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USER GUIDE

Hybrid Inverter

IPV-4K24U IPV-6K48U

Contents

ABOUT THISMANUAL

Purpose

This manual describes the assembly, installation, operation, warning code and fault code of this unitPlease 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 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 dropa 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 or DC breaker is provided as over-current protection for the battery supply, which is necessary.Surge Protective Device is necessary for AC input port and PV input port.Adjustable Voltage Protector is necessary for AC input port.
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.

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 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-configurable 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
- Configurable 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
- Parallel connection quantity up to 12units for 6KVA model (Battery must be connected)
- Intelligent fan control greatly reduces fan noise

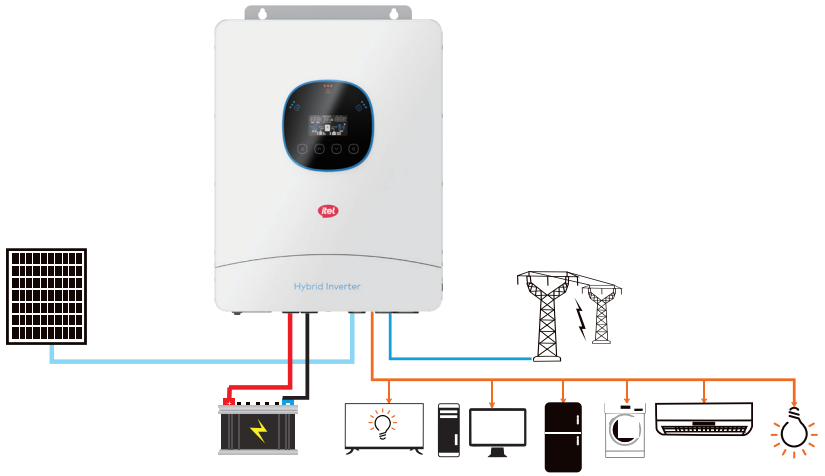
Basic System Architecture

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

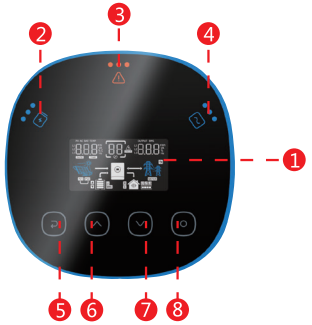
- Generator or Utility
- PV modules (option)

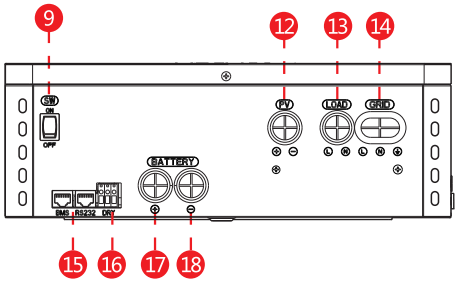
Consult with your system integrator for other possible system architectures depending on your requirements.

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

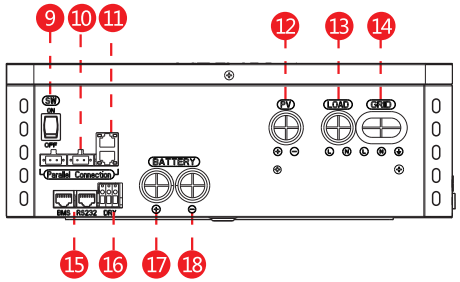


PRODUCT OVERVIEW





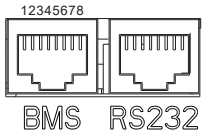
IPV-4K24U



IPV-6K48U

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. Switch
10. Reserved port
11. Parallel connection-CAN port
12. PV input connection port
13. AC output port
14. AC input port
15. Communication connection port
16. Dry contact port
17. Battery+ connection port
18. Battery- connection port

15 Order of the BMS communication port

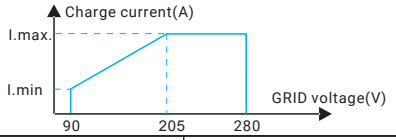
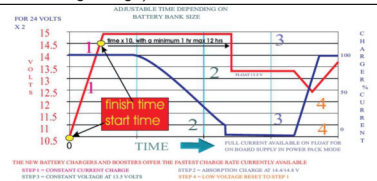


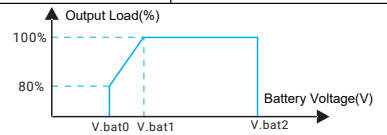
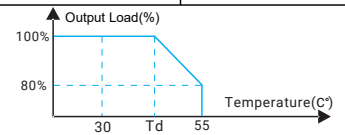
NO.	BMS	RS-232
1		RS232-TXD
2		RS232-RXD
3		VDD
4		VSS
5	NC	
6	VSS	
7	RS485-A	
8	RS485-B	VSS

Itel hybrid inverter

SPECIFICATIONS

Line Mode Specifications		
Model	IPV-4K24U	IPV-6K48U
Rated Output Power	4000VA	6000VA
	4000W	6000W
Nominal DC Input Voltage	24V	48V
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Line Voltage Disconnect	90Vac ±3V(For Home Appliances)170Vac ±3V(For Computers)	
Low Loss Voltage Re-connect	100Vac±3V (For Home Appliances)180Vac±3V (For Computers)	
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 Frequency 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 ful 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	22A	40A
Max. Bypass Input Current	28A	50A
Max. Inverter/Rectiher Current	18.2A/4000W	27.3A/6000W

Utility Charge Mode Specifications		
Model	IPV-4K24U	IPV-6K48U
Nominal Input Voltage	230Vac	
Input Voltage Range	90-280Vac	
Nominal Output Voltage	Dependent on battery type	
Max. Grid Charge Current	100A	120A
Charge Current Regulation	10A-120A(Adjustable unit is 1A)	
Over Charge Protection	Yes	
Grid Charging Current (I.max/I.min) Relationship between battery charging current and grid voltage		
	100A/25A	120A/30A
Solar Charging & Grid Charging		
Max. PV Open Circuit Voltage	500V	
PV voltage range	85V-450V	
Max. Input Power	4000W	6000W
Max. Solar Charging Current	120A	120A
Max. Charging Current(PV+Grid)	120A	120A
Max. Input Current	15A	27A
Min. Startup Voltage	80V	
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/56.4V	27V/54V
	Flooded	29.2V/58.4V	27V/54V
	Self - defined	Adjustable, up to 30V/60V	
	Lithium		

Inverter Mode Specifications		
Model	IPV-4K24U	IPV-6K48U
Rated Output Power	4000VA	6000VA
	4000W	6000W
Nominal DC Input Voltage	24V	48V
Output Voltage Waveform	Pure sine wave	
Nominal Output Voltage	230Vac±5%	
Nominal Output Frequency (Hz)	50±0.3Hz/60±0.3Hz(Adjustable)	
Parallel capability	No	Yes,up to 12 units
Peak Efficiency	93%	
Over-Load Protection (SMPS load)	5s@≥150%load;10s@105%~150%load	
Surge Rating	2* rated power for 5s	
Capable of Starting Electric	Yes	
Output Short Circuit Protection	Yes	
Cold Start Voltage	23V	46V
Low DC Input Shut-down Load < 50% @Load = 50%	21.5V 21V	43V 42V
High DC Input Alarm & Fault	31V ± 0.2V	62V ± 0.4V
High DC Input Recovery	29V ± 0.2V	60V ± 0.4V
Battery Voltage Limitation (V.bat0/V.bat1/V.bat2) When battery voltage is lower than V.bat1 output power will be derated.The minimum AC output voltage is 180V.		
	21V/27.2V/31V	42V/50V/62V
Temperature Limitation (Td) When ambient tempeature is higher than Td, output power will be derated The minimum ACoutput voltage is 180V.		
	40°C	45C°
General Specifications		
Operating Temperature	-10C°~55C°	
Range Storage Temperature	-15C°~60C°	
Net Weight(KG)	9.2kG	13kG
Gross Weight(KG)	11.4kG	15kG
Product Size(D*W*H)	120x345x443MM	
Package Dimension(D*W*H)	140x365x463MM	

