All in one system
(off-grid version)

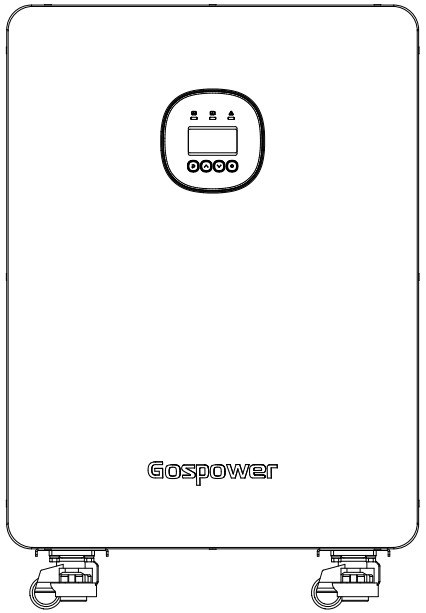
Version 1.0

Gospower

User Manual

All in one system

GPSO-03K6L1-052A



Contents

ABOUT THIS MANUAL

Purpose

This manual describes the assembly, installation, operation, warning code and fault code 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. Before 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 risk of injury, charge only deep-cycle lead acid type rechargeable batteries. 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. Fuse is 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.
14. **WARNING!!** This series of off-grid inverters provides a backfeed function without grid-tie protection. If enabled, implement protective measures prior to operation. The customer assumes full liability for any accidents resulting from the use of this function.

WARNING MARKS

Warning marks inform users of conditions which can cause serious physical injury or death, or damage to the device. They also tell users how to prevent the dangers. The warning marks used in this operation manual are shown below:

Mark	Name	Instruction	Abbreviation
Danger	Danger	Serious physical injury or even death may occur if not follow relevant requirements.	
Warning	Warning	Physical injury or damage to the device may occur if not follow relevant requirements.	
Forbid	Electrostatic sensitive	Damage may occur if relevant requirements are not followed.	
Hot	High temperature	Do not touch the base of the inverter as it will become hot.	
Note	Note	The procedures taken for ensuring proper operation.	Note

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-confiqurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

Features

- Pure sine wave inverter
- Built-in MPPT solar charge controller
- Confiqurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload / Over temperature / short circuit protection
- Inverter running without battery
- Lithium battery activation function
- Cold start function
- The 3.6KW support 12 units in parallel.
- Intelligent fan control greatly reduces fan noise

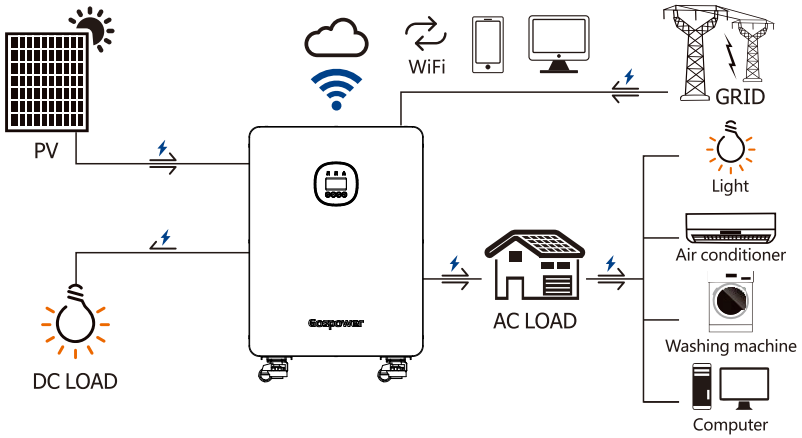
Basic System Architecture

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

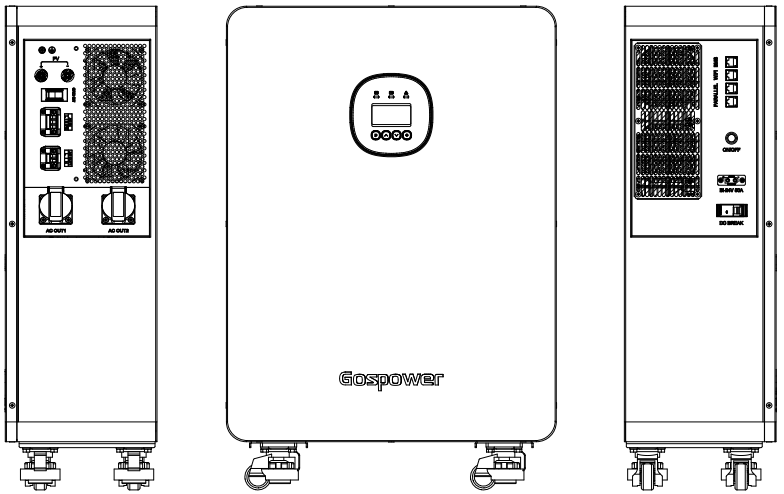
- Generator or Utility
- PV modules (option)

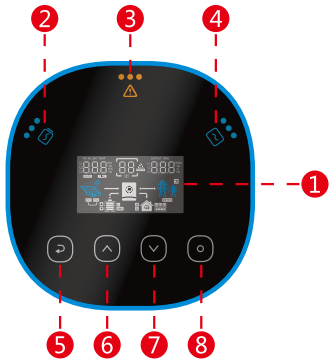
Consult with your system integrator for other possible system architectures depending on your reguirements.

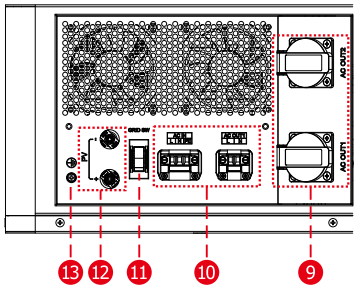
This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

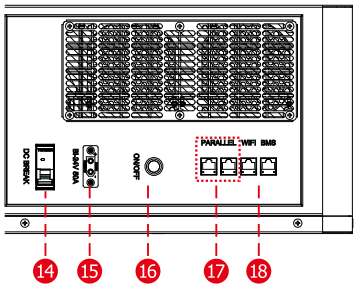


PRODUCT OVERVIEW



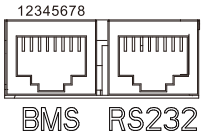






1. LCD display
2. Charging indicator
3. Fault or warning indicator
4. Utility bypass/Inverter indicator
5. ESC button
6. UP button
7. Down button
8. Enter button
9. Three-prong outlet
10. AC input(3P)/AC output(2P)
11. AC input switch
12.PV input connection port
13. Ground port
14. DC circuit breaker
15. DC output (24V50A)
16. Switch
17. Parallel connection-CAN port
18. WIFI stick interface

*Definition of BMS communication port pin

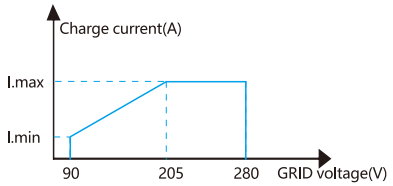
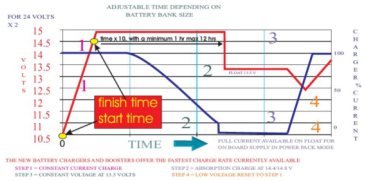


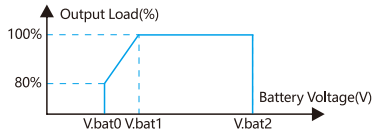
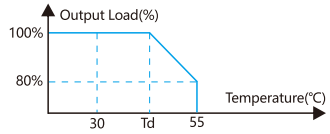
NO.	BMS	RS-232
1	NC	RS232-TXD
2	NC	RS232-RXD
3	RS232-TXD	VDD
4	RS232-RXD	VSS
5	VSS	NC
6	VSS	NC
7	NC	NC
8	NC	VSS

All in one system(off-grid version)

SPECIFICATIONS

Line Mode Specifications	
Model	**GPSO-03K6L1-052A**
Rated Output Power	3600VA
	3600W
Nominal DC Input Voltage	24V
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Line Voltage Disconnect	90Vac±3V(For Home Appliances: APL)170Vac±3V(For Computers: UPS)
Low Loss Voltage Re-connect	100Vac±3V(For Home Appliances: APL)180Vac±3V(For Computers: UPS)
High Line Voltage Disconnect	280Vac±3V
High Line Voltage Re-connect	270Vac±3V
Max AC Input Voltage	280Vac±3V
Nominal Input Frequency	50Hz/60Hz(Auto detection)
Low Line Frequency Disconnect	40±1Hz
Low Line Frequency Re-connect	42±1Hz
High Line Freguency Disconnect	65±1Hz
High Line Frequency Re-connect	63±1Hz
Output Voltage Waveform	As same as input waveform
Output Short Circuit Protection	Line mode: Circuit Breaker; Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95%(Rated R load, battery full charged)
Transfer Time (Single unit)	10ms typical (UPS); 20ms typical (Appliances)
Transfer Time (Parallel)	50ms typical
Pass Through Without Battery	Yes
Max. Bypass Overload Current	20A
Max. Bypass Input Current	20A
Max. Inverter/Rectifier Current	16.2A/3600W

