GROWATT

MAX 300-350K-X
User Manual

Purpose

This document describes the installation, electrical connection, operation, commissioning, maintenance, and troubleshooting of the MAX 300-350K-X inverter. Before installing and operating the MAX 300-350K-X inverter, ensure you are familiar with the product features, functions and safety precautions provided in this document.

Symbol	Description
 **DANGER**	DANGER indicates a hazardous situation which,if not avoided,will result in death or serious injury
 **WARNING**	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 **CAUTION**	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 **ATTENTION**	NOTICE is used to address practices which are not safety relevant.
 **Information**	Information that you must read and know to ensure optimal system operation.

Context

Picture list

1 Overview

1.1 Overview

This manual will provide detailed product information and installation instructions for users of the MAX 300-350K-X series photovoltaic inverters of Shenzhen Gurewatt Co., Ltd. (hereinafter referred to as Gurewatt). Please read this manual carefully before using this product and store it in a place easy for installation, operation and maintenance personnel. We will continuously review the content of the document and revise it if necessary. Gurewatt reserves the right to change the information at any time without prior notice. All stated information and recommendations in this document do not constitute any guarantee, express or implied. Gurewatt reserves the right of final interpretation.

1.2 Applicable personnel

The inverter must be installed by the professional electrical personnel with the relevant partial certification qualification. By reading this manual in detail, the installer can quickly install the MAX 300-350K-X series inverter correctly, and can carry out troubleshooting and communication system building.

If there is any problem during the installation process, you can log on to the www.growatt.com website to leave a message or call the 24-hour customer service hotline 400-931-3122.

1.3 Disclaimer

For the "danger", "warning", "attention", "caution" matters mentioned in the manual, not covering all safety matters to be observed, and also complying with the relevant international, national or regional standards and industry standards. Gurewatt will not be liable for any problems arising from violations of safety operation requirements or safety standards of the equipment.

Gurewatt will not be liable for any loss of safety operation requirements, safety standards and safety precautions in the manual.

This equipment must be used in an environment that meets its design specifications. If the use environment does not meet the requirements, it may cause equipment failure, functional abnormality or component damage, which is not within the quality assurance range of the equipment. In addition, Gurewatt will not be liable if personal injury or property damage occurs.

Install, operate, use, maintain, transport and store the equipment, and the safety matters in the manual shall only be used as a supplement to the local laws, regulations, standards and specifications.

Reverse engineering, decompiling, disassembly, adaptation, implantation or any other derivative operation of the equipment software is strictly prohibited. You may not in any way study the internal logic of the device, obtain the software source code, or infringe upon intellectual property rights, or disclose the results of any software performance tests.

Gurewatt will not be liable for any of, or any consequences caused by:

- Equipment damage caused due to earthquake, flood, volcanic eruptions, debris flow, lightning strikes, fire, war, armed conflict, typhoons, hurricanes, tornadoes, extreme weather or other force majeure factors;
- The equipment does not operate according to the conditions specified in this manual;
- The installation and use environment does not meet the requirements of the manual and does not meet the international, national or regional standards;
- Equipment damage occurs not installation according to the instructions in this manual;
- Equipment shall be installed and used by personnel without corresponding qualifications;
- Failure to follow the operation instructions and safety warnings specified in the product document;
- Disassemble, change the product or modify the software code without authorization;

- Damage caused by you or a third party entrusted by you during transportation;
- Damage caused by the storage conditions not meeting the requirements of the product documents;
- Your own materials and tools do not meet the local laws, regulations and relevant standards;
- Damage caused by tools not used in accordance with the manual and tightening the product at the specified torque;
- Damage due to your or third party negligence, intentional conduct, gross negligence, improper operation or non-Gurewatt causes.

2 Safety Precautions

2.1 Safety Overview

- Please read this manual carefully before installation. If the equipment is not installed according to the instructions in this manual, Gurewatt New Energy has the right not to conduct quality assurance.
- All operations and wiring must be performed by well-trained professional electrical technicians.
- When installation, do not touch the chassis except the terminal.
- All electrical connections must comply with the local electrical safety standards.
- If the equipment needs maintenance, please contact the local designated system installation and maintenance personnel.
- The grid connection of the equipment for power generation shall obtain the permission from the local power supply department.

2.1.1 Unpack inspection

 **WARNING**	• Check all safety signs, warning signs and nameplate contents on the product. • Before the products are scrapped, its safety marks, warning labels and nameplates must be clearly visible and shall not be removed or covered.
 **Information**	• After receiving the product, first check whether the packaging, appearance and structural parts of the inverter are complete. If there is any damage, please contact the supplier.

2.1.2 Personnel operation safety

 **DANGER**	• Before installation, operators should ensure that the inverter is not electrically connected. • During the installation process, the operators are strictly prohibited from conducting live operation. • Operators are strictly prohibited to wear watches, bracelets, bracelets, rings, necklaces and other easily conductive bodies. • During the operation, operators must use special insulation tools with insulation voltage rating meeting the requirements of local laws, regulations, standards and specifications.
 **WARNING**	• Installation conditions, spacing, please follow the contents of this manual, please refer to Chapter 5. • Please install the inverter in a dry and ventilated position, otherwise it may affect the inverter operation. • See this manual for the installation steps. Please read them

	carefully before installation. • Operators must use special protective equipment during the operation.
 **CAUTION**	• The installation torque of screws and nuts shall follow the manual, and the torque value error shall not exceed the specified 10%. • When installing the equipment, the appropriate torque tool should be selected to tighten the screws. When tightening the wrench, make sure the wrench is not crooked.
 **ATTENTION**	• Operators should undergo professional training, master the correct operation methods, understand various safety precautions and relevant standards of the country / region. • Operators should read this manual carefully before installation. • Except for the personnel who operate the equipment, other personnel do not access the equipment.

2.1.3 Safety of electrical connection

 **DANGER**	• Before electrical connection, the inverter with DC switch should ensure that the DC switch of the inverter is in OFF state and disconnect the AC side switch, otherwise the high voltage of the inverter may lead to life danger. • High pressure danger, do not touch the inverter arbitrarily. • Do not place inflammable and explosive items around the inverter. • Improper or incorrect operation may lead to accidents such as fire or electric shock. • During the operation, foreign objects must be prevented from entering the equipment, otherwise it may lead to short circuit failure or damage, load current reduction or power loss, and personal injury.
 **WARNING**	• Each inverter must be installed with an AC circuit breaker, and prohibit multiple inverters to share one AC circuit breaker. • No load access between the inverter and the circuit breaker. • If the cable is thick, do not shake the cable terminal. Make sure the terminal is well connected before starting the inverter. To

	prevent terminal loosening and overheating damage. • Please confirm the positive and negative electrodes before the photovoltaic panel and the inverter. • The grounding equipment must be connected to the protective ground wire first when installed, and the protective ground wire must be removed last. • The maximum DC input voltage cannot exceed 1500V.

2.1.4 Requirements for the installation environment

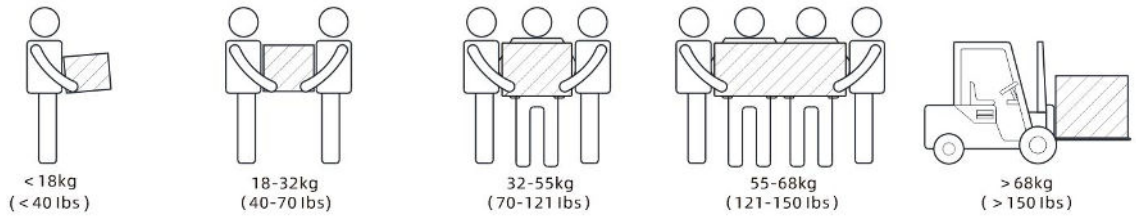
 **DANGER**	• Never place inflammable and explosive items in the working area of the equipment. • It is strictly prohibited to have heat source and fire source in the working area of the equipment. abnormal heating of the equipment may cause equipment damage or even fire. • It is strictly prohibited to install, use and operate outdoor equipment and cables (including but not limited to handling equipment, operating equipment and cables, plug and plugging outdoor signal interface, aerial work, outdoor installation, door opening, etc.) in severe weather such as lightning, rain and snow, and strong wind above level 6.
 **ATTENTION**	• It is forbidden to install the equipment in an environment with dust, smoke, volatile gases, corrosive gases, infrared radiation, organic solvents or excessive salts. • It is forbidden to install the equipment in an environment with metal conductive dust and magnetic conductive dust. • It is forbidden to install equipment in areas prone to breed fungi, mold and other microorganisms. • Do not install equipment where water may be submerged. • When selecting the installation site, comply with local laws and regulations and relevant standards. • Equipment equipment in salt areas may be corroded, so do not install outdoors in salt areas. Salt damage areas are areas within 500 meters of the coast or affected by the sea breeze. Areas affected by the sea breeze will vary according to meteorological conditions (e. g., typhoons, seasonal winds) or terrain (such as dikes, hills).

	• The elevation of the inverter should be lower than 4000m. When the altitude is higher than 2000m, the inverter will decrease. • The installation ground must be solid, without rubber soil, soft soil or geology easy to sink. It is forbidden to choose low-lying areas prone to water and snow. The level of the station should be higher than the historical highest water level in the area. • Before installing, operating and maintaining the equipment, it is necessary to clear the water, snow or other debris on the top of the equipment, and then open the equipment door to prevent the debris from falling into the equipment. • When installing the equipment, ensure that the mounting surface is strong enough to withstand the weight of the equipment. • After installation of the equipment, remove all empty packaging materials from the equipment area, including cartons, foam, plastic, tape, etc.

2.1.5Note for mechanical installation

2.1.5.1 Handling

 **WARNING**	• Considering the weight of the inverter, take care when handling. Palm handling equipment, not fingers. Avoid personal injury caused by the inverter falling off. • If many people need to carry heavy equipment, it is necessary to consider the height and other factors, do a reasonable personnel collocation and division of labor. Ensure a uniform weight distribution to maintain the balance. • When carrying equipment by hand, wear gloves, protective shoes, helmets and other protective equipment to prevent injury.
 **ATTENTION**	• When handling, avoid applying to DC switch, PV terminal, BAT terminal or AC terminal. The resulting damage to the terminals or switches is not covered by the warranty. • When using a forklift to carry the inverter, ensure that the inverter is located in the middle of the fork arm and is secured with a suitable strap to prevent tipping over.



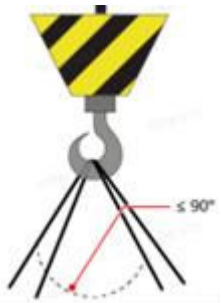
2.1.5.2 Use the ladder

WARNING	• Any work done at 2 meters or higher is called aerial work. Use a ladder when working at a height. If site conditions permit, double hook seat belts should be used when climbing ladders to prevent falling. The hook shall not be tied to the steps of the ladder, but to the firm building against which the ladder rests. If there is no safety belt, a fall protection safety rope should be used • The ladder base shall be left intact. Place the ladder on a flat, solid platform for slip and tilt.
ATTENTION	• When it is necessary to work at high altitude, a wooden ladder or insulation ladder should be used. Check the ladder for compliance before use. The use of ladders with potential safety hazards is prohibited. • When working at height, please use the platform ladder with guardrail, and the straight ladder is not recommended.

2.1.5.3 Lifting equipment

WARNING	• The personnel carrying out hoisting operation shall undergo relevant training and can take up posts after being qualified. • It is strictly prohibited to walk under the lifting arm and lifting objects. • Temporary warning signs or fences shall be erected in the hoisting area for isolation. • When hoisting the equipment, the local hoisting standards shall be strictly observed. • The foundation for the hoisting operation must meet the load-bearing requirements of the crane work. • Before hoisting, ensure that the hoisting tool is firmly fixed on the fixation object or wall that meets the load-bearing standards. • When hoisting, it is forbidden to drag the wire rope and hanging gear, and it is forbidden to use hard objects to strike.

	• During hoisting, ensure that the angle between the two cables is not more than 90°, as shown in the figure below.



2.1.5.4 Drill

WARNING	• The Client and the Contractor shall be consent before drilling. • Wear goggles, masks, protective gloves and other protective equipment when drilling. • Avoid bored pipes and power lines to prevent short circuit or other hazards. • When drilling, block the protective machine to prevent debris from splashing. Remove the debris from the hole in time. • After drilling, the dust should be cleaned in the hole.

2.1.5.5 Repair and replacement safety

DANGER	• Improper maintenance operations may result in personnel injury or product damage. • Must be operated by trained professional electrical technicians and follow this manual. • Please disconnect the DC and AC switches for at least 15 minutes to avoid danger. All operations after power off. • When the inverter reports that the insulation impedance fault is low, the casing may be charged. Do not touch the casing. • High pressure danger, beware of electric shock.
WARNING	• For better heat dissipation, please clean the fan regularly. • Do not clean the fan with an air pump, which may cause fan damage.

2.2 Symbol conventions

symbol	description
	• Used to warn of emergency dangerous situations, if not avoided, will lead to death or serious personal injury.

DANGER	
 WARNING	• Used to warn of potentially dangerous situations that, if not avoided, may lead to death or serious personal injury.
 CAUTION	• Used to alert potentially hazardous situations that, if not avoided, may cause moderate or minor personal injury.
 ATTENTION	• Used to indicate that property damage may be caused if not performed properly as required.
 Information	• Remind the operator to check the instructions and instructions before operating or installing the inverter.

2.3 Description of safety symbols

symbol	Symbol description	Symbolic meaning
	High-voltage hazard identification	There inverter high voltage in the operation, all operations for the inverter must be carried out by trained professional electrical technicians.
	Overheat logo	High-temperature watch case may cause burns!
	Protect grounding identification	Connect the inverter with the grounding row to achieve the purpose of grounding protection.
	Time-lapse discharge identification	High voltage still exists after the equipment is down. After 15 minutes.
	Refer to the manual identification	Remind the operator to check the instructions before operating or installing the inverter.
	DC logo	This identification interface is direct current.
	Communication logo	This identification interface is AC.

2.4 Certification and recycling identification instructions

symbol	Symbol description	Symbolic meaning
	CE marking	The inverter complies with the requirements of the applicable EU directives
	UK marking	UK Certified
	Recycling Symbol	Lithium-lon batteries can be recycled
	WEEE Symbol	Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site
	WEEE Symbol	Do not dispose of the system with the household waste but in accordance with the local regulations

3 Product Introduction

3.1 Product Introduction

Functions / Features

The inverter is a three-phase transformer-less series grid-connected inverter, which is an important part of the photovoltaic power generation system.

The inverter converts the direct current generated by the photovoltaic group into alternating current that meets the requirements of the power grid and feeds it into the power grid.

