User Manual

PV Off-Grid Inverter With Controller

JNF3KLF24V-V2

JNF3KLF48V-V2

JNF4KLF48V-V2

JNF5KLF48V-V2

JNF3KLF24V-A-V2

JNF3KLF48V-A-V2

JNF4KLF48V-A-V2

JNF5KLF48V-A-V2

Content

1 Safety Instruction

1.1 Safety identification

The following safety symbols may be used in this manual, and the meanings are shown in below：

Safety Symbol	Meaning
⚠️Danger	Indicates that if safety warnings are ignored, serious accidents may result in personal injury; Pay attention to the polarity of the connection, do not connect wrong, there is a risk of damage.
⚠️Warning	Means that it may lead to serious accident of injuries, equipment serious damage or main business interruption, if safety warning is ignored.
⚠️Notice	Means that it may lead to moderate accident of injuries, equipment moderate damage or part of the business interruption, if safety warning is ignored.
👉Note	Means that the content is additional information.

Inverter&Controller related symbol：

Symbol	Meaning
⎓	Direct current (DC)
∼	Alternating current (AC)
⏚	Protecting Earthing (PE)
📖	Refer to relevant instructions
🗑	Can't discard inverter together with domestic garbage
⚡	Beware of dangerous high-voltage. Be careful during operation.！
CE	CE certification mark. It means that Inverter&Controller complies with the requirements of CE certification.

For the electrical and electronics equipment, safety relates to the whole process of installation, commissioning, operation and maintenance. Therefore, incorrect use or operation would damage the

life and personal security of operating person or the third party, and inverters.

In order to reduce casualties, damage of inverter&controller and other equipment, user or operating person should strictly abide by all the safety information tips of danger, warning and notice which are in the process of operating and maintaining

1.2 Safety instruction

⚠ Warning！

All the installation operation on the machine must be completed by the professional and technical personnel. The professional and technical personnel shall:
- Passed specialized training.
- Please read this manual and master the operation of the relevant security matters completely.

If not in accordance with the manual installation and operation of the machine is damaged .It will not in the scope of the warranty.

① Before installation

⚠ Notice！

When you receive the product, please check the damage of the whole machine during the transportation. If you find any problems, please contact Supplier (Supplier) or transportation company immediately

② Installing

Ensure inverter& controller NOT have electrical connections and electricity before installing.

⚠️ Warning！

If inverter damage caused by the following circumstances will be beyond the warranty scope of our company.

- The PV array configuration should ensure the max. short-circuit current of DC side within the allowable range of inverter & controller, otherwise it may cause irreversible damage to inverter & controller.
- The PV array configuration should ensure each PV string open circuit voltage NOT exceed 140V, otherwise it will cause irreversible damage to inverter & controller.
- Improper installation environment will affect performance of inverter & controller and may cause damage to the device.
- Do NOT install the device in flammable or explosive place, or store with flammable and explosive articles.
- Do NOT install the device in an explosive place
- Do NOT install the device in areas where lightning strikes may occur
- Do not install the device in place where have much salt fog
- During running the device, please ensure good ventilation.
- Inverter should be installed erectly, and ensure the heat sink, fans etc. are without shelter.

Electrical connection：

⚠️ Warning！

- All the operation and wiring work should be operated by professional electrical or mechanical engineer.
- Please do not close any circuit breakers until all devices are fully connected

⚠️Notice！

- All electrical installation must comply with local and national electrical installation standards.
- In order to ensure the safe operation, require proper earthing, use appropriate size conductor and provide necessary short circuit protection.

- Cable connection must select the appropriate specifications, firm connection and good insulation.

③ In operation

⚠ Danger！
- Please do NOT open the device cover when the device is with electricity！

④ Repair

⚠ Danger！
Maintenance work should be carried out by professional maintenance technicians.

2 Products Introduction

2.1Household PV off-grid Power Generation System Introduction

Household PV off-grid power generation system consists of PV array、solar mounting structure、storage battery、Grid（Diesel Generator）、PV off-grid inverter with controller and conventional household loads. Use PV solar panel transform solar energy into electrical energy, meanwhile use solar controller store electrical energy into battery, inverter can transform battery's DC power into single phase AC power to drive household loads work. To meet the power demand of customers in areas without electricity and poor power.

This system can meet the demands of electric power in the areas that without grid electricity or lack of electricity.

Meanwhile, in the area of having Grid power and Diesel Generator input, if grid power is not stable or want to control cost of diesel
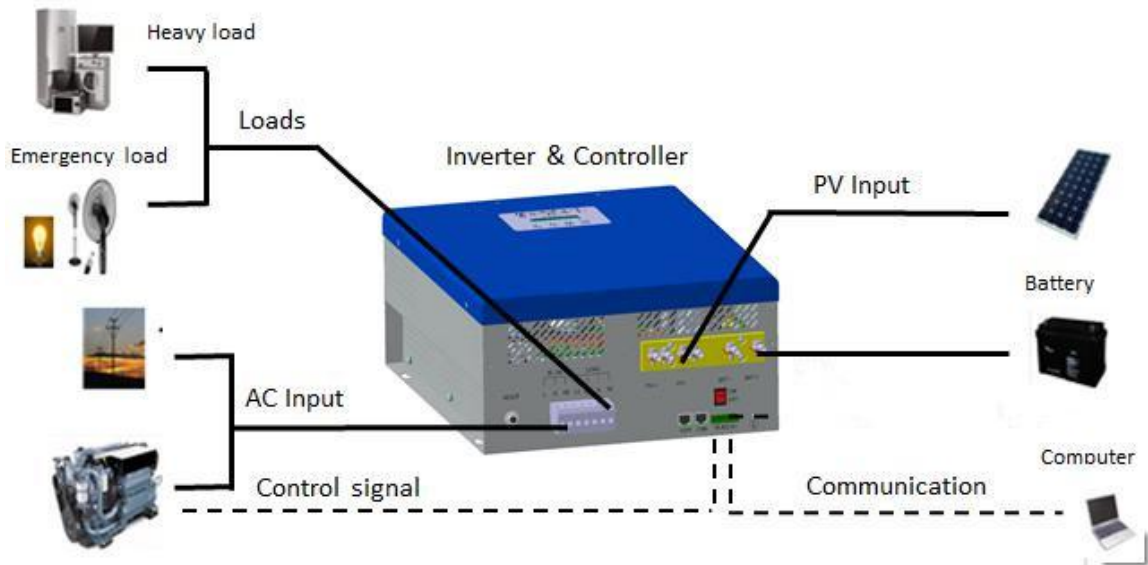
generator, the system can manage power automatically, which ensure household loads work regularly and reduce use-cost.

Figure 2-1Diagram of household PV off-grid power generation system

2.2 Product Introduction

2.2.1 Appearance Introduction
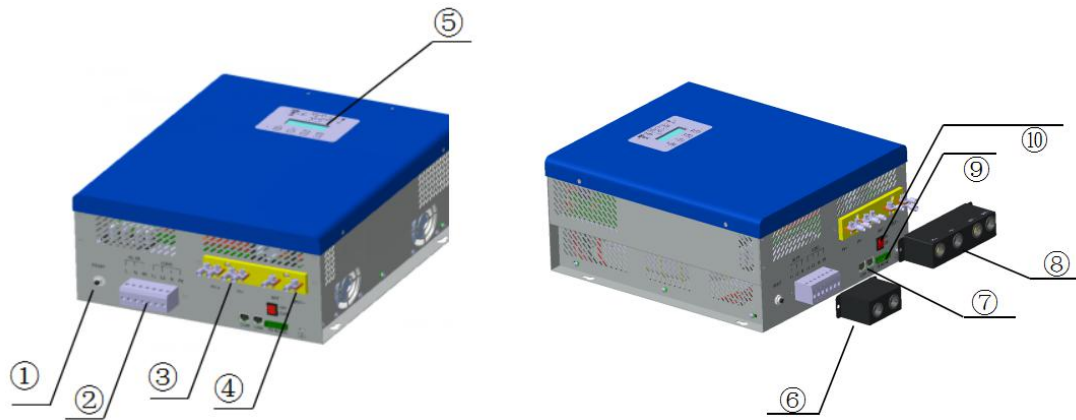
Figure 2-2Appearance of inverter & controller

Diagram2-1Information of inverter & controller appearance

No.	Name	Description
1	Overload protection device	Overload protection reset
2	AC Input	Common machine: AC input is connected to power grid or diesel generator (L is AC source fire line, n is AC source zero line, PE is grounding protection; voltage between L and N is 230VAC). American Standard Machine: AC input is connected to power grid or diesel generator (L1 is AC source live wire 1 phase, L2 is AC source live wire 2 phase, n is AC source zero line; voltage between L1 and L2 is 230VAC, voltage between L1 and N is 115VAC, voltage between L2 and N is 115VAC).
	AC Output	Common machine: AC output connection load (L is output live line, n is output zero line, PE is grounding protection). American Standard Machine: AC output connection load (L1 is output live wire 1 phase, L2 is output live wire 2 phase, n is output neutral line, PE is grounding protection; voltage between L1 and L2 is 230VAC, voltage between L1 and N is 115VAC, voltage between L2 and N is 115VAC).
3	PV Input	Input terminals，connect with PV array.
4	Battery Terminals	Connect battery array.

5	LCD display	Display current working status and parameter modify functions.
6	Protection cover of terminals	Protection cover of terminal "AC IN" and "Load", protect terminals from corrosion and person from electric shock
7	Communication Interface	RS485 communication function, can connect communication transform equipment, to monitor the working status of the whole system.
8	Protection cover of terminals	Protection cover of terminal "PV" and "BAT", protect terminals from corrosion and person from electric shock
9	Control Interface	TB is the connecting interface of temperature sensor, be used to monitor battery's temperature to prolong battery lifespan；NO、NC is dry contactor control terminal, can connect diesel generator and control its start.
10	Power Button	Inverter & Controller's power button

2.2.2 Production Dimensions
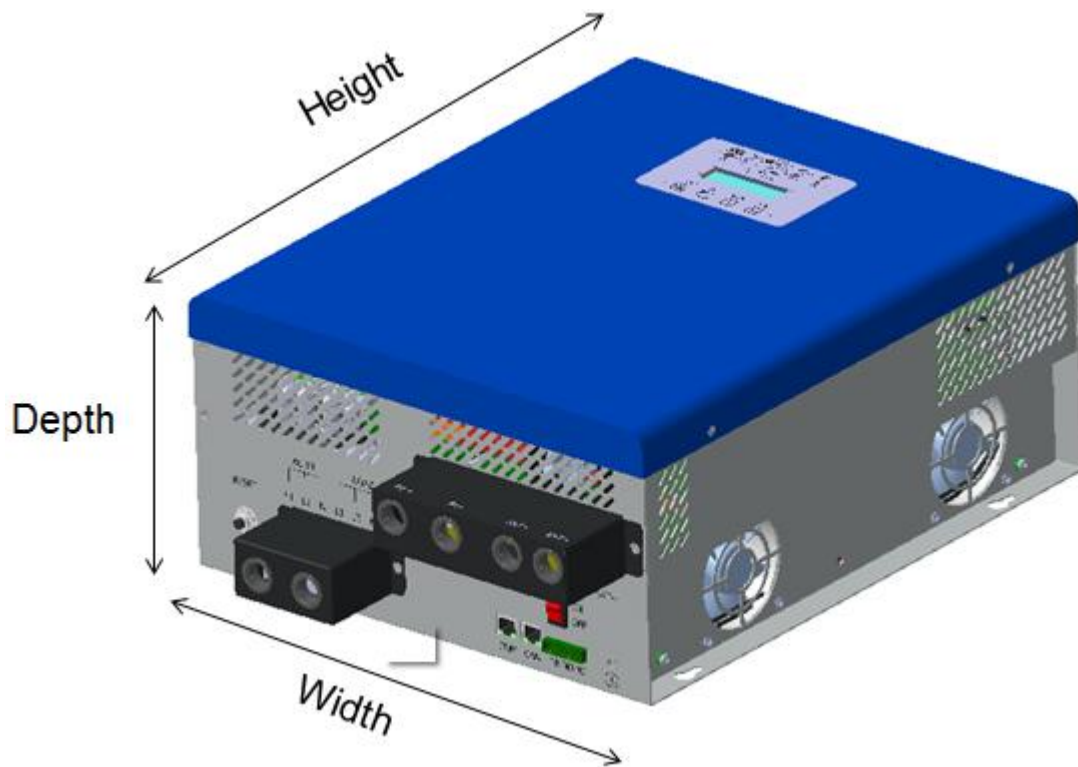
Figure 2-3Dimension of inverter &controller(mm)

Diagram 2-2 Inverter & Controller Size and Weight Sheet

No.	Model No.	W (mm)	H (mm)	D (mm)	Net Weight （kg）
1	JNF3KLF24V-V2 JNF3KLF24V-A-V2	370	440	190	29
2	JNF3KLF48V-V2 JNF3KLF48V-A-V2	370	440	190	30
3	JNF4KLF48V-V2 JNF4KLF48V-A-V2	370	440	190	31
4	JNF5KLF48V-V2 JNF5KLF48V-A-V2	370	440	190	33

In order to meet the voltage requirements of different national power grids, the all-in-one machine models are divided into two series: ordinary and American Standard

General machine model: JNF__ KLF__ V-v2 series

American Standard Machine Model: JNF__ KLF__ V-a-v2 series

The difference between ordinary machines and American standard machines lies in the different input voltage levels of AC source and the different AC output voltage levels.

3 Inverter & Controller Unpacking Installation

3.1 Unpacking Inspection

To ensure system installation goes smoothly, please check before unpacking. Specific inspection items are as follows:

●Check whether the outer packing is in good condition.

●Unpack, and check up the products damage or not.

●Contrast to packing list, to check whether all accessories is correct and in good condition.

Standard inverter & controller and some common used accessories are as follows, specific models and qty. please check up with installation list：
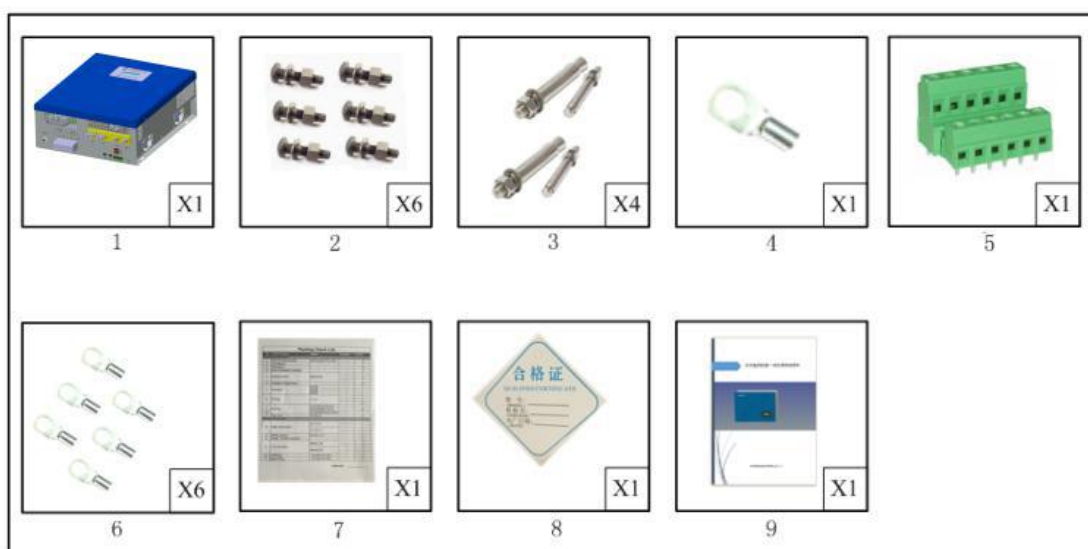
Figure 3-1 Inverter & Controller and standard accessories

Diagram 3-1 Inverter & Controller and Accessories sheet

No.	Description	Dispatch status
1	Inverter & Controller	Standard
2	M6*16 cross head combination screw and matching nut	Standard
3	Expandable screw	Standard
4	SC5-6 Cool pressing terminal	Standard
5	Phoenix terminal	Standard
6	SC35-6 Cool pressing terminal	Standard
7	Installation list	Standard

8	Quality Certification	Standard
9	User manual	Standard

3.2 Prepare Installation Tools

Inverter & controller installation and wire installation tools are as follows，installation workers need to use tools as per request of follow sheet without any mistake.

Diagram 3-2 Installation Tools List

Diagram sketch	Name	Recommended spec.	Function
	Flat screwdriver	Φ2	Use for cable installation
	Cross screwdriver	Φ4	Use for cable installation
	hydraulic tongs	M2.5~M8	Use for cool pressing terminal installation
	Crimping Pliers	M2.5~M8	Use for connecting with battery terminals
	adjustable spanner	300mm	Use for nut assembly, inverter& controller installation
	Impact drill	Φ8	Use for drilling hole and inverter & controller installation
	Wire stripping pliers	M1.5~M8	Use for connecting PV cable
	Hammer	6Pounds	Use for striking expansion screws

3.3 Hanging-mounted Installation

Inverter & Controller's hanging-mounted installation should be controlled the angle range of vertical and horizontal be 80°-90°, as follows：
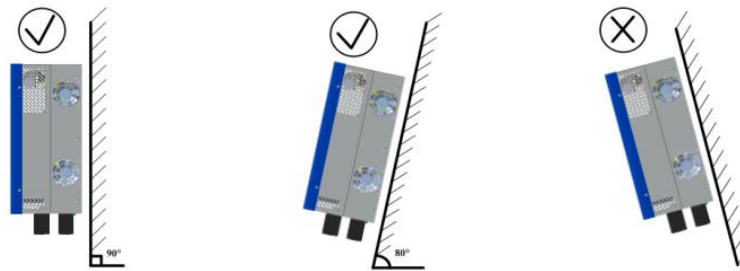
Figure 3-2 Hanging-mounted Installation Demonstration Figure

Step 1: Please check the installation situation, to ensure its convenient installation and heat dissipation, we suggest leave up and down gap >=100cm, right and left side >=100cm, front side >=30cm.

Step 2: Mark up the installation holes, drill 4 holes accordingly (Diameter: 10mm; Depth: 80mm).
As shown in the figure:
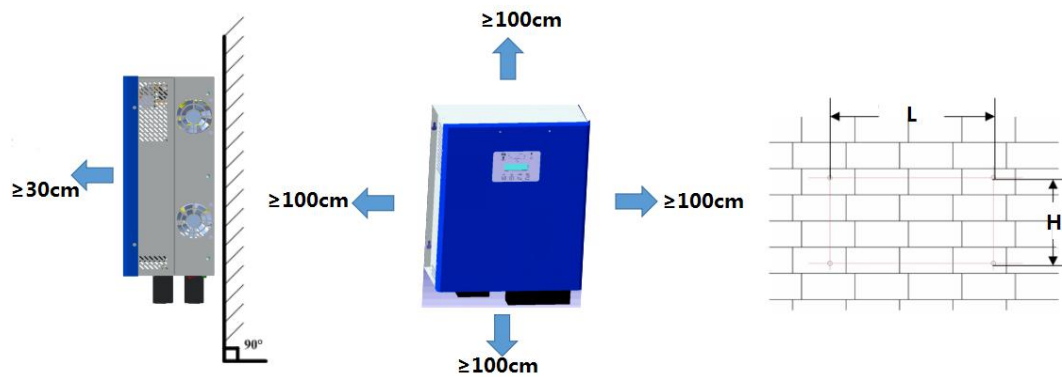
Figure 3-3 Hang position diagram

Follows are wall hanging sizes of different inverter & controller models：
Diagram 3-3 Fixed position sizes chart

Position size	Model of Inverter & Controller	
L：349mm	JNF3KLF24V-V2	JNF3KLF24V-A-V2
H：316mm	JNF3KLF48V-V2	JNF3KLF48V-A-V2
	JNF4KLF48V-V2	JNF4KLF48V-A-V2
	JNF5KLF48V-V2	JNF5KLF48V-A-V2

Step 3：Refer to follow installation method to finish the installation:

1，Drill hole around 80mm deep by impact drill at the positioning point of the wall and the panel, hammer the expansion bolt into

2，Unscrew the nut, hang up inverter & controller, screw-up nut by adjustable spanner, complete hang-up installation
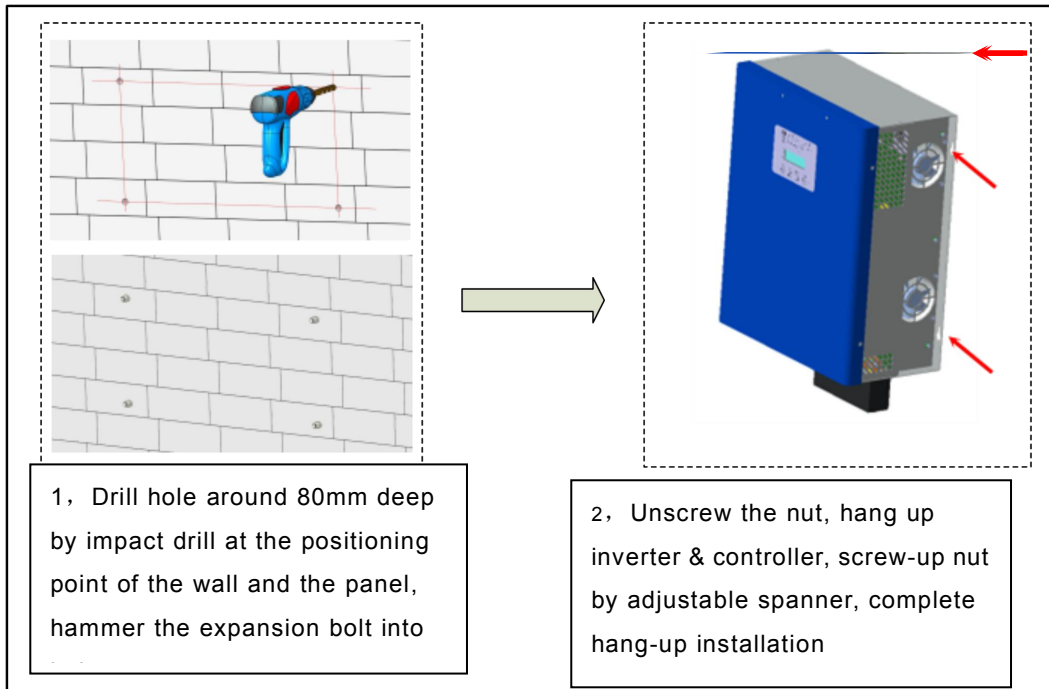
Figure 3-4 Installation operation diagram

3.4 Electrical connection

Carry on electrical connection when installation conditions are satisfied. Please ensure electrical connection's air-switch and cable model can meet system demands, specific selection model sheet are as follows:

Diagram 3-4 Selection of Inverter & Controller breaker and cable model

Inverter & Controller model	Breaker selection					Cable selection（AWG）				
	PV	AC	BAT	Load1	Load2	PV	AC	BAT	Load 1	Load 2
JNF3KLF24V-V2 JNF3KLF24V-A-V2	50	32	125	16	16	10	12	3	13	13
JNF3KLF48V-V2 JNF3KLF48V-A-V2	50	32	80	16	16	8	10	6	13	13
JNF4KLF48V-V2 JNF4KLF48V-A-V2	63	32	100	20	20	6	9	5	12	12
JNF5KLF48V-V2 JNF5KLF48V-A-V2	63	32	100	25	25	6	7	4	10	10

Note: AWG of cable selection means American Standard, indicating diameter of cable

3.4.1 PV Input Connection

Step 1: Do the following inspections before PV side terminal connecting:

⚠️ Please make sure system's DC air-switch on PV side is in off state, before connecting with PV array.

⚠️ Please ensure PV array's polarity be matched with PV connectors' polarity, to avoid inverter & controller damage.

⚠️ Make sure PV array's max open-circuit voltage must less than inverter & controller's max allowable input voltage.

Step 2: Make PV connectors and cable connecting of PV input side, please according to following steps:
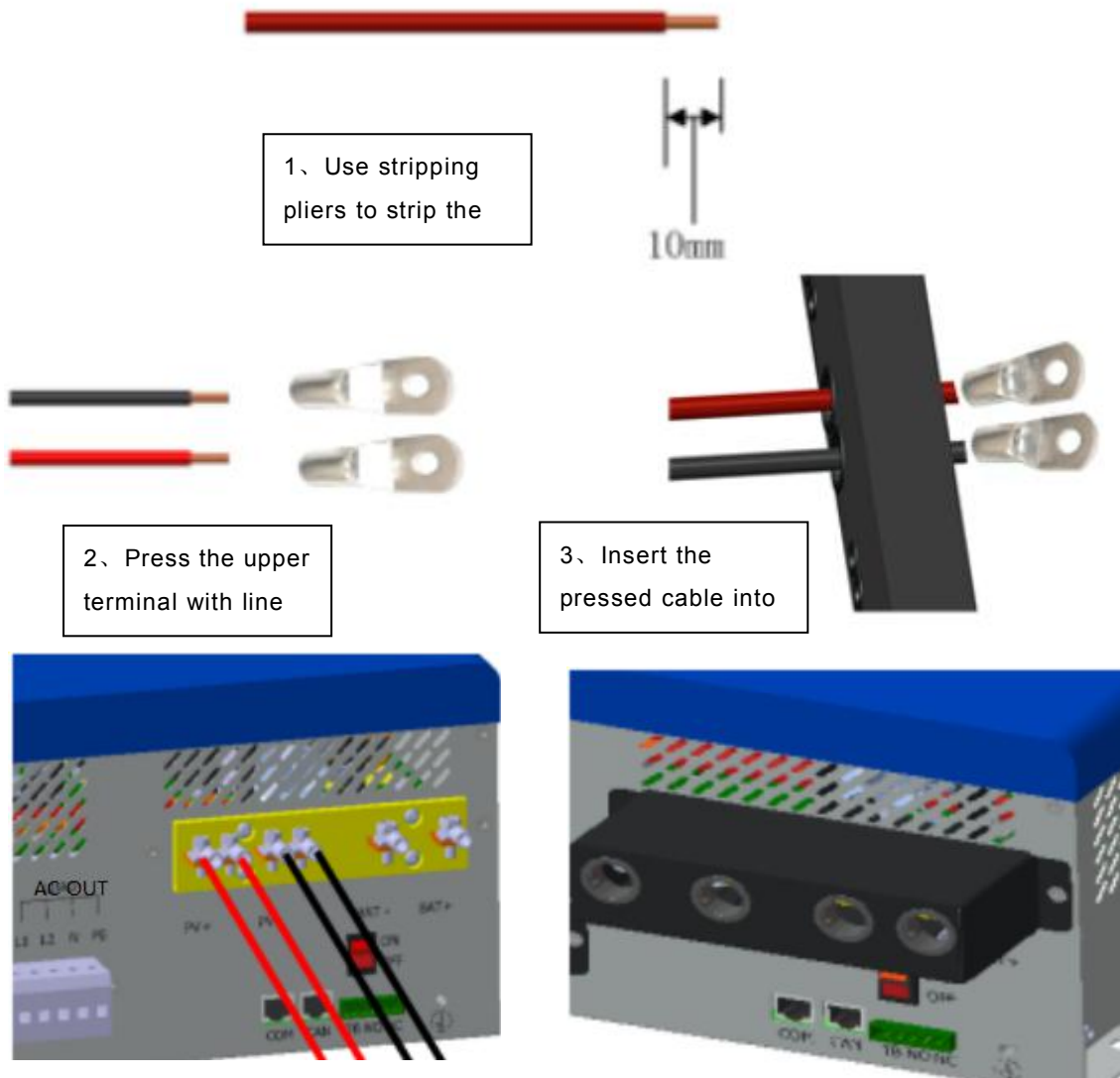
1、Use stripping pliers to strip the

10mm

2、Press the upper terminal with line

3、Insert the pressed cable into

4、Screw M6*16 and M6 nut are used to fix the cable inserted into the protective cover corresponding to the terminals connected to PV+ and PV- screen printing in the case, then tighten the

Figure 3-5 schematic diagram of photovoltaic terminal production and connection

Step 3: During cable connecting of PV input side, insert PV cable of PV array into auto Air-switch respectively according to positive pole and negative pole; then insert the two cables which made in Step 2 into Air-switch separately.

Step 4: Check whether PV connecting is correct and firm.

The cable connection diagram of PV input side is as follows:
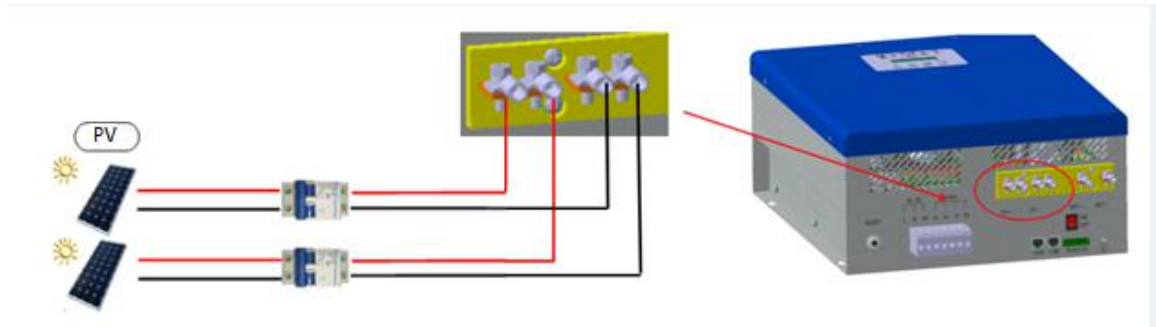
Figure 3-6 PV Input Side Cable Connecting Diagram

3.4.2 AC Input Connection

Inverter & Controller can accept two kinds of AC power input, one is single phase grid power, and another is single phase diesel generator power. Please select corresponding connection mode according to the specific connection.

3.4.2.1Grid Power Input connection

⚠ Please make sure Grid power in off state.

Step 1: Please according to follow methods, making Grid power side cable connection and connectors.

1、Use stripping pliers to strip the cable for 10mm

10mm

2、Insert the finished cable into the protective cover
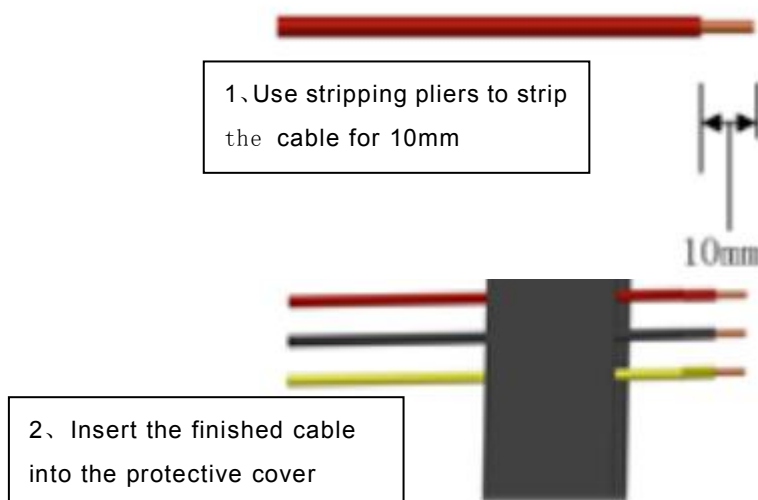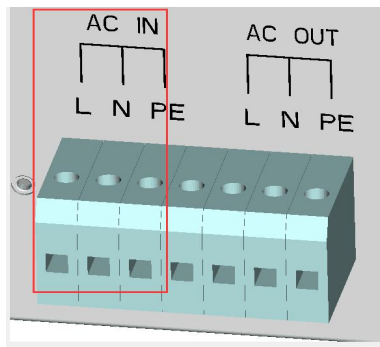
Ordinary machine: AC IN screen printing for L, N, PE
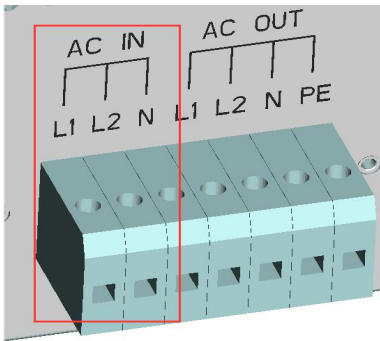
American standard machine：American standard machine: AC IN screen for L1, L2, N

3、Screw down the cable inserted into the protective cover corresponding to the terminal connected to the box AC IN screen printing and tighten it with a word screw driver, then tighten the protective cover on the cover to complete the terminal connection of the power grid
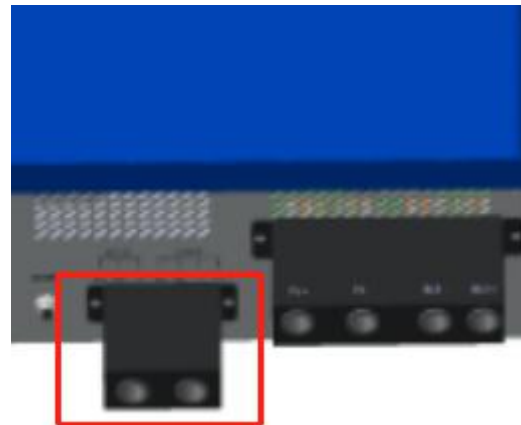
Figure 3-7 Grid Power Side Connectors Making and Cable Connecting Diagram

Step 2:Conduct wiring at the input end of the power grid:
Common machine:Connect the cables at the end of the power grid to the air switch according to L (fire line) and N (zero line) respectively, and PE ground; Keep ac side space open and off.

American standard machine:Connect the cables at the end of the grid to the air switch according to L1 (fire line 1 phase), L2 (fire line 2 phase) and N (zero line) respectively. Keep ac side space open and off.

Step 3: Then connect the other end of the cable made in Step 1 to the open space and check whether the connection is correct and firm.

The wiring diagram of the input end of the power grid is as follows:
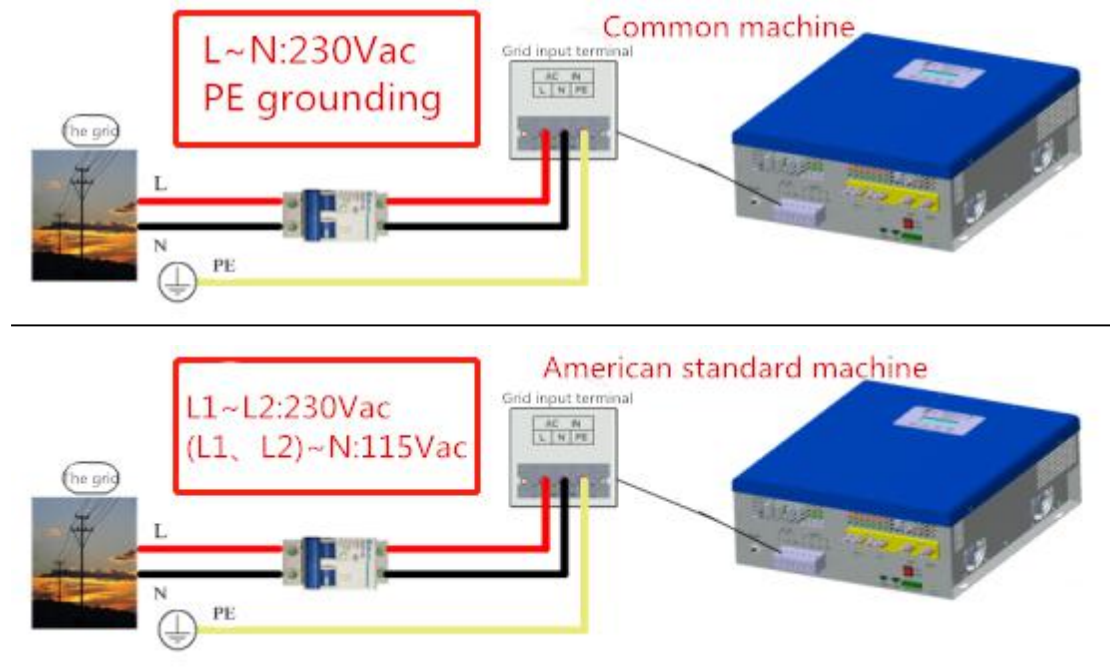
Figure 3-8 Grid Input Side Cable Connecting Diagram

3.4.2.2Diesel Generator Connection

⚠ Please ensure inverter & controller in power off state.

Step 1: Refer to diesel generator's user manual, to find its start mode is NO (normally open) or NC (normally close).

Step 2:If diesel generator's start mode is NO (normally open), then insert diesel generator's NO terminal into inverter & controller's NO terminal accordingly; If diesel generator's start mode is NC (normally close), then insert diesel generator's NC terminal into inverter& controller's NC terminal accordingly; Ensure the connecting of NO-NO or NC-NC is correct, specific connection mode, please refer to follows for details.
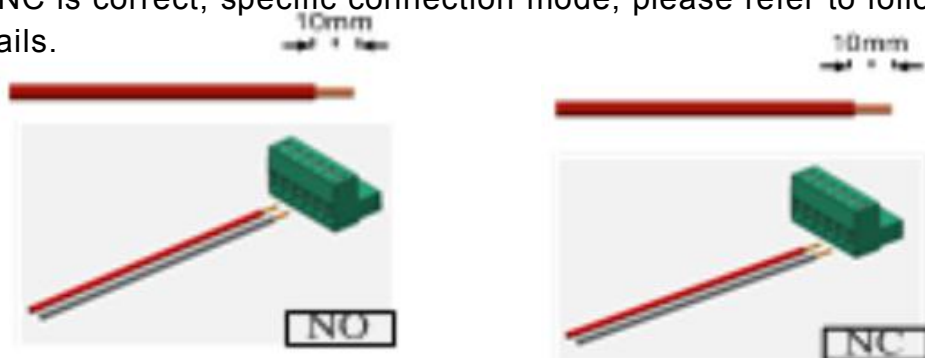
1、Use stripping pliers to strip the cable for 10mm
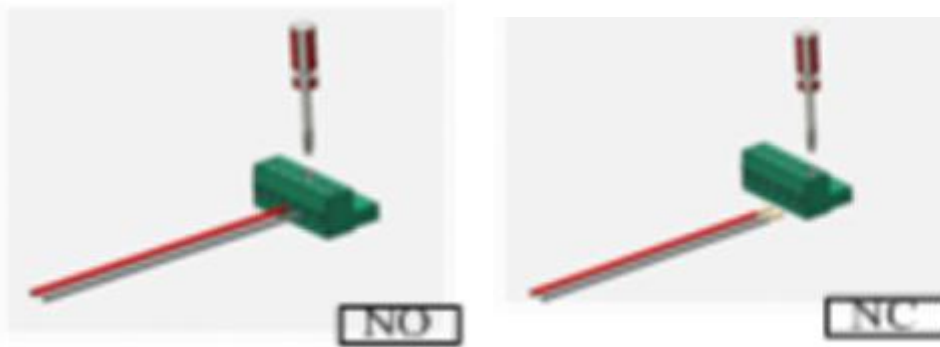
2、According to the starting signal of the diesel engine, insert the cable into the NO terminal or the NC terminal, and tighten the screw
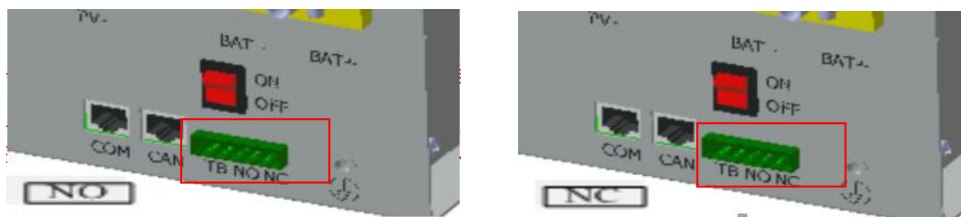
3、Insert the screwed terminals into the NO and NC terminals of the all-in-one machine to complete the terminal connection of the diesel engine

Figure 3-9 Diesel Generator Terminal Making and Cable Connecting Diagram

Step 3: Connecting diesel generator's AC output with inverter & controller's AC input, specific operation please refer to grid power input side cable connection.

Diesel generator input side cable connection diagram as follows:
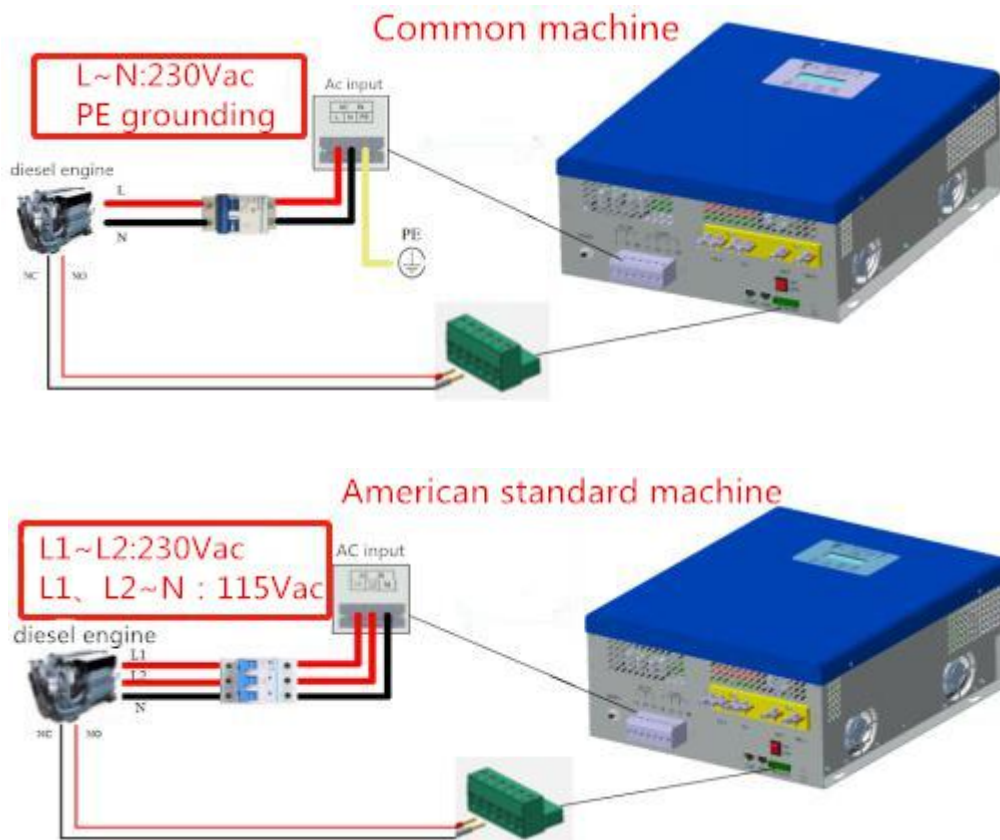
Figure 3-10 Diesel Generator Input Side Cable Connecting Diagram

3.4.3 Battery Connection

⚠ (1) Inverter & Controller in switch off state.

⚠ (2) Ensure battery side's air switch in off state.

⚠ (3) Avoid battery being short circuit during its installation.

Step 1: According to nameplate to confirm the battery pack voltage, PV hybrid power generating system's battery pack voltage could refer to follow sheet.

Diagram 3-5 Battery Pack Voltage Selection List

Battery Pack Voltage	Inverter & Controller Model No.
24V	JNF3KLF24V-V2 JNF3KLF24V-A-V2
48V	JNF3KLF48V-V2 JNF4KLF48V-V2 JNF5KLF48V-V2 JNF3KLF48V- A-V2 JNF4KLF48V- A-V2 JNF5KLF48V- A-V2

Step 2: Cable making and connecting, please refer to follow method:

1、Use stripping pliers to strip the cable for 10mm

10mm

2、Press the upper terminal with line clamp
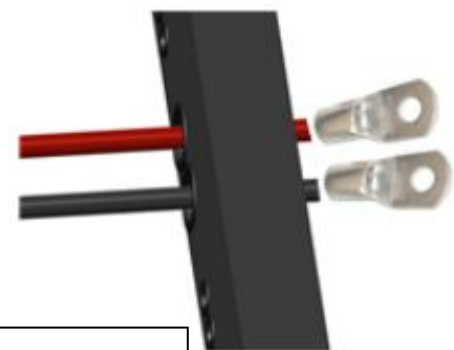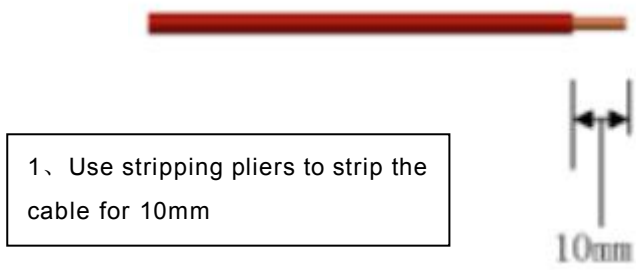
3、Insert the pressed cable into the protective cover accordingly
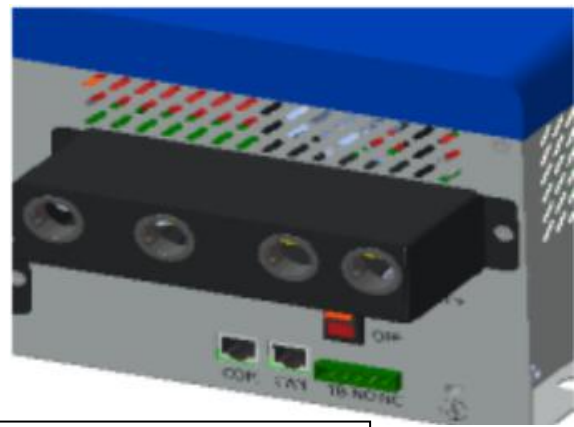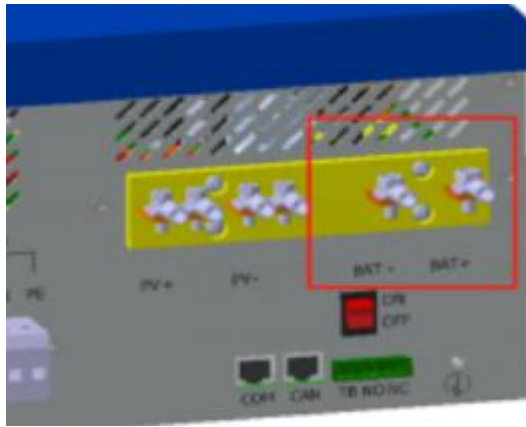
4、Screw M6*16 and M6 nut to fix the cable inserted into the protective cover on the terminals connected to the box BAT- and BAT+ screen printing, then tighten the protective cover on the cover to complete the terminal connection of the battery

Figure 3-11 Battery Terminal Making and Connecting Diagram

Step 3:Firstly, connect the cables of the battery terminal to the air opening according to the corresponding positive and negative poles (during connecting the cables, the positive and negative poles of the battery must not be in contact); Keep the battery end open and disconnected; Then connect the other end of the cable made in Step 2 to the open air and check whether the connection is correct and firm. The wiring diagram of battery input terminal is as follows:
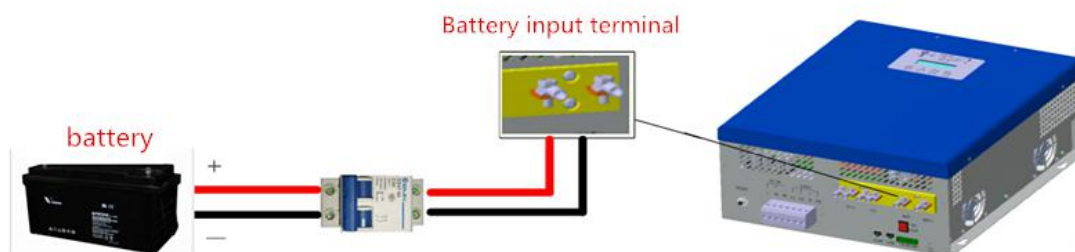
Figure 3-12 Battery Input Side Cable Connecting Diagram

3.4.4 AC Output Connection

⚠️Inverter & controller is in power off, switch off state

Step 1: Making AC output side terminals according to following method:

1、 Use stripping pliers to strip the cable for 10mm

10mm

2、 Insert the finished cable into the protective cover
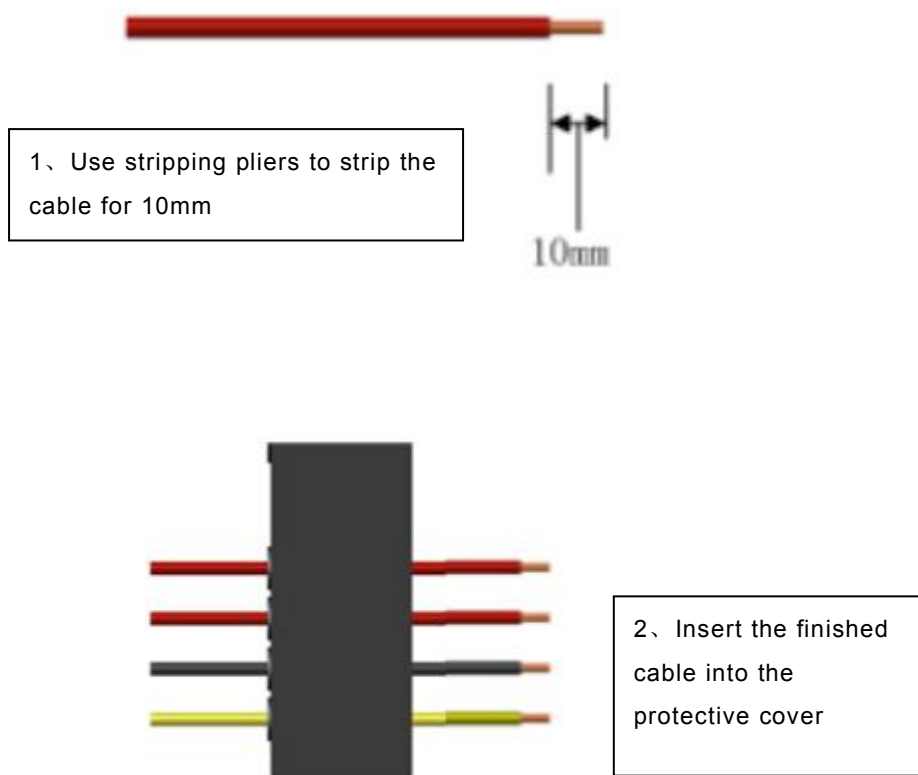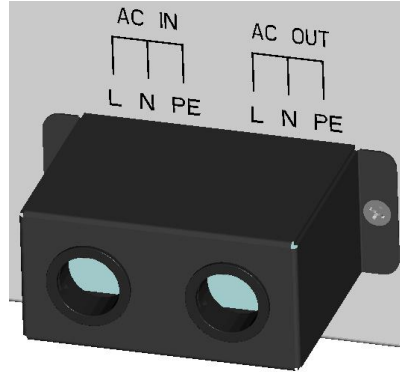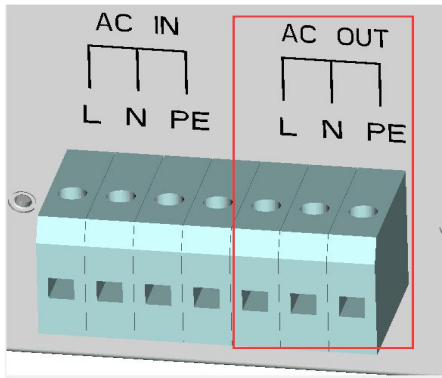
Common machine：AC OUT screen printing is L, N, PE
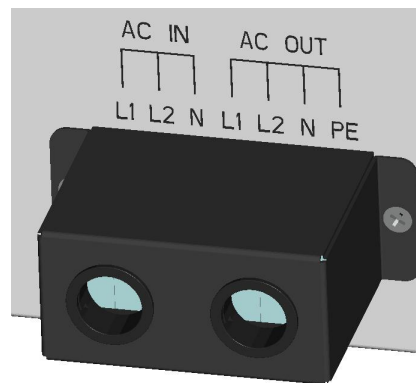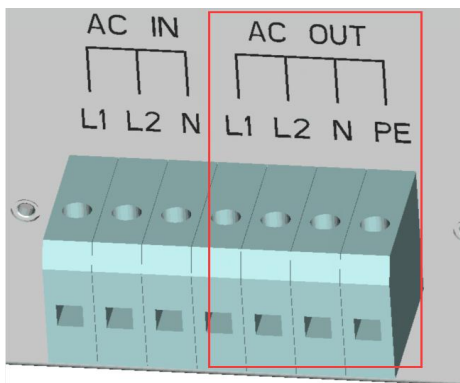
American standard machine：AC OUT screen printing is L1, L2, N, PE

3、Screw down the cable inserted into the protective cover corresponding to the terminal connected to the AC OUT screen printing in the case and tighten the word screw driver, then tighten the protective cover on the cover to complete the AC output terminal terminal connection

Figure 3-13 AC loads terminals' Making and Cable Connecting Diagram

Step 2:Wiring of ac load terminal:

Common machine:Connect the cable at the ac load end to the air open according to L (fire line) and N (zero line) respectively, and PE ground; Keep the load side open and open.

American standard machine:The cables at the end of the power grid are connected to the air switch according to L1 (fire line 1 phase), L2 (fire line 2 phase) and N (zero line) respectively, and PE is earthed. Keep the load side open and open.

Step 3: Connect the other end of the cable made in Step 1 to the open air to check whether the connection is correct and firm.

The wiring diagram of AC output terminal is as follows:
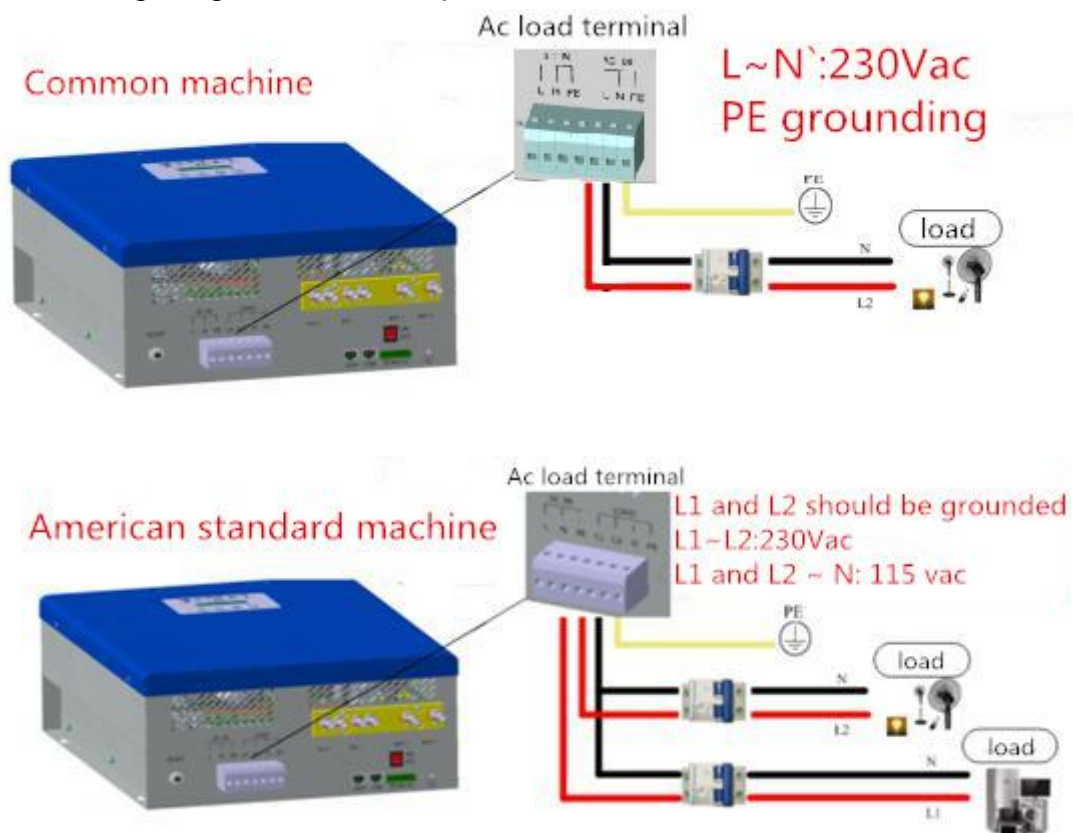
Figure 3-14 AC Output Side Cable Connecting Diagram

☞ Note

Over load is forbid for PV hybrid inverter & controller.

3.4.5 Communication Ports Connection

Step 1: Before communication interface connecting, please check follows items:
(1) Ensure PV hybrid inverter & controller is in power off, switch off state ;
(2) Please clear the communication interface, ensure there is no foreign matters.

Step 2: Making communication interface terminals according to following methods

1,Prepare a communication cable, such as network cable

2, Insert communication cable into corresponding communication port of inverter & controller

3, Finished view
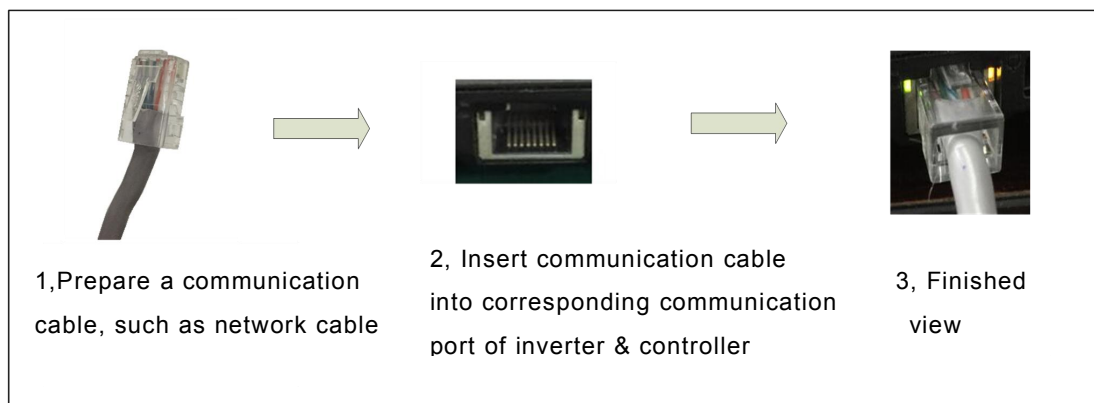
Figure 3-17 Communication Interface Terminal Making and Cable Connection Diagram

1	2	3	4	5	6	7	8
orange white	orange	greenwhite	blue	blue white	green	brownwhite	brown

RJ45 cable plug
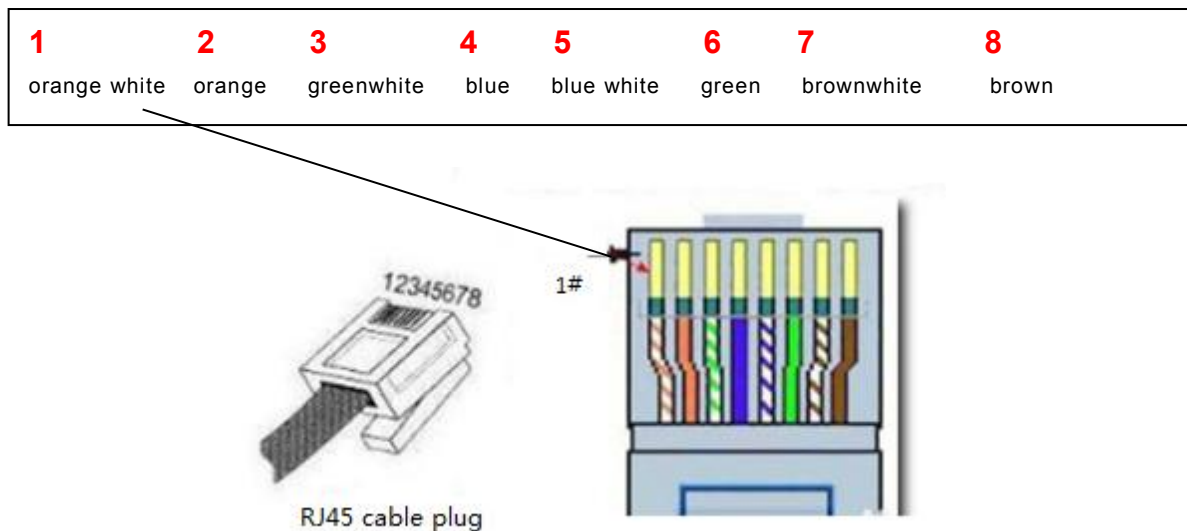
(Blue and Blue &White(Line order 4、5) corresponding to communication port A and B of 485;

Orange & White and Brown(Line order 1、8) corresponding to   communication terminal 5V and GND of 485)

Step 3: Connecting appliances needed for communication (such as computer, communication module. etc) with inverter & controller through COM interface. Follows are control interface connection figure:
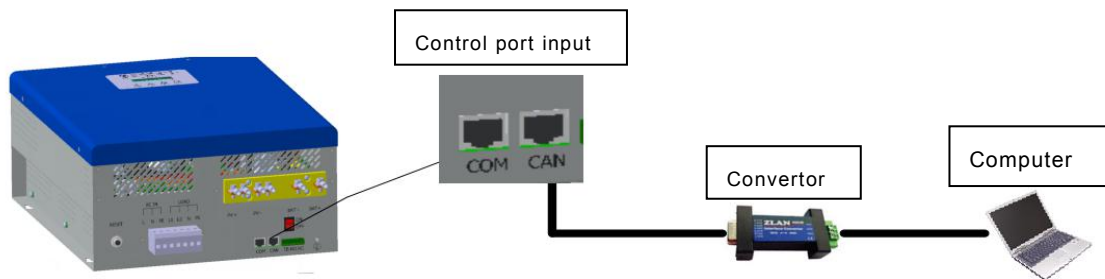
Figure 3-18 Control Interface Connecting General Diagram

4 Commissioning

4.1 Electrical Connection Inspection before Commissioning

Before commissioning, electrical connection inspection should be done strictly,to ensure safety of the inverter & controller as well as the personal safety; To prevent accidents, specific inspection items as follows:

(1) Check whether the PV open circuit voltage is within the allowable voltage range of the inverter & controller;

(2) Check if the PV positive and negative poles are correct;

(3) Check AC input connection is firm or not;

(4) Check whether the battery voltage is within the allowable range of the inverter & controller;

(5) Check the negative and positive pole of battery be right;

(6) Check AC output side is firm and correct;

(7) Check control interface is firm and correct.

4.2 Charging Commissioning

4.2.1 PV Charging Commissioning

matters need attention:

①All-in-one machine factory system configuration default for lead-acid battery, ac source for the power grid, operation mode for the economic model.

1）economic model all-in-one maximum use of solar energy (factory default mode);

2）backup mode when all-in-one priority use ac source energy, to ensure sufficient battery to the greatest extent.

② Photovoltaic charging needs to be in full sunlight conditions of operation. It is impossible to view and set photovoltaic parameters at night or when the light voltage is input.

③ ★★★ **Necessary settings (extend battery life)**

according to the selection of battery, confirm the parameters of the battery. The default setting of products is lead-acid battery. If the integrated machine product is equipped with lithium battery, the factory

parameters are also in good condition of configuration and debugging. Other uncertain battery parameters need to be configured according to the following table (the all-in-one machine can be modified after running).

Table 4.1 Description of menu items related to battery setting.

type of battery	menuitem	set value	state
lead-acid	SystemSet-->BatterySet-->BMSEn	ON	
	SystemSet-->ySet-->BatterIb-Const	（0—80A）	PV charging current (Set 15A for 100AH capacity battery, set constant charge current value in proportion to the actual battery capacity, and the maximum value shall not exceed the set range) 3 klf24v series 4 klf48v series 5 klf48v series
		（0—60A）	3KLF48Vseries
	SystemSet-->BatterySet-->Igridchg	（0—40A）	Grid charging current (Set 15A for 100AH capacity battery, set the charging current value and the maximum value not exceeding the set range according to the actual battery capacity) 3KLF48V Series 4KLF48V Series 5KLF48V Series
		（0—30A）	3KLF24VSeries

lithium battery	SystemSet-->BatterySet-->BMSEn	Off	
	SystemSet-->BatterySet-->BMSType	AXE-485/ CSW-485/ NG-CAN/ CSW-V20	Please contact the supplier to set parameters for supporting only the lithium batteries configured by our company and other lithium batteries.
	SystemSet-->BatterySet-->PackNum	1~8	According to the actual number of parallel lithium battery packs configured.
	SystemSet-->BatterySet-->Ib-Const	Set parameters according to the lithium battery nameplate	Photovoltaic charging current
	SystemSet-->BatterySet-->Igridchg	Set parameters according to the lithium battery nameplate	Grid charging current

④★★★ **Product application scenario settings (set according to the needs of the system)**

Ac source selection and economic mode selection are set in the energy schedule menu. Customers can change the system configuration of the all-in-one machine according to their own requirements according to Section 4.3(**Section 4.3.4.5)** (the all-in-one machine can be modified after running).

To ensure that the electrical connection of the whole machine is completed and meet the test operation conditions of the whole machine, the specific operation steps are as follows:

Step 1: Check the battery voltage normal after closing the battery empty K1;

Step 2: Check the photovoltaic input voltage before closing the photovoltaic side to open K2;

Step 3: Check the input voltage of AC source and close the ac source side to open K3(if there is no power grid, there is no need to operate; If there is a power grid, the LCD interface AC light will be ON), then turn ON the ON/OFF switch at the bottom of the machine;

Step 4: Check the AC load (meet the load power not exceeding the rated power of the all-in-one machine), then close the ac output side of the air switch K4, and observe the liquid crystal display information. As shown in the figure below, when the light is on, the trial run is successful and can run normally.
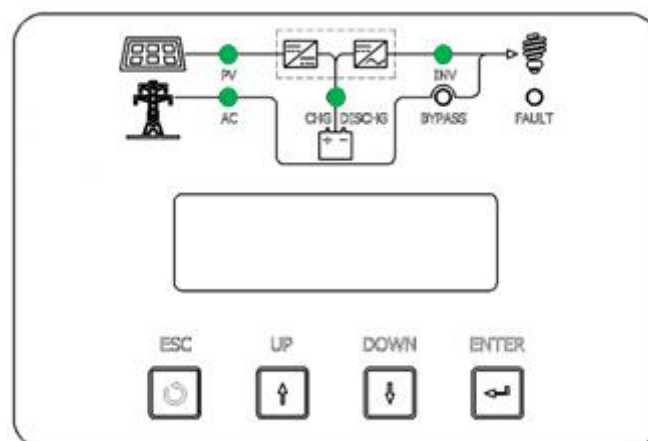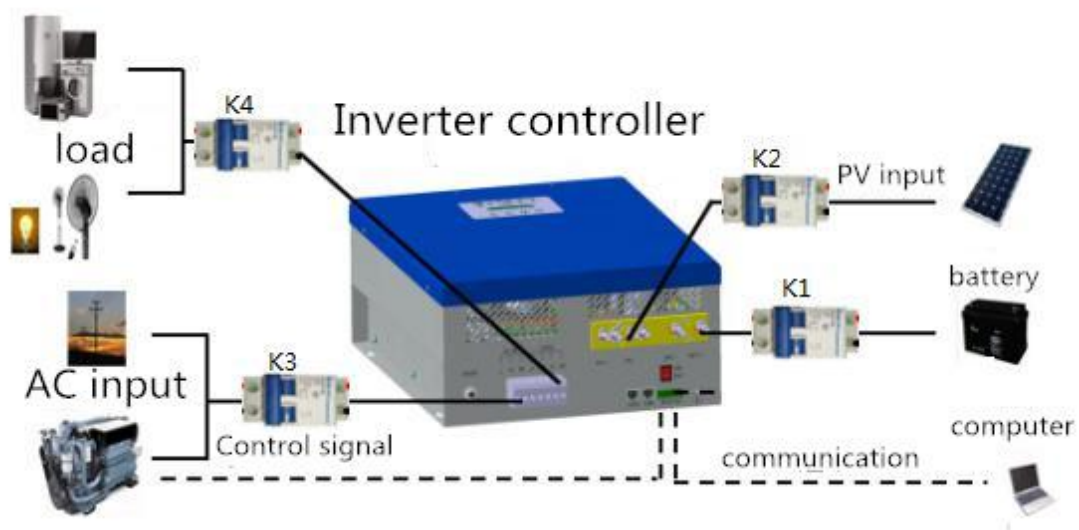
FIG. 4-1 is a schematic diagram of the whole unit coordination of an all-in-one machine

4.3 Liquid crystal operation instructions

4.3.1 All-in-one LCD display

The all-in-one machine is equipped with LCD and LED display functions. It can view the all-in-one machine operation information through LCD and set key parameters by combining with the keys. At the same time, the LED light indicates the current running state of the all-in-one machine. The display panel is shown as follows:
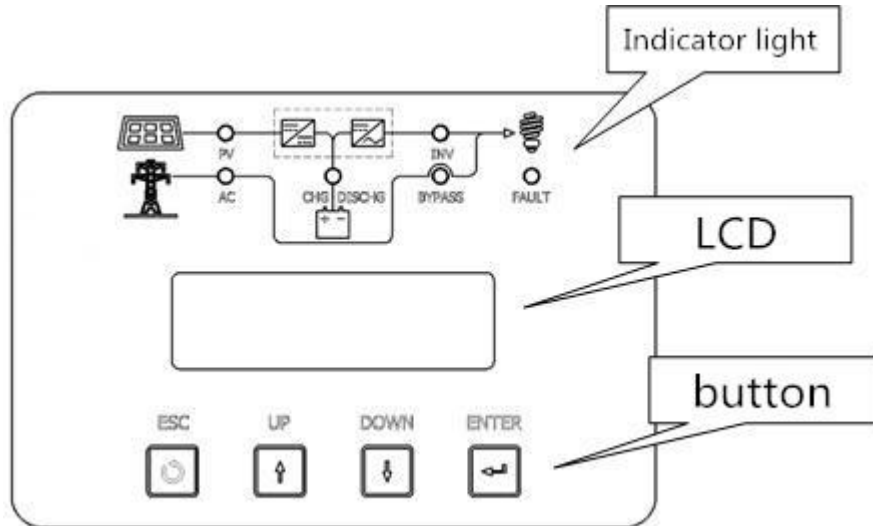
Figure 4-2 shows the schematic diagram of the panel

Table 4-2 Meaning table of LED lightss

Logo	condition	describe
PV	Green /flashing	Pv online，Stop charging/PV charging
	close	PV Don't online
AC	Green /flashing	Grid online，Stop charging/Grid charging
	close	Grid Don't online
INV	Green	Inverter working
	close	Inverter to stop
BYPASS	Green	grid bypass is open
	close	grid bypass is off
CHG DISCHG	Green /flashing	battery standby/battery is charging or discharging
	close	battery has no voltage
FAULT	yellow	alarm
	red	fault

	close	No fault

Table 4-3 Key description table

button	function
ESC	back
UP	1.Turn the menu up； 2.Data set value increment operation。
DOWN	1.Turn the page； 2.Data reduction。
ENTER	Go to the next level menu； Set values to modify and save。
DOWN+ENTER	Press at the same time to return to the priority screen

4.3.2 LIQUID crystal display interface

The following is the general block diagram of LIQUID crystal display to understand the distribution of liquid crystal operation in a simple and clear way:

RunInfo >
Upv	100.0V
Ipv	5.3A
Ppv	531W

FaultInfo >
| CurrentFault | > |
| HistoryFault | > |

StatisInfo >
| Ene-pv | 1.8kWh |
| Ene-Inv | 1.7kWh |

SystemInfo >
VerLcd	3001
VerChg	1001
VerInv	2001

EMS >
RunMode	Econ
Debug	Disable
ACSource	Diesel

SystemSet >
BatterySet	>
Site	10
LcdLight	10min

Ub-Rate	48.0V
Ub-Const	56.0V
Ib-Const	80.0A

Main display:
Ubat	22.5V
Ibat	6.0A
Upv	100.0V
Ipv	5.3A
Ppv	531W
Uout	230V
Iout	1.0A
Pout	230W

Figure 4-3 LIQUID crystal display block diagram

4.3.3 CONTENTS of LCD display

After the LCD is powered on, "Welcome to use" will appear. After 3 seconds, the priority screen interface will jump to the following figure:

Ubat	22.5V
Ibat	6.0A
Upv	100.0V
Ipv	5.3A
Ppv	531W
Uout	230V
Iout	1.0A
Pout	230W

Figure 4-4 LCD priority screen interface display

Table 4-4 LCD priority screen display contents

display content	function declaration
Ubat	Displays the current voltage of the battery.
Ibat	Display current current value of battery, negative value is discharge.
Upv	Displays the current voltage value of the PHOTOVOLTAIC array.
IPV	Displays the current input current value of the PHOTOVOLTAIC array.
Ppv	Displays the current input power value of the PHOTOVOLTAIC array.
Uout	Display ac output voltage value during operation.
Iout	Display the ac output current value at work.
Pout	Displays the power value of the connected load at work.

After opening the priority screen and pressing "ENTER", ENTER the first-level menu as shown in the figure below

Figure 4-5 Display of first-level menu interface

Table 4-5 LCD first level menu display contents

first level menu	function declaration
RunInfo	Displays the current state of the machine.
FaultInfo	Displays the machine's current and historical fault codes.
StatisInfo	Display the total amount of power generated and consumed by the machine.
SystemInfo	Displays the machine software version and serial number.
EMS	Set system energy scheduling parameters.
SystemSet	Key machine parameter setting.

4.3.4 Liquid crystal function information

4.3.4.1 Operating information of LIQUID crystal

The information status of the main parameters of the current system is displayed.

Upv	100.0V
Ipv	5.3A
Ppv	531W
Tmos	25℃
Tsoc	25℃
Tenv	20℃
Ubat	50.1V
Ibat	6.0A
Pbat	301W
SOC	95%
Tmaxbat	——
Tminbat	——
Uinv	230V
Iinv1	1.0A
Iinv2	0A
Pinv	230W
Finv	50Hz
Tmosu	26℃
Tmosd	27℃
Ugrid	236V
Fgrid	50HZ
Igridchg	0A
Pgridchg	0W
Uload	230V
loadRate	4%
Fan_ chg	run
Fan_inv	stop
PVChg	run
Invert	run
Bypass	Stop
GChg	Stop
Diesel	Stop
ExtComm	Break
BMSComm	Break

Figure 4-6 Operation information operation interface

Table 4-6 Liquid crystal operation information operation interface display contents

secondary menu (Operation information)	function declaration
Upv	Displays the current voltage value of the PHOTOVOLTAIC array.
Ipv	Displays the current input current value of the PHOTOVOLTAIC array.
Ppv	Displays the current input power value of the PHOTOVOLTAIC array.
Tmos	Display MOS current temperature.
Tsoc	Shows the current SCO temperature.
Tenv	According to 0.
Ubat	Displays current battery voltage.
Ibat	Displays the current current of the battery.
Pbat	Displays the current power value of the battery.
SOC	Display battery remaining capacity.
Tmaxbat	BMS communication displays the temperature of the cell with the highest temperature.
Tminbat	Display the lowest cell temperature during BMS communication.
Uinv	Display ac output voltage value during operation.
Iinv1	Display the ac output current value at work. The American standard shows the L1 output current.
Iinv2	According to 0. The American standard shows L2 output current.
Pinv	Display ac output power value at work.
Finv	Display the ac output frequency value at work.
Tmosu	Displays the current MOSU temperature.
Tmosd	Displays the current MOSD temperature.
Ugrid	Displays current grid voltage.
Fgrid	Displays current grid frequency.
Igridchg	Displays the current charging current of the grid.
Pgridchg	Displays the current charging power of the grid.
Uload	Displays the current load output voltage.
loadRate	Displays the ratio of the current load to the rated power.
Fan_ chg	Displays the current running status of the fan.
Fan_inv	Displays the current running status of the fan.
PVChg	Display the working status of pv.
Invert	Display contravariant working state.

Bypass	Shows bypass operation status.
GChg	Display the charging status.
Diesel	Display the working status of diesel engine.
ExtComm	Displays external communication status.
BMSComm	Displays the BMS communication status.

4.3.4.2 Liquid crystal fault information and its basic operation

The current fault records the current fault, the historical fault records the historical fault, the historical fault 1 represents the nearest fault to the current time (or the current fault), the historical fault 2 is the fault before the historical fault 1, and so on.

When the yellow lamp fails, the LCD displays the alarm information and the buzzer does not sound.

When the red light fails, the LCD displays the alarm information and the buzzer rings all the time.

If you want to turn off the buzzer, you can choose to turn off the buzzer in system Settings → Buzzer Settings.

```
CurrentFault   >  ──►  101 Charge soft o
HistoryFault   >  ─┐    ...
                   │    201 Bat overvolta
                   │
                   └►  HistoryFault1  >  ──►  101 Charge soft o
                        ...                    ...
                        HistoryFault9  >       201 Bat overvolta
```
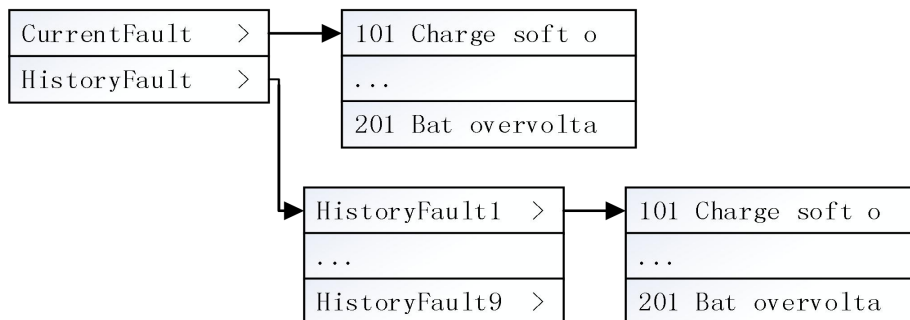
Figure 4-7 Operation interface of fault information

Table 4-7 Contents of LCD fault information operation interface

secondary menu (Fault information)	function declaration
CurrentFault	Displays the current system failure.
HistoryFault	Displays system history failures.

4.3.4.3 Statistics of LIQUID crystal and its basic operation

The accumulative value of photovoltaic power generation and inverter output power is recorded.

```
Ene-pv      1.8kWh
Ene-Inv     1.7kWh
```

Figure 4-8 LCD statistical information operation interface

Table 4-8 Display contents of LCD statistical information operation interface

secondary menu (Statistics)	function declaration
Ene-pv	Display statistics of the total output of the current photovoltaic system.
Ene-Inv	Display statistics of the current system total inverter power.

4.3.4.4 System information of LIQUID crystal

The current machine model, specification and software version are displayed. The address is the device address for external Modbus communication, and the default is 10.

VerLcd	3001
VerChg	1001
VerInv	2001
InvType	
JNF5KLF48V-V2	
ChgType	48V80A
SN	123456123456
Site	10

Figure 4-9 LCD system information operation interface

Table 4-9 Contents displayed on the LCD system information operation interface

secondary menu (System Information)	function declaration
VerLcd	Displays the current machine LCD version number.
VerChg	Displays the current machine charging version number.
VerInv	Displays the current machine inverter version number.
InvType	Displays the current machine specifications.
ChgType	Displays current machine charging specifications.
SN	Displays the current machine SN number.
Site	Display the device address of external Modbus communication

4.3.4.5 Energy management of LIQUID crystal and its basic operation

Ac source Settings changed: Power dispatch - AC source: power grid and diesel engine. The default grid mode can be changed to diesel engine mode according to customer demand.

When selecting the diesel engine with AC source, it is necessary to ensure that the starting signal line of the diesel engine is normally connected to the communication interface of the dry contact of the all-in-one machine, and that the output end of the diesel engine is connected to the input end of the AC source without passing through other input ends.

Operating mode Settings change: Power scheduling - Operating mode: (economy and backup). Default economic mode, according to customer needs can be changed to backup mode.

In the economic mode, the all-in-one machine maximizes the utilization of photovoltaic energy (factory default mode);

Backup mode when the all-in-one machine prefered to use ac source energy, can ensure that the battery power is sufficient.

RunMode	Econ
Debug	Disable
ACSource	Diesel
I-Gch-L	10.0A
I-Gch-H	40.0A
SOCDown	20%
SOCUp	30%
LowSOC	40%
HighSOC	80%
UnderV	46.0V
RecovV	48.0V
LowVolt	47.0V
HighVolt	53.0V
IgchgEn	Enable

Figure 4-10 Operation interface of energy scheduling

Table 4-10 Display contents of the classification block diagram of LCD energy management

secondary menu (Power dispatching)	function declaration

RunMode	Set the operating mode of the system.
Debug	When debugging mode is selected, the machine runs in debug mode first.
ACSource	Ac bypass input selection for an all-in-one machine.
I-Gch-L	In the economic mode, the power grid has power, the power grid charging enables, the photovoltaic charging current < this value, and lasts for 1min, and the power grid charging is started.
I-Gch-H	In the economic model, the power grid has power, the power grid charging enables, the value of the photovoltaic charging current >, and it lasts for 1min, and the power grid is shut down for charging.
SOCDown	grid without electricity,SOC < this value,Stop the inverter.
SOCUp	The grid without electricity,且 SOC≥value,Open the inverter.
LowSOC	Economic mode, the power grid has power, SOC < this value, switch from the inverter state to the power grid bypass. If you need the grid to enter the system in advance to charge the battery, please increase this value. It is recommended to adopt 40% of factory parameters.
HighSOC	Economic mode: the power grid has electricity, SOC≥ this value, switching from the state of the grid bypass to the contravariant. If you need to use the power grid to charge the battery more, please enlarge this value, but if you enlarge this value, you may waste the power of the power grid. It is recommended to adopt 80% of factory parameters. If this value is greater than 90%, it is recommended to change the system operation mode to backup mode.
UnderV	grid without electricity,Battery voltage < this value,Stop the inverter.
RecovV	grid without electricity,Battery voltage ≥ this value,Open the inverter.
LowVolt	Economic mode, the grid has electricity, battery voltage < this value, from the inverter state switch to the grid bypass.
HighVolt	In the economic mode, the grid has electricity, and the battery voltage ≥ this value, the state of the grid bypass is switched to the contravariant.
IgchgEn	Grid charging function switch, enable or disable power grid charging functions.

4.3.4.6 LCD system Settings

The battery setting in the system setting requires the password to enter. The default password is 0000.

When using lead-acid batteries, set the BMS enabling item to disabled. When lithium battery is used, BMS enabling item should be set as enabling, and corresponding BMS type and PACK number should be selected. The all-in-one machine is connected to lithium battery BMS through external communication interface. Support BMS for Anxuan AX-485, CSW-485, CSW-V20 and NG-CAN only.

Table 4-11 LCD fault information display in case of communication failure of lithium batteries (XX represents serial number of batteries in parallel)

BMS type	Communication failure fault code	solution
NG-CAN	502 BMS communication failure	①Check for loose communication lines②Check whether the communication line is connected correctly ③Check whether the lithium battery model is selected correctly
AXE-485	502 BMS communication failure	
CSW-485	PXX-31 communication failure	
CSW-V20	PXX-81 communication failure	

The backlight time in the system setting is the LCD keyless operation backlight time.

BatterySet	>
Site	10
LcdLight	10min
Language	English
Buzzer	On
ClearEneData	
ClearFaultData	
Factory reset	

Password	****
Esc	

Yes
No

Yes
No

Yes
No

Ub-Rate	48.0V
Ub-Const	56.0V
Ib-Const	80.0A
Ub-Float	53.0V
Ib-Float	5.0A
Ub-Over	62.0V
Ub-Reco	56.0V
T-Comp	3
Ut-Top	2600mV
Ut-Down	1000mV
Igridchg	40.0A
BMSEn	Disable
BMSType	AXE-485
PackNum	1
EditPasssword	>

NewPwd	****
Esc	
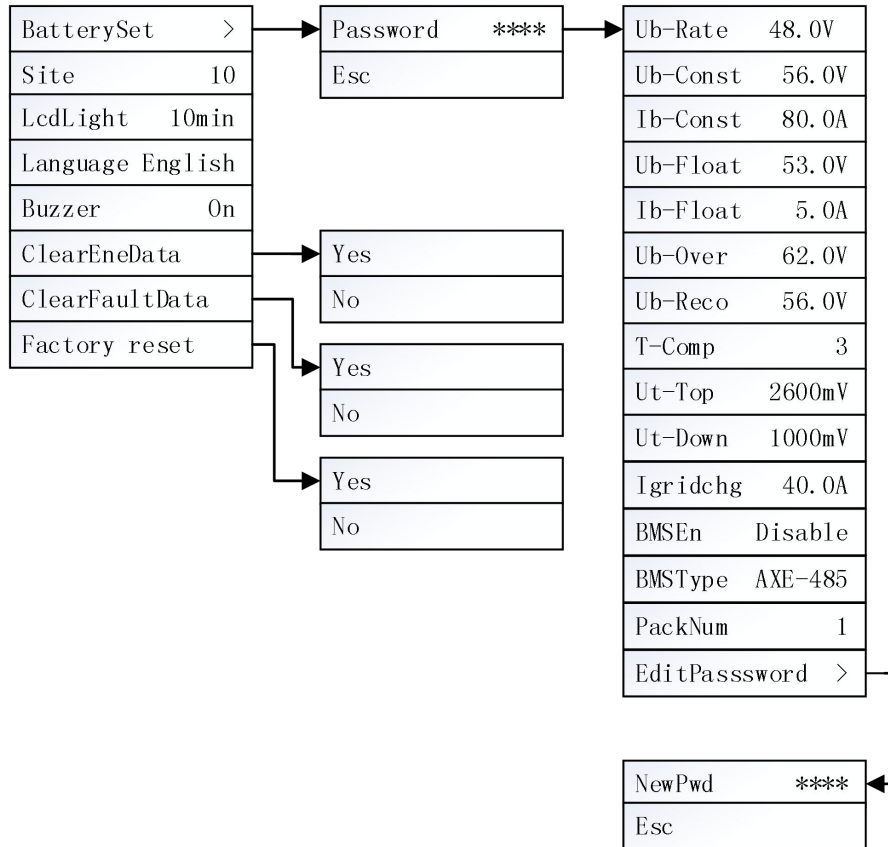
Figure 4-11 Operation interface of parameter setting

Table 4-12 Contents of LCD parameter setting operation interface

secondary menu (System Settings,password：0000）	function declaration
BatterySet	Set battery parameters.
Site	Set the device address for external Modbus communication
LcdLight	Set the backlight lighting time when the all-in-one machine is working.
Language	Settings show Chinese and English toggle.
Buzzer	Setting and its buzzer switch.
ClearEneData	The calculated generation and consumption of electricity will be cleared to zero.
ClearFaultData	The statistical history fault will be cleared.
Factory reset	Restores parameters to factory values
Third level menu (Battery Settings)	function declaration

Ub-Rate	Set the rated voltage of the battery used in the system.
Ub-Const	The charging voltage value of an all-in-one machine under constant voltage charging state.
Ib-Const	The charging current value of an all-in-one machine when it is in constant current charging state.
Ub-Float	The charging voltage of the all-in-one machine in floating charging state.
Ib-Float	The charging current value of the all-in-one machine in floating charging state.
Ub-Over	When the battery voltage exceeds this set value, disconnect the charging function.
Ub-Reco	When the overvoltage of the all-in-one machine is disconnected and the battery voltage drops to the set value, the charging function is restored.
T-Comp	Set the temperature compensation coefficient when charging the battery.
Ut-Top	Set the upper limit of temperature compensation coefficient when charging the battery.
Ut-Down	Set the lower limit of temperature compensation coefficient when charging the battery.
Igridchg	Set the charging current of the grid charging.
BMSEn	Set the BMS enabled state.
BMSType	Set the matching BMS type of the inverter.
PackNum	When PACK battery is used concurrently, set corresponding quantity.
EditPasssword	Change the system setting password.

Note !

The best parameters have been set according to the auxiliary battery when the all-in-one machine leaves the factory. It can be used directly without modification.

5 Common troubleshooting and maintenance

5.1 Troubleshooting

  Once the all-in-one machine fails, the fault light will be on and the LCD screen will display the current fault information. Users can query the fault information according to the fault code. The following table provides some basic fault troubleshooting methods. See Table 5-1 below for details.

Failure light: The yellow light is the warning light and the machine continues to run

The red light means failure light and machine stop

Basic fault information for an all-in-one machine					
Module	Fault code	Implication	Possible reason	Solution	Memo
Charger fault	100	Charging soft overcurrent	Excessive charging current	Restart and observe whether the fault repeats	
	101	Charge hard overcurrent			
	102	Mos overheating	Fan failure or ventilation block	1. Check whether there is any shielding around the chassis 2. Check whether the inlet and outlet of the chassis are blocked 3. Check whether all fans are running normally	
	103	Mos temperature sensor fault	Temp. sensor terminal loose	contact the customer service	Yellow light alarm Machine running
	104	Schottky overheated	Fan failure or ventilation block	1. Check whether there is any shielding around	

				the chassis 2. Check whether the inlet and outlet of the chassis are blocked 3. Check whether all fans are running normally	
	105	Schottky temperature sensor failed	Temp. sensor terminal loose	contact the customer service	Yellow light alarm Machine running
	107	PV array undervoltage	Sunshine weak or PV input switch is off	1.The undervoltage of the array is normal when the sunlight is weak 2. Check whether the photovoltaic input switch is closed	Yellow light alarm Machine running
	108	PV array overvoltage	PV input voltage too high	Check whether input voltage is higher than 180V	
	109	Bat overvoltage	Whether the battery is connected Cell aging Abnormal battery voltage causes machine damage	1. Check whether the battery side switch is closed 2. Check the battery voltage level Check the battery for aging	24V machine overpressure point: 32V Overpressure point of 48V machine: 64V
	110	Bat undervoltage	Whether the battery is connected Whether the battery is aging	1.Check whether the battery side switch is closed 2.Check the battery voltage level 3.Check whether the battery is	Yellow light alarm Machine runningt 24V, 48V machine undervoltage point: 15V

				aging or not	
	115	Storage rw fault	hardware failure	contact the customer service	
Inverter failure	200	Bat overvoltage	Whether the battery is connected Cell aging Abnormal battery voltage causes machine damage	1. Check whether the battery side switch is closed 2. Check the battery voltage level 3, check whether the battery is aging	24V machine overpressure point: 32V Overpressure point of 48V machine: 64V
	201	Bat undervoltage	Whether the battery has been overdischarged Battery voltage class	1. Check the battery voltage level 2. Check whether the battery is overreleased 3, check whether the battery is aging	24V machine overpressure point: 32V Overpressure point of 48V machine: 64V
	202	Invert output hard overcurrent	Excessive load current Short circuit of load	1. Observe whether the fault is automatically restored 2. Check whether the load is too heavy or short circuit	
	203	Invert output soft overcurrent			
	204	Invert output soft overvoltage	load sudden change	Restart the boat switch	
	205	Inverter up mos overheating	Fan failure or blockage of inlet and outlet	1.Check whether there is any shielding around the chassis 2. Check whether the inlet and outlet of the chassis are blocked 3. Check whether	
	206	Inverter down mos overheating			

				all fans are running normally	
207	Invert output overload	The load exceeds the rated capacity of the machine	Reduce load and not exceed nameplate capacity		
208	Invert transformer overheating	Long time operation at full power	Reduce load or stop inverter wait for a few hours		
209	Inverter up mos temperature sensor fault	The temperature sensor connector is loose or in bad contact	contact the customer service	Yellow light alarm Machine running	
210	Inverter down mos temperature sensor fault				
212	Invert undervoltage fault	hardware failure	contact the customer service		
213	Short circuit fault	Load connection short circuit	Check the load connection for short circuit		
214	Invert current zero error	hardware failure	contact the customer service		
215	Invert voltage zero error				
300	AC undervoltage	Power gateway outage moment The power grid is not connected	1. Check whether the grid side switch is closed 2. When the power gateway is off, the undervoltage fault is reported as a normal phenomenon	Yellow light alarm Machine runningt	
301	AC overvoltage	Network voltage fluctuation A hardware failure	Contact customer service after reconnecting to the power grid or restarting the machine		
302	Grid frequency error				
303	Grid capture phase error	hardware failure			

	304	Grid lock phase error			
	305	Invert relay KM1 turn on fault	hardware failure	contact the customer service	
	307	Grid relay KM3 turn on fault			
	309	Soft start fault KM4			
	315	Slave init error			

<table>
<tr><td colspan="6" align="center">Basic fault information of lithium batteries</td></tr>
</table>

Lithium battery type	fault code	implication	fault phenomenon	handling method	remark
ATX BMS fault	400	Total overvoltage	Stop charging	The inverter is controlled by itself without operation	Failure with yellow-light
	401	Single overvoltage	Stop charging	The inverter is controlled by itself without operation	
	402	Total undervoltage	Start the power grid charging, stop the inverter	Please charge in time when the battery is low	
	403	Single undervoltage	Start the power grid charging, stop the inverter	Please charge in time when the battery is low	
	404	Dsicharge high temperature	Stop the inverter	contact the customer service	
	405	Charge high temperature	Stop charging	contact the customer service	
	406	Dsicharge low temperature	The working environment of the battery pack is not suitable below 0℃	Please heat the battery pack or transfer it indoors	
	407	Charge low temperature	The working environment of the battery pack is not suitable	Please heat the battery pack or transfer it indoors	

			below 0℃		
	408	Dsicharge overcurrent	The discharge overcurrent is detected continuously for 10s, and the inverter is stopped. The alarm is detected continuously for 3 times within 2 minutes	Please restart the inverter after reducing the load	
	409	Charge overcurrent	Continuously detect charging overcurrent for 10s, stop charging, detect 3 times within 2 minutes, and lock the alarm	Restart the inverter	
	410	Single voltage difference	Battery imbalance	Please contact the manufacturer to replace the battery pack	
	600	Cell overvoltage	Stop charging and discharging of the battery, disconnect the main circuit of the battery, and resume after a delay of 1h	The inverter is controlled by itself without operation	
	601	Cell undervoltage	Stop the battery charging and discharging, and the main circuit of the battery is disconnected	Restart inverter power is low, please charge in time	
	602	Single overvoltage	Stop charging and discharging the battery. The battery's main	The inverter is controlled by itself without operation	

		circuit is constantly on		
603	Single undervoltage	Stop charging and discharging the battery. The battery's main circuit is constantly on	The inverter is controlled by itself without operation	
605	Bat overvoltage	Stop charging and discharging of the battery, disconnect the main circuit of the battery, and resume after a delay of 1h	The inverter is controlled by itself without operation	
606	Bat undervoltage	Stop the battery charging and discharging, and the main circuit of the battery is disconnected	Restart inverter power is low, please charge in time	
607	Bat High Temperature	Stop charging and discharging of the battery, disconnect the main circuit of the battery, and resume after a delay of 1h	contact the customer service	
608	Bat Low Temperature	Stop the battery charging and discharging, and the main circuit of the battery is disconnected	Please heat the battery pack or transfer it indoors Restart the inverter	
609	OCDSG	Stop the battery charging and discharging, and the main circuit of the battery is disconnected	Please restart the inverter after reducing the load	

610	OCCHG	Stop charging and discharging of the battery, disconnect the main circuit of the battery, and resume after a delay of 1h	The inverter is controlled by itself without operation	
612	Monomer unbalance protection	Stop the battery charging and discharging, and the main circuit of the battery is disconnected	Please contact the manufacturer to replace the battery pack	
613	Bat overvoltage	Stop charging the battery, allow discharging, and keep the battery main loop open	The inverter is controlled by itself without operation	
614	Bat undervoltage	Stop the battery discharge and send the emergency charging protocol frame to the inverter at the same time. The main circuit of the battery keeps on	The inverter is controlled by itself without operation	
615	Battery temperature warning	Stop charging and discharging the battery. The battery's main circuit is constantly on	The inverter is controlled by itself without operation	
616	Battery low temperature warning	Stop charging and discharging the battery. The battery's main circuit is constantly on	The inverter is controlled by itself without operation	

	617	Discharge overcurrent warning	Stop discharging the battery and keep the battery main circuit open	The inverter is controlled by itself without operation	
	618	Overcurrent charge warning	Stop charging the battery and keep the battery main circuit open	The inverter is controlled by itself without operation	
	620	Monomer imbalance warning	Stop charging and discharging the battery. The battery's main circuit is constantly on	The inverter is controlled by itself without operation	
LCD fault	500	Charge dsp comm fault	It is normal phenomenon that the light is weak in cloudy and rainy days or there is no pv input at night	Check whether the photovoltaic input has power. If the photovoltaic input has power but still reports failure, you can contact customer service	Failure with yellow-light
	501	Inverter dsp comm fault	The inverter ON/OFF switch is not ON or the battery side input has no power	Check whether the ON/OFF switch is ON and whether there is power ON the battery side. If not, please contact customer service	
	502 / PXX-31 / PXX-81	Bms comm fault	Bad contact with BMS communication line Wrong lithium battery model selection	1. Please check whether the communication line is loose 2. Whether the connection position is correct 3. Whether the lithium battery model is selected	(XX represents the serial number of batteries in parallel)

				correctly	
	503	Lcd eeprom storage error	hardware failure	contact the customer service	Yellow light alarm Machine running
CSW - 485 failures	PXX-00	Bat cell invalid	stop charging	The inverter is controlled by itself without operation	Failure with yellow-light (XX means PACK No.）
	PXX-01	Single overvoltage	Start the power grid charging, stop the inverter	Please charge in time when the battery is low	
	PXX-02	Single undervoltage	stop charging	The inverter is controlled by itself without operation	
	PXX-03	Total overvoltage	Start the power grid charging, stop the inverter	Please charge in time when the battery is low	
	PXX-04	Total undervoltage	The discharge overcurrent is detected continuously for 10s, and the inverter is stopped. The alarm is detected continuously for 3 times within 2 minutes	Restart the inverter	
	PXX-05	Charge high temperature	The discharge overcurrent is detected continuously for 10s, and the inverter is stopped. The alarm is detected continuously for 3 times within 2 minutes	Please restart the inverter after reducing the load	
	PXX-06	Charge low	The working	Please heat the	

		temperature	environment of the battery pack is not suitable below 0℃	battery pack or transfer it indoors	
	PXX-07	Dsicharge high temperature	Stop charging, stop inverter	contact the customer service	
	PXX-08	Dsicharge low temperature	The working environment of the battery pack is not suitable below 0℃	Please heat the battery pack or transfer it indoors	
CSW -V20 fault	PXX-09	Env high temperature	Check if the ambient temperature is too high	contact the customer service	Failure with yellow-light （XX means PACK No.）
	PXX-53	Env low temperature	stop charging	The inverter is controlled by itself without operation	
	PXX-54	Power high temperature	Start the power grid charging, stop the inverter	The battery is low, please charge it in time	
	PXX-55	Charge overcurrent	stop charging	The inverter is controlled by itself without operation	
	PXX-56	Dsicharge overcurrent	Start the power grid charging, stop the inverter	The battery is low, please charge it in time	
	PXX-57	Level2 overcurrent	stop charging	contact the customer service	
	PXX-58	Output short circuit	The working environment of the battery pack is not suitable below 0℃	Please heat the battery pack or transfer it indoors	
	PXX-59	SOC error	Stop the inverter	contact the customer service	
	PXX-60	Comm fault	The working environment of the battery pack is not suitable	Please heat the battery pack or transfer it indoors	

		below 0℃	
PXX-61	environment of high temperature	Stop charging, stop inverter	contact the customer service
PXX-62	environment of low temperature	The working environment of the battery pack is not suitable below 0℃	Please heat the battery pack or transfer it indoors
PXX-63	power of high temperature	Stop charging, stop inverter	contact the customer service
PXX-64	charging current is too strong	The charging overcurrent was detected continuously for 10s, stopped charging, detected continuously for 3 times within 70S, and the alarm was locked	Please properly configure the photovoltaic panels
PXX-65	discharge current is too strong	The discharge overcurrent was detected for 10s continuously, inverter stopped, continuously detected for 3 times within 70S, and the alarm was locked	Please restart the inverter after reducing the load
PXX-68	Low capacity alarm	The remaining power is too low	Please charge in time.

Table 5-1 Handling table of failure and alarm status
* If the above treatment method is invalid and affects the normal use of the all-in-one machine, please contact the customer service of the company.

5.2 maintenance

Before the maintenance of the all-in-one machine, it shall be ensured that the all-in-one machine is not electrified. The following routine checks shall be carried out on the all-in-one machine every six months:
● Check whether the all-in-one machine is damaged or deformed.
● Check if there is abnormal sound when the all-in-one machine is running.
● Check whether each parameter setting is normal, whether the time setting is accurate.
● Check whether the fan is running normally and whether there is foreign body blockage.
Every six months to once a year, the following inspections shall be carried out on the all-in-one machine:
● Check the humidity and dust of the environment around the all-in-one machine. If the dust is too much, the all-in-one machine can be cleaned.
● Check whether the cable connection of the all-in-one machine is loose. If it is loose, fasten it again according to the wire connection method introduced above.
● Check the cable for damage, especially for cuts on the surface of the metal contact.

6 Appendix A technical parameters

Normal machine model	JNF3KLF24V-V2	JNF3KLF48V-V2	JNF4KLF48V-V2	JNF5KLF48V-V2
PV Input				
Maximum input DC voltage	180Vdc			
Recommended input power	3500W	5000W	7000W	7000W
MPPT working voltage range	35~170Vdc	65~170Vdc	65~170Vdc	65~170Vdc
Battery				
nominal voltage	24Vdc	48Vdc	48Vdc	48Vdc
maximum charging current	80A	60A	80A	80A
Maximum charging efficiency	≥97%			
Battery Information	Gel/lithium			
Inverter output				
Max short circuit current	3000VA	3000VA	4000VA	5000VA
Peak output capacity	9000VA	9000VA	12000VA	15000VA
Rated output (linear load)	3000W	3000W	4000W	5000W
Output voltage (to meet the voltage requirements of different countries)	230Vac±20%			
rated frequency	50/60Hz (±3%)			
Standby Power	≤10W			
Maximum Efficiency	93%			
waveform	sine wave			
THD	<3%			
Rated Current	13.5A	13.5A	18A	22.5A
Peak output current coefficient	3：1			
overload	125%@rated power, 70s;150%@rated ,20s; 200%@rated ,5s;over 300%@rated,0s.			

AC INPUT				
alternating voltage	230Vac±20%			
alternating current frequency	50/60Hz (±3%)			
maximum charging current	30A	40A	40A	40A
Ac bypass				
Allowable input voltage	230Vac±20%			
switching time	≤10ms			
Machine Parameters				
dimensionality(W/H/D)	440*370*190mm			
weight	29Kg	30kg	31kg	33kg
Miscellaneous				
Protection grade	IP20			
Noise	<60dB			
Cooling Method	forced cooling			
operating temperature	-20～+50℃			
critical temperature	-25～+70℃			
status indicator	LCD+LED			
port	RS485/CAN(Optional)			
altitude	2000m(>2000m Derating work)			

American standard machine model	JNF3KLF24V-A-V2	JNF3KLF48V-A-V2	JNF4KLF48V-A-V2	JNF5KLF48V-A-V2
PV Input				
Maximum input DC voltage	180Vdc			
Recommended input power	3500W	5000W	7000W	7000W
MPPT working voltage range	35~170Vdc	65~170Vdc	65~170Vdc	65~170Vdc
battery				
nominal voltage	24Vdc	48Vdc	48Vdc	48Vdc
Max Charge Current	80A	60A	80A	80A

Maximum charging efficiency	≥97%			
Battery Information	Gel/lithium			
Inverter output				
Max short circuit current	L1～L2：3000VA L～N：1500VA	L1～L2：3000VA L～N：1500VA	L1～L2：4000VA L～N：2000VA	L1～L2：5000VA L～N：2500VA
Peak output capacity	L1～L2：9000VA L～N：4500VA	L1～L2：9000VA L～N：4500VA	L1～L2：12000VA L～N：6000VA	L1～L2：15000VA L～N：7500VA
Rated output (linear load)	L1～L2：3000W L～N：1500W	L1～L2：3000W L～N：1500W	L1～L2：4000W L～N：2000W	L1～L2：5000W L～N：2500W
Output voltage (to meet the voltage requirements of different countries)	L1～L2：230Vac±20% L～N：115Vac±20%			
rated frequency	50/60Hz（±3%）			
Standby Power	≤10W			
maximum efficiency	93%			
waveform	sine wave			
THD	<3%			
rated current	13.5A	13.5A	18A	22.5A
Peak output current coefficient	3：1			
overload	125%@rated power, 70s;150%@rated ,20s; 200%@rated ,5s;over 300%@rated,0s.			
AC input				
alternating voltage	L1～L2：230Vac±20% L～N：115Vac±20%			
AC Frequency	50/60Hz（±3%）			
maximum charging current	30A	40A	40A	40A
Ac bypass				
Allowable input voltage	L1～L2：230Vac±20% L～N：115Vac±20%			
switching time	≤10ms			
Machine Parameters				
dimension(W/H/D)	440*370*190mm			
weight	29Kg	30kg	31kg	33kg
Miscellaneous				
IP Grade	IP20			

dBA	<60dB
cooling method	forced cooling
operating temperature	-20～+50℃
critical temperature	-25～+70℃
status indicator	LCD+LED
port	RS485/CAN(Optional)
altitude	2000m(>2000m Derating work)

7 appendix B

Quality assurance

Products in the warranty period of failure, our company will free maintenance or replacement of new products. The warranty period of the products shall be subject to the contract.

evidence

During the warranty period, the customer is required to produce the invoice and date of the purchased product. At the same time, the trademark on the product should be clearly visible, otherwise the right not to guarantee the quality.

conditions

● The replacement of unqualified products should be returned to our company.

● The customer shall allow us a reasonable amount of time to repair the faulty equipment.

Liability waiver

If the following situations occur, our company has the right not to conduct quality assurance:

● Transport damage

● Improperly installed, modified, or used

● The whole machine and parts have exceeded the free warranty period

● Very harsh operating environment beyond the description in this manual

● Machine failure or damage caused by repair, replacement or disassembly not by our service organization or personnel

● Damage caused by abnormal natural environment

Note: In case of any change of product size and parameters, the latest information of the company shall prevail without prior notice.

Contact us

If there are any problems during the operation and maintenance of the inverter, please contact the supplier.

In order to provide faster and better after-sales service, we need your assistance to provide the following information:

● Inverter type number

● Inverter serial number

● Fault name and time

● Simple description of failure phenomenon

8 Appendix C

All in one machine user fault feedback information table

Product Information			
product model		Factory serial number	
cost of time		Life timer	
Product status			
load model			
fault message	fault code		
	fault phenomenon		
Fan	Whether the fan is running		
	Fan running condition		
Group information	Solar panel model		
	Solar panel configuration		
Battery information	Battery model		
	Battery configuration		
After-sales service requirements			
userinfo			
username		User contact information	
customer address		postcode	
Product improvement Suggestions			

* If you still can't solve the problem by contacting the customer service, please fill in this form and describe the fault in detail, and return it to the factory with the machine.