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 operation manual are shown below:

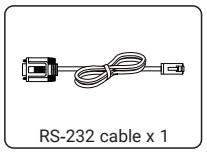
	After receiving this product, first confirm the product package Is intact. If any contact the logistic company or local distributor immediately. The installation and operation of inverter must be carried out by professimal technicians who have received professional trainings and thoroughly familiar with all the contents in this manual and the safety requirements of the electrical ssystem
	Do not cary out connectin 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 interfereice caused by other electronic electrical devices around the installation site. Do not reft the inverter unless authorized. All the electrical installation must conform to localand national electrical standards
	Do not touch the housing of the inverter or the radiator to avoid scald they maybecome 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 circut breakers have been disconnected and wait at least 5 minutes before wiring and checking.

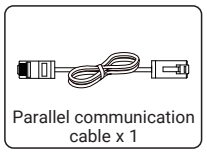
Unpacking and Inspection

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


RS-232 cable x 1


Parallel communication cable x 1


O-shaped terminal x 2


Parallel communication connector x 1pcs


Expansion bolt x 3


WiFi module x 1

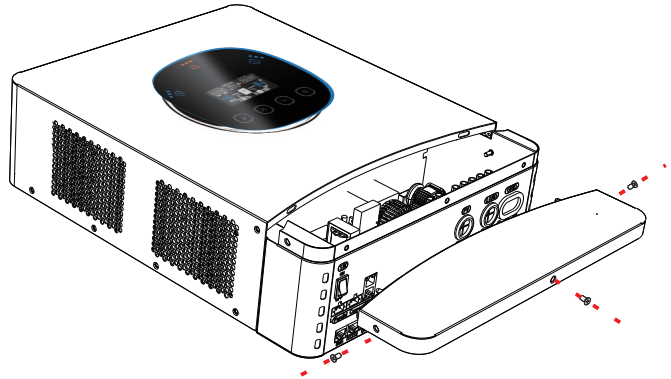

Dual output connector x1(Optional)


Wall Hangers x 2 and Screws x 3


Case grounding screw x 1

Preparation

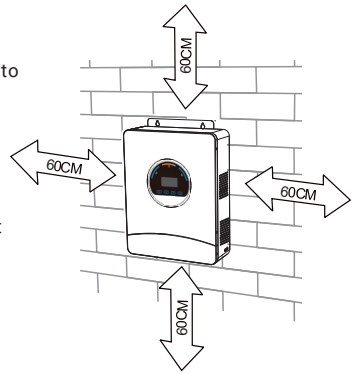
Before connecting all wirings, please take off bottom cover by removing three screws as shown below.



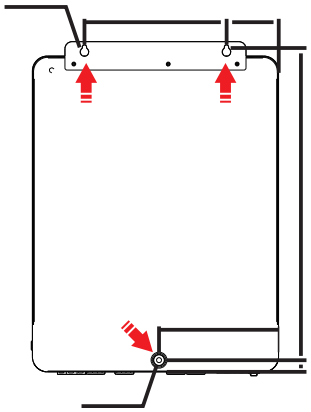
Mounting the Unit

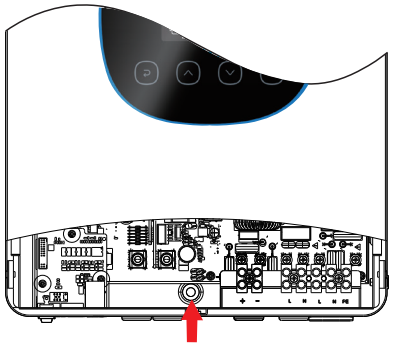
Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials,
- Mount on a solid surface.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -10˚C and 55˚C ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



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





Battery Connection

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

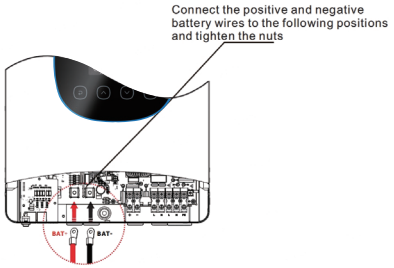
WARNING!All wiring must be performed by a qualified personnel.

WARNING!It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Model	Gauge	Cable(mm²)	Torque Value
4kVA	1*1AWG	50	2 Nm
6kVA	1*2AWG	35	2 Nm

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Connect all battery packs as units requires. It's suggested to connect at least 200Ah capacity battery.
3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2 Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



	WARNING: Shock Hazard Installation must be performed with care due to high battery voltage in series.

	CAUTION!! Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur. CAUTION!! Do not apply anti-oxidant substance on the terminals before terminals are connected tightly CAUTION!! Before making the final DC connection or closingDC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative(-) must be connected to negative(-)

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 ACinput. The recommended spec of AC breaker is 28A for 4KVA and 50A for 6KVA.

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 efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the propeer recommended cable size as below.

Suggested cable requirement for AC wires

Model	Gauge	Cable(mm²)	TorqueValue
4KVA	10AWG	6	1.2Nm
6KVA	8AWG	8	1.4-1.6Nm

Recommended circuit breaker type for AC input

Models	Maximum bypass input current	Recommended circuit breaker
4KVA	22A	2P-40A
6KVA	50A	2P-50A

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

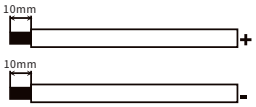
1.Before making AC input/output connection, be sure to open DC protector or disconnector first.
2.Remove insulation sleeve 10mm for six conductors. And shorten pphase Land neutral conductor N3mm.

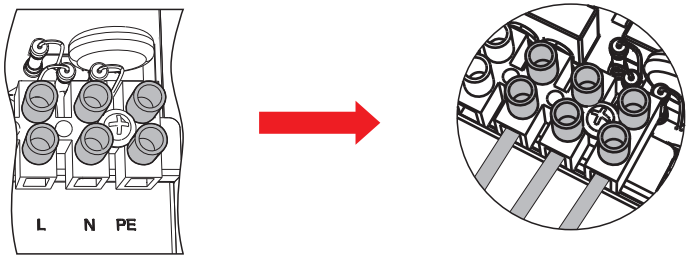
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚ → **Ground (yellow-green)**

L → LINE(brown or black)

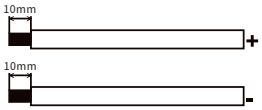
N → Neutral(blue)





⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit

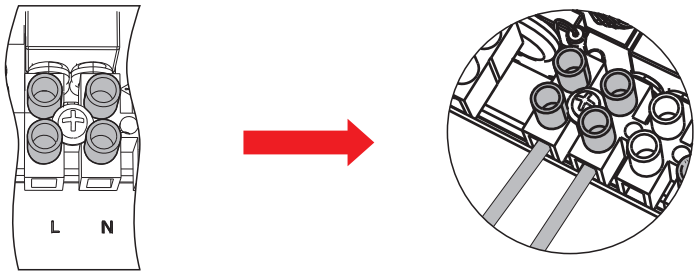
4.Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.



