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OFF-GRID INVERTER

N2400S / N3000S / N3300S

User Manual

Contents

1. About this manual

1.1 Applicability

This manual applies to the following equipment:

N3300S

N3000S

N2400S

1.2 Scope

This manual describes the assembly, installation, operation and troubleshooting of this equipment. Please read this manual carefully before installation and operation.

1.3 Object

This manual is intended for qualified person and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified person must have the following skills:

- Knowledge of how the inverter works and how to operate it.
- Training on how to deal with the hazards and risks associated with the installation and use of electrical equipment and devices.
- Hazards and risks associated with equipment and devices.
- Training in the installation and commissioning of electrical equipment and devices.
- Knowledge of applicable standards and directives.
- Knowledge of and compliance with this document and all safety information.

1.4 Safety instructions

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

1.CAUTION - Only qualified personnel should install equipment with batteries.

2. Before using the device, read all instructions and warning labels on the device, understand the battery and all relevant sections of this manual.

3. Never cause a short circuit in the AC output and DC input, and never connect the power supply when the DC input is short-circuited.

4. Do not charge frozen batteries.

5. Do not disassemble the unit and take it to a qualified service center if servicing or repair is required. Improper reassembly may result in electric shock or fire hazard.

6.To reduce the risk of electric shock, disconnect all wiring before attempting any maintenance or service. Turning off the unit will not reduce this risk.

7. Extreme caution should be exercised when using metal tools on or around batteries. Potential risks, such as sparking or short-circuiting of the battery or other electrical components due to a dropped tool, could cause an explosion.

8.For optimal operation of this off-grid solar inverter, please select the appropriate cable size according to the required specifications, which is very important for the correct operation of this off-grid solar inverter.

9.When you want to disconnect the AC or DC terminals, please strictly follow the installation procedures.

10.Grounding Instructions - This off-grid solar inverter should be connected to a permanently grounded wiring system.

11.Fuses - This inverter is supplied with specific standard fuses as overcurrent protection for battery power.

12.Warning! Only qualified service personnel should service this equipment. If the error persists after troubleshooting according to the troubleshooting table, return this off-grid solar inverter to your local dealer or service center for repair.

2. Introduction

This is a multi-function inverter/charger that combines inverter, solar charger and battery charger functions to provide uninterruptible power support in a portable size. Its comprehensive LCD display provides user-configurable and easy-to-access push-button operations, such as battery charging current AC/solar charger priority, and acceptable input voltages depending on the application.

2.1 Function

- Configure the input voltage range for home appliances and personal computer through LCD settings.
- Configure battery charging current based on application through LCD settings.
- Configure AC/Solar charger priority through LCD settings.
- Compatible with utility or generator power.
- Automatic restart when AC power is restored.
- Overload/over temperature/short circuit protection.
- Smart battery charger design optimizes battery performance.
- Cold start function.

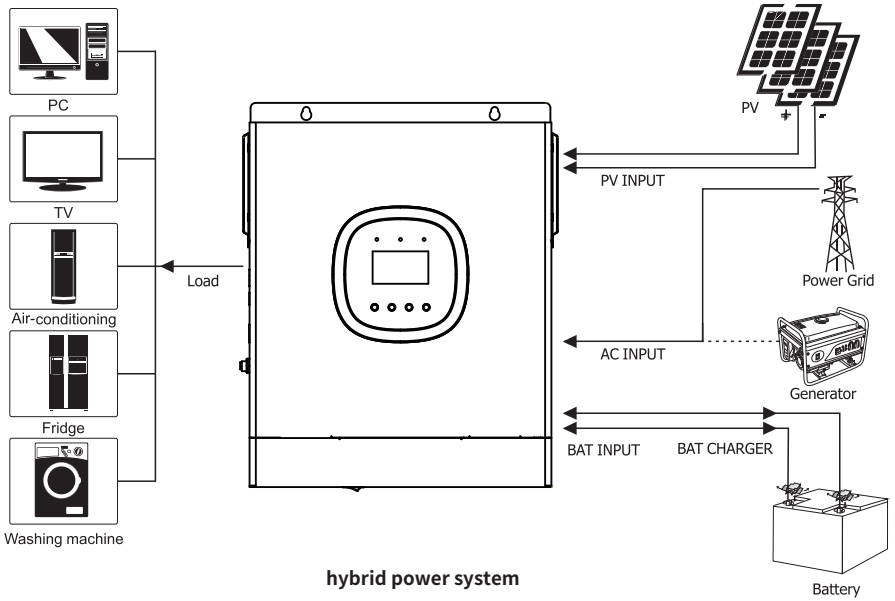
2.2 Basic system structure

The diagram below shows the basic application of this inverter/charger. It also includes the following equipment to form a complete operating system:

- Generator or utility power
- Photovoltaic module (optional)

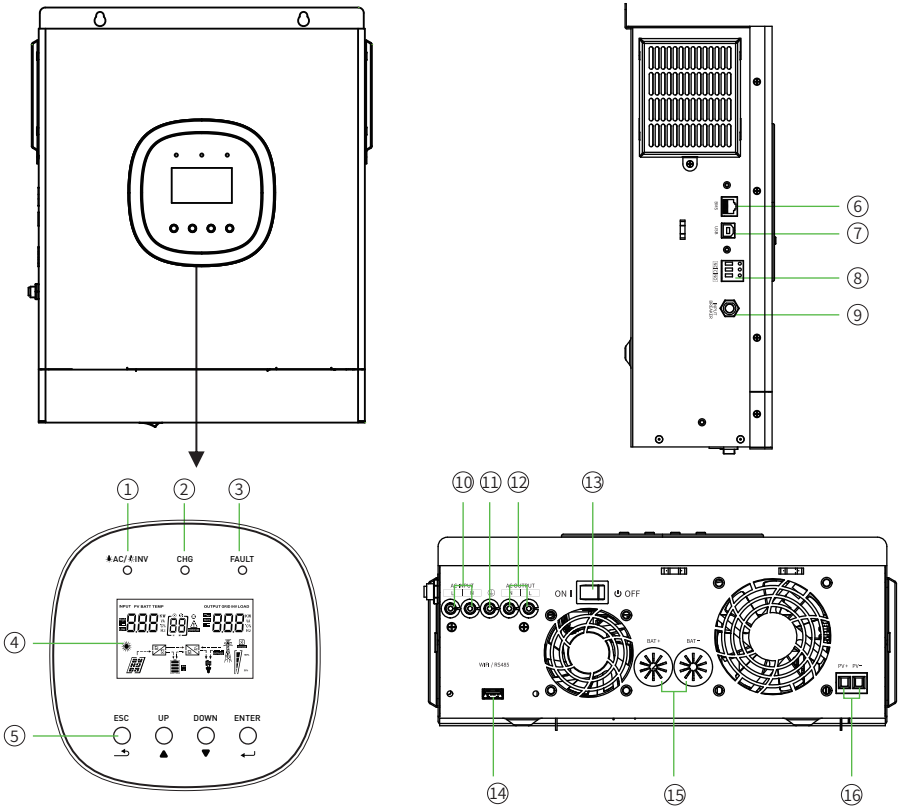
For other possible system configurations, please consult your system integrator, depending on your requirements.