Model description

MAX 320K - X
① ② ③

order number	meaning	explain
①	product line	MAX：Product series name
②	Power level	• 300K: Rated power 300kW • 320K: Rated power 320kW • 333K: Rated power 333kW • 350K: Rated power 350kW
③	Electrical architecture	X: Platform level

3.1 Appearance

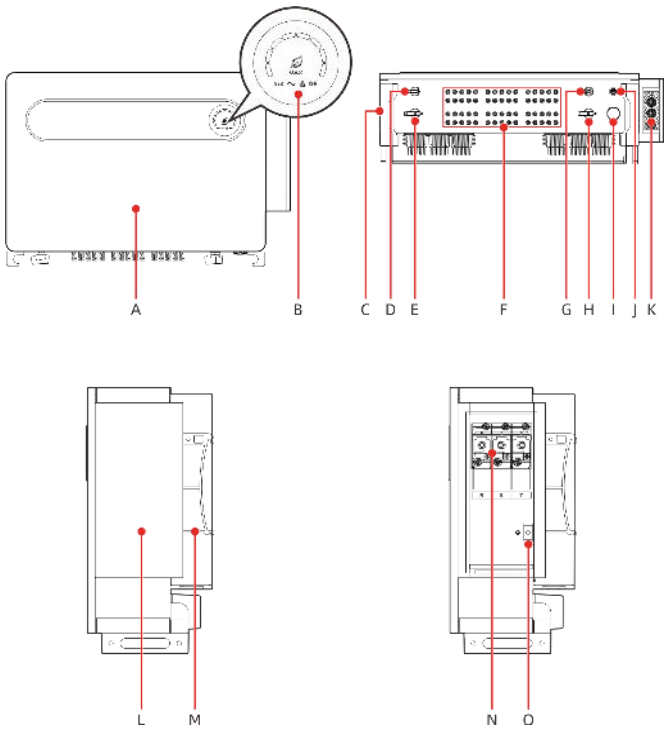


Figure 3.1 Appearance description

Mark	Description	Mark	Description
A	Front Panel	I	Pressure Relief Valve
B	LED	G	COM interface
C	Corner guard	K	Waterproof silicone pad
D	AuxiliarySwitch	L	Junction Box
E	DC switch 1	M	Mounting Feet
F	PV terminal	N	AC terminal
J	USB interface	O	Built-in Grounding Point
H	DC switch 2		

3.2 Basic Data

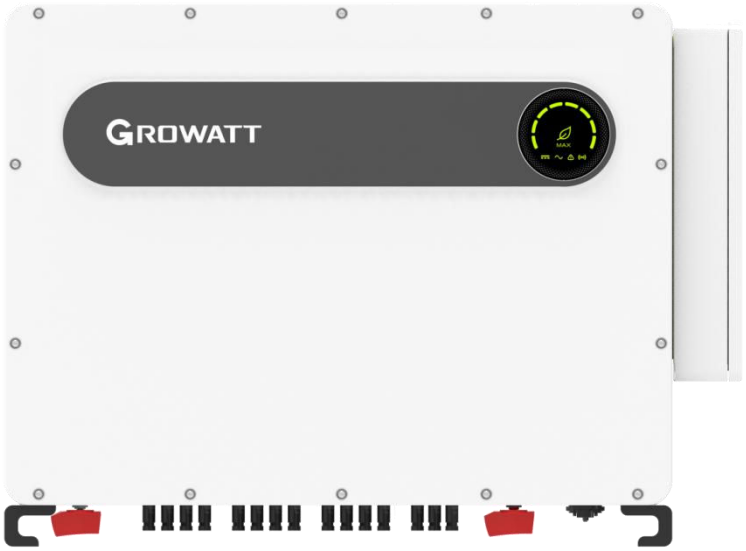


Figure 3.1 Visual dimensions

Model	Dimension (mm)			Weight(kg)
	Height(H)	Width (W)	Depth (D)	
MAX 300-350K-X Inverter	1145	790	371	126
MAX 300-350K-X Inverter with packaging	1285	890	500	143

3.3 Nameplate

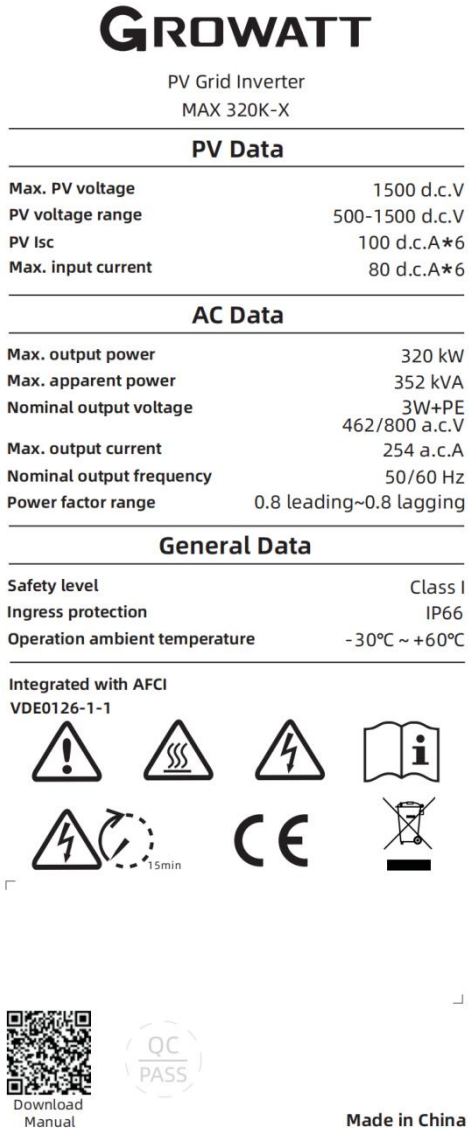


Figure 3.2 Nameplate

Note: The nameplate of MAX 300-350K-X series inverter is similar to the nameplate displayed above, but the product model and specific content parameters are different. See the product specifications in Chapter 10.

3.4 Working Principle

The working principle of MAX 300-350K-X series inverter is as follows:

- The PV panels gather solar to generate DC power to inverter
- With input current detection circuit, it can monitor all the PV panels' working status and use MPPT to track the maximum power point.
- With inverter circuit change DC power to AC power, and feed power back to grid per grid reuqirement.
- With output isolation relay can isolate AC output and grid, if anything goes wrong on either inverter side or grid side, isolation relay can disconnect inverter immediatel.

3.4.1 Circuit Diagram

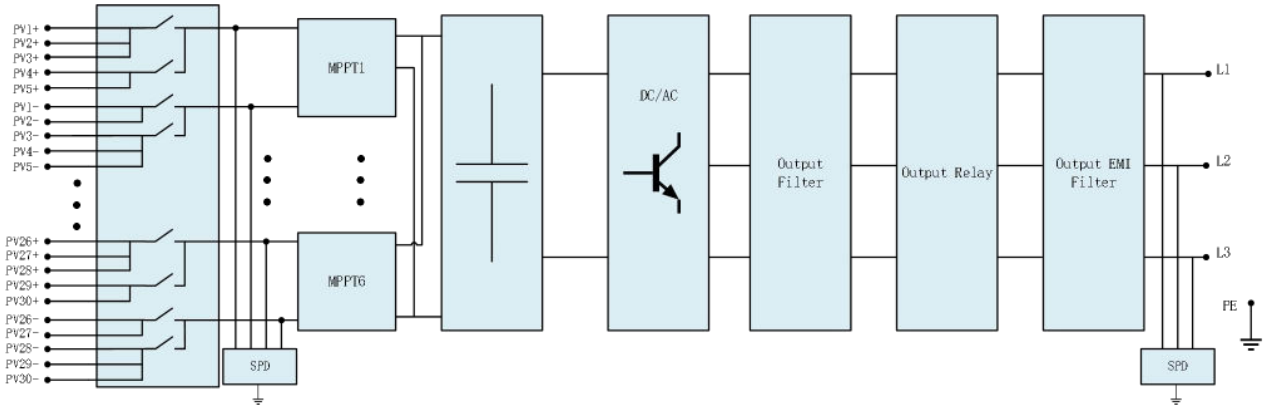


Figure 3. Circuit Diagram

3.4.2 Working Modes

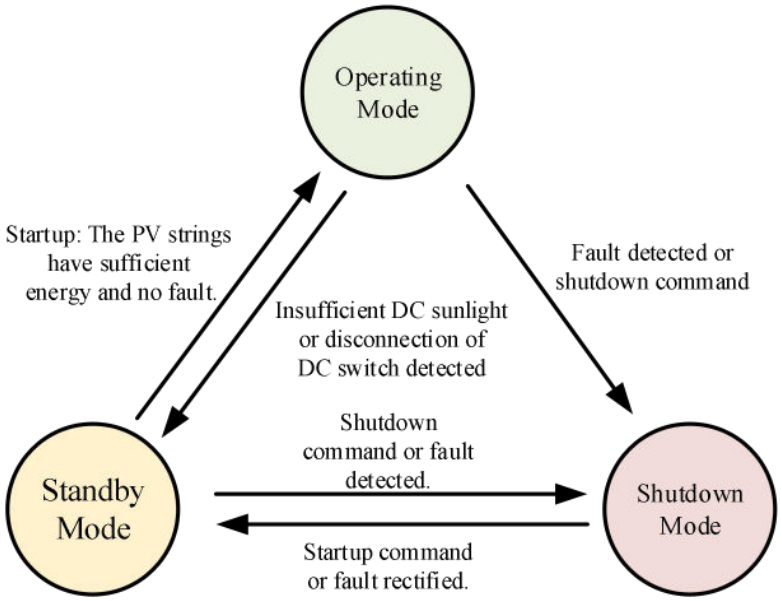


Figure 3. Working mode

Working Mode	Description
Standby	The shutdown instruction or PV voltage does not meet the grid connection requirements
Operating	Successfully connected to the grid, or the inverter works normally in off-grid mode
Shutdown	If a fault occurs, the inverter exits the grid connection or off-grid output state

3.4.3 System block diagram

The block diagram of the photovoltaic grid-connected system is as follows:

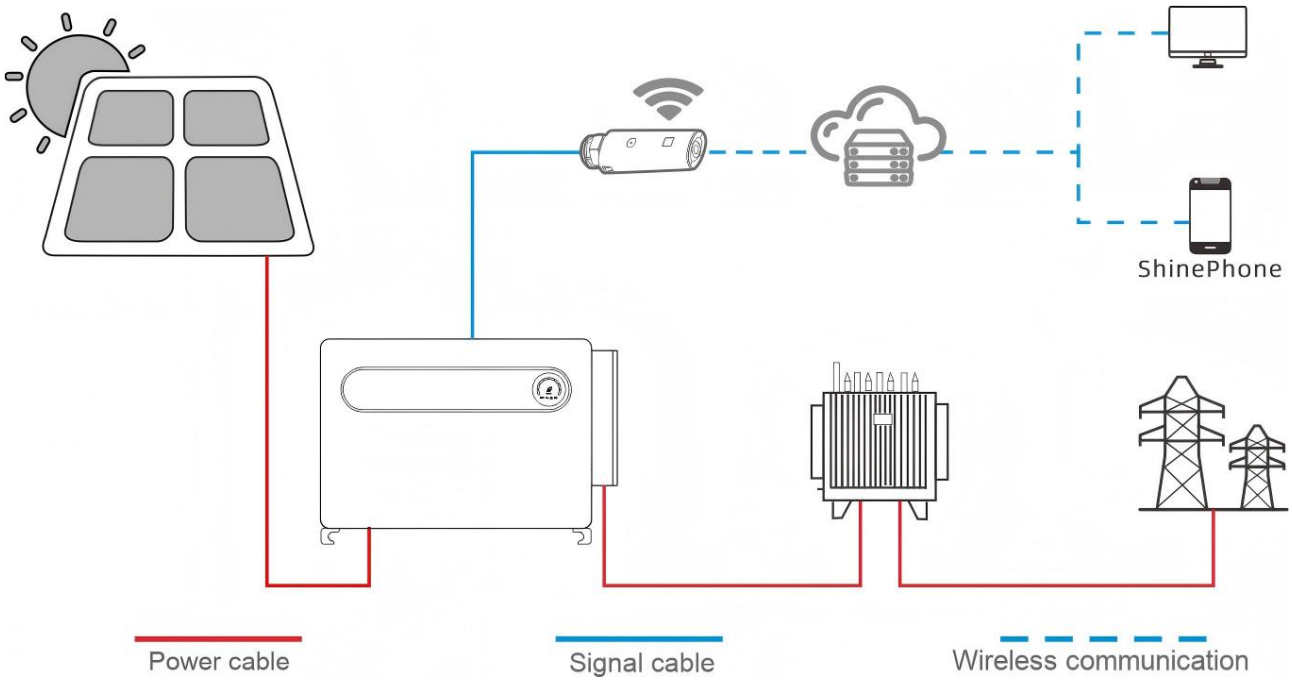


Figure 3.3 System block diagram

3.5 Grid Type

The grid type of MAX 300-350K-X series inverter is shown in the figure below:

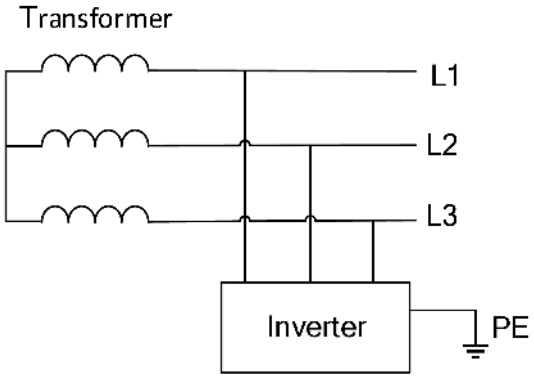


Figure 3.4 Power Grid connection mode diagram

3.6 Functions

3.6.1 LED display

The current running state of the inverter can be visually read by the LED display.

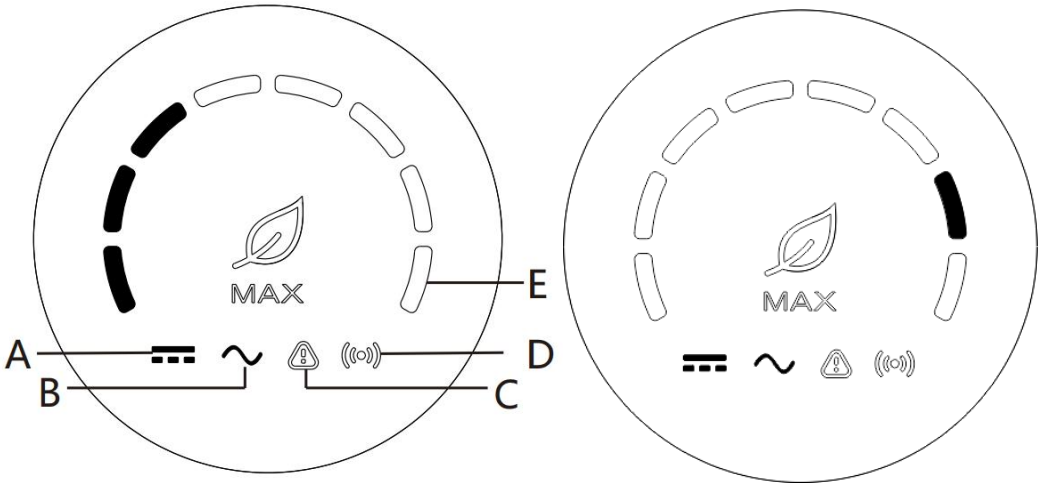


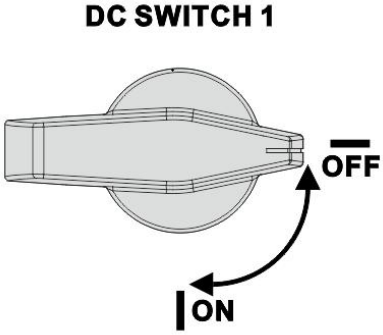
Figure 7.3 Schematic diagram of the inverter LED

The LED lamp status description			
Position of LED	Type of LED	Inverter status	LED status
A	PV voltage indicator light	PV voltage reaches grid voltage	Green light is on
		PV voltage does not reach the grid voltage	Light is not on
B	AC voltage LED pilot lamp	Inverter is in the grid state	Green light is on
		No AC voltage	Light is not on
		With AC voltage, inverter is in the grid countdown state	The green light flashes slowly,and the alarm or fault indicator light is not on
		With AC voltage, inverter is in a fault state	The green light flashes slowly,and the alarm or fault indicator light is steady red.
C	Alarm or fault indicator light	Inverter works normally	Light is not on
		Inverter is in alarm state	Red light flashes slowly
		Inverter is in fault state	Red light is on
D	Communication indicator light	Inverter has external communication, such as RS485, GPRS, etc.	Green light is on
		Inverter has no external communication	Light is not on
		Inverter upgrade or USB interface is reading and writing data	Green light flashes

E	Power or fault code indicator light	Inverter is in the grid state	The 8 LEDs from left to right represent the power of the inverter: if 8 green lights are on, it represents 100% of the inverter power. As shown in Figure 7.3, it represents 37.5% of the inverter power, and so on.
		Inverter is in fault state	The 8 LED lights from right to left represent the fault codes currently reported by the inverter. From right to left, they represent 1, 2, 4, 8, 16, 32, 64, and 128. For example, the first and fourth green LEDs on the right are always on, which means 1+8=9. In addition, add 200 to get 209, which means the inverter reports fault 209, and so on.