⏚ → **Ground (yellow-green)**

L → LINE(brown or black)

N → Neutral(blue)



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 instal 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	Gauge Size	Cable (mm²)	Torque Value
4KVA	10 AWG	6	1.2Nm
6KVA	10 AWG	6	1.2Nm

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

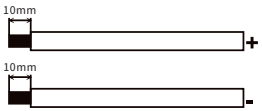
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Max. power voltage (Vmp) should be during PV array MPPT voltage range.

Solar Charging Mode		
INVERTER MODEL	4KVA	6KVA
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 10 mm for positive and negative conductors.

2.Check correct polarity of connection cable from PV modules and PV input

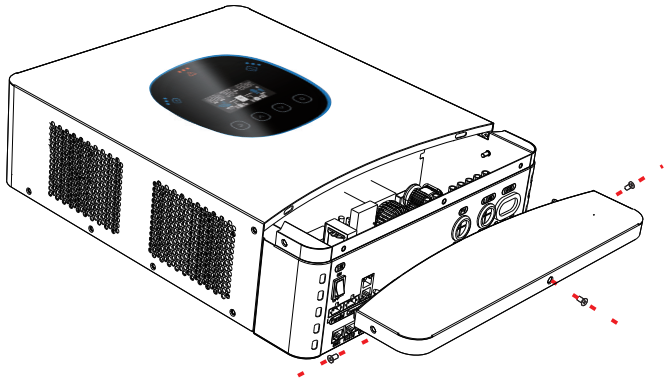


connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector

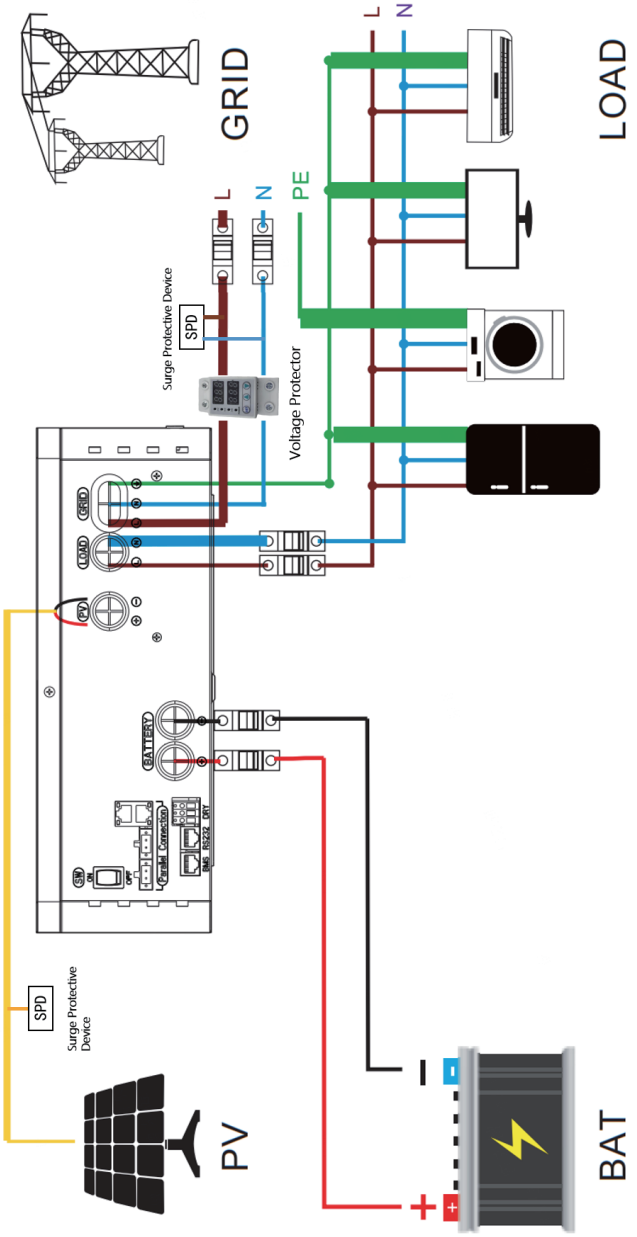
3. Make sure the wires are securely connected

Final Assembly

After connecting all wirings, please put bottom cover back by screwing three screws as shown below.



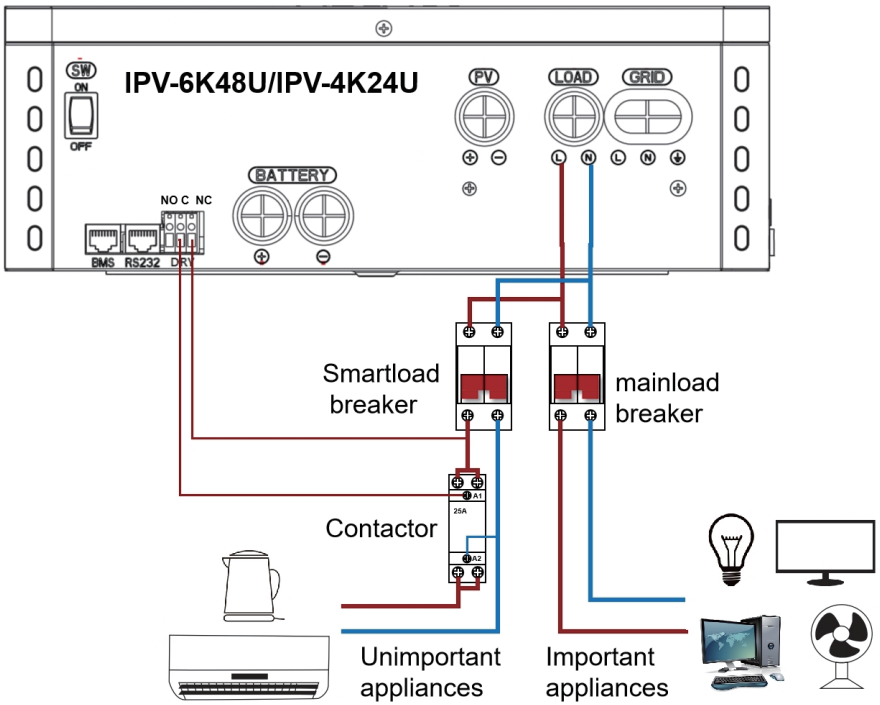
Wiring System for Inverter



Dual Output Description

IPV-6K48U/IPV-4K24U only has one inverter output interface.However, it can achieve dual output function by controlling external Contactor through dry contact.