Utility Charge Mode Specifications			
Model	**GPSO-03K6L1-052A**		
Nominal Input Voltage	230Vac		
Input Voltage Range	90-280Vac		
Nominal Output Voltage	Dependent on battery type		
Max. Grid Charge Current	125A		
Charge Current Regulation	1-125A-Max. Grid Charge Current (Adjustable unit is 1A)		
Over Charge Protection	Yes		
Grid charging Current (I.max/I.min)	125A/30A		
Relationship between battery charging current and grid voltage.			
Solar Charging & Grid Charging			
Max. PV Open Circuit Voltage	500V		
PV voltage range	75V-425V		
Max. Input Power	4500W		
Max. Solar Charging Current	125A		
Max. Charging Current(PV+Grid)	125A		
Max.PV Input Current	18A		
Min. Startup Voltage	75V		
Charge Algorithm			
Algorithm	**Three stage:** Boost CC (Constant current stage)-> Boost CV(Constant voltage stage)-> Float FV(Constant voltage stage)		
Charging Curve			
Battery Type Setting	Battery Type	Boost CC/CV	Float
	AGM	28.2V	27V
	Flooded	29.2V	27V
	Self-defined	Adjustable, up to 30V	
	Lithium		

Inverter Mode Specifications	
Model	**GPSO-03K6L1-052A**
Rated Output Power	3600VA
	3600W
Nominal DC Input Voltage	24V
DC Max.charging/Discharging current	125/170A
Output Voltage Waveform	Pure sine wave
Nominal Output Voltage	230Vac±5%
Nominal Output Frequency(Hz)	50±0.3Hz/60±0.3Hz(Adjustable)
Parallel capability	Yes, up to 12 units
Peak Efficiency	93%
Over-Load Protection(SMPS load)	2s@≥150%load; 10s@105%~150%load
Surge Rating	2* rated power for 2s
Capable of Starting Electric	Yes
Output Short Circuit Protection	Yes
Cold Start Voltage	23V
Low DC Input Shut-down Load < 50%/@Load ≥ 50%	21.5V/21V
High DC Input Alarm & Fault	31V±0.2V
High DC Input Recovery	29V±0.2V
Battery Voltage Limitation (V.bat0/V.bat1/V.bat2)	21V/24V/31V
When battery voltage is lower than "V.bat1", output power will be derated. The minimum AC output voltage is 180V.	
Temperature Limitation(Td)	45℃
When ambient temperature is higher than 40℃/45℃, output power will be derated. The minimum Ac output voltage is 180V.	
General Specifications	
Operating Temperature	-10C°~55C°
Range Storage Temperature	-15C°~60C°
Net Weight(kg)	59kg
Gross Weight(kg)	66kg
Product Size(D*W*H)	733x500x230mm
Package Dimension(D*W*H)	820x590x390mm

INSTALLATION

Safety Guidance

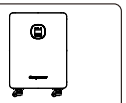
Warning marks inform users of conditions which can cause serious physical injury or death, or damage to the device. They also tell users how to prevent the dangers. The warning marks used in this operation manualare shown below:

WARNING!! Do not push or pull the machine from its front or back until it has been properly installed.

	• After receiving this product, first confirm the product package is intact. If any question, contact the logistic company or local distributor immediately. • The installation and operation ofinverter must be carried out by professional technicians who have received professional trainings and thoroughly familiar with all the contents in this manual and the safety requirements of the electrical system.
	• Do not carry out connection/disconnection, unpacking inspection and unit replacement operations on the inverter when power source is applied. Before wiring and inspection, users must confirm the breakers on DC and AC side of inverter are disconnected and wait for at least 5 minutes.
	• Ensure there is no strong electromagnetic interference caused by other electronic or electrical devices around the installation site. • Do not refit the inverter unless authorized. • All the electrical installation must conform to local and national electrical standards.
	• Do not touch the housing of the inverter or the radiator to avoid scald as they may become hot during operation.
	• Ground with proper technics before operation.
	• Do not open the surface cover of the inverter unless authorized. The electronic components inside the inverter are electrostatic sensitive. Do take proper anti-electrostatic measures during authorized operation.
	• The inverter needs to be reliably grounded.
	• Ensure that DC and AC side circuit breakers have been disconnected and wait at least 5 minutes before wiring and checking.

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:


Inverter unit x 1


Manual x 1


mains terminal and output terminal x 1


WiFi module x 1


Self-tapping screw x 2
M4 x 2


Case grounding screw x 1


Locking wall bracket x 1


Parallel communication cable and connector x 1

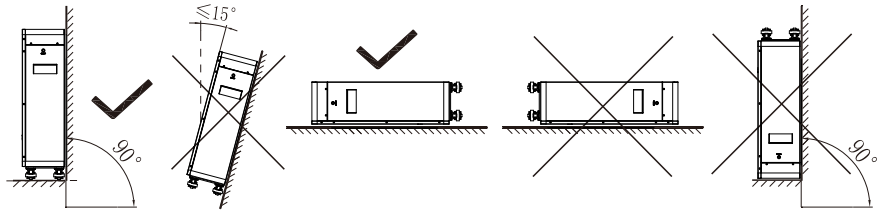

Parallel communication connector x 1

Installation location

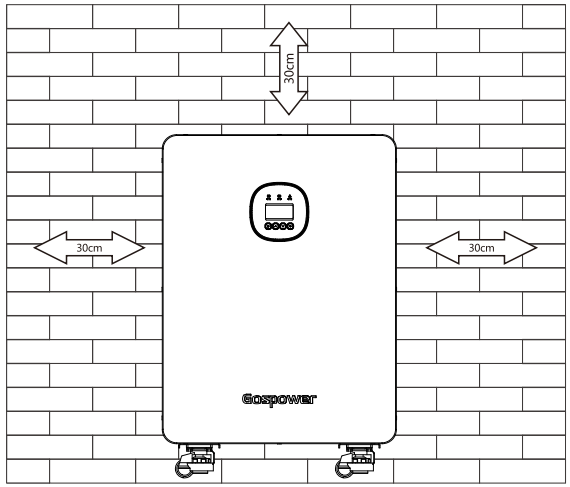
Before selecting the installation location, please consider the following points:

- Do not install the solar inverter all-in-one machine on fammable building materials
- The ambient temperature should be between -10 'c and 55 'c to ensure optimal operation of the inverter.
- The installation posture is to place it on a horizontal qround to prevent tipping.
- Ensure that the distance between the surface of other objects placed and the inverter is as shown in the figure below, to ensure that the solar inverter integrated machine has sufficient space for heat dissipation and can remove wires.

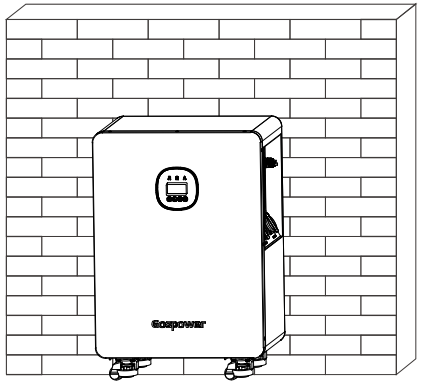
SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

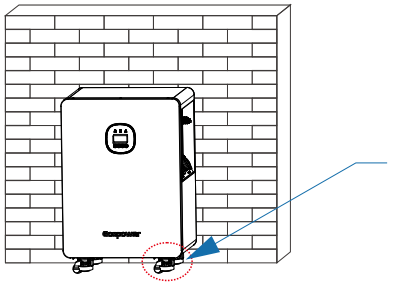


◆ In order to ensure good heat dissipation and convenience in operation and maintenance, sufficient clearance shall be reserved while installing the battery. An example of such clearances are shown in the figure below. Please strictly follow the local battery installation guidelines, where applicable.



- Place the battery vertically in the installation.
- After placement, adjust the wheels to a fixed foot position for support, and all four wheels must be horizontal. Then rotate the fixing valve of the wheel to the right, and let the wheel be fixed in place.
- Installation is complete.





