GROWATT



MAX 300-350K-X

User Manual

About This Manual

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.

Notice: When PV modules are exposed to sunlight, it supplies a DC voltage to the PCE.

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1 Overview

1.1 Product Overview

This manual will provide detailed product information and installation instructions for users of the MAX 300-350K-X series photovoltaic inverters of Shenzhen Growatt New Energy Co.,Ltd. (hereinafter referred to as GROWATT). 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. GROWATT 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. GROWATT 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 en.growatt.com website to leave a message.

1.3 Disclaimer

For the "DANGER", "WARNING", "CAUTION", "NOTICE" 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. GROWATT will not be liable for any problems arising from violations of safety operation requirements or safety standards of the equipment.
GROWATT 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, GROWATT 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.

GROWATT 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 caused by your or a third party's negligence, willful act, gross negligence, misoperation or not attributable to GROWATT.

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, GROWATT has the right not to conduct quality assurance.
- Only qualified and trained electrical technicians are allowed to perform operations and cable connections on the inverter.
- During installation, please do not touch other parts inside the equipment other than the wiring terminals.
- Ensure that all electrical connections comply with local electrical standards.
- If maintenance is required, please contact the authorized local system installation and maintenance personnel.
- Before operating the inverter in the on-grid mode, ensure that you have obtained any permission needed from the local grid operator.

2.1.1 Unpacking and 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.
 **NOTICE**	• 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 Electrical Connection Safety

 **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 wiggle it after tightening the cable terminals. Ensure that the terminals are properly connected before powering on the inverter. Otherwise, loose connection may cause overheating and device 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 Environment Requirements

 **NOTICE**	• 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 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 5000m. When the altitude is higher than 4000m, 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.

 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.

2.1.5 Mechanical Safety

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.
 NOTICE	• 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.

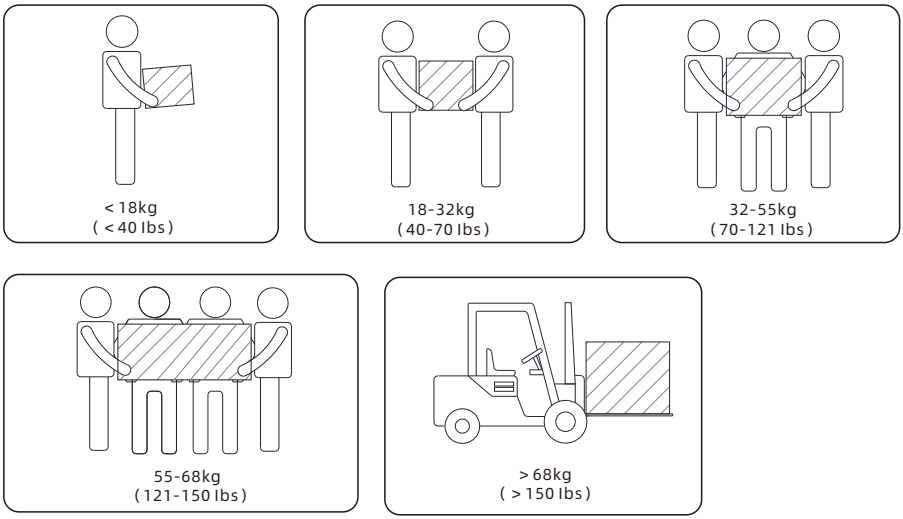


Figure 2.1 handing

2.1.5.2 Using Ladders

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.
NOTICE	• 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.

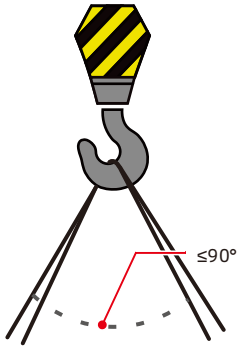


Figure 2.2 Diagram of the angle of hoisting cable

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
 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.
 NOTICE	**NOTICE** indicates a situation which, if not avoided, can result in property damage.
 Information	**Information** that you must read and know to ensure optimal system operation.

2.3 Lable Description

Symbol	Designation	Note
	High voltage hazard symbol	Risk of high voltages which might lead to electric shocks
	Overheat symbol	Risk of burns due to hot surface
	PE (Protective Earthing)symbol	Connect the inverter to the grounding bar for grounding
	Delayed discharge symbol	Delayed discharge: High voltage exists after the inverter is powered off. It takes 15 minutes to discharge to the safe voltage
	Manual reference symbol	Refer to the manual
	DC symbol	Direct Current (DC)
	AC symbol	Alternating Current (AC)

2.4 Certification Symbols

Symbol	Designation	Note
	CE symbol	The inverter complies with the requirements of the applicable EU directives
	Recycling symbol	Lithium-Ion 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 symboll	Do not dispose of the system with the household waste but in accordance with the local regulations

3.1 Product Introduction

Functions and Features

The inverter is a transformerless 3-phase PV 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 320 K - X

① ② ③

Mark	Description	Explain
①	Product series	MAX: Product series name
②	Power level	• 300K: Rated power 300kW • 320K: Rated power 320kW • 333K: Rated power 333kW • 350K: Rated power 352kW
③	Electrical architecture	X: Platform level

3.2 Appearance

Front view:

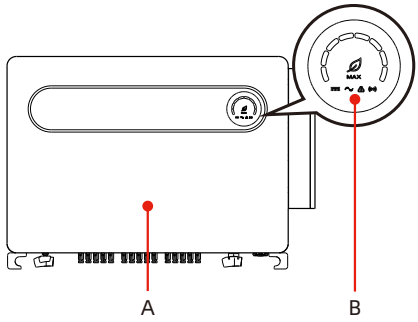


Figure 3.1

Bottom view (connection area):

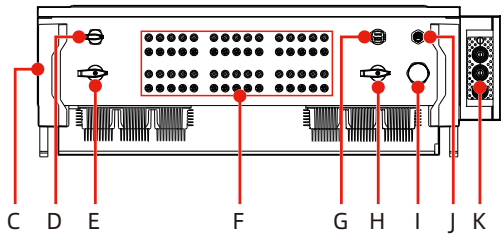


Figure 3.2

Side view:

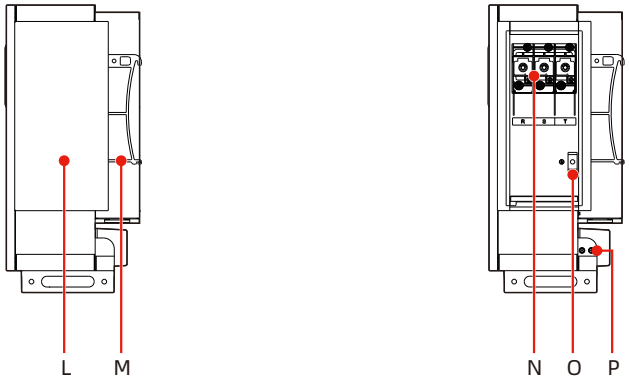


Figure 3.3

Mark	Description	Mark	Description
A	Front panel	I	Ventilation valve
B	LED	J	USB port
C	Corner guard	K	Waterproof silicone pad
D	AUX. SWITCH	L	Junction Box
E	DC SWITCH1	M	Mounting feet
F	PV terminal	N	AC terminal
G	COM port	O	Internal earthing busbar
H	DC SWITCH2	P	Protective earth terminal

3.3 Basic Data

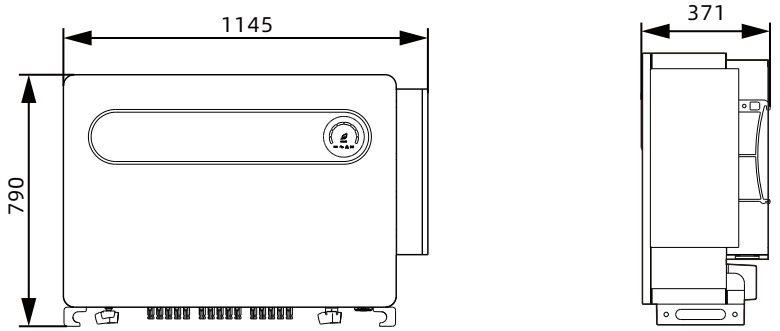


Figure 3.4 Visual Dimensions

Model	Dimension (mm)			Weight (kg)
	Height (H)	Width (W)	Depth (D)	
MAX 300-350K-X inverter	1145	790	371	139
MAX 300-350K-X inverter with packaging	1285	890	500	159

3.4 Nameplate

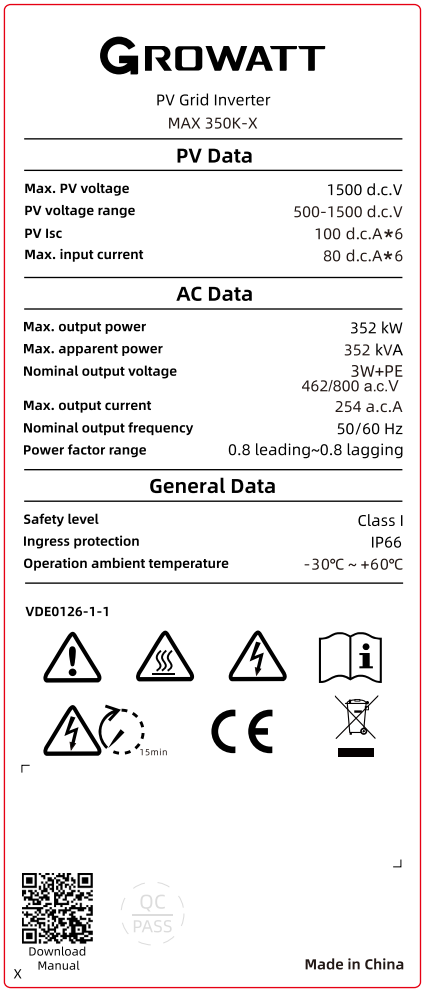


Figure 3.5 Nameplate

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 11.

3.5 Working Modes

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

- The PV strings generate DC power with solar irradiance and send the DC power to the inverter.
- Monitor the operating status of all PV modules via the input current sensor circuit and track the maximum power point with the MPPT (Maximum Power Point Tracker).
- Convert the DC power into the grid-compliant AC power through the inverter circuit and feed the power to the grid.
- Isolate the inverter AC output from the grid with the isolation relay to ensure safe disconnection when the inverter or the grid fails.

3.5.1 Circuit Diagram

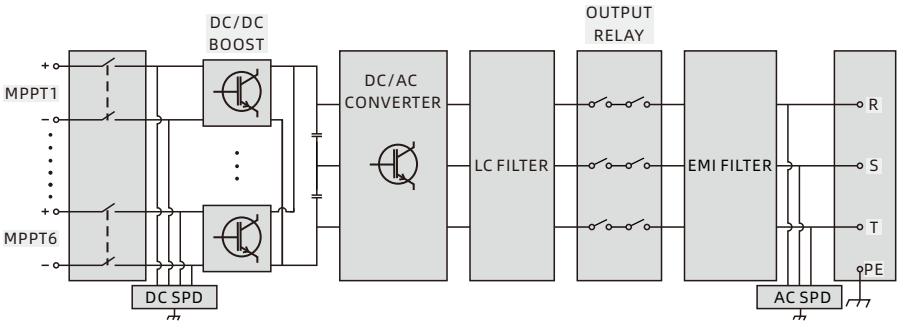


Figure 3.6 Circuit Diagram

3.5.2 Working Modes

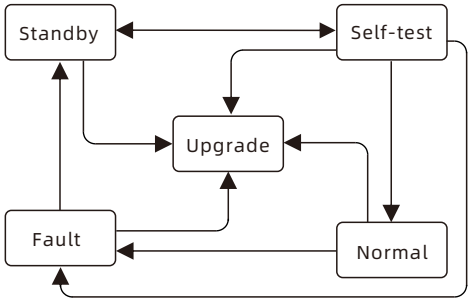


Figure 3.7 Working Modes

Working Mode	Description
Standby	The shutdown instruction or PV voltage does not meet the grid connection requirements.
Self-test	Perform self-test to check whether the grid connection requirements are met.
Normal	Successful grid connection; the inverter is operating normally.
Fault	A fault has occurred, and the inverter has disconnected from the grid.
Upgrade	In software upgrade state

3.5.3 System Block Diagram

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

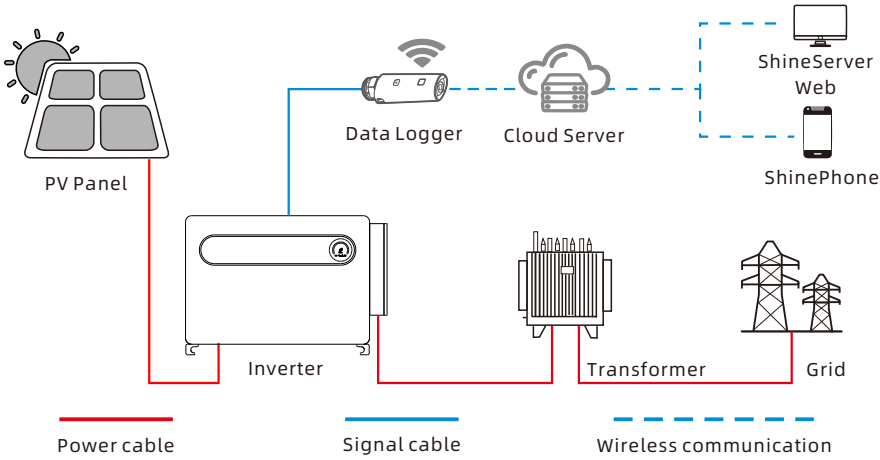


Figure 3.8 System Block Diagram

3.6 Grid Type

The grid type supported by the inverter is IT earthing system, as shown in the figure below.

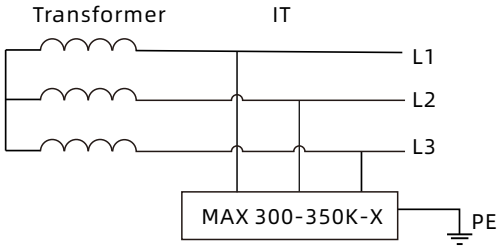


Figure 3.9 Grid Type

3.7 Functions

3.7.1 LED Indicator

The working state of the inverter can be visually read by the LED indicator.