Wiring

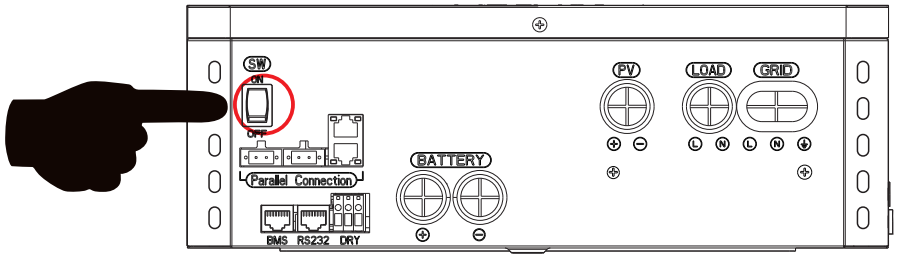


Dry Contact Signal

Unit Status	Scenarios	SOC Conditions	Dry contact port: NO C NC		Generator	Smart load
			NO-C	NC-C		
POWER OFF	——	——	Open	Close	off	off
POWER ON	Battery only	>setting 7	Open	Close	off	on
		<setting 6	Close	Open	on	off
	Grid supply	>setting 7	Open	Close	off	on
		<setting 6	Open	Close	off	on
	PV≥3KW	>setting 7	Open	Close	off	on
		<setting 6	Open	Close	off	on
	Battery+PV<3KW	>setting 7	Open	Close	off	on
		<setting 6	Close	Open	on	off

OPERATION

Power ON/OFF



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

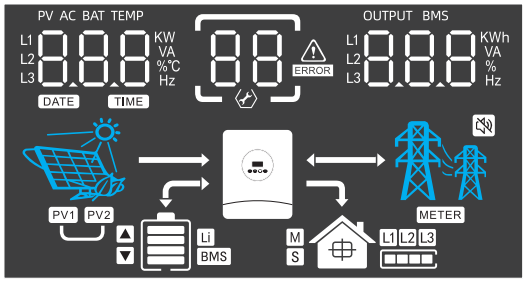
Operation and Display Panel

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		Toprevious 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").

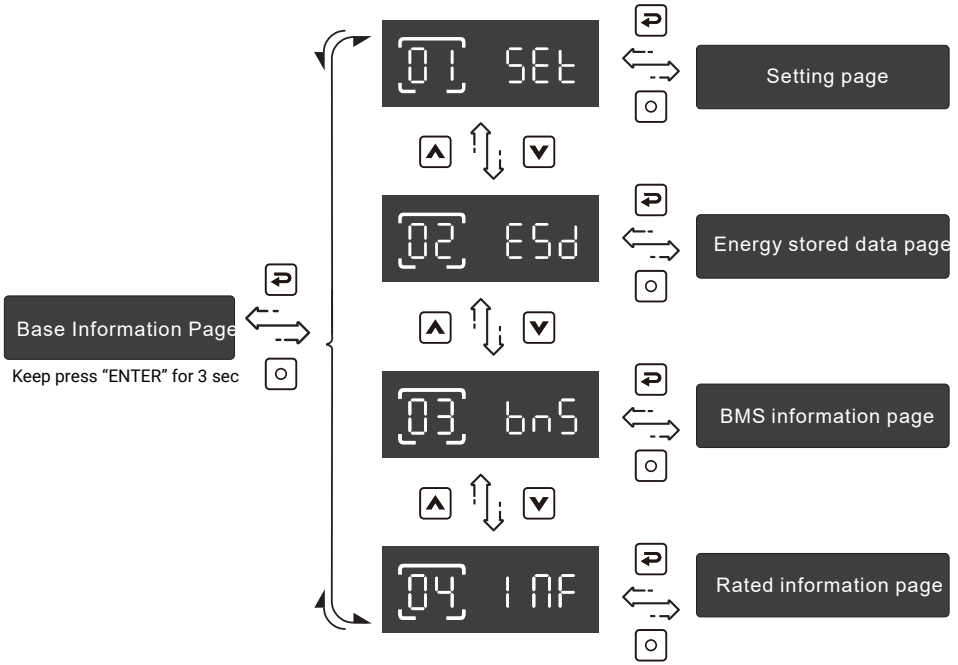
LCD Display Icons



Icon	Function description
Input Source Information	
PV AC BAT TEMP L1 L2 L3 KW VA %℃ 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 888 KW 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%and75-100%.
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

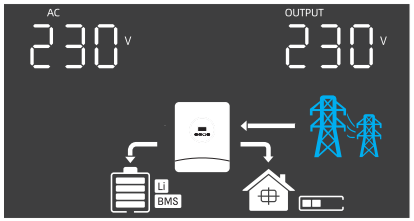


On base information page, pressing and holding "ENTER" key for 3 sec, the unit will enter parameters page.Press "UP" or "DOWN" key to switch the selection and press "ENTER" key to enter selected page. Press "ESC" key to back to previous page.

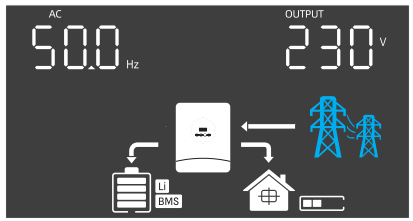
Base information Page

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

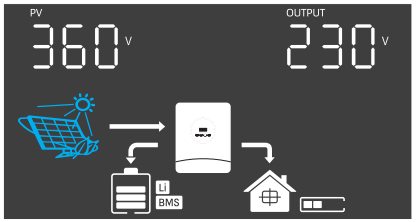
Input voltage / Output voltage
Utility voltage is 230V ,output voltage is 230V



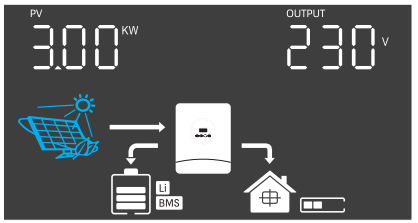
Input frequency / Output voltage
Utility frequency is 50.0Hz, output voltage is 230V



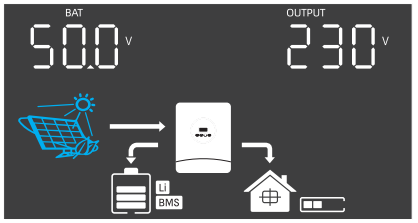
PV voltage / Output voltage
PV voltage is 360V, output voltage is 230V



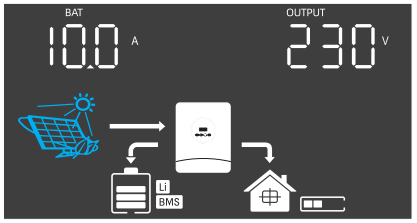
PV power / Output voltage
PV power is 3.00kW output voltage is 230V



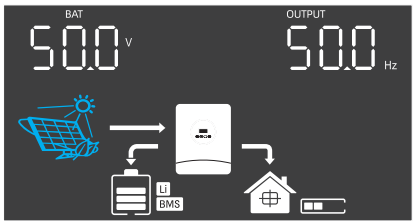
Battery voltage / Output voltage
Battery voltage is 50.0V, output voltage is 230V



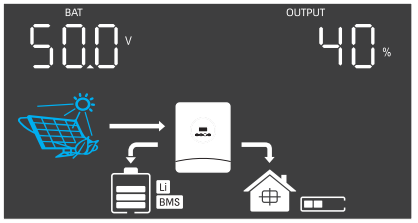
Charging current / Output voltage
Charging current is 10A, output voltage is 230V



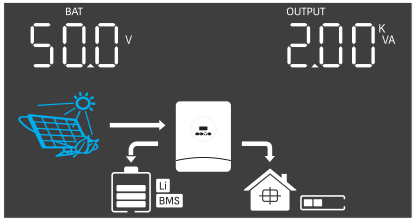
Battery voltage / Output frequency
Battery voltage is 50.0V, output frequency is 50.0Hz



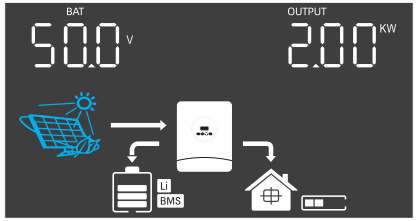
Battery voltage / Load percentage
Battery voltage is 50.0V, load percentage is 40%