Horizontal adjustment nut

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 30A.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect input and output connectors.
WARNING! All wiring must be performed by qualified personnel.
WARNING! It's very important for system safety and eficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

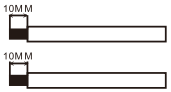
Suggested cable requirement for AC wires:

Model	Gauge	Cable (mm²)	Torque Value
3.6KW	10AWG	6	1.2 Nm

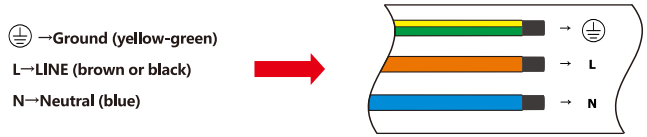
Recommended circuit breaker type for AC input:

Models	Maximum bypass	Recommended circuit breaker
3.6KW	28A	2P-30A

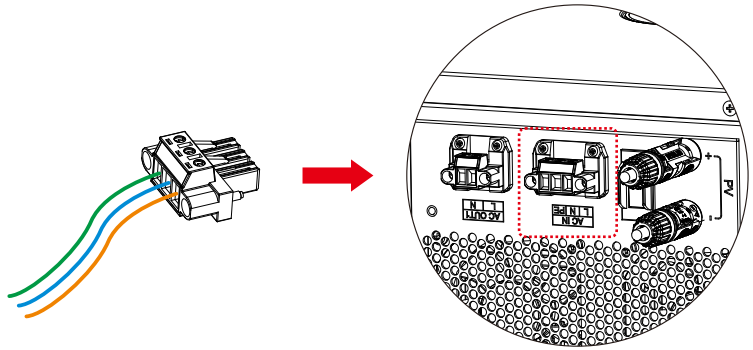
Please follow below steps to implement AC input/output connection:



1. Before making AC inputloutput connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And pressing ring terminal.

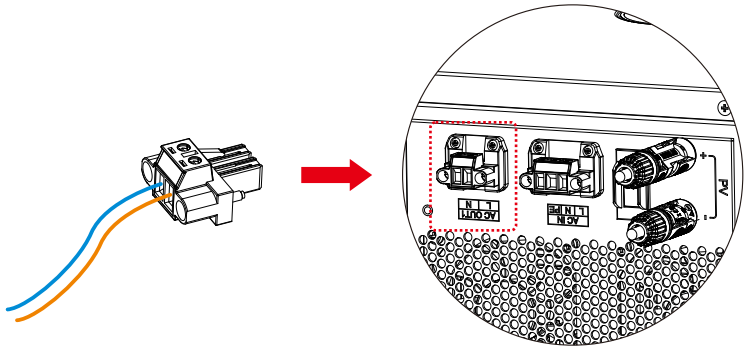


3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sureto connect PE protective conductor (⏚) first.



WARNING:
Be sure that AC power source is disconnected before attempting to hardwire it to the unit. Each connection must be securely fastened. The exposed copper wires between the wires should not come into contact with each other; otherwise, there is a risk of fire.

4. Then, insert AC output/Generator input wires according to polarities indicated on terminal block and tighten terminal screws.Be sure to connect PE protective conductor (⏚) first.



5. Make sure the wires are securely connected.

CAUTION: Important Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.
CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.
WARNING! All wiring must be performed by qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Cable Size	Cable (mm²)	Torque
3.6KW	10AWG	6	1.2Nm

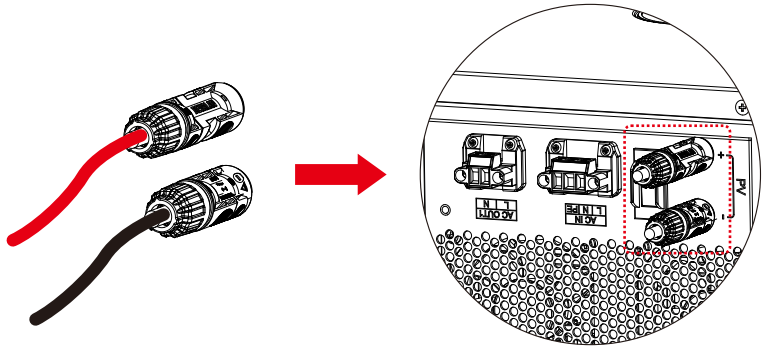
PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Max. power voltage (Vmp) should be during PV array MPPT voltage range.

Solar Charging Mode	
INVERTER MODEL	3.6KW
Max. PV Array Open Circuit Voltage	500V
PV Array MPPT Voltage Range	85Vdc~450Vdc

Please follow below steps to implement PV module connection:
1. Remove insulation sleeve 10mm for positive and negative conductors.

2. Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

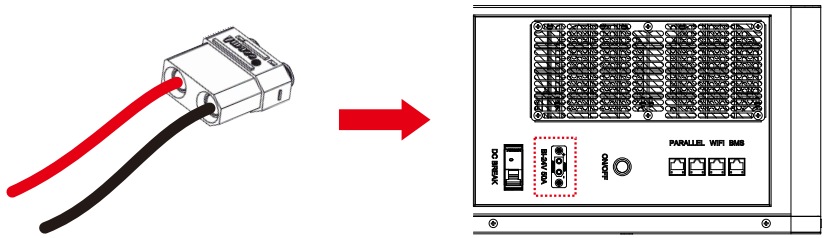


3. Make sure the wires are securely connected.

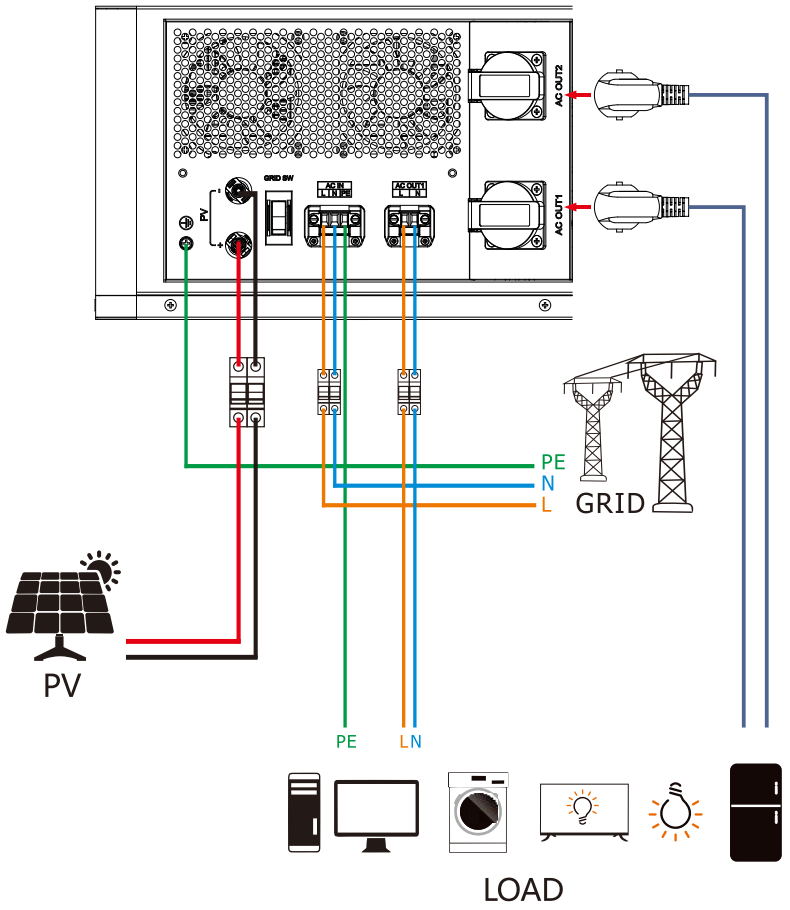
DC Connection

CAUTION: This port is a direct current output port. Please use it according to the specifications marked above (24V 50A). Otherwise, it will damage the machine or the electrical equipment!
WARNING! All wiring must be performed by qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for connection. To reduce risk of injury, please use the proper recommended cable size as below.
WARNING! Please connect the device when the power is off or the circuit breaker is not closed. Do not plug or unplug it while the device is powered on.

Model	Cable Size	Cable (mm²)	Torque
3.6KW	8AWG	8	1.2Nm



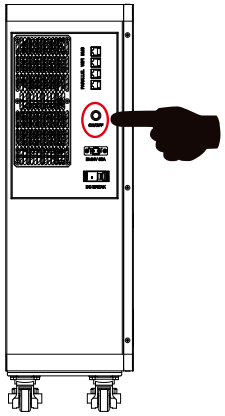
Wiring System for Inverter



PV+ PV- L wrie N wrie PE wrie Binch power cord

OPERATION

Power ON/OFF



Press the button (when the button is in the pressed state), the all-in-one machine will be started. Wait for 10 seconds. Once the all-in-one machine is fully started, it will begin to output energy. Press the button again (when the button is not pressed), the power supply of the all-in-one machine will be cut off, and the output will stop. Wait for 10 seconds, and the screen of the all-in-one machine will go dark. Note: When the all-in-one machine is not in use, please turn off the power output!