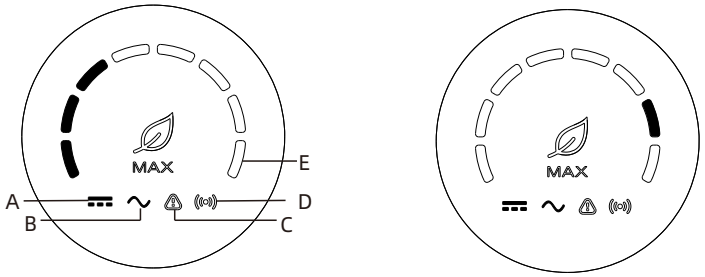


Figure 3.10 Schematic Diagram of LED

The LED status description			
Mark	**Type of LED**	**Inverter status**	**LED status**
A	PV voltage Indicator	PV voltage reaches grid-connection level	Green light steady on
		PV voltage below grid-connection level	Off
B	AC voltage Indicator	Inverter in grid-connected operation	Green light steady on
		No AC voltage detected	Red light steady on
		AC voltage present, grid-connection countdown	Green light slow blinking (no alarm/fault)
		AC voltage present, fault condition	Green light slow blinking + Red alarm light steady on
		AC voltage present, fault condition	Green light slow blinking + Red alarm light steady on
C	Alarm & Fault Indicator	Normal operation	Off
		Warning condition	Red light slow blinking
		Fault condition	Red light steady on
D	Communication Indicator	External communication active (RS485/4G-X2)	Green light steady on
		No external communication	Off

The LED status description			
Mark	**Type of LED**	**Inverter status**	**LED status**
D	Communication Indicator	Firmware upgrade or USB data transfer	Green light fast blinking
E	Power & Error Code Indicator	Inverter in grid-connected operation	The 8 left-to-right LEDs indicate current power output: All 8 green lights on = 100% power; As shown in Figure 3.10 (3 lights on) = 37.5% power, and so on.
		Inverter 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. As shown in the right figure of Figure 3.10, representing 2, and then adding 200, we get 202, indicating that the inverter reports fault 202, and so on.

3.7.2 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 15 minutes, 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.

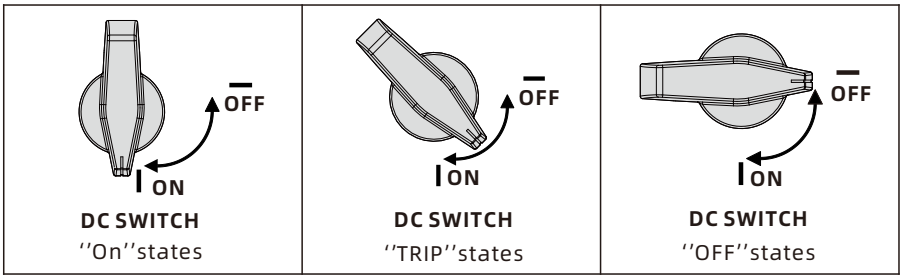


Figure 3.11 DC SWITCH Status

Switch	Status	Description
DC SWITCH1 DC SWITCH2	ON	The DC SWITCH is on and has a automatic breaking protection function.
	TRIP	The DC SWITCH is in automatic disconnection status. The switch handle is between "ON" and "OFF".
	OFF	The DC SWITCH is off.

3.7.3 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 inverter 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 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 functio**n.**

3.7.4 Power Reduce

In order to ensure the safe and reliable operation of the inverter, the inverter will automatically reduce the output power in a non-ideal working environment.
The following are the reasons why power derating may occur, and the following situations should be avoided during inverter operation.

- Do not remove the outer packaging of the inverter.
- Unfavorable environmental conditions, such as high ambient temperature of the inverter and poor heat dissipation of the inverter.
- The output power percentage of the inverter is not set to 100%
- Power grid over-frequency, over-voltage and load shedding.
- The input PV voltage value is higher.
- The input PV current value is higher.
- At an altitude of over 4,000 meters.

Storage and Unpacking 4

4.1 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-condensing.
- 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 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:

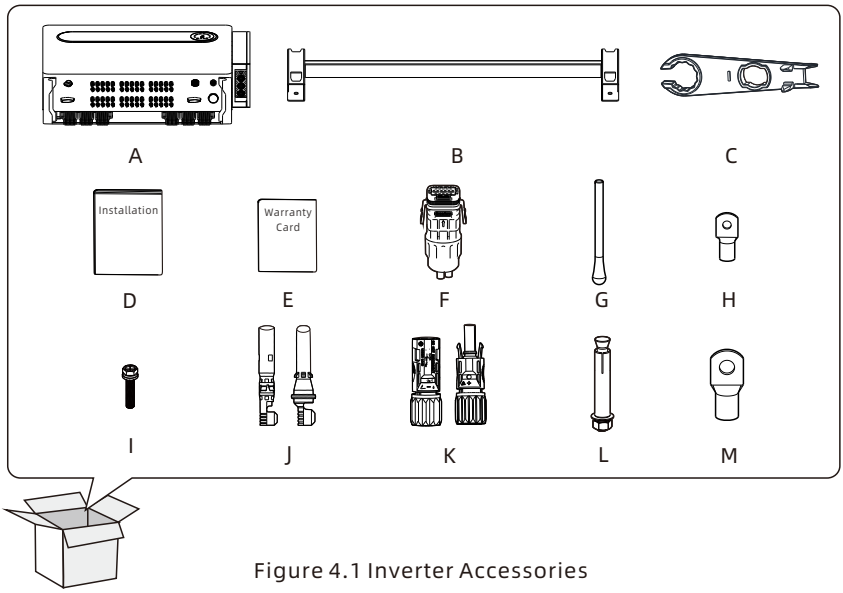


Figure 4.1 Inverter Accessories

Mark	Descriptions	Quantity
A	Inverter	1
B	Mounting-bracket	1
C	Removal tool of PV terminals	1
D	User manual	1
E	Warranty card	1
F	Communication terminal	1
G	Auxiliary handles (opt)	2
H	DT 70-10 PE terminal (opt)	1
I	Safety screw	2
J	PV+/- terminal metal core	30/30
K	PV + /- terminal	30/30
L	M10 * 90 Expansion screw	4
M	DT 120-12 AC wiring terminal (opt)	3

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

4.3 Moving Inverter

WARNING	• The MAX 300-350K-X inverter weighs about 139 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 4.2 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.

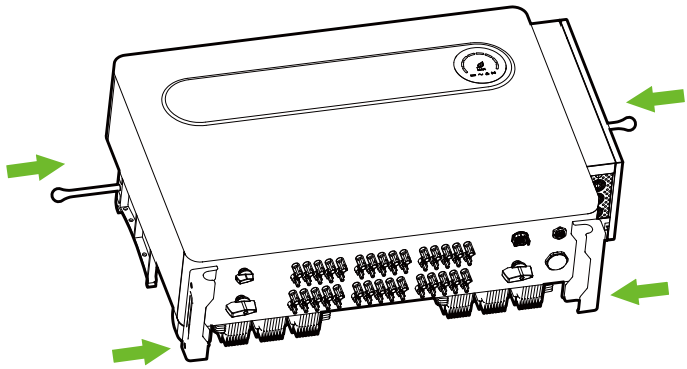


Figure 4.2 Handling the Inverter

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 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.
- If you need to install the inverter outdoors in salt-affected areas that may cause corrosion. A salt-affected area refers to a region within 500m of the coast or prone to 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 5000m. When the altitude is higher than 4000m, 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.

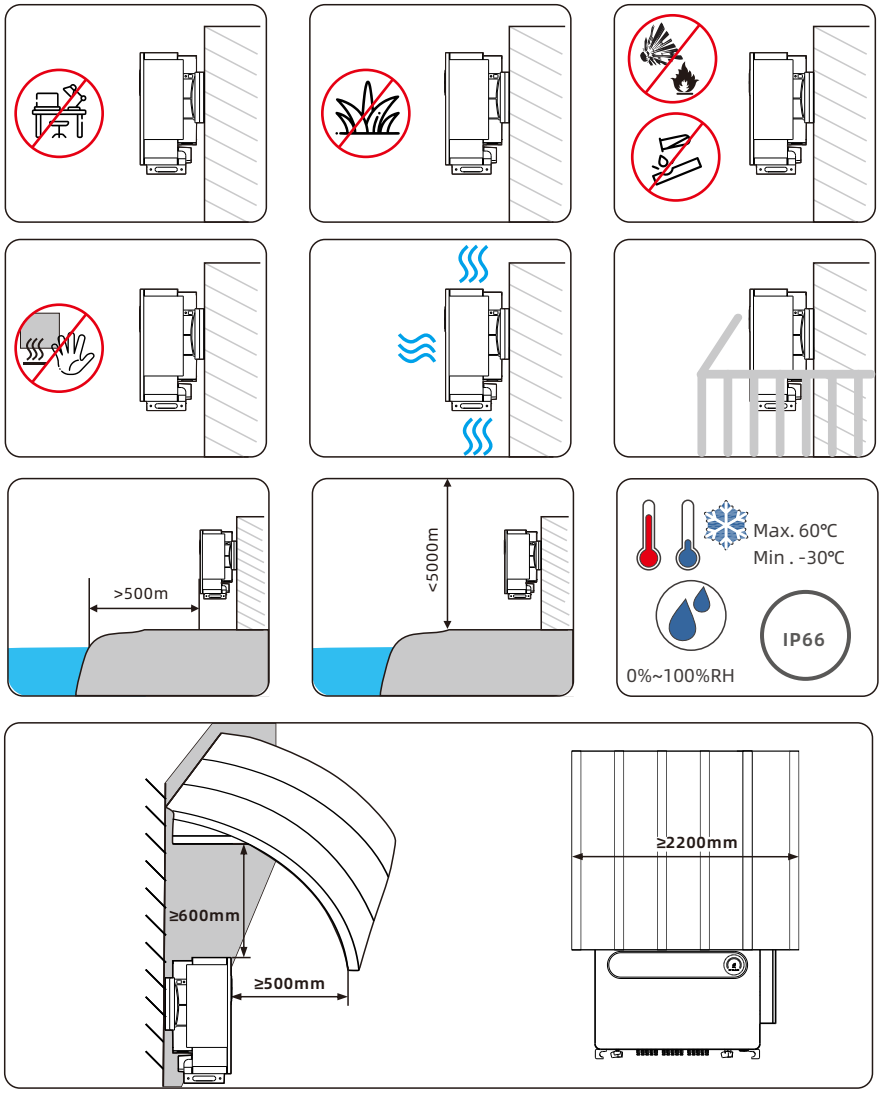


Figure 5.1 Installation Environment Diagram

5.1.2 Carrier 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 at a vertical angle or backwards within a range of 15°, which is conducive to heat dissipation.
- Do not reverse the inverter, forward tilt, horizontal placement.

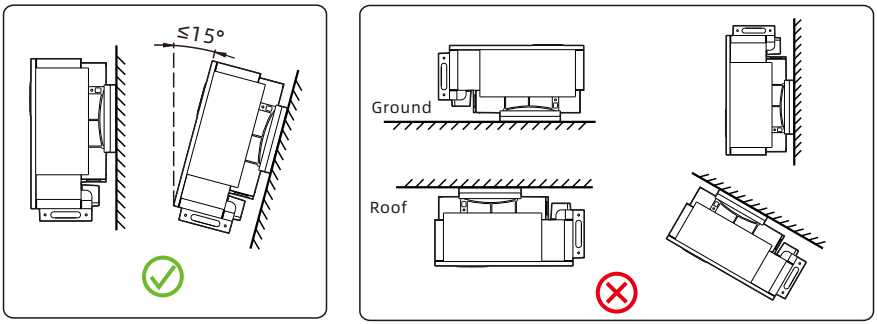


Figure 5.2 Schematic Diagram of Installation

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.

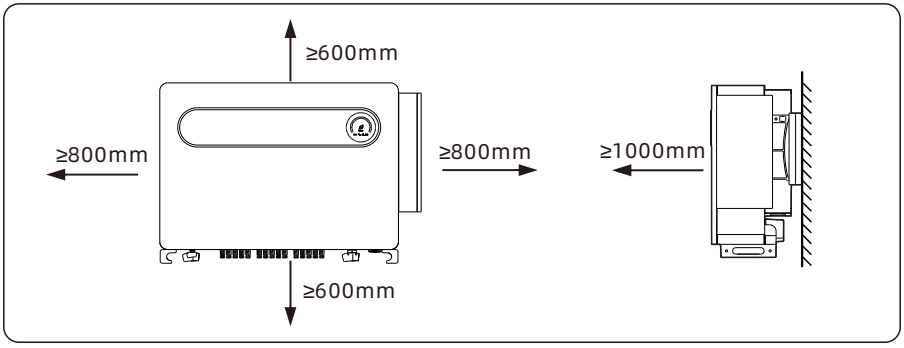
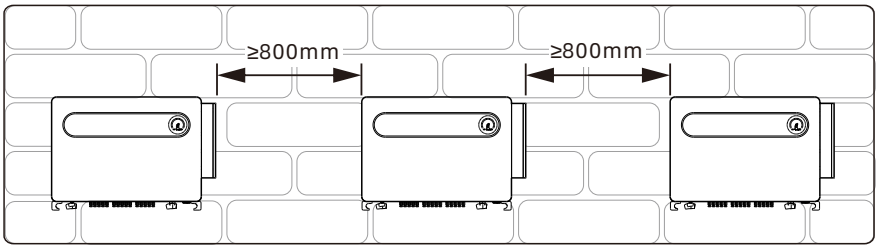


Figure 5.3 Schematic Diagram of Installation Space

Horizontal installation mode (recommended)

When installing multiple inverters, please refer to the following diagram to maintain a suitable distance:



Triangle installation mode

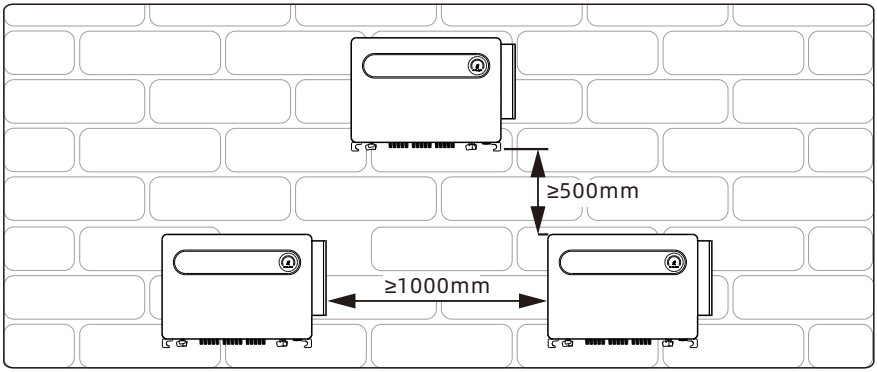


Figure 5.4 Installation Distance

5.2 Mounting-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

Knock 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.

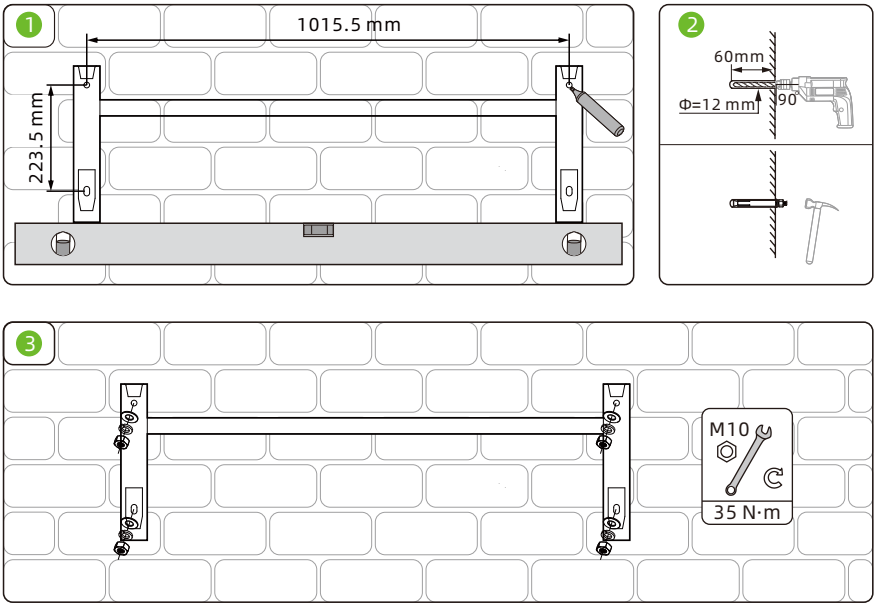


Figure 5.5 Mounting-bracket Installation

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.