The inverter can power a wide range of appliances in a home or office environment, including motor-based appliances such as lamps, fans and air conditioners.



hybrid power system

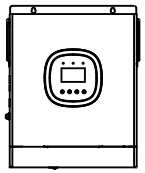
2.3 Product overview



1. Status indicator
2. Discharging/Charging indicator
3. Fault indicator
4. LCD display
5. Function buttons
6. BMS communication interface
7. USB
8. Dry Contact
9. Input breaker
10. AC Input
11. PE (protective earth)
12. AC output
13. Power on/off switch
14. USB WIFI
15. Battery input
16. PV input

3. Installation

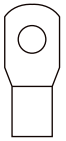
3.1 Unpacking and inspection



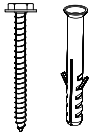
Inverter x1

3.2mm Blue tube terminals x5

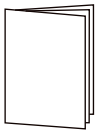
4.9mm Red tube terminals x1
4.9mm Black tube terminals x1



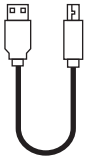
Battery terminals x2



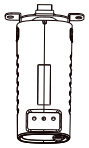
Expansion Screw Combination x2



User manual x1



USB cable x1



Wireless module x1

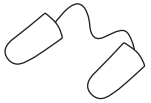
M4 screws x2

Optional. The type of equipment used varies from region to region. Please consult your local customer service department for the selection of equipment types.

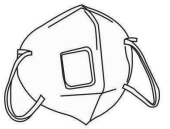
3.2 Installation tools

Recommended installation tools include but are not limited to the following tools. If necessary, additional auxiliary tools can be used on site.

Protection Goggle



Anti-noise Earplugs



Dust Mask

Safety Gloves

Safety Shoes

Utility Knife

Marker Pen

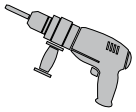
Anti-static Bracelet

Cord Cutters

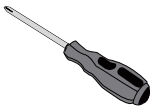
Wire Strippers

Measuring Stick

Rubber Hammer

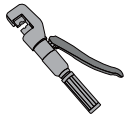


Impact Drill



Phillips Screwdriver

Electric Screw Driver



Hydraulic Pliers

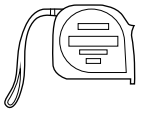
Heat Gun

Crimping plier

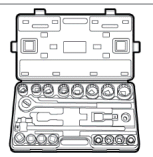
MC4 PV connection wrench

Multimeter

Straight Screwdriver



Steel Tape

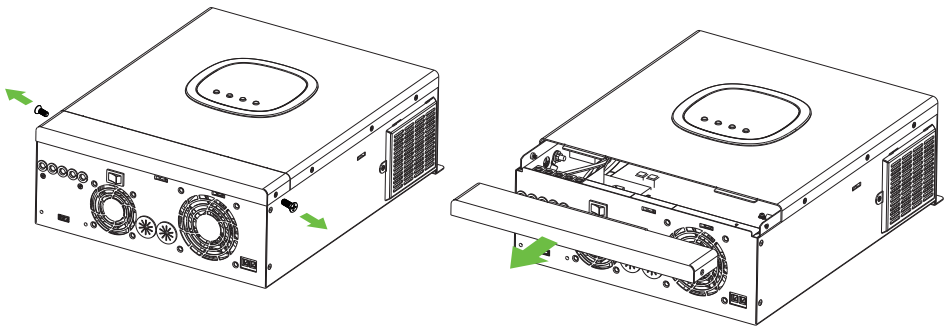


Socket Wrench Set

Vacuum Cleaner

3.3 Preparation

Before connecting all wires, remove the bottom cover by removing the two screws as shown below.



3.4 Installing the device

Before selecting a mounting location, please consider the following points:

Do not install the inverter on flammable building materials.

Mount on a solid surface.

Mount this inverter at eye level so that the LCD display can be read at all times.

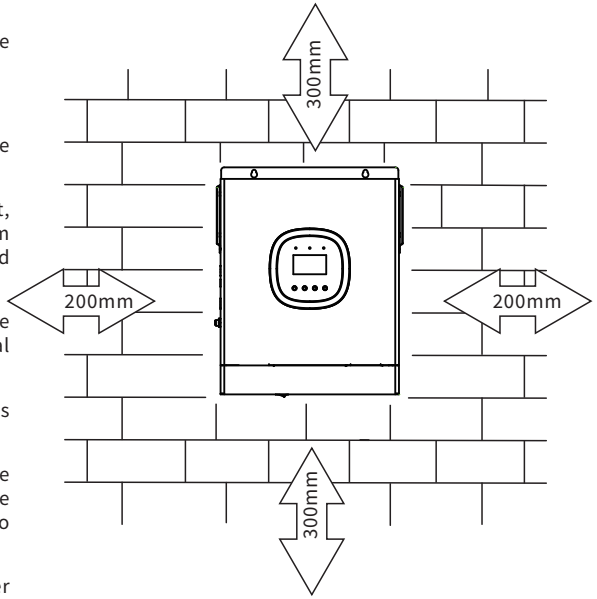
For proper air circulation to dissipate heat, leave a clearance of approximately 200 mm and approximately 300 mm above and below the unit.

The ambient temperature should be between 0℃ and 55℃ to ensure optimal operation.

The recommended mounting position is vertically adhered to the wall.