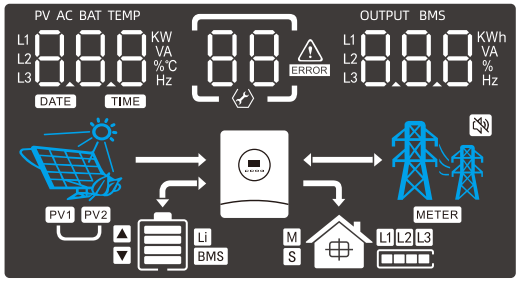
Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

Function Key	Icon	Description
ESC		To previous page
UP		To go to previous selection
DOWN		To go to next selection
ENTER		To confirm the selection or go to next page

LED indicator	Icon	Description
Battery		Charging the battery, the LED light flash. If battery is full, the LED light will always-on. The battery is not charged, the LED light will go out.
Utility		Inverter running in utility mode, the LED will always-on.
Inverter		Inverter running in off-grid mode, the LED light will flash. Inverter is not running in off-grid mode, the LED light will go out.
Fault		If inverter in fault event, the LED light will always-on. If inverter in warning event, the LED light will flash. Inverter work normally, the LED light will go out.
Buzzer Information		
Buzzer beep		Press any button, the buzzer will last for 0.1s. Hold on the "ENTER" button. the buzzer will last for 3s. If in fault event, the buzzer will keep going. If in warning event, the buzzer will beep discontinuous (Check more information on the chapter of "Warning Code Table").

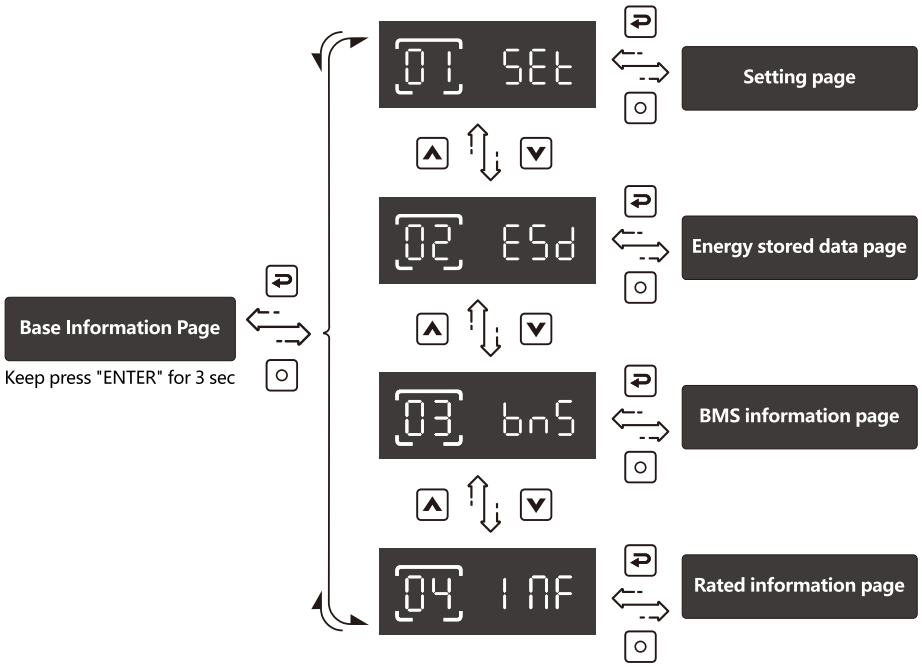
LCD display Icons



Icon	Function description
Input Source Information	
PV AC BAT TEMP L1 L2 L3 KW VA %°C Hz	Indicate input voltage, input frequency, PV voltage, PV power, battery voltage and charger current.
Configuration Program and Fault Information	
	Indicates the setting programs.
ERROR	Indicates the warning and fault codes. Warning: flashing with warning code. Fault: lighting with fault code.

Output Information	
OUTPUT BMS L1 L2 L3 Kwh VA % Hz	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
	Indicates battery level by 0-24%,25-49%,50-74% and 75-100%. The battery is connected normally, this icon is always on.
	If the inverter is in the process of lithium battery activation, or the battery is not connected, or the inverter is not connected to the grid and the battery voltage is low, this icon will flash.
Li	Indicates Lithium battery type.
BMS	BMS Indicates communication is built between inverter and BMS. Indicates BMS allows battery discharge. Indicates BMS allows battery charge. Force charge occurs if icon flash.
Mode Operation Information	
	Indicates load is supplied by utility directly.
	Indicates the utility charger circuit is working.
	Indicates the inverter/charger is working.
	Indicates PV MPPT is working to power load.
	Indicates PV MPPT is working to charge battery.
	Indicates battery is discharging to load.
Mute Operation	
	Indicates unit alarm is disabled.

LCD operation flow chart

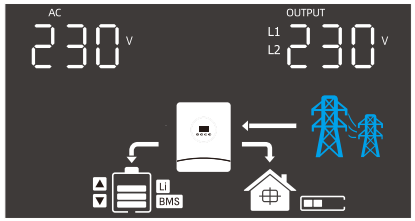


On base information page, pressing and holding "ENTER" key for 3 sec, the unit will enter parameters page. Press "UP" or "DOWN" key to switch the selection and press "ENTER" key to enter selected page. Press "ESC" key to back to previous page.

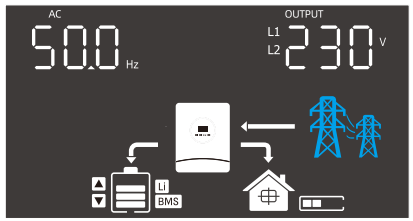
Base information Page

1. The base information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order: (Take the 48V model for example).
2. The 2nd AC output is enabled in program 64, the "L1" or "L2" icon on the LCD will be showed, only show "L1" represent to main AC output data, only show "L2" represent to 2nd AC output data. show "L1" and "L2" represent to all AC output data("L1" + "L2").

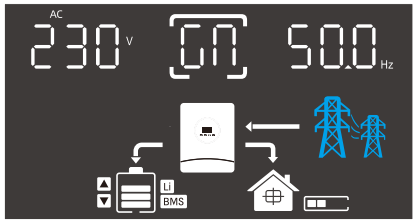
Input voltage Output voltage
Utility voltage is 230V, output voltage is 230V



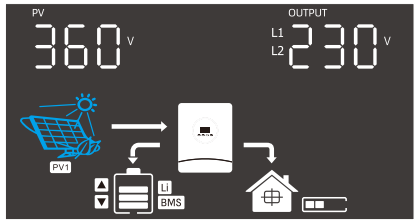
Input frequency / Qutput voltage
Utility frequency is 50.0Hz, output voltage is 230V



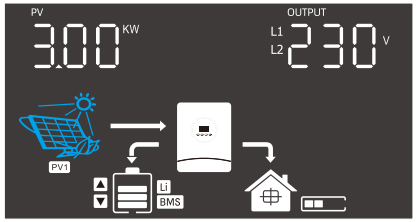
Generator voltage/Generator frequency
Generator input voltage 230V, input frequency 50.0Hz



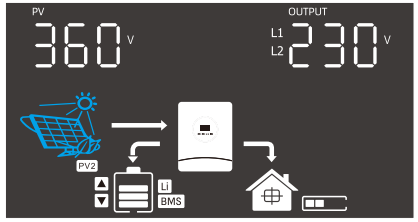
PV1 voltage / Output voltage
PV1 voltage is 360V, output voltage is 230V



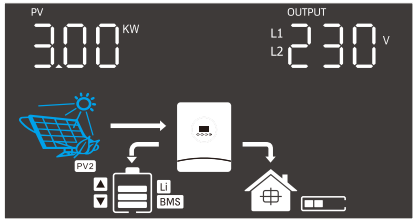
PV1 power / Output voltage
PV1 power is 3.00kW, output voltage is 230V



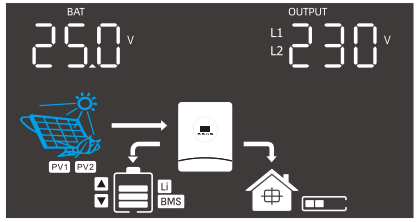
PV2 voltage / Output voltage
PV2 voltage is 360V, output voltage is 230V