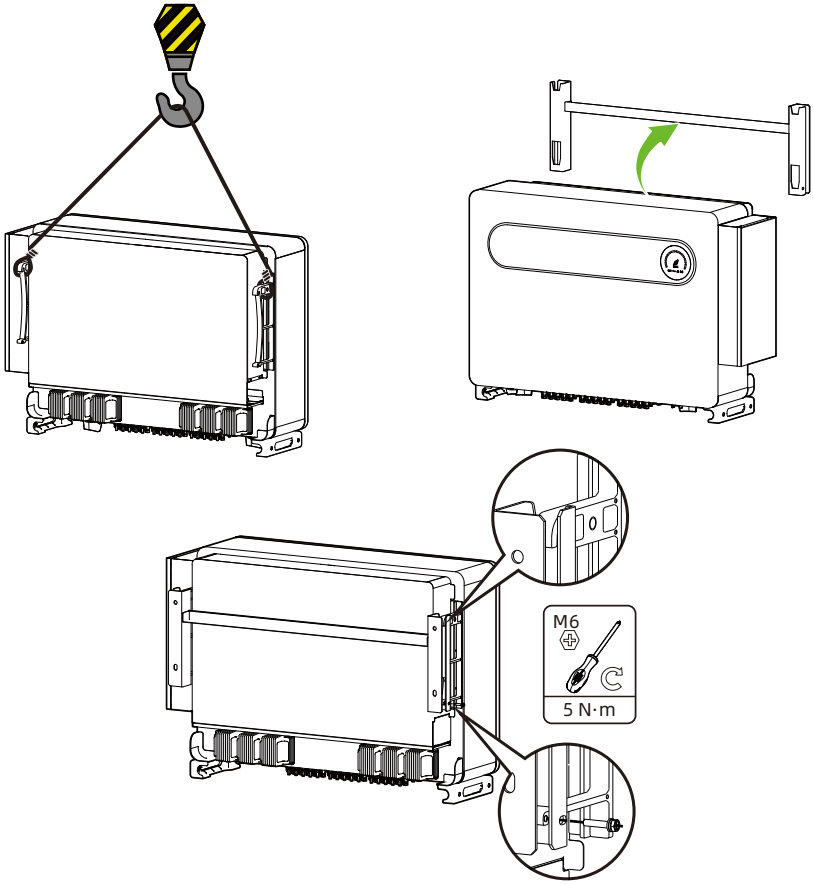


Figure 5.6 Hoisting and Hanging

6 Electrical Connection

6.1 Precautions

 **DANGER**	• PV 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.
 **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.

NOTICE	• 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.

6.2 Prepare the Cables

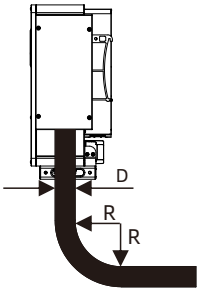
Cable specification (S is cross sectional area of AC output line conductor, Sp is cross sectional area of protective ground wire conductor):

No.	Cable	Type	Recommended specifications	Source
1	DC input cable (single-core)	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: 15mm~34mm	Prepared by the customer

No.	Cable	Type	Recommended specifications	Source
2	AC output cable (multi-conductor)	Outdoor copper core cable	Conductor cross-section area: 120 mm^2~400mm^2 Cable outer diameter: 28mm~75mm	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: $S_p \geq S/2$ Cable outer diameter: /	Prepared by the customer

Note:
The value of Sp is only identical to the PE cable and the AC output 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

<table>
<tr><th colspan="2">Cable Type</th><th colspan="2">Cable Type</th><th>Single core cable</th><th>Multi-core cable</th></tr>
<tr><td rowspan="6">
</td><td rowspan="2">Plastic insulated cable</td><td>Without Armor</td><td>R≥20D</td><td>R≥15D</td></tr>
<tr><td>With Armor</td><td>R≥15D</td><td>R≥12D</td></tr>
<tr><td colspan="2">Rubber insulated cable</td><td colspan="2">R≥10D</td></tr>
<tr><td rowspan="3">Control cable</td><td>Unarmored, Shielded Flexible Cable</td><td>/</td><td>R≥6D</td></tr>
<tr><td>Armored, Copper-shielded</td><td>/</td><td>R≥12D</td></tr>
<tr><td>Others</td><td>/</td><td>R≥10D</td></tr>
<tr><td colspan="5">Note: R is the bending radius of the cable, D is the outer diameter of the cable.</td></tr>
</table>

6.3 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. GROWATT 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.
 NOTICE	• It is the responsibility to prepare terminals for connecting the AC breaker.

AC Circuit Breaker Specifications

Model	AC circuit breaker recommended
MAX 300-350K-X	400A/800Vac

6.4 AC Equipment Requirements

6.4.1 Transformer

The MV transformer on the AC side of the inverter should meet the following requirements:

- The selected transformer can be a distribution transformer. It can meet the needs of PV systems with load during the day and without load at night.
- A liquid-immersed type transformer or a dry type transformer can be used, and the shield winding is not a requisite.
- The line-to-line voltage on the low voltage side of the transformer should endure the output voltage of inverter. When the transformer is connected to the IT grid, to-ground withstanding voltage of the low voltage winding of the transformer, the low voltage side AC cables, and the low voltage side secondary equipment should not be lower than 920V.
- The line-to-line voltage on the High voltage side of the transformer should comply with the local grid voltage.

- It is advisable to choose a transformer with a tap transfer switch on the high voltage side so that it can be consistent with the grid voltage.
- When the ambient temperature is 30°C, the transformer should be able to operate under 1.1 times the overload condition for a long time.
- A transformer with a rated capacity of 3200kVA and a short-circuit impedance equal to 7% (allowable error ±10%) is recommended.
- The voltage drop of system cable is no more than 3%.
- The DC component that the transformer can withstand is 1% of the fundamental current at rated power.
- The transformer must be overload protected and short-circuit protected.
- For thermal rating, the load curve of the transformer and environment conditions should be taken into account.
- The apparent power of the inverter is not allowed to exceed the power of the transformer. The maximum AC current of all inverters connected in parallel must be taken into account.
- The transformer is an important part of grid-connected PV generation system. The fault tolerance capacity of the transformer should be taken into account at all times. The fault include :system short circuit, grounding fault, voltage drop, etc.
- Take ambient temperature, relative humidity, altitude, air quality, and other environmental conditions into account when selecting and installing the transformer.

6.4.2 Box-type low voltage cabinet

The box-type low voltage cabinet should meet the following requirements:

- The breaking capacity of the branch molded case circuit breaker (MCCB)and air circuit breaker(ACB) of the box-type low voltage cabinet should be greater than the short circuit current at the low voltage side of the transformer. For example, the low voltage side short-circuit current of a boost transformer with a rated capacity of 3200kVA and a short-circuit resistance of 7% can be calculated in the following way: I=320000/0.8/1.732/0.07/0.9/1000=36.66kA. It is required that the box-type low voltage cabinet is required to have a molded case circuit breaker Icu≥ of 36.66kA under the condition of 880Vac.
- The circuit breaker needs to consider the temperature and altitude derating, and needs to have a low-voltage cabinet temperature rise test report.
- When designing a low voltage cabinet, must pay attention to the impact of the diffused MCCB electric arc on the cabinet and other branch circuit MCCBs, thus the interior of the cabinet needs to be insulated. A third-party test report of the circuit-breaking performance of the whole machine in an event of a short-circuit on the low voltage side is also required. It is recommended to adopt graduated protection to ensure that in an event of a single short-circuit fault on the low voltage side of the box, the corresponding branch MCCB trips normally while the general ACB does not trip.

6.4.3 Anti-PID Box

When used with the Anti-PID Box, the following requirements must be met:

- The low voltage side winding of the transformer, AC cables, and secondary devices (including protective relay, detection and measurement instruments, and related auxiliary devices) must withstand the voltage to ground of at least 920V.
- If the low voltage side winding is in Y shape, neutral point grounding is prohibited.
- The string serial communication box SEM-X requires an external power supply of 220 Vac, so a power supply port and an input port (including switches) should be reserved in the low voltage power distribution room of the boost transformer.
- Surge protective devices (SPD) for the AC combiner box and on the low voltage side of the transformer are recommended to be connected in the "3+1" manner, as shown in the figure below. The minimum continuous operating voltage of SPD1-SPD4 is 680Vac.

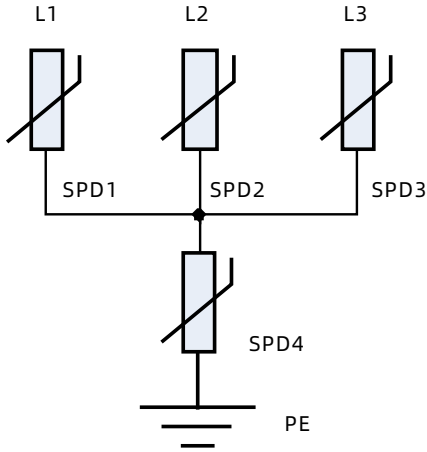


Figure 6.1 Schematic Diagram of SPD

6.5 Connect the PE Cable

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.
NOTICE	• 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.

It is recommended that the inverter be connected to a nearby ground point. For a system with multiple inverters connected in parallel, connect the ground points of all inverters to ensure equipotential bonding between PE cables.
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 is 35N.m.
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.

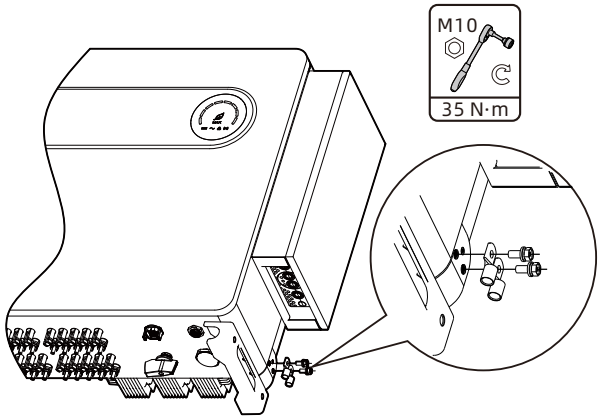


Figure 6.2 Schematic Diagram of Protective Earthing

According to relevant provisions of IEC 61643-32 "Surge protective devices connected to the d.c. side of photovoltaic installations - Selection and application principles" , whether for household or outdoor photovoltaic power plants, it is necessary to ensure the implementation of lightning protection.

WARNING	• The lightning protection measures for photovoltaic systems shall be carried out in accordance with the corresponding national standards and IEC standards. Otherwise, photovoltaic devices such as PV modules, inverters and power distribution facilities may be damaged by lightning, which are not covered under any warranty and Growatt shall not assume any responsibility.

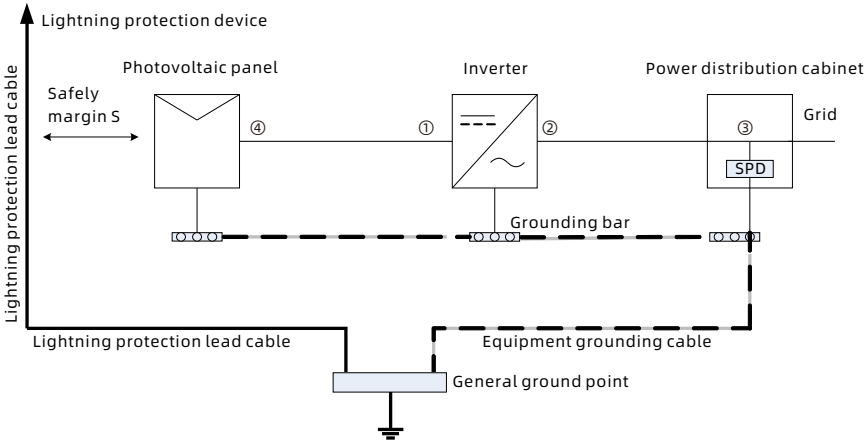


Figure 6.3 Lightning Protection Wiring

1. It is generally recommended to install the SPD (Surge Protection Devices), such as the lightning rod, lightning belt or the down conductor, to prevent the PV array from lightning.
2. Keep a safety distance (S) between the SPD and the equipment of the PV system, including the PV panels, inverters, cables and power distribution devices. Suggested value of S: Take the 5-floor building as an example, which is about 15m in height, the safety distance (S) is suggested to be 2.5 m. The safety distance is inversely proportional to the building height.

A. When the safety distance (S) is met:
SPD should be installed in Position ① and ③. Generally, it is recommended to install Type II in position ① and Type I in position ③.

B. When the safety distance (S) is not met:
In addition to position ③, Type I SPD should be installed in Position ①②④.

3. The down conductor and the PE cables of the devices will come to the total grounding point, but they cannot share the same conductor. You should prepare separate cables for device grounding and the cable specification should be greater than 6 mm2with the safety distance met.
4. For air-termination system design, please refer to GB/T 21714.3-2015.

6.6 Connect the AC Output Cable

 **DANGER**	• Do not connect a load between the inverter and the AC switch directly connected to the inverter, to avoid causing the switch to trip incorrectly. • 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. GROWATT is not responsible for the corresponding consequences.
 **WARNING**	• Each inverter must be equipped with an AC circuit breaker, and multiple inverters cannot share the same AC circuit breaker.
 **NOTICE**	• Be careful not to damage the wire core. • The cavity formed by the conductor of the OT/DT 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> The following figure shows the AC terminal of the inverter. Terminals R, S and T are for live wires.

Note: Screw are M12 screws.

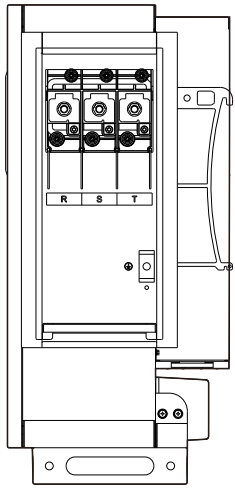
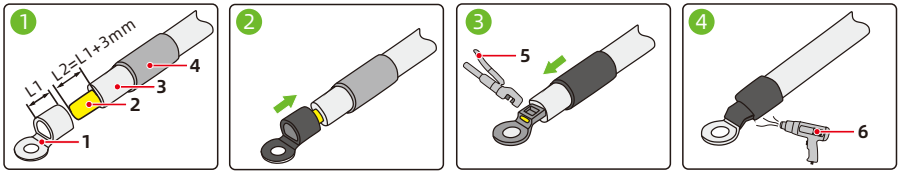


Figure 6.4 AC Terminal

2> Crimp the terminal



(1) OT/DT terminal (2) Copper wire (3) Cable

(4) Heat Shrink Tubing (5) Hydraulic pliers (6) Heat gun

Figure 6.5 Schematic Diagram of Terminal

3> Steps for Connecting AC Output Lines

Step 1: If the AC cable is a single-core cable, refer to the figure below to remove the corresponding number of rubber rings based on its wire diameter.