3.6.2 DC SWITCH Automatic breaking function of DC switch

DANGER	• The DC switch will automatically break off when the inverter appears "series reverse connection" and "series current reverse irrigation" alarm. Please check the fault type through monitoring data. After troubleshooting, wait for at least 15min, rotate the handle to "OFF" and then rotate the handle to "ON" for closing operation. • The DC switch will automatically break in the inverter (the alarm or fault LED is always red, both DC SWITCH will automatically break). After the switch is broken, please contact the customer service center, do not close the DC switch by yourself.



switch	description	meaning
DC SWITCH1, DC SWITCH2	ON	The DC switch is closed and has break protection capability.
	TRIP	The DC switch is in automatic split.(The switch is located between the ON, and the OFF.)

	OFF	The DC switch is in an off state.

3.6.3 AFCI detection function

AFCI (Arc Fault Circuit Interrupter) is a circuit protection device to prevent fire caused by faulty arc. For example, wire and other electrical insulation aging, damage, loose connection, the air moisture caused by electric breakdown may cause the generation of electric spark, that is, the arc.

The AFCI function of MAX 300-350K-X series machine is optional, and the testing equipment is assembled inside the machine. When the arc pulling on the PV input side of the machine, the CT on the PV input side will detect the arc pulling current, the machine will shut down, and the machine will display the corresponding fault information and the buzzer will ring, so as to avoid harm and economic loss to users.

Note: The AFCI is an optional function.

3.6.4 Power reduction

In order to ensure the safe operation of the inverter, the inverter will automatically reduce the output power when the operating environment is not in an ideal state.

The following are the possible power drop, please avoid during the operation of the inverter.

Unfavorable environmental conditions, such as inverter operating environment temperature, inverter heat dissipation is poor.

The percentage of power output of the inverter was set to non-100%.

Power grid over-frequency and over-voltage drop load.

The input PV voltage value is high.

The input PV current value is high.

4 Storage, unpacking, and handling

4.1 Inverter storage

- Do not remove the outer packaging of the inverter.
- Ensure that the storage is not affected by rain, snow, sun exposure, moisture and pollution and other harmful packaging environment.
- The finished product storage temperature is recommended to remain between-30℃ and + 60℃, the relative humidity is recommended between 0% RH and 100% RH, and ensure non-condensation.
- Ensure that the number and direction of the inverter stacking meet the requirements of the packing box identification, and there is no dumping risk after stacking.
- Please be very careful to prevent equipment damage and personal injury caused by the inverter from falling off.
- Do not store the inverter in the place of chemical corrosive substances, insect and rat infestation.
- If the storage time is more than two years, it must be checked and tested by a professional before operation.

	After the storage time is more than one month, the time and date of the inverter may be incorrect. Relevant Settings should be made before the inverter is connected to the grid. Please refer to the time and date of setting the inverter in Chapter 7.1 of this manual.

4.2 Unpacking

1> Before opening the inverter package, check the outer package for damage.

2> After opening the package, check whether the inverter is damaged or missing accessories. If damaged or missing, contact the manufacturer.

 **Information**	• It is recommended to remove the outer packaging of the products within 24 hours before preparing for installation.

The diagram of MAX 300-350K-X series inverter is as follows:

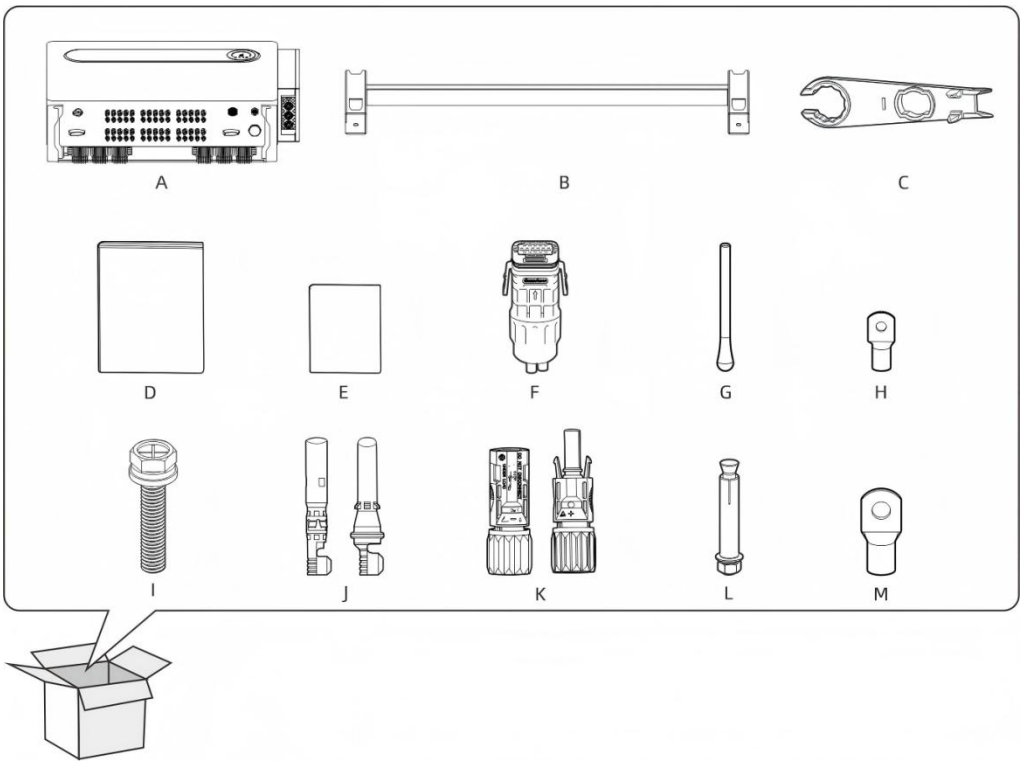


Figure 4.1 Drawing of inverter accessories

Mark	Descriptions	Number
A	Inverter	1
B	Wall mount	1
C	Removal tool of PV terminals	1
D	Installation manual	1
E	Warranty card	1
F	Communication terminal	1
G	Removal handle(opt)	2
H	DT70-8 ground terminal(opt)	1
I	Safety screw	2
J	PV terminal metal core	30/30
K	PV-terminalPV + terminal, PV- terminal	30/30
L	M10 * 90 Expansion screw	4
M	AC wiring copper terminal (opt)	3

Note: Although the packaging box of photovoltaic inverter is firm and durable, please take the box gently and properly handle the box.

4.3 Handling of the inverter

WARNING	• The MAX320K-X inverter weighs about 126 kg and requires 4-6 people to move it to the installation site. • When moving the inverter, do not use the hand on the terminal, because the terminal cannot bear the weight. • When placing the inverter on the ground, foam pads or cardboard must be placed under it to prevent damage to the heat sink.
CAUTION	• The inverter is heavy, please pay attention to keep the balance when handling, to avoid the machine falling and injuring the operator. • The power line interface at the bottom of the inverter and the signal line interface do not contact the terminal directly to the ground.

1> As shown in Figure 5.8 below, 4-6 people respectively put their hands into the packaging, lift the inverter out of the packaging, then install the handling handle, and move it to the designated installation position.

2> When handling the inverter, please keep the inverter balance.

Note: The front and bottom identification will be given on the packing box.

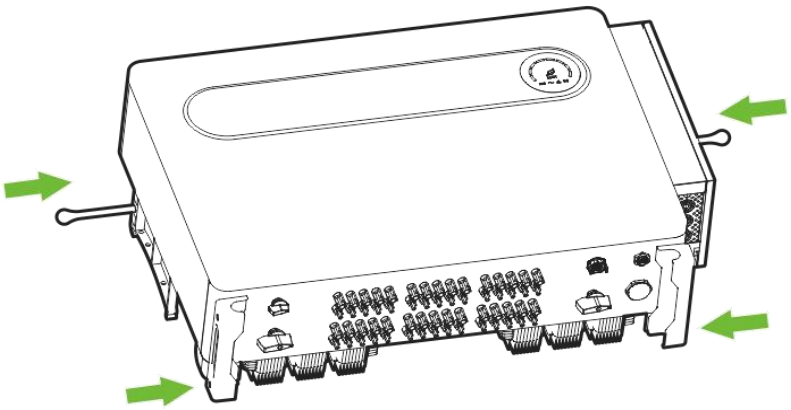


Figure 5.8 Mode of handling the inverter

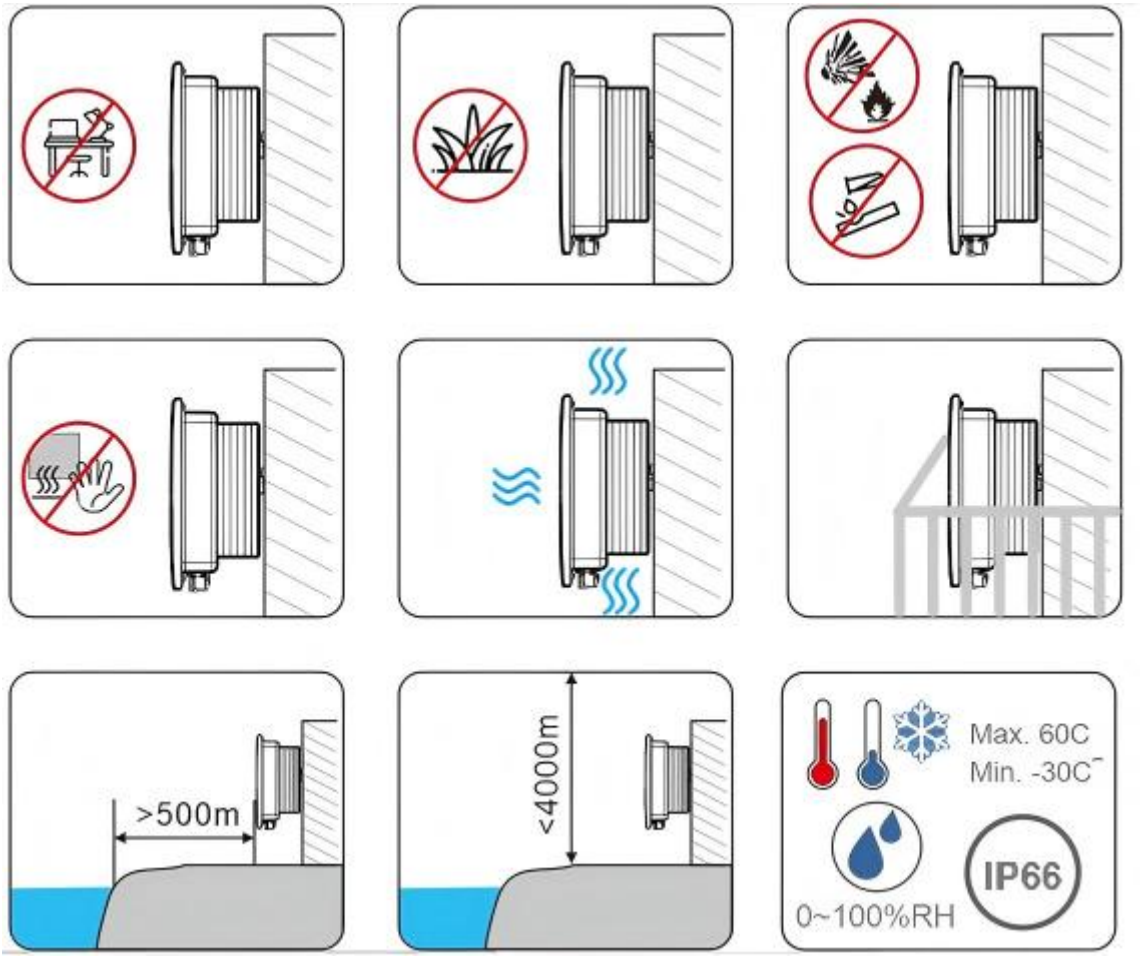
5 Installation

 CAUTION	● The inverter is heavy, please be careful to prevent falling off and injury. ● The power line interface at the bottom of the inverter and the signal line interface can not bear the load, do not contact the surface directly to the ground. ● When the inverter is placed on the ground, the foam or paper skin should be placed under it to avoid damage to the shell.

5.1 Basic Installation Requirements

5.1.1 Installation Environment Requirements

- The inverter has IP66 protection grade and supports indoor and outdoor installation.
- The inverter will produce some noise when running, so it is not recommended to install the inverter in the living area. If it is unavoidable, it is recommended that the inverter installation site is more than 25 meters away from the residential areas or adopt noise reduction measures.
- In residential areas, avoid installing the inverter on the wall of plasterboard or similar materials with poor sound insulation performance, lest the noise emitted during its work will affect the residents in the living areas.
- If the inverter is installed in a place with dense vegetation, in addition to routine weeding, the lower ground should be hardened and laid with concrete or gravel (recommended area: 3m 2.5m).
- Do not install the inverter in the area for storing flammable and explosive items.
- The case produces high temperature during inverter operation, so install it out of reach.
- If the inverter is installed in a closed environment, it is necessary to install a heat dissipation device or ventilation device, and the indoor ambient temperature is not higher than the external ambient temperature when working.
- The inverter cannot be installed in places where people can easily touch it.
- The inverter shall be installed in a dry and well-ventilated environment to ensure its heat dissipation performance.
- Equipment equipment in salt areas may be corroded, so do not install outdoors in salt areas. Salt damage areas are areas within 500 meters of the coast or affected by the sea breeze. Areas affected by the sea breeze will vary according to meteorological conditions (e. g., typhoons, seasonal winds) or terrain (such as dikes, hills).
- The elevation of the inverter should be lower than 4000m. When the altitude is higher than 2000m, the inverter will decrease.
- The inverter should avoid the sun, rain, snow, etc. It is recommended to install a sunshade on the upper part of the inverter.



5.1.2 Vector requirements

- Ensure that the strength of the installation surface meets the load-bearing requirements of the inverter, at least 4 times that of the inverter, and match with the inverter.
- Do not install the inverter on a carrier that may produce resonance.
- The installation carrier must be fire-proof and high-temperature resistant.