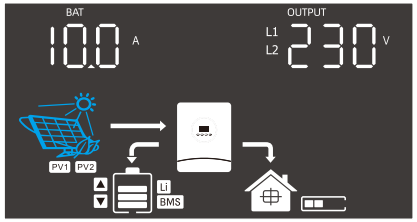
PV2 power / Output voltage
PV2 power is 3.00kW, output voltage is 230V



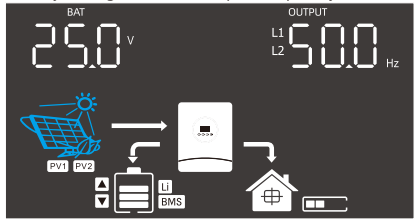
Battery voltage / Output voltage
Battery voltage is 25.0V, output voltage is 230V



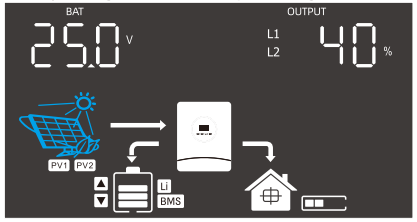
Charging current / Output voltage
Charging current is 10A, output voltage is 230V



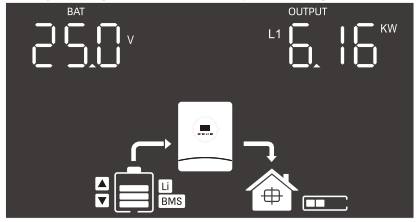
Battery voltage / Output frequency
Battery voltage is 25.0V, output frequency is 50.0Hz



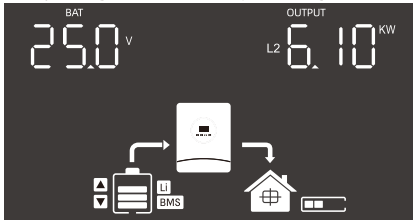
Battery voltage / Load percentage
Battery voltage is 50.0V, load percentage is 40%



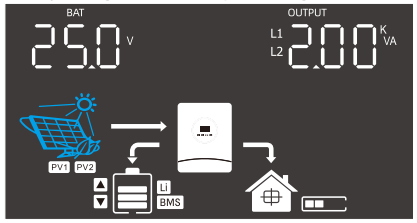
Battery voltage / L1 Load wattage
Battery voltage is 25.0V, L1 output wattage is 6.16kW



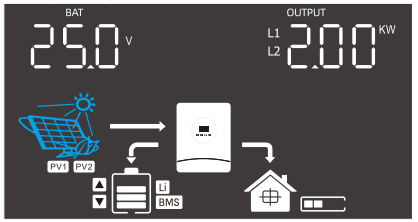
Battery voltage / L2 Load wattage
Battery voltage is 25.0V, L2 output wattage is 6.10kW



Battery voltage / Load VA
Battery voltage is 25.0V, output wattage is 2.00kVA

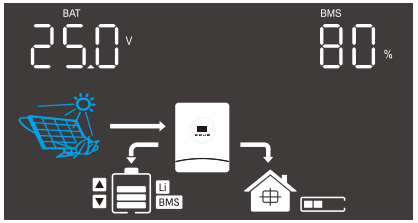


Battery voltage / Load wattage
Battery voltage is 25.0V, output wattage is 2.00kW

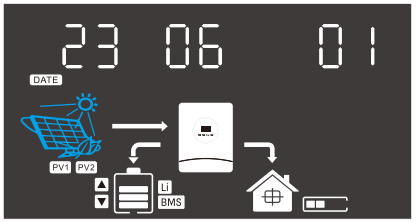


Battery voltage / Discharging current
Battery voltage is 25.0V, discharging current is 80A

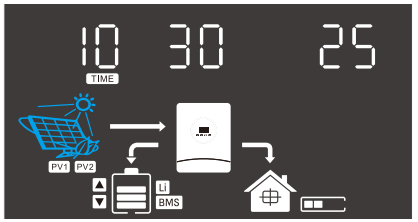
Battery voltage / SOC
Battery voltage is 25.0V, SOC is 80%



Date
2023-06-01



Time
10: 30: 25



Setting Page

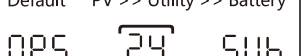
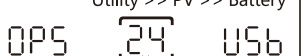
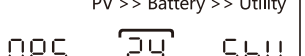
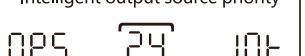
Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.
Keep pressing UP or DOWN button after 1.5 seconds, it will increase or decrease setting value quickly.

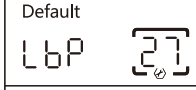
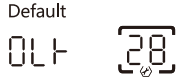
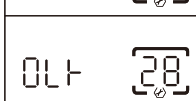
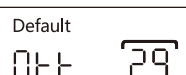
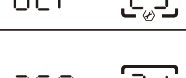
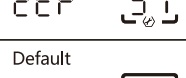
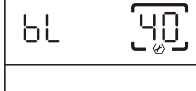
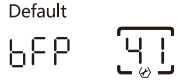
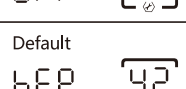
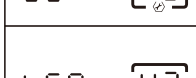
Setting items:

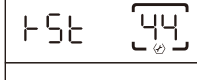
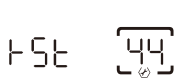
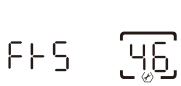
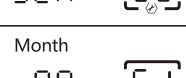
		Selectable option	
00	Exit setting	00 ESC	
01	Battery type setting	Default bAt 01 AGM AGn	If "Self-defined" or "Lib" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 03 , 04 and 05. If "Lib" is selected, inverter can charge lithium battery when the lithium battery need to be activated. Please make sure lithium battery is connected before you start up inverter. If inverter doesn't connect battery or lithium battery, do not select "Lib" battery type. Note: The all-in-one machine must be set to the lithium battery mode.
		bAt 01 Flooded FLd	
		bAt 01 self-defined USE	
		bAt 01 Lib LIb	
02	BMS type	Default bnS 02 1	Default Protocol.
		BMS bnS 02 0	Protocol 0.
03	Bulk charging voltage setting (CV voltage)	Default CU 03 24V model 28.2 V	If "self-defined" or "Lib" is selected in program 01, this program is enabled. Setting range is from 24.0V to 30.0V.
04	Floating charging voltage	Default FLU 04 24V model 27.0 V	If "self-defined" or "Lib" is selected in program 01, this program is enabled. Setting range is from 24.0V to 30.0V.
05	Low DC cut-off voltage or SOC	Default bCU 05 24V model 21.0 V	If "self-defined" or "Lib" is selected in program 01, this program is enabled. Setting range is from 21.0V to 26.0V.
		Default bCU 05 10 %	If the battery type is lithium battery, the set value will change to SOC. Setting range is from 0% to 90%.

06	Setting battery voltage or SOC point back to utility when selecting "SBU priority" in program 24	Default 24V model 	Setting range is from 22.0V to 27.0V. Increment of each click is 0.1V.
		Default 	If the battery type is lithium battery, the set value will change to SOC. Setting range is from 5% to 90%.
07	Setting battery voltage point back to battery mode when selecting "SBU priority" in program 24	Default 24V model 	Setting range is from 24.0V to 30.0V. Increment of each click is 0.1V.
		Fully charged 	Battery should be charged to float charging stage.
		Default 	If the battery type is lithium battery, the set value will change to SOC. Setting range is from 10% to 100%.
09	Max charging current (Utility charge current +PV charging current)	Default 30A 	Setting range is from 1A to 125A. Increment of each click is 1A.
10	Max utility charging current setting	Default 30A 	Setting range is from 1A to 125A. Increment of each click is 1A.
20	AC output mode	Default Single 	When the units are used in parallel with single phase, please select "PAL" in program 20.
		Parallel 	
21	Output voltage setting	Default 230V 	Output voltage configuration.
		220V 	
		240V 	
22	Output frequency setting	Default 50Hz 	Output frequency configuration.
		60Hz 	

NOTE: The setting value of item "07" should be larger than the setting value of item "06".