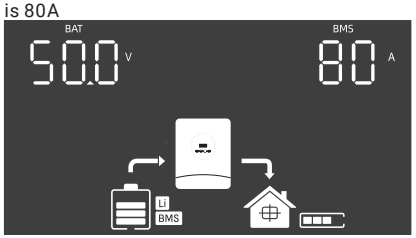
Battery voltage / Output frequency
Battery voltage is 50.0V, output wattage is 2.00kVA



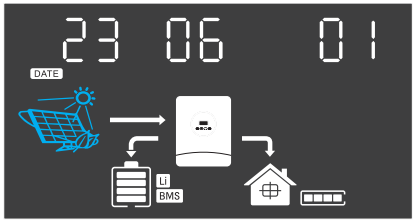
Battery voltage / Load wattage
Battery voltage is 50.0V, output wattage is 2.00kW



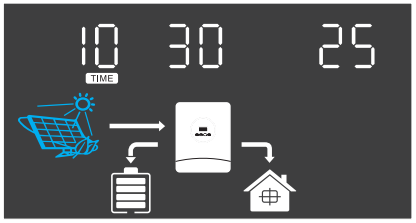
Battery voltage / Discharging current
Battery voltage is 50.0V, discharging current is 80A



Date
2023-06-01



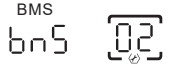
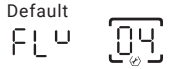
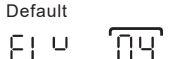
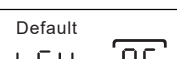
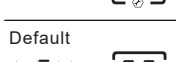
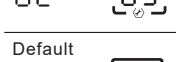
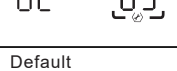
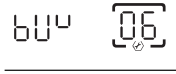
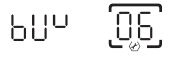
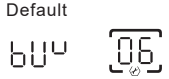
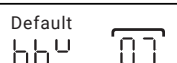
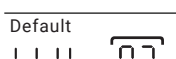
Time
10: 30: 25

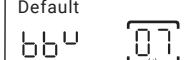
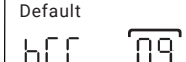
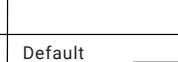
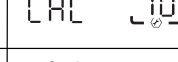
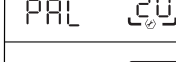
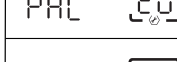
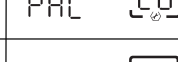
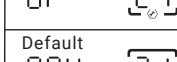
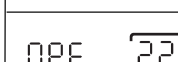
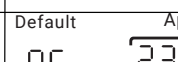
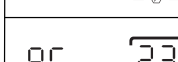


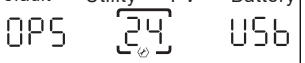
Setting Page

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 fastly.Setting items:

		Selectable option	
00	Exit setting	00 ESC	
01	Battery type setting	Default bAt 01 AGM AGn bAt 01 Flooded FLd bAt 01 self-defined USE bAt 01 Lib LIb	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.
02	BMS Type	Default bnS 02 0	Default Protocol.

		BMS 		Protocol 01.
03	Bulk charging voltage setting (CV voltage)	Default 	24V model 28.2V	If"self-defined"or "Lib" is selected in program 01 ,this program is enabled. Setting range is from 24.0V to 30.0V.
		Default 	48V model 56.4V	If"self-defined"or "Lib" is selected in program 01 ,this program is enabled. Setting range is from 48.0V to 60.0V.
04	Floating charging voltage	Default 	24V model 27.0V	If"self-defined"or "Lib" is selected in program 01 ,this program is enabled. Setting range is from 24.0V to 30.0V.
		Default 	48V model 54.0V	If"self-defined"or "Lib" is selected in program 01 ,this program is enabled. Setting range is from 48.0V to 60.0V.
05	Low DC cut-off voltage or soc	Default 	24V model 21.0V	If"self-defined"or" Lib" is selected in program 01 ,this program is enabled. Setting range is from 21.0V to 24.0V.
		Default 	48V model 42.0V	If"self-defined"or "Lib" is selected in program 01 ,this program is enabled. Setting range is from 42.0V to 48.0V.
		Default 	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 program24	Default 	24V model 24.0V	Setting range is from 22.0V to 27.0V. Increment of each click is 0.1V
		Default 	48V model 46.0V	Setting range is from 44.0V to 54.0V. Increment of each click is 0.1V
		Default 	20 %	If the battery type is lithium battery, the set value will change to SOC Setting range is from 5 to 95%
07	Setting battery voltage point back to battery mode when selecting "SBU priority" in program 24	Default 	24V model 27.0V	Setting range is from 24. 0V to 30.0V Increment of each click is 0 .1V
		Default 	48V model 54.0V	Setting range is from 48.0V to 60.0V Increment of each click is 0.1V
			Fully charged FUL	Battery should be charged to float charging stage.

		Default 	70 %	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 	60A 60A	Setting range is from 0A to 120A. Increment of each click is 1A.
10	Max utility charging current setting	Default 	30A 30A	Setting range is from 0A to 100A/120A Increment of each click is 1A.
20	AC output mode	Default 	Single SIG	When the units are used in parallel with single phase, please select "PAL"in program 20. It is required to have at least three inverters or maximum twelve inverters to support three-phase equipment. It is required to have at least one inverter in each phase or it is up to ten inverters in one phase. Please select "3P1" in program 20for the inverters connected to L1 phase, "3P2" in program 20 for the inverters connected to L2 phase and "3P3" in program 20 for the inverters connected to L3 phase. Before starting up inverters, please connect all N wires of AC output together.
			Parallel PAL	
			L1 Phase 3P1	
			L2 Phase 3P2	
			L3 Phase 3P3	
21	Output voltage setting		220V 220V	Output voltage configuration
		Default 	230V 230V	
			240V 240V	
22	Output frequency setting	Default 	50Hz 50Hz	Output frequency configuration.
			60Hz 60Hz	
23	Utility input range setting	Default 	Appliance mode APL	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 UPS	

24	Output source priority	Default 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 >> 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.
		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 5.
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 First 	PV will charge battery first. Utility will charge battery only when PV is unavailable.
		PV and Utility 	PV and utility will charge battery together.
		PV Only 	Only PV can charge the battery.
26	Feeding power to grid	Default Disable 	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	Disable 	If it is enabled, the inverter will switch to utility mode if overload happens in battery mode.
		Default Enable 	
28	Overload restart function	Disable 	If it is enabled, the inverter will auto restart when overload occurs.
		Default Enable 	

29	Over temperature restart function	Disable 	If it is enabled, the inverter will auto restart when over temperature occurs.
		Default Enable 	
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 Disable 	If selected, the display screen will stay at latest screen user finally switches.
		Enable 	If selected, it will automatically return to the first page of display screen (Input voltage/ output voltage) after no button is pressed for 60s.
42	Buzzer Alarm	Disable 	If selected, buzzer is not allowed to beep.
		Default Enable 	If selected, buzzer is 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, Enable restores all Settings other than the parallel Output mode setting item (20) to their initial values.

45	Fan Work Mode	Default FAN	45	PFC	In performance mode, the inverter will perform at its highest performance.
		FAN	45	bLC	Balanced mode, applicable to the condition of 80% output power and 90A charge current limitation , to reduce additional noise greatly.
		FAN	45	SLC	Silent mode, applicable to the condition of 60% output powerand 70A charge current limitation, to reduce additional noise extremely.
50	Time setting- Year	Year YEA	50	23	Setting range is from 23 to 99.
51	Time setting- Month	Month nON	51	8	Setting range is from 1 to 12.
52	Time setting- Day	Day dAY	52	20	Setting range is from 1 to 31.
53	Time setting- Hour	Hour HOU	53	21	Setting range is from 0 to 23.
54	Time setting- Minute	Minute n IN	54	43	Setting range is from 0 to 59.
55	Time setting- Second	Second SEC	55	50	Setting range is from 0 to 59.

