WEEE Number: 80133970

INSTRUCTION MANUAL

SOLAR INVERTER

INTRODUCTION

Thank you for selecting and buying V-TAC Product. V-TAC will serve you the best. Please read these instructions carefully & keep this user manual handy for future reference. If you have any another query, please contact our dealer or local vendor from whom you have purchased the product. They are trained and ready to serve you at the best.

Multi-Language Manual QR CODE

Please scan the QR code to access the manual in multiple languages.

WARNING

1. Please make sure to turn off the power before starting the installation.
2. Installation must be performed by a qualified electrician.
3. Proper grounding should be ensured throughout the installation.

This marking indicates that this product should not be disposed of with other household wastes.

Caution, risk of electric shock.

SAFETY PRECAUTIONS

The series grid-tied solar inverters are designed and tested strictly in accordance with relevant international safety standards. As an electrical and electronic device, all relevant safety regulations must be strictly complied during installation, operation, and maintenance. Incorrect use or misuse may result in：

- Injury to the life and personal safety of the operator or other people.
- Damage to the inverter or other property belonging to the operator or other people.

In order to avoid personal injury, damage to the inverter or other devices, please strictly observe the following safety precautions.
This chapter mainly describes various warning symbols in operation manual and provides safety instructions for the installation, operation, maintenance and use of the series grid-tied solar inverters.

ICONS

This manual provides relevant information with icons to highlight the physical and property safety of the user to avoid device damage and physical injury.
The icons used in this manual are listed below:

Icons	Name	Instruction	Abbreviation
 Danger	Danger	Serious physical injury or even death may occur if not follow the relative requirements	
 Warning	Warning	Physical injury or damage to the devices may occur if not follow the relative requirements	
 Do not	Electrostatic sensitive	Damage may occur if not follow the relative requirements	
 Hot sides	Hot sides	Sides of the device may become hot. Do not touch.	
Note	Note	The procedures taken for ensuring proper operation.	Note

SAFETY GUIDELINES

	● After receiving this product, first ma ke sure that the product is well packaged. If you have any questions, please contact the shipping company or local distributor immediately. ● Installation of PV inverters must be performed by professional technician who has been specially trained, thoroughly read and familiar with all the contents of this manual and familiar with the safety requirements of the electrical system. ● Do not carry out any wiring and inspection or changing components when the power supply is applied.
	● Ensure that there is no electromagnetic interference from other electrical and electronic equipment on the installation site. ● Do not refit the inverter unauthorized. ● All the electric installation needs to be compliance with the national or local laws and standards.
	● The temperature of individual parts o r the enclosure of the inverter– especially the heat sink may become hot in normal operation. There is a danger of burning. Do not touch.
	● It must be reliably grounded before operation.
	● Do not open the cover of inverters unauthorized. The electrical parts and components inside the inverter are electrostatic. Take measurements to avoid electrostatic discharge during rel evant operation.
	● The inverter must be reliably grounded.
	● Ensure that DC and AC side circuit breakers have been disconnected and wait at least 5 minutes before wiring and checking.
Note: Technical personnel who can perform installation, wiring, commissioning, maintenance, troubleshooting and replacement of the series grid-tied solar inverters must meet the following requirements:	
● Operators need professional training. ● Operators must read this manual completely and master the related safety precautions. ● Operators need to be familiar with the relevant safety regulations for electrical systems. ● Operators need to be fully familiar with the composition and operating principle of the entire grid -tied photovoltaic power generation system and related standards of the countries/regions in which the project is located. ● Operators must wear personal protective equipment.	

WHAT TO DO AFTER SCRAPPING

- Do not dispose of the inverter together with household waste. The user has the responsibility and obligation to send it to the designated organization for recycling and disposal.

DELIVERY AND INSTALLATION

- Keep the package and unit complete, dry and clean during storage and delivery.
- Please remove and install the inverter with two or more people, because of the inverter is heavy.
- Remove and instal l the inverter with appropriate tools to ensure safe and normal operation and avoid physical injury or death. The people also need mechanical protective measures, such as protective shoes and work clothes.
- Only qualified electricians are allowed to install the inverter.
- Do not put and install the inverter on or close to combustible materials.
- Keep the installation site away from children and other public places.
- Remove the m etal jewelry such as ring and bracelet before installation and electrical connection to avoid electric shock.
- Do cover solar modules with light-tight materials before electrical connection. Exposed to sunlight, solar modules will output dangerous voltage.
- The inverter input voltage cannot exceed the maximum input voltage; otherwise inverter damage may occur.
- The positive and negative pole of solar module s cannot be grounded, otherwise irrecoverable damage may occur.
- Ensure the proper grounding of the inverter, otherwise, improper connection or no grounding may cause stop of the in verter.
- Ensure reliable installation and electrical connection.

GRID-TIED OPERATION

- Only qualified electricians are allowed to operate the inverter under the permission of local power departments.
- All electrical connections must meet the electrical standards of the countries/regions in which the project is located.
- Ensure reliable installation and electrical connection before operation.
- Do not open the cover of inverter during operation or voltage is present.

MAINTENANCE AND INSPECTION

	● Only qualified electricians are allowed to perform the maintenance, inspection, and components replacement of the inverter. ● Contact with the local dealer or supplier for maintenance. ● In order to avoid irrelevant personnel from entering the maintenance area during maintenance, temporary warning labels must be placed to warn non-professionals to enter or use fence for isolation. ● Firstly disconnect all power supplies of the grid to the inverter before any maintenance, and then disconnect the DC breakers and wait for at least 5 minutes until the inverter is discharged before maintenance. ● Please follow electrostatic protection norms and take correct protective measures because of the electrostatic sensitive circuits and devices in the inverter. ● Do not use parts and components not provided by our company during maintenance. ● Restart the inverter after settling the fault and problem which may affect the safety and performance of the inverter. ● Do not get close to or touch any metal conductive part of the grid or inverter, otherwise electric shock, physical injury or death and fire may occur. Please do not ignore the warning icons and instructions with "electric shock".

SOLAR GRID-TIED POWER GENERATION SYSTEM

APPLICATION

The photovoltaic grid-tied power generation system consists of solar modules, grid-tied inverter, metering devices and public grid.

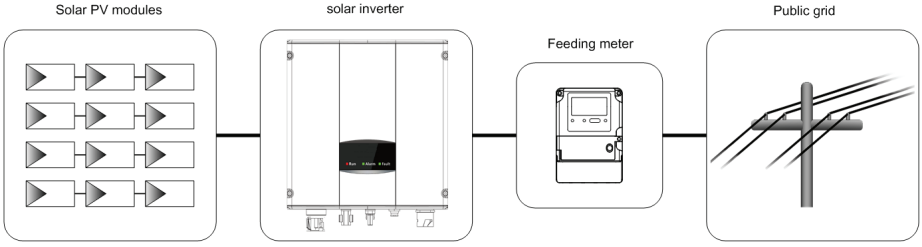


Figure 1 Application of the series grid-tied solar inverters

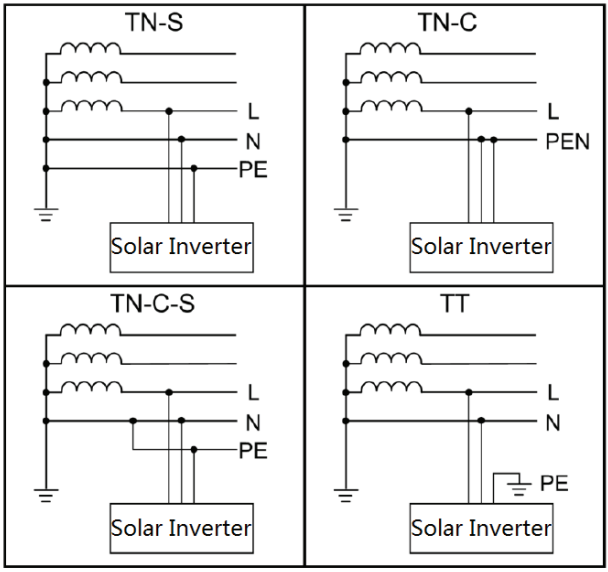
Grid-tied solar inverter is the core of photovoltaic power generation system. The solar energy can be converted into DC electric energy through solar modules and then be changed into sinusoidal AC energy which has the same frequency and phase with the public grid by grid-tied solar inverters, and then be fed to the grid.

The series grid-tied solar inverters are only applied in solar grid-tied power generation system and its DC input are only composed of crystalline silicon solar modules whose negative and positive poles are not grounded.

	● The recommended solar modules need to comply with IEC61730 Class A standard.

SAFETY GUIDELINES

The series grid-tied solar inverters support TN-S, TN-C, TN-C-S and TT grid connection. When applied to the TT connection, the N-to-PE voltage should be less than 30V.



PRODUCT APPEARANCE

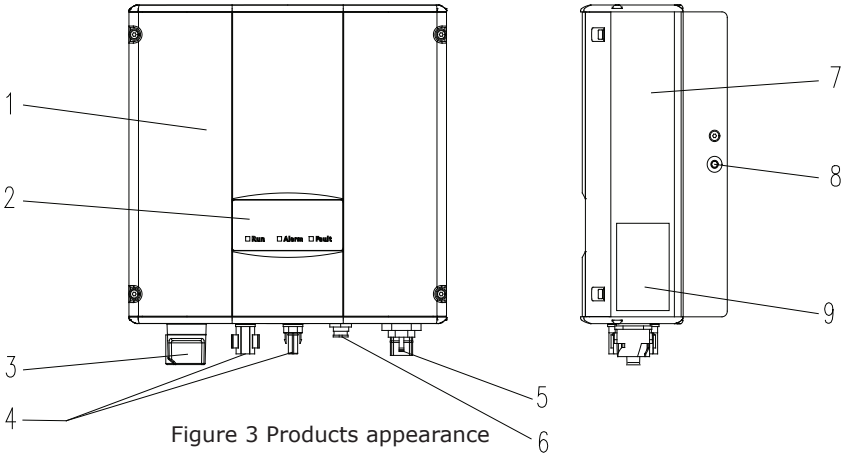
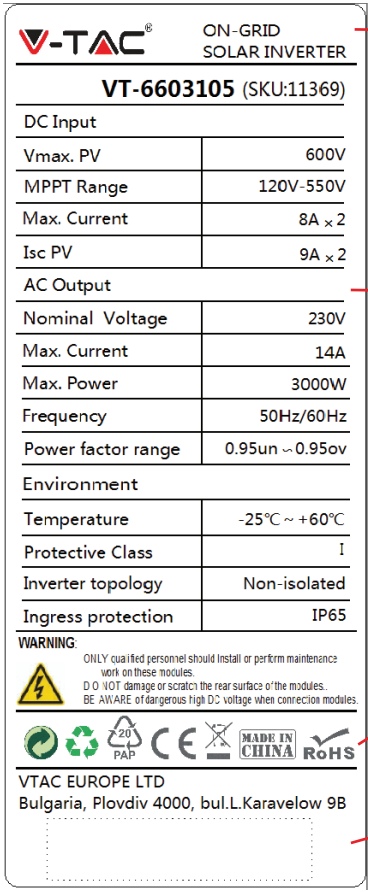


Figure 3 Products appearance

PARTS INSTRUCTION

No.	Name	Instruction
1	Cover	
2	LED display panel	LED indicators
3	DC switch	On –off of the DC input (optional)
4	DC input port	For the connection of solar modules
5	AC terminal	For the connection of AC output
6	Communication port	RS485 and EXT communication port
7	Cooling chamber	
8	Radiator	
9	Name plate	For rated parameters and safety precautions of the inverter

NAMEPLATE



1. Trademark and product type

2. Model and important technical parameters

3. Certification system of the inverter confirming

4. Serial number, company name and country of origin.

Figure 4 Inverter nameplate

ICONS CERTIFICATION

Icons	Instruction
	● EU WEEE mark. Cannot dispose of the inverter as household waste.
	● CE certification mark. The inverter complies with the CE directive.

PRODUCTS MODULES

Table of the grid-tied solar inverter

Product name	Model	Rated output power
Single-phase (L, N, PE)		
Single-phase grid-tied solar inverter	3KW-2M	3000
Single-phase grid-tied solar inverter	5KW-2M	4600

DIMENSIONS AND WEIGHT

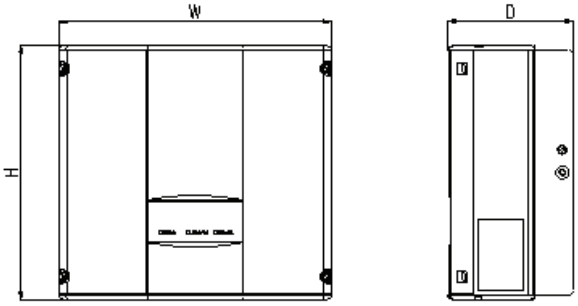


Figure 5 Inverter dimensions

Table of inverter dimension and net weight

Model	H (mm)	W (mm)	D (mm)	Net weight (kg)
3KW-2M / 5kW-2M	420	360	150	17

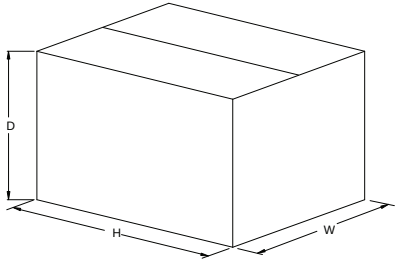


Figure 6 Paper packages dimension

Table of packages dimension and gross weight

Model	H (mm)	W (mm)	D (mm)	Gross weight (kg)	Packaging Material
3KW-2M / 5kW-2M	573	480	284	19	Paper

STORAGE

If the inverter is not put into use immediately, the storage of inverter should meet the following requirements:

• Do not remove the outer packing.
• The inverter needs to be stored in a clean and dry place, and prevent the erosion of dust and water vapor.
• The storage temperature should be kept at -40℃~+70℃, and the relative humidity should be kept at 5%RH~95%RH.
• The stacking of inverters is recommended to be placed according to the number of stacking layers in the original shipment. Place the inverter carefully during stacking to avoid personal injury or equipment damage caused by the falling of equipment.
• Keep away from chemically corrosive substances that may corrode the inverter.
• Periodic inspections are required. If damages are found by worms and rats, or packages are found to be damaged, the packaging materials must be replaced in time.
• After long-term storage, inverters need to be inspected and tested by qualified personnel before put into use.

INSTALLATION

This chapter describes how to install the inverter and connect it to the grid-tied solar system (including the connection between solar modules, public grid and inverter). Read this chapter carefully and ensure all installation requirements are met before installation. Only qualified electricians are allowed to install the inverter.

UNPACKING INSPECTION

The inverter has been thoroughly tested and rigorously checked before delivery, but damage may still occur during transportation. Before unpacking, check carefully whether the product information in the order is consistent with that on the nameplate of the package box and whether the product package is intact. If any damage is detected, please contact the shipping company or the supplier directly. Please also provide photos of the damage to get our fastest and best service.
Put the inverter into the package if not used and protect it from humidity and dust.

Check as following after unpacking:

(1) Ensure no damage to the inverter unit.
(2) Ensure the operation manual, port and installation accessories in the package.
(3) Ensure no damage or loss to the items in the package.
(4) Ensure the information of the order is the same as that of the name plate.
(5) The standard delivery list is shown as below.

Single-phase inverter packing list:

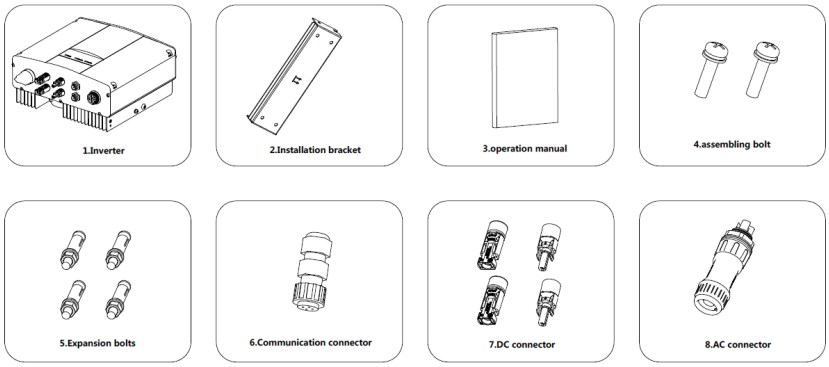


Figure 7 Single-phase inverter packing list

Table of detailed delivery list of single-phase inverter

NO	NAME	QUANTITY
1	3KW-2M / 5KW-2M	1
2	Installation bracket	1
3	Operation manual	1
4	Bolt M5*20	2
5	Expansion bolts M6*60	3KW-2M / 5KW-2M
6	Communication connector	1
7	DC connector	3KW-2M / 5KW-2M:2 pairs
8	AC connector	1

BEFORE INSTALLATION

Installation tools

Table of tools list

NO	INSTALLATION TOOLS	INSTRUCTION
1	Marking pen	Mark the installation hole
2	Electrodrill	Drill in the bracket or wall
3	Hammer	Hammer on the expansion bolts
4	Monkey wrench	Fix the installation bracket
5	Allen driver	Fasten the screws, remove and install AC wiring box
6	Straight screwdriver	For AC wiring
7	Megger	Measuring insulation performance and impedance
8	Multimeter	Check the circuit and AC and DC voltage
9	Electric iron	Weld communications cable
10	Wire crimper	Crimp DC terminals

INSTALLATION PLACE

Select installation place based on the following considerations:
(1) The height of the installation position should ensure that the line of sight is at the same level as the LCD for viewing the parameters of inverter conveniently.
(2) Select a well ventilated place sheltered from direct sun radiation and rain.
(3) Allow sufficient space around the inverter to enable easy installation and removal from the mounting surface and air convection. (See Figure 8).
(4) The ambient temperature of installation should be -25°C~60°C
(5) The installation site should be away from electronic devices which can generate strong electromagnetic interference.
(6) The inverter needs to be installed on a firm and sturdy surface, such as wall and metal bracket and so on.
(7) The installation surface should be perpendicular to the horizontal line. (See Figure 9)
(8) The installation should ensure that the inverter is reliably grounded, and the material of grounded metal conductor should be consistent with the metal material reserved for the grounding of the inverter.

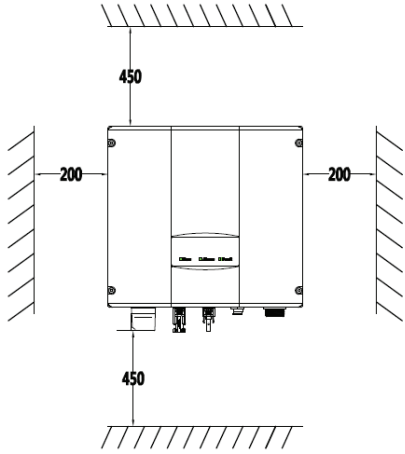


Figure 8 Installation space

Ensure there is sufficient space for heat-releasing. In generally, below space requirement should be met:

Table of detailed installation space

	Minimum clearance
Lateral	200mm
Top	450mm
Bottom	450mm

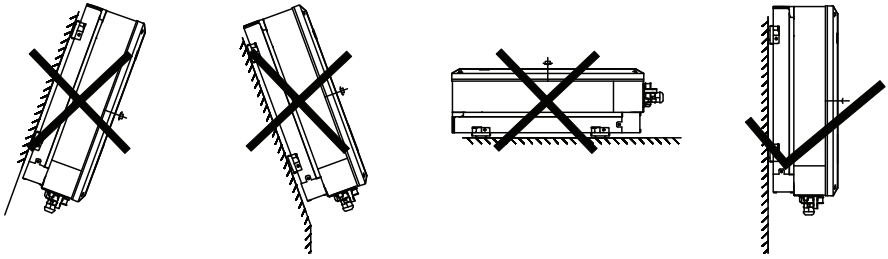


Figure 9 Installation position

	● Do not open the cover of the inverter or replace any part as incomplete inverter may cause electric shock and damage the device during operation.

CABLE SPECIFICATION

In order to regulate and compatible with the inverter AC/DC connector or terminal block specifications, below requirements on the AC/DC cable connected to corresponding inverter should be fulfilled:

Table of cable specifications

Model	DC side		AC side	
	Min cross-sectional area mm²(length≤50m)	Min cross sectional area mm² (Length>50m)	Mini cross-sectional area mm²	
			L	N/PE
3kW-2M / 5kW-2M	4	4	6	

MINIATURE CIRCUIT BREAKERS

In order to ensure safe operation of the inverter and circuits, it is recommended to configure corresponding micro breaker or fuse on the DC input side and AC output side of the inverter. The below table is the requirements for recommended micro breaker:

Table of specifications of micro breaker

Model	DC input	AC output
	Recommended DC breakers	Recommended AC breakers
3KW-2M	DC500V, C16A, 2P	AC240V, C20A, 2P
5KW-2M	DC500V, C20A, 2P	AC240V, C32A, 2P

MECHANICAL INSTALLATION

The material for fixing the inverter and the installation mode vary with the different installation sites. It is recommended to install the inverter vertically to the firm wall or metal bracket. Here we take wall installation as an example to introduce the installation matters of the inverter.

As shown in the Fig 10, the overall installation of the inverter should be vertical to the horizontal surface.

INSTALLATION OF SINGLE-PHASE INVERTER

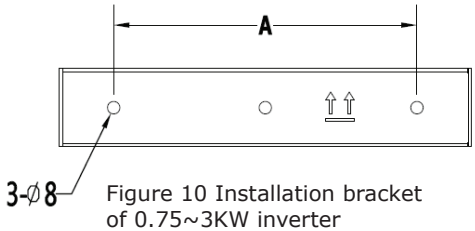


Figure 10 Installation bracket of 0.75~3KW inverter

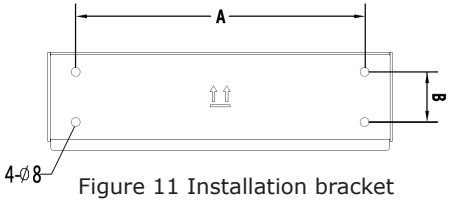


Figure 11 Installation bracket of 4~6KW inverter

Table of size of installation bracket

Model	Installation hole
	A(mm)*B(mm)
3KW-2M / 5KW-2M	260*45

Table of instruction of installation bracket

No.	Structure instruction
1	Installation hole∅ 8
2	Assembling bolt hole M5

INSTALLATION STEPS:

(1) Firstly, take down the installation bracket from the package.
(2) Place the bracket at the appropriate height and position on the wall. Mark the punching position according to the fixing hole. Drill holes of 70mm deep and install the expansion screw. Fix the bracket on the expansion bolt according to the arrow instruction. Ensure the installation is firm enough, the tightening torque is 8Nm.
(3) Lift the inverter to suspend it on the installation bracket through M8 hex socket cap screws.
(4) Finally, fasten the inverter and the bracket with M5 screws and tighten the screws to 2 Nm. For firm installation, the operators cannot release the device until the inverter is installed on the bracket firmly.

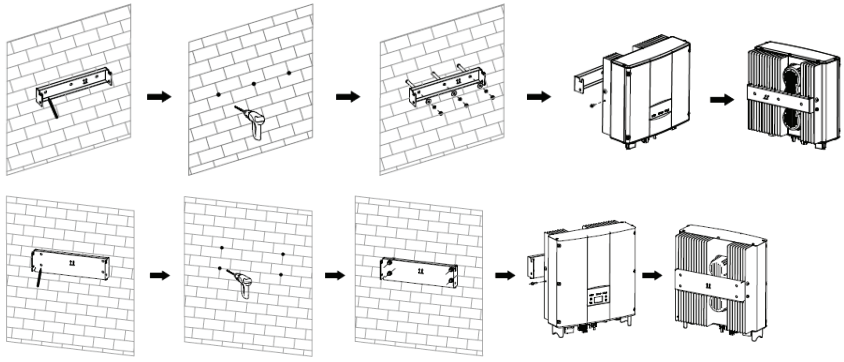


Figure 12 Installation of inverter

WIRING INSTALLATION

This section describes the electrical connection related content and related safety precautions. Figure 13 is the schematic diagram of the photovoltaic grid-connected system.

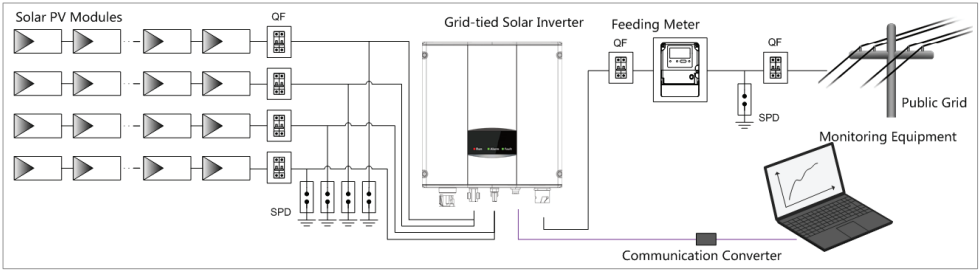


Figure 13 PV grid-connected system diagram

⚠	● Electrical connection must be carried out by professional technicians as wrong operation may cause damage to the device, physical injuries or even death during system operation. ● All the electrical installation must conform to the national and local electrical safety regulations. ● Ensure all the cables are installed firmly according to the specified safety requirements and free from any damage. ● It is not allowed to close the AC and DC breakers before the inverter is electrically connected.
Note	● Read and follow the instructions provided in this section . Strictly follow the requirements when operating. ● Always note the rated voltage and current defined in this manual. Never exceed the limits.

WIRING INSTALLATION

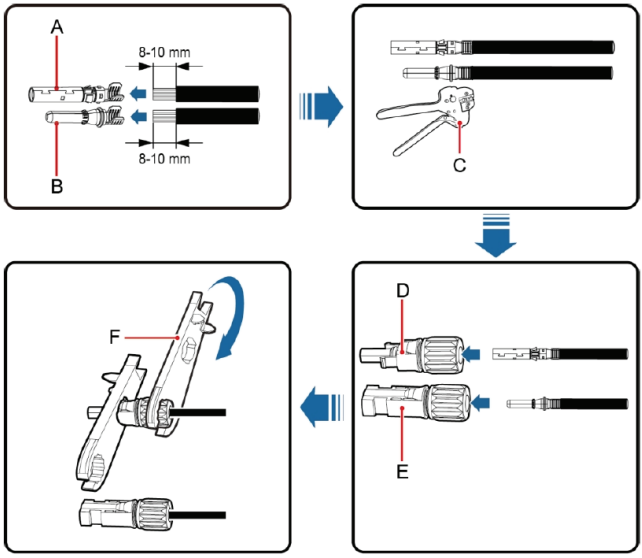


Figure 14 Connection between DC connector and solar modules

Connection steps:
(1) Lighting, short-circuit and other protection measures which meet the local electrical safety laws and regulations are needed before the AC connection.

⚠	● PV strings can be connected to inverter only after protection measures which conform to local electrical regulations are taken and the technical parameters in this manual are fulfilled.

(2) Connect the output cables of solar modules to the DC connector of inverter as Figure 4.8 shows. Loose the nut of connector and remove the isolation layer of the DC cable for about 8-10mm. Insert the conductor part into the appropriate position of the connector, crimp the MC4 DC terminal of the inverter and tighten the nut with a torque of 2.5-3Nm. The wiring of negative pole is the same as that of the positive pole. Ensure the poles of solar modules are well connected with the connectors;

⚠	● The PV string connected to the series inverter must adopt the DC connector configured especially for the inverter, do not use other connection devices without authorization from our company, otherwise damage to the device, unstable operation or fire may occur and our company will not undertake quality assurance or assume any direct or joint liability thereof.

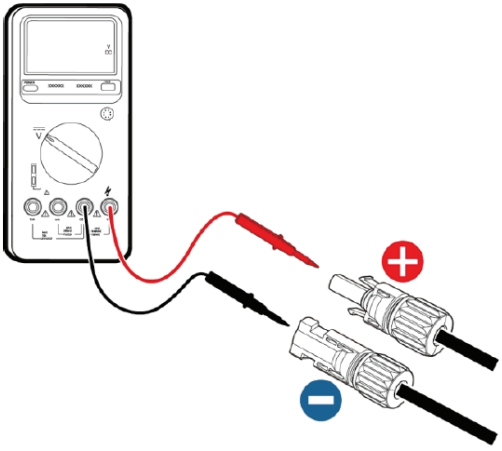


Figure 15 DC input voltage measuring

(3) After the DC connector is connected, use a multimeter to measure the voltage of the DC input string, verify the polarity of the DC input cable, and ensure that the voltage of each string is within the allowable range of the inverter, as shown in Figure 15
(4) Connect the DC connector with the inverter and ensure tightly-fastened;
(5) When removing the DC connector from the inverter, insert the head of the straight screwdriver into the raised hole in the middle of the connector, and force the movable end of the connector to exit.

AC CONNECTION

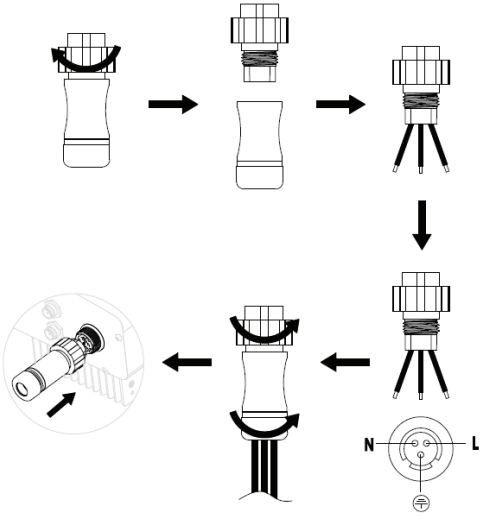


Figure 16 AC connection of single-phase inverter

AC connection steps of single-phase inverter:
(1) Before connecting the single-phase AC grid cable to the inverter, take lightning and short circuit protection measures in accordance with the local electrical safety codes;
(2) As shown in Figure 16, connect and fasten L, N and PE conductors of the single-phase AC grid to AC terminal and tighten to 0.5 Nm. Assemble the AC terminal and tighten to 2.5-3 Nm, then connect the terminal to the AC port of the inverter.
(3) Connect the DC output cable of the PV module to the DC connector which provided by our company, and then connect the DC connector to the DC terminal of the inverter.

⚠	• Only qualified cables under the local electrical safety laws and regulations and comply with the technical parameters of this manual are allowed to connect to the inverter. • Only with the permission of the local electric power company can the inverter be connected to the utility grid.

OPERATION

INSPECTION BEFORE OPERATION

The following items must be checked strictly before running the PV grid-connected inverter (including but not limited to):
(1) Ensure the installation site meet the requirement mentioned in installation pace for easy installation, removing, operation and maintenance;
(2) Ensure the mechanical installation meet the requirement mentioned in table of installation pace;
(3) Ensure the electrical installation meet the requirement mentioned in table of cable specifications;
(4) Ensure all switches are "off";
(5) Ensure the open circuit voltage of the PV module complies with the DC side parameter requirements(in the appendix) of inverter;
(6) Ensure all electrical safety precautions are clearly-identified on the installation site.

	● In order to ensure a safe, normal and stable operation of the PV power generation system, all the newly installed, renovated and repaired PV grid-connected power generation system and its grid-connected inverter must undergo inspection before running.

GRID-TIED OPERATION

Start the inverter according to below steps to achieve grid-connected operation of the inverter:

Note	Note	● Must to select the country to set grid-connected standard during the initial operation of the inverter ● Keep the power-on state of the inverter for at least 30 minutes, and complete the charging of built-in clock battery of the inverter to ensure the clock can run normally!

Please start the inverter as follows:
(1) Ensure the requirements mentioned in inspection before operation are met;
(2) Switch on the breakers at the AC side;
(3) Switch on the integrated DC switch;
(4) Switch on the switch on the DC side;
(5) Observe the LED indicator state of the inverter and the information displayed by LCD. Refer to chapter 6 for LED state indicator and LCD display information.

Run Green indicator flickers, other indicators are off: Inverter is powered on and under self-inspection, wait for enough light to fulfill grid-connected condition;
Run Green indicator on, others off: The inverter is in power generation after self-inspection----successful commissioning.
"Warn" or "Fault" indicator is on or flickers: inverter is powered on but system fault occur. Refer to LCD screen to check the fault code in LCD display, stop the inverter as per STOPPING, and rule out faults according to TROUBLESHOOTING. After all the faults are removed, repeat the operations

STOPPING

When it is necessary to carry out power-off maintenance, inspection and fault elimination on the inverter, stop the inverter according to the following steps:
(1) Disconnect the breaker on inverter public grid AC side;
(2) Disconnect the integrated DC switch of the inverter;
(3) Disconnect the circuit switch on PV string DC input side;
(4) Wait for at least 5 minutes until the internal parts of the inverter are fully discharged, and complete the stop operation.

DAILY MAINTENANCE

In solar PV grid-connected power generation system, the series grid-connected solar inverter can realize grid-connected power generation and stop/start operations automatically day and light in whatever seasons. In order to safeguard and prolong the service life of the inverter, it is necessary to carry out daily maintenance and inspection on the inverter besides using the inverter strictly according to this manual.

REGULAR MAINTENANCE

Maintenance contents	Maintenance methods	Maintenance cycle
Store the operation data	Use real-time monitoring software to read inverter running data, regularly back up all inverter running data and stats. Check the monitoring software and inverter LCD screen to make sure the parameters are set correctly.	Once each quarter
Check inverter operation status	Check to make sure the inverter installation is solid, no damage or deformation. When inverter running, check to make sure the sound and variables are normal. When inverter running, use thermal imager to check whether the case cooling is normal.	Every six months
Clean the inverter	Check the ambient humidity and dust around inverter, clean the inverter when necessary.	Every six months
Check electrical connection	Check whether system cable connection and inverter terminal block are loosened, if yes, secure them again in the manner specified in installation. Check whether the cable is damaged, and whether the cable skin touched by the metal surface is cut.	Every six months
Check the security features	Check the inverter LCD and stop function of the system. Simulate stop operation and check the stop signal communication. Check the warning marks and replace them if necessary.	Every six months

MAINTENANCE GUIDE

Clean the inverter

Cleaning procedure is as follows:

(1) Disconnect the input and output switches.

(2) Wait ten minutes.

(3) Use a soft brush or a vacuum cleaner to clean the surface and the inlet and outlet of the inverter.

(4) Repeat inspection before operation - operating content.

(5) Restart the inverter.

DISPLAY PANEL

This chapter describes the panel displaying and how to operate on the panel, which involves the LCD display, LED indicators and operation panel.

LED INDICATORS

There are three LED indicators on the panel:

(1) "Run", operation indicator, green;

(2) "Warn" recoverable fault indicator, yellow;

(3) "Fault", unrecoverable fault indicator, red.

The inverter state includes 6 states of stand-by, self-inspection, power generation, recoverable fault and unrecoverable fault; LED indicators are on, off and blinking. Please refer to the table below for detailed state of inverter and LED indicators state.

"○": LED indicator is off;

"◐" (green), "◐" (yellow), "◐" (red): LED indicator is blinking at every 0.25S or 0.5S;

"●(Green), "●" (yellow), "●" (red): LED indicator is on.

Table of inverter state and LED indicators

Inverter state	LED indicators	Description
Stand-by	○ Run ○ Warn ○ Fault	No power on. All indicators off.
Self-inspection	◐ Run ○ Warn ○ Fault	Green indicator blinks in every 0.25s, others off. Power on and ready for self-inspection
Power generation	● Run ○ Warn ○ Fault	Green indicator keeps on, others off. Grid-tied power generation.
	● Run ● Warn ○ Fault	(1) Grid-tied power generation, but clock fault (A007); (2) Grid-tied power generation, but DC input fault (A001 or E001); (3) Grid-tied power generation，but fan fault(E006 or E012); Green and yellow indicator keeps on, others off.

Recoverable fault	○ Run ◐ Warn ○ Fault	Inverter stand-by. The public grid fault(A001, A003, A004, A005or A006); Yellow indicator blinks in every 0.5s, others off
	○ Run ● Warn ○ Fault	(1) Inverter stand-by. Temperature abnormal(E006); (2) Inverter stand-by. DC input fault (E001); Yellow indicator keeps on, others off
Unrecoverable fault	○ Run ○ Warn ◐ Fault	Hardware or software fault (E003, E004, E005, E008, E009, E011, E013 or E015). De-couple the inverter from the system before maintenance. Red indicator blinks in every 0.5s, others off
	○ Run ○ Warn ● Fault	Current-leakage or unqualified output power energy of the inverter (E007, E010, E014, E017, E018 or E020). De-couple the inverter from the system before maintenance. Red indicator keeps on, others off
Artificial turned off	● Run ● Warn ● Fault	Stop after the communication or panel command. All indicators are on.
Note	Please refer to chapter 6 and 8 for detailed fault information and troubleshooting.	

OPERATION PANEL

There are 4 buttons on the panel:
(1) "ESC", exit and return ;
(2) " ∧", back to the front page and data increasing;
(3) " ∨", to the next page and data decreasing;
(4) "ENT", enter.
The machine can be turned on and off by pressing the buttons: press "ESC" and "ENT"(about 3 seconds) at the same time, and then the quick start-up and stop is available.

LCD SCREEN

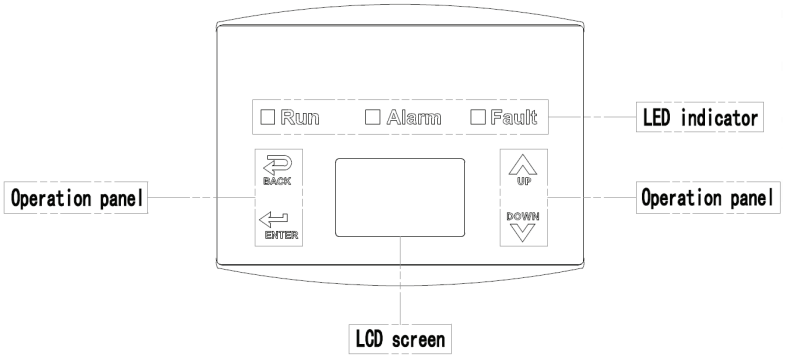


Figure 17 Operation panel

All information is displayed on the LCD screen. The background illumination of LCD screen will go out to save power if there is not button operation in 15 seconds. But it can be activated by pressing any button. Press "ENT" to enter into the main interface if the background illumination is on, as shown in Figure 19. All parameters can be viewed and set on the interface.

There are main interface and menu interfaces on the LCD screen, of which the main interface is the default one after power on, while the menu interfaces are used to watch and set parameters or other manual operation, such as viewing the monitoring parameters, history record, system information, statistics and fault information and setting the displayed language, time, communication address, password and factory defaults.

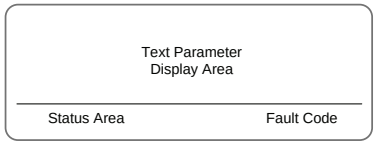


Figure 18 Main interface

The main interface of the LCD screen is shown as the Figure above:
(1) The curve graph display area displays the power change curve of current day;
(2) Text parameter display area displays the key running parameters of current inverter operation, which displays three rows of parameters every time. Under running or sleep state of the inverter, the displayed content rolls up per screen at 3s interval; press "∧" or "∨" to look through the displayed content;
(3) State display area displays current running state of the inverter, which can display "self-inspection", "grid-connected power generation", "alarm", "fault", "OFF" state;
(4) Dynamic fault code and menu entrance. When the state display area displays "alarm" or "fault", the dynamic fault code area will display corresponding fault code (display up to 8 fault codes).

FUNCTIONS OPERATION

Most of the parameters can be viewed and set through the LCD screen and operation panel.

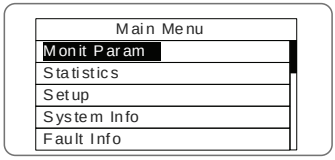


Figure 19 Main interface

MONITORING PARAMETERS

Press "∧" and "∨" in the main interface to select "Monit Param", and then press "ENT" to view the parameters which is shown in Figure 20. Go the front or next page through "∧" and "∨" and return through "ESC".

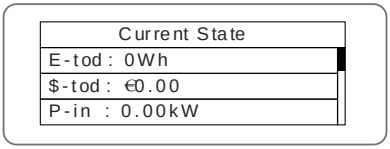


Figure 20 Monitoring parameters

HISTORY

Press "∧" and "∨" in the main interface to select "History", and then press "ENT" to view the parameters which is shown in Figure 21.

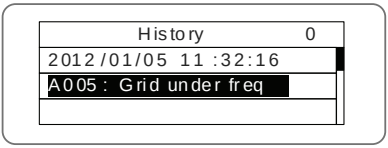


Figure 21 History parameters

"Historical record" can display 32 pieces of historical information, press "∧" or "∨" key to look through the historical information, press "ESC" to return. The number on the upper right corner of the first row is the number of historical record, the 2nd row (as shown in Fig 21) displays the date and time when fault occurred or restored, and the 3rd row displays detailed information of fault code. When the 3rd row displays in inverse color, it indicates fault occurred, otherwise it is fault restored.

STATISTICS

Press "∧" and "∨" in the main interface to select "Statistics", and then press "ENT" to view the parameters which is shown in Figure 22 .

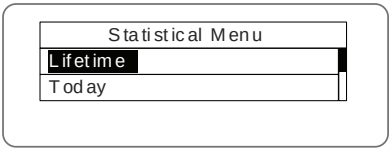


Figure 22 Statistic information

The information in table below can be viewed in the statistical menu.

Table of statistic information

Content	Detailed
Lifetime	Total operation time, total power produced, total power saved, total CO_2 reduction in lifetime
Time statistics	Total power produced, total power saved, peak power and total CO_2 reduction in statistical time
Day statistics	Total power produced, total power saved, peak power and total CO_2 reduction in current day
Latest 7 days	Total power produced, total power saved and total CO_2 reduction in latest 7 days
Latest 1 month	Total power produced, total power saved and total CO_2 reduction in latest 1 month
Latest 30 days	Total power produced, total power saved and total CO_2 reduction in latest 30 days
Latest 1 year	Total power produced, total power saved and total CO_2 reduction in latest 1 year

PARAMETER SETTINGS

Press "∧" and "∨" in the main interface to select "Setup Menu", and then press "ENT" to view the parameters which is shown in Figure 23.

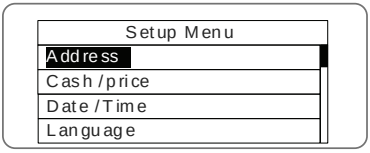
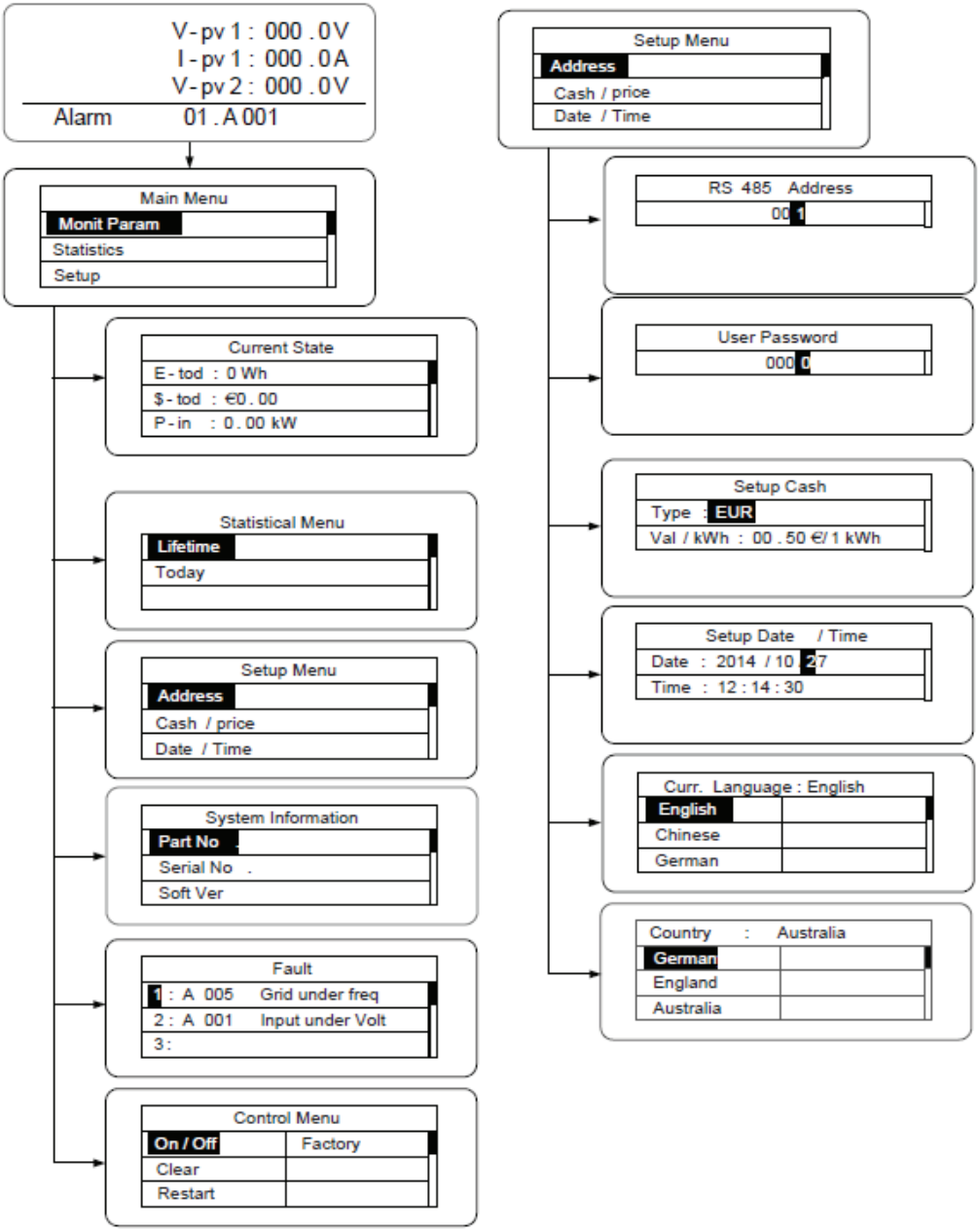


Figure 23 Setting information

"Setup menu" can realize parameter setup shown in table of parameters setting.

LCD MENUS:



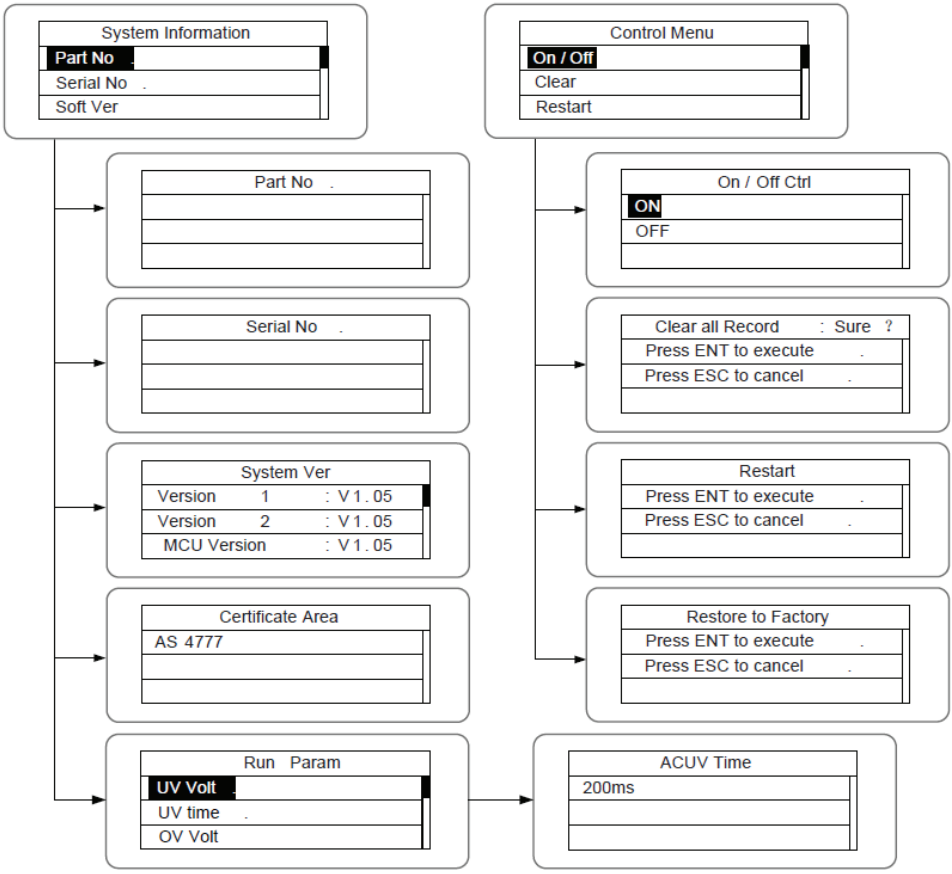
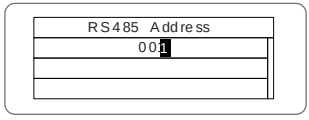
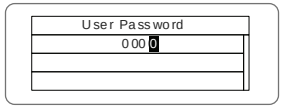
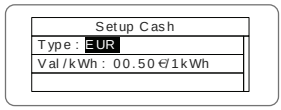
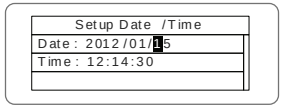
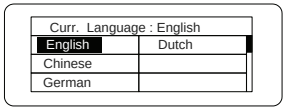
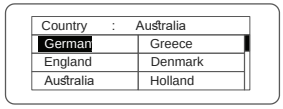
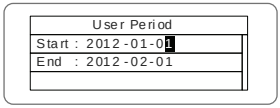
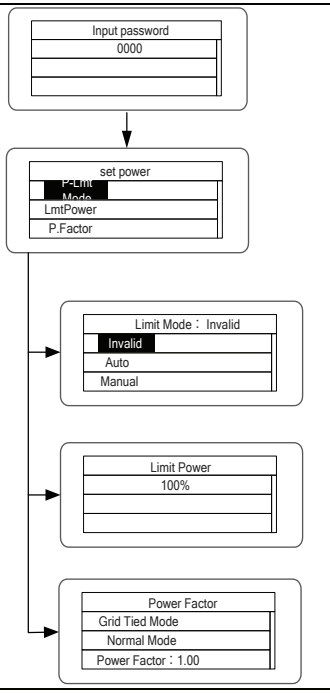
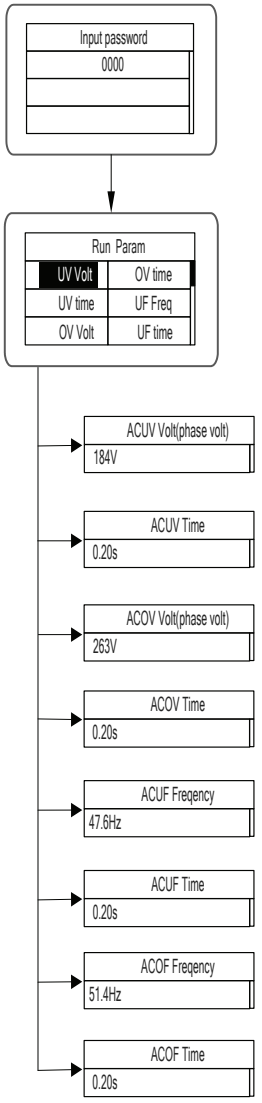


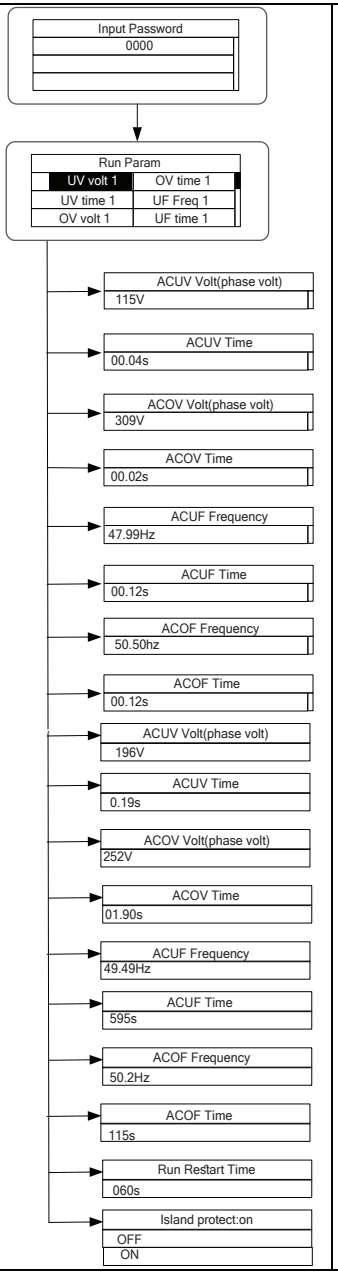
Table 6-3 Parameters setting

Setting item	LCD display	Instruction
RS485 Address		Enter into the interface and edit the data through "∧" or "∨". And then press "ENT" again to the next bit. After editing the three bits, press "ENT" to save the edition and press "ESC" to exit.

User password		Enter into the interface and edit the data through "∧" or "∨". And then press "ENT" again to the next bit. After editing the four bits, press "ENT" to save the edition and press "ESC" to exit. The default password is "0000"; the user can enter into the setting interface without password. If the password is not "0000", the user can enter into the setting interface with password.
Setup Cash		Enter into the interface and edit the currency type and cash through "∧" or "∨". And then press "ENT" again to the next line. After editing the four bits, press "ENT" to save the edition and press "ESC" to exit. The currency types include EUR, POD, CNY and USD.
Setup Date/Time		Enter into the interface and edit the date and time through "∧" or "∨". And then press "ENT" again to the next line. After editing the four bits, press "ENT" to save the edition and press "ESC" to exit.，
Language		Enter into the interface and edit the language through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit. The default language is English.
Select Country		Enter into the interface and select country through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.

User period		Enter into the interface and edit the user period through "∧" or "∨". And then press "ENT" again to the next bit. After editing, press "ENT" to save the edition and press "ESC" to exit. Of which, the setting time and date needs to be later than the system setting, and the start time needs to be earlier than the end time. The setting date and time is used for the statistical information.
Set power		The password is needed when enter into the interface of "Set power". Get the password from the supplier if necessary. There are 3 submenus: ①P-Lmt Mode: invalid (limited power function is invalid),auto (special for single phase) ,manual (set the limit of output value manually); ② LmtPower: this function is only valid when the P-Lmt Mode is manual, the percentage is that of the rated power and the setting range is from 10% to 100%; ③Power factor: includes normal model (default value "1"), current advanced mode and current hysteresis mode and the setting rage is -0.9-0.99.

Run Param		Password is required when enter into the interface of "Run Param". Get the password from the supplier if necessary. Set ACUV Volt, ACUV time and others under the related submenus, and then press "∧" and "∨" to modify, and finally press "ENT" to confirm.

Run Param		There are 2 protections under G83/G59(UK) and PEA(Thailand) standards, and there is only one protection under other grid tied standard. Set ACUV Volt, ACUV time and others under the related submenus, and then press "∧" and "∨" to modify, and finally press "ENT" to confirm. Generally, it is only necessary to set ACUV2, ACOV2 and ACUF2 value for ACUV, ACOV and ACUF protection. And it is necessary to set ACOF1 and ACOF2 together for ACOF protection.

SYSTEM INFORMATION

Press "∧" and "∨" in the main interface to select "System Information", and then press "ENT" to view the parameters which is shown in Figure 24.

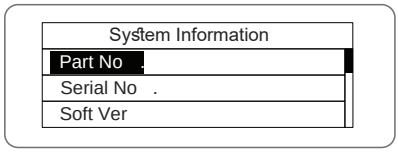


Figure 24 System information

The system information include "product model", "serial No.", "software version" and "certificate version". If select "Software Version" in the "System Version", can view the inverter Version 1, Version2, MCU Software Version, RS485 protocol and other information, as shown in Figure 25.

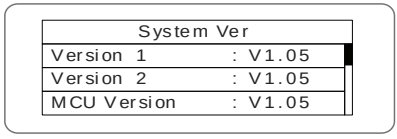


Figure 25 System version

FAULTS

Press "∧" and "∨" in the main interface to review the fault history, and then press "ENT" to view the sub-menu which is shown in Figure 26.

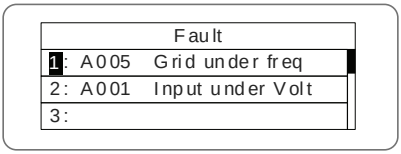


Figure 26 Fault information

There are 8 pieces of fault information in the record which is shown in Figure 26. Otherwise it will display "No Fault!" Refer to HISTORY for more detailed information.

INVERTER CONTROL

Press "∧" and "∨" in the control interface, and then press "ENT" to view the sub-menu which is shown in Figure 27.

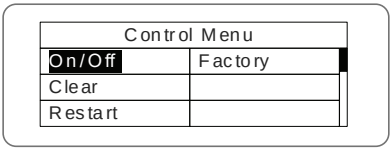
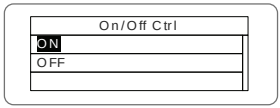
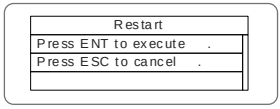
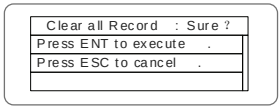
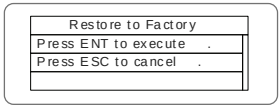


Figure 27 Control interface

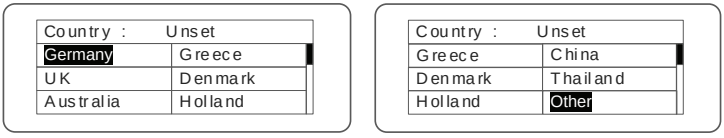
Refer to the table below for detailed information.

Table of inverter control

Control item	LCD display	Instruction
On/Off control		Control the "On/Off" through the panel. Press "∧" and "∨" in the control interface to select the operation. Press "ENT" to ensure the operation and press "ESC" to return.
Restart		Restart the inverter through the panel. And save the all settings and operation record. Press "ENT" to ensure restarting and the inverter will begin to self-inspect or press "ESC" to return.
Record clear		Press "ENT" to ensure clear all records or press "ESC" to return. "Record clear" is to clear all setting parameters through the panel, restore to the factory setting and save all history operation records.
Restore to factory		"Restore to factory" is to clear all setting parameters and history operation records through the panel, restore to the factory setting. Press "ENT" to ensure clear or press "ESC" to return.

GRID CERTIFICATION CHOICE

Power on the inverter by DC input for the first time or after restore factory settings, the LCD screen will appear a list of countries, requiring the user to choose what country of use. As shown below:



Press the "∧" or "∨" button to select the country (refer to the below table), press the ENT button to complete the setting.

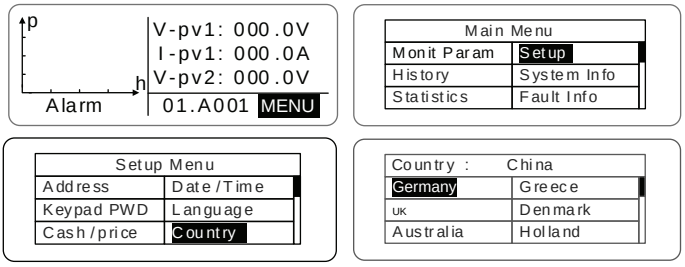
After finish the country setting, please follow the user manual required with the proper use of inverter.

Comparison Table: Available countries and their grid certification

No.	Country	Certification	Remark
1	Germany	VDE0126& AR-N4105	
2	UK	G83/G59	
3	Australia	AS4777	
4	Greece	VDE0126	
5	Denmark	TF3.2.1	
6	Holland	C10/C11	
7	China	CQC	
8	Thailand	PEA	
9	Other	VDE0126	

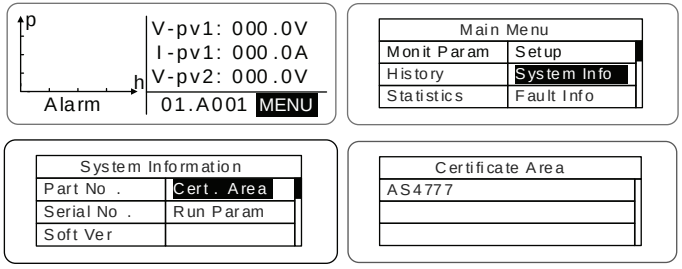
The user can change the country setting through the following ways:

LCD screen：MENU→Main Menu: Setup→Setup Menu: Country→Country:



The user can query the grid certification which has been set through the following ways:

LCD Screen：MENU→Main Menu: System Info→System Information: Cert. Area→ Certificate Area



MONITORING COMMUNICATION

This chapter describes the communication connection of inverter and monitoring system (Industrial master, private computers, smart phones and so on).
The standard communication mode of grid-tied solar inverter is RS485 which includes "RS485-M" and "RS485-S" ports. The RS485-M ports can communicate with private computers, smart phones and so on. The system monitoring solution is shown as Figure below.

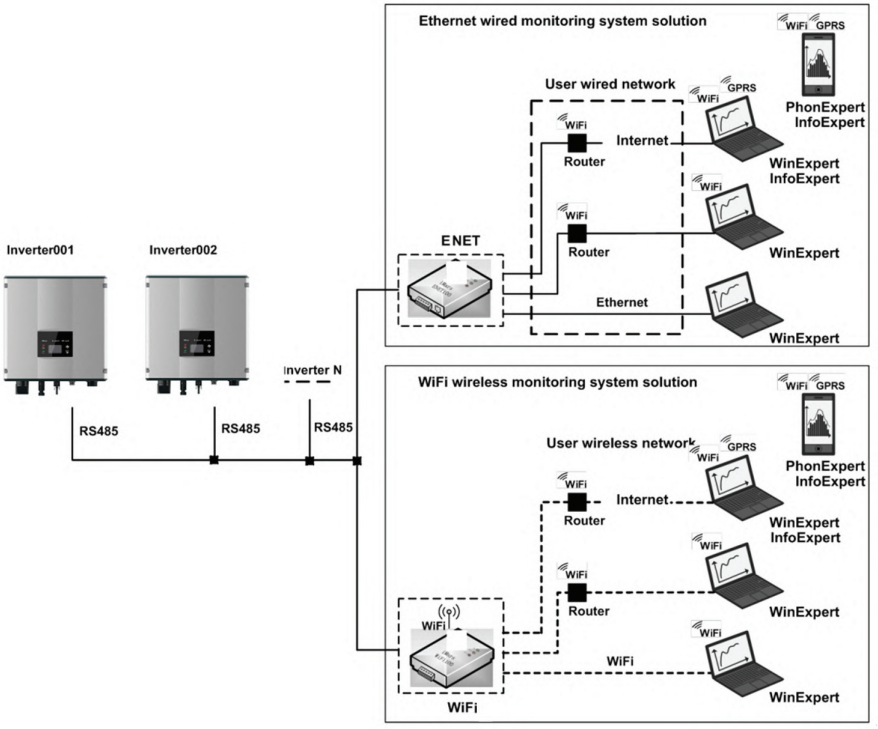


Figure 28 Monitoring system of inverter

STANDARD COMMUNICATION

Table of pins on inverter instruction

Pin on inverter	Definition
1(Red)	+5VDC
2(Orange)	A (RS485+)
3(Brown)	B (RS485-)
4(Black)	GND

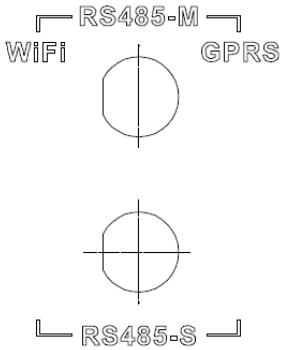


Figure 29 RS485 pin on inverter

Figure 30 Communication connector

CONNECTION STEPS:

(1) Connect the communication connector configured for the inverter to the RS485 terminal of the inverter, as shown in Fig b;

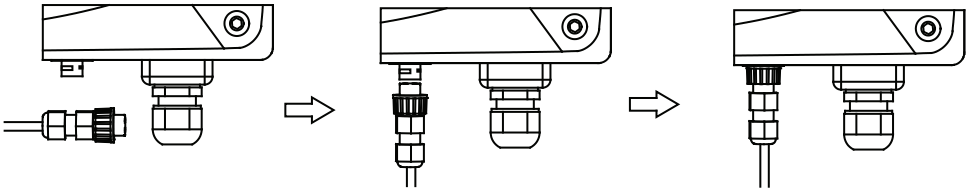


Figure 31 Detailed connectiona

(2) According to the table of Optional communication accessories, connect the communication connector pinout and the user's device, make sure the connection is correct.
(3) Please download the monitoring software " WinExpert" and its operation instruction from our website.

Table of Optional communication accessories

Optional accessories	Inverter port	Port of upper PC
Ethernet convert	RS485-M	RJ45 pin
WiFi converter	RS485-M	WiFi signal
GPRS converter	RS485-M	GPRS signal
ENET converter	RS485-M	Ethernet port

Please download the connection instruction, operation manual and commissioning tools on website.
Note: the optional accessories are not standard-configured, need to buy separately.

TROUBLESHOOTING

Table of Fault code

Fault code	Message	Instruction	Fault analysis
A			
A001	Input UV	Input undervoltage	PV1 undervoltage PV2 undervoltage
A002	Bus UV	Bus undervoltage	DC input
A003	Grid UV	AC undervoltage	Low voltage of the public grid
A004	Grid OV	AC overvoltage	High voltage of the public grid
A005	Grid UF	AC underfrequency	Low frequency of the public grid
A006	Grid OF	AC overfrequency	High frequency of the public grid
A007	Clock Fail	Clock alarm	Wrong setting
A009	Cmd Shut	Manual stutdown	Stop by the operation panel or upper PC
A011	Grid Loss	The public grid disconnects.	Check if inverter AC connection is well
E			
E001	Input OV	Input overvoltage	DC input overvoltage
E003	Bus OV	Bus overvoltage	Internal bus voltage
E004	Boost Fail	Voltage-boost fault	Voltage-boost fault of the inverter
E005	Grid OC	AC overcurrent	Internal AC overcurrent
E006	OTP	Over temperature	Internal over temperature
E007	Riso Low	Low isolation impedance	Low isolation impedance of the external port system
E008	IGBT drv	IGBT drive protection	IGBT drive protection of the inverter
E009	Int Comm	Internal communication fault	Master-slave DSP communication disabled Error of master-slave DSP check bit
E010	ILeek Fail	Huge leakage current	Huge leakage current of the system or inverter
E011	Relay Fault	Relay fault	Internal relay fault
E012	Fan Fail	Fan fault	Internal fan fault
E013	Eeprom	Memory error	Internal memory error
E014	Dc inject	High DC injection	High DC injection during AC output

E015	OutputShort	Output short-circuit	Output short-circuit
E018	Input OC	Input overcurrent	DC input overcurrent
E019	Incnst	Data consistency fault	Inconsistent grid voltage, frequency, leakage current or AC/DC injection
E020	PowerReversed	DC power reversed	DC power reversed
E021	Meter commErr	Power meter communication is faulty	The communication between smart meter and inverter is faulty (when anti-feedback function is enable)
E022	FreqChg	Frequency is changed	Fluctuation of grid voltage is over inverter normal sustainable range
E023	PE Loss	PE wire not connected	The PE wire is unconnected (this error code only available under AS4777 safety)
E024	MeterLoss	The smart meter not connected	The smart meter not connected
E025	Locking	The inverter is locked	The inverter is locked
E026	Run Limit	Light load	Light load (when anti-feedback function is enable)
E028	DRM0 Loss	The DEM0 box not connected	The DRM0 box is unconnected (this error code only available under AS4777 safety)

TECHNICAL PARAMETERS

Table of technical parameters

Model		Single-phase	
		3kW-2M	5kW-2M
Input(DC)	Max. DC voltage (V)	600	600
	Starting voltage (V)	120	120
	MPPT voltage(V)	125-550	125-550
	Operation voltage (V)	180-500	250-500
	MPPT/strings per MPPT	2/1	2/1
	Max. DC power (W)	3000	5000
	Max. input current (A)	8×2	12×2
	Isc PV	9×2	14×2
	Max inverter backfeed current to the array	0	0
	DC switch	Optional	
Output(AC)	Max output power	3000	4600
	Voltage(V)/ frequency(Hz)	180~270Vac、50Hz(47~515Hz) / 60Hz(57~615Hz)	
		VDE0126& AR-N4105、AS4777.2/AS4777.3、CQC、G83-2、G59-3、C10/11、TF3.2.1、PEA	
	Max. AC current (A)	14	20
	Maximum output overcurrent protection	27	40.2
	Maximum output fault current	104A,37.2ms	
	AC inrush current	Less than 2 A	
	Power factor	-0.9~+0.9 (adjustable)	
	Harmonic distortion	< 3% (rated power)	
System	Cooling	Natural cooling	
	Maximum efficiency	97.60%	97.40%
	European efficiency	96.50%	96.50%
	MPPT efficiency	99.90%	
	Protection degree	IP65	
	Power consumption	< 1W	
	Isolation mode	Transformerless	
	Protective class	I	
	Overvoltage category	AC:III,PV:II	
	inverter topology	Non-isolated	
	Pollution degree	3	
	Operation temperature	(-25 ~+60), derate after 45	
	Relative humidity	4~100%, Condensation	
	Max. altitude(m)	<2000 (derate if the altitude> 2000)	
	Displaying	LED/ LCD, backlit display	
	Systerm language	English, Chinese, German, Dutch	
	Communication	RS485 (standard); handheld keypad; WiFi (optional)	
	DC terminal	BC03A/ BC03B	
	Noise dB(A)	≤25	
	Installation mode	Wall installation	
Protection	Input overvoltage protection, input overcurrent protection, DC isolation monitoring, DC monitoring, grounding fault current monitoring, grid monitoring, island protection, short circuit protection, overheating protection		