5.1.3 Angle requirements

- It is recommended to install vertical or 15°, which is conducive to heat dissipation
- Do not reverse the inverter, forward tilt, horizontal placement

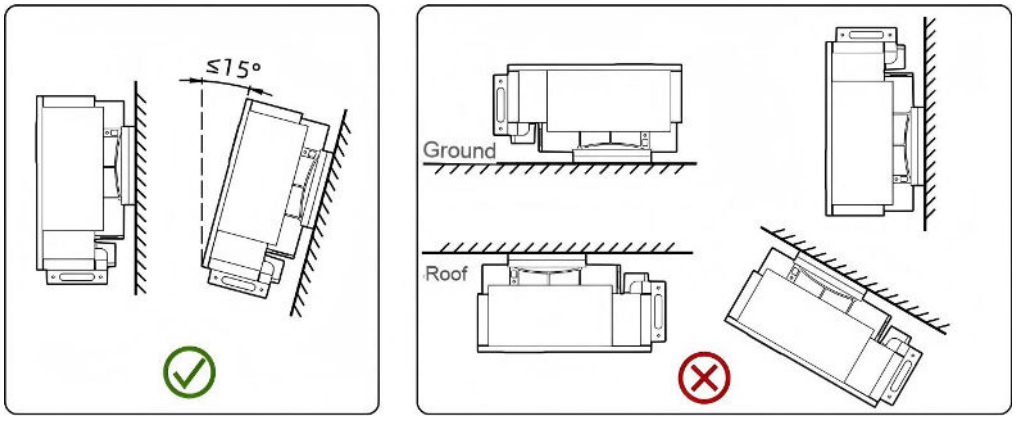


Figure 5.1 Schematic diagram of the inverter installation

5.1.4 Space requirements

- To ensure the optimal operation of the inverter and facilitate the bottom wiring and subsequent maintenance of the inverter, please leave enough space around the inverter.
- The temperature at the vents is relatively high. Therefore, the clearance requirements must be strictly observed, so as not to affect other equipment.

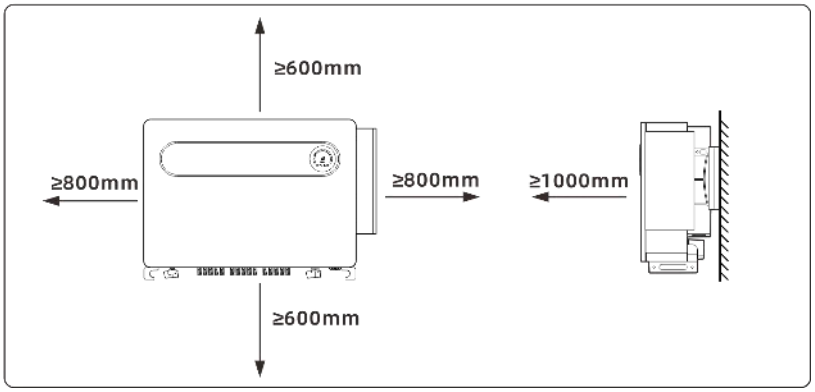


Figure 5.2 Description of the inverter installation gap

Install against the wall

- When installed near the wall, it is necessary to reserve the space for the air duct. At the same time, in order to avoid the backflow of air inlet and outlet air, the L-shaped windshield needs to be added. When the distance between the engineering installation parts and the wall is> 600mm, the windscreen may not be installed.
- L-shaped windscreen is recommended to use aluminum plate, thickness> 2mm, width is recommended d-10mm (d is the distance from the engineering installation parts to the wall).

One-word installation

When installing multiple inverters, refer to the following graphics to maintain the appropriate gaps:

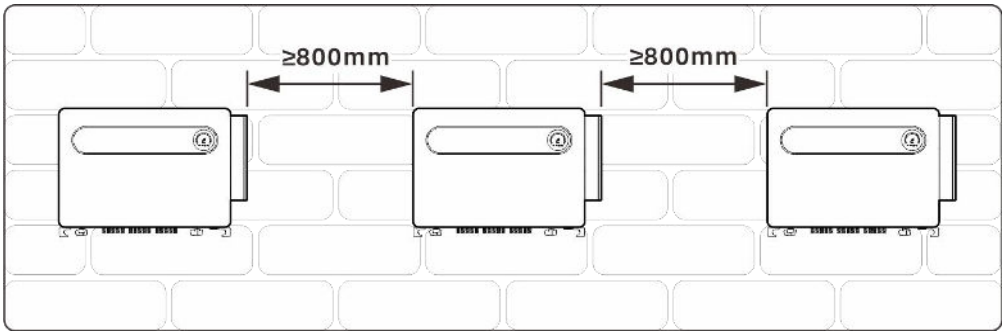


Figure 5.6 Installation distance parameters between inverters

Pin glyph installation

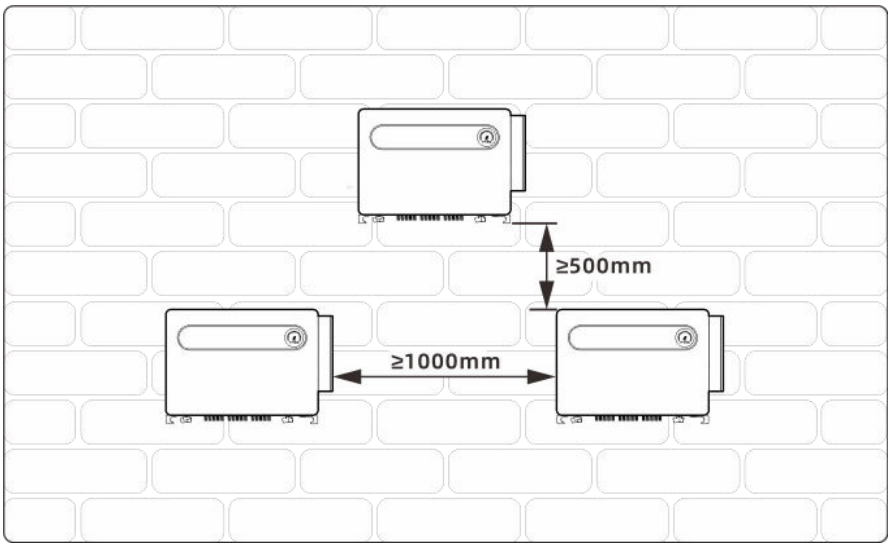


Figure 5.5 Installation distance parameters between inverters

5.2 Wall Mount Bracket Installation

DANGER	• In order to prevent inhaling dust or dust from falling into the eye during drilling, operators should wear protective goggles and dust mask. • When determining the installation location, avoid the pipes and wires embedded in the wall to prevent accidents during drilling.
WARNING	• After drilling, use a vacuum cleaner to remove all dust and debris in and around the hole and measure the hole spacing. For holes with large hole position errors, the holes should be re-drilled. • Ensure that the mounting bracket is horizontal to the cement wall surface. Otherwise, the inverter cannot be firmly installed on the wall.

Before installing the inverter, it is necessary to install the wall hanger provided by the accessories, so that the inverter can be firmly installed on the wall.

Step 1., Determine the hole position

Place the level in the predetermined mounting position, then place the wall mount over the level, and mark the hole position with a marker.

Step 2. Drilling the hole

Use a 10 mm drill hole in the marked position to a depth of 60 mm.

Step 3. Fixed with the mounting bracket

Hck the plastic expansion pipe with a hammer into the hole and secure the bracket in the plastic expansion pipe by tightening the screws.

Note: Expansion screws should be installed on a solid cement or brick wall with a wall thickness of at least 100mm.

Step 4. Verify the bracket is installed safely

Shake the holder by hand and check it for secure mounting.

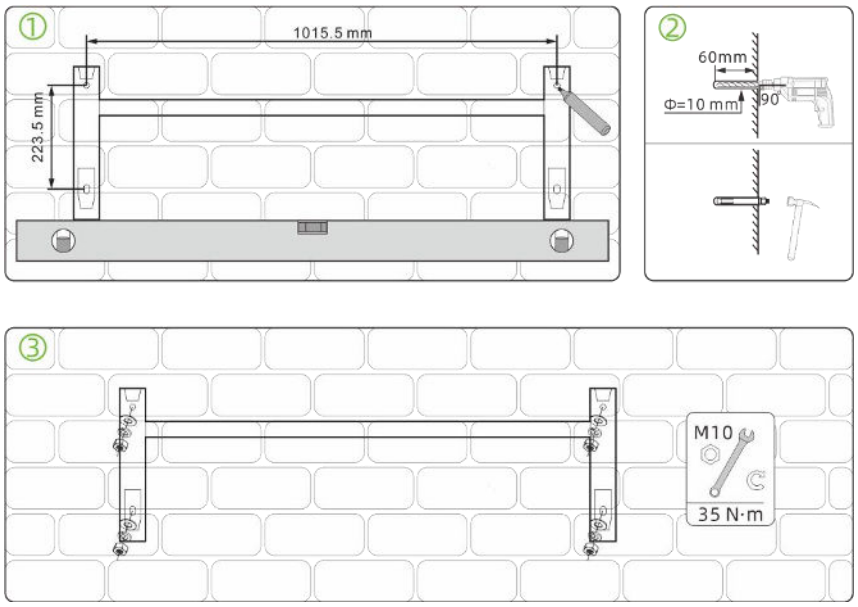


Figure 5.9 Dimension and installation mode of the wall-hanger

5.3 Install the inverter

Information	• Before installing the inverter, make sure that the wall hanger is firmly installed. • Electrical connection is possible only after confirming that the screws have been tightened.

step:

1> The lifting rope (to meet the bearing requirements of the product) shall be fixed on two supporting feet, as shown in the figure below.

2> Hang the inverter on the wall hanger and fix it with bolts. Please keep the inverter balance when hanging.

3> Check whether the inverter is firmly fixed, and lock all the screws.

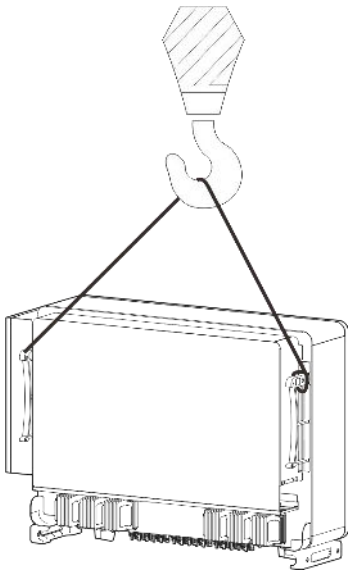


Figure. 5.12 Hoisting

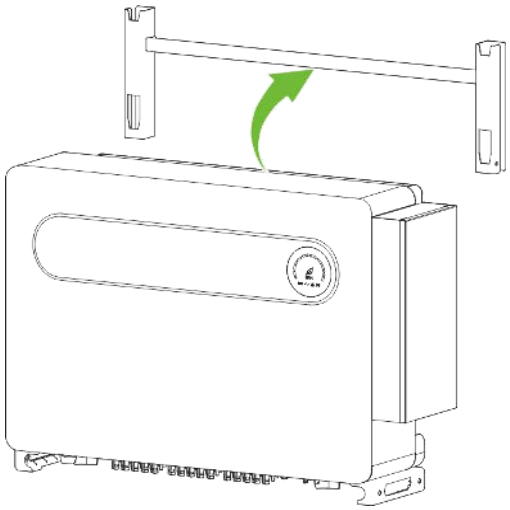


Figure 5.13 Hang on the wall mount

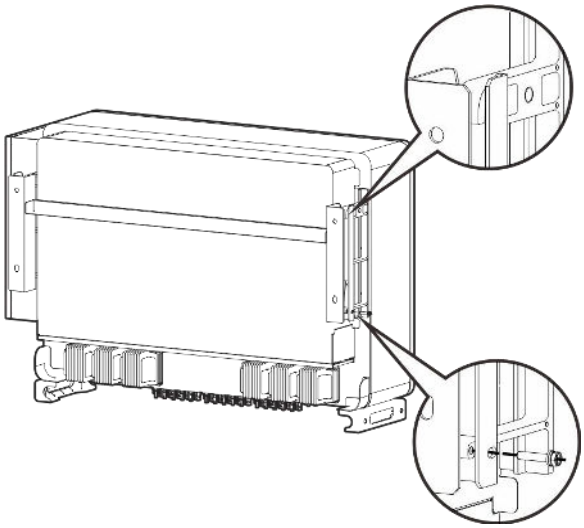


Figure 5.14 Fixed on the wall bracket

6 Electrical connection

6.1 Precautions

 **DANGER**	• Photovoltaic modules produce a high DC voltage in the DC cable. Before wiring, the inverter with a DC switch should ensure that the DC switch is in the OFF state. • It is recommended that fire equipment such as fire sand and fire extinguishers. • Wear insulation gloves and use insulation tools to prevent electric shock injury. • In the process of power cord laying, circling and twisting is strictly prohibited. If the length of the power cord is not enough, the power cord should be replaced again. It is strictly prohibited to make joints or solder joints in the power cord. • High pressure danger, do not touch the inverter. • Do not place inflammable and explosive items around the inverter.
 **WARNING**	• Observe the wiring instructions specified in the user manual; otherwise, any equipment damage caused by improper wiring will not be covered by the warranty. • Non-professional personnel shall not make any electrical connections. • Wear insulated gloves to prevent static damage to the inverter components. • It is recommended to use multi-core copper core cable. If aluminum wire is needed, please use copper-aluminum transition terminal for wiring. • Please ensure that the selected terminal can have direct contact with the copper bar. If in doubt, please contact the terminal manufacturer. • Ensure that copper strip and aluminum wire are not in direct contact or they will cause chemical corrosion and affect the reliability of electrical connection. • Avoid overstretching the cable, which may cause poor contact. • The use of cables in high temperature environment may cause aging and damage of the insulation layer, and the distance between the cable and the periphery of the heating device or heat source area should be at least 30mm.
 **ATTENTION**	• Cables of the same type should be bundled together, with a straight and neat appearance and no outer sheath damage. Cables of different types should be laid separately, and must not be entangled or crossed. • The cable slot and crossing holes should have no sharp edges, and the position of the cable crossing pipe or crossing holes should be protected to avoid the damage caused by sharp edges and burrs. • Buried cables need to be securely fixed using cable supports and cable clamps.

	The cables in the backfill area must be ensured to fit tightly against the ground to prevent deformation or damage caused by stress on the cables when backfilling. • When assembling the cable, please keep a certain distance from the inverter to prevent the cable debris from falling off the machine and causing a short circuit. • Machine damage caused by dust or moisture entry due to improper installation of the waterproof joint is not covered by the warranty. • The selection, erection and wiring of cables must follow the local laws, regulations and norms. • Cable specifications shall comply with local regulations. • When external conditions (such as laying method or ambient temperature, etc.) change, refer to IEC-60364-5-52 or local regulations and specifications for cable selection verification, such as whether the load flow rate meets the requirements.
Information	• The color of cables involved in the electrical connection diagram in this section is for reference only and the selection of cables shall comply with local cable standards

6.2 Prepare the cables

Cable specification (S is cross sectional area of AC output line conductor, SP is cross sectional area of protective ground wire conductor)

Number	Cable	Type	Recommended specifications	Source
1	DC cable	Outdoor photovoltaic cable	Conductor cross-section area: 4mm^2~6mm^2 Cable outer diameter: 5mm ~ 7.8mm	Prepared by the customer
2	AC output cable	Outdoor copper core cable	Conductor cross-section area: 120 mm^2~400mm^2 Cable outer diameter: 14mm~40mm	Prepared by the customer
3	Signal cable	Outdoor shielding of a twisted-pair cable	Conductor cross-section area: 0.25mm^2 ~ 1mm^2 Cable outer diameter: 4mm ~ 11mm	Prepared by the customer
4	PE cable	Outdoor copper core cable	Conductor cross-section area: SP ≥ S/2 Cable outer diameter: /	Prepared by the customer

Note: The value of Sp is only identical to the ground cable and the AC cable conductor. If the material is different, ensure that the equivalent conductivity of the grounding cable is consistent with the requirements in the table. Protection ground specifications are determined by this table or calculated according to IEC60364-5-54.