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

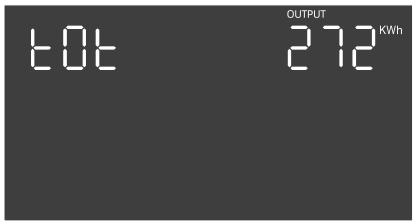
PV generated energy in total
348 kWh

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:

Battery pack number / mean SOC

Connected battery pack number is 4, mean SOC is 97%

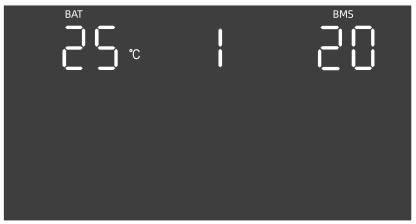
BMS voltage / SOC

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

BMS highest trempreture / lowest temerpature is 25ºC, lowest tempreture is 20ºC on battery pack of address 1



BMS fault code / flag

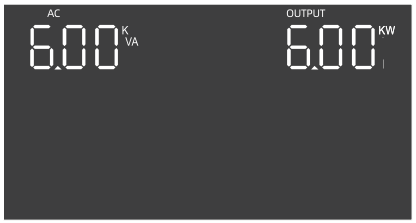
BMS fault code is 0, flag is 000 on battery pack of address 1

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 6kVA, WATT is 6kW



Rated battery voltage / Max charge current

Rated battery voltage is 48V, Max charge current is 120A

Firmware version

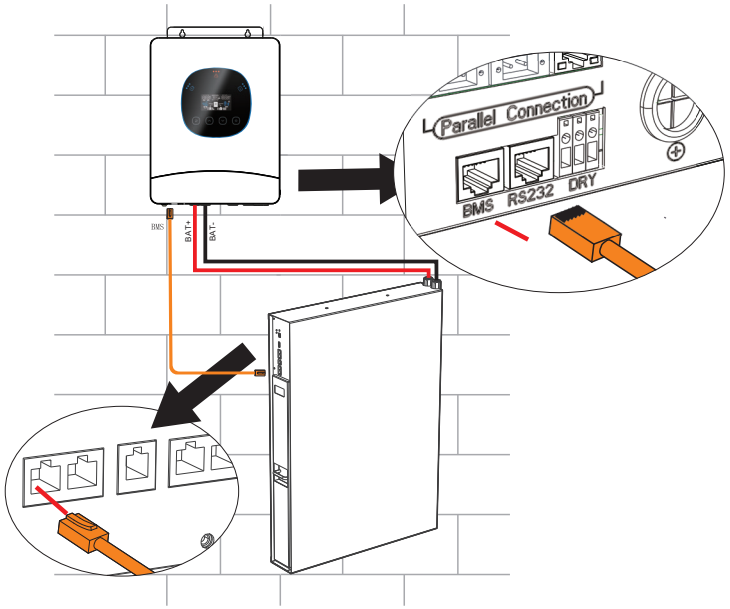
Firmware version is 1400

Lithium Battery Communication

It is allowed to connect lithium battery and build communication only which it has been configured
Please follow bellow steps to configure communication between lithium battery and inverter.

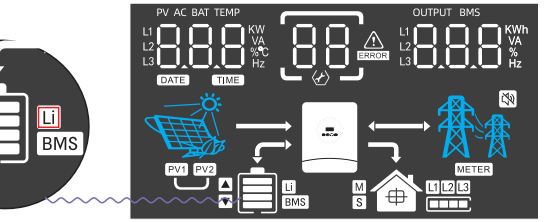
1. Connect power cable between lithium battery and inverter. Please pay attention to terminal of positive. and negative. Make sure the positive terminal of battery is connected to the positive terminal of inverter, and the negative terminal of battery is connected to the negative terminal of inverter.

2. The communication cable is bundled with lithium battery. Both sides are RJ45 port. One port is connected to the BMS port of inverter and another one is connected to the COMM port of lithium battery.

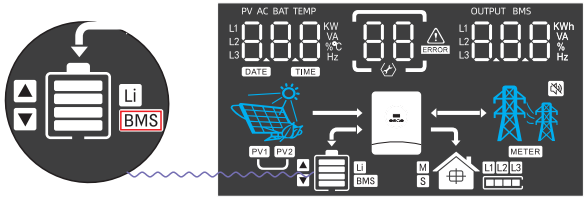


3.Configure battery type to Lib in LCD setting No. 01.

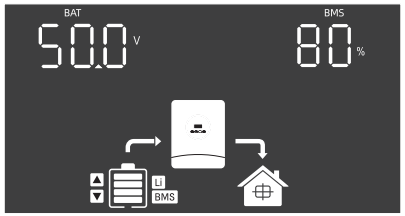
The battery type is Lib



4.Power up lithium battery and inverter.Wait a moment, if the communication is built between them, LCD will show you "BMS" icon as below.



5. Roll LCD real time information pages by pressing "UP" or "DOWN" button, as below page, you can see the parameters of SOC in the communication system.



This page means SOC is 80%.

Parallel Installation Guide(Only Valid for 6kVA Model)

1.Introduction

This inverter can be used in parallel with two different operation modes.

1. Parallel operation in single phase with up to 12 units. The supported maximum output power is 72kW/72kVA

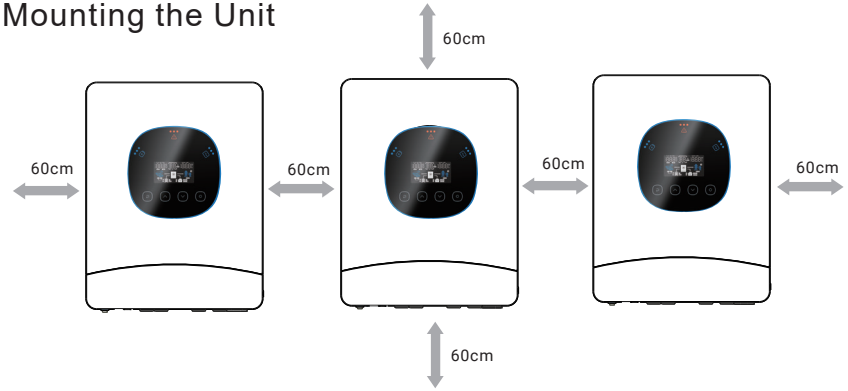
2. Maximum twelve units work together to support three-phase equipment. The supported maximum output power is 72kW/72kVA and one phase can be up to 60kW/60kVA.

NOTE 1: If this unit is bundled with share current cable and parallel cable, this inverter is default supported paralle operation.You may skip section 2.

NOTE 2: Under parallel operation modes, battery must be connected with inverters.

NOTE 3: Before starting up inverters, please connect all positive (+) and negative (-) wires of battery together.

2.Mounting the Unit



NOTE:For proper air circulation to dissipate heat, allow a clearance of approx.60 cm to the side and approx.60 cm above and below the unit. Be sure to install each unit in the same level.

