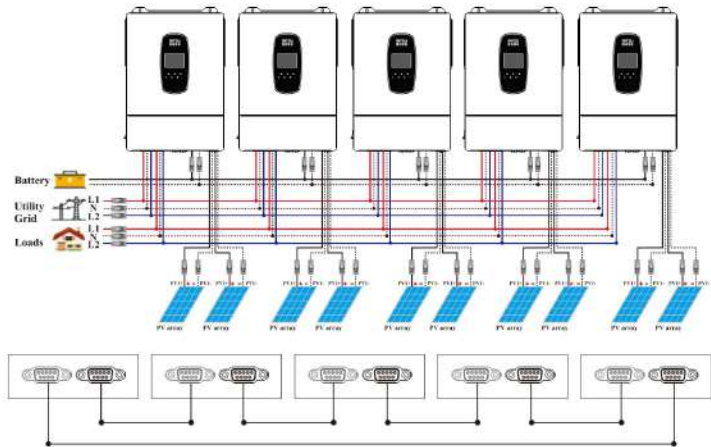
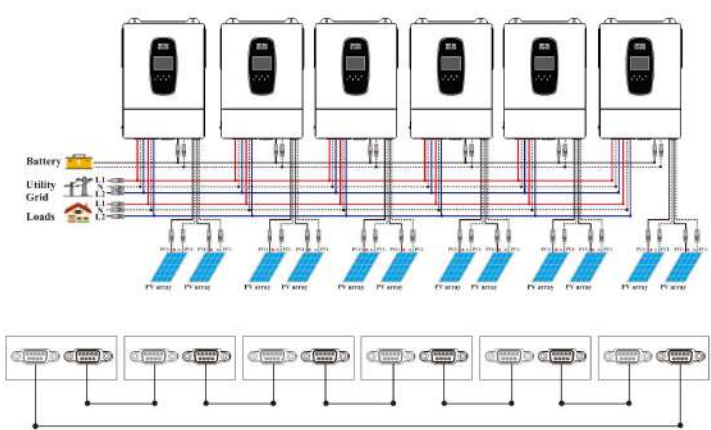


d. Five inverters parallel system connection:

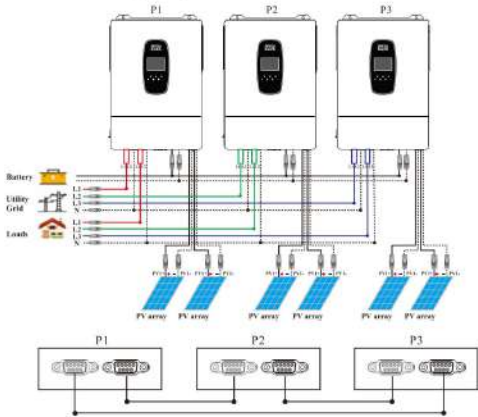


e. Six inverters parallel system connection:

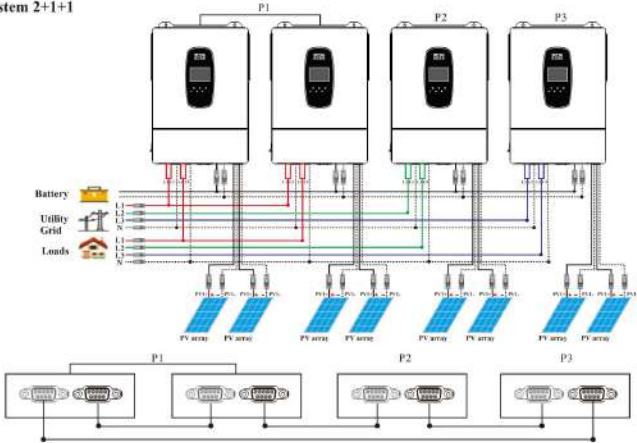


11.6 Three-Phase Parallel Wiring Guide Diagram
Configure P1 unit [31] to “3P1.” Configure P2 unit [31] to “3P2.” Configure P3 unit [31] to “3P3.”
Parameter [68] remains fixed at “0” (not adjustable). The phase difference between P1–P2, P1–P3, and P2–P3 equals 120°. When Parameter [38] is set to 120Vac: The line voltage L1–L2, L1–L3, and L2–L3 equals $120 \times 1.732 = 208\text{Vac}$.

a. Three inverters combined into three phase system:
system 1+1+1



b. Four inverters combined into three phase system:
system 2+1+1





US-Split-Phase Hybrid Solar Inverter



User Manual

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Warning

**This is A class inverter. It might cause slightly radio interference in daily life.
And practical measure is required to take under this condition.**

Preface

Thank you for the purchase of Split-Phase hybrid solar inverter (Hereinafter referred to as inverter). Please read this manual carefully before installing and using the inverter!

Copyright

We have been devoted to technological innovation and aims to meet the demands of its customers with better product and services. And product design and specification would be updated without prior notice. Please in kind prevail.

Safety instructions

1.1: How to use this manual

This manual contains important information, guidelines, operation and maintenance of the product users must follow the contents of this manual.

Meaning of symbols in the manual:

Symbol	Description
 DANGER	DANGER indicates a hazardous situation happen, if not be voided, will result in death or serious injury
 WARNING	WARNING indicates a hazardous situation happen, if not be avoided, could result in death or serious injury
 CAUTION	CAUTION indicates a hazardous situation happen, if not be avoided, may result in minor or moderate injury
 NOTICE	NOTICE provides some tips on operation of products

1.2: Safety instructions:

This chapter contains important safety instructions. Please read and save this manual for future reference.

- Be sure to comply with local requirements and regulations when installing this inverter.
- Beware of high voltage. Before and during installation, please turn off the switch of each power source to avoid electric shock.
- In order to achieve optimal operation of this inverter, please select appropriate cable sizes and necessary protection devices in accordance with regulations.
- Do not connect or disconnect any connections while the inverter is working.
- Do not open the terminal cover when the inverter is working.
- Make sure the inverter is well grounded.
- Do not short-circuit the AC output and DC input.
- Do not disassemble the machine. For all repairs and maintenance, please send it to a professional repair center.
- Never charge a frozen battery.

Overview

Please read the product manual carefully before installation, operation and maintenance. This manual contains important safety instructions and installation instructions. The contents of the instructions must be followed during equipment installation and maintenance.

Who should read this manual

This manual is intended for professional electrical technicians responsible for the installation and commissioning of inverters in photovoltaic power generation systems.

Symbols used in this manual

In order to ensure the personal and property safety of users when using solar inverters, as well as efficient use of this product, the manual provides relevant safe operation information and uses corresponding symbols to highlight it. This emphasized information must be fully understood and absolutely adhered to to avoid personal injury and property damage. The symbols used in this manual are listed below.

	"DANGER" indicates a highly potential hazard that, if not be avoided, will result in personal injury or death.
	"WARNING" indicates a moderately potentially hazardous hazard happened, if not be avoided, will result in personal injury or death.
	"CAUTION" indicates a mild potential hazard that, if not be avoided, will result in moderate or minor personal injury.
	"NOTE" indicates a mild potential hazard that, if not be avoided, may result in moderate or minor personal injury.
	"TIPS" are additional information in the manual, which emphasize and supplement the content. They may also provide tips or tricks for optimizing the use of the product, which can help you solve a certain problem or save time.

1. Installation Instructions

1-1: Open-package inspection

After opening the package, please check random accessories, including user manual (contains conformity certificate and warranty card) and accessories for optional functions. And check whether the inverter is still kept well after transportation, if find any broken or component missing, do not turn on the machine, feedback to the carrier and distributor.

Note:

- Please keep the packing box and packing material, can be used for next delivery if needed.
- This series of product is very heavy (check appendix as reference), please handle with care when carrying.

1-2: Installation notice

- 1) Install in an area of well ventilated, free of water, burning gas and corrosive.
- 2) The installation method of the machine is wall-mounted, and the air inlet of the fan and the air outlet on the side and top of the box should be kept unobstructed.
- 3) Around environment temperature should remain 0~40 centigrade.
- 4) If disassembling and operate under low temperature environment, may happen water condense, only can work till thorough dry of machine inside and outside, otherwise will be shock risk.
- 5) If the machine is placed for a long time, it should be confirmed that the machine is completely dry and no corrosion can be installed and used.

1-3: Installation steps

1) Environmental requirements

Open the package and place the inverter in a reasonable working environment. Refer to the "Installation Precautions" for specific requirements.

2) Wire diameter selection

Use a cable with a suitable wire diameter, which can not be lower than the national safety standard. The general wire diameter is selected according to the current density of not more than 5A/mm², and the length of the connecting wire is minimized to reduce the loss.

3) Connect the battery

Determine the appropriate number of battery cells according to the rated battery voltage of the inverter. Connect the battery cable to a circuit breaker that meets the breaking capacity, and then connect it to the BATTERY terminal of the inverter. Note that the positive and negative poles cannot be reversed. Otherwise, the product may be damaged.

4) Connect load

First turn off all loads, connect the AC load to the AC output of the inverter, and ensure that the load power is lower than the rated power of the inverter when the inverter

5) Connect PV

Connect the PV cable to the circuit breaker that meets the breaking capacity first, and then connect it to the PV input end of the inverter. The open circuit voltage/short-circuit current of the PV array should be lower than the maximum PV input voltage/current of the inverter. Note that its positive and negative poles cannot be reversed.

6) Connect mains power

Connect the mains power input cable to the circuit breaker that meets the breaking capacity first, and then connect it to the AC input end of the inverter. Note that its phase and polarity should not be reversed.

7) Selection of circuit breaker

a. The circuit breaker at the battery end shall be a DC circuit breaker, and the working voltage of the circuit breaker shall be greater than the rated voltage of the battery; The circuit breaker at the PV input end shall be a DC circuit breaker whose working voltage shall be greater than the voltage of the PV array. The circuit breaker at the AC input end shall be an AC circuit breaker whose working voltage shall be greater than the rated voltage of the mains supply.

b. The rated current of the circuit breaker should be about 1.5 times of the maximum current when the inverter is working.

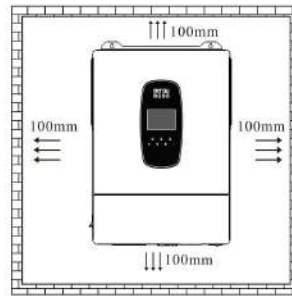
Note:

- Before connecting the load to the machine, please turn to the loads firstly.
- This product can only protect high-voltage surges with low energy. In areas with high lighting output, it is recommended to install lightning protection devices outside the mains input terminals and PV input terminals.
- To ensure the personal safety of the user and ensure the correct use of the product, please confirm that it is properly grounded before starting the machine.
- If user want to load an inductive load such as a motor or a laser printer which operating power is too large, the inverter rated capacity should be selected according to its peak power. The load starting power is generally 2 to 3 times of its rated power.

1-4: Placement:

Please leave 100mm of space for each side of inverter to keep good air circulation.

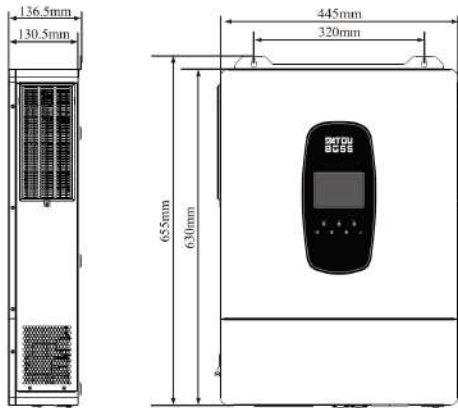
(Only suitable for installation on concrete or other non-combustible surfaces with objects with appropriate load-bearing capacity, and ensure that the inverter is placed vertically. A suitable place for installing electrical equipment should be selected to ensure sufficient fire escape space for repairs in the event of a failure. Maintain Proper ventilation conditions to ensure sufficient air circulation required for cooling, air humidity < 90% during assembly.)



- ★ Avoid direct sunlight
- ★ Avoid dust
- ★ Avoid moisture and liquids
- ★ Avoid over heating

1-5 Installation size & Wall mounted installation

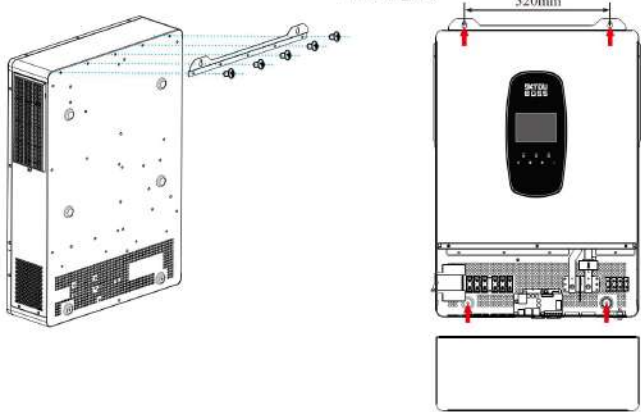
1) Installation size



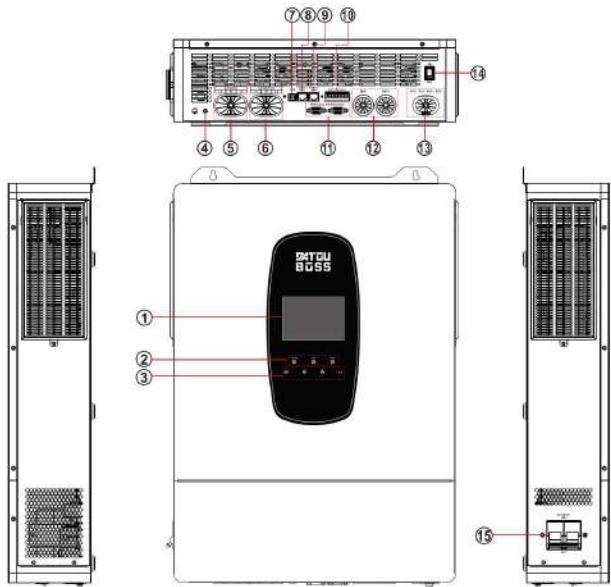
2) Wall mounting

a. Fix the wall mount on the machine with M4x6 screws (the wall mount and screws are shipped randomly)

b. Firstly, install the inverter by tightening two M6 screws on the top of the machine. Then, remove the wiring cover at the bottom of the machine and fix it with two M4 screws at the position shown in the diagram (it is recommended to use expansion screws, which need to be purchased by the user themselves, and the installation hole distance is shown in the diagram)



2. Outlook/Overview of Inverter



1. LCD display	2. LED display	3. Function button
4. Earth	5. AC input (on-grid) terminal(L1/N/L2)	
6. AC output (backup output/uninterrupted output) wiring terminal port(L1/N/L2)		
7. USB communication interface (External communication)		
8. RS485-1 communication interface(External communication/WIFI)		
9. RS485-2 communication interface (BMS communication)		
10. Dry Connect	11. Parallel communication port	
12. Battery terminal port	13. PV input terminal port	
14. Power on/off switch	15. AC input circuit breaker	

Notice:
* Please see the appendix below for the interface definition.
* The pictures may be different from the real products, please refer to the real product!