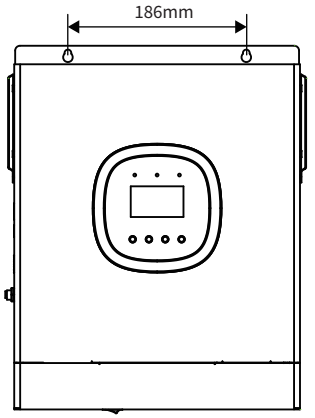
Ensure that other objects and surfaces are kept as shown below to ensure adequate heat dissipation and sufficient space to remove wires.

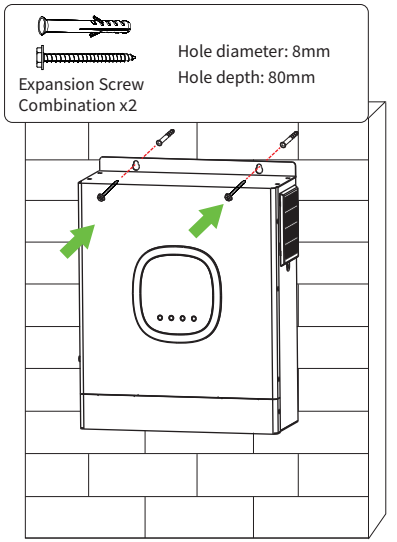
For installation on concrete or other non-combustible surfaces only.



The unit is suitable for installation on concrete or other non-combustible surfaces.

Tighten the two expansion screws to install the unit.

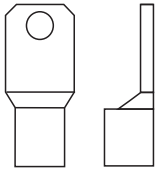




3.5 Battery connection

Note: For safe operation and regulatory compliance, a separate DC overcurrent protector or circuit breaker is required between the batteries and the inverter. The circuit breaker may not be requested but an overcurrent protector is still required to be installed.

O-type terminal:



Warning! All wiring must be performed by qualified personnel.

Warning! Using the proper cables to connect the battery is important for the safe and efficient operation of the system. To reduce the risk of injury, use the appropriate cable and terminal sizes recommended below.

Recommended battery cable and terminal sizes:

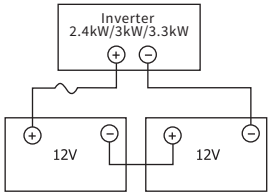
Model	Typical Amperage	Battery capacity	Wire diameter
2.4KW	114A	100AH	1*6AGW
		200AH	2*6AGW
3KW	142A	100AH	1*4AGW
		200AH	2*6AGW
3.3KW	156A	100AH	1*3AGW
		200AH	2*4AGW

Follow the steps below to make battery connections:

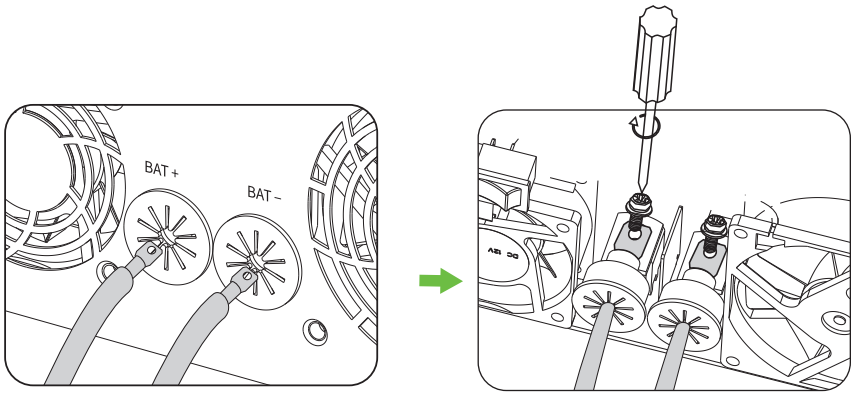
1. Assemble the battery ring terminals according to the recommended battery cable and terminal sizes.

2. 2.4kW/3kW/3.3kW models support 24VDC systems.

Connect all battery packs as shown below. It is recommended to connect batteries with at least 100AH capacity for 2.4KW models and at least 200AH capacity for 3KW/3.3KW models.



3. Insert the ring terminals of the battery cables flat into the battery connectors of the inverter and make sure the bolts are tightened to a torque of 2-3 Nm. Ensure that the polarity of the battery and the inverter/charger are correctly connected and that the ring terminals are tightly screwed onto the battery terminals.



Warning: electric shock hazard
Due to the high voltage of series batteries, care must be taken when installing.

Attention! Do not place anything between the flat part of the inverter terminals and the Aring terminals. Otherwise overheating may occur.

CAUTION!!! Do not apply antioxidants to the terminals before they are tightly connected.

CAUTION!!! Make sure that DC (+) must be connected to DC (+) and DC (-) must be connected to DC (-) before making final DC connections or turning off the DC breaker/circuit breaker.

3.6 AC input/output connection

Note! Install a separate AC circuit breaker between the inverter and the AC input power supply before connecting to the AC input power supply. This will ensure that the inverter can be safely disconnected during maintenance and will completely prevent AC input overcurrent. The recommended size of the AC circuit breaker is 20A for 2.4kW and 32A for 3kW/3.3kW.

Note! There are two terminals labeled “AC INPUT” and “AC OUTPUT”. Do not misconnect the input and output connectors!

Warning! All wiring must be carried out by qualified personnel.

Warning! It is important for the safe and efficient operation of the system that the proper cables are used for AC input connections. To reduce the risk of injury, use the appropriate cable size recommended below.

AC Line Recommended Cable Requirements

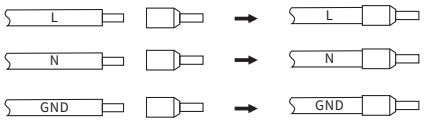
Model	Specification	Torque value
2.4kW	14AWG	0.8~1.0Nm
3kW/3.3kW	12AWG	1.2~1.6Nm

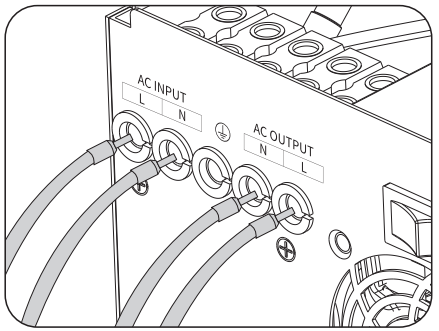
Follow the steps below to make AC input/output connections:

1.Always turn on the DC protector or circuit breaker before making AC input/output connections.