3.Package Contents

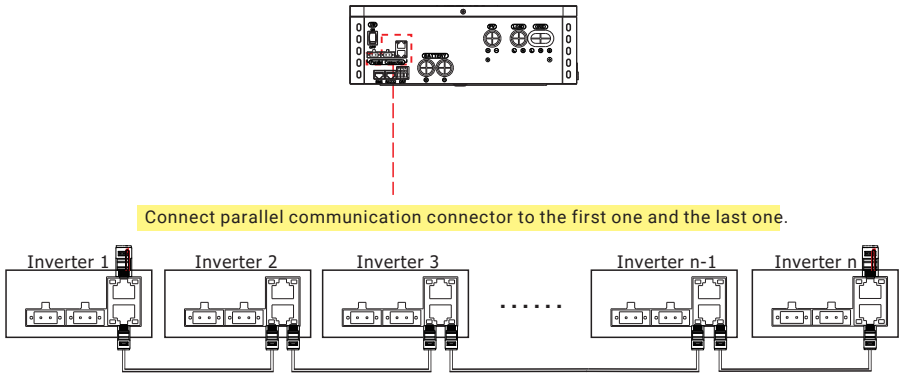
In parallel kit, you will find the following items in the package:

Parallel communication cable x 1pcs

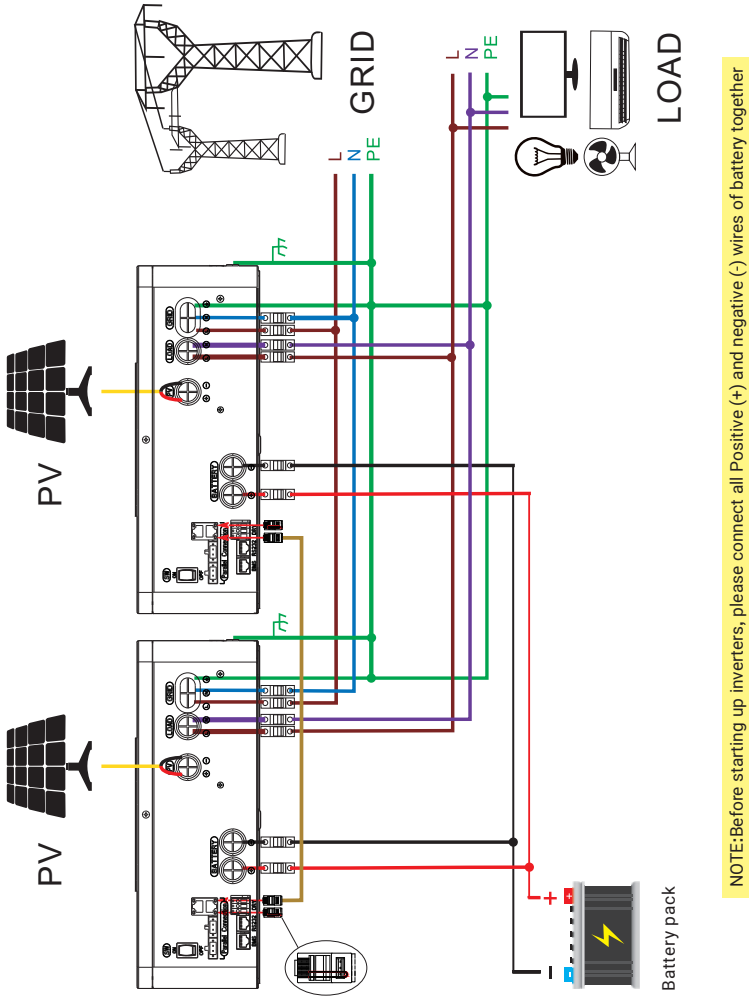
Parallel communication connector x 1pcs

4.Wiring Connection

This installation steps are only applied to 6K model.
Inverters Communication Connection

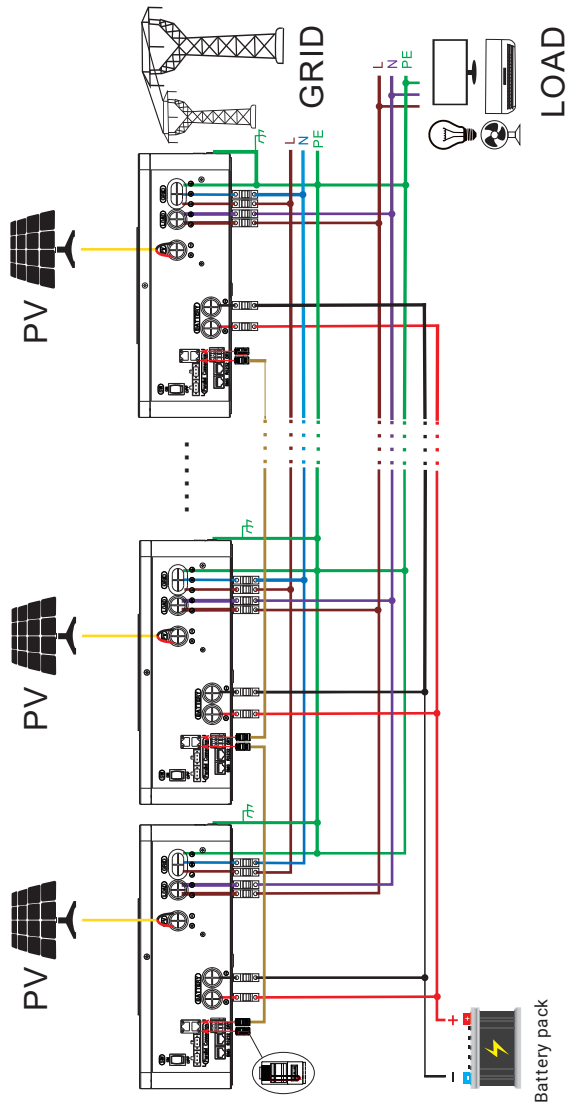


Single Phase Parallel connection diagram for two inverters in parallel



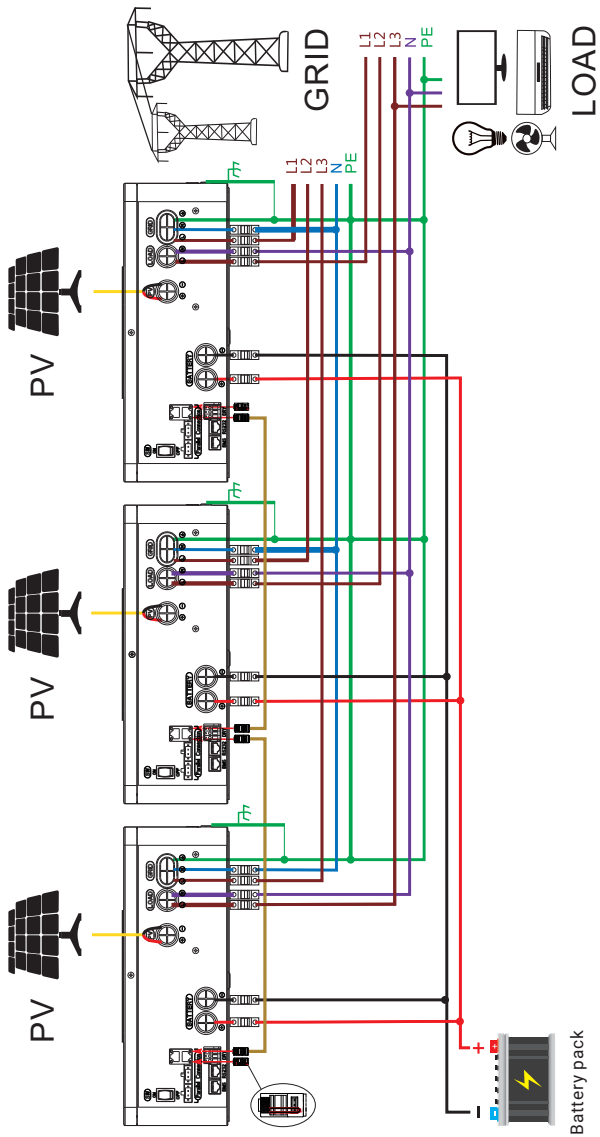
NOTE:Before starting up inverters, please connect all Positive (+) and negative (-) wires of battery together