3. Wiring instructions

Electrical connection precautions

When inverter connect with electrical, observe all current national regulations regarding the prevention of electrical accidents and that, if not be avoided, will result in personal injury or death.

 DANGER	- Always cover the PV panels with light-tight material or disconnect the DC side circuit breaker before making electrical connections. - When exposed to sunlight, photovoltaic arrays will generate dangerous voltages. - When install the battery, please confirm the positive and negative poles of the battery are connected in right way and break the battery connection.
 WARNING	- All installation operations must be performed only by professional electrical engineers. - Must undergo training. - Read this manual completely and understand the relevant safety matters.

Operation precautions

 DANGER	- Touching the terminals of the mains or equipment may result in death by electric shock or a fire! - Do not touch terminals or conductors connected to the mains circuit. - Pay attention to any instructions or safety documentation regarding grid connection.
 NOTE	Some internal components will become hot during operation, please wear protective gloves.

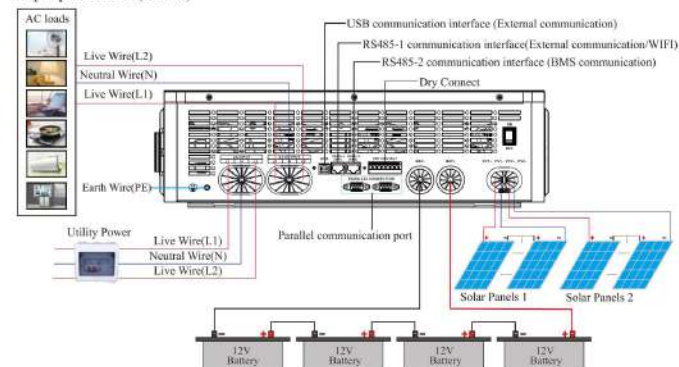
Maintenance and repair precautions

 DANGER	- Before carrying out any maintenance work, first disconnect the inverter from the electrical grid and then disconnect the DC side electrical connection. - Wait at least 5 minutes until the internal components are discharged before proceeding with maintenance work.
 NOTE	- Any fault that affects the safety performance of the inverter must be eliminated before the inverter can be turned on again. If any maintenance work is required, please contact our maintenance center. - Do not disassemble or assemble the internal components of the inverter without authorization. Our company will not be responsible for the warranty and joint liability for the resulting losses.

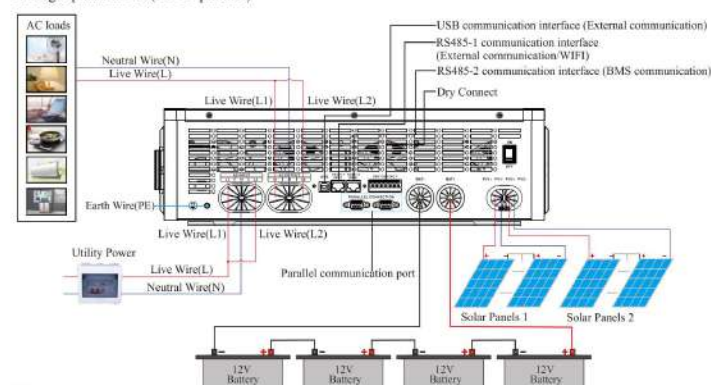
Wiring

(Note: Please see the technical parameter table for specific battery voltage, AC voltage and solar panel parameters. This picture is only a wiring diagram.)

a. Split phase mode (default)



b. Single phase mode (L1-L2 parallel)

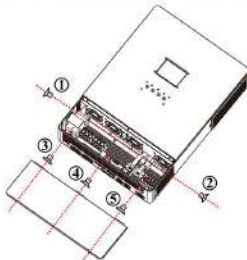


Note:

- When connecting the battery and photovoltaic, pay attention to the positive and negative poles of the cable, and do not connect them reversely;
- If connecting a generator, please start the generator first, and then connect to the inverter mains input after it runs stably. If to the output end of the generator, then start the inverter, and finally connect to the user equipment after the inverter becomes normal;
- It is recommended that the generator capacity is $\geq$ three times the inverter rated capacity.

Prepare:

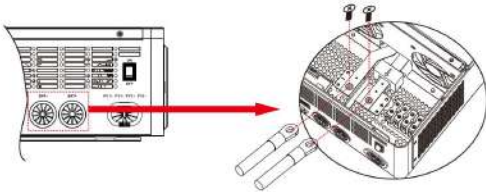
Before wiring, please remove the 5 screws on the bottom cover and move the cover away, as shown in the figure below



1) Battery input connections

Please follow the steps below to complete the battery connection

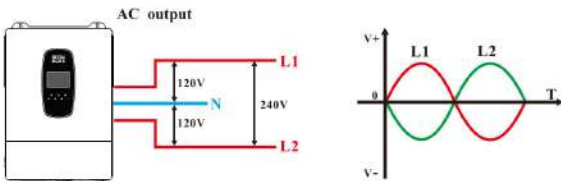
- Assemble the battery ring terminals and wiring according to the recommended battery wire diameter and terminal specifications.
- Whether the positive and negative poles of the connecting cable connecting the battery assembly and the battery input connector are correct. First unscrew the screws at the battery terminal port, insert the assembled battery wiring ring terminal flatly into the battery port of the inverter, and then tighten the screws.
- Confirm that the wiring polarity is correct and the ring terminal is locked with the battery terminal of the inverter. Make sure there is no short circuit between the positive and negative electrodes.



2) AC input /AC output connection

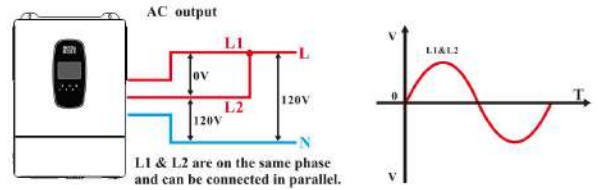
Select the appropriate connection method based on the AC phase configuration.

• Split-Phase Mode (Default)



Item	Description
Applicable	Inverter settings items 68 = 180
AC phase voltage (L1-N/L2-N)	100~120Vac, default 120Vac
AC Line Voltage (L1-L2)	200~240Vac, default 240Vac

• Single-Phase mode



Item	Description
Applicable	Inverter settings items 68 = 0
AC phase voltage (L1-N/L2-N)	100~120Vac, 120Vac by default

! Attention:

Users can change the output phase mode and output voltage through the setting menu. Refer to the operations manual for details.

Output Phase Mode: Controlled by Parameter 68.

- Setting 180 → Split-phase mode
- Setting 0 → North American single-phase mode

Output Voltage: Controlled by Parameter 38, adjustable within 100~120Vac.

AC input/Output wiring diagram

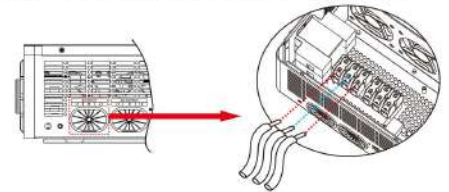
AC Phase Mode	Wiring Diagram
Split-Phase Mode	
Single-Phase Mode	

Attention! The terminal blocks are marked "INPUT" and "OUTPUT", please do not connect the input and output terminals incorrectly

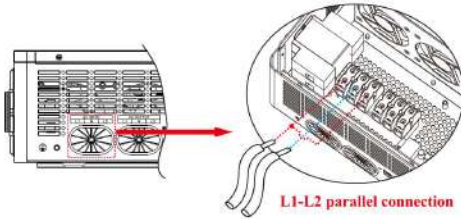
Please follow the steps below to connect the AC input/AC output cables:

- Before connecting the AC input and output, make sure the battery circuit breaker is disconnected.
- Peel off the insulation of the five wires by approximately 10mm.
- According to the polarity markings on the terminal block of the AC input end (INPUT), insert the AC cable into the terminal block and tighten the terminal block screws. Please connect the ground wire (PE) first

Split phase input wiring method



Single phase input wiring method

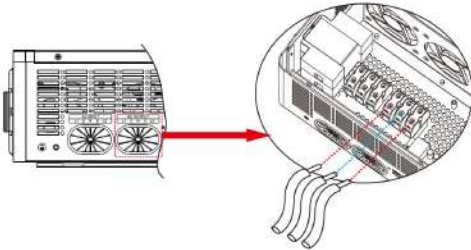


WARNING:

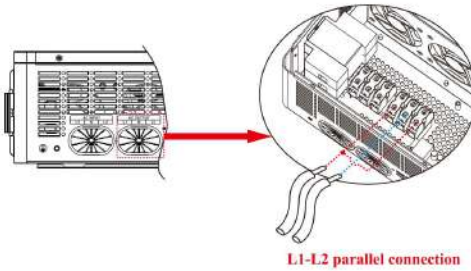
Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

- According to the polarity markings on the AC output terminal (OUTPUT) terminal block, insert the AC cable into the terminal block and tighten the terminal block screws.

Split phase output wiring method



Single phase output wiring method



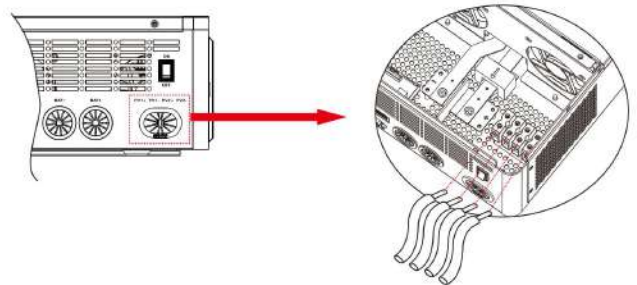
Notice! Important matters

Please ensure that the AC input and output cables are connected correctly in the neutral sequence

3)PV input connection (the model has 2 MPPT inputs, please ensure that the PV arrays connected to PV1/PV2 are 2 independent channels)

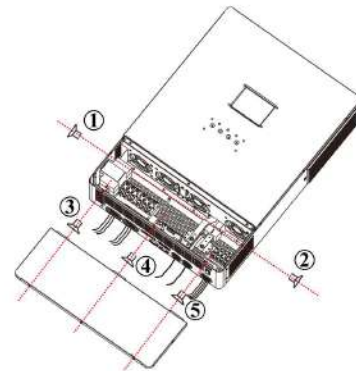
Please follow the steps below to connect the solar module input:

- Peel off the insulation of the positive and negative wires by about 10mm.
- Check whether the positive and negative poles of the connecting cable connecting the solar module to the solar input connector are correct. After that, connect the positive pole (+) of the connecting cable to the (PV+ terminal block) on the inverter. Connect the negative pole (-) of the connecting cable to the (PV-terminal block) on the inverter
- Confirm that the wiring is firmly connected.



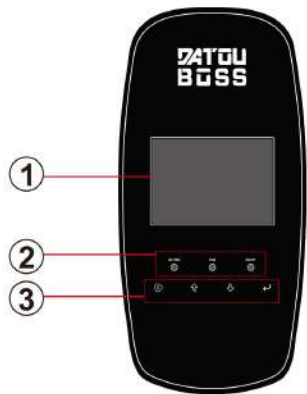
Assembly:

All wiring is connected, please lock the bottom cover back, see the picture below.



Note : The image shown here is indicative only. The actual product may differ.

4. Display board Description



4-1. Display control layout

The display board is divided by function as shown in the figure. Divided into 3 functional areas:
①LCD display area ②LED display area ③Function key control area

4-2. LED

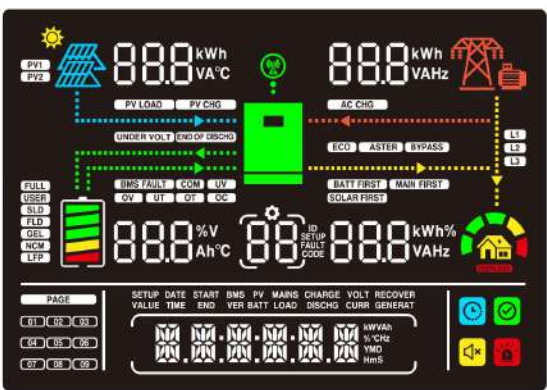
The three light-emitting diodes (LEDs) in the LED display area of the figure serve as operating status and fault indicators.