Minimum bending radius of the cable requirement

Cable form		Single core cable	Multi-core cable
Plastic insulated cable	No armor	20D	15D
	There is armor	15D	12D
Rubber insulated cable		10D	
Control cable	Non-armored, shielded flexible cables	/	6D
	Armored type, copper shield type	/	12D
Note: D is the outer diameter of the cable			

6.3 Prepare the AC circuit breaker

The external AC circuit breaker should be equipped with the inverter AC side to ensure that the inverter can be safely disconnected from the power grid.

DANGER	• If the specification of the AC circuit breaker used is higher than the recommended value or beyond the local requirements, the inverter may not be disconnected from the grid, which may cause serious damage. Gurewatt is not responsible for the consequences.
WARNING	• Each inverter must be equipped with an AC output circuit breaker, and multiple inverters cannot share the same AC circuit breaker.
ATTENTION	• It is the responsibility to prepare terminals for connecting the AC breaker.

AC circuit breaker specification

Inverter model	Selection specification of the circuit breaker
MAX 300K-X	400A/800Vac
MAX 320K-X	400A/800Vac
MAX 333K-X	400A/800Vac
MAX 350K-X	400A/800Vac

6.4 Connect the protective ground wire

DANGER	• Ensure that the ground cable is firmly connected without causing the risk of electric shock. • Do not use the N wire as a grounding cable to connect to the inverter shell,

	otherwise there is a risk of electric shock.
WARNING	• The PE point at the AC output terminal serves only as an equipotential connection point and should not be used instead of the protective contact site on the enclosure. • It is recommended to apply silicone or paint around the ground terminals after installation to prevent corrosion. • The lightning protection of the photovoltaic system shall comply with the international standards or IEC standards. Otherwise, it may cause damage to photovoltaic modules, accessories, inverters and power distribution facilities. In this case, the company is not liable for its consequences.
ATTENTION	• Do not damage the wire core during wire stripping. • Ensure that the wire connections are tight and reliable. • The pressing line can be covered with heat shrink pipe or insulation tape. The following introduction takes the use of heat shrinkable pipe as an example. When using a hot air gun, be careful to avoid baking the equipment.

In photovoltaic power generation systems, all non-current-carrying metal parts and the shell of the equipment need to be grounded.

A single inverter needs to ground the inverter PE cable, and multiple inverters need to connect all the inverter PE cables and photovoltaic array metal frame to the same ground to achieve equipotential connection.

MAX 300-350K-X series inverter grounding only remove the nut at the grounding position at the bottom of the machine and lock the grounding wire according to the figure below.

Note: 1. The machine is safely separated from the lightning protection ground and as far away as possible.

2. Pay attention to rain protection at the joint of the grounding wire terminal, and do not be directly exposed in the air.

3. When locking the housing grounding screw, the torque size is 60kgf · cm.

4. Improve the anti-corrosion performance of the grounding terminal. It is recommended to apply silica gel or paint outside the grounding terminal for protection.

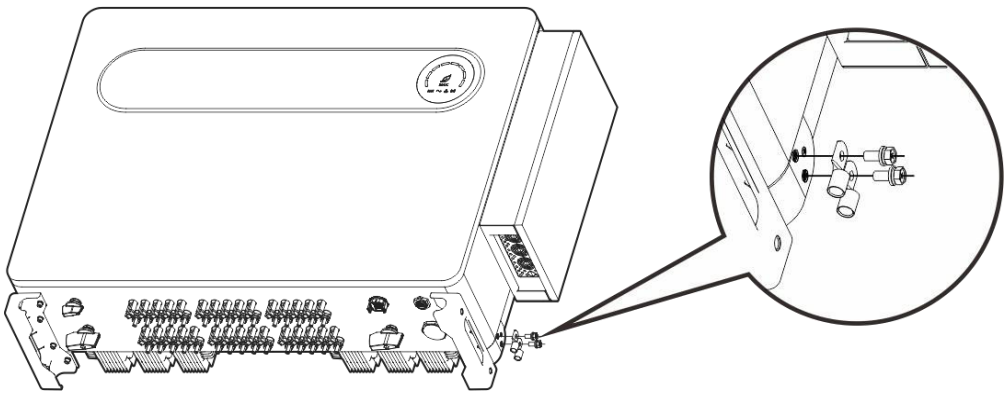


Figure 6.11 Schematic diagram of protective grounding

According to the IEC 61643-32 Guide for the Selection and Use of —— Surge Protectors connected to Photovoltaic Equipment, both household and outdoor photovoltaic power stations need to ensure that the photovoltaic system implements lightning protection measures.

WARNING	● Lightning protection measures of photovoltaic system shall be implemented in accordance with the corresponding national standards and IEC standards. Otherwise, photovoltaic equipment such as modules, inverters and distribution facilities may be damaged by lightning strikes. In this case, the company does not conduct the warranty and assume any liability.

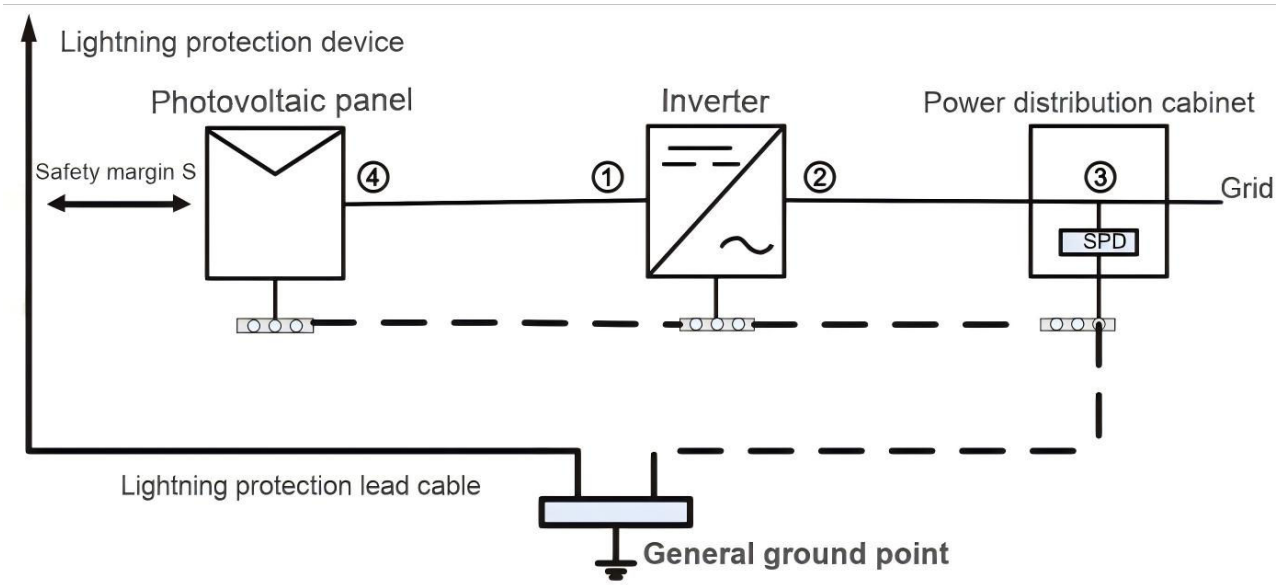


Figure 6.12 Lightning protection wiring of the inverter

1. It is generally recommended to install lightning protection devices (such as lightning rod / lightning belt and lead line) to prevent lightning from hitting the photovoltaic modules.

2. Lightning protection devices and lead lines and related equipment (including photovoltaic panels, inverters, cables, power distribution equipment) in the photovoltaic system should be maintained with safe spacing S.

S suggested value: according to the general 5 storey high (about 15m) building roof, S can take 2.5m, this distance can be simplified according to the inverse relationship of the height.

A. When the safe distance S is met:

The lightning protection module should be installed at the ①③ position in the figure. In general, it is recommended to install Type II in location ① and Type I in position ③.

B. When the safe distance S is not satisfied:

In addition to position ③, the type I lightning protection module shall be installed in Figure ①②④.

3. The lightning lead line and the equipment ground line finally sink into a common contact site, but the two cannot share the line. That is, the grounding wire of the equipment should be pulled out separately to meet the requirement of> 6mm² at the safety interval distance S.

6.5 Connect the AC output cable

DANGER	• It is forbidden to connect the load between the inverter and the AC switch directly connected to the inverter to avoid the mistripping of the switch. • An AC circuit breaker should be configured outside the AC side to ensure that the inverter can be safely disconnected from the power grid. • If the rating value of the AC circuit breaker is higher than the

	recommended specification or local regulations, the inverter may not be safely disconnected in time in case of abnormality, resulting in serious damage. Gurewatt is not responsible for the corresponding consequences.
WARNING	• Each inverter must be equipped with an AC output circuit breaker, and multiple inverters cannot share the same AC circuit breaker.
ATTENTION	• Be careful not to damage the wire core. • The cavity formed by the conductor of the OT terminal shall be completely wrapped around the wire core to ensure that the connection is tight and firm. • The pressing line can be covered with heat shrink pipe or insulation tape. The use of the heat shrink tube as an example. When using a hot air gun, be careful to avoid baking the equipment.

AC terminal wiring steps:

WARNING	● If the cable is thick, do not shake the inverter vigorously after tightening the cable terminal. Make sure that the terminal is well connected. To prevent the terminal from becoming loose, causing overheating and damage.

1> AC terminal on the inverter, R, S, T are three live wire channels.

Note: Screw are M12 screws.

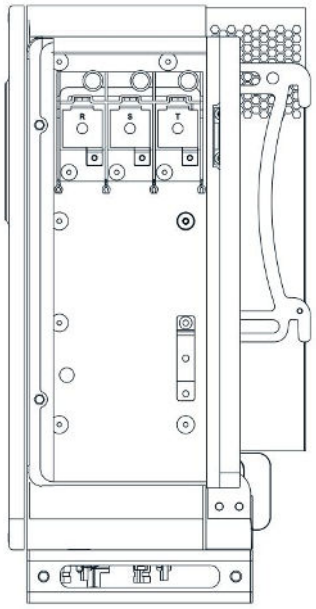
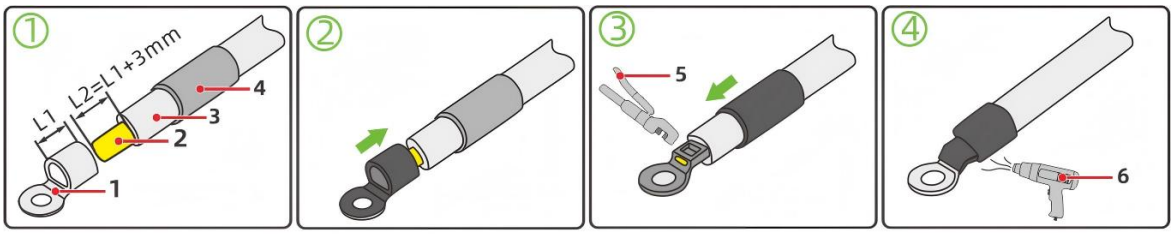


Figure 6.1 AC Terminal diagram of the inverter

2> Press the terminal

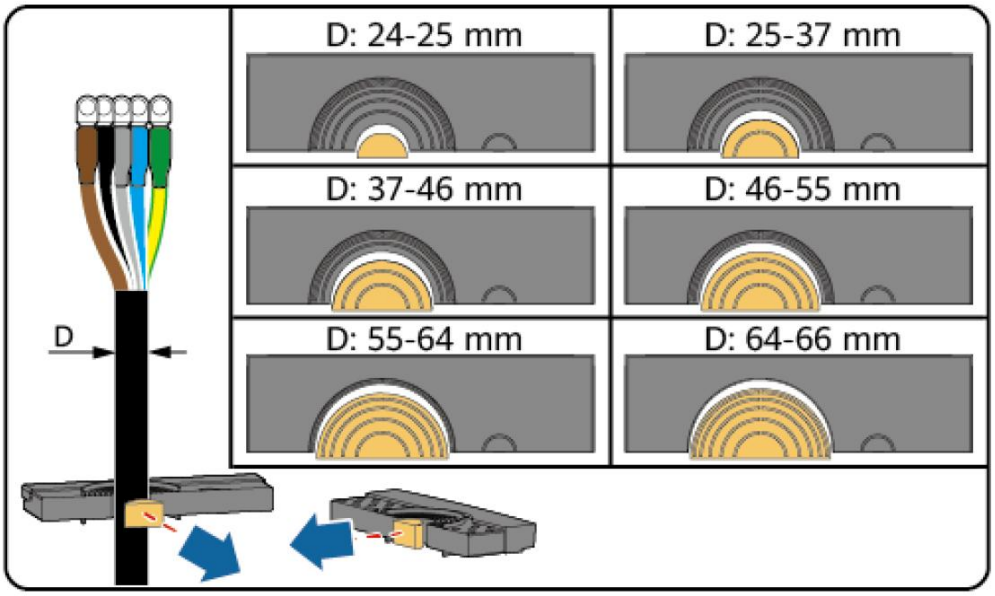
Diagram of pressing terminal:



(1) OT/DT terminal (2) Copper wire (3) Cable
(4) Heat Shrink Tubing (5) Hydraulic pliers (6) Heat gun

Figure 6.3 Schematic diagram of line terminal

3> First open the AC junction box, then pass the cable through the waterproof silicone insert, determine the length of the strip according to the specifications of the compression line terminal (30mm recommended), press the wire and the terminal with the compression wire clamp, and connect them to the corresponding channel respectively, and tighten the screws of each terminal.



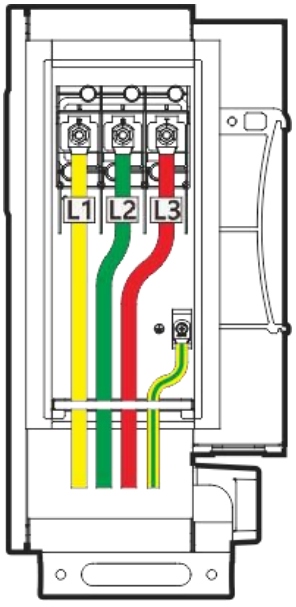


Figure 6.2. AC output wiring line diagram

Note: When fixing the cable to the corresponding terminal, ensure that the cables are parallel to each other and do not tilt, left and right.

4> After the installation of AC cable, firestop putty must be used to plug all the waterproof silicone pad to ensure good waterproof performance.

WARNING	● If the output terminal gap is not blocked as required, resulting in the machine failure, Gurewatt New Energy does not carry out quality warranty, and assume any responsibility.

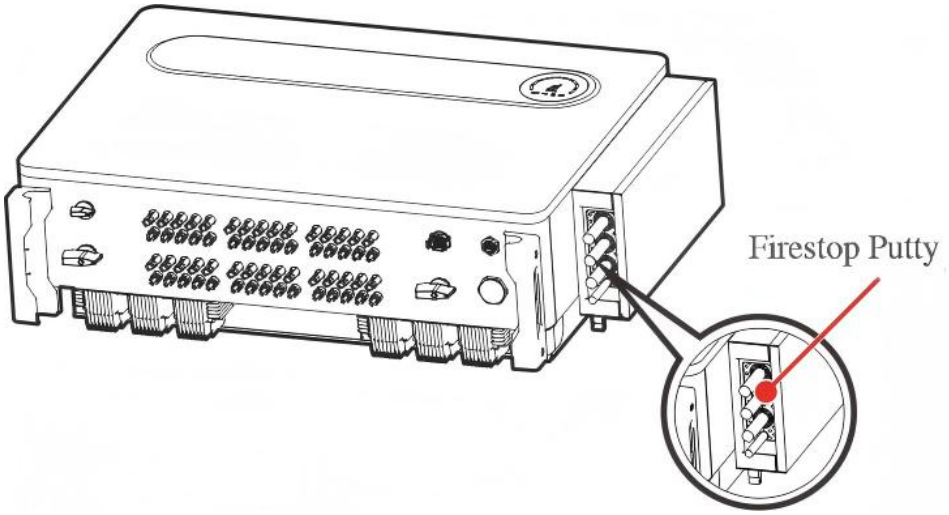


Figure 6.4 Schematic diagram of Firestop Putty

6.2 Connect the DC input cable

DANGER	• Before connecting the DC input cable, confirm that the DC voltage is within the allowable range (<36VDC), and ensure that the DC switch is in the OFF state. Otherwise, an electric shock may result. • When the inverter is running, do not maintain the DC input cable, such as connecting or removing the PV group string or its modules. Otherwise, it may lead to an electric shock. • If the inverter is equipped with a protective cover, and the DC input terminal is

	not connected to the photovoltaic group string, do not remove the waterproof cover of the DC input terminal, otherwise the protection level of the equipment may be affected.
 **WARNING**	• Ensure that the following conditions are met or that you may damage the inverter or create a fire hazard. In this case, Gurewatt assumes no responsibility for: • The maximum open circuit voltage for each string of PV panels shall not ever exceed 1500 Vdc. • When the voltage of each string of photovoltaic panel exceeds 1500V, the inverter stops the output. • The PV modules in each PV cluster shall be of the same specification and type. • The maximum short-circuit current per MPPT shall not exceed 80A in any case. The DC input module in each group string shall have the same specification and type. • The panel power should not exceed 1.5 times the maximum input power. • In order to optimize the system configuration, it is recommended to access the same number of photovoltaic modules on each route. • In the case of the inverter without the output isolation transformer, the negative electrode of the photovoltaic panel is charged and cannot be directly grounded. • Pay attention to the correct polarity when connecting the DC cable. The positive and negative electrodes of the photovoltaic group are respectively connected to the positive and negative electrodes of the inverter respectively. • If the DC cable is reversed, do not immediately operate the DC switch and the negative connector. In the evening, when the solar irradiance is reduced, the series current of the photovoltaic group drops below 0.5A, then let the DC switch be in the "OFF" state, remove the positive and negative electrode connector, and correct the DC input linear polarity.
 **ATTENTION**	During the process of installing the pv string and inverter, the equipment damage caused by the following conditions is not covered by the warranty: • Improper installation or incorrect wiring of the distribution cable leads to short circuit to the positive or negative electrode of the photovoltaic string, which may cause AC / DC short circuit during the operation of the inverter. • Ararc or connector overheating due to inadequate DC connector assembly. • The inverter damage caused by the PV group string connected to multiple inverters along the same road.

	• The PV side is not sealed, causing water vapor or dust to enter.

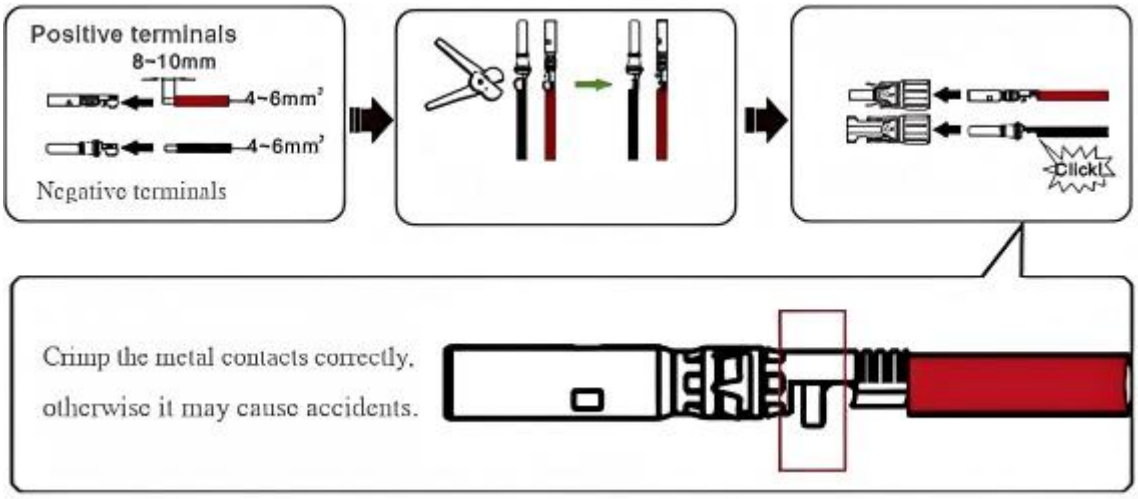
Note: the sunlight on photovoltaic panels will produce voltage, series after high pressure may lead to life danger, so before connecting the dc input line, need to photovoltaic panels with opaque material cover for operation, and ensure that the inverter dc switch in "OFF" state, otherwise inverter high voltage can lead to life danger.

6.2.1 Connect the PV terminals

WARNING	• Use the inverter package with the attached positive and negative electrode metal terminals and connectors. The use of positive and negative metal terminals and DC connectors of other incompatible models may cause serious consequences, and such equipment damage is not outside the equipment warranty. • Press the PV metal terminals with special wire pliers. The use of inappropriate wire pressing tools may cause serious consequences, and the equipment damage is not within the equipment warranty. • It is not recommended to avoid poor terminal contact caused by cable bending stress • Before assembling the DC connector, make sure that the cable polarity is correct, and complete the positive and negative cable labels. After the positive and negative electrode connectors are stuck in place, the DC input line is fastened without falling off. • During the site wiring, the DC input line should naturally droop no less than 50mm, the axial tension of the photovoltaic connector should not exceed 80N, and the radial stress or torque of the photovoltaic connector should be prohibited.

step:

1> Determine the length of the strip according to the specifications of the wire terminal, press the wire and the terminal with the wire clamp, and connect them to the corresponding connector shell respectively, and hear the clicking sound to ensure good connection. After the positive and negative electrode connectors are stuck in place, the DC input line is fastened without falling off.



2> The connector needs to be matched with the male head. Before the connection between the photovoltaic module and the inverter, that is, the positive electrode of the photovoltaic module is connected to the DC input terminal marked "+" of the inverter, and the negative electrode is connected to the DC input terminal marked "-".

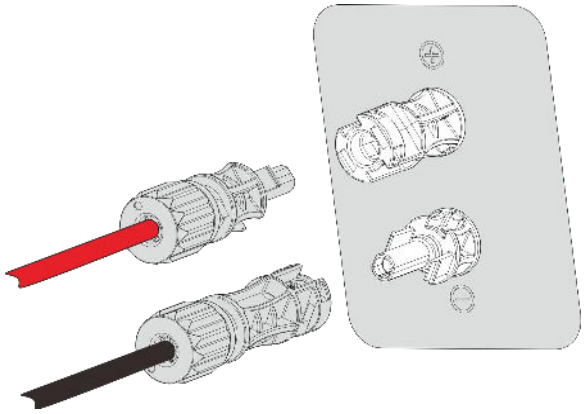


Figure 6.5 PV terminal connection diagram

3> If the machine side PV terminal is not connected temporarily, please use the blue dust plug to block it.

6.2.2 Terminal description

The inverter has 30 DC input terminals, of which PV 1 to PV 15 is controlled by DC SWITCH 1, and PV 16 to PV 30 is controlled by DC SWITCH 2.

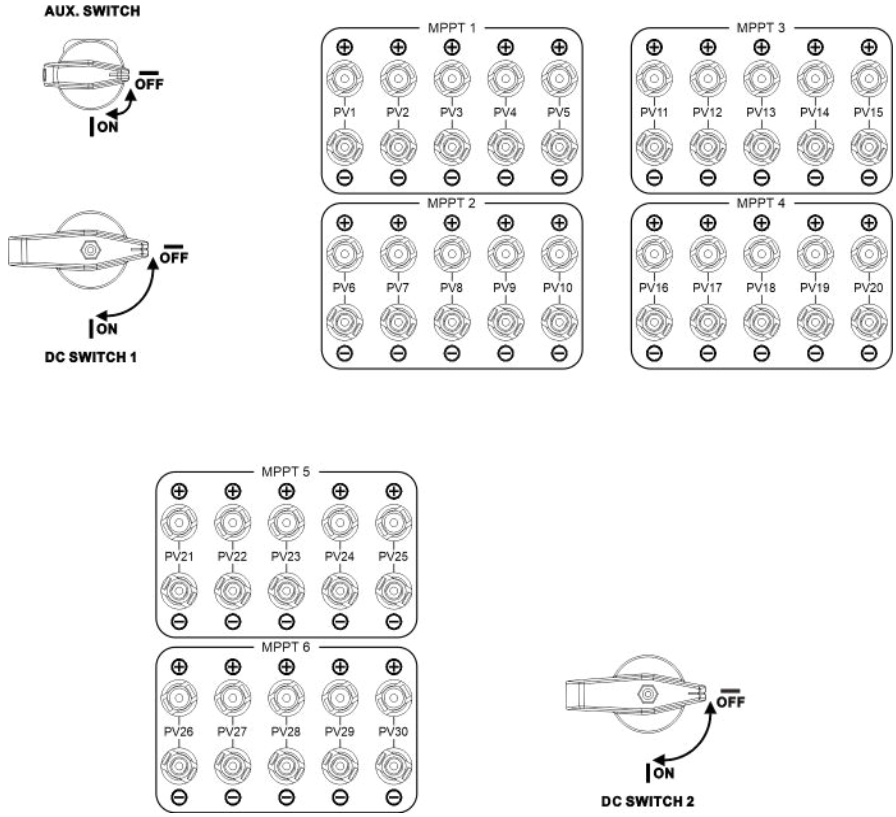


Figure 6.6 DC side switch and PV terminal diagram

The DC input terminal selection shall meet the following principles:

1. The PV group string must be connected to the PV 1 DC input terminal.

2. It is recommended to distribute the DC input terminals evenly on each MPPT.

3. Please prefer the white area terminal. If the white area terminal is full, then connect to the black area terminal.

For example, when the number of group strings is 24, PV5 / 10 / 15 / 20 / 25 / 30 is not connected, when the number of group strings is 25~29, the 25~29 group strings is connected to PV5 / 10 / 15 / 20 / 25 in turn.

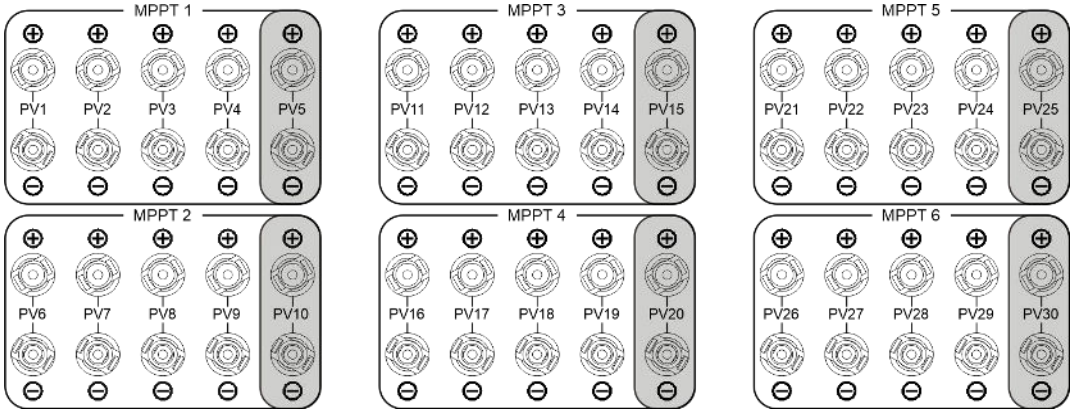


Figure 6.7 Division map of PV terminal regions

6.3 Connect the communication cable

6.3.1 The COM communication port

WARNING	• When arranging signal lines, separate them from the power cord and stay away from strong interference sources to avoid communication interruption. • If the signal line is not required, do not remove the pre-installed COM terminal dust cover of the inverter. • The tube terminal is pressed to the end of the signal line. Ensure that the connection is firm and does not fall off, otherwise it will affect the communication quality.

The COM port uses RS485, which can conduct single-machine communication or multi-machine (32 pcs) parallel long distance (500 meters), high speed (port rate 38400) communication. Communication line is recommended to be twisted pair in RS485. The communication line can be connected to pin 3 / 4 and the shielding layer can be connected to pin 1; when multiple machines are in parallel, two RS485-1 connections shall be used at the same time, and the shielding layer can be connected to pin 1 / 2 respectively, as shown in Figure 6.8.

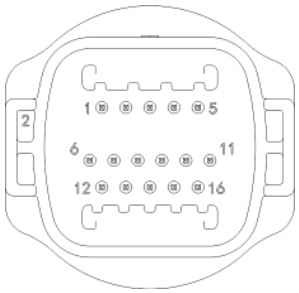


Figure 6.8 Communication port definition diagram

Port	PIN	Description	Port	PIN	Description
shield earthing	1/2	485-1 / 485-2 PE shield	DRMS	9	DRM1/5
RS485-1 IN	3	485-1 A1		10	DRM2/6
	4	485-1 B1		11	DRM3/7
RS485-1 OUT	5	485-1 A1		12	DRM4/8
	6	485-1 B1		13	REF/GEN
RS485-2	7	485-2 A1		14	DRM0/COM
	8	485-2 B1	RS485-1 Matching resistance	15/16	485-1 Matching resistance

pour:

1. When multiple inverters communicate in parallel, the lastmachine needs to add matching resistance. The method is to use a wire to connect the pin 15/16 together.

2. The inverter is shipped with two types of terminals. The performance of the two terminals is consistent, but only the appearance is different. The client needs to match the corresponding shape terminal to use.

The steps are as follows:

1> Remove the COM terminal waterproof cover and remove the waterproof plug.

2> Pass the cable into the lock nut, sealing ring and communication terminal components in turn.

3> Connect the RS485 communication line as defined in the above figure.

I. Peel off the protective layer and insulation layer of appropriate length and insert it into the terminal;

II. Using tools;
III. Wiring according to the definition of Figure 6.8 RS485 communication interface.

4> Attach the cable to the terminal hub and connect to the RS485 port.

5> Gently pull the cable backward, and assemble the lock nut, sealing ring, and communication terminal components in turn.

6> Tighten the lock nut clockwise.

Note: When locking the RS485 cable terminal, the recommended torque is 4kgf * cm.

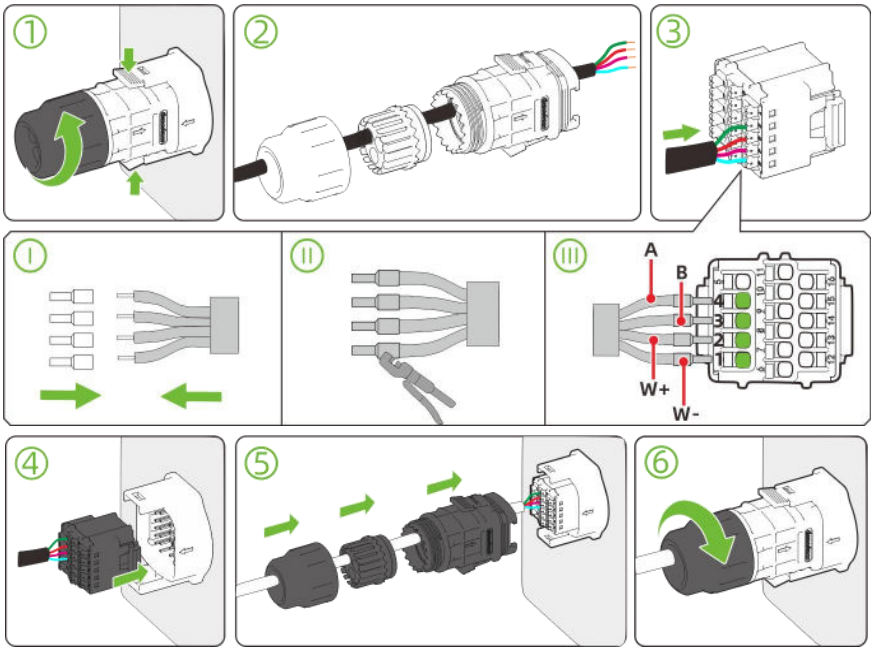


Figure 6.9 RS485 wiring diagram

6.3.2 USB monitoring port

WARNING	The USB-type COM port will only allow a connection to the Gurewatt collector.
Information	• The collector is an optional accessory, and the user needs to purchase it separately. • Refer to Section 7.2 for details on commissioning the inverter.

MAX 300-350K-X series inverter, standard with USB interface, which can be connected to USB to WIFI module, Shine WIFI-X, Shine 4G-X, Shine Link-X and other optional monitoring modules, to achieve monitoring function. In addition, you can also quickly update the software through the U disk.

Step of installing the monitoring module:

1> Remove the USB interface waterproof cover and remove it;

2> As shown in Figure 6-8, insert USB to WIFI module into the USB interface, when USB to WIFI module LED lights on.

3> Make sure the △ is up, insert the monitoring module into the USB port, and tighten the screws.

Note: When the operator leaves, please take the monitoring module and data cable away and tighten the waterproof cover to avoid water into the interface.

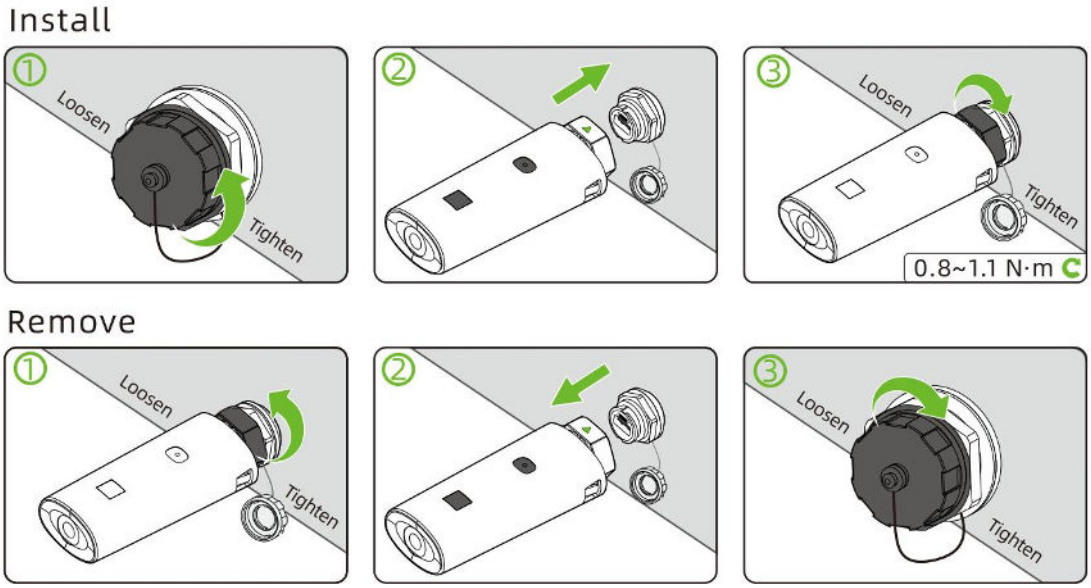


Figure 6.10 Installation steps of the monitoring module

7 Debug

7.1 Power up on the inverter

 **DANGER**	• Before electrical connection, make sure that the inverter DC switch is in "OFF" state and disconnect the AC side switch, otherwise the high voltage of the inverter may cause life danger. • Must be operated by professional electrical or mechanical personnel and follow this manual and relevant local regulations. • Before the photovoltaic module and the inverter, please confirm the positive and negative electrodes. • High pressure danger, do not touch the inverter. • Do not place inflammable and explosive items around the inverter.
 **WARNING**	• Make sure the following conditions are met or they may cause a fire hazard or damage to the inverter. In this case, Gurewatt New Energy does not carry a warranty and assume any responsibility. • Before the equipment is powered on for the first time, the professionals should set the parameters correctly. The wrong setting may cause the equipment to match the grid connection requirements of the country / region and affecting the normal operation of the equipment. • Before closing the AC switch between the inverter and the power grid, use the multimeter AC voltage range to measure whether the AC voltage is within the allowable range. • When the inverter is not running for more than half a year, the inverter needs to be checked and tested by professionals before it can be put into operation • For the first time of the system, we must ensure that the PV1 has an access group string and the "AUX. SWITCH" is closed first. The "DC SWITCH 1" and "DC SWITCH 2" are not closed until the PV connection indicator is always on green and the alarm indicator is always red on, and then the "AUX. SWITCH" is disconnected. The company will not be responsible for the damage of the equipment caused by the operation in this order. • When the grid-connected indicator light is always on in green (the inverter is in the grid-connected state), it is forbidden to close the DC switch again, otherwise the inverter may be damaged due to no insulation impedance detection • The DC switch has the function of automatic breaking. If the wiring connection is reverse and the photovoltaic panel configuration is not reasonable, the DC

	switch will trigger automatic disconnection protection. Please check the alarm and confirm the alarm disappears before closing the DC switch. The equipment damage caused by the forced closing of the DC switch is not within the warranty range. • When the system is powered on or running, the rotation stroke of the DC switch handle prevents the obstacles (such as the cable or the operator holding the handle), otherwise the DC switch will not be automatically broken.

Power-on steps:

Step 1 Ensure that the PV1 has an access group string and that the AUX. SWITCH, DC SWITCH 1, and DC SWITCH 2 are all disconnected.

Step 2 Place the inverter "AUX. SWITCH" switch in the "ON" position and hear a click indicating that the switch is completely closed.

Step 3 Observe the LED indicator. If the PV connection indicator is green and the AC indicator is red, place "DC SWITCH 1" and "DC SWITCH 2" in the "ON" position.

Step 4 to disconnect the AUX. SWITCH.

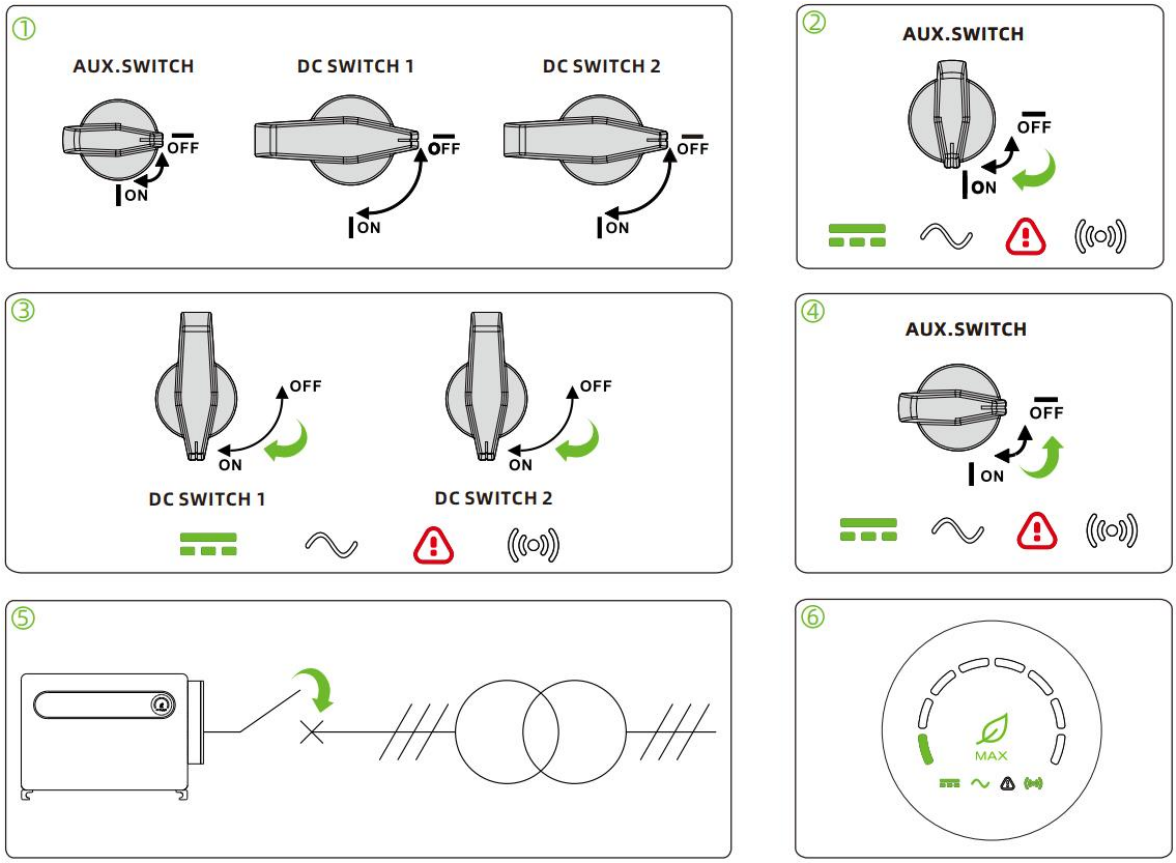
Step 5: Close the AC switch between the inverter and the power grid

Step 6 Observe the LED indicator light and see the running status of the inverter. If the inverter is operating normally, the LED indicator has no red light and the LED power indicator is always on.

Step 7 is set by APP or ShineBus, see 7.2 Test inverter for details.

Note: After 1min, if the PV connection indicator light is not on, the "DC SWITCH" is not closed. Meanwhile, immediately disconnect "AUX. SWITCH" and check whether the input cable is reversed or the input voltage meets the start voltage requirements. After correction, perform step 3 again. If the PV connection indicator is not on, break the "AUX. SWITCH" and contact the technical support engineer.

Note: "AUX. SWITCH" only needs to be closed for the first power on and disconnected during subsequent operation.



7.2 Debug the inverter

	After the storage time is more than one month, the time and date of the inverter may be incorrect, and relevant Settings should be made before the inverter is connected to the grid.

7.2.1 Set the inverter address address

After the inverter is started normally, the inverter communication address can be set through RS485 or USB to WIFI module. When the inverter communicates through RS485, set the inverter to different mailing address; When the single communication, directly use the default mailing address 1.

Note: The inverter address address can be set to 1~254.

7.2.1.1 ShineBus Set 485 address

The inverter RS485 address can be modified by the upper computer software ShineBus, which is performed by professionals.

7.3 Operation mode

7.3.1 Waiting mode

When the DC voltage is> 500V, the inverter will power up and enter the "waiting" state.

In this mode, the inverter detects the system parameters. If the system is normal, and the voltage 500V inverter will try to connect to the grid.

7.3.2 Working mode

In this mode, the inverter works normally, and the power and fault code LED indicator light shows the power transmitted by the inverter to the power grid. When the DC voltage is 500V, the inverter will convert the DC power generated by the photovoltaic modules into AC power and deliver it to the grid. When the DC voltage is <500V, the inverter enters the "waiting" state and tries to connect to the grid. In this state, the inverter consumes only a small power to detect the state of the internal system.

Note: When the PV module provides enough power (voltage> 500 Vdc), the inverter will be automatically activated.

7.3.3 Failure mode

The intelligent control system of the inverter will constantly monitor and adjust the state of the system. When the inverter detects any fault, the alarm or fault LED indicator is running red or flashing red light, and the power and fault code LED indicator shows the fault information.

Note: Refer to Chapter 99.2 for specific fault information.

7.3.4 Shutdown mode

When the light is very weak or no light, the inverter will automatically stop working. When in shutdown mode, the inverter does not consume the energy from the grid or the solar panels.

Note: When the DC voltage of the PV group string is too low (500 Vdc), the inverter will enter the shutdown mode.

8 System maintenance

To ensure long-term reliable operation of the system, it is recommended to perform regular maintenance following the instructions in this section.

 **DANGER**	• If the inverter is connected to the DC / DC high voltage controller and the off-grid mode is enabled, and the AC circuit breaker between the inverter and the power grid is disconnected, the inverter will output 230 / 240V in the off-grid mode. Before maintaining the system, make sure that the DC switch on the DC / DC HP controller is placed in the OFF status.
	• After the system power down, there may still be residual power and heat in the inverter, which may cause electric shock or burn. Please wait for 15 minutes after the system is powered on, and wear the protective gloves before operating the inverter.

8.1 Power off the system

Follow the following steps to power off the system:

Step 1. Close the AC circuit breaker between the inverter and the power grid.

Step 2. Place the DC switch on the inverter in the OFF status.

Step 3. If there is a DC circuit breaker between the inverter and the photovoltaic equipment, please disconnect the DC circuit breaker.

Step 4. If the inverter is connected to the battery, place the DC switch on the battery in the OFF state.

8.2 Inspection item and maintenance frequency

Inspection item	Scope of examination	Interval
cleaning	Check the radiator and fan regularly for dust blockage.	Annually
running state	Check whether the appearance of the inverter is damaged or deformed; Check for any abnormal sound during the operation.	Once every half a year
	Check the system running status on the APP.	fix a date
wiring	Check for poor cable contact or loose connection. Check the cable for damage. Check the terminal junction for melting.	Once every half a year
landing	Check that the ground wire is firmly connected.	Once every half a year
seal	Check the sealing of all the terminals and interfaces.	Once every half a year
environment	Patrol the environment around the inverter and remove weeds in time	Annually

8.2.1 Clean up the inverter

	• Please disconnect the AC and DC switches for at least 5 minutes before the capacitance discharge is fully operated. If the inverter is contaminated with dust,

DANGER	please wipe the housing with clean water.

1> Check the humidity and dust around the inverter, and clean the inverter when necessary;

2> Observe whether the inlet and outlet air is normal. If necessary, clean the inlet and outlet or the fan as described in 9.2.2.

8.2.2 Clean the dust net and fan

DANGER	• Must be operated by trained professional electrical technicians and follow the manual instructions. • Please disconnect the DC and AC switches for at least 15 minutes to avoid danger. All operations after power off.
WARNING	• Do not use the air pump to clean the fan, and may cause fan damage.

When the inverter works in a high temperature environment, good ventilation and heat dissipation can effectively reduce the probability of load reduction. The inverter is equipped with a cooling fan. When the internal temperature is too high, the fan works to reduce the internal temperature. If the inverter reduces the output power due to the high internal temperature, the possible reasons and countermeasures are as follows:

• If the fan is blocked or has excessive dust on the heat sink, the fan, fan dust filter or heat sink should be cleaned;

• The fan is damaged and it needs to be replaced;

• The installation position of the inverter is poorly ventilated, and the appropriate installation position should be selected according to the basic installation requirements.

• Cleaning and replacement steps of dust filter and fan:

1. Replace the dust filter screen

1> Remove the fan fixing plate screw with a cross screwdriver, as shown below:

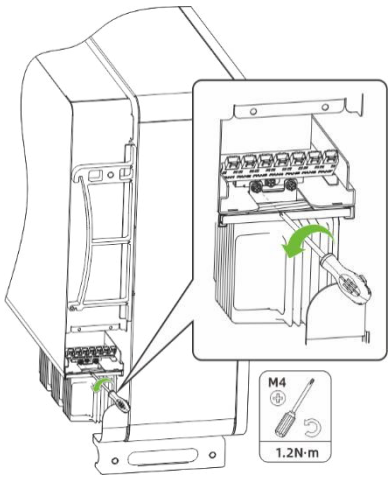


Figure 9.1 Replace the dust filter 1

2> Remove the dust filter and remove the connecting screw with a cross screwdriver

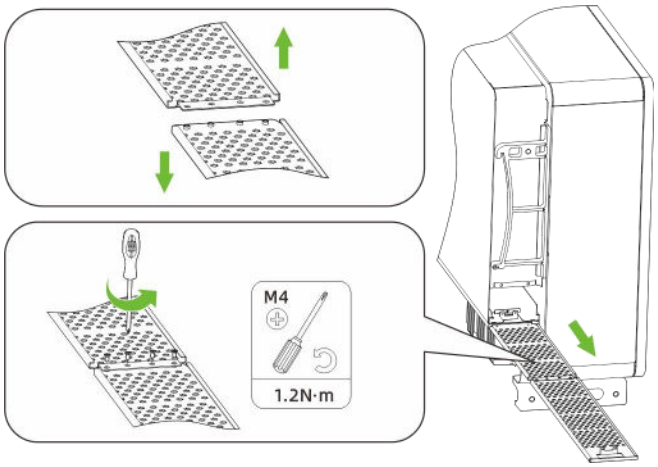


Figure 9.2 Replace the dust filter 2

3> Remove the cross screwdriver and remove the top air filter

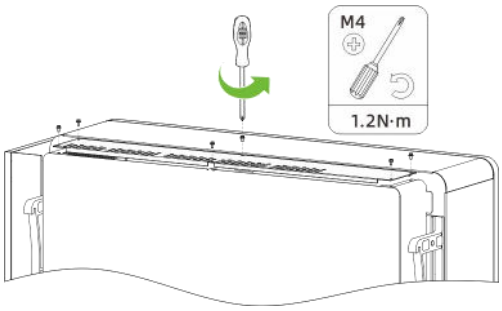


Figure 9.3 Replace the top dust filter

2. Replace the fan

1> Remove the fan fixing plate screw with a cross screwdriver, as shown below:

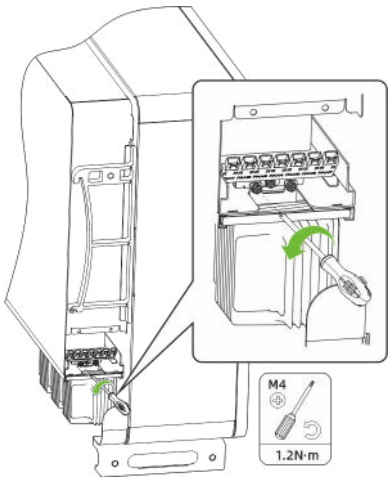


Figure 9.4 Replace the fan 1

2> Disconnect the fan connector, then remove the internal screw of the fan fixing plate with a screwdriver, and finally remove the fan, as shown below:

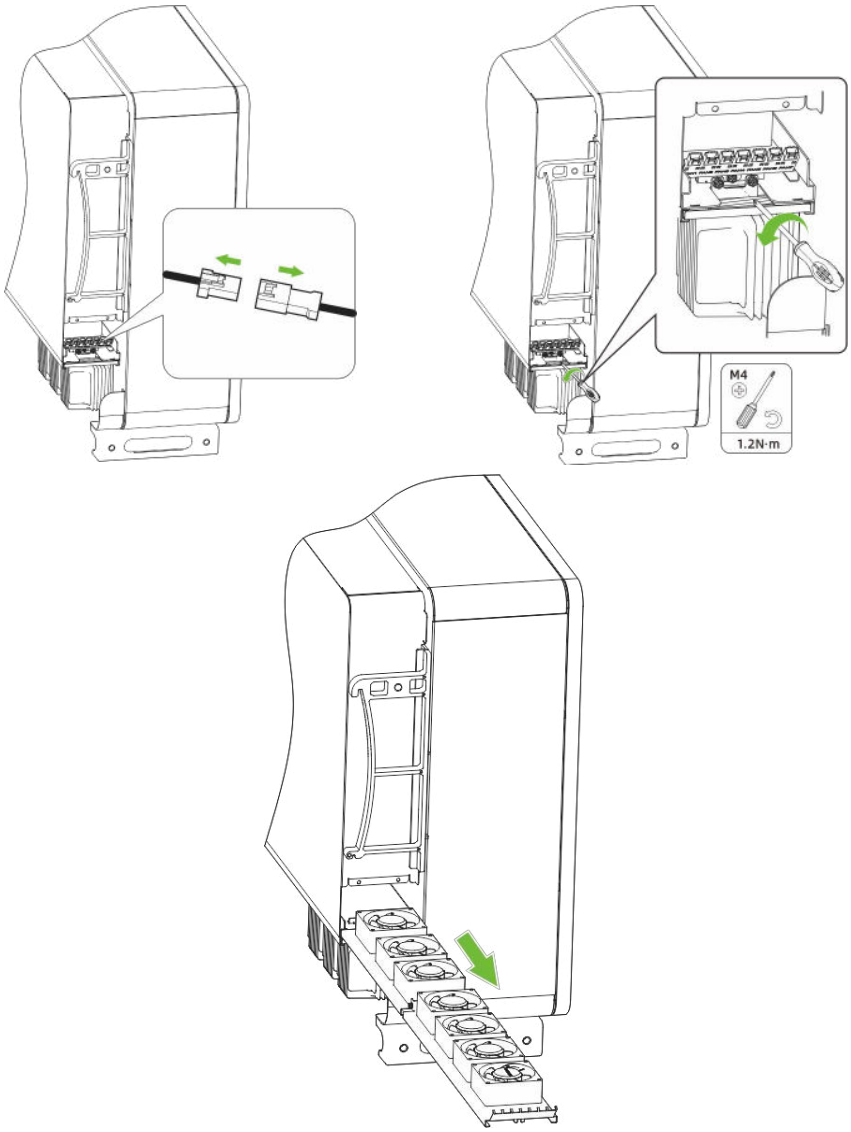


Figure 9.5 Replace the fan 2

4. Clean the fan, fan protection net and heat sink or replace the fan.

- Clean the heat sink with an air pump, and clean the fan and fan protection net with a brush or wet cloth;
- If necessary, each fan can be removed and cleaned separately;
- Use the cross screwdriver to remove the fan that needs to be replaced and replace a new fan;
- Arrange the wiring harness and tie the belt to fix it;

5. Reinstall the fan fixing plate and the inverter.

9 Shutdown treatment

9.1 Stop running the inverter

If the inverter is no longer running in the future, it shall be properly handled. The steps are as follows:

1> Disconnect the external AC circuit breaker and prevent reconnection by misoperation.

2> Turn the DC switch to the OFF position.

3> Wait at least 15 minutes until the internal capacitance is fully discharged.

4> Remove the AC connection cables.

5> Remove the DC connection connections.

6> The inverter is removed from the wall.

9.2 Packaged inverter

If there is the original packaging, please put the inverter in the original packaging box, and tie it with adhesive tape. If no original packaging, put the inverter in a carton for its size and weight.

9.3 Store the inverter

Store the inverter in a dry place with recommended temperatures between-30°C and 60°C.

9.4 Disposal of the inverter

	It is forbidden to treat the product together with household garbage, but should be treated in accordance with the local applicable disposal regulations of waste electronic equipment

10 Product specifications

Model / Specifications	MAX 300K-X	MAX 320K-X	MAX 333K-X	MAX 350K-X
Input data (DC)				
Max. recommended PV power (for module STC)	450000W	480000W	499500W	528000W
Max. DC voltage	1500V			
Start voltage	500V			
Nominal voltage	1080V			
MPP voltage range	500V-1500V			
No. of MPP trackers	6			
No. of PV strings per MPP tracker	5			
Max. input current per MPP tracker	80A			
Max. short-circuit current per MPP tracker	100A			
Output data (AC)				
AC nominal power	300000W	320000W	333000W	352000W
Max. AC apparent power	333000VA	352000VA	366300VA	352000VA
Nominal AC voltage/range	800V 640-920VAC			
AC grid frequency/range	50/60Hz 45-55Hz/55-65Hz			
Max. output current	238A	254A	264A	254A
Power factor (under rated power)	>0.99			
Adjustable power factor	0.8leading ...0.8lagging			
THDi	<3%			

Model / Specifications	MAX 300K-X	MAX 320K-X	MAX 333K-X	MAX 350K-X
AC grid connection type	3W+PE			
Efficiency				
Max. efficiency	99.03%			
Euro-eta	98.53%			
Protection devices				
DC reverse polarity protection	Yes			
DC switch	Yes			
DC surge protection	Type II			
Insulation resistance monitoring	Yes			
AC surge protection	Type II			
AC short-circuit protection	Yes			
Grid monitoring	Yes			
Anti-islanding protection	Yes			
Residual-current monitoring unit	Yes			
String monitoring	Yes			
Anti-PID function	Optional			
AFCI protection	Optional			
General data				
Dimensions (W / H / D)	1145*790*371mm			
Weight	126kg			
Operating temperature range	-30℃ - +60℃			

Model / Specifications	MAX 300K-X	MAX 320K-X	MAX 333K-X	MAX 350K-X
Altitude	5000m(>4000m derating)			
Nighttime power consumption	<1W(Note1)			
Topology	Transformerless			
Cooling	Smart air cooling			
Protection degree	IP66			
Relative humidity	0~100%			
DC connection	H4/MC4(Optional)			
AC connection	OT/DT terminal			
Display and communication				
Display	LED/WIFI+APP			
RS485/USB	Yes			
PLC/WIFI/GPRS/ 4G	Optional			
Warranty: 5 / 10 years	Optional			
Note1: With AC power supply, the night loss is <25W.				

11 Troubleshooting

 **DANGER**	● Must be operated by trained professional electrical technicians and follow this manual. ● When the insulation impedance of the wrong panel is reported, the casing may have grounding problems, so do not touch it. ● High pressure danger, beware of electric shock

11.1 System protect code

The protection code identifies the current status of the MAX 300-350K-X inverter. The protection code does not refer to faults. When a protection code appears, it can be cleared by orderly shutting down, resetting, or self-correcting the inverter. The protection codes are shown in the following table:

Protect Code	Warning description	propose
Protect 200	PV string fault	1. Check if the PV panels are normal after shutdown. 2. If the error message persists, contact Growatt support.
Protect 202	DC SPD function abnormal	1. Check the DC SPD after shutdown. 2. If the error message persists, contact Growatt support.
Protect 203	PV1 or PV2 short circuited	1. Check if PV1 or PV2 is short circuited. 2. If the error message persists, contact Growatt support.
Protect 206	AC SPD function abnormal	1. Check the AC SPD after shutdown. 2. If the error message persists, contact Growatt support.
Protect 310	The voltage difference between the N line and the PE cable is abnormal	1. Check if the PE cable is reliably connected after shutdown. 2. If the error message persists, contact Growatt support.
Protect 400	Fan failure	1. Check if the fan is properly connected after shutdown. 2. If the error message persists, contact Growatt support.
Protect 407	Over-temperature	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Protect 408	NTC temperature sensor is broken	1. Restart the inverter. 2. If the error message persists, contact Growatt support.

Note: If the fault persists, please contact Gurewatt New Energy.

11.2 System error code

The error code indicates that the equipment is damaged or abnormal, and any operation should be conducted by professionals. After the error is cleared, the machine stops reporting the error. Some errors are irreparable errors, please contact Gurewatt New Energy.

Error Code	Fault description	Troubleshooting
Error 200	DC arc fault has been detected	1. After shutdown, check the connection of the PV string. 2. Restart the inverter. 3. If the error message persists, please contact Growatt support.
Error 201	An excessively high leakage current has been detected	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 202	PV input voltage exceeds the upper	1. Disconnect the DC switch immediately and check the voltage. 2. If the PV input voltage is within the permissible range and the

	threshold	error message persists, please contact Growatt support.
Error 203	PV panels have low insulation resistance	1. Check if the PV strings are properly grounded. 2. If the error message persists, please contact Growatt support.
Error 300	Grid voltage is beyond the permissible range	1. Check the grid voltage. 2. If the grid voltage is within the permissible range and the error message persists, please contact Growatt support.
Error 301	AC terminals reversed	1. Check the connection of the AC output terminals. 2. If the error message persists, please contact Growatt support.
Error 302	No utility grid connected or utility grid power failure	1. After shutdown, check the AC wiring. 2. If the error message persists, please contact Growatt support.
Error 303	The voltage difference between the N line and the PE cable is abnormal	1. After shutdown, check if the ground cable is reliably connected. 2. If the error message persists, please contact Growatt support.
Error 304	Grid frequency is beyond the permissible range	1. Check the grid frequency and restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 402	High DC component in output current	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Error 404	Bus voltage sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 405	Relay failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 408	Over-temperature	1. After shutdown, check the temperature of the inverter and restart the inverter after the temperature is within the acceptable range. 2. If the error message persists, please contact Growatt support.
Error 409	Bus voltage abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 410	Abnormal voltage across the flying capacitor	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 411	Internal communication failure	1. Check the wiring of the communication board after shutdown. 2. If the error message persists, please contact Growatt support.
Error 415	Auxiliary power supply abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 416	DC/AC overcurrent protection	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 420	GFCI module abnormal	1. Check the GFCI module after shutdown. 2. If the error message persists, please contact Growatt support.
Error 421	CPLD abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.

Error 423	PWM pass-through signal failure	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 425	AFCI self-test failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 426	DC current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 427	AC current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.

12 Quality assurance

Please refer to the relevant documents

13 Contact us

If you have technical problems with the product, please contact your installer or Gurewatt New Energy. At the query, provide the following information:

1> Model number of the inverter

2> Serial number of the inverter

3> Ermessage code for inverter

4> The LED of the inverter display content

5> Input and output voltage of the inverter

6> Communication mode of the inverter

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