23	Utility input range setting	Default Appliance mode 	The APL mode is suitable for ordinary household electrical loads. UPS mode is suitable for computer loads. When the effect is not satisfactory, it is recommended to adjust to APL.
		UPS mode 	
24	Output source priority	Default PV >> Utility >> Battery 	PV provides power to the loads first. If PV is not sufficient, utility will supply power the loads at the same time. Battery will provide power to loads only when utility is not available.
		Utility >> PV >> Battery 	Utility provides power to the loads first. PV and battery will provide power to loads only when utility is not available.
		PV >> Battery >> Utility 	PV provides power to the loads first. If PV is not sufficient, battery will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to the setting point in program 6.
		Intelligent output source priority 	The intelligent priority can use more solar energy and save electricity bills. It is applicable to South Asia (such as Pakistan) and Africa. In this priority mode, the PV provides power to the loads first. If PV is not sufficient, battery or utility will supply power to the loads at the same time. If the energy storage system is not installed with solar panels, do not choose this priority mode.
25	Charger priority	If inverter is working in utility mode, charger priority can be set as below. However, when inverter is working in battery mode, only PV can charge battery.	
		Default PV and Utility 	PV and utility will charge battery together.
		PV First 	PV will charge battery first. Utility will charge battery only when PV is unavailable.
		PV Only 	Only PV can charge the battery.
26	Feeding power to grid	Disable Default 	If selected, inverter is not allowed to feed exceeding solar power to grid.
		Enable 	If selected, inverter is allowed to feed exceeding solar power to grid.

27	**Overload bypass function**	Default  Enable	If it is enabled, the inverter will switch to utility mode if overload happens in battery mode.
		 Disable	
28	**Overload restart function**	Default  Enable	If it is enabled, the inverter will auto restart when overload occurs.
		 Disable	
29	**Over temperature restart function**	Default  Enable	If it is enabled, the inverter will auto restart when over temperature occurs.
		 Disable	
31	**Zero Export Power**	 Default 0	Regulate the input power of the Grid while in SBU Mode. Setting range is from -90W to 90W. Increment of each click is 5W.
40	**Backlight of LCD**	Default  Disable	If selected, LCD backlight will be off after no button is pressed for 60s.
		 Enable	If selected, LCD backlight will be always-on.
41	**Auto return to the first page of display screen**	Default  Enable	If selected, it will automatically return to the first page of display screen (Default interface) after no button is pressed for 60s.
		 Disable	If selected, the display screen will stay at latest screen user finally switches.
42	**Buzzer alarm**	Default  Enable	If selected, buzzer is allowed to beep.
		 Disable	If selected, buzzer is not allowed to beep.
43	**Energy stored data for PV and load**	Default  Disable	If selected, inverter will esase all historical data of PV and Load energy, and stop record historical data for PV and Load energy.

		 Enable	If selected, inverter will record historical data for PV and Load energy. NOTE: Before selected, please double check if date and time is correct, if incorrect, please set date and time in program 50~55.
44	**Reset default**	Default 	If selected, default initial settings page.
			If selected, enabling the function will restore all settings except for the parallel settings and time settings. Output mode setting item (20) to their initial values.
45	**Fan work mode**	Default  PFC	In performance mode, the inverter will perform at it's highest performance.
		 bLC	Balanced mode, applicable to the condition of 80% output power and 90A charge current limitatiaon, to reduce additional noise greatly.
		 SLC	Silent mode, applicable to the condition of 60% output power and 70A charge current limitation, to reduce additional noise extremely.
46	**Failure recovery**	Default  Disable	If selected, when the inverter enter the fault state, the inverter will not exit the fault state or start up again.
		 Enable	If selected, when the inverter enter the fault state, the inverter will exit the fault state and start up again.
50	**Time setting-Year**	Year  23	Setting range is from 23 to 99.
51	**Time setting-Month**	Month  8	Setting range is from 1 to 12.
52	**Time setting-Day**	Day  20	Setting range is from 1 to 31.
53	**Time setting-Hour**	Hour  21	Setting range is from 0 to 23.
54	**Time setting-Minute**	Minute  43	Setting range is from 0 to 59.

55	**Time setting-Second**	Second SEC 55 50	Setting range is from 0 to 59.
60	**Low DC cut off voltage on second output**	Default bCS 60 24V model 21.0V	Setting range is from 21.0V to 26.0V. Increment of each click is 0.1V. This low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.
		Default bCS 60 10%	If any type of lithium battery is selected in program 1, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 0% to 95%. Increment of each click is 1%.
62	**Scheduled time for 2nd AC output on**	Default tdO 62 0	Setting range is from 00:00 to 23:00. Increment of each click is 1 hour. Within scheduled on/off time setting in program 62 and 63, 2nd AC output will be turn on/off.
63	**Scheduled time for 2nd AC output off**	Default tdF 63 0	
64	**Dual output Settings**	Default SPt 64 Enable AUt	1. The second output is normally on: The grid is power on. 2. The second output is turned off: The grid is power off and the battery voltage or SOC is less than program 60. 3.The second output is recovery: The grid is power off and the battery voltage>program 07 setting voltage, or the SOC >program 07 setting SOC.
		SPt 64 tIn	2nd AC output will be turn on/off according to setting in program 62 and 63.
		SPt 64 Disable dIS	Disabled, single output only.
67	**Scheduled time for AC charge on**	Default ACO 67 0	Setting range is from 0~23 hour. If the time achieves the setting vaule, AC charge will be allowed/not allowed. If the setting time for AC charge on and off are the same, the AC charge will be allowed always.
68	**Scheduled time for AC charge off**	Default ACF 68 0	

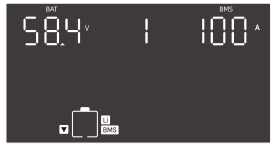
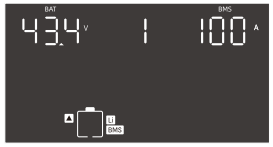
Energy stored data Page

The energy stored data will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

PV generated energy today 88 kWh 	PV generated energy this month 88 kwh 	PV generated energy this year 89 kwh 
PV generated energy current in total 348 kWh 	Load consumed energy today 78 kWh 	Load consumed energy this month 78 kWh 
Load consumed energy this year 80 kWh 	Load consumed energy in total 272 kWh 	

BMS information Page

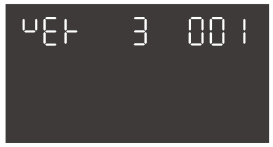
The BMS information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order: (Take the 48V model for example).

Battery pack number / mean SOC Connected battery pack number is 4, mean SOC is 97% 	**BMS voltage / SOC** BMS voltage is 54.0V, SOC is 99% on battery pack of address 1 	**BMS voltage / current** BMS voltage is 54.0V, current is 1A on battery pack of address 1 
Charge voltage limit /charge current limit Charge voltage is 58.4V, charge current is 100A on battery pack of address 1 	**Discharge voltage limit /discharge current limit** Discharge voltage is 43.4V, discharge current is 100A on battery pack of address 1 	**BMS highest temperature /lowest temperature** BMS highest temperature is 25°C, lowest temperature is 20°C on battery pack of address 1 

BMS fault code / flag BMS fault code is 0, flag is 000 on battery pack of address 1 		

Rated information Page

The rated information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

Rated VA / WATT Rated VA is 12kVA, WATT is 12kW 	**Rated battery voltage / Max. charge current** Rated battery voltage is 48V, Max. charge current is 210A 	Firmware version (Master DSP) Firmware version is 3102 
Firmware version (Slave DSP) Firmware version is 3001 		

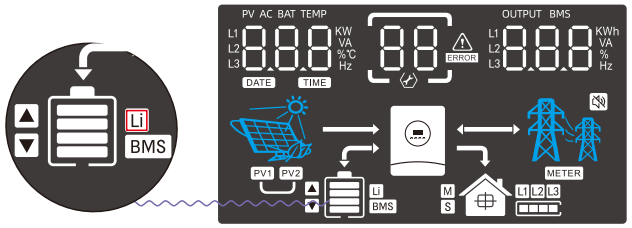
Lithium Battery Communication

1. It only allows the connection of lithium batteries and the establishment of confgured communication. Please follow the steps below to configure communication between the lithium battery and inverter.

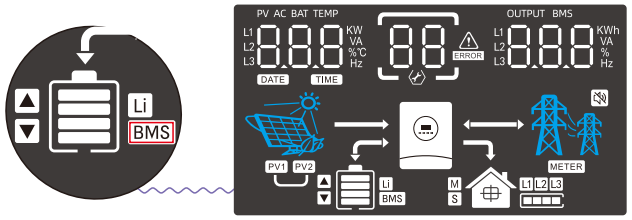
2. Configure the battery type to "Lib" in LCD settings project 01; Default "Lib" when leaving the factory.

The battery type is lithium battery

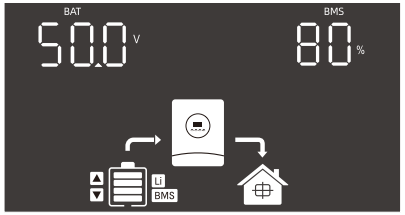
Then the LCD display will display the "Li" icon



3. Power the lithium battery and inverter, Wait a moment, if communication is established between them, the LCD will display the "BMS" icon, as shown below.