Name	Description
AC/INV(Green)	On: The inverter works in the main state Flash: the inverter output state Off: other states
CHG(Yellow)	On: Battery charging is complete Flash: The battery is charging at constant current and constant voltage Off: other states
FLUAT(Red)	Fault occurs in the inverter Off: other states

4-3. Function Key button

Function Key button	Describe
	Enter/Exit the settings menu
	Go to the previous option
	Go to next option
	Confirm/enter selection in the settings menu

4-4. LCD area explanation



Icon	Description	Icon	Description
	Solar panels		Mains power
	Battery		Generator
	Inverter is working		Loads
	Indicates that the inverter is communicating with the data		Indicates that the buzzer is in silent state
		Indicates the direction of electrical energy flow	
	Indicates that the inverter is in standby state		Inverter is working normally
	Inverter fault or alarm		Setting
	Loads power is 80%~100%		Battery SOC is 80%~100%
	Loads power is 60%~79%		Battery SOC is 60%~79%

	Loads power is 40%~59%		Battery SOC is 40%~59%
	Loads power is 20%~39%		Battery SOC is 20%~39%
	Loads power is 5%~19%		Battery SOC is 5%~19%
	Indicates battery low voltage		Indicates battery over-discharge
	Indicates overload		Indicates BMS communication failure
	Indicates system communication error		Indicates that the system voltage is insufficient
	Indicates system over voltage		Indicates that the system temperature is too low
	Indicates that the system temperature is too high		Indicates system overcurrent
	Indicates the battery is full		Indicates a user-defined battery type
	Indicates sealed lead-acid battery		Indicates open lead-acid battery
	Indicates colloidal lead-acid battery		Indicates ternary lithium battery
	Indicates LFP lithium battery		Indicates energy saving mode
	Indicates that photovoltaic power is loading		Indicates that photovoltaic power is charging the battery
	Indicates that the AC mains is charging the battery		Indicates that the inverter output priority is AC power first
	Indicates that the inverter output mode is AC bypass		Indicates that the inverter's output priority is photovoltaic priority
	Indicates that the inverter output priority is battery priority		

a. Numerical display and function setting area:

- In non-function setting mode, this area displays the relevant information of the inverter. In normal mode, the output information is displayed. Operating the up and down query keys (UP or DOWN key) can display the input voltage and output voltage, input frequency and output frequency, battery voltage and current, PV voltage and PV current, PV voltage and power, output power and output voltage, output power and output voltage, load percentage and output voltage and other related information.
- Fault mode displays fault code.
- On the function setting page, you can set the working mode, battery high and low voltage alarm, etc. by operating the ENTER key and the UP and DOWN keys.

4-5. LCD area explanation

- Please refer to this manual for power on/off operations.

- The power button is a rocker-shaped switch; flip it to ON to turn the power on (activating AC output and charging), and flip it to OFF to turn the power off (disabling AC output and charging).

a. Power-on steps

The power-on operation can be performed when connected to a battery or mains power that meets the requirements (the mains power needs to confirm a reasonable input range according to the output mode) or connected to a PV that meets the requirements.

- Power on mains

Connect to a working mains supply, and the inverter will establish its internal operating power supply (if the power button is not pressed, the inverter will be in standby mode). Press the power button to the ON position, and the system will boot up. If the mains output is set to prioritize, wait for a moment until the panel displays the mains mode, indicating that the power-up is complete and the system enters mains mode.

- Battery power on

Connect a working battery and press the switch to establish the internal working power supply of the inverter. The system will automatically start up. After a while, the panel will display the battery mode, indicating that the startup is complete and the system enters the battery mode.

- PV startup

Connect a normal PV and the inverter will establish internal working power (if the power button is not pressed, the inverter will be in standby mode). Press the switch to the ON position. The system will start up.

b. Shutdown steps

- Battery shutdown

In the battery inverter output mode only, press the switch to the OFF state, the inverter will disconnect the output, and after a period of time, the inverter will disconnect the internal working power supply.

- Mains power off

In the normal output mode with AC power connected, press the switch to the OFF state, the inverter will disconnect the output and stop charging. At this time, the inverter is in standby state. Disconnect the AC power and the inverter will be powered off.

- PV shutdown

In normal output mode with PV connected, press the switch to OFF state, the inverter will disconnect the output and stop charging. At this time, the inverter is in standby state. Disconnect the PV connection and the inverter will be powered off.

c. Operating in the alarm state

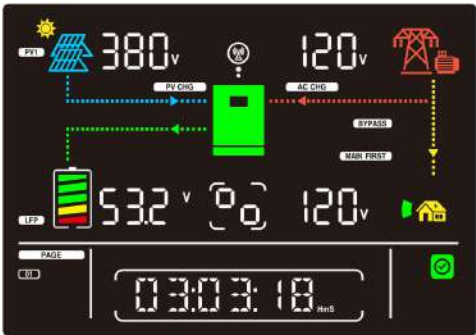
If the inverter emits an alarm tone and the fault LED flashes, it indicates that the inverter is operating in a fault alarm state. You can investigate the cause of the alarm based on the alarm information or contact the supplier.

5. Display Interface Overview (Main Display Interface)

On the main display interface, press the UP/DOWN keys to view real-time data during inverter operation.

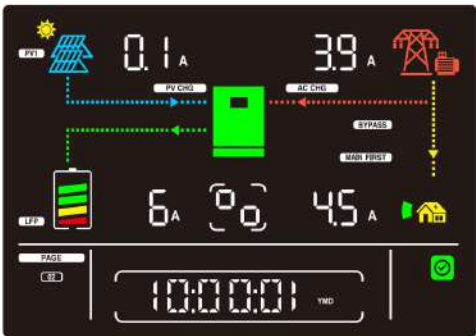
Page 1

PV side	Battery side	AC input side	Load side	General information
PV input voltage	Battery voltage	AC input voltage	Single-phase voltage	Current time



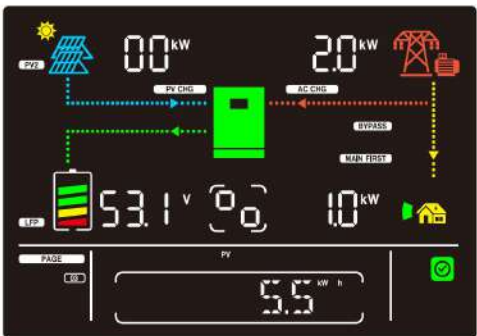
Page 2

PV side	Battery side	AC input side	Load side	General information
PV input voltage	Battery current	AC input current	Single phase output current	Current date



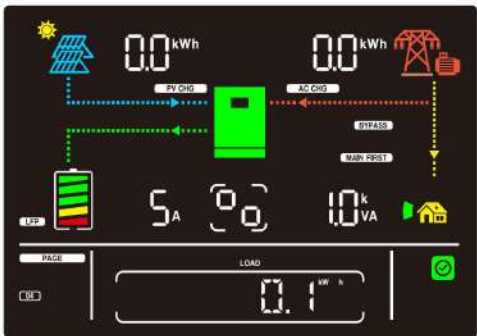
Page 3

PV side	Battery side	AC input side	Load side	General information
PV input power	Battery voltage	Charging power/ generating power	Single phase Active Power	Total PV generation



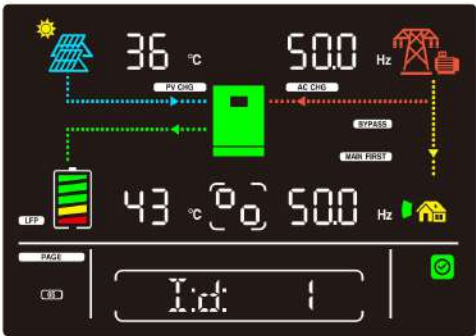
Page 4

PV side	Battery side	AC input side	Load side	General information
PV generation per day	Battery current	Daily AC charging amount	Single phase Apparent power	Total load consumption



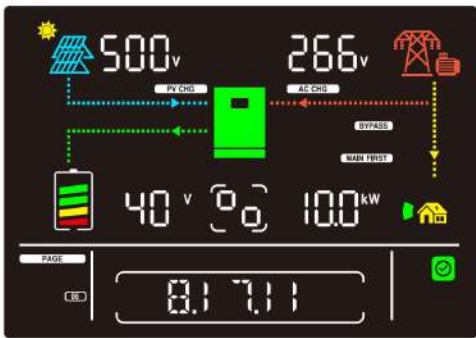
Page 5

PV side	Battery side	AC input side	Load side	General information
PV side heat sink temperature	heat sink temperature	Mains frequency	Output frequency	RS485 communication address



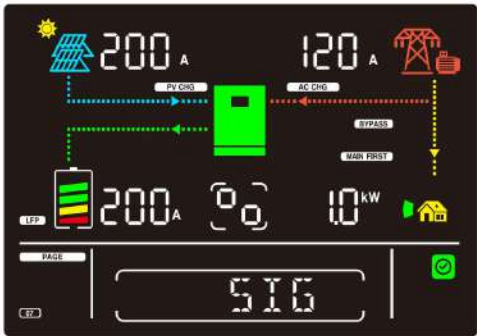
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PV side	Battery side	AC input side	Load side	General information
Max PV open-circuit voltage	Rated battery voltage	BUS voltage	Rated output power	Software version



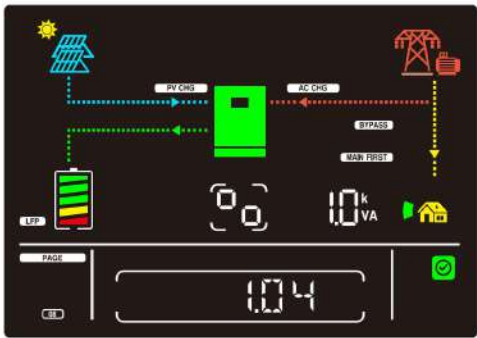
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PV side	Battery side	AC input side	Load side	General information
Max PV input current	Max battery charge current	Max mains charge current	Total active power output	Parallel mode display

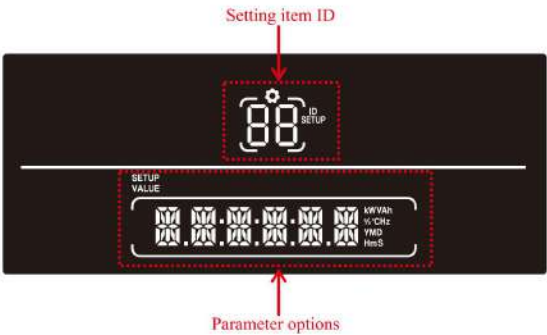
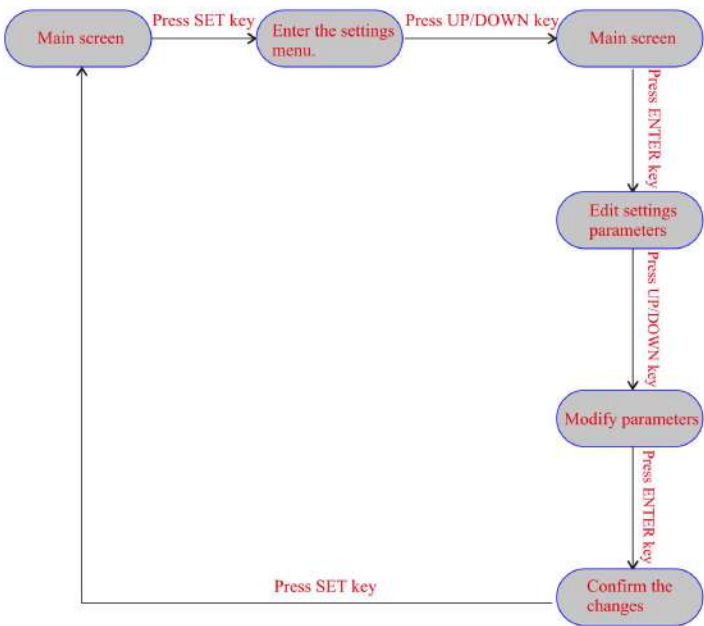


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PV side	Battery side	AC input side	Load side	General information
/	/	/	Total apparent power output	/



6. Function setting operation



Battery voltage setting logic: [15] <[12] <[04] <[14] <[35] <[37] <[05] <[09/11]

Setting item ID	Parameter meaning	Options	Function description
00	Exit	ESC	Exit Settings Menu
01	Output priority	UTL _{Default} SBU SOL	Grid power takes priority. When PV is available, in hybrid mode and on grid mode, grid power and PV are supplied to the load simultaneously, and the battery only supplies power to the load when grid power is unavailable (e.g., when the timed discharge function is used, the battery can discharge). Battery priority. Switch to mains power supply only when the battery voltage is lower than the set value in parameter 4. When the battery voltage is higher than this set value in parameter 5 or fully charged, switch back to inverter power supply from mains power supply. PV priority. When PV is unavailable or the battery voltage is lower than the set value in item 4, switch to mains power.
02	AC output frequency	50.0 _{Default} 60.0	In utility bypass mode, the AC output frequency will match the utility frequency; in other cases, the output will follow the preset value
03	AC input voltage range	UPS _{Default} RPL	When the output voltage is 110/120V, the input voltage range is 90~140V. When the output voltage is 100/105V, the input voltage range is 85~140V.
04	Battery to mains voltage point	43.6	When parameter 01 is set to SBU or SOL, the output switches from the inverter to the utility power supply when the battery voltage falls below this set value. The setting range is 40V to 52V.
05	Mains-to-battery voltage conversion point	56.0	When parameter 01 is set to SBU or SOL, the output switches from mains power to inverter when the battery voltage exceeds this set value. The setting range is 48V to 60V.
06	Charging priority	SNU _{Default} CUB CSD DSO	PV and mains power charge the battery simultaneously, with PV charging taking priority. When PV is unavailable, mains power will supplement it. PV and mains power can only charge the battery simultaneously in bypass mode. During inversion, only PV charging can be activated. This can only be set in off-grid mode. In hybrid mode (when setting 34 is not 0), it automatically switches to SNU. Prioritize charging from the mains power supply, and only start charging from solar power when the mains power supply is unavailable. Prioritize charging with solar power, and only start charging with mains power when solar power is unavailable. Only solar charging, no mains charging.
07	Max charge current	60	10KW model, setting range:0-200A 12KW model, setting range :0~220A
08	Battery type	USER SLd FLd GEL _{Default} L14/L15/L16 N13/N14	User-defined, all battery parameters can be set Sealed lead-acid batteries Open lead-acid battery Gel lead-acid battery Lithium iron phosphate battery L14/L15/L16, corresponding to lithium iron phosphate battery 14 strings, 15 strings, 16 strings N13/N14, corresponding to ternary lithium batteries13-series and 14-series batteries

09	Battery boost charging voltage	57.6	Setting range: 48V~58.4V, step 0.4V, valid when battery type is custom and lithium battery
10	Increase charging duration	120	Refers to the continuous charging time for the voltage to reach the voltage set by parameter 09 during constant voltage charging. The setting range is 5min~900min, with a step of 5 minutes
11	Battery float charge voltage	55.2	The setting range is 48V~58.4V, with a step of 0.4V. This parameter cannot be set after BMS communication is successful.
12	Battery over-discharge voltage (delayed shutdown)	42	When the battery voltage is lower than the judgment point and the value of parameter 13 is triggered, the inverter output is turned off. The setting range is 40V~48V, with a step of 0.4V
13	Battery over-discharge delay time	5	The battery voltage is lower than parameter 12, and the inverter output is turned off after the delay time set by this parameter is triggered. The setting range is 5S~50S, with a step of 5S
14	Battery low voltage alarm point	44	When the battery voltage is lower than the judgment point, the device will issue an undervoltage alarm, but the output will not shut down. The setting range is 40V~52V, with a step of 0.4V.
15	Battery discharge limit voltage	40	When the battery voltage is lower than the value of this parameter, the output will be turned off immediately. The setting range is 40V~52V, with a step of 0.4V. It is valid when the battery type is custom and lithium battery.
16	Battery equalization charging	dis	Equalizing charging is prohibited
		ENA	Allows equalization charging, which is only valid for open lead-acid batteries, sealed lead-acid batteries and custom batteries.
17	Equalizing charging voltage	58	The setting range is 48V~58V, with a step of 0.4V. It is only valid when the battery type is open lead-acid battery, sealed lead-acid battery, or customized
18	Equalizing charging time	120	The setting range is 5min~900min, with a step of 5 minutes. It is only valid when the battery type is open lead-acid battery, sealed lead-acid battery, or custom
19	Equalizing charging delay time	120	The setting range is 5min~900min, with a step of 5 minutes. It is only valid when the battery type is open lead-acid battery, sealed lead-acid battery, or custom
20	Equalizing charging interval	30	The setting range is 0~30days, with a step of 1 day. It is only valid when the battery type is open lead-acid battery, sealed lead-acid battery, or customized
21	Equalizing charging start and stop	dis	Start equalizing charging immediately
		ENA	Stop equalizing charging immediately
22	Energy saving mode (only supports stand-alone mode)	dis	Disable energy saving mode
		ENA	When energy saving mode is enabled, the inverter output will be shut down after a 5-minute delay when the load power is less than 50W. When the load exceeds 50W, the inverter will automatically restart.
23	Overload automatic restart	dis	Disable overload automatic restart. If an overload occurs and the output is shut down, the machine will not restart.
		ENA	Allow overload automatic restart. If overload occurs and the output is shut down, the machine will restart after a delay of 3 minutes. After 5 times in total, the machine will not be restarted.

24	Over temperature automatic restart	dis	Disable over-temperature automatic restart. If over-temperature occurs, the output will be turned off and the machine will not turn on the output again
		ENA	Allows automatic restart over temperature. If over temperature occurs, the output will be turned off and the output will be restarted when the temperature drops.
25	Buzzer alarm	dis	Disable buzzer alarm
		ENA	Allow buzzer alarm
26	Mode change reminder	dis	Disable alarm prompts when the status of the main input source changes
		ENA	Allows alarm notification when the status of the main input source changes
27	Inverter overload switches to bypass	dis	Automatic switching to mains load is prohibited when inverter is overloaded
		ENA	Automatically switch to AC power when inverter is overloaded
28	Mains charging current	60	10KW model, setting range: 0~120A 12KW model, setting range: 0~140A
30	RS485 communication address	168	RS485 communication address setting range: 1 to 254 Parallel mode range: 1 to 6
31	Parallel mode (can only be set in standby mode)	SIG	Single-unit operation
		PAR	Multi-unit parallel operation
		2P0/2P2/2P2	Two-phase split-phase parallel operation
		Set all units connected to P1 to "2P0." Assume the output voltage defined by Parameter [38] is set to 120Vac: 1) When all units connected to P2 are set to "2P1": • The phase angle between P1 and P2 differs by 120°. • The line voltage between L1 (from P1) and L2 (from P2) equals $120 \times 1.732 = 208\text{Vac}$. • The phase voltage L1-N and L2-N equals 120Vac. 2) When all units connected to P2 are set to "2P2": • The phase angle between P1 and P2 differs by 180°. • The line voltage between L1 (from P1) and L2 (from P2) equals $120 \times 2 = 240\text{Vac}$. • The phase voltage L1-N and L2-N equals 120Vac.	
		3P1/3P2/3P3	Three-Phase Parallel Operation
32	RS485 communication function	SLA	Enable PC and remote monitoring protocols
		485	Enable BMS communication function based on RS485 communication

33	BMS Communication		When 32 items are set to 485 (enabling BMS communication function based on RS485 communication), the corresponding communication protocol needs to be selected in item 33 and the corresponding lithium battery type needs to be selected in item 08 PAC=PACE, RDA=RITAR, AOG=ALLGRAND, OLT=OLITER, HWD=SUNWODA, DAQ=DYNESS, WOW=SRNE, PYL=PYLONTECH, UOL=VILION
34	Work mode	dis ^{Default} ON GRd MAX LOd	Off-grid mode operation Reserved function, same as hybrid mode. In hybrid mode, photovoltaic power is used to charge the battery first, and any excess energy is used to power the load. With anti-backflow function, photovoltaic power will not be fed back to the grid (when this option is set, the setting items are fixed: 01 is UTI, 03 is UPS, 06 is SNU)
35	Battery undervoltage recovery point	52	When the battery is undervoltage, the battery voltage needs to be greater than this setting value to restore the battery inverter AC output. The setting range is: 44V~54.4V
37	Recharge voltage point after battery is fully charged	52	When the battery is fully charged, the inverter stops charging. When the battery voltage drops below this value, charging resumes. Setting range: 44V~54V
38	AC output voltage	120	Setting range: 100/105/110/120VAC
40	Timed mains charging start/ time setting	000000	Setting range: 00:00:00-23:59:00
41	Timed mains charging end/ time setting	000000	Setting range: 00:00:00-23:59:00
42	Timed mains charging start/ time setting	000000	Setting range: 00:00:00-23:59:00
43	Timed mains charging end/ time setting	000000	Setting range: 00:00:00-23:59:00
44	Timed mains charging start/ time setting	000000	Setting range: 00:00:00-23:59:00
45	Timed mains charging end/ time setting	000000	Setting range: 00:00:00-23:59:00
46	Timed AC charging function/ time setting	dis ^{Default} ENR	Disable this feature When the time-sharing mains charging/on-load function is enabled, the output priority mode will change to SBU, and the mains will be switched to charge during the set charging period or after the battery is over-discharged. If the timed discharge function is enabled at the same time, the system power supply mode will change to UTI, and the mains will be switched to charge only during the set charging period, and will switch to battery inverter power supply during the set discharge period or when the mains is off (The above function description is only applicable to off-grid mode)
47	Timed battery discharge start/ time setting	000000	Setting range: 00:00:00-23:59:00
48	Timed battery discharge end/ time setting	000000	Setting range: 00:00:00-23:59:00

49	Timed battery discharge start/ time setting	000000	Setting range: 00:00:00-23:59:00
50	Timed battery discharge end/ time setting	000000	Setting range: 00:00:00-23:59:00
51	Timed battery discharge start/ time setting	000000	Setting range: 00:00:00-23:59:00
52	Timed battery discharge end/ time	000000	Setting range: 00:00:00-23:59:00
53	Timed battery discharge function/ time setting	dis ^{Default} ENR	Disable this feature After the time-sharing battery discharge function is enabled, the power supply mode will switch to UTI. The system will switch to battery inverter power supply only during the set discharge period or when the mains power is off.
54	Current date	000000	Year/Month/Day Setting range: 00:01-01-99:12:31
55	Current time	000000	Setting range: 00:00:00-23:59:00
57	Stop charging current	2	Stop charging when the charging current is less than the set value (unit: A)
58	Discharge alarm SOC setting	15	When the capacity is less than this setting, an SOC alarm is issued. (Unit: %, valid only when BMS communication is normal)
59	Discharge cut-off SOC setting	5	When the capacity falls below this setting, discharging stops. (Unit: %, valid only when BMS communication is normal)
60	Charging cut-off SOC setting	100	When the capacity is greater than the set value, charging stops (unit: %, valid only when BMS communication is normal)
61	Switch mains SOC settings	10	When the capacity is less than this setting, the system switches to mains power. (Unit: %, valid only when BMS communication is normal)
62	Switch inverter output SOC settings	100	When the capacity exceeds this setting, the system switches to inverter output mode. (Unit: %, valid only when BMS communication is normal)
63	Whether the output neutral line is grounded in the inverter state.	dis ^{Default} ENR	Automatic switching of N-PE connections is not allowed Allows automatic switching of N-PE connections
68	AC Phase Mode (Configurable only in standby mode)	0 180 ^{Default}	0 = Single-Phase Mode • When Parameter [38] is set to an AC output voltage of 120Vac, the phase difference between L1 and L2 is 0°. • L1 and L2 can operate in parallel. • The phase voltage L1-N and L2-N equals 120Vac. 180 = Split-Phase Mode • When Parameter [38] is set to an AC output voltage of 120Vac, the phase difference between L1 and L2 is 180°. • L1 and L2 can operate in parallel. • The phase voltage L1-N and L2-N equals 120Vac. • The line voltage L1-L2 equals 240Vac.
71	Solar priority setting	CHG ^{Default} 10d	Solar energy is used to charge the battery first, and then to generate electricity for the grid. Solar energy is first fed into the grid for power generation

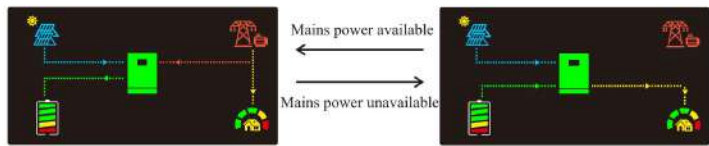
Note: The above default values are for reference only and are subject to change without prior notice.

6.1 Output Priority and Operating Mode Overview

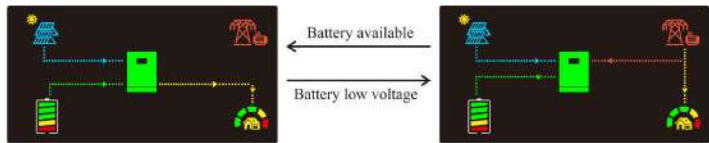
The AC output mode corresponds to parameter settings 01 (Output Priority) and 34 (Operating Mode), allowing manual user settings.

6.1.1 Off-Grid Mode (Default)

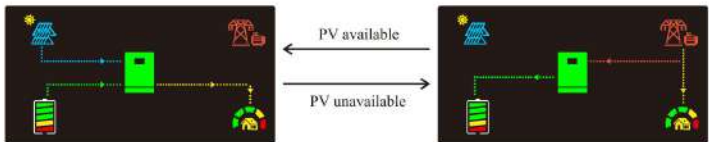
1) Mains Output Priority: The mains power is used to power the load, while the photovoltaic power supply charges the battery. The photovoltaic power supply and battery supply power to the load only when the mains power is unavailable. (Priority: AC > PV > Battery)



2) Battery Output Priority: PV will prioritize supplying power to the load. If PV is insufficient or unavailable, the battery will supplement the load power. When the battery voltage falls below the value set in Settings 4 or 61 (Battery Switch to Mains), the load will be powered by the mains. When the battery voltage rises above the value set in Settings 5 or 62 (Mains Switch to Battery) or is fully charged, the inverter will switch from the mains to the load. This mode maximizes the use of DC power and is suitable for areas with stable power grids. (Priority: PV > Battery > AC)



2) Photovoltaic output priority: PV prioritizes powering the load. When excess energy is available, the battery is charged. When PV energy is insufficient for load use, the battery is discharged to supplement the load. When PV power is ineffective or the battery power falls below the set value in settings 4 or 61 (battery switching to mains power), the system switches to mains power. This mode maximizes PV utilization while maintaining battery power and is suitable for areas with relatively stable power grids. (Priority: PV > AC > battery)



6.1.2 Hybrid Mode

PV Energy Priority corresponds to parameter setting item 71 and can be manually set by the user.

1) PV Energy Prioritizes Battery Charging

When PV is available, both the mains and PV supply power to the load simultaneously. The battery only provides power to the load when the mains is unavailable. PV power prioritizes battery charging, with excess energy then used to power the load.

2) PV Energy Prioritized Grid Feed

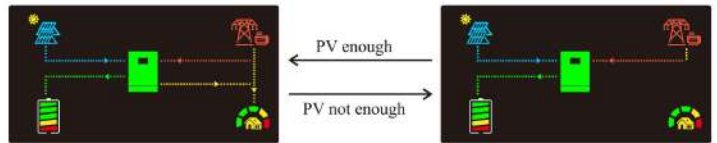
When PV power is available, both the mains and PV power supply the load simultaneously. The battery only provides power to the load when the mains is unavailable. PV power prioritizes the load, and the mains supplements when PV power is insufficient. Excess energy is then used to charge the battery.

6.2 Charging priority

Charging priority corresponds to parameter setting item 06, which allows the user to manually set the charging mode.

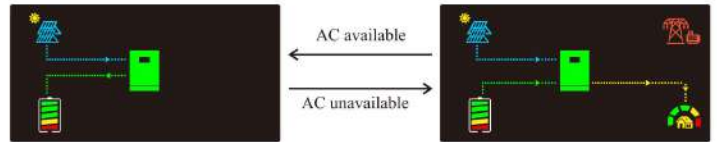
● Hybrid charging SNU (default)

The battery is charged simultaneously with both photovoltaic and mains electricity, with photovoltaic power taking priority and mains electricity supplementing the battery when photovoltaic power is insufficient. This is the fastest charging method and is suitable for areas with insufficient power supply, providing users with sufficient backup power. (Priority: photovoltaic power > mains electricity)



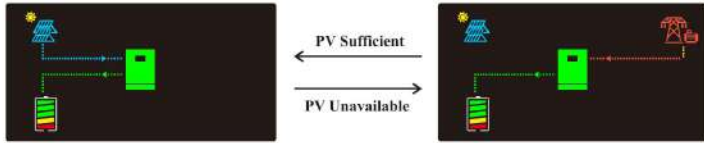
● Mains power prioritizes charging the Cub

Mains power prioritizes charging the battery, and PV charging only occurs if mains power is unavailable. (Priority: Mains > Photovoltaic)



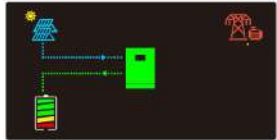
• PV charging priority CSO

PV charging priority, and mains charging is only activated when solar power is unavailable. By fully utilizing solar energy during the day and switching to mains charging at night, the battery capacity can be maintained. This is suitable for regions where the power grid is relatively stable and electricity prices are high. PV Sufficient(Priority: PV> Grid)



• PV charging only OSO

Only solar power is used to charge the battery; grid charging is not activated. This is the most energy-efficient method, as all battery power comes from solar energy. It is typically used in regions with good sunlight conditions.



6.3 Output Priority and Charging Output Priority Applications

Mode	Settings	Option	Definition	Power usage priority	Features
Output priority	01	UTI	Grid Priority Output Mode	Grid - PV -Battery	This mode maximizes the available power while maintaining battery power as emergency energy storage, and is suitable for areas with unstable power supply.
		SOL	PV Priority Output Mode	PV - Grid - Battery	This mode maximizes the use of photovoltaic energy while keeping the battery charged as emergency backup.
		SBU	Inverter Priority Output Mode	PV - Battery - Grid	This mode maximizes the use of DC power, reduces electricity costs, and is suitable for areas with expensive electricity but stable power supply.
Charging priority	06	SNU	Grid and PV Hybrid Charging Mode	PV - Hybrid Charging -Grid	Fastest charging speed.
		CBU	Grid Priority Charging Mode	Grid - PV	PV charging only starts when mains power is unavailable.
		CSO	PV Priority Charging Mode	PV - Grid	When PV power not available, it starts charging with mains electricity. It is suitable for areas with stable power grid and high electricity price.
		OSO	PV Charging	PV	PV charging only, no grid charging

6.4 Working mode(Off-grid/Grid-tied/Hybrid)

Mode	Settings	Option	Definition	Power usage priority	Features
Working Mode	34	DIS	Indicates hybrid/grid-tied mode is disabled; the system defaults to off-grid mode.		
		ON GRD	Grid-tied mode	The power usage priority can be set via 46, 53, and 71.	Surplus energy or battery storage can be fed back to the grid, helping users earn revenue from power generation.
		MIX LOD	Hybrid mode		Anti-backflow function enables grid and PV hybrid load, supports use without battery, helping users reduce electricity costs.
PV priority	71	CHG	PV prioritized for charging	If this option is selected, PV power will be prioritized for charging; once the battery is fully charged, surplus energy can be fed into the grid.	Maintains battery charge as emergency backup; surplus PV energy is fed into the grid or used for load.
		LOD	PV prioritized for grid feed-in	If this option is selected, PV power will be prioritized for feeding energy back to the grid; if there is excess energy, it will be used to charge the battery.	No battery storage involved, helping users maximize power generation revenue.

6.5 Time Separated Charging /Discharging

Mode	Settings	Option	Definition	Power usage priority	Features
Time separated mains charging and load function	46	DIS	Turn off this function		
		ENA	Turn on time separated mains charging and load function	After turning on this function, users can set the time period in items 40-45. During the set time period, if there is photovoltaic power, photovoltaic power will be used for charging first; when photovoltaic power is insufficient, the mains power will be used for hybrid charging; when there is no photovoltaic power, the mains power will be used for charging.	Taking advantage of peak and valley electricity prices, PV power and off-peak electricity can be stored in energy storage batteries.
Time separated battery discharge function	53	DIS	Turn off this function		
		ENA	Turn on time separated battery discharge function	After turning on this function, users can set the time period in items 47 to 52. During the set time period, if the photovoltaic energy is not enough to carry the load or is not enough to connect to the grid at full power, the battery power is allowed to carry the load or connect to the grid.	Utilize utility grid power or feed battery energy back into the grid, thereby generating higher grid-connected revenue.

6.6 Time-separated charging/discharging function

Time-separated charging and discharging, allowing users to set different charging and discharging periods based on local peak and valley electricity prices, effectively utilizing both utility and photovoltaic energy. When utility electricity is expensive, the battery inverter supplies power to the load; when utility electricity is affordable, the load can be powered and charged using utility electricity, maximizing savings. The time-of-day charging and discharging function can be enabled or disabled in parameters 46 and 53 of the setup menu, and the charging and discharging periods can be set in parameters 40-45 and 47-52.

The following is a case example to help users understand this function.

Before using this function for the first time, please set the local time and date in parameter items 54 and 55. Then the user can set the corresponding time period according to the local peak and valley electricity price.

Time-separated mains charging and load-carrying function



With 3 definable time periods, users can freely set the mains charging/loading period within the range of 00:00 to 23:59. During the time period set by the user, if there is photovoltaic energy output, photovoltaic energy will be used first. If there is no photovoltaic energy output or the photovoltaic energy is insufficient, the mains will be used as a supplement.

Time-separated battery discharge function



With three definable time periods, users can freely set the battery discharge period within the range of 00:00 to 23:59. During the time period set by the user, the inverter will give priority to battery inversion to carry the load. If the battery power is insufficient, the inverter will automatically switch to the mains to ensure stable operation of the load.

6.7 Battery Parameter

• Lead-Acid Battery

Parameters, battery type	Sealed Lead-Acid Battery	Gel battery	Flooded Lead-Acid Battery	User customize
	SLd	GEL	FLd	USER
Over charge voltage	60V	60V	60V	60V
Constant charge voltage	58V	56.8V	58V	40~60V can be set
Boost charging voltage	57.6V	56.8V	57.6V	40~60V can be set
Floating charge voltage	55.2V	55.2V	55.2V	40~60V can be set
Low battery voltage alarm	44V	44V	44V	40~60V can be set
Low battery voltage protection point	42V	42V	42V	40~60V can be set
Discharge limiting voltage	40V	40V	40V	40~60V can be set
Overcharge delay time	5s	5s	5s	1~30s can be set
Constant charging duration	120m	—	120min	0~600min can be set
Constant charging cycle	30d	—	30d	0~250d can be set
Enhance charging cycle	120m	120m	120m	10~600m can be set

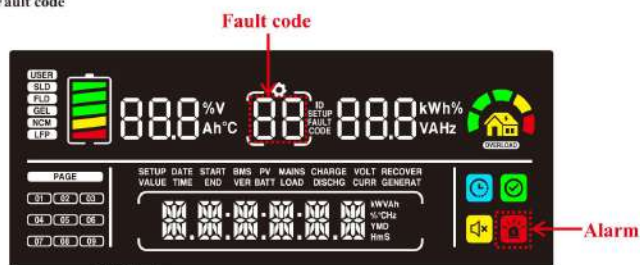
• Lead-Acid Battery

Parameters, battery type	Ternary lithium battery		Lithium iron phosphate battery			User customize
	MB	MY	LIG	LIS	LM	USER
Over charge voltage	60V	60V	60V	60V	60V	60V
Constant charge voltage	—	—	—	—	—	40~60V can be set
Boost charging voltage	53.2V	57.6V	56.8V	53.2V	49.2V	40~60V can be set
Floating charge voltage	53.2V	57.6V	56.8V	53.2V	49.2V	40~60V can be set
Low battery voltage alarm	43.6V	46.8V	49.6V	46.4V	43.2V	40~60V can be set
Low battery voltage protection point	38.8V	42V	48.8V	45.6V	42V	40~60V can be set
Discharge limiting voltage	36.4V	39.2V	46.4V	43.6V	40.8V	40~60V can be set
Overcharge delay time	30s	30s	30s	30s	30s	1~30s can be set
Constant charging duration	—	—	—	—	—	0~600min can be set
Constant charging cycle	—	—	—	—	—	0~250d can be set
Enhance charging cycle	120min can be set	120min can be set	120min can be set	120min can be set	120min can be set	1~600m can be set

Not communicate with lithium battery BMS, inverter will charge battery according to its default setting; Communicated with lithium battery BMS, inverter will charge lithium battery under command of BMS.

7. Fault description

7.1 Fault code



Error code	Meaning	Whether affect output	Description
01	BatVoltLow	Y	Battery low voltage warning
02	BatOverCurrSw	Y	Battery discharge average current overcurrent software protection
03	BatOpen	Y	Battery Not Connected Warning
04	BatLowEod	Y	Battery low voltage stop discharge warning
05	BatOverCurrHw	Y	Battery Overcurrent Hardware Protection
06	BatOverVolt	Y	Overcharge Protection
07	BusOverVoltHw	Y	Bus overvoltage hardware protection
08	BusOverVoltSw	Y	Bus overvoltage software protection
09	PvVoltHigh	Y	PV Overvoltage Protection
10	PvBoostOCSw	N	Boost Overcurrent software protection
11	PvBoostOCHw	N	Boost Overcurrent hardware protection
12	SpiCommErr	Y	Master-Slave Chip SPI Communication Failure
13	OverloadBypass	Y	Side-pass overload protection
14	OverloadInverter	Y	Inverter overload protection
15	AcOverCurrHw	Y	Inverter Overcurrent Hardware Protection
16	AuxDspReqOffPWM	Y	Chip Request Shutdown Failure
17	InvShort	Y	Inverter short-circuit protection
18	Bussoftfailed	Y	Bus soft start failure
19	OverTemperMppt	N	PV Radiator Over-temperature Protection
20	OverTemperInv	Y	Inverter radiator over-temperature protection
21	FanFail	Y	Fan failure
22	EEPROM	Y	Memory failure

Error code	Meaning	Whether affect output	Description
23	ModelNumErr	Y	Model setting error
24	Busdiff	Y	Positive and negative busbars voltage imbalance
25	BusShort	Y	Bus short circuit
26	Rlyshort	Y	The inverter AC output is back-fed to the bypass AC output.
28	LinePhaseErr	Y	Mains power input phase error
29	BusVoltLow	Y	Bus voltage low protection
30	BatCapacityLow1	Y	Battery capacity rate below 10% warning (effective after successful BMS communication)
31	BatCapacityLow2	N	Battery capacity rate below 5% warning (effective after successful BMS communication)
32	BatCapacityLowStop	Y	Battery low capacity shutdown (effective after successful BMS communication)
33	CtrlCanCommErr	Y	Parallel control CAN communication failure
34	CanCommFault	Y	Parallel CAN communication failure
35	ParaAddrErr	Y	Parallel ID (communication address) setting error
37	ParaShareCurrErr	Y	Parallel current balancing failure
38	ParaBattVoltDiff	Y	Parallel mode, large battery voltage difference
39	ParaAcSrcDiff	Y	Parallel mode, inconsistent mains input sources
40	ParaHwSynErr	Y	Parallel mode, hardware synchronization signal failure
41	InvDcVoltErr	Y	Abnormal DC component of inverter voltage
42	SysFwVersionDiff	Y	The parallel program versions are inconsistent
43	ParaLineContErr	Y	Parallel wiring fault
44	Serial number error	Y	Serial number not be set at the beginning
45	Phase merging unit configured incorrectly	Y	【31】 Setting item setting error
58	BMSComErr	N	BMS communication failure
59	BMSErr	N	BMS error
60	BMSUnderTem	N	BMS low temperature alarm (effective after successful BMS communication)
61	BMSOverTem	N	BMS over-temperature alarm (effective after successful BMS communication)
62	BMSOverCur	N	BMS overcurrent alarm (effective after BMS communication is successful)
63	BMSUnderVolt	N	BMS low voltage alarm (effective after BMS communication is successful)
64	BMSOverVolt	N	BMS over voltage alarm (effective after successful BMS communication)

7.2 Troubleshooting

Error code	Meaning	Reason	Solution
/	Nothing on display	No power, or not switch "on"	Check whether battery or pv circuit breaker is closed; Press any button to exit screen sleep mode.
01	Battery low voltage	The battery voltage is lower than the value set in parameter item [14]	Charge the battery until the battery voltage is higher than the value set in parameter [14].
03	Battery not connected	The battery is not connected, or the lithium battery BMS is in discharge protection state	Check whether the battery is tightly connected; check whether the battery's circuit breaker is turned off; ensure that the BMS of the lithium-ion battery can communicate normally.
04	Battery over discharged	The battery voltage is lower than the value set in parameter 12.	Manual reset. Turn off the power and restart. Automatic reset: Charge the battery until the battery voltage is higher than the value set in parameter [35].
06	Battery overcharged protection	Battery is in overcharged state	Manually power off and then back on. Check if the battery voltage exceeds the limit. If so, discharge the battery until the voltage is below the battery's overvoltage recovery point.
13	Bypass overload (software detection)	Bypass output power or output current is overloaded within a certain period of time	Reduce the load power and restart the inverter. For more details, please refer to item 11 in the protection function.
14	Inverter overload (software detection)	The inverter output power or output current is overloaded within a certain period of time	
19	The PV input heat sink temperature is too high. (Software detection)	3sThe radiator temperature of the pv input exceeds 90°C for 3 seconds	When the temperature of the radiator cools down below the over-temperature recovery temperature, normal charging and discharging are resumed.
20	Inverter output heat sink temperature too high (software detection)	3sThe radiator temperature of the inverter output exceeds 90°C for more than 3 seconds.	
21	Fan failure	Hardware detects a fan failure	After the inverter is turned off, manually turn on the fan to check if there are any foreign objects blocking it.
26	AC input relay short circuit	AC output relay stuck	Shut down manually and restart. If the fault occurs again after restarting, you need to contact after-sales service for inverter repair.
28	Mains power input phase failure	The phase of the AC input is inconsistent with the phase of the AC output.	Ensure that the phase of the AC input is the same as the phase of the AC output. For example, if the output is split-phase mode, the input must also be split-phase mode.

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

8. Protection Function and Product Maintenance

8.1 Protection Function

No	Protection Function	Explanation
1	PV current limiting protection	When the configured pv array charging current or power exceeds the inverter's rated current and power, it will be charged at the rated current and power of the inverter.
2	PV overvoltage protection	If the photovoltaic voltage exceeds the maximum value allowed by the hardware, the machine will report a fault and stop the photovoltaic boost to output sinusoidal AC waves.
3	Nighttime anti-reverse charging protection	During the night, since the battery voltage is greater than that of the photovoltaic module, it will prevent the battery from discharging to the photovoltaic module.
4	Mains input overvoltage protection	When the mains voltage exceeds 280Vac per phase, mains charging will stop and switch to inverter output.
5	Mains power input undervoltage protection	When the phase voltage of mains power is below 170Vac, mains charging will be stopped and converted to inverter output.
6	Battery Overvoltage Protection	When the battery voltage reaches the overvoltage disconnection point, PV and mains will automatically stop charging the battery to prevent overcharging and damage to the battery.
7	Battery undervoltage protection	When the battery voltage reaches the low-voltage disconnection point, it will automatically stop discharging to prevent excessive discharge and damage to the battery.
8	Battery Overcurrent Protection	When the battery current exceeds the range allowed by the hardware, the machine will shut down the output and stop discharging the battery.
9	AC Output Short Circuit Protection	When a short-circuit fault occurs at the load output terminal, the output AC voltage will be immediately shut off. After 1 minute, it will be re-outputted. If the attempt to output three times still results in a short circuit at the load end, the short-circuit fault of the load must be eliminated before manually powering on again to restore normal output.
10	Heater over-temperature protection	When the internal temperature of the inverter is too high, the inverter will stop charging and discharging; when the temperature returns to normal, the inverter will resume charging and discharging.
11	Overload protection	After the overload protection is triggered, the inverter will resume output after 3 minutes. If there are five consecutive overloads, the output will be shut off until the inverter restarts. (102% < Load < 110%) ±10%; Error, output will be shut off after 5 minutes. (110% < Load < 125%) ±10%; Error reported and output will be shut off after 10 seconds. Load > 125% ±10%; Error reported, output will be shut off after 5 seconds.
12	AC backfeed protection	Prevent the battery inverter AC from being back-fed into the bypass AC input
13	Bypass overcurrent protection	Built-in AC input overcurrent protection circuit breaker
14	Bypass wiring error protection	When the phase of two bypass inputs is different from that of the inverter's split-phase, the machine will prohibit switching to bypass to prevent load power failure or short circuit when switching to bypass.

8.2. Maintenance

- 1) The inverter just needs the minimum maintenance. And life of Pb(battery) can be preserved by frequent charge.
- 2) Batteries should be charged for every three months if the inverter is long-term unused.
- 3) Lifespan of battery normally lasts for three to five years. It should be replaced in advance if any battery is found in poor state. And the replacement shall be operated by the professional.
- 4) Batteries should be wholly replaced by the instruction of the supplier.
- 5) For every three months, batteries should be discharged (until the inverter shuts down) and recharged. Every charge (by standard inverter) should last at least for 12 hours.
- 6) Among high temperature area, batteries should be discharged and recharged forevery two months. Every charge (by standard inverter) should last at least for 12 hours.

Note:

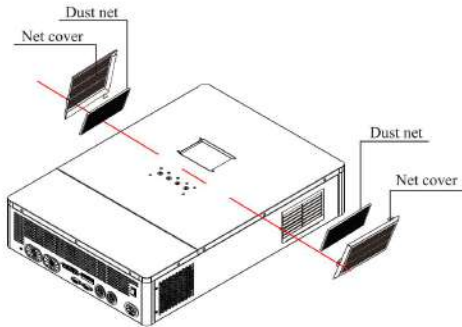
- Please shut down the inverter , then disconnect AC input and PV input before replacing batteries.
- Please do not wear metal jewelry such as ring or watch.
- Please use screwdriver with insulated handle and avoid to place tools or metal objects on batteries.
- Please avoid short circuit or reverse connection.

Warning:

- Battery must not be put in the fire, which may cause explosion.
- Shall not open or damage the battery. Electrolyte released will cause harm to eyes and skin and even intoxication.

Assembly of dust filter

As shown in the picture, remove the 2 screws fixing the dust filter cover on the left and right sides. Then take off the dust filter cover and dust filter to clean the dust filter. After cleaning, install the dust filter and its cover in the order shown in the figure, and then use the 2 removed screws to fix the left and right dust filter covers on the inverter.



Note:

When using the inverter in areas with poor environment, the dust filter is easily blocked by air particles. Please disassemble and clean the dust filter regularly to avoid affecting the air volume and flow rate inside the inverter and triggering the over-temperature protection of components. The Failure will affect power supply usage and the service life of the inverter.

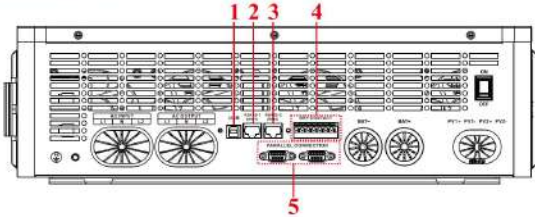
9. Technical Parameters

Model:		DT-4812USP
PV	Maximum photovoltaic input power	6500W*2
	MPPT tracking voltage range	125VDC~425VDC
	Rated input voltage	360VDC
	Maximum photovoltaic input voltage Voc (At minimum temperature)	500VDC
	Maximum photovoltaic input current	22A*2
	MPPT tracking routed (input routed)	2
Battery & Charging	Battery Type	Lead-acid battery/Lithium battery Customized battery (charge and discharge parameters of different types of batteries can be set through the operation panel)
	Rated battery voltage	48VDC
	Battery voltage range	42~60VDC(Default value)
	Maximum photovoltaic charging current	220A
	Maximum AC charging current	140A
	Maximum charging current	220A
AC input	Rated input voltage	Single phase input 100/105/110/120Vac Split phase input L1-N-L2(L1-L2: 200/210/220/240Vac; L1-N/L2-N: 100/105/110/120Vac)
	Mains input voltage range	Single phase input 85/90~140Vac Split phase input L1-N-L2(L1-L2: 170/180~280Vac; L1-N/L2-N: 85/90~140Vac)
	Rated input frequency	50Hz/60Hz
	Rated output power	12KW
AC output	Rated output voltage	Single phase input 100/105/110/120Vac Split phase input L1-N-L2(L1-L2: 200/210/220/240Vac; L1-N/L2-N: 100/105/110/120Vac)
	Output voltage accuracy	±2%
	Rated output frequency	50Hz/60Hz
	Output frequency accuracy	±1%
	Output waveform	Pure sine wave

General parameters		
Maximum conversion efficiency (battery discharge)	92%(Peak)	
MPPT tracking efficiency	≥99.9	
Conversion time	10ms(Typical Value)	
Panel Display	LCD+LED	
Cooling method	Smart Fan Control	
Communication function	USB/RS485/Dry contact/mobile phone APP (WIFI or GPRS monitoring) (optional)	
Protection level	IP20	
Installation	Wall-mounted	
Protection	Overload protection	After triggering overload protection, the inverter will resume output after 3 minutes. Five consecutive overloads will shut down output until the inverter restarts. (102% < Load < 110%) ± 10%; An error message will be displayed, and output will be shut down after 5 minutes. (110% < Load < 125%) ± 10%; An error message will be displayed after 10 seconds, and output will be shut down. (Load > 125% ± 10%; An error message will be displayed, and output will be shut down after 5 seconds.)
	Isolation protection	≤2S
	Overload power protection	Automatic protection (battery mode), circuit breaker or fuse (mains mode)
	Output short-circuit protection	Automatic protection (battery mode), circuit breaker or fuse (mains mode)
	Over temperature protection	>90°C(Turn off inverter and charging)
Environment	Operating temperature	-10℃~50℃
	Storage temperature	-15℃~60℃
	Noise	≤55dB
	Altitude	2000m(Exceeding the limit ,Derating is required)
General parameters		
Product size(L*W*Hmm)	630x445x136.5	
Packing size(L*W*Hmm)	725x540x225	
N.W(kg)	21.5	
G.W(kg)	22.5	

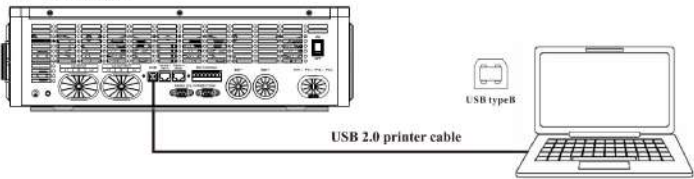
Note: The above parameters are subject to change without prior notice!

10. Communication Port



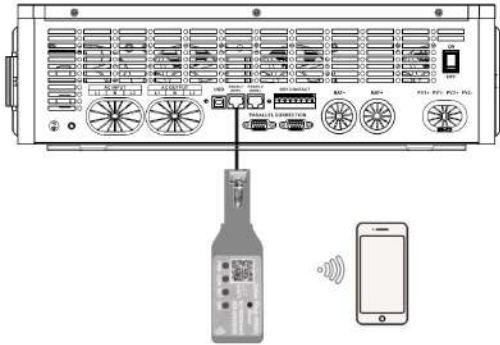
1	USB-B port	2	RS485-1 port	3	RS485-2 port
4	Dry contact port	5	Parallel port		

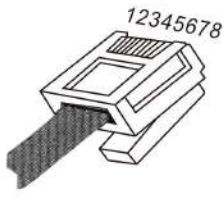
10.1 USB-B port



Users can use the host computer software to read and modify device parameters through this port.

10.2 RS485-1 port



PIN1-----RS485-B	
PIN2-----RS485-A	
PIN3-----NC	
PIN4-----+5V	
PIN5-----NC	
PIN6-----NC	
PIN7-----NC	
PIN8-----GND	

NC: Indicates that the pin is not connected.

Connecting a WiFi data logger allows for remote monitoring and control via mobile or web browsers. Inverter operating information can be uploaded to a server via WiFi, allowing users to monitor and view it using the web browser or app as needed. Users must register an account and bind the device to their WiFi serial number. The WiFi data logger serial number is affixed to the packaging and the data logger.

Website: <https://solar.siseli.com/>

App: Android users can search for "Solar of Things" in the App Store. iOS users can search for "Solar of Things" in the App Store.

Note: You can also scan the QR code below to download the app.



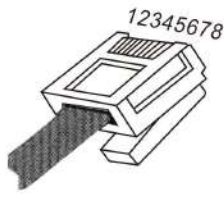
Note: For detailed instructions on the Wi-Fi data collector, please refer to the Wi-Fi data collector's user manual.

The Wi-Fi data collector is an optional accessory.

10.3 RS485-2 port

The RS485-2 port is used to connect to a lithium-ion battery BMS.

If you need the inverter to communicate with a lithium-ion battery BMS, select the BMS protocol corresponding to the lithium-ion battery in setting 33.

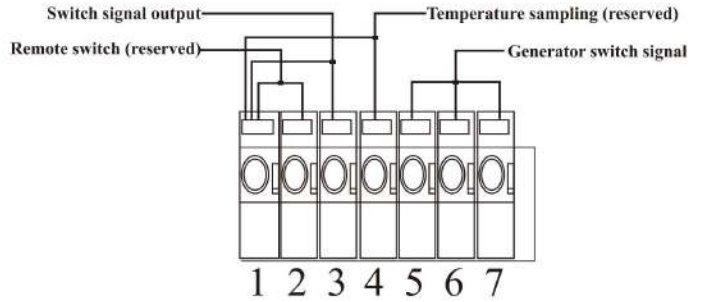
PIN1-----NC	
PIN2-----NC	
PIN3-----NC	
PIN4-----CAN-H(Reserved function)	
PIN5-----CAN-L(Reserved function)	
PIN6-----NC	
PIN7-----RS485-A	
PIN8-----RS485-B	

NC: Indicates that the pin is not connected.

10.4 Dry contact port

The dry contact port has four functions:

1. Remote on/off
2. Switch signal output
3. Battery temperature sampling
4. Generator remote start/stop



Function	Describe
Remote switch (reserved)	When pin 1 is connected to pin 2, the inverter will shut down the AC output. When pin 1 is disconnected from pin 2, the inverter will output normally.
Switch signal output	When the battery voltage reaches the discharge limit voltage (parameter 15), the voltage from pin 3 to pin 1 is 0V. When the battery is charging and discharging normally, the voltage from pin 3 to pin 1 is 5V.
Temperature sampling (reserved)	Pins 1 and 4 can be used for battery temperature sampling compensation.
Remote start and stop of generators	When the battery voltage reaches the low voltage alarm (parameter 14) or the voltage point at which the AC power switches to the battery (parameter 04), pins 6 to 5 are normally open, and pins 7 to 5 are normally closed. When the battery voltage reaches the voltage point at which the battery switches to the AC power (parameter 05) or the battery is fully charged, pins 6 to 5 are normally closed, and pins 7 to 5 are normally open. (Pins 5/6/7 output 125Vac/1A, 230Vac/1A, 30Vdc/1A)

The generator switch signal is generally used to remotely start/stop the generator. Please ensure that the generator supports the remote start/stop function.

11. Parallel Operation Instructions (Only for models equipped with parallel boards)

11.1 Introduction

- Six units can be max connected in parallel.
- When using the parallel function, the parallel communication cable must be connected correctly, firmly and reliably. The following is a diagram of the connection line (packaging accessories)

Parallel communication cable*1



11.2 Notice for connecting the parallel cable

Warning

1) PV wiring

When connected in parallel, different inverters need to be connected to different PV arrays or PV sources. The same PV cannot be connected to different inverters, and the PV1 and PV2 of the machine cannot be connected to the same PV source.

2) Battery wiring

When connecting single-phase or three-phase inverters in parallel, all inverters must be connected to the same battery, with BAT+ connected to BAT+ and BAT- connected to BAT-. Ensure that the connections are correct and the wire length and diameter are the same before powering on to avoid incorrect connections that may cause malfunction of the parallel system output.

3) AC OUT wiring

a. Single-phase parallel line

When connecting single-phase inverters in parallel, all inverters must be connected with L to L, N to N, and PE to PE. Ensure that the connections are correct and the wire length and diameter are the same before powering on to avoid incorrect connections causing malfunction of the parallel system output. For wiring, refer to the diagram in 2.4.3.

b. Three-Phase Parallel Connections

For three-phase parallel connection, all inverters must connect their N leads to N and their PE leads to PE. The L leads of all inverters on the same phase must be connected together, but L leads of AC outputs on different phases must not be connected together. Other precautions apply to single-phase parallel connection. Refer to the diagram in 2.4.4 for wiring.