2. Strip the insulated sleeve of the cables for 7-8mm and press the condutor part into the corresponding inverter terminals. You are advised to determine the length of the conductor by the length of the inverter terminal.

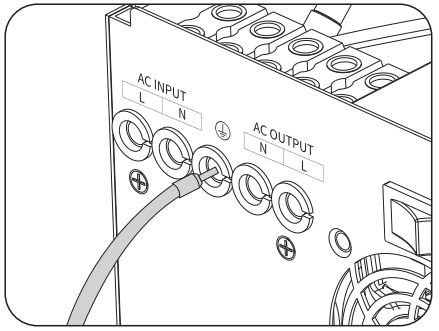
⏚-Ground wire (yellow-green)
L-Line (brown or black)
N-Neutral wire (blue)





Make sure AC power is disconnected before attempting to hardwire AC power to the unit.

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



CAUTION: IMPORTANT

Be sure to connect the AC wires with the correct polarity. If the L and N wires are connected reversely, it may cause a short circuit in the grid when these inverters are operated in parallel.

CAUTION: Appliances such as air conditioners take at least 2~3 minutes to restart because there needs to be enough time to balance the refrigerant gas within the circuit. If a power outage occurs and is restored in a short time, it will damage your connected appliances. To prevent such damage, please check whether the air conditioner manufacturer is equipped with a delay function before installation. Otherwise, this inverter/charger will trigger an overload fault and cut off the output to protect your appliances, but sometimes it will still cause internal damage to the air conditioner.

3.7 PV connection

CAUTION: Before connecting the PV modules, install a separate DC circuit breaker between the inverter and the PV modules.

WARNING! All wiring must be done by qualified personnel.

WARNING! Using appropriate cables to connect PV modules is important for safe and efficient system operation. To reduce the risk of injury, use the appropriate cable size recommended below.

Model	Typical current strength	Cable size	Torque
2.4kW/3kW/3.3kW	60A	8AWG	1.4~1.6Nm

PV module selection:

When selecting the appropriate PV modules, always consider the following requirements first:

1. The open circuit voltage (Voc) of the PV modules should not exceed the maximum PV array circuit volatge of the inverter.

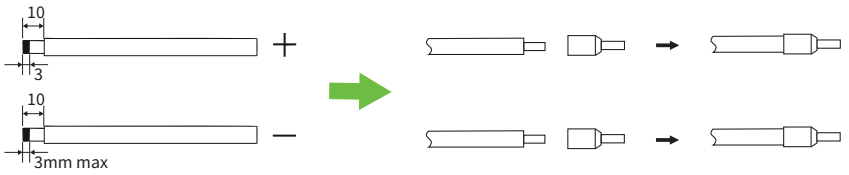
2. The open circuit voltage (Voc) of the PV module should be higher than the minimum battery voltage.

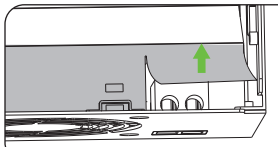
Solar charging mode	
	MPPT Charger
Inverter Model	2.4kW/3kW/3.3kW
Charging Current	60A
Maximum PV Array Open Circuit Voltage	145Vdc
PV Array MPPT Voltage Range	30~120Vdc
Minimum battery voltage for PV charging	17Vdc
System DC Voltage	24Vdc

Follow these steps to make PV module connections:

1. Remove the 10 mm insulating sleeves from the positive and negative conductors.

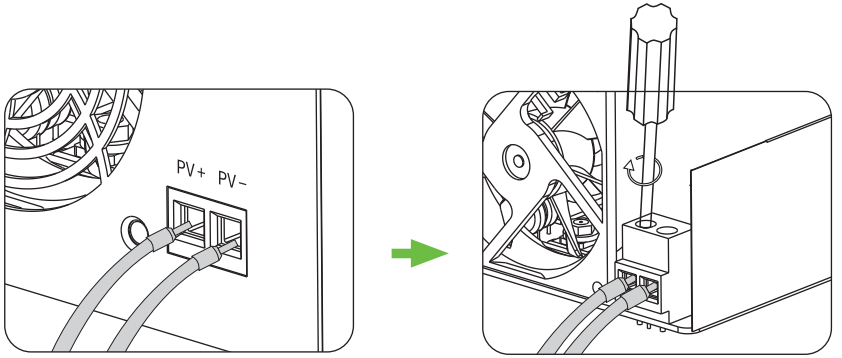
2. Check the polarity of the PV module and PV input connector wires. Then, connect the positive (+) lead of the wire to the positive (+) lead of the PV input connector. Connect the negative (-) lead of the wire to the negative (-) lead of the PV input connector.





Note: Lift up the duct paper and then tighten the screws to secure the wires.

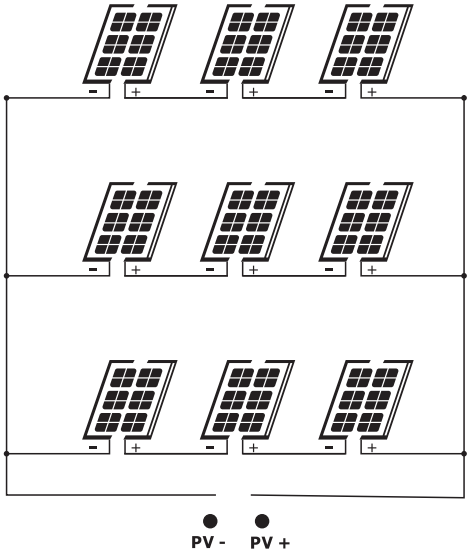
3. Locking screws to secure the wire. Ensure that wires are securely connected.



Recommended PV module configuration

PV Module Spec. (reference)	Inverter model	Solar Input	Number of PV modules
-260Wp -Vmp:30.9Vdc -Imp:8.42A -Voc:37.7Vdc -Isc:8.89A -Cells:60	MPPT-60A	3S3P	9PCS

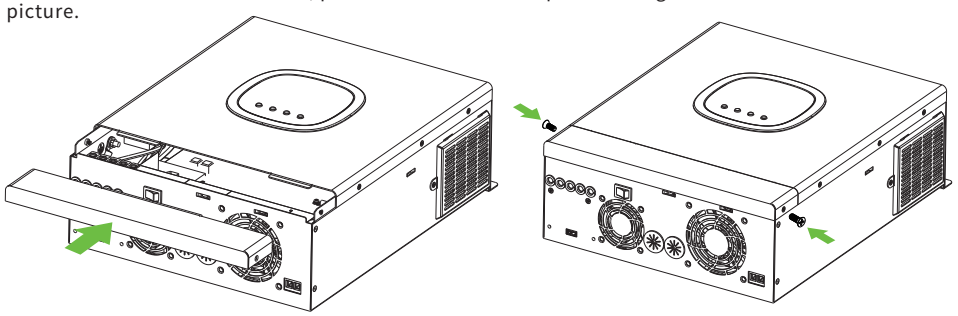
Solar panel installation diagram



MPPT-60A

Final Assembly

After all the wires are connected, put the buttom cover in place and tighten the screws as shown in the picture.



