5% (PV360V@1/2load)	95.5% (PV360V@1/2load)	95.1% (PV360V@1/2load)	97.5% (PV360V@1/2load)	97.5% (PV360V@1/2load)
Mixed network output overload current	20A	20A	20A	50A	50A
Off grid carrying capacity	110%<load<150% (±10%): 10s after Alarm shutdown; 150%<load<200% (±10%): 5s after Alarm shutdown; 200%<load (±10%): Immediate alarm shutdown;	110%<load<150% (±10%): 10s after Alarm shutdown; 150%<load<200% (±10%): 5s after Alarm shutdown; 200%<load (±10%): Immediate alarm shutdown;	110%<load<150% (±10%): 10s after Alarm shutdown; 150%<load<200% (±10%): 5s after Alarm shutdown; 200%<load (±10%): Immediate alarm shutdown;	110%<load<150% (±10%): 10s after Alarm shutdown; 150%<load<200% (±10%): 5s after Alarm shutdown; 200%<load (±10%): Immediate alarm shutdown;	110%<load<150% (±10%): 10s after Alarm shutdown; 150%<load<200% (±10%): 5s after Alarm shutdown; 200%<load (±10%): Immediate alarm shutdown;