4) AC IN Wiring

a. When connecting single-phase inverters in parallel, all inverters must be connected with L to L, N to N, and PE to PE. Ensure correct connections and consistent wire lengths and diameters before powering on to avoid incorrect connections that could cause malfunction of the parallel system output. Also, avoid multiple different AC input sources to avoid damage to the inverter or external electrical equipment. Ensure the AC input source is consistent and unique. Refer to the wiring diagram in 11.3.

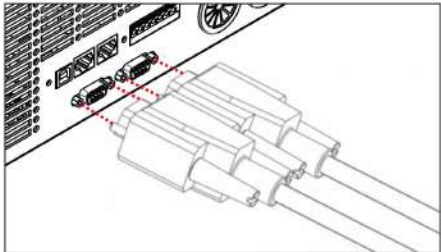
b. When connecting three-phase inverters in parallel, all inverters must connect their N wires to N wires and their PE wires to PE wires. The L wires of all inverters on the same phase must be connected together, but L wires of AC inputs from different phases must not be connected together. Other precautions are the same as for single-phase parallel connection. Wiring reference 11.4 Schematic.

5) Parallel Communication Cable Wiring:

Our parallel communication cables are shielded DB15 standard computer cables, suitable for single-phase or three-phase parallel connection. Each unit must be connected with one input and one output. This means the male connector (output) of one unit must be connected to the female connector (input) of the unit to be paralleled. Do not connect the male connector of one unit to the female connector of another unit. Ensure that the DB15 terminal screws on each unit are securely fastened to prevent loosening or poor contact, which could cause system output malfunction or damage.

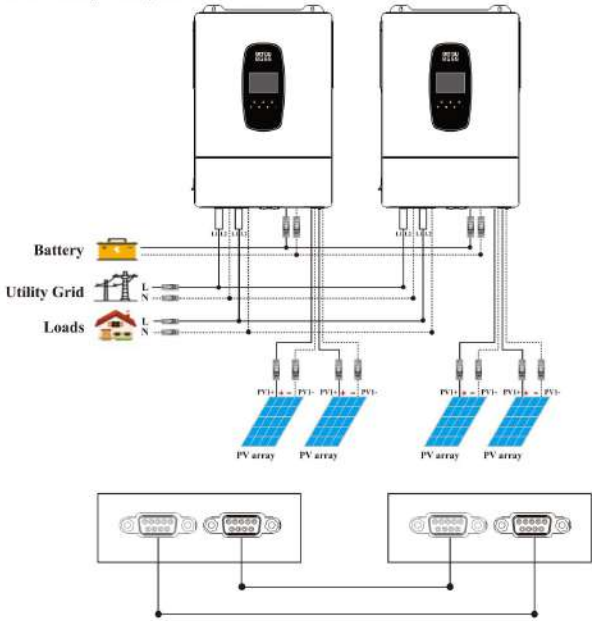
11.3 Single-Phase Parallel Wiring Guide Diagram (AC Phase Mode = 0)

- 1) After the inverter parallel communication cable is connected, it needs to be tightened with screws. The diagram as follows

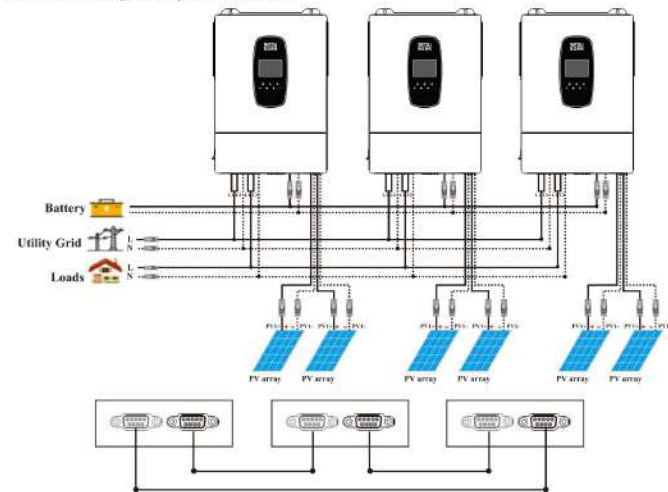


- 2) Configure Parameter [31] to "PAL." Configure Parameter [68] to "0°." When Parameter [38] is set to 120Vac, the output phase voltage L-N equals 120Vac.

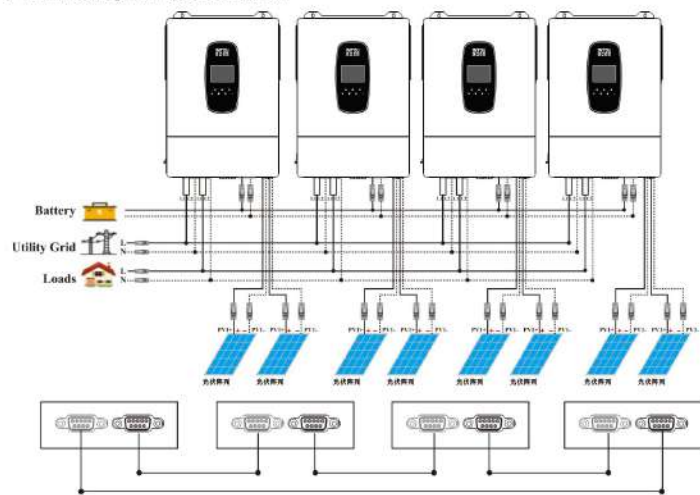
a. Two inverters parallel system connection:



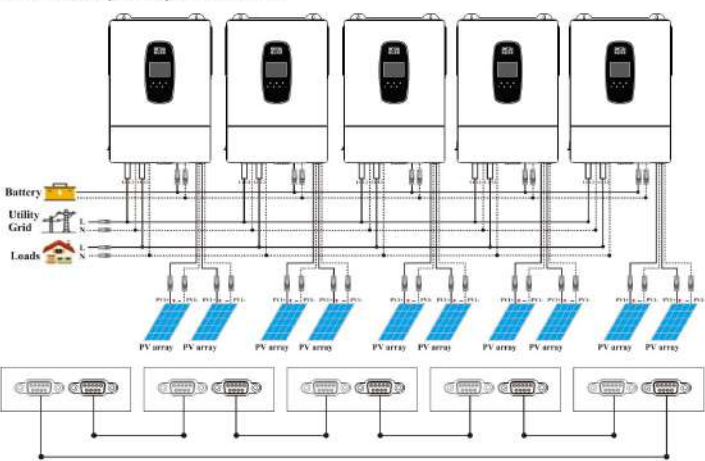
b. Three inverters parallel system connection:



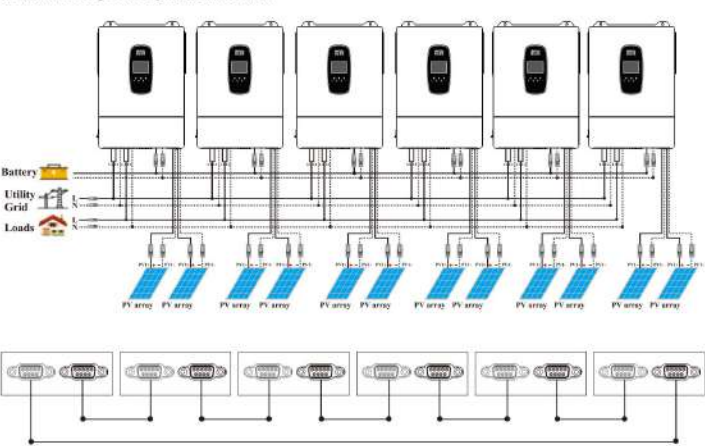
c. Four inverters parallel system connection:



d. Five inverters parallel system connection:



e. Six inverters parallel system connection:



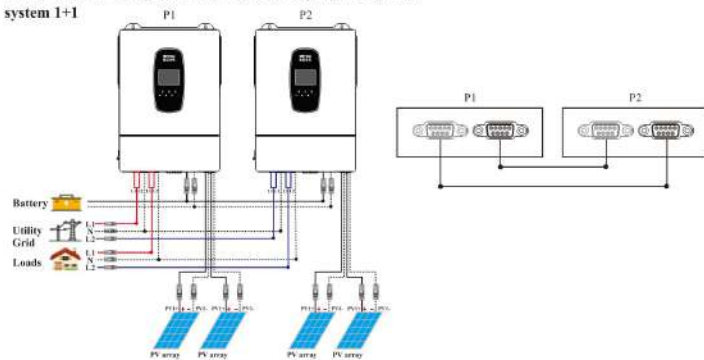
11.4 Two-Phase Split-Phase Parallel Wiring Guide Diagram (AC Phase Mode = 0)

1) Configure P1 unit [31] to "2P0." Configure P2 unit [31] to "2P1." Parameter [68] remains fixed at "0°" (not adjustable). The phase difference between P1 and P2 is 120°. When Parameter [38] is set to 120Vac; The line voltage L1-L2 (P1 L1 to P2 L2) equals 208Vac. The phase voltage L1-N equals 120Vac.

Case 2:
2) Configure P1 unit [31] to "2P0." Configure P2 unit [31] to "2P2." Parameter [68] remains fixed at "0°" (not adjustable). The phase difference between P1 and P2 is 180°. When Parameter [38] is set to 120Vac; The line voltage L1-L2 (P1 L1 to P2 L2) equals 240Vac. The phase voltage L1-N equals 120Vac.

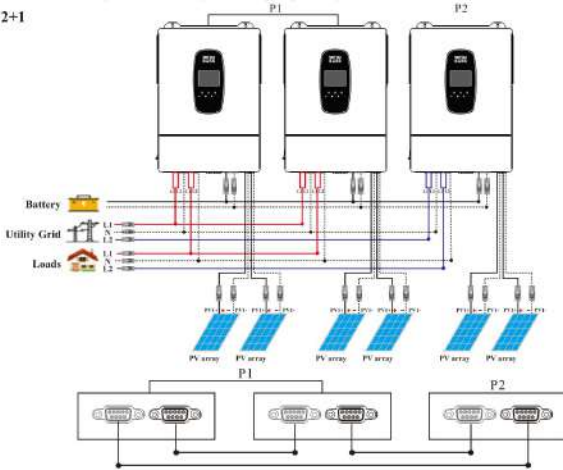
a. Two inverters configured in this way form a split-phase system:

system 1+1



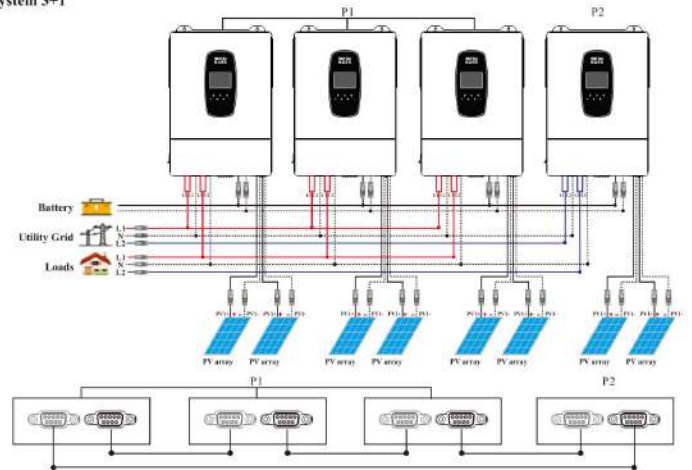
b. Three inverters configured in this way form a split-phase system:

system 2+1

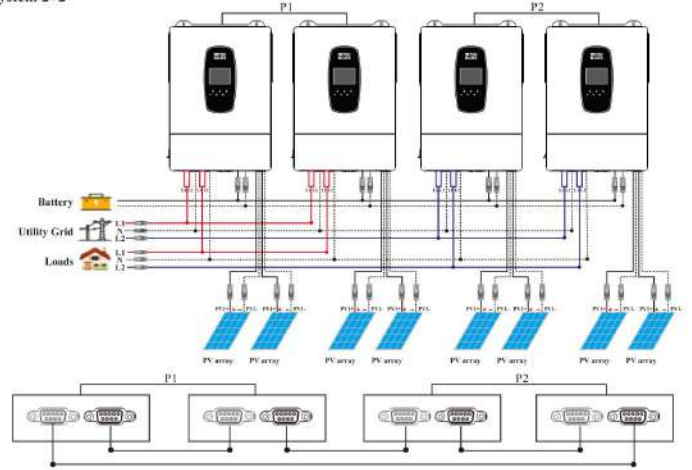


c. Four inverters configured in this way form a split-phase system:

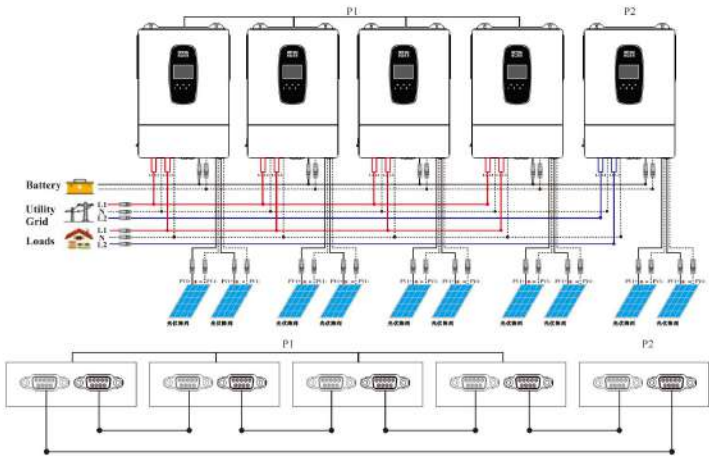
system 3+1



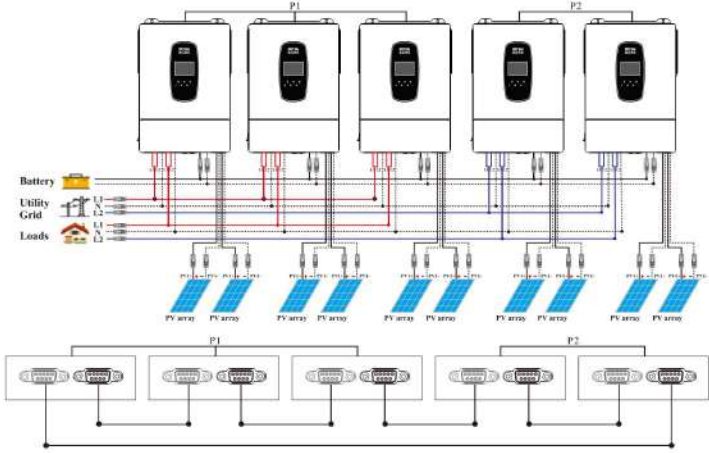
system 2+2



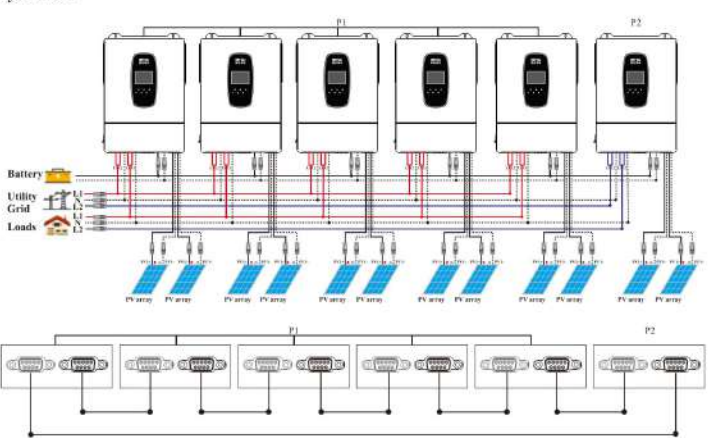
d. Five inverters configured in this way form a split-phase system:
system 4+1



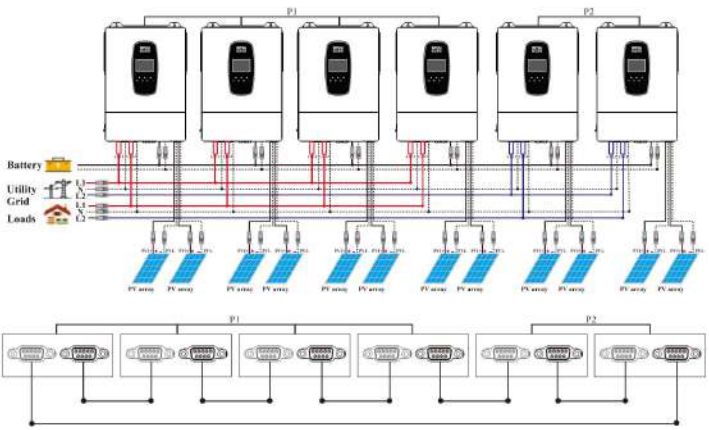
system 3+2



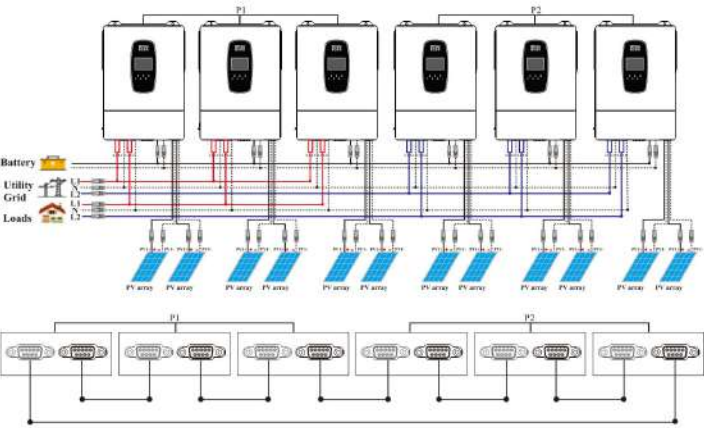
e. Six inverters configured in this way form a split-phase system:
system 5+1



system 4+2

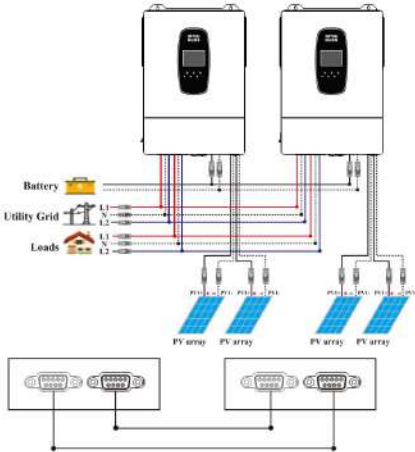


system 3+3

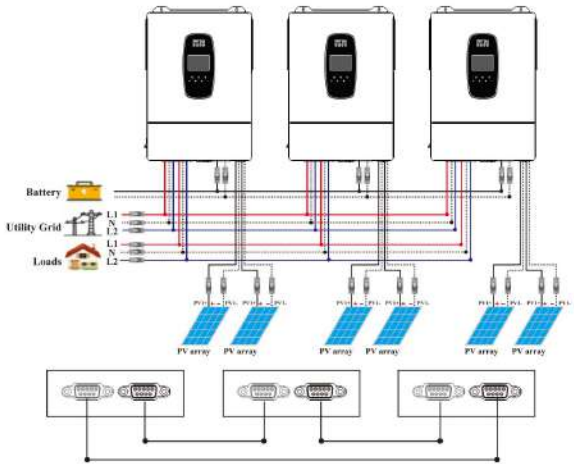


11.5 Split-Phase Parallel Connection (AC Phase Mode = 180°)
Configure Parameter [31] to "PAL." Configure Parameter [68] to 180°. When Parameter [38] is set to 120Vac:
The line voltage L1-L2 equals 240Vac. The phase voltages L1-N and L2-N both equal 120Vac.

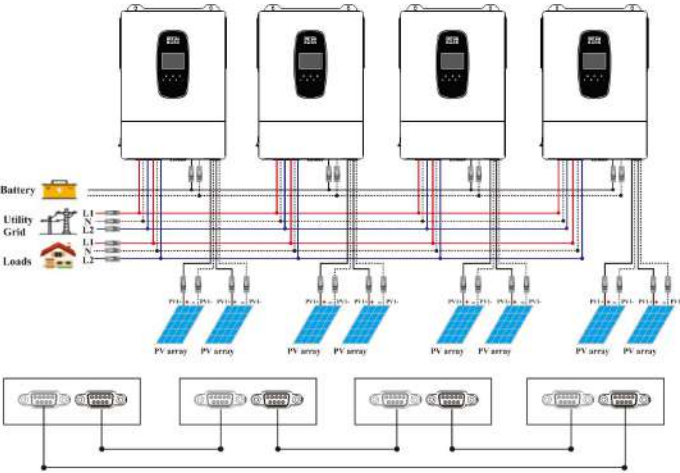
a. Two inverters parallel system connection:



b. Three inverters parallel system connection:



c. Four inverters parallel system connection:



Notice:

Parallel mode setting, you need to be in standby mode (connect the battery, turn the power button to ON and then back to OFF to enter standby mode).

- 1) Before powering on the screen, check whether the wiring is correct according to the wiring diagram above to avoid system problems.
- 2) All connections must be securely fastened to prevent the wires from falling off and causing system malfunction.
- 3) When connecting the AC output to the load, the wiring must be done correctly according to the requirements of the electrical load equipment to avoid damage to the load equipment.
- 4) Ensure Parameter [38] is set consistently across all units, or configure it only on the master unit. During parallel operation, the system follows the voltage setting of the master unit. The master unit will automatically overwrite the slave units to keep settings consistent. You can configure this option only in standby mode.
- 5) Each unit is set to single-unit mode by default at the factory. To enable parallel or three-phase operation, you must configure Parameter [31] via the display. Configuration procedure:
 - Power on only one unit at a time, keeping all other units switched off.
 - Set Parameter [31] according to the required system operating mode.
 - After completing the setting, switch off the unit and wait until it is fully powered down.
 - Repeat the process for all other units.
 - Once configuration is complete, power on all units simultaneously to enter normal operation.

Single-Phase Parallel Operation

Set Parameter [31] = PAL, Set Parameter [68] = 0°, When Parameter [38] = 120Vac, the output phase voltage L-N = 120Vac.

Two-Phase Split-Phase Parallel Operation

Case A (120° phase difference): Set P1 unit [31] = 2P0, Set P2 unit [31] = 2P1, Parameter [68] defaults to 0° (non-adjustable). The phase difference between P1 and P2 = 120°. When Parameter [38] = 120Vac: The line voltage L1-L2 (P1 L1 to P2 L2) = 208Vac, The phase voltage L1-N = 120Vac.

Case B (180° phase difference): Set P1 unit [31] = 2P0, Set P2 unit [31] = 2P2, The phase difference between P1 and P2 = 180°. When Parameter [38] = 120Vac: The line voltage L1-L2 (P1 L1 to P2 L2) = 240Vac, The phase voltage L1-N = 120Vac

Split-Phase Parallel Operation

Set Parameter [31] = PAL, Set Parameter [68] = 180°, When Parameter [38] = 120Vac:
The line voltage L1-L2 = 240Vac, The phase voltages L1-N = 120Vac, L2-N = 120Vac

Three-Phase Parallel Operation

Set P1 unit [31] = 3P1, Set P2 unit [31] = 3P2, Set P3 unit [31] = 3P3, Parameter [68] defaults to 0° (non-adjustable). The phase difference between P1-P2, P1-P3, and P2-P3 = 120°.

When Parameter [38] = 120Vac: The line voltage L1-L2, L1-L3, L2-L3 = $120 \times 1.732 = 208\text{Vac}$

- 6) After the system is running, measure the output voltage and make sure it is correct before connecting the load.

Warranty Card

Customer Name: _____ Tel.: _____

Address: _____

Brand: _____ Model: _____

Serial No.: _____ Date of Purchase: _____

Bought From: _____

Invoice Number: _____ Invoice Price: _____

Warranty Instruction

- Please keep this warranty card as proof of maintenance.
- The warranty period is 1 year from the date of purchase.
- During the warranty period, under the condition of normal use and maintenance, if damage caused by the product's own quality, the company will provide free repair and replacement parts after verification.
- The company reserves the right to maintain and interpret all contents.

Free maintain won't be given under the following circumstance:

- The damage caused by the manipulation that hasn't follow the requests of the manual.
- The product has been repaired, modified by technicians other than our company's, and any internal parts of the product have been replaced by users.
- The product number has been altered or product is inconsistent with the warranty card.
- Damage caused by careless use, penetration of water or other substances into the product.
- Damage caused by accident or natural disaster.

Certificate

Name: _____

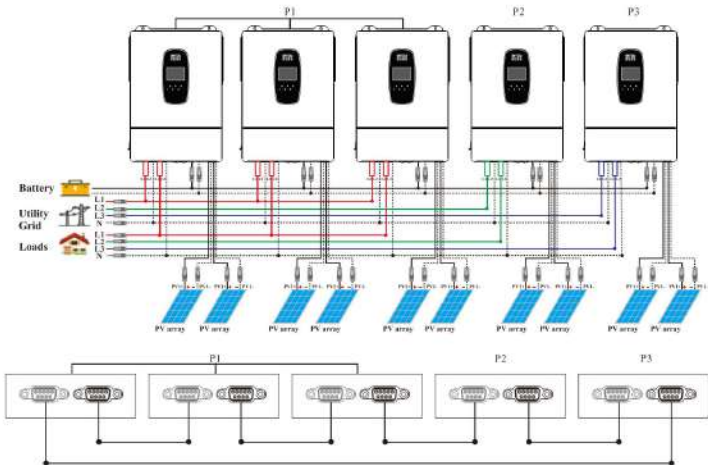
Model: _____

Inspectors: _____

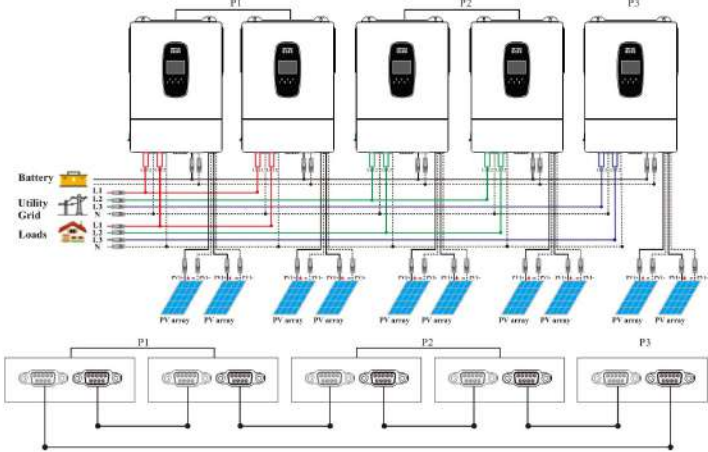
Date: _____

Products have been tested qualified by standard and permitted to deliver.

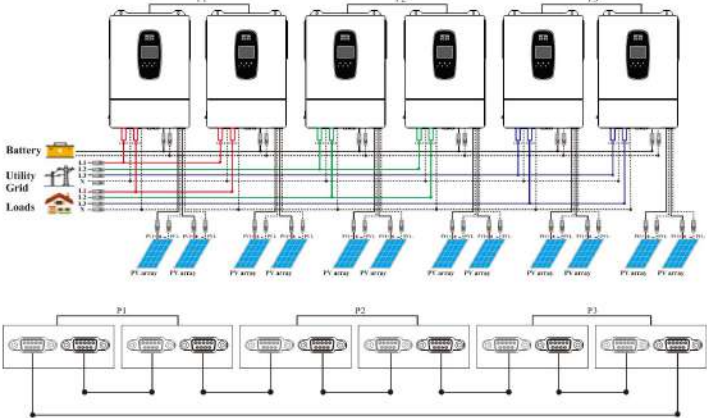
c. Five inverters combined into three phase system:
system 3+1+1



system 2+2+1



d. Six inverters combined into three phase system:
system 2+2+2



system 3+2+1