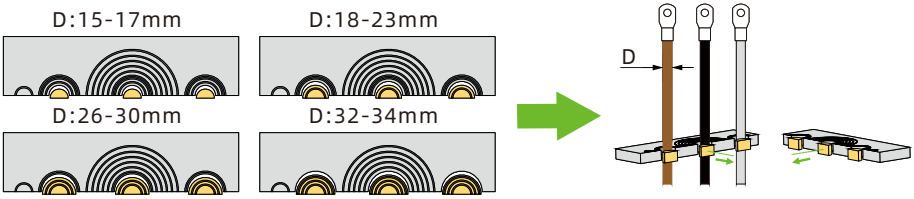


Figure 6.6 Single-core wire connection method

Step 2: If the AC cable is a multi-core cable (taking a three-core cable as an example), refer to the following figure to remove the corresponding number of rubber rings based on its wire diameter.

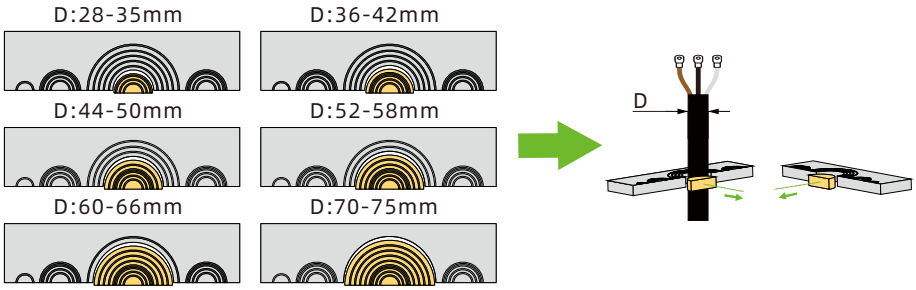


Figure 6.7 Multi-core Wire Connection Method

Step 3: Open the communication junction box, pass the single-core or multi-core wire through the waterproof silicone gasket, connect them to the corresponding channels respectively, and tighten the screws of each terminal.

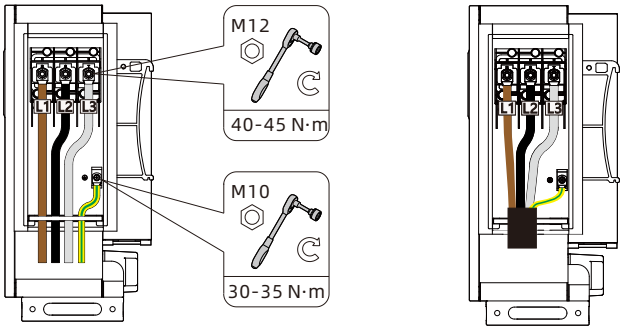


Figure 6.8 Schematic Diagram 1 of AC Wiring

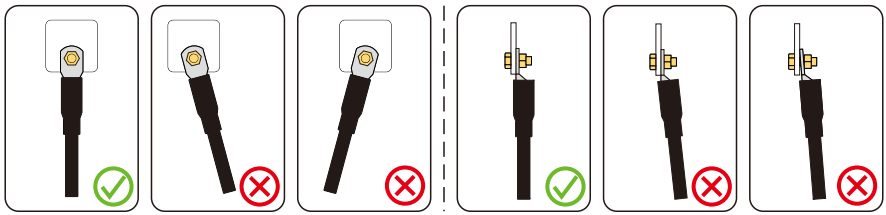


Figure 6.9 Schematic Diagram 2 of AC Wiring

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, GROWATT does not carry out quality warranty, and assume any responsibility.

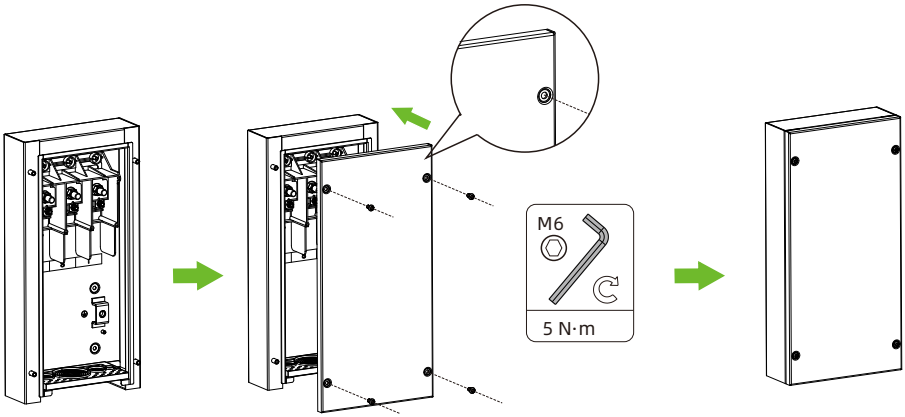


Figure 6.10 Wiring Box Installation Diagram

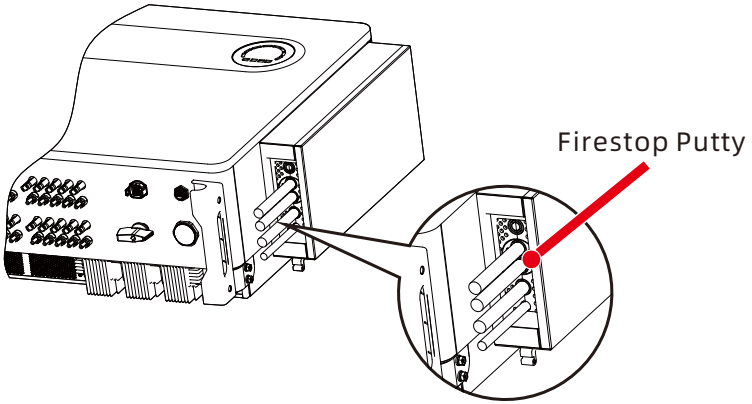


Figure 6.11 Schematic Diagram of Firestop Putty

6.7 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 AUX. SWITCH and 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.
NOTICE	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. • Arc 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.



WARNING

- Ensure that the following conditions are met or that you may damage the inverter or create a fire hazard. In this case, GROWATT 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 working.
- 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 100A 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.
- The inverter does not support full parallel connection for PV strings (full parallel connection: PV strings connect to one another in parallel outside the inverter and then connect to it separately).
- 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.

Note:

The sunlight on PV 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.

6.7.1 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.

When installing DC input cables, route the positive and negative cables of the DC string through separate conduits, as shown in the figure below, to prevent damage to the DC cables due to improper installation or other causes, which could result in a short circuit between the positive and negative terminals.

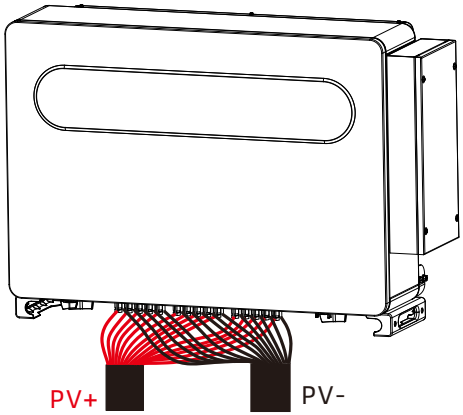


Figure 6.12 Schematic diagram of PV branch wiring

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 "-".It is important to ensure that the open-circuit voltage of each PV string does not exceed the upper input limit of 1500V for the inverter.

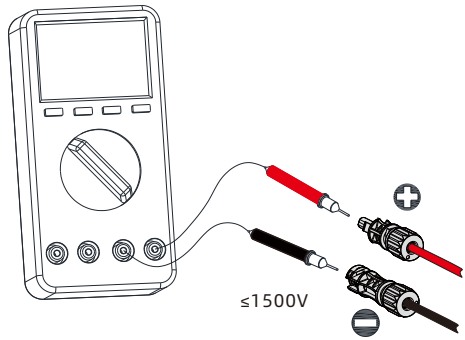


Figure 6.13 Multimeter Measurement Diagram

Note:

The DC voltage range of the multimeter should not be less than 1500V, if the PV voltage is negative, it means that the DC input polarity is wrong, and the polarity needs to be corrected.

3> Before connecting PV strings to the inverter, ensure that the insulation resistance of each PV string to the ground is normal: Use an insulation resistance tester to test the insulation resistance of the PV- cable to the ground. Add a DC voltage of more than 1500 V between the PV- cable and the ground and check the insulation resistance.

- If the insulation resistance is greater than or equal to 1 MΩ, the insulation resistance is normal.
- If the insulation resistance is less than 1 MΩ, troubleshoot the insulation fault of the cable or PV string.

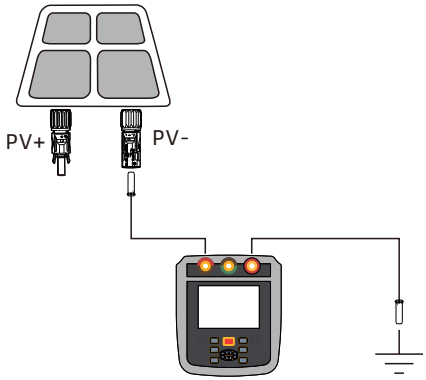
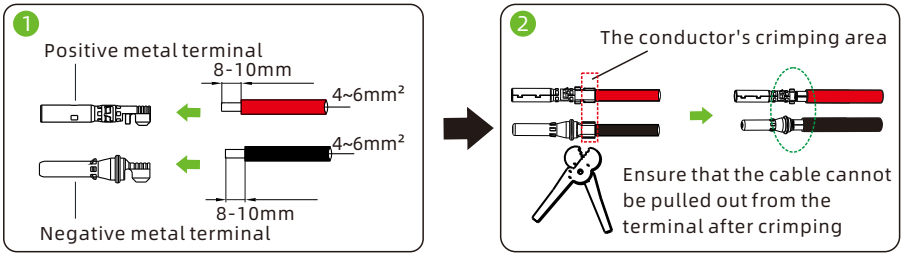
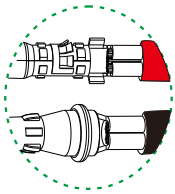


Figure 6.14 Schematic Diagram of Insulation Resistance Tester

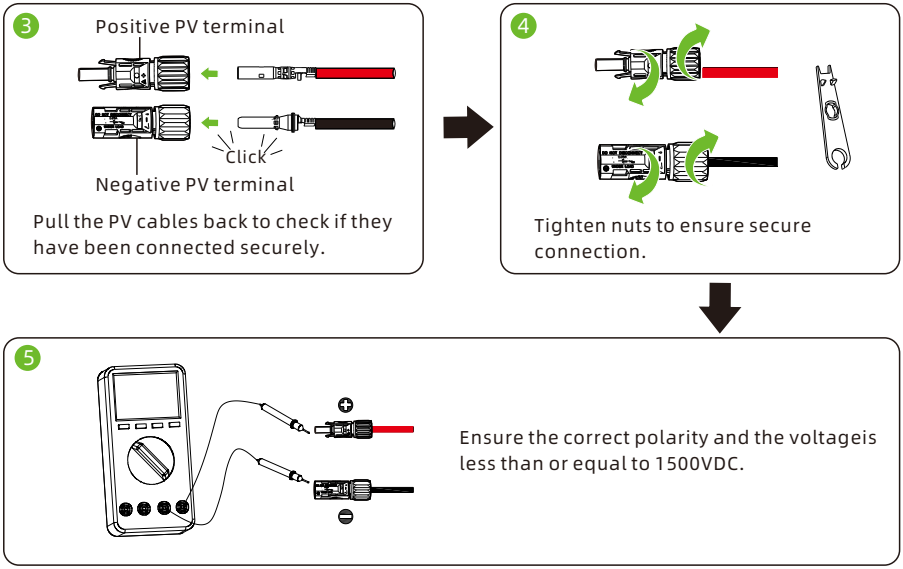
4> If the machine side PV terminal is not connected temporarily, please use the dust plug to block it.





⚠ Notice:

During crimping, only crimp the conductor's crimping area; otherwise, it may cause device damage.

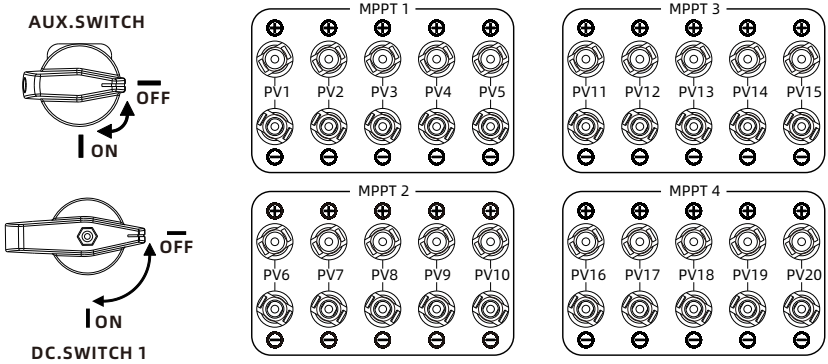


Note:

1. Under any circumstance, the total current of all strings cannot exceed the inverter's maximum current.
2. Do not touch any solar panel in operation.
3. The wires should be tinned. Do not use cracked or frayed wires.

6.7.2 PV Terminal Instructions

The inverter has 30 PV 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.



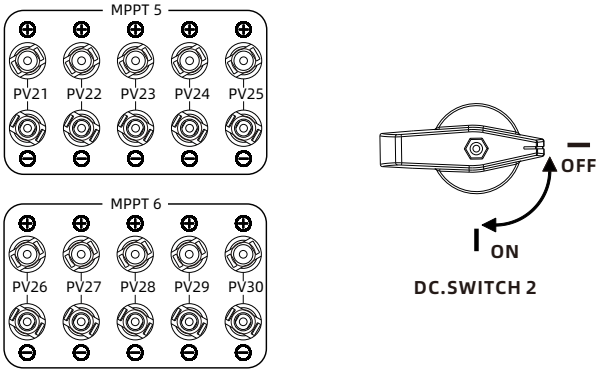


Figure 6.16 DC SWITCH and PV Terminal

The PV terminal selection shall meet the following principles:
1. The PV group string must be connected to the PV 1 DC input terminal.
2. The PV6-PV15 terminal is connected to at least one PV string.
3. It is recommended to distribute the DC input terminals evenly on each MPPT.
4. 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.

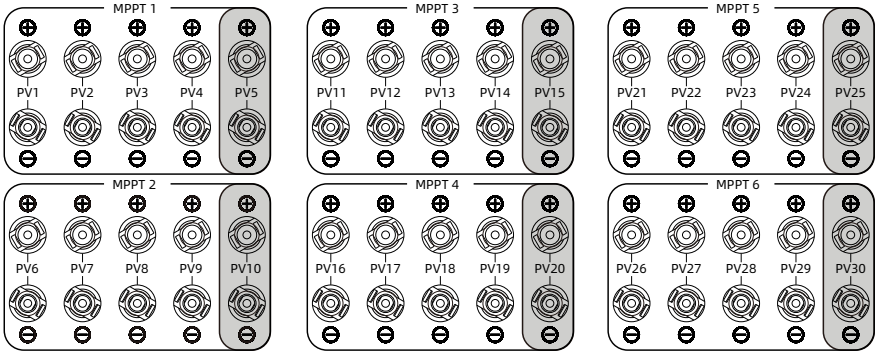


Figure 6.17 Schematic of the PV terminal area

Note:
1. It is recommended to connect 6 MPPT for optimal inverter performance.
2. If the number of PV strings is limited, it is advised to connect MPPT 1/2/3/4/6 (the white area terminals, as shown in the figure below) to improve inverter performance.

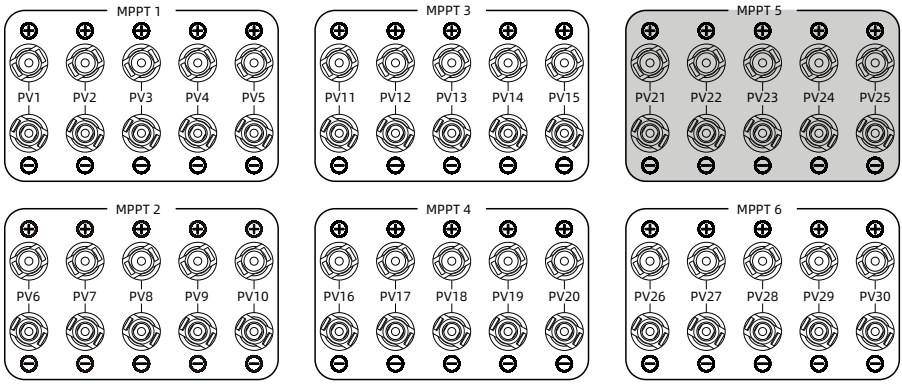


Figure 6.18 PV Terminal Wiring Diagram 1

3. It is not recommended to connect only 4 MPPT, if there are special circumstances when only 4 MPPT can be connected, please refer to the following figure to connect the string to MPPT1/3/4/6 (white area terminals).

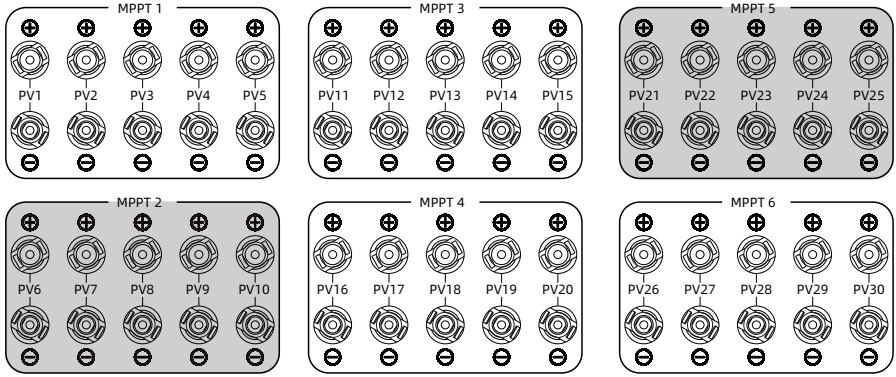


Figure 6.19 PV Terminal Wiring Diagram 2

6.8 Connect the Communication Cable

6.8.1 COM 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 can be connected to RS485 cable for single-machine communication or multi-machine (32pcs) long distance (500 meters) high-speed (baud rate 38400) communication. Communication cable is recommended to be twisted pair in RS485. It is recommended to use twisted-pair shielded wire for RS485 communication line. For single-machine communication, the communication line can be connected to pin 3/4, and its shielding layer can be connected to pin 1. When multiple machines are connected in parallel, two RS485-1 ports can be connected at the same time. When used, the shielding layer can be connected to pin 1/2.

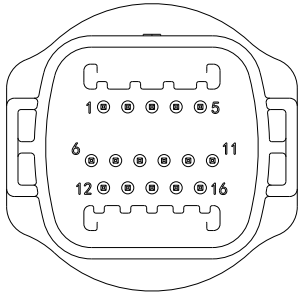


Figure 6.20 COM Port

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

1. When multiple inverters communicate in parallel, the last machine needs to add matching resistance. The method is to use a wire to connect the pin 15/16 together.
2. There are two types of communication terminals, which are randomly matched for inverter shipment. The performance of the two terminals is the same, but there is a difference in appearance.

Steps:

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. Use the tool to crimp the terminals.

III. Refer to the pin definitions in the previous table for wiring.

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

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

6> Tighten the waterproof nut.

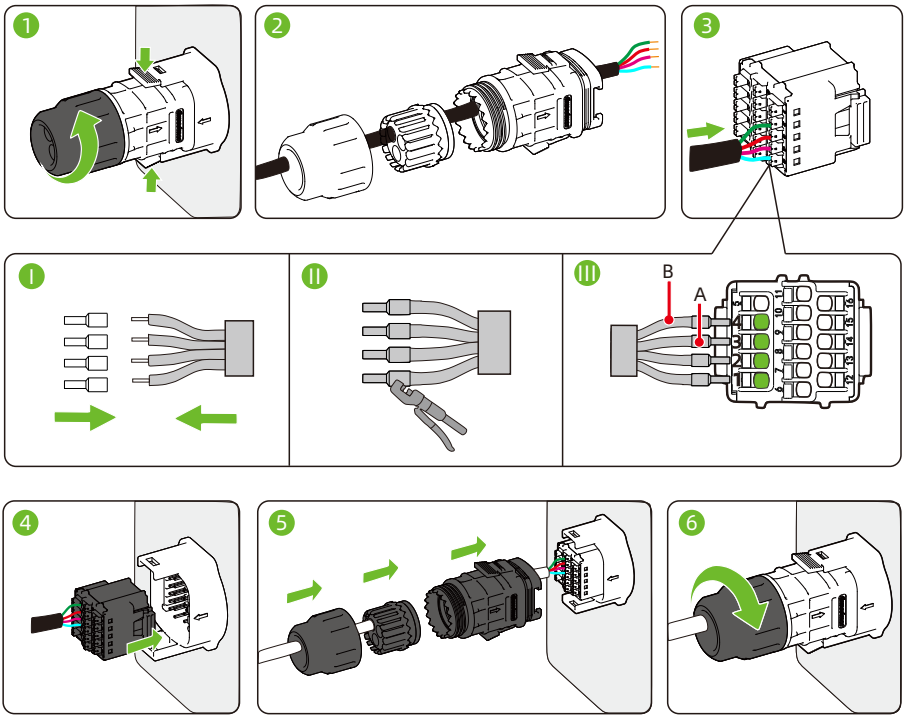


Figure 6.21 RS485 Wiring Diagram

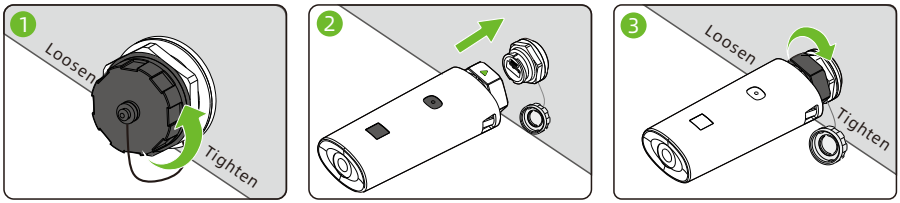
6.8.2 USB Port

WARNING	• The USB port will only allow a connection to the GROWATT data logger.
Information	• The data logger is an optional accessory, and the user needs to purchase it separately. • Refer to Chapter 7 for details on commissioning the inverter.

The MAX 300-350K-X series inverter is equipped with a USB Port by default, which can be connected to the USB to WIFI module, Shine WIFI-X, Shine 4G-X2, Shine Link-X, etc., to achieve monitoring functions. In addition, the software can be quickly updated via a USB flash drive.

Installing the data logger:

Install



Remove

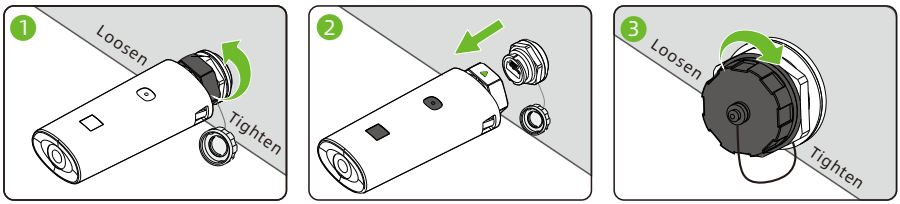


Figure 6.22 Installation of Data Logger

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

Debug 7

7.1 Power-On

 **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, GROWATT 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:

Before connecting the components, it is necessary to check that the component has no issues such as short circuit to ground, reverse connection, or series connection, and that all switches ("AUX. SWITCH", "DC SWITCH 1", and "DC SWITCH 2") are all in the OFF position.

Step 1
Ensure that:
- There is PV string connected to PV1.
- The PV6-PV15 DC input terminal is connected to at least one PV string.

Step 2
Turn the inverter's "AUX. SWITCH" to the ON position.
- An audible click confirms the switch is fully closed.

Step 3
Monitor the LED indicators:
- If the PV voltage indicator shows steady green light and the AC voltage indicator shows steady red light.
- Then turn both "DC SWITCH1" and "DC SWITCH2" to the ON position.

Step 4
Turn the "AUX.SWITCH" to the OFF position.

Step 5
Close the AC circuit breaker between the inverter and the utility grid.

Step 6
Check the indicator lights to determine the inverter's operating status. If the inverter is operating normally, the alarm/fault indicator light will not be flashing slowly in red, and the power/fault code indicator light will remain steady.

Notice1:
If the PV voltage indicator does not light up within 1 minute of power-up, do not turn on the two “DC SWITCH”. Immediately turn off the “AUX.SWITCH” and check whether the input cables are connected in reverse or whether the input voltage meets the startup voltage requirement. After correcting the issue, repeat Step 3. If the PV voltage indicator still does not light up, turn on the “AUX.SWITCH” and contact a technical support engineer.

Notice2:
"AUX. SWITCH" only needs to be closed when the system is powered on for the first time, and needs to be disconnected when the inverter is connected to the grid.

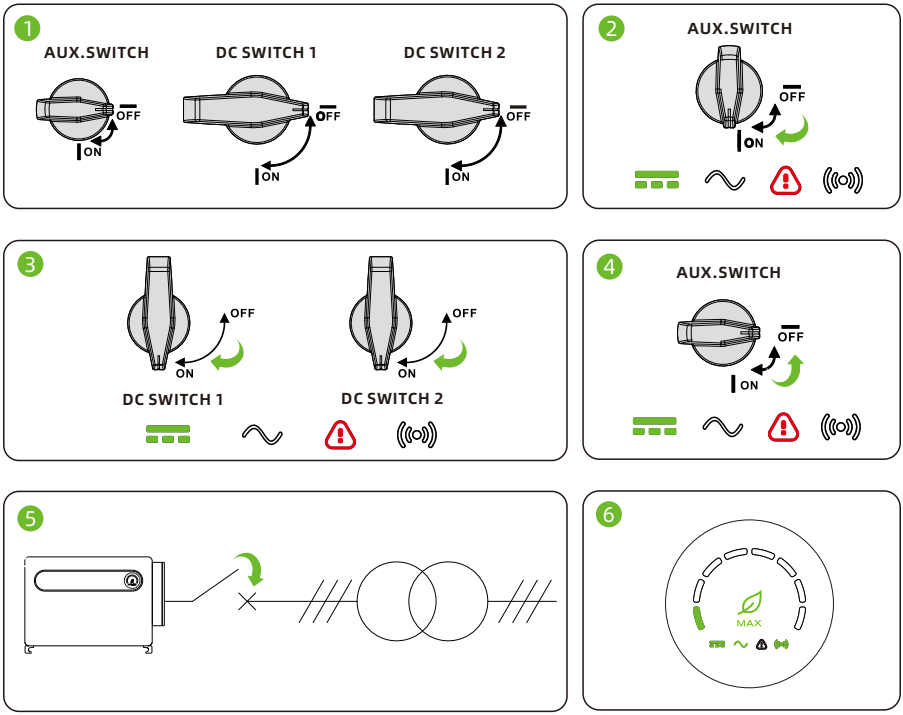


Figure 7.1 Power-on Diagram

7.2 Set Time and Date

	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.

Method 1:
Please refer to Chapter 8 and log in to the ShinePhone APP. Click "Inverter Time" to set inverter time and date on the parameter setting page.

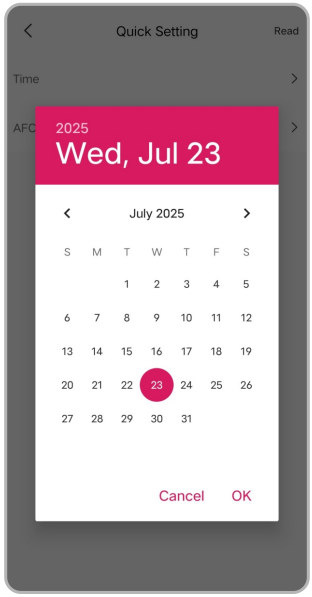


Figure 7.2 Set Time and Date

Method 2:
Refer to Chapter 8 to install the collector and connect to the server, the inverter will automatically update the system time.

Data Monitoring 8

8.1 Remote Monitoring

MAX 300-350K-X series inverter remote monitoring ways include APP(ShinePhone) and server Web page, RS485, 4G, WIFI, PLC(optional) can satisfy both ways of monitoring.

8.1.1 Mobile phone APP(ShinePhone) remote monitoring

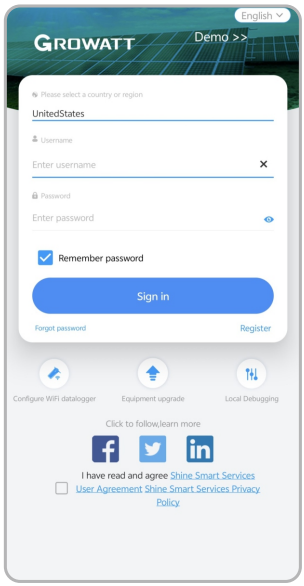
1> Scan the following QR code, or download from Android store or App store by searching “ShinePhone”, download and install software.

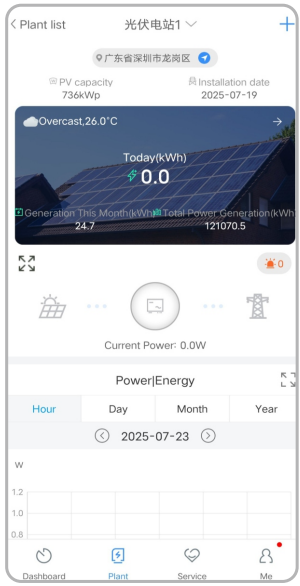


Note:
1. Make sure to install the latest version of the software.
2. Please find more details on http://server.growatt.com.

2> Users can register their mobile APP account by following the steps below:
Run ShinePhone, and tap “Register” on the login page. Registration is required to fill in the information, with the * is required, the agreement is mandatory, you can log in to the main interface of ShinePhone after registration, the login page and the main interface are as shown below.

ShinePhone login and main page:

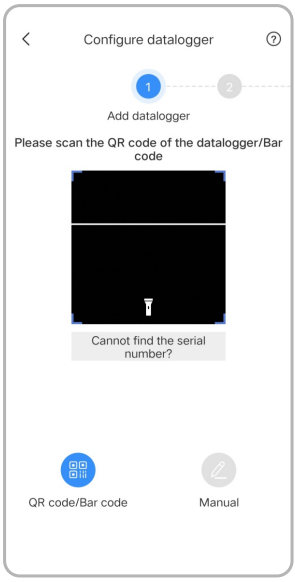




Main page:

User can tap the “+” icon at the upper right corner to add a datalogger, check the datalogger or add a power plant.





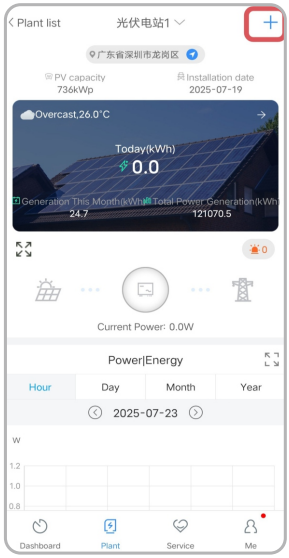


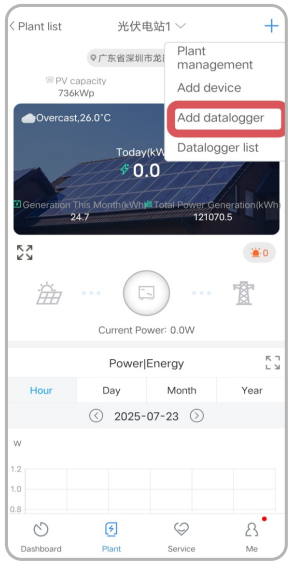
Data logger:

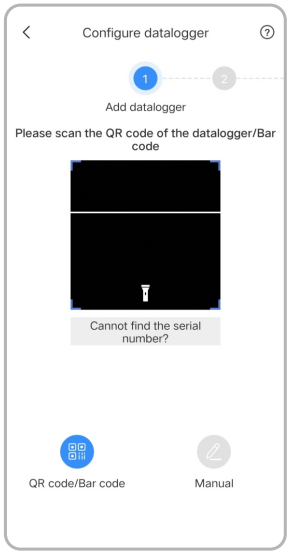
1> User can add more datalogger under the particular plant.

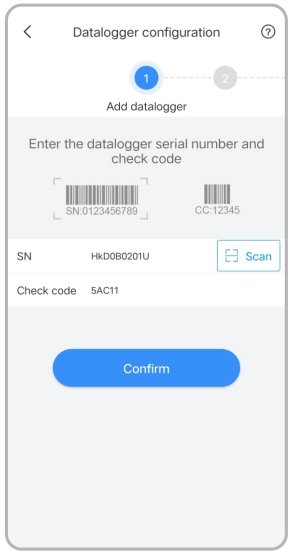
Click “+” in the upper right corner of the device page and select “Add datalogger”, as shown in the figure below.

Note: You can choose to manually enter the collector serial number for addition, or you can add it by scanning the barcode on the nameplate.





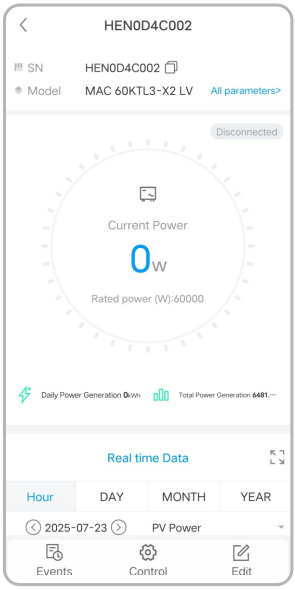




2> User can add datalogger at the datalogger list page to add a datalogger, edit, delete, configure etc.

Device page and function:

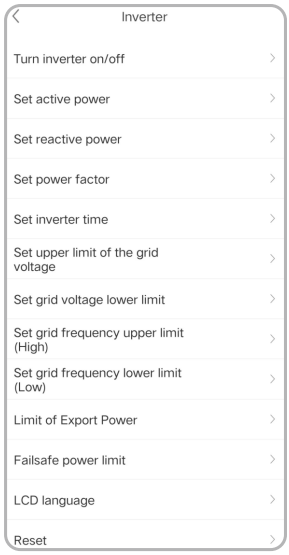
1> Device page: User can click the device to see more details, the device page show current power and Energy today and daily power chart, user can find more with control, parameter, data and Events page.

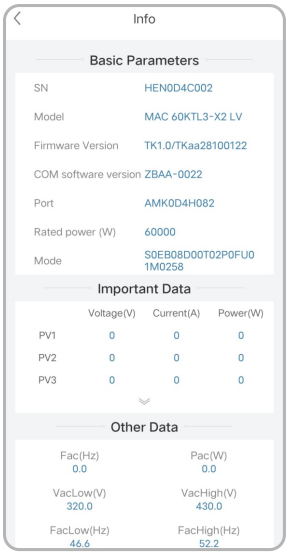


2> Control: user set inverter on/off, set active power, set reactive power, set PF, set inverter time, set grid voltage high, set grid voltage low. The operation password is: inverter+date.

For example: if today's date is 22 July 2026, the password is inverter20260722.

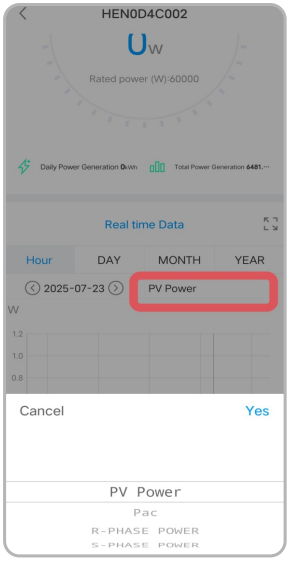
3> Parameter: user can see device SN, rated power, firmware version, PV voltage, current, and power etc.

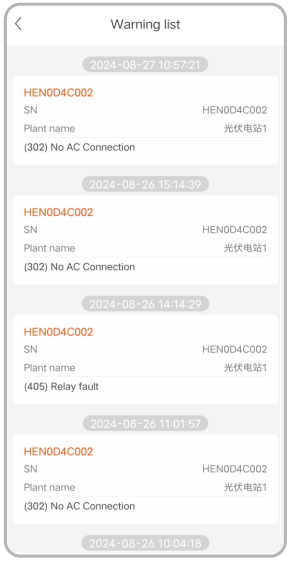




4> Data page: user can see the PV power, voltage, current, R phase power, S phase power, S phase power, T phase power, output power by day, month, year, by finger up cross the screen.

5> Events page: User can see the fault message if there it is.



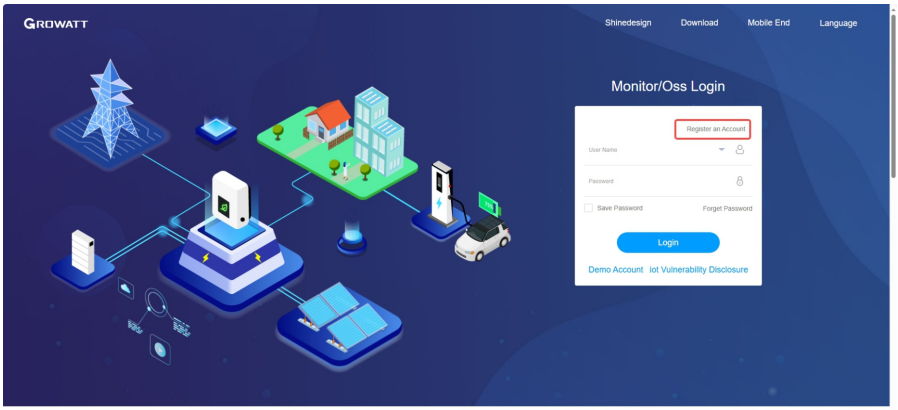


8.1.2 WEB Remote Monitoring

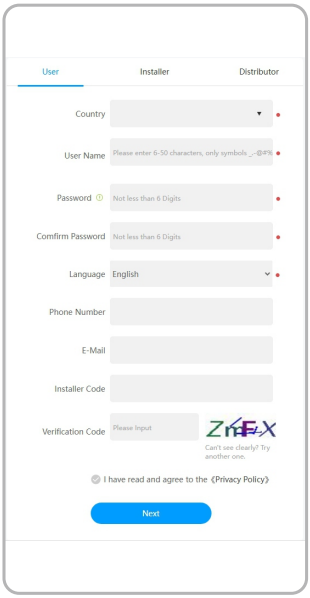
8.1.2.1 4G /WIFI Remote Monitoring

1> Register account

Open browser, input " https://server.growatt.com" , click "Register an Account" at login page, input the necessary information then go back to login page, input the registered username and password, click "Login" .

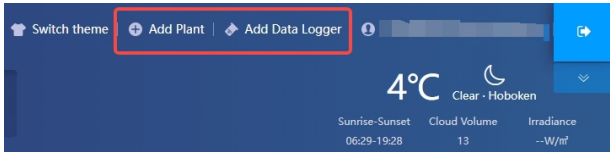


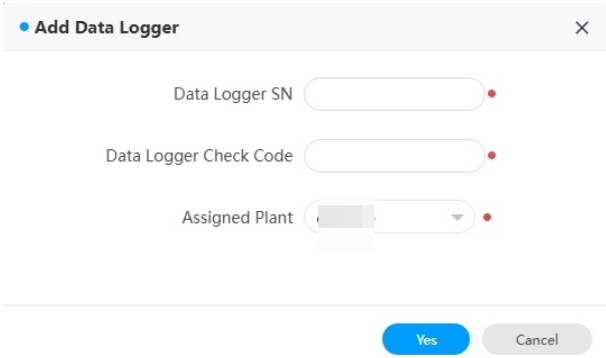
Demo Account

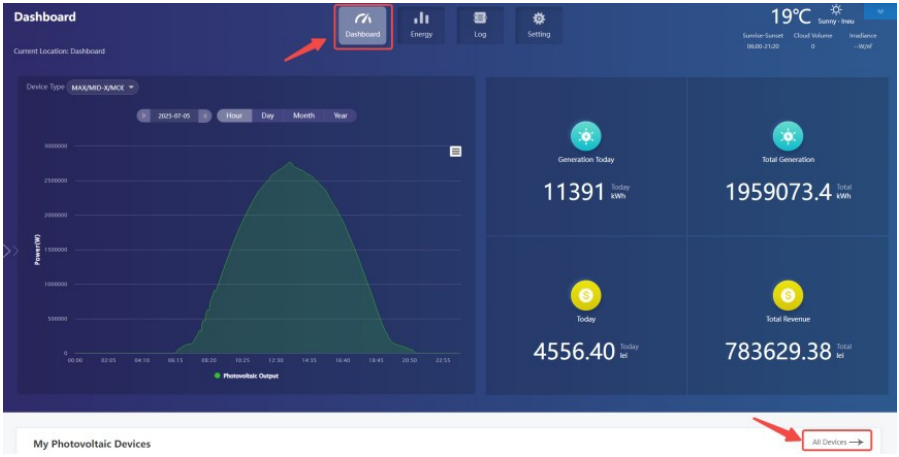


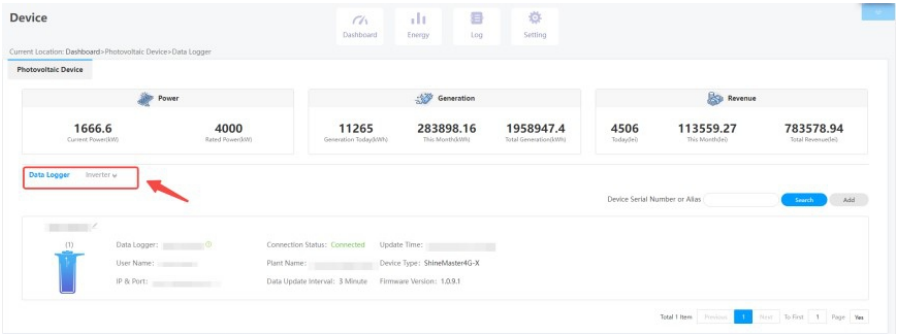
2> Add data logger

At home page, click “Add Plant” and fill in the relevant information. Then click "Add Data Logger" and type Data Logger SN with Check Code. The inverter and data logger will be displayed online within 5 minutes after the inverter is powered on, and you can click "Dashboard" and "All Devices" on the home page to view the added inverter and data logger information.



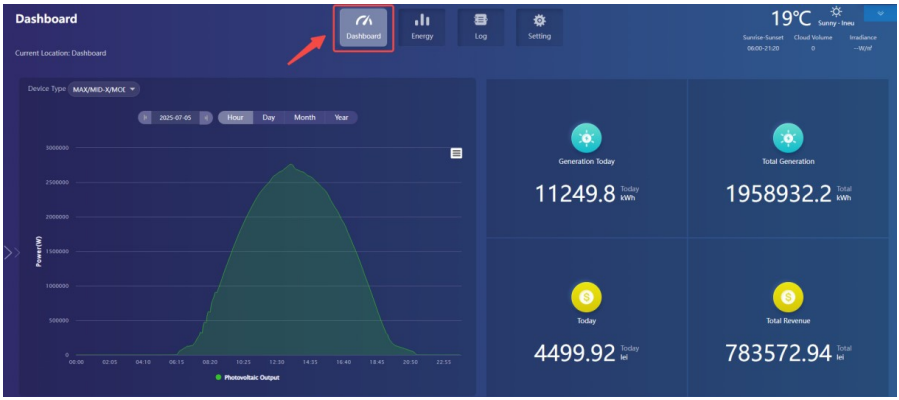






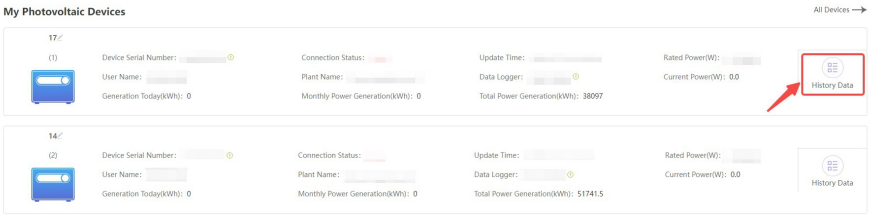
3> Data viewing

A. Click “Dashboard”, then you can view information such as “Generation Today”, “Total Generation”, “Today” and “Total revenue”.



B. Check detailed data

Click on "Dashboard", scroll down the webpage, and you can see the list of inverters. Click "Historical Data" to display the detailed data of the inverter. The data can be viewed by date or exported.





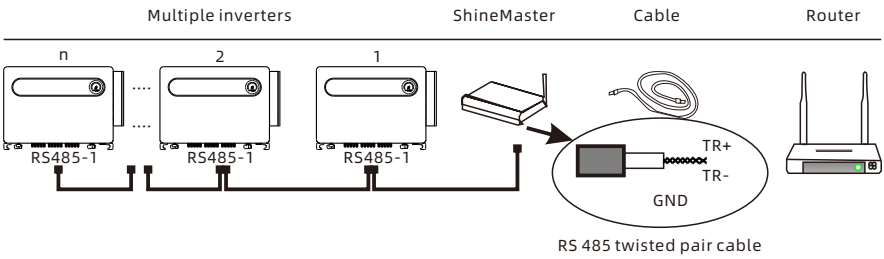
No.	Serial number	Time	Status	EacToday(kWh)	EacTotal(kWh)	Vpv1(V)	Vpv2(V)	Vpv3(V)	Vpv4(V)	Vpv5(V)	Vpv6(V)
146		2025-07-02 16:43:17	Normal	563.7	48876.3	678.8	662.0	672.4	667.6	676.4	669.8
147		2025-07-02 16:40:17	Normal	557.5	48870.0	667.6	667.4	672.2	668.9	680.6	674.9
148		2025-07-02 16:37:17	Normal	555.3	48867.9	663.8	673.8	670.2	672.0	671.6	684.4
149		2025-07-02 16:34:17	Normal	550.3	48862.8	674.0	673.8	668.3	668.5	670.1	683.0
150		2025-07-02 16:31:17	Normal	548.0	48860.5	669.5	666.8	660.4	664.3	665.1	671.1
151		2025-07-02 16:28:18	Normal	544.6	48857.2	662.4	670.8	663.8	666.8	672.2	671.9
152		2025-07-02 16:25:18	Normal	540.5	48853.0	664.9	669.3	672.8	662.9	672.9	669.1
153		2025-07-02 16:22:17	Normal	537.9	48850.4	669.4	660.3	678.0	663.1	664.7	678.7

C. Click "Energy" to view the power, voltage, current and other curves of each inverter.



8.1.2.1 ShineMaster monitoring

This is a cost-effective and compact monitoring device that is specially designed for solar power plants, with a high-speed CPU and a stable Linux system that intelligently records the user's system characteristics.



Feature:

1> A versatile and high performance communication data logger that notifies the user of system status at any time.

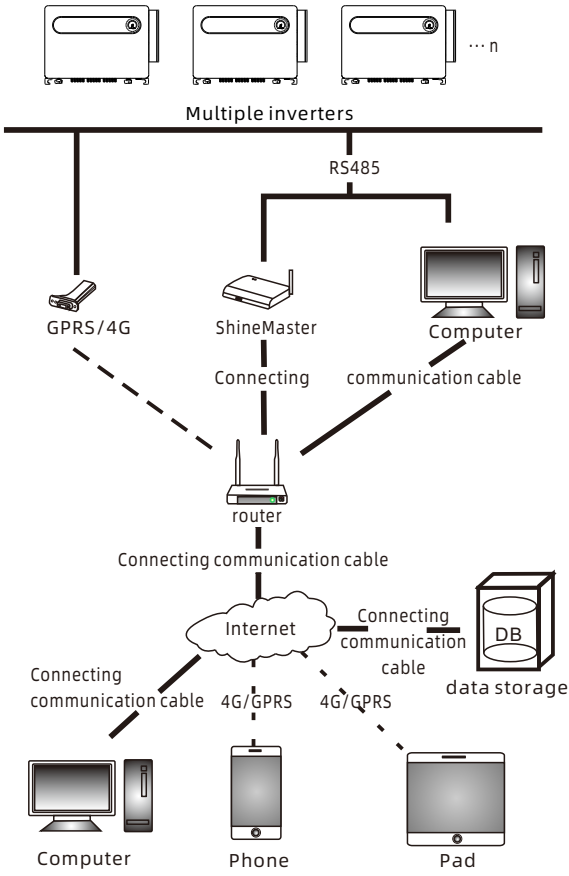
2> Flexible parameter setting, system information management, error prompting and recording, high-capacity storage.

3> Collect data and upload data to Growatt in real time over the network.

Note:

The smart meter and environmental monitor must be Growatt's designated manufacturer, otherwise monitoring will not be possible. When RS485 of multiple machines is used in parallel, please connect the ground wire according to Chapter 6.

The system framework of communication monitoring is shown in the figure below. Users can choose the most suitable monitoring method according to the actual situation.



1> ShineMaster IP Address query

A. The PC and ShineMaster LAN ports are connected to the router's port through the network cable, so that they are in the same local area network.

B. Go to the router's management page and check the "Internet host list" to query the IP address of the ShineMaster serial number as the name of the connected device. This IP is the IP address assigned by the router to the ShineMaster. For technical support, please contact professional personnel or Growatt.

Note:

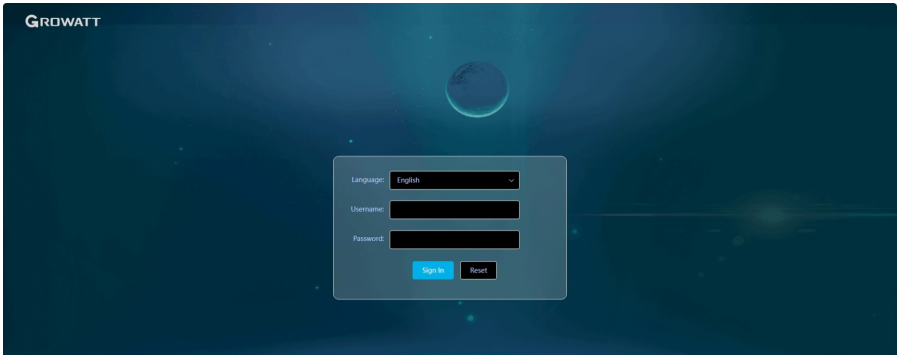
The router needs to enable automatic IP assignment, that is, open the DHCP function.

Enter the ShineMaster IP address in the browser to enter the ShineMaster built-in page.

2> ShineMaster Built-in page access

A. Before accessing the built-in page, check whether the communication cable between the devices is securely connected. After confirming a secure connection, go to enter the ShineMaster IP address in the IE browser to access the built-in page of the ShineMaster, as shown in the figure below.

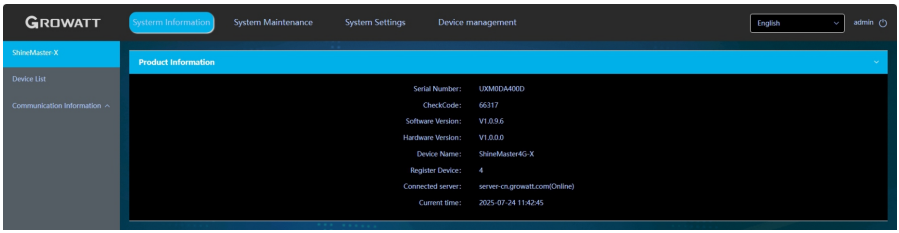
Note: ShineMaster and the PC should be in the same network segment.



B. The initial user name and password are “admin”, enter them to log in.

3> View ShineMaster datalogger status

Click “Datalogger State” to view information, including the system status, SN, server address and the number of devices connected.

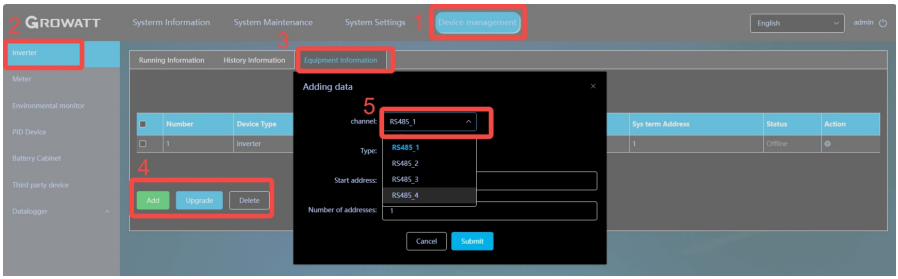


4> Add or remove devices connected to the datalogger

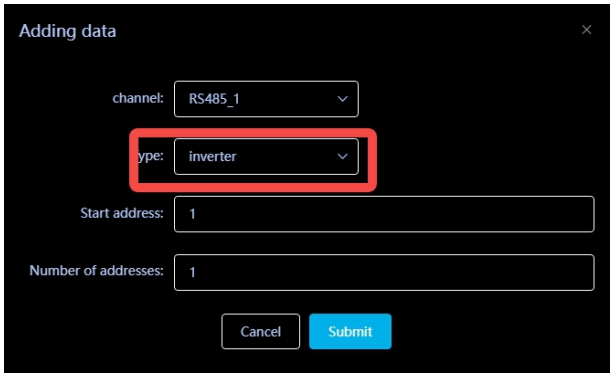
ShineMaster Before monitoring photovoltaic devices, we need to enter the page of the built-in ShineMaster data collector settings to add devices.

A. Add device

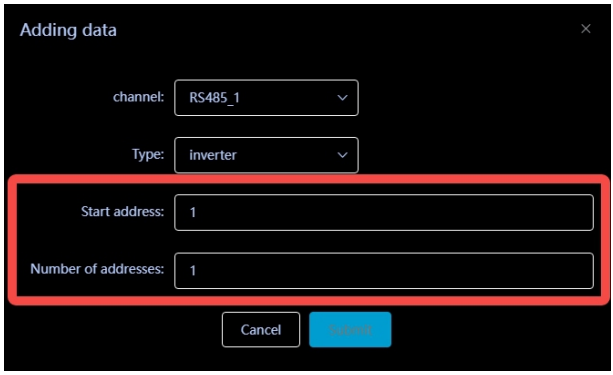
1) Select the inverter monitoring mode from the drop-down list of “Add or remove devices”, for instance, RS485_1.



2) Select the type of device to be monitored from the second drop-down list.

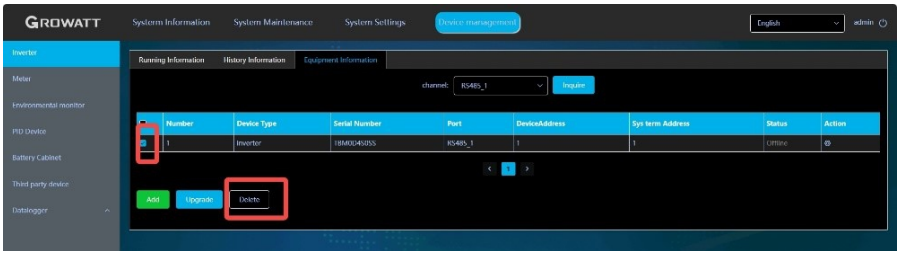


3) Enter the communication address of the inverter in the third filed, which is 1 by default.



4) Select “Add” and then click "Save”.

5) Go to the “Device State” page to check if the device has been successfully added.



B. Remove a device

1) Select the inverter monitoring mode from the drop-down list of “Add or remove devices”.
2) Select the type of device to be monitored from the second drop-down list.
3) Enter the communication address of the inverter in the third filed.
4) Click “Del” > “Save”.
5) Go to the “Device State” page to check if the device has been successfully removed.

5> Upload ShineMaster data to ShineServer

A. Register

Enter the domain name in the browser to enter the ShineServer page: “http://server.growatt.com/?lang=en”.

B. Login

After logging in, you can view the monitoring data of the inverter.

8.2 Local Data Monitoring

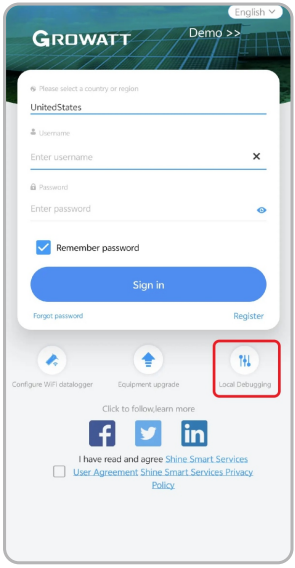
The local data monitoring of MAX 300-350K-X series inverters can be realized through mobile APP and USB Port.

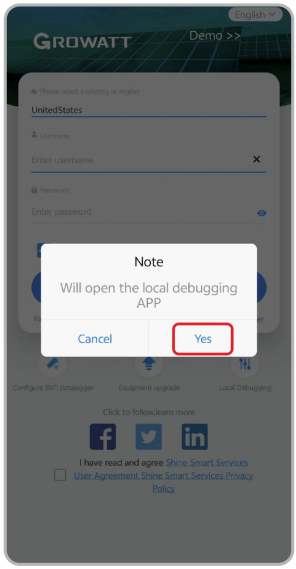
8.2.1 Mobile APP Monitoring

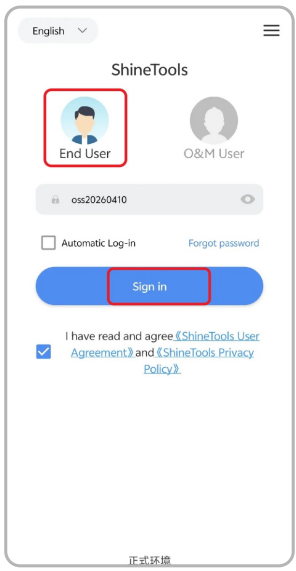
Refer to Section 6.8.2 to connect the USB to WiFi module to the inverter.
Refer to Section 8.1.1 and download the ShineTools app.

8.2.1.1 Log into the APP

Method 1
No Login: On the home page, tap "Local Debugging" and then "Yes" in sequence. Once ShineTools has opened, tap "End User", enter the password, the operation password is: oss+date.
For example: if today's date is 10 April 2026, the password is oss20260410.
Obtain the WiFi name by scanning the QR code or barcode of the USB to WiFi module (default WiFi password: 1234567), then connect to the WiFi. If it has been already connected, please skip this step.