3.8 Communication connection

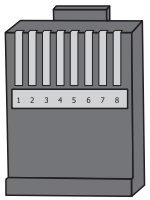
Please use the communication cable provided to connect the inverter to the computer, insert the CD that comes with the inverter into the computer, and follow the on-screen instructions to install the monitoring software. For detailed software operations, please refer to the software manual in the CD.

WARNING! It is strictly forbidden to use the network cable as a communication cable to communicate directly with the computer port, otherwise it may damage the internal components of the controller.

WARNING! The RJ45 interface is only suitable for use with our company's supporting products or operation by professionals.

RJ45 Pinout

Pin	Definition
1	Wake Up
2	GND
3	GND
4	CAN-H
5	CAN-L
6	GND
7	RS-485A
8	RS-485B



Dry contact signal

There is a dry contact (3A/250VAC) on the rear panel. It can be used to send a signal to an external device when the battery voltage reaches a warning level.

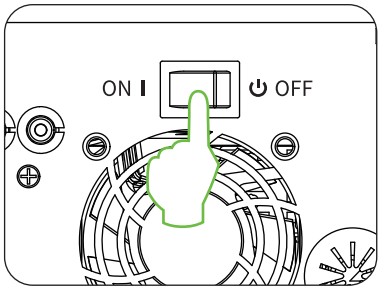
Device Status	condition			Dry contact port	
				NC & C	NO & C
Power Off	The device is turned off and no output power is supplied.			Close	Open
Power on	The output is powered by the utility.			Close	Open
	The output is powered by batteries or solar energy	Procedure 01 Set to Utility Power	Battery voltage < low DC warning voltage	Open	Close
			Battery voltage > setting value in program 14 or battery charging reaches floating stage	Close	Open
		Procedure 01 First set to SBU or solar	Battery voltage < setting value in program 13	Open	Close
			Battery voltage > setting value in program 14 or battery charging reaches floating stage	Close	Open

4. Operation

4.1 Battery On/Off

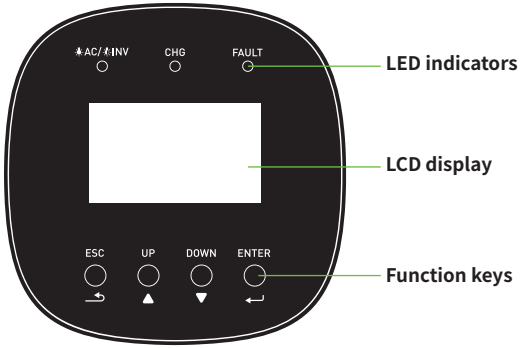
Once the device is properly installed and the battery is well connected, simply press the on/off switch (at the bottom) to turn the device on.

Note: To turn off the power, please press the switch to turn off first, then turn off the braeker of the PV and the AC, and finally turn off the braeker of the battery.



4.2 Operation and display panel

The operation and display panel is shown in the figure below. It is on the front panel of the inverter, which includes three indicator lights, four function keys and an LCD display screen to display the operating status and input/output power information.



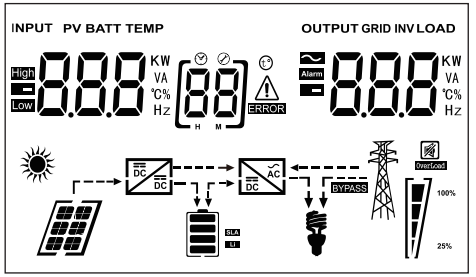
LED indicators

LED indicators			Information
AC/INV	Green	**Always on**	Mains mode.
		Flash	Off-grid mode.
CHG	Green	**Always on**	The battery is fully charged.
		Flash	The battery is charging or discharging.
FAULT	Red	**Always on**	The inverter has failed.
		Flash	A warning occurs in the inverter.

Function keys

Function keys	Description
ESC	Exit setting mode.
UP	Go to previous selection.
DOWN	Go to next selection.
ENTER	Confirm selection in setup mode or enter setup mode.

4.3 LCD screen icons



Icon	Functional description
Input source information and output information	
	Indicates the exchange of information.
	Indicates DC information.
	Indicates input voltage, input frequency, PV voltage, battery voltage, and charger current. Indicates output voltage, output frequency, VA load, Watt load, and discharge current.
Configuration procedures and error messages	
	Instructions for setting up the procedure.
	Indicates warning and fault codes. Warning: Flashing and warning code. Fault: Illuminates and the fault code.

Battery Information		
	Displays battery level 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in AC mode.	
In AC mode, the battery charging status will be displayed.		
State	Battery voltage	LCD display
Constant current mode / Constant voltage mode	<2V/cell	The 4 bars will flash in turn.
	2 ~ 2.083V/cell	The bottom bar will light up and the other three bars will flash in turn.
	2.083 - 2.167V/cell	The bottom two bars will light up and the other two bars will flash in turn.
	> 2.167 V/cell	The bottom three bars will light up and the top bar will flash.
The battery is fully charged.		The 4 bars will light up.
In battery mode, the battery capacity will be displayed.		
Load percentage	Battery voltage	LCD display
Load>50%	< 1.717V/cell	
	1.717V/cell- 1.8V/cell	
	1.8~ 1.883V/cell	
	> 1.883 V/cell	
50%> Load > 20%	< 1.817V/cell	
	1.817V/cell~ 1.9V/cell	
	1.9 - 1.983V/cell	
	> 1.983V/cell	
Load < 20%	< 1.867V/cell	
	1.867V/cell~ 1.95V/cell	
	1.95 - 2.033V/cell	
	> 2.033V/cell	
Load information		
OverLoad	Indicates an overload.	
	The load levels are indicated at 0-24%, 25-49%, 50-74%, and 75-100%.	
	0%~24%	25%~49% / 50%~74% / 75%~100%

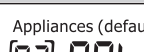
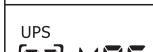
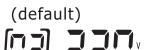
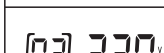
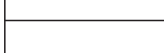
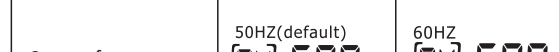
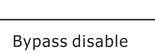
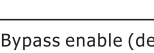
Mode operation information	
	Indicates that the device is connected to a power source.
	Indicates that the device is connected to a PV panel.
BYPASS	Indicates that the load is powered by the utility power supply.
	Indicates that the solar charger is working.
	Indicates that the DC/AC inverter circuit is operating.
静音操作	
	Indicates that the device alarm is disabled.

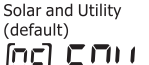
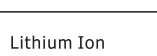
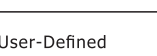
4.4 LCD Settings

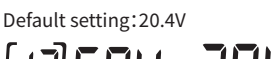
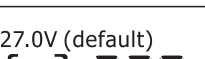
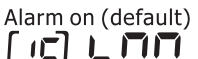
After pressing the "ENTER" button for 2 seconds, the device will enter the setting mode. Press the "UP" or "DOWN" button to select the setting program. Press "ENTER" to confirm the selection, then press "UP" or "DOWN" to select the setting content. After the setting is completed, press and hold "ENTER" to confirm the setting, and press "ESC" to exit.

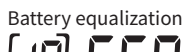
Setup Procedure:

Program	Description	Available options	
01	Output source priority selection		Solar power supplies the loads first. If solar power is insufficient to supply all connected loads, the battery will supply power to the loads simultaneously. The utility power will supply power to the loads only when the battery voltage drops to the low level warning voltage or the set value in program 13.
			Solar energy provides power to the loads first. If solar energy is insufficient to power all connected loads, the battery energy will provide power to the loads simultaneously. The utility will provide power to the loads only if any of the following occurs: • Solar energy is not available. • The battery voltage drops to the low warning voltage or the set value in Program 13.
		(default) 	The utility power will give priority to power the load. Solar energy and battery will power the load only when the utility power is unavailable.

Program	Description	Available options	
02	AC input voltage range	Appliances (default) 	If selected, the acceptable AC input voltage range is 90-280VAC.
		UPS 	If selected, the acceptable AC input voltage range is 170-280VAC.
		VDE 	If selected, the acceptable AC input voltage range complies with VDE4105 (184VAC-253VAC)
		GEN 	Select generator mode when the device is connected to the generator by the user.
03	Output voltage	(default) 	Set the output voltage range, (230VAC)
			Set the output voltage range, (240VAC)
			Set the output voltage range, (220VAC)
			Set the output voltage range, (208VAC)
			Set the output voltage range, (200VAC)
04	Output frequency	50HZ(default) 	60HZ 
05	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable 	Bypass enable (default) 

Program	Description	Available options	
06	Charger source priority: to configure charger source priority.	If this inverter/charger is in Online, Standby or Fault mode, and the Output source priority selection is UTI, the charger source can be programmed as follows:	
		Solar first 	Solar power will be prioritized for charging the battery. Only when solar power is not available will the utility charge the battery.
		Solar and Utility (default) 	Solar power and the utility will charge the batteries simultaneously.
		Only Solar 	Solar power is the only charging source, whether or not there is utility access.
		If this inverter/charger is in battery mode or power save mode, only solar energy is available and sufficient. If solar energy is available and sufficient, it will charge the battery. Note: Only when Output source priority is UTI, the charger source priorit OS0/CSO can be selected.	
07	Maximum solar charging current	60A (default) 	When setting item [08] is 20A, the setting range is 0A to 60A; when setting item [08] is 30A, the setting range is 0A to 50A. The increment of each click is 1A.
08	Maximum utility charging current	20A (default) 	30A (Maximum current) 
09	Battery Type	AGM (default) 	Flooded 
		GEL 	LEAD 
		Lithium Ion 	User-Defined 
		If “LI” is selected, you can set the battery charge voltage and low DC cut-off voltage in program 10, 11, and 12.	

Program	Description	Available options	
10	Constant voltage charging voltage (C.V voltage)	Default setting: 28.2V 	
		This program can be set if “LI” is selected in Program 17. For 24Vdc models, the setting range is from 24.0V to 29.2V. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.	
11	Float charge voltage	Default setting：27.0V 	
		If “LI” is selected in Program 14, this program can be set. The setting range for 24Vdc models is from 24.0V to 29.2V. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.	
12	Low DC cut-off battery voltage setting	Default setting：20.4V 	
		This program can be set if “LI” is selected in Program 14. For 24Vdc models, the setting range is from 20.0V to 24.0V. The set value of the low DC cutoff voltage will not change.	
13	When the grid is available, the battery stops discharging voltage.	23V (default) 	The setting range is from 22.0V to 29.0V. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.
14	Battery stop charging voltage when grid is available.	27.0V (default) 	The setting range is from 22.0V to 29.0V. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.
15	Alarm Control	Alarm on (default) 	Alarm off 
16	Beeps when main power is lost	Alarm on 	Alarm off (default) 

Program	Description	Available options	
17	Solar Balancing: When enabled, the solar input power will automatically adjust according to the connected load power.	Solar power balance enable 	If selected, when the machine is in off-grid working state, the solar input power will be automatically adjusted according to the following formula: Max. solar input power = Max. battery charging power + connected load power.
		Solar power balance disable (default) 	If selected, the solar input power will be the same as the maximum battery charge power regardless of how many loads are connected. The maximum battery charge power will be based on the set current in program 7 and 8 (Maximum solar power = Maximum battery charge power)
18	Battery equalization	Battery equalization 	Battery equalization disable 
19	Battery equalization voltage	24V Models Available Options: 28.8V 	
		The setting range is from 24.0V to 29.2V. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.	
20	Battery equalization time	60 minutes (default) 	The setting range is from 5 minutes to 900 minutes. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.
21	Battery equalization timeout	120 minutes (default) 	The setting range is from 5 minutes to 900 minutes. The set value will increase or decrease by 0.1V every time the UP or DOWN button is pressed.
22	Equalization interval	30 days (default) 	The setting range is from 0 to 90 days. The set value will increase or decrease by 0.1V every time the UP and DOWN button is pressed.
23	Active equalization immediately	Enable 	Disable (default) 
		If equalization function is enabled in program 18, this program can be set. If “Enable” is selected in this program, the battery equalization will be activated immediately and the LCD home page will display “ES”. If “Disable” is selected, it will cancel the equalization function until the activated equalization time arrives. At this time, “ES” will be shown on the LCD home page.	

After pressing the "ESC" button for 2 seconds, the device will enter reset mode. Press "Up" and "DOWN" to select a program. Then press the "ESC" button to exit.

SEt	(Default) 	Reset settings disabled.
		Reset settings enabled, restore default system parameters.

5. Fault reference code

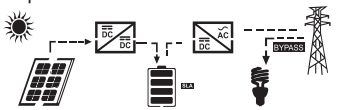
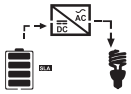
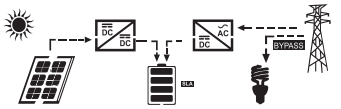
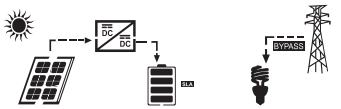
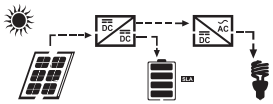
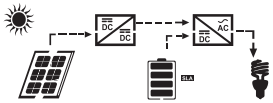
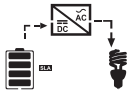
Fault Codes	Fault events	Icon on
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Output voltage is too high	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failure or low bus voltage	
11	Output Voltage is Abnormal	
14	Battery Fuse Broken	
34	Temperature sensor is open	
38	Battery discharge overLoad	
41	Inverter over current	
55	Output voltage DC component too high	
58	Output voltage is too low	
80	CAN fault	

6. Warning indicators

Fault Codes	Fault events	Icon on
01	Fan is locked	
02	The PV temperature is too High	
03	Battery is over-charged	
04	Low battery	
07	Overload	
10	Output power derating	
12	Grid Charge Over Current	
14	PV Reverse Short Connect	
21	Grid Voltage Abnormal	
22	Grid Frequency Abnormal	
31	Bat Only Charge	
32	Bat Need Charge	
34	PV Temperature sensor is open	
44	PV voltage or current too high	
56	Battery connection is open	
75	Discharge Over Current	

Fault Codes	Fault events	Icon on
76	Charge Over Current	
Eq	Battery equalization	
bp	Battery is not connected	

7. Operation status description

Running status	Description	LCD Display
Grid loaded/charging status	The PV energy is charging the battery and the utility power is supplying the AC loads.	PV Open 
		PV Close 
Charging status	PV energy and the grid can charge the battery.	
Bypass status	The error is caused by internal circuit error or external reasons, such as overheating, etc.	
Off-grid status	The inverter will provide output power from both the battery and PV power.	Inverter powers loads from PV energy 
		Inverter powers loads from battery and PV power 
		Inverter powers loads from battery only. 
Stop Mode	The inverter will stop working if you shut down the inverter via software or an error occurs in the condition of no grid.	

Display Settings

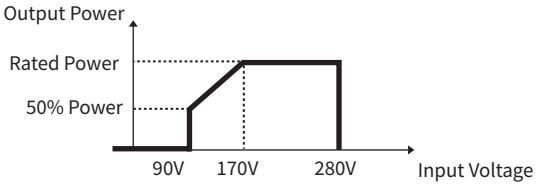
Press the “UP” or “DOWN” button to switch the LCD display information in sequence. The selectable information order is switched as below: battery voltage, battery current, inverter voltage, inverter current, grid voltage, grid current, load (watt), load (VA), grid frequency, inverter frequency, PV voltage, PV charging power, PV charging output voltage, PV charging current.

Selectable Information	LCD Display
Battery voltage/DC discharge current	BATT 26.0 V 40 A
Inverter output voltage/inverter output current	229 V INV 6.7 A
Grid voltage/grid current	229 V -3.0 A
Load (Watts/VA)	1.50 KW LOAD 1.68 KVA
Grid frequency/inverter frequency	INPUT 50.0 Hz INV 50.0 Hz
Photovoltaic voltage and power	PV 61 V 1.00 KW
Photovoltaic charger output voltage and MPPT charging current	PV 25.0 V OUTPUT 40.0 A
Grid charging current and power	BATT 18.1 A GRID 0.47 KW
Version number	VAR 1.82

8. Specifications

Inverter Model	N2400S / N3000S / N3300S
Line Mode	
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	90Vac±7V(APL,GEN); 170Vac±7V(UPS);186Vac±7V(VDE)
Low Loss Return Voltage	100Vac±7V(APL,GEN); 180Vac±7V(UPS);196Vac±7V(VDE)
High Loss Voltage	280Vac±7V(APL, UPS,GEN);253Vac±7V(VDE)
High Loss Return Voltage	270Vac±7V(APL,UPS,GEN);250Vac±7V(VDE)
Max AC Input Voltage	300Vac
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
Low Loss Frequency	40Hz±1Hz(APL,UPS,GEN)47.5Hz±0.5Hz(VDE)
Low Loss Return Frequency	42Hz±1Hz(APL,UPS,GEN); 48Hz±0.5Hz(VDE)
High Loss Frequency	65Hz±1Hz(APL,UPS,GEN); 51.5Hz±0.5Hz(VDE)
High Loss Return Frequency	63Hz±1Hz(APL,UPS,GEN); 50.05Hz±0.5Hz(VDE)
Output Short Circuit Protection	Line mode: Circuit Breaker;Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)
Transfer Time	10ms typical (UPS,VDE);20ms typical (APL)

Output power derating:When AC input voltage drops to170V depending on models, the output power will be derated



Inverter Mode

Rated Output Power	2400W/3000W/3300W	
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	60Hz or 50Hz	
Peak Efficiency	91%	
Overload Protection	5s@> 150% load; 10s@110%~ 150% load	
Nominal DC Input Voltage	24Vdc	
Cold Start Voltage	23.0Vdc	
Low DC Warning Voltage	@ load < 20%	22.0Vdc
	@ 20%<load<50%	21.4Vdc
	@ load 250%	20.2Vdc
Low DC Warning Return Voltage	@ load < 20%	23.0Vdc
	@ 20%<load<50%	22.4Vdc
	@ load 250%	21.2Vdc
Low DC Cut-off Voltage	@ load < 20%	21.0Vdc
	@ 20%<load<50%	20.4Vdc
	@ load 250%	19.2Vdc
High DC Recovery Voltage	29Vdc	
High DC Cut-off Voltage	30Vdc	

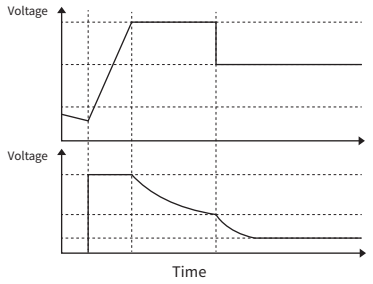
Utility Charging Mode

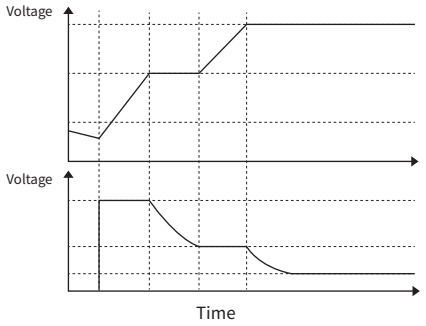
Charging Current Nominal Input Voltage	20/30A±5%	
Floating charging voltage	AGM / Gel/LEAD/Battery	27.4Vdc
	Flooded Battery	27.4Vdc
Bulk charging voltage(C.V voltage)	AGM / Gel/LEAD/Battery	28.2Vdc
	Flooded Battery	28 4Vdc
AC Voltage range	(105V-265Vac)±3%/AC Frequency range(45-63)±0.5Hz	
Charging Algorithm	3-Step(Flooded Battery, AGM/Gel Battery), 4-Step(LI)	

Solar Charging Mode

Charging Current	MPPT-60A
System DC Voltage	24Vdc
Operating Voltage Range	30-120Vdc
Max.PV Array Open Circuit Voltage	145Vdc
Standby Power Consumption	2W
Battery Voltage Accuracy	+/-0.3%
PV Voltage Accuracy	+/-2V
Charging Algorithm	3-Step(Flooded Battery, AGM/Gel Battery),4-Step(LI)

Charging algorithm for lead acid battery



Charging algorithm for Lithium battery	

Joint Utility and Solar Charging Mode

Charger Model	MPPT-60A
Max Charging Current	80A
Default Charging Current	80A

General Specification

Protection Degree	IP20
Dimension (D*W*H)	311x380x 127mm
Net Weight	7.2kg
Humidity	5% to 95% Relative Humidity(Non-condensing)
Altitude	<2000m
Operating Temperature	0°C ~ 55°C
Storage temperature	-25°C ~ 60°C
Display	LCD+LED
Communicatiom Interface	CAN/RS485/Wifi/DRY Connector
Standard & Certification	IEC62109-1,IEC62109-2,IEC/EN 61000

9. Troubleshooting

Problem	LCD/LED/Buzzer	Explanation/Possible Cause	Solution
The device automatically shuts down during the boot process.	The LCD/LED and buzzer will activate for 3 seconds and then turn completely off.	Battery voltage is too low. (<1.91V/Cell)	1. Recharge the battery. 2. Replace the battery.
No response after power on.	No instruction.	1. The battery voltage is too low. (<1.4V/Cell) 2. The battery polarity is connected in reverse.	1. Check whether the battery and cables are connected correctly. 2. Recharge the battery. 3. Replace the battery.
Mains exists but the device is working in battery mode.	The input voltage is displayed as 0 on the LCD and the green LED (CHG) flashes.	Input protector tripped	Check whether the AC circuit breaker is tripped or the AC wiring is connected correctly.
	Green LED (CHG) flashes.	Insufficient AC power quality. (Shore power or generator)	1. Check whether the AC cord is too thin or too long. 2. Check if the generator (if used) is working properly or if the input voltage range is set correctly. (Appliance-wide)
When the device is turned on, the internal relay is switched on and off repeatedly.	The LCD display and LEDs flash.	Battery disconnected.	Check if the battery cables are connected correctly.
The buzzer keeps beeping and the red indicator light is on.	Fault code 07	Overload error. The inverter is overloaded by 110% and the time has expired.	Turn off some devices to r educe the connection load.
	Fault code 05	Output short circuit.	Check whether the wiring is correct and remove abnormal loads.
	Fault code 02	The internal temperature of the inverter component is too high.	Check if the airflow of the unit is blocked or if the ambient temperature is too high.
	Fault code 03	The battery is overcharged.	Automatically stop charging, wait for the battery voltage to drop and then disappear automatically.
		Battery voltage is too high.	Check whether the battery specifications and quantity meet the requirements.
	Fault code 01	Fan failure	Replace the fan

Problem	LCD/LED/Buzzer	Explanation/Possible Cause	Solution
The buzzer keeps beeping and the red indicator light is on.	Fault code 06/58	Output abnormality. (Inverter voltage is lower than 184Vac or higher than 276Vac)	1. Reduce connected load. 2. Return to repair center.
	Fault code 08/09	Bus voltage too high or too low.	Return to the repair center.
	Fault code 55	Output voltage is unbalanced.	Restart the device. If the error reoccurs, return it to the repair center.
	Fault code 14	The battery is not connected correctly or the fuse is burnt.	If the battery connection is good, return to the repair center.
	Fault code 44	PV overvoltage or high PV charging current.	1. Check the solar equipment access voltage and solar charging current; need to meet the inverter specifications. 2. Return to repair center.

Appendix: Approximate backup schedule

Model	Load(W)	Backup time @ 24Vdc 100Ah(min)	Backup time @ 24Vdc 200Ah(min)
2.4KW	200	766	1610
	400	335	766
	600	198	503
	800	139	339
	1000	112	269
	1200	95	227
	1400	81	176
	1600	62	140
	1800	55	125
	2000	50	112
	2400	35	94
3KW	300	449	1100
	600	222	525
	900	124	303
	1200	95	227
	1500	68	164
	1800	56	126
	2100	48	108
	2400	35	94
	2700	31	74
	3000	28	67
3.3KW	300	449	1100
	600	222	525
	900	124	303
	1200	95	227
	1500	68	164
	1800	56	126
	2100	48	108
	2400	35	94
	2700	31	74
	3000	28	67
	3300	23	51

Note: The backup time depends on the quality of the battery, the age of the battery and the type of battery. The specifications of the battery may vary depending on different manufacturers.