Single Phase Parallel connection diagram for 3-12 inverters in parallel



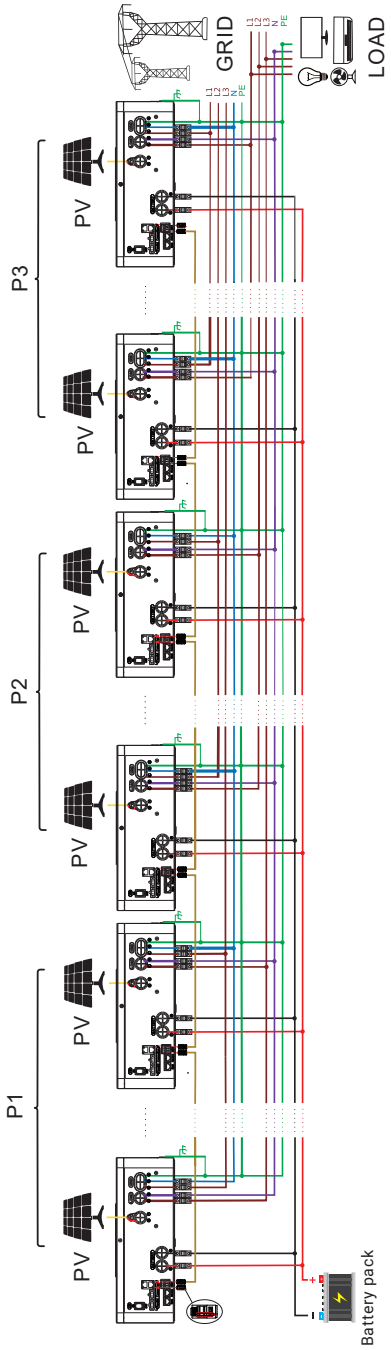
NOTE:Before starting up inverters, please connect all Positive (+) and negative (-) wires of.battery together

Three Phase Parallel connection diagram for three inverters in parallel



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

Three Phase Parallel connection diagram for 4-12 inverters in parallel



WARNING:
1. Before starting up inverters, please connect all positive(+) and negative (-) wires of battery together
2. Each phase is connected with at least one, a maximum of 10 parallel, and a maximum of 12 parallel three phases.

5.LCD Setting and Dispaly

Setting Program

20	AC output mode	Single	20 SIG	When the units are used in parallel with single phase, please select"PAL"in program 20.It is required to have at least three inverters or maximum twelve inverters to support three-phase equipment. It's required to have at least one inverter in each phase or it's up to ten inverters in one phase. Please select"3P1" in program 20 for the inverters connected to L1 phase,"3P2" in program 20 for the inverters connected to L2phase and"3P3" in program 20 for the inverters connected to L3 phase. Before starting up inverters, please connect all N wires of AC output together.
		Parallel	20 PAL	
		L1 Phase	20 3P1	
		L2 Phase	20 3P2	
		L3 Phase	20 3P3	

6.Commissioning

Parallel in single phase

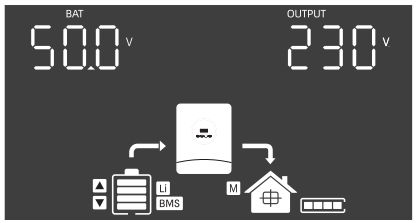
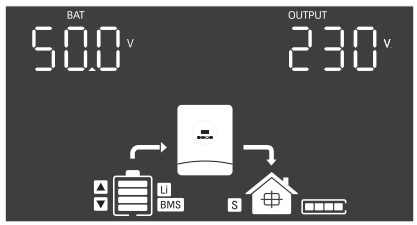
Step1: Check the following requirements before commissioning:

- Correct wire connection.
- Ensure all breakers in line wires of load side are open and each Neutral wires of each unit are connected toaether.

Step2: 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.

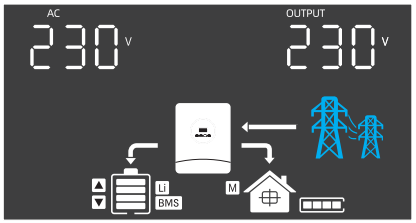
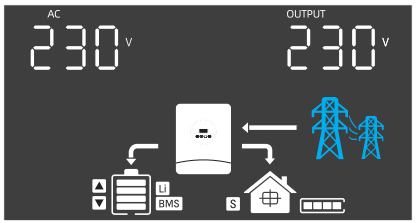
Step3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

NOTE:Master and slave units are randomly defined.

Step4: 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. After detecting AC connection, they will work normally.

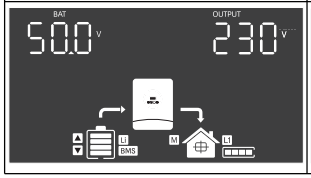
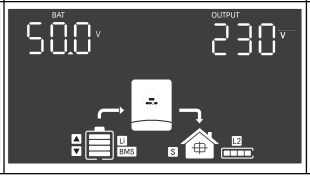
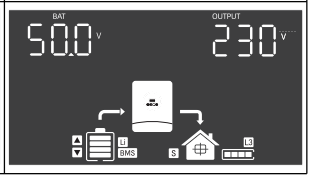
LCD display in Master unit	LCD display in Slave unit
	

Step5: If there is no more fault alarm, the parallel system is completely installed.
Step6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load

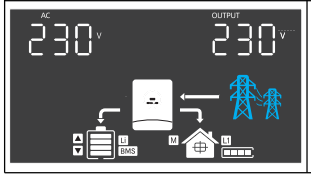
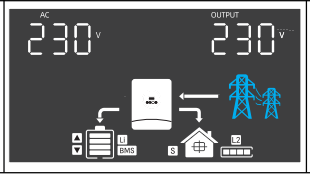
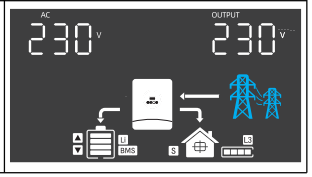
Support three-phase equipment.

Step1: 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.

Step2: Turn on all units and configure LCD program 20 as P1, P2 and P3 sequentially. And then shut down all units.
NOTE:To be safe, it's better to turn off switch when setting LCD program.
Step3: Turn on all units sequentially.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step4: Switch on al AC breakers of Line wires in AC input. If AC connection is detected and three phases are matched with unit setting, they will work normally. Otherwise, the AC icon will flash and they will not work in line mode.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.
Step6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.
Note1: To avoid overload occurring before turning on breakers in load side, it's better to have whole system in operation first.
Note 2:Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

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 times every second	Check if the Fans wiring connected well. Replace the fan.
04	Grid over voltage warning	No buzzer alarm	
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.

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 and ERROR are 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.
22	Sharing 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 funish 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.
32	DC/DC current sensor failed	Restart the unit, if the error happens again, please return to repair center.
33	No.2 DC/DC current sensor failed	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
35	Over current happen at DC/DC circuit detected by hardware	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
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.

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.
55	Over temperature happen at LLC TX	The temperature of internal DC/DC TX 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 funish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer.