

AU Series

Grid-tied PV Inverter user manual



AU 50~75K3P

Austa

NINGBO AUSTA SOLAR TECH CO.,LTD.

Contents

Thank you for choosing AUSTA on-grid PV inverter. In order to ensure your safety and proper use, please read the manual in details before using. Thanks for your cooperation!

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Overview

1.1 Use of this manual

This manual mainly introduces installation, operating and maintenance of inverter and related technical parameters. It is suitable for people who install the inverters and do other related jobs. Readers need to have some knowledge of electric, electrical wiring and mechanics. Before installing this product, please read this manual carefully, and put it in a suitable place, so as to ensure that relevant personnel of installation and operation can easily get it.

This manual applies to the following models of PV inverters.

AU50/60K3P Series , AU70/75K3P-HV Series

1.2 Symbols

Please strictly follow below safety rules when installing and operating.



DANGEROUS

DANGEROUS indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.




NOTE

NOTE indicates a situation which, if not avoided, could result in equipment or property damage.

1.3 Nameplate

Take AU 50K3P for example

Grid Tie Solar Inverter NINGBO AUSTA SOLAR TECH CO.,LTD. 1-1 NO.136 Haichuan Road Jiangbei District Ningbo Zhejiang P.R. China			
AU50K3P		NO.	
Vmax PV	1100V	AC voltage	3 ϕ /N/PE400Vac
Isc PV	3*56A	Frequency	50/60Hz
MPPT voltage range	250-1000Vdc	Max. continuous current	80A
Max PV input current/MPPT	3*45A	Max. continuous Power	55kW
PF	1(0.8Leading-0.8Lagging)	Max. AC apparent Power	55kVA
Protective class	Class I		
Ingress protection	IP 66		
Working temperature	-25℃-60℃(Derating 45℃)		
Overvoltage category	OVC II(PV)	OVC III(AC)	
			

1.4 Operating instructions

AU Series inverters are designed and tested strictly in accordance with relevant international safety standards. But for electrical and electronic equipment, its safety involves its installation, trial run, operation and maintenance of the whole process. Therefore, improper use or misoperation will also endanger:

- Life and personal safety of the operator or third party.
- Inverter or other property belonging to the operator or third party.

To prevent personal injury or damage to inverters and other devices, observe the following safety precautions during operation and maintenance. Specific precautions during the operation will be described in the corresponding chapter.



WARNING

All installation operations must be performed only by professional technicians.

- **Professional and technical personnel must: have been specially trained.**
- **Read this manual completely and master the operation related safety matters;.**
- **Be familiar with electrical system safety specifications.**

The above professional and technical personnel can carry out the following work:

- Mount the inverter on the wall
- Connect inverter to PV system.
- Connect other equipment to the PV system.
- Test run of inverter.

- Operate and maintain inverters.
- ◆ Before installation



NOTE

When receiving the product, the inverter should be checked first to see if it has been damaged during transportation. If you find any problem, please contact supplier or transportation company immediately.



CAUTION

- Incorrect transport of inverters may result in injury or property damage.
- Always move and position inverters in accordance with instructions and instructions in the manual.
- The weight of the inverter can cause injuries such as crushing if not handled properly.

- ◆ Mechanical erection



DANGEROUS

Before installing the inverter, ensure that the inverter is not electrically connected and powered on.



CAUTION

- Poor wind conditions in installation environment will affect system performance!
- When the inverter is running, good ventilation should be ensured.
- It is necessary to keep the inverter unit upright and ensure that the heat sink is not covered.

- ◆ Electrical connection



NOTE

- All electrical installations must meet local and national electrical standards.
- Connect the inverter to the grid only after obtaining permission from the local power department and all electrical connections are completed by professional technicians.



DANGEROUS

Before electrical connection, the solar panel must be covered with an opaque material. Exposed to sunlight, the PV arrays will generate dangerous voltages.



WARNING

- Before connecting the DC input of the inverter, make sure that the positive and negative polarity of the solar panel is correct, and the positive and negative polarity cannot be connected.
- Cables used in PV power generation systems must be firmly connected, well insulated and with appropriate specifications

◆ Trial run



DANGEROUS

When the AC side of the inverter is loaded, do not disconnect the DC connection. Before disconnecting the DC connection, disconnect the dual power supply of the inverter and verify that no voltage exists.



WARNING

Do not open the inverter shell when the inverter is working or live. Complete and closed cabinet casing to protect personnel and property safety.



DANGEROUS

When the inverter is running, only LCD display and DC switch can be touched, equipment heating components (such as: radiator) can not be touched!

◆ Maintenance and replacement



DANGEROUS

- Before any repairs, disconnect the inverter from the electrical grid, and then disconnect the DC side electrical connection.
- Wait at least 10 minutes until the internal energy storage element is discharged before starting repair work.
- Use a multimeter to ensure that there is no internal voltage or current.



CAUTION

Prevent unnecessary personnel from entering the maintenance site. Temporary warning signs or fences should be placed to warn or isolate non-operational maintenance personnel from access to electrical connections or maintenance areas.



NOTE

- You can start the inverter again only after removing any fault that affects the security performance of the inverter.
- If you need any repair service , please contact our equipment supplier or service provider.



NOTE

Do not change the internal components of the inverter without authorization. The company will not undertake warranty and joint and several liability for the loss caused thereby.



NOTE

- Contact or improper handling of printed circuit boards or other electrostatic sensitive components can cause device damage.
- Avoid unnecessary contact with the PCB board.
- Observe the ESD rules and wear an ESD wrist strap.



WARNING

All safety identifiers, warning labels and nameplates on the inverter.

- Must be clearly visible.
- Cannot be removed or overwritten.



WARNING





Note the following.

- Grid access criteria.
- Description of PV panels.
- Other electrical equipment safety instructions



The "notes" are additional information in the manual, highlighting and supplementing the content, too. There may be some tips or tricks you can use to optimize your product a question or save you time.

◆ The identifier on the inverter

NO.	Characteristic	Description
1		<p>This symbol indicates that after the inverter is disconnected from the power grid and solar panel, Wait for 10 minutes before touching the internal conductive device.</p>
2		<p>Symbol indicates, hot surface, watch out for burns! To avoid scalding and fire, do not touch the hot surface when the machine is running.</p>
3		<p>Read the manual before performing any operation on the inverter.</p>
4		<p>Electrical danger! There are live devices here, only professional and qualified personnel are allowed to enter line installation and operation.</p>

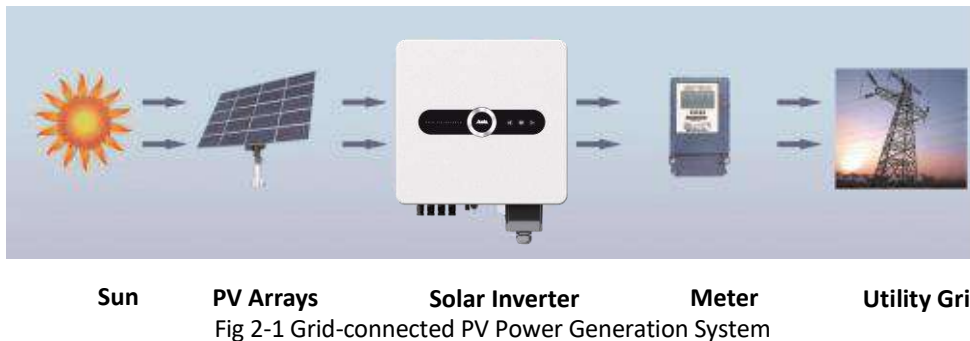
2

Description

2.1. Brief Introductions

On-grid PV power generation system usually is composed of solar panels, junction box, inverter, ammeter and power grid. The core of the system is PV grid-connected inverter. The sunshine irradiates on the surface of the solar panels, solar panels output DC, converted by inverter, then output AC of the same frequency and phase with the grid, and then feed into the grid.

The grid-connected PV inverter is a three-phase series transformerless inverter, and its application in PV power generation system is shown in Figure 2-1.



PV arrays: monocrystalline silicon, polysilicon. The inverter can only be connected with solar panel with II level protection.

If the PV system exceeds the capacity of a single inverter, multiple inverters can be used in the system. Appropriate PV inputs are connected to each inverter on the input side, and connected to the power grid in parallel on the output side.



WARNING

The inverter cannot be connected to PV arrays that require positive or negative grounding.

Do not connect the local load between the inverter and the AC circuit breaker.

The inverter is only applicable to the grid-connected power generation system, except for the above occasions, the inverter is not used in other occasions.

Product performance

- Transformerless, highest efficiency is 99%.
- Wide input voltage, MPPT efficiency is 99.9%.

- Active and passive anti-islanding protection technology.
- Comprehensive protection, higher reliability.
- IP66 Outdoor design, suitable for harsh environmen .
- RS485 communication.
- Optional GPRS/WIFI communication function.

2.2 General introduction

- ◇ Appearance and interface



Fig 2-2 Appearance of AU 50K3P

Figure 2-2 shows the product appearance. The picture is for reference only. The external interface is located at the bottom of the product, including PV+ input port, PV - input port,WIFI/GPRS/RS485communication port, AC output port, and DC switch (side).

Figure 2-3 shows the schematic diagram of the external interface.

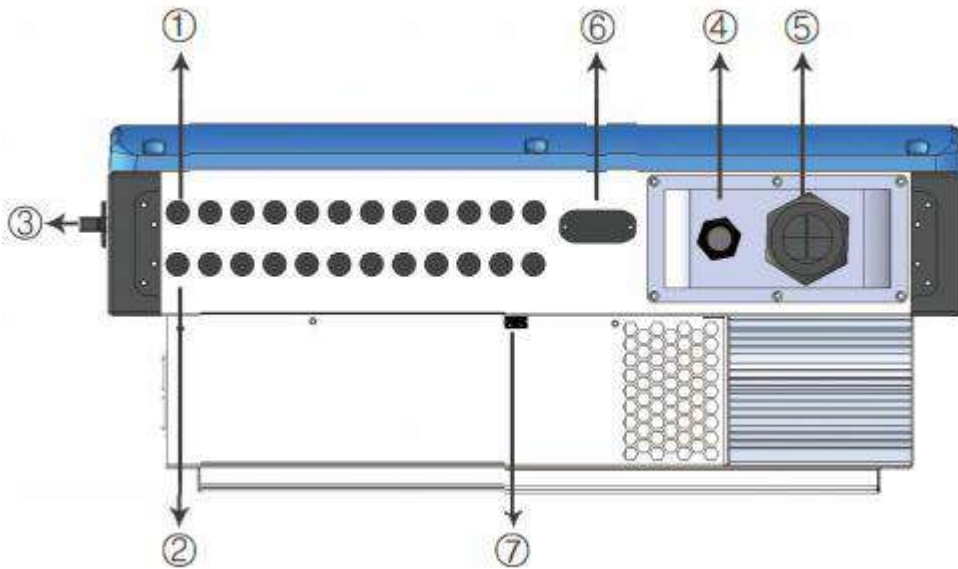


Fig 2-3 External Port

No.	Name	Description
1	PV input port +	Inverter's DC input port, connect with + port of PV arrays
2	PV input port -	Inverter's DC input port, connect with - port of PV arrays
3	DC switch	Electric cut off between inverter and PV arrays
4	RS485 communication port	Connect inverter with PC through this port for remote monitoring
5	AC output port	Connect with phase L1, L2, L3 and wire N of the grid through the breaker, connect ground wire to the ground
6	USB communication port (selective assembly)	Connect inverter with PC through this port for remote monitoring
7	Breathable valve	Waterproof and breathable valve to balance internal and external pressure difference.

Table 2-1 External Interface

3

Installation

Please carefully read below installation guide for AU 50/60K3P.

3.1 Installation Procedure

Before installing and operating this product, please strictly abide by the installation sequence and warning symbols.

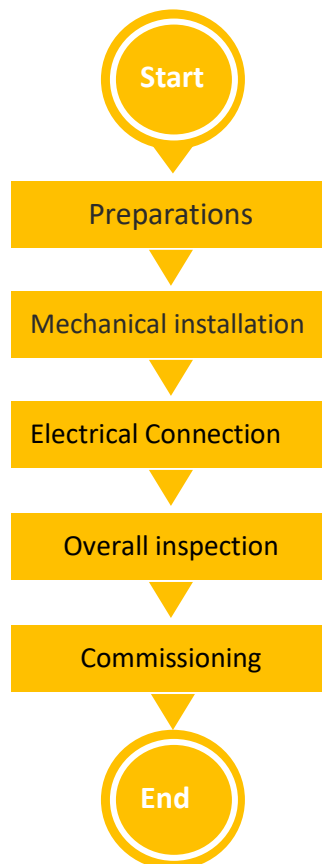


Fig 3-1 Installation procedure

3.2 Installation Preparation

✧ Check whether there is damage during transport

Although we have carefully tested and inspected the inverter before shipping, there might be damage during transport. So please check them before installation. If there is any damage, please contact the shipping company or directly contact us. Please provide photos of the damaged part. We will provide the best service as fast as possible.

- Check the packing case for damage when receiving the goods.
- Check whether the goods are complete and consistent with the order according to the packing list.
- After unpacking, check whether the internal devices are intact.

✧ Scope of Supply

There are following items in the packing box, as shown in Table 3-1.

Please check in time after receiving the products.

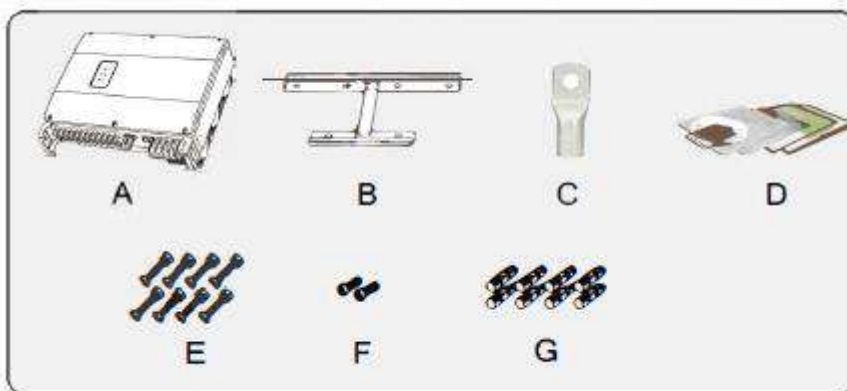


Fig 3-2 Packing goods in boxes

NO.	Name	Qty	Description
A	Inverter	1	-----
B	fixed plate	1	For fixing inverter to mounting surface (solid wall, etc.)
C	wiring copper nose	4	A link for ac output harness
D	document	1	Including:Instruction manual, certificate of quality, packing list, product test report, etc
E	expansion screw,	5	Used to fix the fixing plate on the mounting surface.
F	fixed screw	2	Used to fix the inverter with the fixing plate
G	DC connector	12(+&-)	It is used to connect the PV arrays to the inverter. Ensure that the polarity of the PV arrays is consistent with that of the inverter

			input terminal.
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Table 3-1: Scope of supply

◇ Inverter storage

If the inverter is not put into operation immediately, please store the inverter in a specific environment:

- The inverter must be packed in the original packing case, sealed with adhesive tape, and placed in a clean and dry environment to prevent dust and water vapor erosion.
- The temperature of the storage site should be between -30°C and 85°C , and the relative humidity should be between 0 and 100%.
- If the storage space really needs to be stacked with more than one stack, the stack must be aligned one by one, and the maximum stacking layer does not exceed.
- Long-term storage is not declared during stacking. Do not tilt or invert the packing case.
- After long-term storage, the inverter can be put into operation only after comprehensive inspection and testing by professionals.

3.3 Choose installation location



WARNING

Please read carefully and follow the following basic installation requirements. Failure to follow these warnings will directly lead to serious personal injury or even life-threatening.



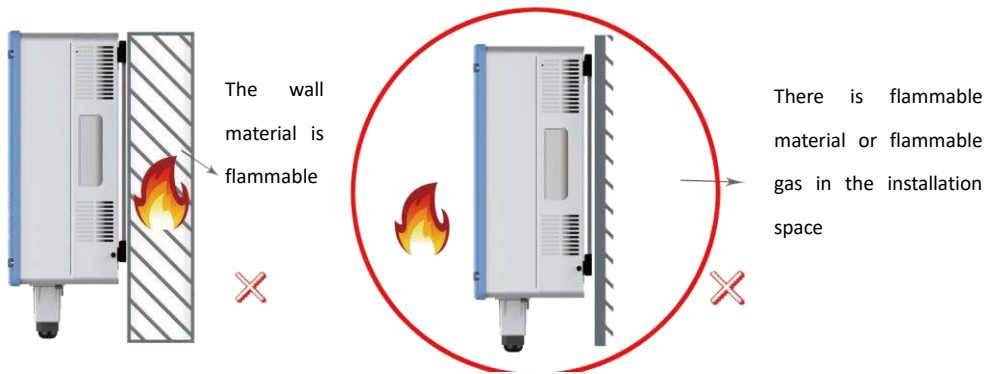
WARNING

Poor ventilation in the installation environment will affect system performance. It is necessary to ensure good ventilation during the operation of the equipment. The device must be kept upright and the heat sink is not blocked to ensure adequate cooling inside the device.

The inverter protection level reaches IP65 and can be used for indoor or outdoor installation.

Choosing the best installation location for the inverter plays a very important role in its safe operation, life guarantee, and performance guarantee.

1. Ensure that the installation wall has the capacity to support the inverter for a long time.
2. The inverter should be installed in a location that is easy for electrical connection, operation and maintenance.
3. The installation wall must have fireproof performance, and there must be no flammable materials or flammable gas in the installation space.



DANGEROUS

Do not place the inverter with inflammable and explosive objects.

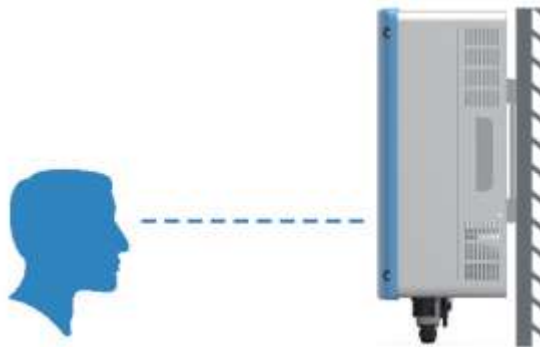
4. Do not install the inverter in the living area to avoid noise affecting daily life.
5. The installation location of the inverter should be far away from the reach of children.



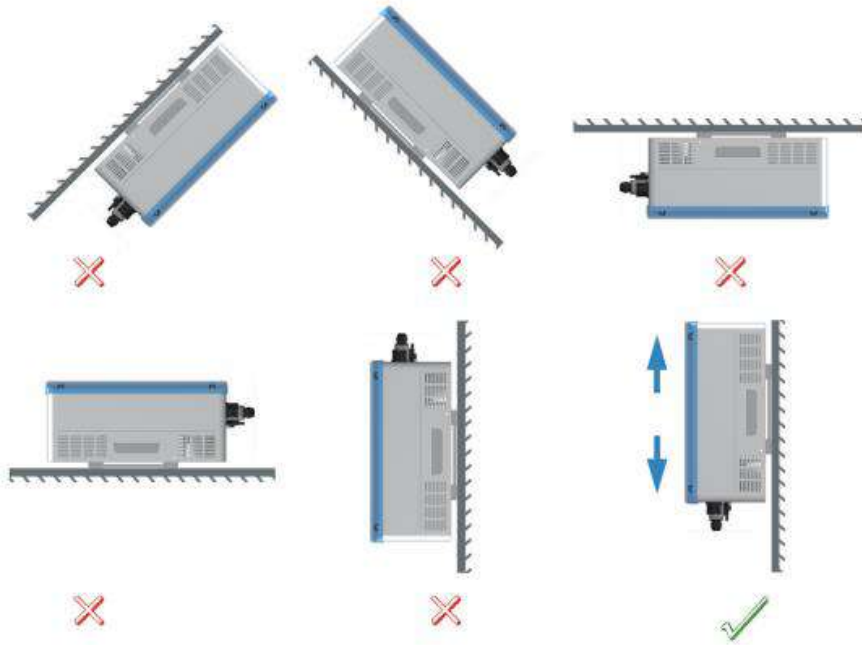
CAUTION

Caution When the inverter is working, the temperature is high. Do not touch it.

6. Installation height is better to make the LCD at the same level with people's eye so as to make it convenient to operate on the LCD.



7. The inverter needs to be installed uprightly, and cannot be placed horizontally or upside down, or tilted.



8. The temperature range of the installation environment should be between -25°C and 60°C .



Minimum ambient temperature -25°C



Maximum ambient temperature 60°C

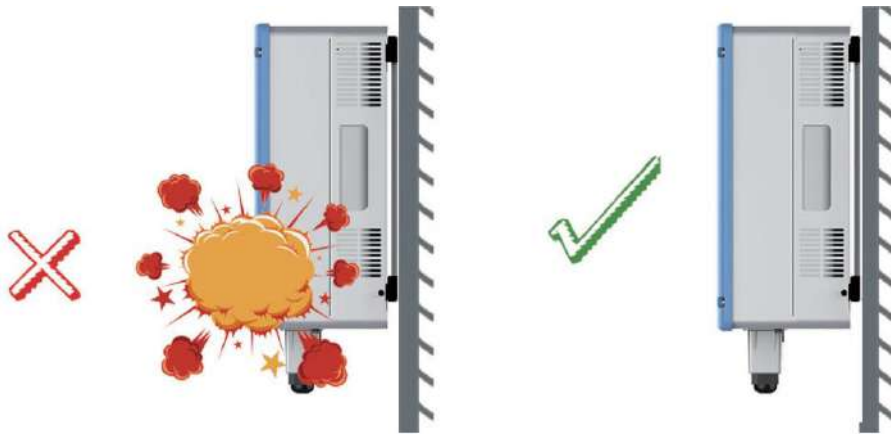


NOTE

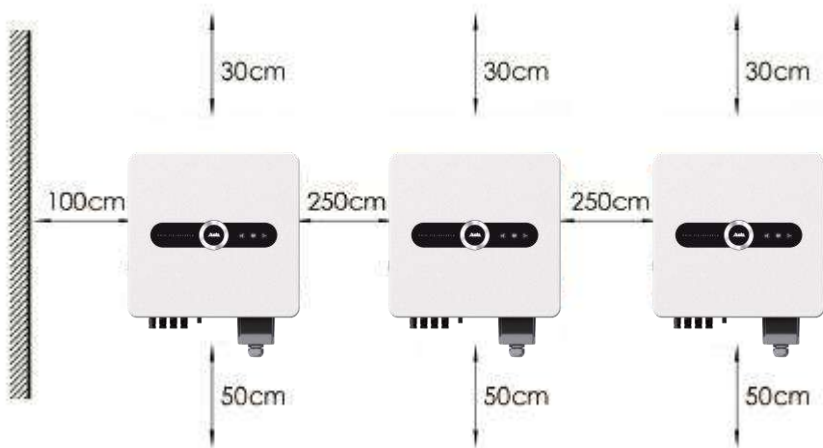
When operating, the ambient temperature ranges from -25°C to $+60^{\circ}\text{C}$. When the ambient temperature exceeds the range, the output power of the inverter decreases.

9. Enough space surrounding the inverter is needed to ensure good heat dissipation.

10. Ensure that the inverter is ventilated and dissipated smoothly. It is strictly forbidden to install the inverter in a closed space, otherwise the inverter will not work normally, and there may even be a danger of explosion.



11. If multiple inverters are installed horizontally and side by side, the distance between the shell is better than 250cm, and the top of the inverter should not be placed, and there should be enough clearance before and after, so as to facilitate system heat dissipation; It is recommended to stagger the inverters.



12. Please choose a place where you can avoid rain, snow, and direct sunlight for installation (sunlight, rain, snow, etc. will directly affect the service life of the inverter. If it is unavoidable, please shield the inverter reasonably. To ensure the best operating environment)



3.4 Mechanical Installation

3.4.1 setting tool

- ✧ Wrench
- ✧ Impact electric drill
- ✧ Phillips screwdriver
- ✧ Hexagon socket wrench
- ✧ Megohmmeter and multimeter

3.4.2 Move inverter

Before installation, take the inverter out of the packing box and transport it to the selected installation site. To move the inverter, follow the following instructions:

- ✧ The weight of the machine is about 45kg.
- ✧ At least two workers work together to move the inverter or with other appropriate moving tools.
- ✧ Prevent the inverter from knocking or falling.

3.4.3 Install inverter

The fixing plate and fastener expansion bolts in the accessory bag are used to vertically install the inverter on the wall or metal support.

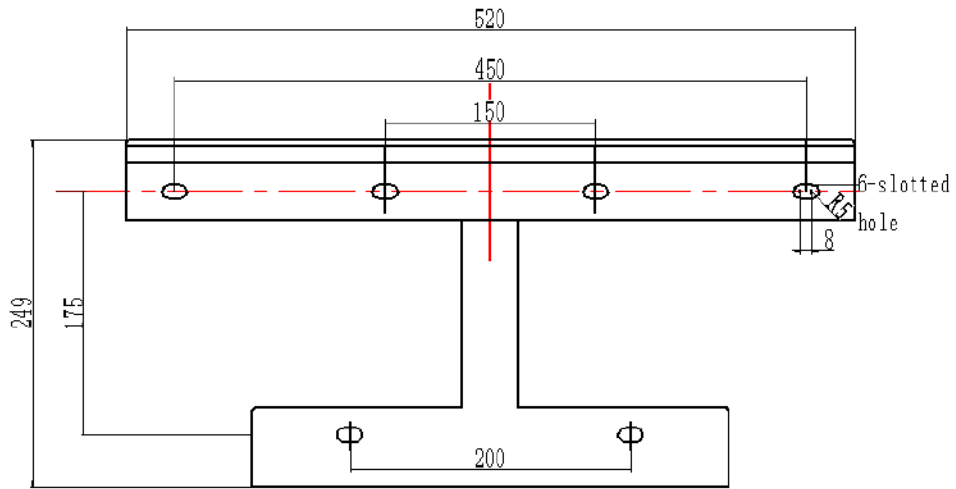


Fig 3-3 Drawing of fixed plate dimensions

- If the chassis is to be installed on a concrete wall, drill holes on the wall based on the specifications of the fixing plate, secure the fixing plate to the wall using expansion bolts, and hang the chassis on the fixing plate.

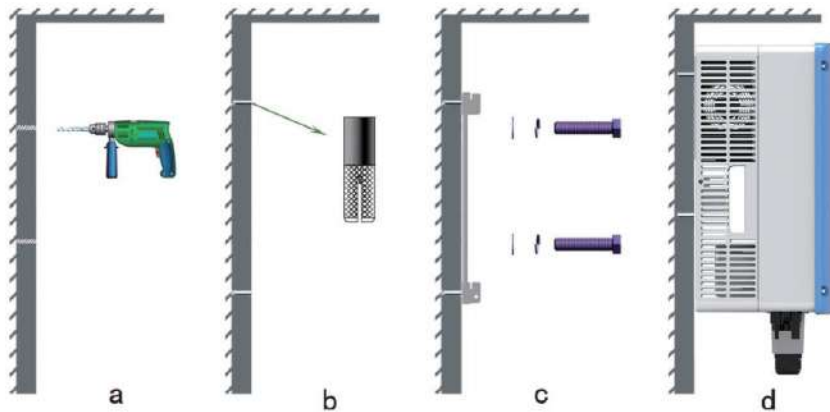


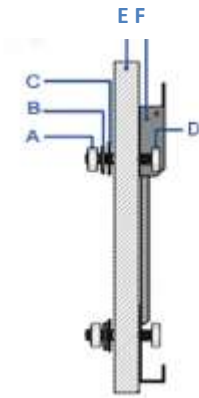
Fig 3-4 installation steps

- If the chassis is installed on a metal support, drill holes on the metal support according to the specifications of the fixing plate, secure the fixing plate using M8 bolts, and hang the chassis on the fixing plate.

No.	Name	Description
A	Hexagon nuts	M8
B	Spring gasket	Φ8
C	flat gasket	Φ8
D	Full thread bolt	M8
E	Metal support	

Mounted panel

F	fixing plate	Accessory
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- After hanging the inverter on the fixing plate, use screws to fix the inverter on the fixing plate.

Note: In the process of installing the inverter, please pay attention to keep the balance, so as not to hit the wall or other obstacles and damage the machine shell.

3.5 Electrical Connection

3.5.1 Safety instructions

As an electronic device, touching any live part can be fatal. Inverter installation must be completed by professional electrical and mechanical engineers.



WARNING

The inverter must be installed by qualified professionals. Improper wiring may result in operator injury or permanent damage equipment.

Before making electrical connections, remember that the inverter has a dual power supply. Electrical personnel must be equipped with protective equipment, such as helmets, insulating shoes, protective gloves, etc.

Matters needing attention:

- ✧ When installing, in addition to wiring terminals, please do not move the rest of the inside of the box.
- ✧ All electrical installations must comply with local regulations and electrical codes;
- ✧ If you need to maintain the device, contact the equipment supplier.
- ✧ Permission of local power supply department shall be obtained when the equipment is connected to the grid for power generation.



WARNING

Ensure that the input Dc voltage does not exceed 1000V. Higher input voltage may permanently damage the equipment and cause other losses. In this case, the company does not undertake warranty and liability.

3.5.2 Wiring requirements

After the inverter is firmly installed to the installation site, it can be connected to the PV system. Electrical connections must comply with local laws and regulations. The following are the wiring requirements of the inverter.

✧ PV arrays

PV arrays open-circuit voltage should not exceed MPPT working voltage range, PV arrays to power can be configured to 50/60/70/75kW.



NOTE

Maximum open-circuit voltage of PV arrays: 900 V.
Maximum power of PV arrays: see 7.1 Technical Specifications.

✧ Three-phase power grid

The inverter will constantly check whether the grid meets the grid-connection conditions. The following are the grid limits that meet the grid-connection conditions. At the same time, permission should be obtained from the local power department before installing grid-connected PV inverters.



NOTE

AU50/60K3P: Grid line voltage: 310V AC-480VAC, grid frequency:45-55HZ/55-65HZ.
AU70/75K3P-HV: Grid line voltage: 422V AC-550VAC, grid frequency:45-55HZ/55-65HZ.

✧ AC and DC cables should comply with local safety standards, and the cable diameter should ensure the most basic current capacity.

Cable	Sectional area	Outside diameter of cable	Note
PV array	4~6mm ²	6~9mm	Max tolerated 1000V
AC cable	25~70mm ²	25~30.5mm	Recommended sectional area 50mm ²
RS485	Shielded signal line		

Table 3-2 Cable specification recommendations

✧ Breaker

Manual circuit breakers must be configured to ensure safe installation and operation of the device. The circuit breakers must meet local safety standards and meet basic over-current and over-voltage protection capabilities. The voltage and current of an ac circuit breaker must be greater than 450V and120A.



NOTE

Multiple inverters cannot share one circuit breaker.

Load cannot be connected between the inverter and the circuit breaker.

◇ leakage protector

The inverter is equipped with integrated leakage current monitoring unit, which can distinguish fault current from capacitance leakage current. The inverter will quickly disconnect from the grid when it detects the leakage current at the maximum allowable value.

However, if an external RCD or leakage switch is installed, the operating current of the switch should be 300mA or higher.

3.5.3 Inverter wiring



NOTE

If the PID lifting function is added to the AC side, then:

The neutral point of the power grid on the inverter side cannot be grounded.

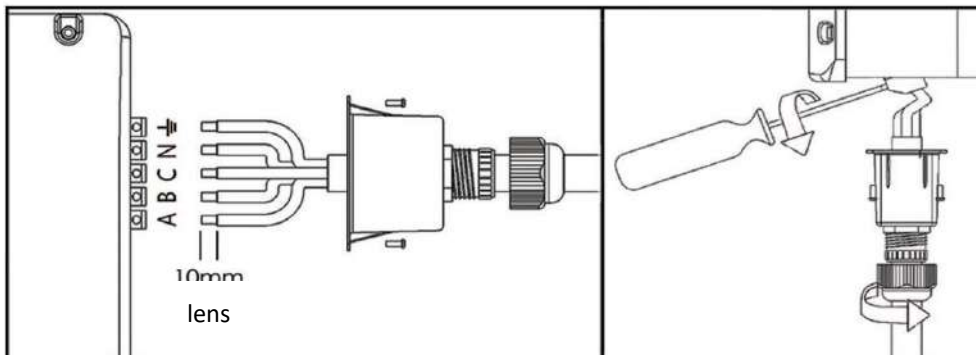
The Ac cable must be 1000V or 600V ;

Solution "3+1" is the best choice for ac PDC SPD test. "3" requires that the U_c is not less than 385Vac. "1" requires dc breakdown voltage $U_{ag} > 600Vdc$;

If there is no PID lifting requirement on the AC side and no other special requirements:

The neutral point of the power grid is grounded or the ac output terminal N inside the machine is connected to the terminal PE .

◇ AC cable wiring steps



- Disconnect the AC circuit breaker and ensure that the AC cable connected to the terminal is not live. Use a multimeter to measure and confirm.
- Unscrew the inner hexagon screw of the inverter top cover and remove the lower top cover.
- Strip the cable according to the following instructions, as shown in the figure above

The following table describes the recommended length ranges based on the cross-sectional area of the AC cable.

Cross-sectional area of the AC cable(mm ²)	Length of AC cable(m)
25	0~50
35	50~100
50	>100

Table 3-3 Length recommended for different cross-sectional areas



WARNING

Do not connect the phase lines L1, L2, and L3 and line N on the AC side to anchors. Ensure that cables are securely connected to prevent cable insulation from being squeezed or stressed. Improper connection may damage the inverter.



NOTE

1. Pay attention to the wiring terminal layout of the AC terminal. The live wire and the neutral wire cannot be reversed, otherwise the inverter may not operate normally.
2. The terminals on the other side of the inverter except for the AC side wiring terminals are all in-line.
3. Flexible copper cable is the best choice for AC side cable.
4. The grounding wire must be connected and well grounded.

- DC cable
- ◆ PV input configuration

The inverter has three PV arrays input regions DC1, DC2 and DC3. The inverter is configured with an MPPT tracker for each input region. (except AU 50K3P)



DANGEROUS

High voltage! Electrical shock!
Pay attention to safety before electrical connection. Exposure of PV arrays to sunlight will generate dangerous voltage.



WARNING

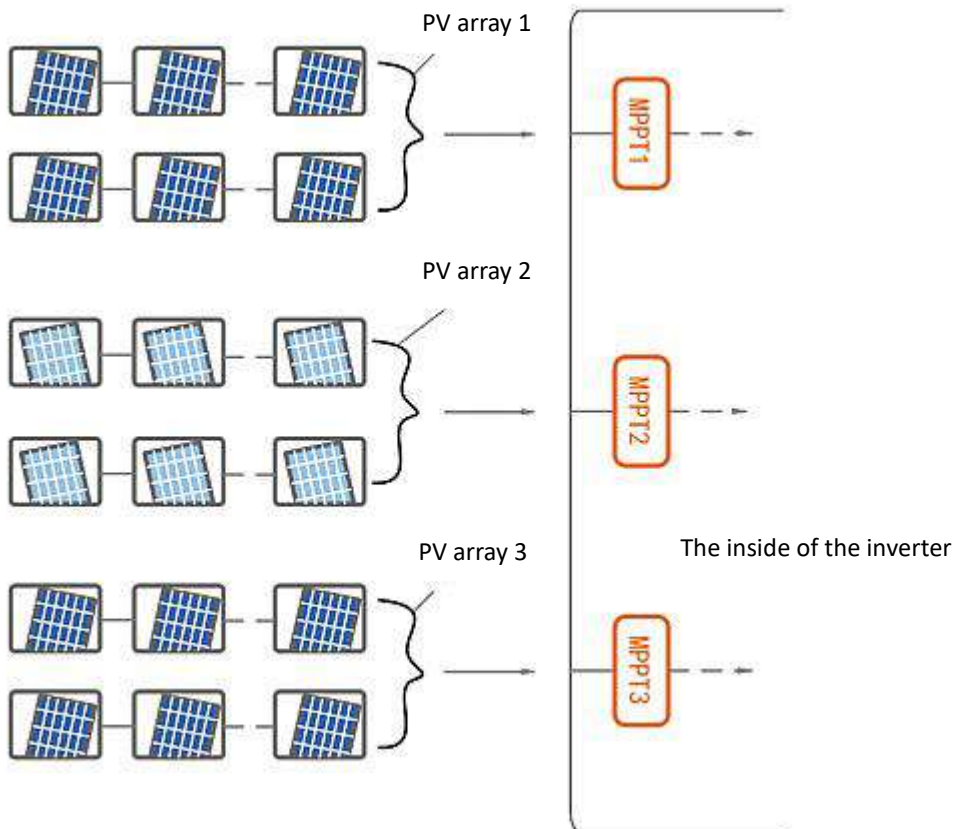
Before connecting the PV arrays to the inverter, ensure that the PV arrays is well insulated to the ground.



NOTE

The following precautions must be met, otherwise the damage caused by the inverter will not be covered by the warranty. Ensure that the maximum short-circuit current on the DC side is within the allowable range of the inverter; otherwise, the inverter may be irretrievably damaged.

The three PV arrays inputs operate independently and each has an independent MPPT. Therefore, the three PV arrays inputs can be different, including: different solar panel types; Different number of batteries; Different inclination angles; Different azimuth.



NOTE

In order to make full use of dc input power, PV arrays with the same input MPPT should have the same structure, including: the same model; The same number of panels; The same inclination Angle: Same azimuth.

◆ DC cable requirements



NOTE

To ensure that the inverter reaches IP65 protection level, only the connectors provided by the supplier or products with the same protection level can be used.

Cross-sectional area	Cable outer diameter	Maximum withstand voltage	Maximum input current of each string
4~6mm ² 10AWG~12AWG	6-9mm ²	1100V	16A

Table 3-4 DC Cable Requirements

DC cable connection steps



DANGEROUS

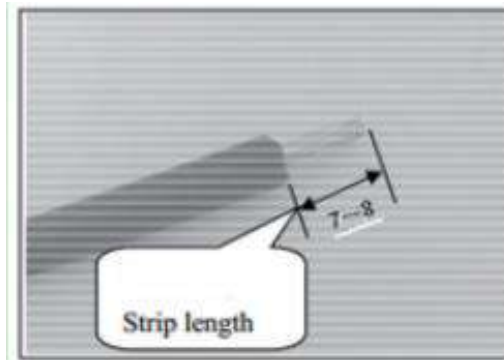
High voltage! Electrical shock!

There may be high voltage in the inverter!

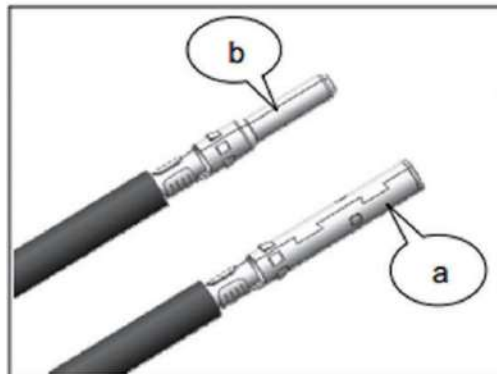
Before electrical operation, make sure that all cables are not live.

Before the electrical connection of the inverter is completed, the AC circuit breaker switch shall not be installed.

1. Remove 7mm of insulation layer from all DC cables.

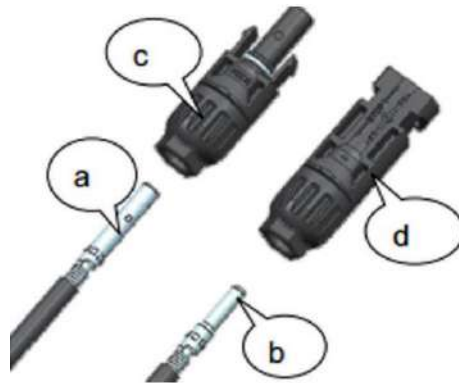


2. Use crimping pliers to bundle cable ends at wiring terminals.



a. female terminal b. male terminal

3. Route the cable through the cable sealing sleeve.
4. Insert the wiring terminal into the insulation sleeve until it is fastened. Gently pull the cable to ensure that it is firmly connected.
- 5 Tighten the sealing sleeve and insulation sleeve with 2.5 to 3N.m force.



a.Male terminal b.Female terminal
c.Male housing body d.Female housing body

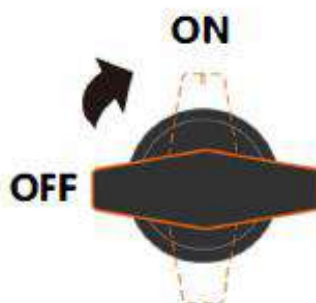
6. Verify that the polarity of the PV arrays cables is correct.



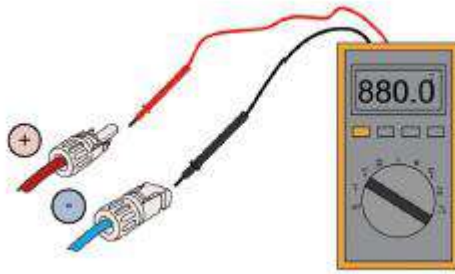
NOTE

If the DC input polarity is reversed, the inverter will not work properly.

7. Off DC switch.



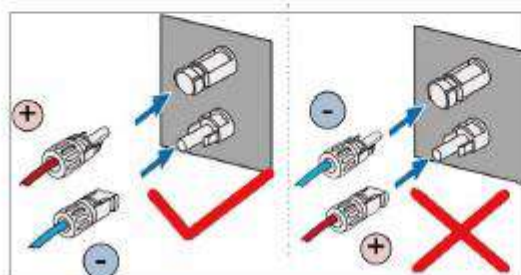
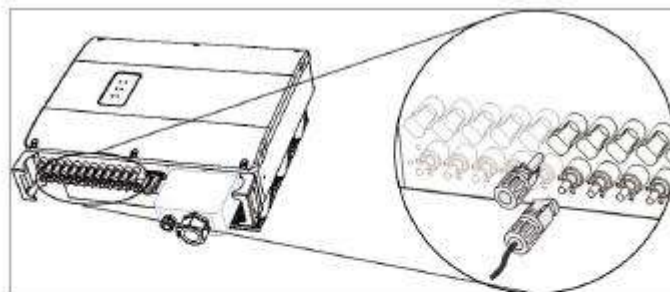
8. Check whether the polarity of the PV arrays cable is correct.



NOTE

- Before connecting the DC terminal to the inverter, check the positive and negative polarity of the PV arrays and insert the terminal into the input terminal at the bottom of the inverter.
- In the same MPPT, it is not allowed to reverse a single PV array. Otherwise, the system or inverter will fail permanently.

9. Insert the positive and negative connectors into the input terminals at the bottom of the inverter and buckle them tightly.



10. Repeat the preceding steps to connect other PV arrays.

11. Seal the vacant DC terminal with a terminal cover.

- Grounding



WARNING

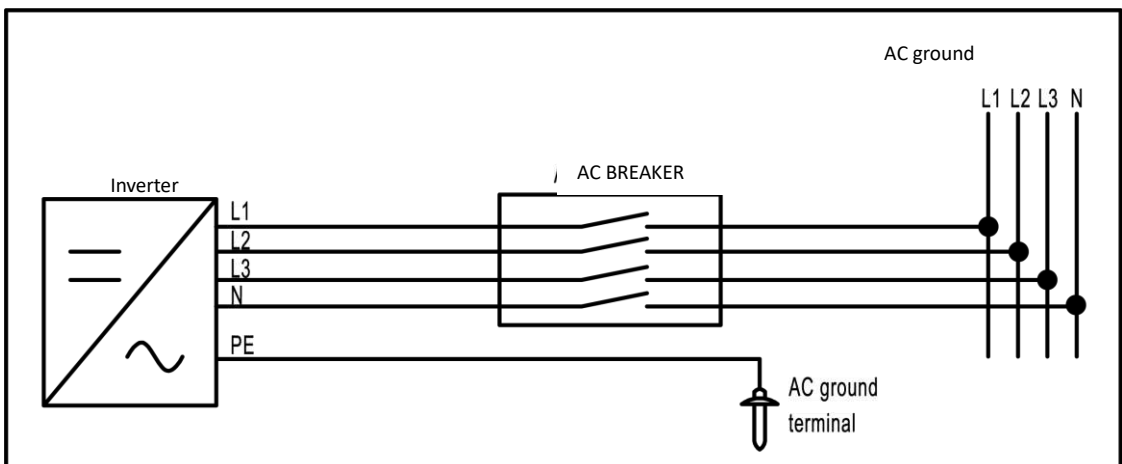
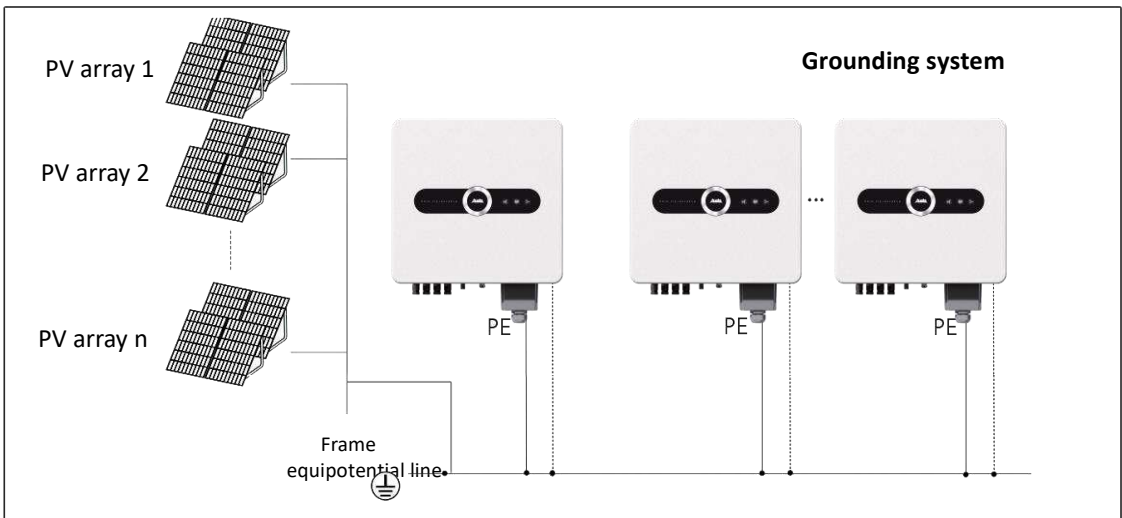
Since the inverter is a transformerless type, it is required that the positive and negative poles of the PV array cannot be grounded, otherwise the inverter will not operate normally.

- ◆ Grounding system

In this PV power generation system, all non-current-carrying metal parts and equipment housings should be grounded (such as the bracket of the PV arrays, the inverter housing, etc.).

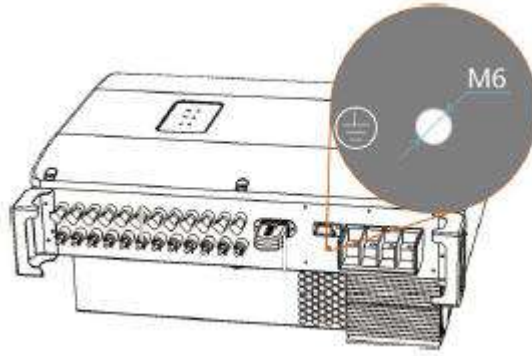
A single inverter system needs to ground the "PE" cable.

Multiple inverter systems support multi-point grounding, but all inverter "PE" cables and the grounding points of the metal frame of the PV arrays need to be connected to the equipotential line (depending on site conditions) to achieve equipotential connection .



- ◆ Secondary protection grounding

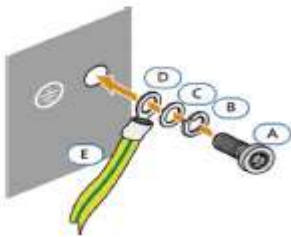
There is a secondary protection grounding terminal at the bottom of the inverter, which must be grounded.



WARNING

- The grounding connection of the secondary protection grounding terminal cannot replace that of the PE terminal in the AC cable. Ensure that both terminals are reliably grounded. Otherwise, manufacturers and suppliers does not assume any responsibility for possible consequences.
- Since the inverter is transformerless, it is required that the positive and negative poles of the PV arrays cannot be grounded, otherwise the inverter cannot work normally.

- Cable grounding



Secondary protection grounding connection.
Connecting parts are not (included in the delivery)

No.	LED indicator	Description
A	Screw	M6×12
B	Locking gasket	
C	gasket	
D	cord end terminal	
E	green and yellow ground wire	

The cross-sectional area of the yellow-green line must be the same as that of the PE cable in the AC cable.

3.6 Trial run

3.6.1 Inspection before trial run

Trial run is an important step for PV system installation. Proper trial run can prevent fire and other accidents. Correctly connect the PV arrays, inverter and ac power grid according to the installation process described above, and check the content before starting the inverter.

✧ PV arrays

Before starting the inverter, check the PV arrays on site to check whether the open-circuit voltage of each solar panel meets the requirements.

- Accurately record all values measured in the field.
- Make sure positive and negative polarity is correct, otherwise the machine will be seriously damaged.
- Use a megohmmeter to test the color edge resistance of the positive and negative poles of each PV array to the large landlord $> 2M \Omega$.

✧ Communication and accessories

Check that the RS485 communication cables are properly connected and securely connected, and that the shielding layer is properly grounded.

✧ Network

- Check if you can connect to the outside (send data).
- Check if you can read data from an external connection (remote service).

✧ AC circuit breaker,

modeling is reasonable

✧ Operating environment

- Confirm that the inverter is firmly and reliably installed.
- The environment is in good wind condition.
- No external items or tools are left on top of the inverter .
- Cables are properly distributed and well protected from mechanical damage.
- Empty terminals are sealed.
- All safety marks and warning labels shall be firmly and clearly visible on the inverter.

3.6.2 Trial run steps

If all the above inspections have passed, the inverter can perform the following trial operation steps for the first startup.

- ✧ Ensure that the above inspection items meet the requirements;
- ✧ Dc switch to ON position;
- ✧ Close the AC side circuit breaker;
- ✧ When the conditions required for normal operation of the machine are met, the inverter will automatically start and connect to the grid for power generation;
- ✧ Grid-connected PV inverter does not need manual control after normal operation, and has automatic shut down and start function after failure.

3.6.3 Shut down

- ✧ When the solar energy is insufficient to generate electricity, the grid-connected PV inverter shuts down automatically.

✧ Emergency shutdown process:

If an emergency shutdown is required, disconnect the CIRCUIT breaker and DC switch on the AC side in time. Otherwise, personal hazard may occur.



NOTE

Please strictly follow the above steps, otherwise the inverter will not work normally.

3.6.4 Stop the inverter

It is not necessary to shut down the inverter manually under normal circumstances, but it is necessary to shut down the inverter for maintenance or operation. To disconnect the inverter from the AC/DC power supply, follow the following steps. Otherwise, personal injury may occur.

- ✧ Disconnect the external AC circuit breaker and prevent reconnection due to misoperation.
- ✧ Turn the DC switch to position “OFF”.
- ✧ Wait for about 10 minutes until the capacitor discharge is complete.
- ✧ Measure the AC voltage to the ground at the AC wiring terminal and ensure that the AC output voltage of the inverter at the AC circuit breaker is 0.
- ✧ Remove the AC cable.
- ✧ Remove the DC cable.



NOTE

Strictly follow the preceding steps; otherwise, the inverter may fail to work properly.

3.6.5 Dismantle the inverter

The user can dismantle the inverter according to the above electrical installation and mechanical installation and follow the reverse steps.

3.6.6 Discarding the inverter

For inverters that will no longer be put into operation in the future, users need to properly dispose of them by themselves.



NOTE

The control panel, batteries, modules and other components contained in the inverter may pollute the environment. Users need to properly dispose of them in accordance with relevant local laws and regulations.

4

Monitoring

4.1 Overview

The inverter has a variety of communication methods. When users need to monitor the operation information of the PV power generation system, we provide the communication system solutions shown in Figures.

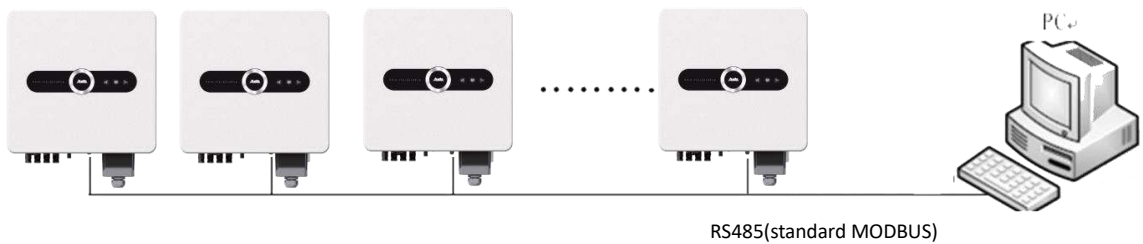


Fig 4-1 RS485 (standard MODBUS protocol) communication system mode

Grid-connected PV inverters can communicate with RS485 bus(standard MODBUS protocol) so as to monitor the working status of the inverters in real time.

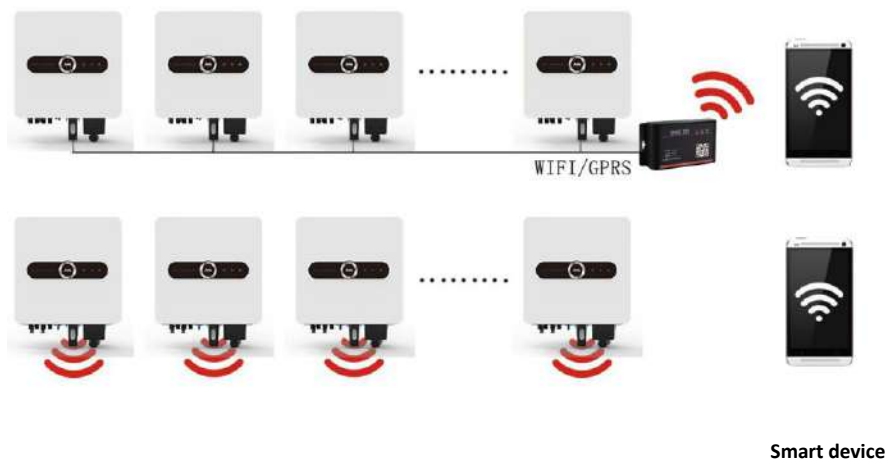
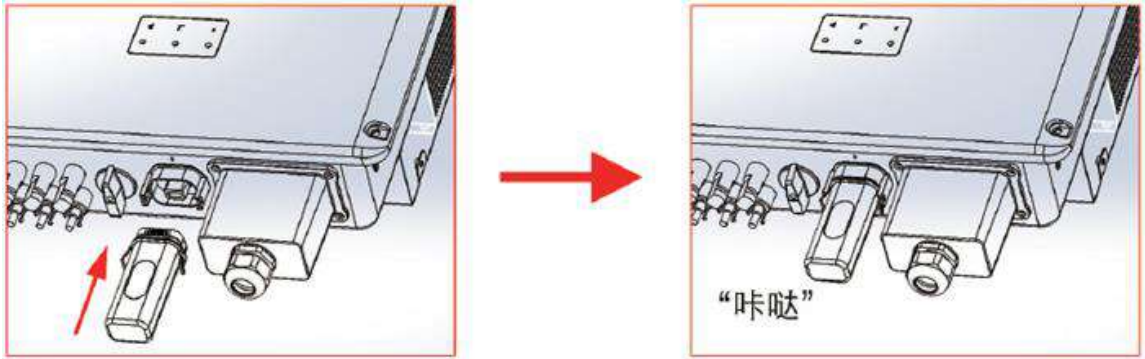


Figure 4-2 WIFI/GPRS communication system mode

After installing the GPRS or Wi-Fi data collector module, you can monitor the operation of the PV system through the AUSTA App program "Ausat Solar".

- WIFI/GPRS installation



4.2 AUSTA PV Wizard App -SolarInfo

Austa Web/Austa Solar APP is rich in functions, covering the entire life cycle of the power station, it perfectly meets the needs of one-stop management. Austa provides installers, operation and maintenance providers, and investors with various tools covering the development period, construction period, and operation and maintenance period of the power station. At the same time, it also provides practical functions such as equipment-based alarm management, protocol management, and control command management for major equipment manufacturers and their distributors.

- Website Login

Web: <http://partner.austasolar.net/>

- Software Installation

Method 1: For ios vesion, earch for "Austa Solar" in the App Store to download and install, and for the Android version, search for "Austa Solar" in the "Google Market" to download and install.
Method 2: Scan the QR code of the icon, enter the download address page, and open the download with a browser.



android



ios

4.3 Display panel

4.3.1 Control panel with LCD display

The panel of the AU series grid-connected PV inverter includes a LCD display. In order to better carry out the interactive operation of the man-machine interface, two LED indicator and a voice switch are set on the panel, as shown in Figure 4-2.

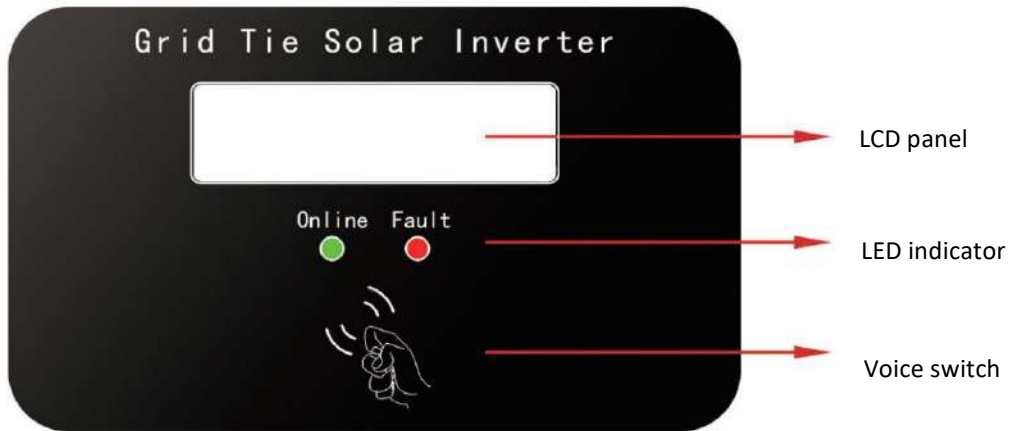



Fig 4-3 AU series LCD control panel

LED display status

No.	LED indicator	Description
1	Online	Grid-connected operation indicator (normal operation, grid-connected power generation indicator is on)
2	Fault	Fault indicator (lights on when a fault occurs)

Table 4-1 LED display status and meaning

The use of voice switch

Tap the picture icon  on the panel, the display interface of the LCD panel is switched

4.3.2 Control panel with indicator light only

For the indicator panel of the AU series grid-connected PV inverter, in order to better carry out the interactive operation of the man-machine interface, 3 LED lights are set on the panel, as shown in Figure 4-3.



Fig 4-3 AU series indicator panel

● LED display status




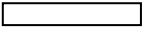





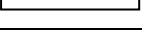



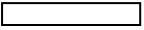

Function	Status		Description
Running	=[]~	
			Grid-connected and power generation
			DC is normal, AC is not powered on
			DC is normal, grid-connected standby
			Equipment failure
			DC switch is not powered on
Communication	()		
			The communication cable or communication module is connected, and there is data interaction on the communication channel
			The communication cable or communication module is not connected or there is no data interaction on the communication channel
Light ON  Light OFF  Light flashes 			

Table4-2 LED display status and display meaning

5 Operating

5.1 Working Mode

The working modes of the inverter include-start mode, run mode, and standby mode. In each working mode, the LCD displays corresponding information.



NOTE

The data in the following tables and graphs are only sample data, and take AU 60K3P as an example, the actual display content and data may change.

✧ Startup mode

The start mode means that the light conditions meet the DC start conditions of the inverter, but the grid has not yet been connected to power generation. In this mode, the inverter information is displayed in sequence. After the display is completed, the inverter meets the grid-connected conditions and switches from the startup mode to the running mode, otherwise, it switches to the standby mode.

The screen display sequence of the startup mode is shown in Figure 5-1(take AU 50K3P as an example).

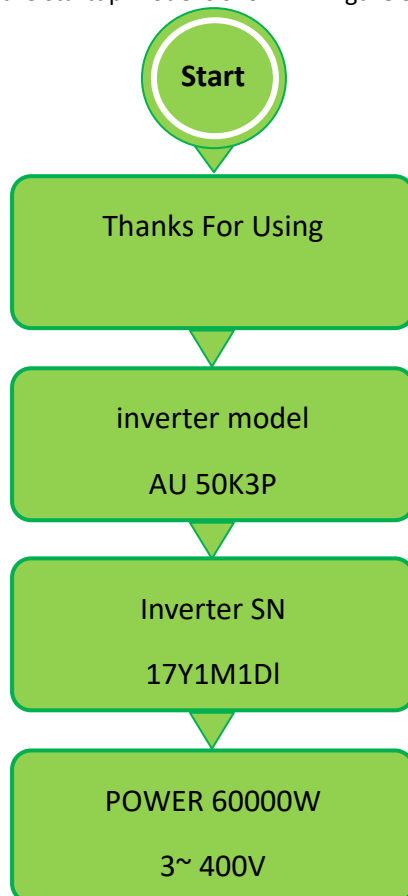


Fig 5-1 Start interface



NOTE

After the PV arrays voltage > 300V, the system will count down for 20 seconds. Within 20 seconds, the PV array voltage will always meet the grid-connected power generation requirements before it will switch to the operation mode.

● Running mode

In the Running mode, the inverter converts the DC power of the PV arrays into AC power and integrates it into the grid. At the same time, the inverter always outputs the maximum energy in the maximum power point tracking (MPPT) mode.

In running mode, the LCD refreshes the contents every two seconds, so the contents are only valid for the current two seconds. The LCD displays the default information. After 30 seconds, the LCD displays the default information, as shown in Figure 5-2. After 10s-20s, the display enters the low-power state. Tap again to wake up the backlight.

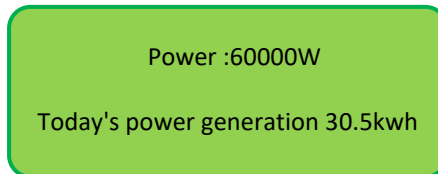


Fig 5-2 Default interface of running mode

In running mode, the screen display content is shown in Table5-3 (take AU 50K3P as an example)

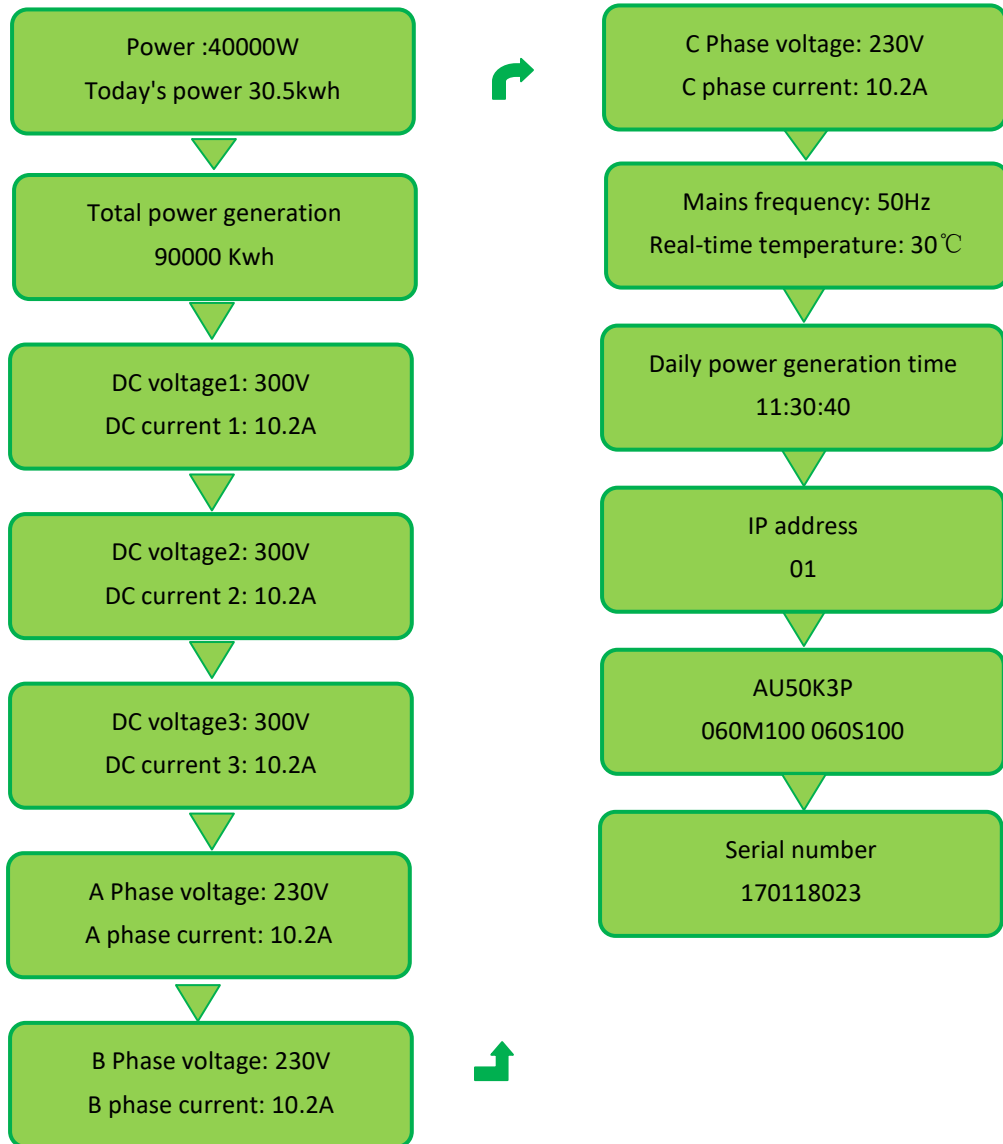


Fig 5-3 Normal interface of running mode

Note:

1. Under grid-connected conditions, tap the position of the indicator of the sound control switch, and the background indicator of the LCD screen will light up. If you do not operate the LCD any more, the background indicator will turn off after 20 seconds, and the LCD screen will restore the default time display.

2. When you are off the network, tap the position of the indicator of the sound control switch, and the background indicator of the LCD is on. If you do not operate the LCD any more, the background indicator is off 2 minutes later and the LCD returns to the default time display.

3. Error Info Common fault codes are described in Table 5-1.

- Standby mode

After operation, the inverter changes from operation mode to standby mode if the current on the DC side is very small (approximate to 0 A) and remains there for 20 seconds. In standby mode, the inverter constantly detects whether the PV arrays has enough energy to connect to the grid for power generation. When it reaches 300V (hold for 20 seconds), the inverter transfers from standby mode to operation mode.

When the inverter starts, it will countdown for 20 seconds. If the inverter counts down for 5 times in a row within 15 minutes, the system considers that the startup conditions are unstable and not suitable for the grid-connected operation of the inverter. The inverter will re-check whether the startup conditions meet the requirements after 30 minutes.

Note: The display mode in standby mode and fault mode is the same as that in normal mode, but the specific parameters (electric quantity, temperature, current, etc.) are different in different modes. The data displayed on the display is real data.

- Failure mode

When the PV power generation system fails. The inverter will stop working and the relay on the AC side will be immediately disconnected; The main circuit of the inverter is disconnected from the power grid. At this time, the system continuously monitors whether the fault is eliminated. If the fault is not eliminated, the fault state is maintained. If the fault is eliminated, reconnect the grid after the 20 seconds countdown.

Table 5-1 lists the fault modes displayed on the screen.

fault code	Shows	Description
01	Pha Seq	The AC phase sequence is faulty
02	AC_SPD	AC arrester failure
03	RELAY_ERROR	Relay failure
04	IGBT_SAT	IGBT saturation failure
05	DC Pol	DC polarity failure
06	Gro Fau	Grounding failure
07	Fan Fau	Fan fault
08	Coml Fau	Communication fault 1
09	DC_SPD	DC SPD fault
10	I_leak_H	Leakage current is over limit
11	I_leak_F	Leakage current fluctuation is over limit
12	island	Islanding

13	la Hig	The A-phase current is over limit
14	lb Hig	The B-phase current is over limit
15	lc Hig	The C-phase current is over limit
16	I_no mat	Current mismatch
17	sys Err	system failure
18	I1 Hig	PV array 1 current is over limit
19	I2 Hig	PV array 2 current is over limit
20	I3 Hig	PV array 3 current is over limit
21	HD Pro	hardware protection
22	Tdc Hig	DC circuit temperature is over limit
23	Tac Hig	AC circuit temperature is over limit
24	NP Bph	Neutral point imbalance
25	NO_Pha	Phase unlock
26	Udc Hig	The DC bus voltage is is over limit
27	Udc Low	The DC bus undervoltage
28	Ua Hig	Phase A voltage is over limit
29	Ub Hig	Phase B voltage is over limit
30	Uc Hig	Phase C voltage is over limit
31	Ua Low	Phase A undervoltage
32	Ub low	Phase B undervoltage
33	Uc Low	Phase C undervoltage
34	Fre Low	Low frequency
35	Fre Hig	Frequency is over limit
36	No Net	Off-grid,no power from grid
37	U1 Hig	PV array 1 voltage is over limit
38	U2 Hig	PV array 2 voltage is over limit
39	U3 Hig	PV array 3 voltage is over limit
Else	else	Please contact supplier

Table 5-1 Fault mode Displays contents



NOTE

The fault information displayed on the above LCD screens only automatically switches to the second screen in off-network mode at regular intervals. Display “No NET” in off-grid state if there is no fault information.

Note: When a fault occurs, the LCD switches between the default screen and the fault screen.

- Stop mode

Shutdown mode refers to the shutdown of the inverter by human intervention, which will immediately disconnect the relay on the AC side, but this is not a system failure.

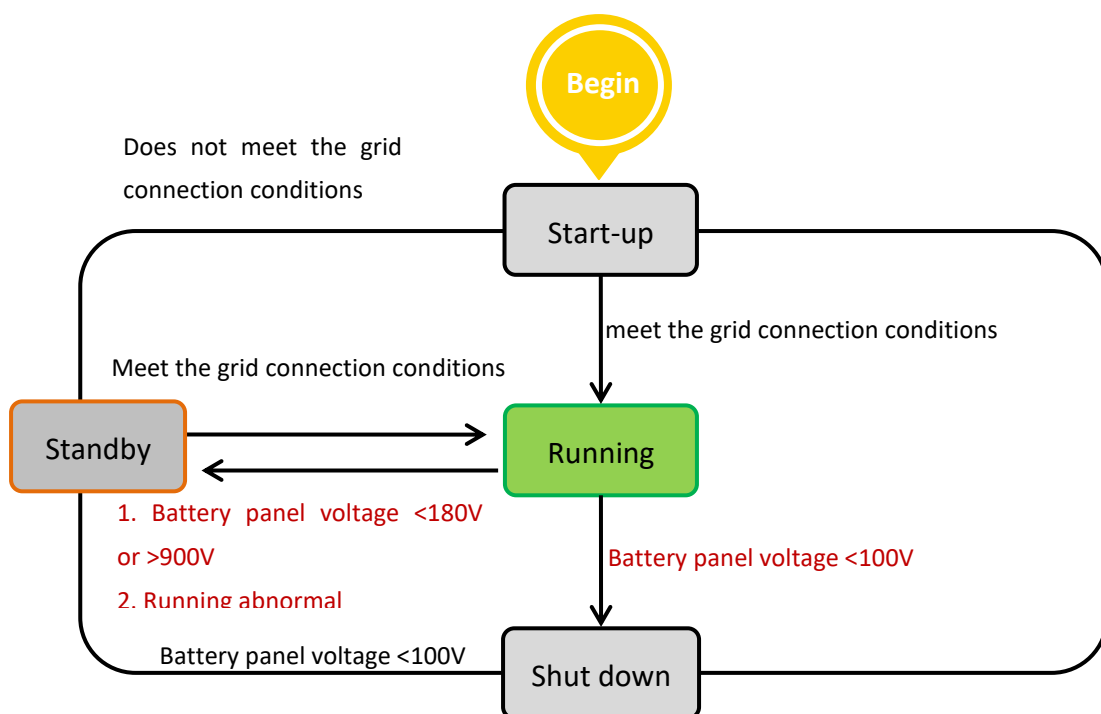


Fig 5-4 Working mode transition diagram

5.2 Power generation process

On grid generating capacity process is automatic, described as follows:

1. Switch on DC and AC circuit breakers, the inverter will enter start-up mode.
2. If input voltage on DC side exceeds 300V, AC side voltage in range 310Vac~480Vac or 422Vac~550Vac, and grid frequency is normal, inverter begins countdown.
3. The DC side starts after a countdown of 20 seconds;
4. After the DC bus voltage stabilizes, the inverter side starts to work and connects to the grid for power generation.

5.3 Disconnect from grid

When the grid has below abnormal situation, inverter will disconnect from the grid immediately.

- ✧ The grid voltage is outside the normal range of 310V~480V /422Vac~550Vac;
- ✧ The grid frequency is outside the normal range of 45-55HZ/55-65HZ;
- ✧ The voltage of the PV arrays is outside the allowable working range of the inverter;
- ✧ The ambient temperature is outside the allowable working range of the inverter.

**DANGEROUS**

Do not open the machine. Users trying to repair the machine by themselves may cause electric shock and fire hazard.

6.1 Maintenance

Due to the influence of ambient temperature, humidity, dust and vibration, the internal components of the inverter will age and wear, which will affect the service life of the inverter. Therefore, daily and regular maintenance of the inverter should be carried out to ensure its normal Operation and service life.

- ✧ Clean the dust and debris from the radiator frequently.
- ✧ When dust accumulates on the PV arrays, clean the PV arrays with water, and the cleaning should be carried out when the weather is cool.
- ✧ Check the system regularly to ensure that all wiring and supply conditions are error-free.
- ✧ Always read the information on the LCD display to understand the changes in the inverter's working status.

**WARNING**

Never use a pressure washer to clean the inverter, or other cleaning methods that may cause water to enter the machine.

6.2 Troubleshooting

**WARNING**

Only qualified engineers can repair the inverter!

Most errors and malfunctions will be displayed. The following table proposes solutions to several possible problems.

No.	Failure	solution
1	LED indicator and LCD screen do not light up	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3. Check the input voltage of the PV arrays (whether it is lower than 200V).
		4.If the above conditions are met, check the circuit breaker.
2	"on line" indicator goes off	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3.Check whether the parameters on the AC and DC sides meet the startup requirements. If the parameters meet the requirements, check the wiring according to 3.5 Electrical connection.
		3
2. Disconnect DC side circuit breaker.		
3. Check whether the voltage of each group of PV arrays meets the range of 300V-1000V.		
4. When the DC voltage is restored to the allowable range of the inverter, restart the inverter.		
4	Unet fault 170V (the grid voltage>450V or <310V)	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3.Detect the voltage on the AC side.
		4.If the grid voltage is not within the allowable voltage range of the inverter, please contact the supplier to adjust the grid voltage.
5	Frequence fault 47.05HZ (the grid frequency is neither 47-51.5Hz nor 57-61.5Hz)	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3.Detect the frequency on the AC side.
		4.If the current grid frequency is not in the inverter's allowable frequency range, please contact the local power company to adjust the grid frequency.
6	Temperature fault 120℃ (inverter temperature is over limit)	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3. Check whether the ambient temperature is higher than 60 ℃ or lower than -25 ℃.

		4. Please check whether the ventilation of the machine is normal, whether the hook-up installation is correct, and whether the air duct is unblocked.
		5. Whether the output power exceeds the rated value.
7	Grounding fault	1. Disconnect AC side circuit breaker.
		2. Disconnect DC side circuit breaker.
		3. Check whether the ground resistance of each group of PV arrays is greater than $2M \Omega$.
8	AC fault	1. Disconnect the AC circuit breaker.
		2. Turn off the DC switch.
		3. Check whether cables to the AC side are correctly connected, for example, whether the neutral cable is connected to the wrong position, and whether the connection is reliable.
		4. Ensure that cables are correctly connected to the AC side and restart the inverter.
9	Leakage current Fault	1. Disconnect the AC circuit breaker.
		2. Disconnect the DC switch.
		3. Check whether the ground resistance of each PV arrays is greater than $2M \Omega$.
10	Other Fault	1. Disconnect the AC circuit breaker.
		2. Turn off the DC switch.
		3. If not, please contact supplier.

Table 6-1 troubleshooting

If the fault cannot be solved or your problem is not mentioned in the above table, please contact supplier.

7

Specification

7.1 Specification

Technical Data	AU50K3P	AU60K3P	AU70K3P-HV	AU75K3P-HV
DC Input Data				
Max. DC input power (KW)	75	90	105	112.5
Max. DC input voltage(VDC)	1100			
MPPT voltage range(VDC)	250~1000			
Max. DC current(A)	45/45/45			
Recommended working voltage(VDC)	650		740	
MPPT number	3			
Max. input strings per MPP tracker	4/4/4			
AC Output Data				
Rated output power (KW)	50	60	70	75
Max. AC power (KVA)	55	66	77	82.5
Max. output current(A)	80	96	89	95
Rated power grid voltage(Vac)	400		500	
Power grid voltage range(Vac)	310~480		422-550	
Rated power grid frequency	50Hz/60Hz			
Grid frequency range	45~55Hz/55~65Hz			
THD	<2%(Under the rated power)			
Power factor	>0.99(Under rated power)/Adjustable range 0.8(Leading)~0.8 (Lagging)			
DC component	<0.5%(Under rated power)			
System Data				
Max. Efficiency(%)	98.7%	98.9%	99%	99%
Euro. efficiency(%)	98.3%	98.5%	98.5%	98.5%
Humidity	0~100%, No condensation			
Cooling	Fan			
Allowed ambient temperature range	-25°C~+60°C			

Consumption during night	<1W
Noise	<55dB
Max. altitude	4000m(It needs to be derated when the altitude exceeds 2000m)
Mechanical Data	
Size (width x height x depth)	681mm × 660mm × 282mm
Weight	47kg
Protection class	IP66 (outdoor)
Display & Communication	
Communication interface	RS485/WIFI(optional)/GPRS(optional)
Display	LED/LCD(optional)
Conforming standards	
Standards for grid connection	NB/T32004-2018; GB/TI 9964-2012
Safety standard	NB/T32004-2018; NIEC62109-1/2
EMC	IEC61000-6-2/4

Table 7-1 Technical Data Sheet

7.2 Quality guarantee

- ✧ The warranty period of this product shall be subject to the contract.
- ✧ condition
- AUSTA will repair or replace the faulty products free of charge during the warranty period.
- Unqualified products after replacement shall be returned to AUSTA.
- The customer shall allow AUSTA a reasonable amount of time to repair faulty equipment.
- ✧ The company reserves the right not to guarantee quality in the following cases:
 - Transport damage.
 - Incorrect installation.
 - Incorrect modification.
 - Incorrect use.
 - Operate beyond the very harsh conditions described in this manual.
 - Any installation and use outside the scope specified in relevant international standards.
 - Damage caused by abnormal natural conditions.



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