4. By pressing the "UP" or "DOWN" button to scroll through the real-time information on the LCD, as shown in the following figure, you can see the parameters of SOC in the communication system.



This page means SOC is 80%.

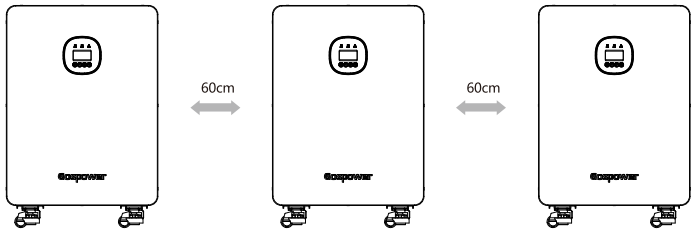
PARALLEL INSTALLATION GUIDE

Introduction

This inverter can be used in parallel with two different operation modes.
Parallel operation in single phase with up to 12 units for **3.6KW**, the supported maximum output power is 43.2kW/43.2kVA.

NOTE 1: If this unit is bundled with parallel cable, this inverter is default supported parallel operation. You may skip section 2.
NOTE 2: Under parallel operation modes, battery must be connected with inverters.

Mounting the Unit



Note: To achieve proper air circulation for heat dissipation, please leave a gap of about 60 centimeters on the side and about 60 millimeters on the left and right sides of the device. Ensure that each unit is installed at the same level.

Package Contents

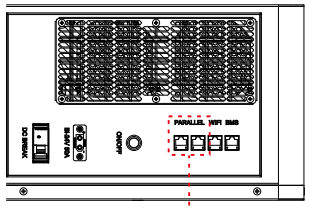
In parallel kit, you will find the following items in the package.

Parallel communication cable x 1pcs

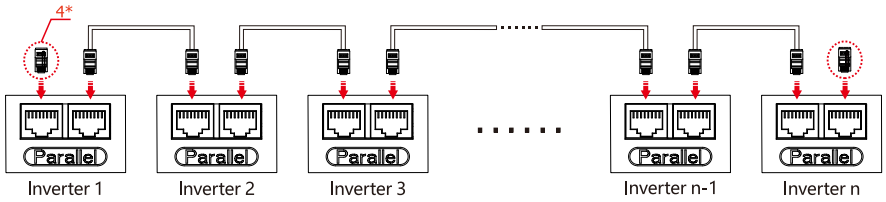
Parallel communication terminal connector x1pcs

Wiring Connection

N Inverters Communication Connection



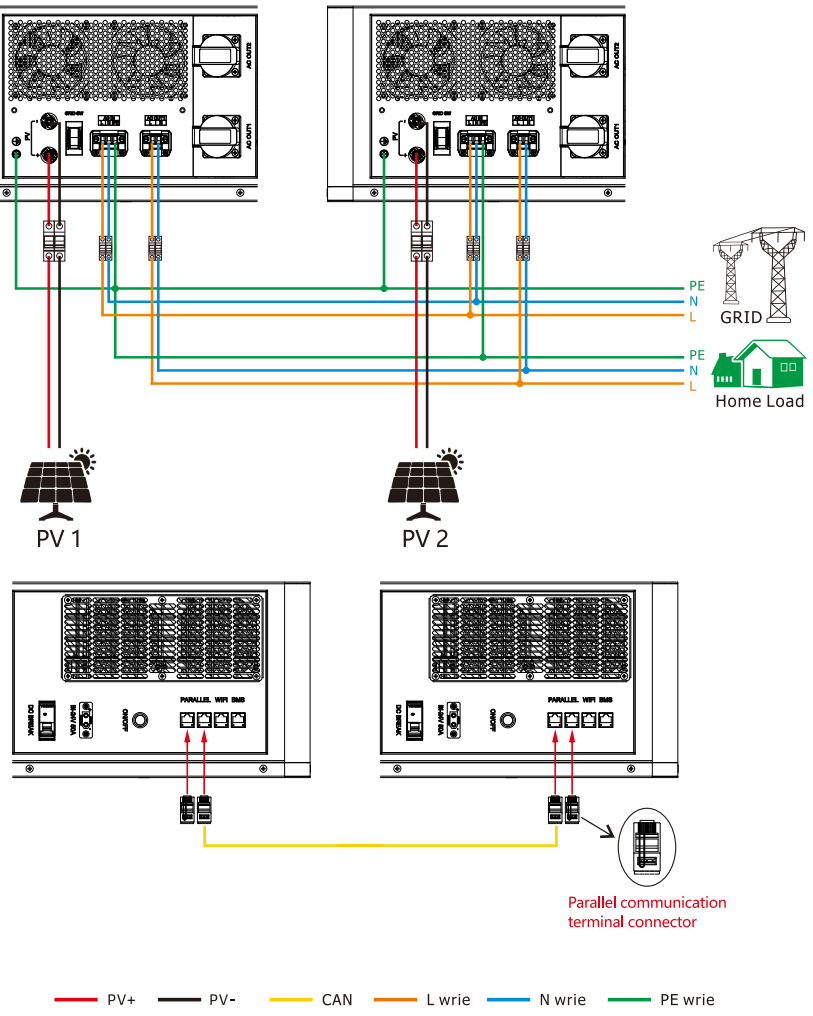
Parallel communication



Connect parallel communication cable one by one.

4*: Connect parallel communication connector to the first one and the last one.

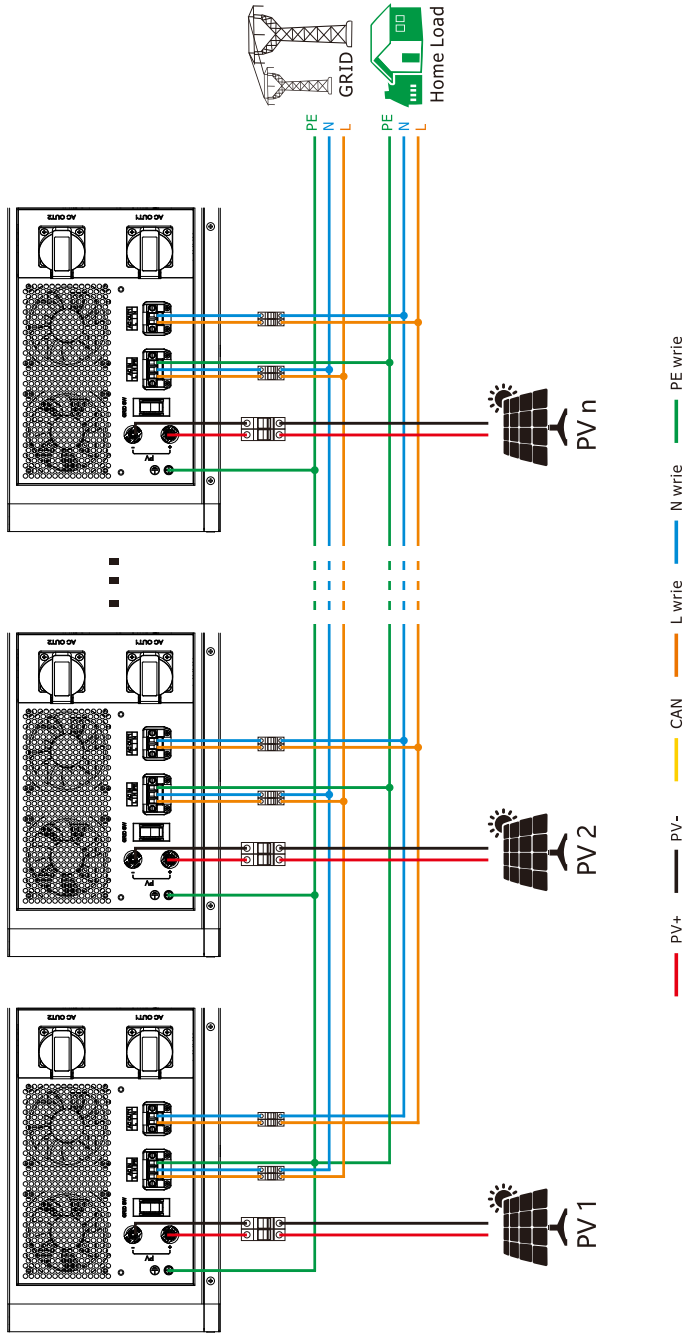
Single Phase Parallel connection diagram for two inverters in parallel.

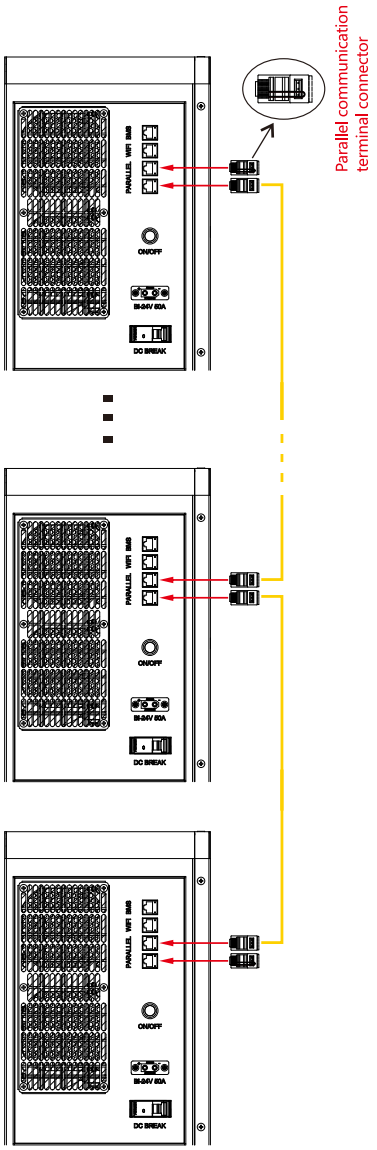


WARNING!! Strictly maintain insulation between PV ports in parallel systems. A single PV module's L/N lines MUST NOT be connected to PV ports of two or more inverters in the parallel configuration.

Note: Before starting up inverters, please connect all positive (+) and negative (-) wires of battery together.

Single Phase Parallel connection diagram for three to twelve inverters in parallel.





WARNING!! Strictly maintain insulation between PV ports in parallel systems. A single PV module's L/N lines MUST NOT be connected to PV ports of two or more inverters in the parallel configuration.

Note:
1. "n" is the number of parallel connections of the inverters.
2. Before starting up inverters, please connect all positive (+) and negative (-) wires of battery together.

LCD Setting and Dispaly

Setting Program

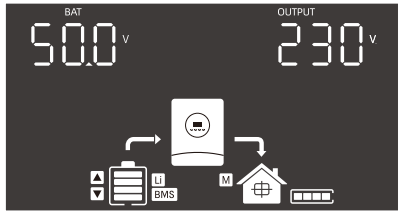
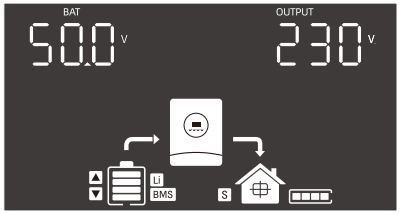
20	AC output mode	Single 	When the units are used in parallel with single phase, please select "PAL" in program 20.
		Parallel 	

Commissioning

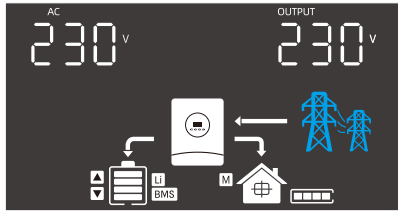
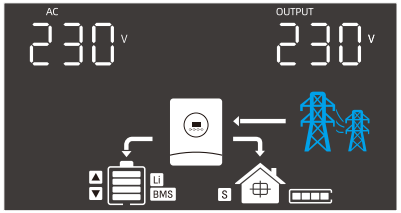
Parallel in single phase

Step 1: Check the following requirements before commissioning:
- Correct wire connection.
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 20 of each unit. And then shut down all units.
NOTE: To be safe, it's better to turn off switch when setting LCD program.
Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

Note: Master and slave units are randomly defined.
Step 4: Switch on all AC breakers of Line wires in AC input. It's better to have all inverters connect to utility at the same time. However, these inverters will automatically restart. If detecting AC connection, they will work normally.

LCD display in Master unit	LCD display in Slave unit
	

Step 5: If there is no more fault alarm, the parallel system is completely installed.
Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

WARNING CODE TABLE

When fault event happens, the fault LED is flashing. At the same time, warning code, icon ⚠ is shown on the LCD screen.

Warning Code	Warning Information	Audible Alarm	Trouble shooting
01	Overload	Beep twice every second	Reduce the loads.
02	Fan is locked (up)	Beep three times every second	Check if the Fans wiring connected well. Replace the fan.
03	Fan is locked (down)	Beep three time every second	Check if the Fans wiring connected well. Replace the fan.
04	Grid over voltage warning	No buzzer alarm	Check whether the grid voltage exceeds the allowable range of the inverter.
05	Output not connected together in parallel mode	No buzzer alarm	Check whether the output load of the inverter is normal, and check whether the inverters are connected together in the same phase.
06	Remote shutdown warning	No buzzer alarm	Check if remote shutdown is enabled via WIFI. Disable the enable or restart the inverter.
07	Second output overload	No buzzer alarm	Reduce the connected load by switching off some equipment, and restart the unit, if the error happens again, please return to repair center.
08	BMS communication failure	No buzzer alarm	Check whether the inverter 01 setting itemis selected for LI battery. If item 01 is set to lithium battery mode, check whether the communication line between the battery pack and the inverter is properly connected.

FAULT CODE TABLE

When fault event happens, inverter will cut off output, and the fault LED is solid on. At the same time, fault code, icon ERROR is shown on the LCD screen.

Fault Code	Fault information	Trouble Shooting
01	Bus voltage is too high	AC Surge or internal components failed. Restart the unit, if the error happens again, please return to repair center.
02	Bus voltage is too low	Restart the unit, if the error happens again, please return to repair center.
03	Bus soft start fail	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
10	Inverter soft start fail	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
11	Over current or surge detected by Software	Restart the unit, if the error happens again, please return to repair center.
12	Over current or surge detected by hardware	Restart the unit, if the error happens again, please return to repair center.

13	Output voltage is too low	Reduce the connected load. Restart the unit, if the error happens again, please return to repair center.
14	Output voltage is too high	Restart the unit, if the error happens again, please return to repair center.
15	Output short circuited	Check if wiring is connected well and remove abnormal load.
16	Inverter current sensor failed	Restart the unit, if the error happens again, please return to repair center.
17	Current feedback into the inverter is detected.	1. Restart the inverter. 2. Check if L/N cables are not connected reversely in all inverters. 3. For parallel system in single phase, make sure the sharing cables are connected in all inverters. For supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase, and disconnected in the inverters in different phases. 4. If the problem remains, please contact your installer.
20	Overload time out	Reduce the connected load by switching off some equipment.
21	OP current sensor failed	Restart the unit, if the error happens again, please return to repair center.
23	The AC input and output wires are inversely connected	1. Please check AC input and output wires are connected correctly. 2. If this error happens during parallel installation, please check wires connection. If they are connected correctly, please finish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer.
24	The output relay exception	Restart the unit, if the error happens again, please return to repair center.
30	Battery voltage is too high	Check if spec and quantity of batteries are meet requirements.
31	Over current happen at DC/DC circuit	Restart the unit, if the error happens again, please return to repair center.
34	DC/DC soft start fail	Restart the unit, if the error happens again, please return to repair center.
36	Over current happen at LLC circuit	Restart the unit, if the error happens again, please return to repair center.
37	LLC hardware fault	Restart the unit, if the error happens again, please return to repair center.
38	BAT hardware fault	Restart the unit, if the error happens again, please return to repair center.
40	PV voltage is too high	Reduce the number of PV modules in series.
41	Short circuited happen at PV port	Check if wiring is connected well.
42	PV power abnormally	Restart the unit, if the error happens again, please return to repair center.
43	Over current happen at PV port	Restart the unit, if the error happens again, please return to repair center.
50	Fan is locked	Check if wiring is connected well. Replace the fan.
51	Over temperature happen at PV circuit	The temperature of internal PV component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.

52	Over temperature happen at INV circuit	The temperature of internal INV component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
53	Over temperature happen at Convert L circuit	The temperature of Convert L battery converter component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
54	Over temperature happen at Convert H circuit	The temperature of internal Convert H component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
60	CAN data loss	1. Check if communication cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
61	Host data loss	
62	Synchronization data loss	
63	The firmware version of each inverter is not the same	1. Update all inverter firmware to the same version. 2. Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update. 3. After updating, if the problem still remains, please contact your installer.
64	The output current of each inverter is different	1. Check if sharing cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
65	AC output mode setting is different	1. Switch off the inverter and check LCD setting program 20. 2. For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set on program 20. For supporting three-phase system, make sure no "PAL" is set on program 20. 3. If the problem remains, please contact your installer.
66	Single unit is installed to parallel system	1. Please check if single unit is installed to parallel system. 2. If this error happens during parallel installation, please check wires connectiotn. If they are connected correctly, please finish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer.
99	Update fault	Restart the unit, if the error happens again, please return to repair center.