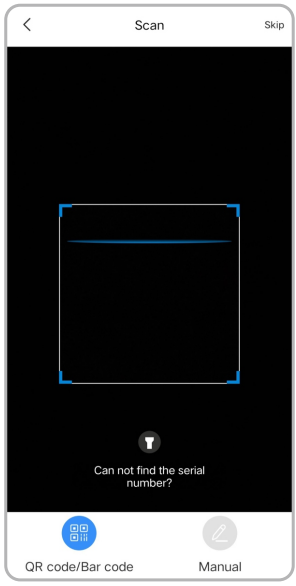


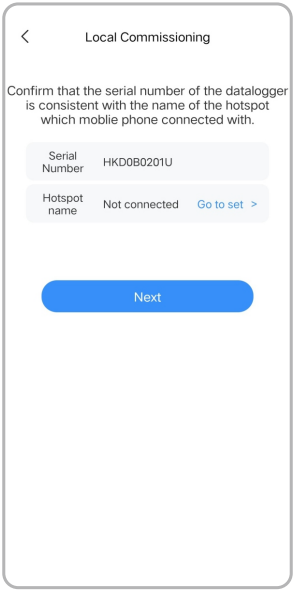


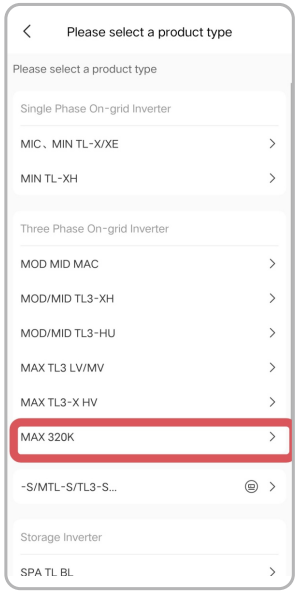


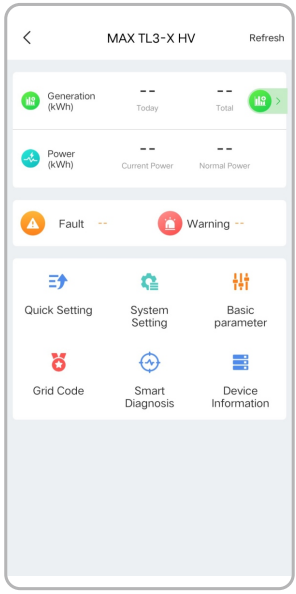

Please select a debugging tool
USB/232-WiFi
ShineWiFi-S/X
Only supports datalogger with version 3.0.0.2 / 3.1.0.2 or above
Direct WiFi/Bluetooth
(MIN TL-XH-US , SPH HU/-US , WIT-H/HU-US)
Microinverter
ShineWiFi-X2E
ShineMaster-X


Connection Tutorial
Step 1/2
Scan the QR code to identify the hotspot name
Step 2/2
Click on the WLAN with the same name with the SN to connect
Next


Scan
Skip
Can not find the serial number?
QR code/Bar code
Manual


Local Commissioning
Confirm that the serial number of the datalogger is consistent with the name of the hotspot which moblie phone connected with.
Serial Number
HKD0B0201U
Hotspot name
Not connected
Go to set
Next


Please select a product type
Please select a product type
Single Phase On-grid Inverter
MIC、MIN TL-X/XE
MIN TL-XH
Three Phase On-grid Inverter
MOD MID MAC
MOD/MID TL3-XH
MOD/MID TL3-HU
MAX TL3 LV/MV
MAX TL3-X HV
MAX 320K
-S/MTL-S/TL3-S...
Storage Inverter
SPA TL BL

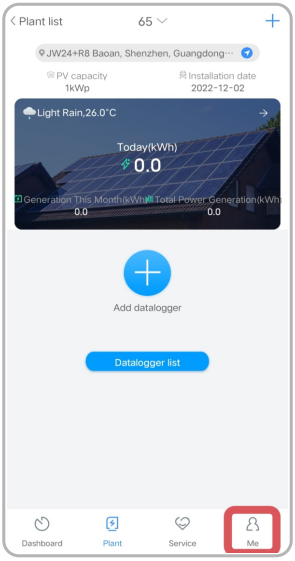

MAX TL3-X HV
Refresh
Generation (kWh)
Today
Total
Power (kWh)
Current Power
Normal Power
Fault
Warning
Quick Setting
System Setting
Basic parameter
Grid Code
Smart Diagnosis
Device Information

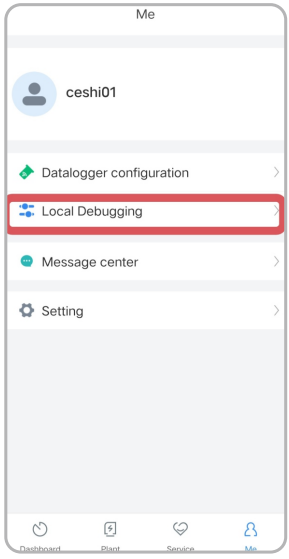
Method 2

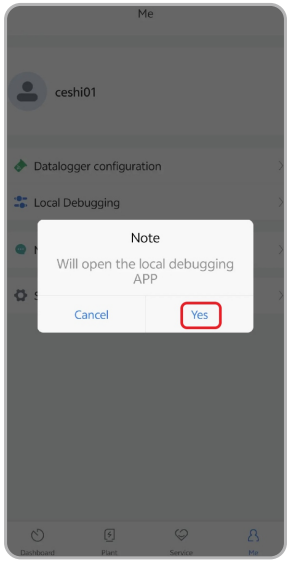
Login: After logging in, Tap “Me” > “Local debugging” > “Yes” . Once ShineTools has opened, tap “End User” , enter the password, the operation password is: oss+date.

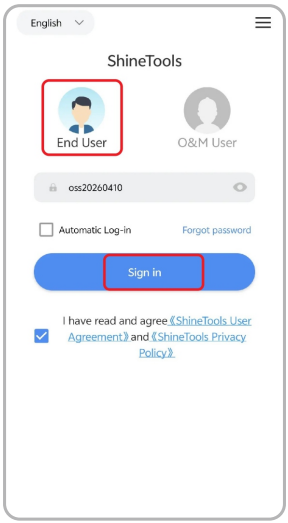
For example: if today’s date is 10 April 2026, the password is oss20260410.

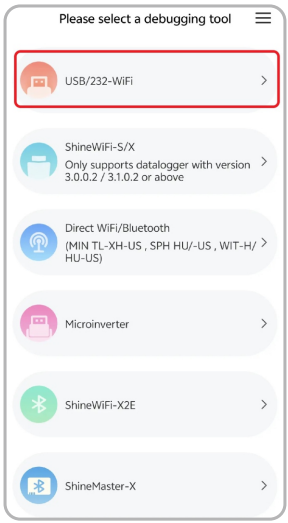
Obtain the WiFi name by scanning the QR code or barcode of the USB to WiFi module (default WiFi password: 1234567), then connect to the WiFi. If it has been already connected, please skip this step.

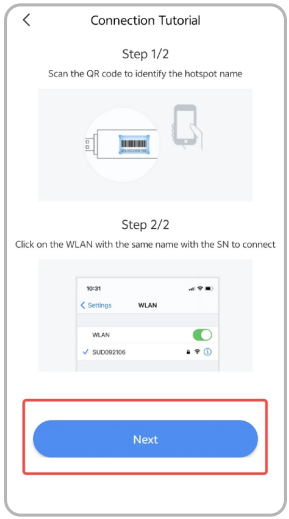


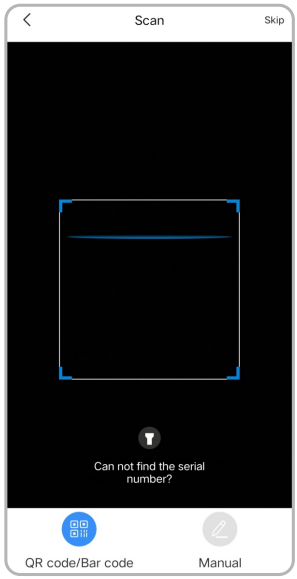


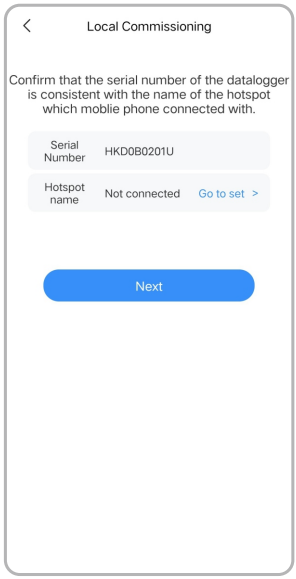


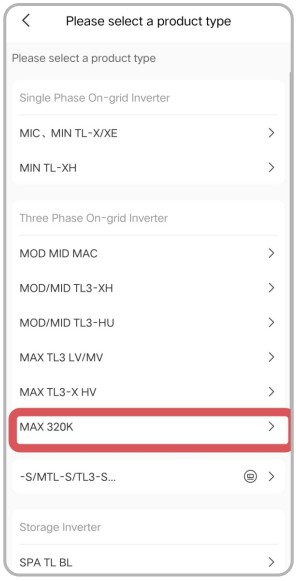


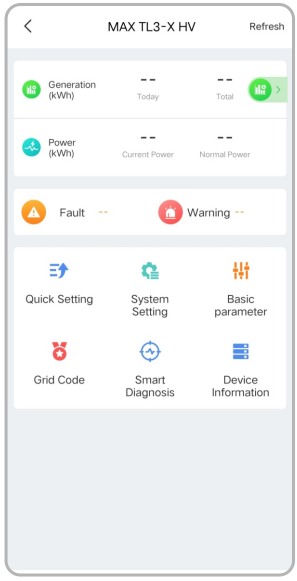





Scan
Skip
Can not find the serial number?
QR code/Bar code
Manual


Local Commissioning
Confirm that the serial number of the datalogger is consistent with the name of the hotspot which moblie phone connected with.
Serial Number
HKD0B0201U
Hotspot name
Not connected
Go to set >
Next


Please select a product type
Please select a product type
Single Phase On-grid Inverter
MIC、MIN TL-X/XE
MIN TL-XH
Three Phase On-grid Inverter
MOD MID MAC
MOD/MID TL3-XH
MOD/MID TL3-HU
MAX TL3 LV/MV
MAX TL3-X HV
MAX 320K
-S/MTL-S/TL3-S...
Storage Inverter
SPA TL BL


MAX TL3-X HV
Refresh
Generation (kWh)
Today
Total
Power (kWh)
Current Power
Normal Power
Fault
Warning
Quick Setting
System Setting
Basic parameter
Grid Code
Smart Diagnosis
Device Information

8.2.1.2 Use of local monitoring and commissioning

Local monitoring data is only available when your phone is connected to the datalogger's WiFi. Tap "Auto refresh" on the upper right corner to access the latest data.

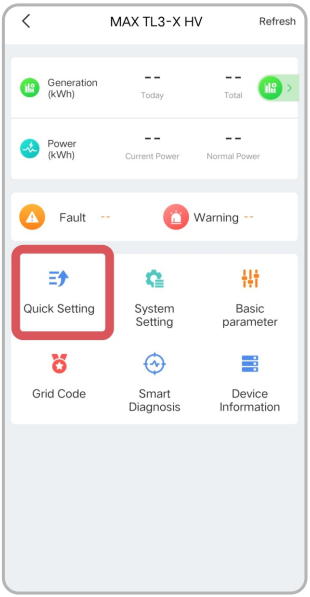
Note: Operations mentioned should be performed by professionals.

1> Device control

Note: For resetting the password, you need to connect to the Internet. Beyond that, other operations can only be carried out with connection to the datalogger's WiFi.

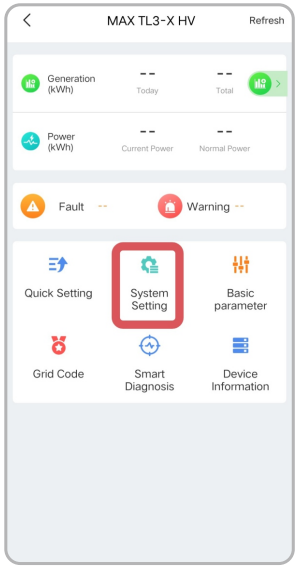
A. Reset the password: Connect to the Internet and log in with your OSS account to set or modify the local commissioning password.

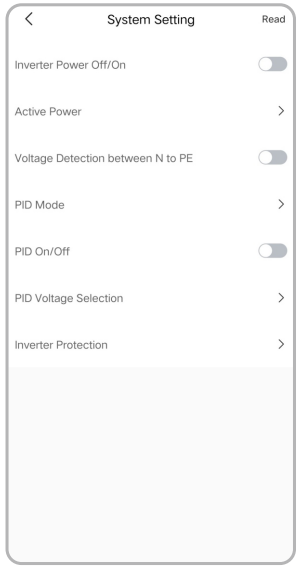
B. Setting configuration: You can modify certain inverter configuration based on the actual use.



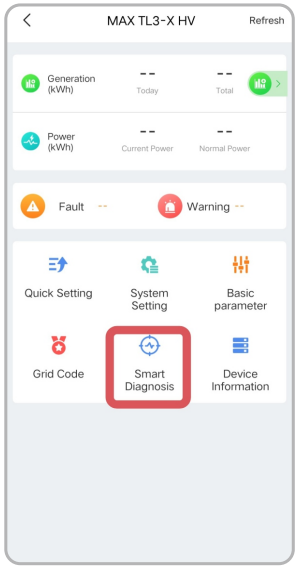


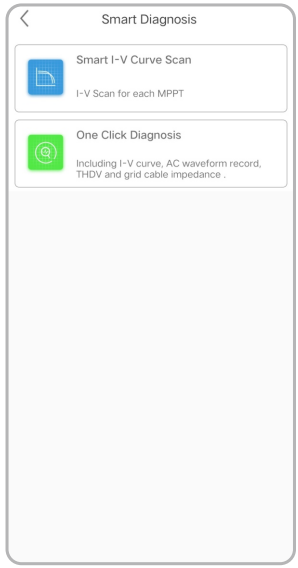
C. System Setting: You can make changes to parameters based on the actual use.



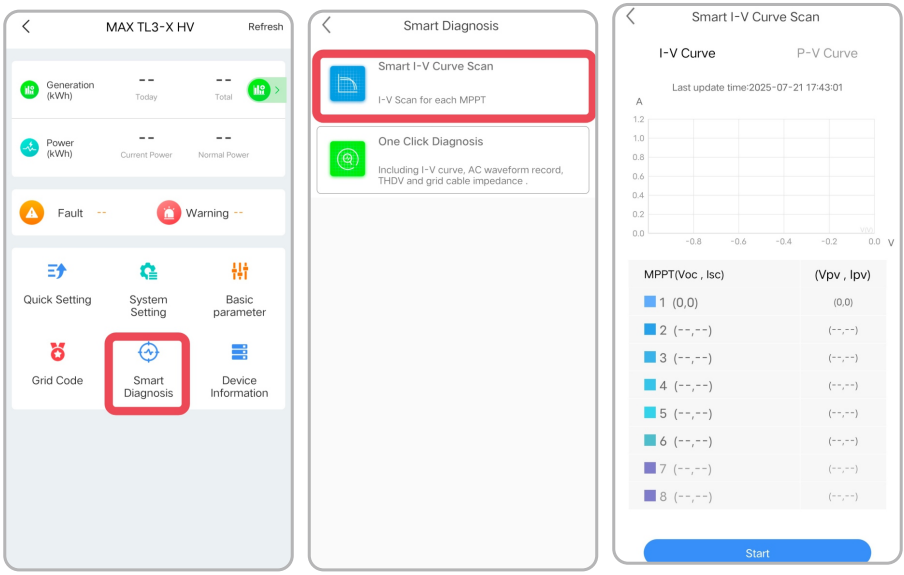


D. Smart Detection: Check detailed device data and status.

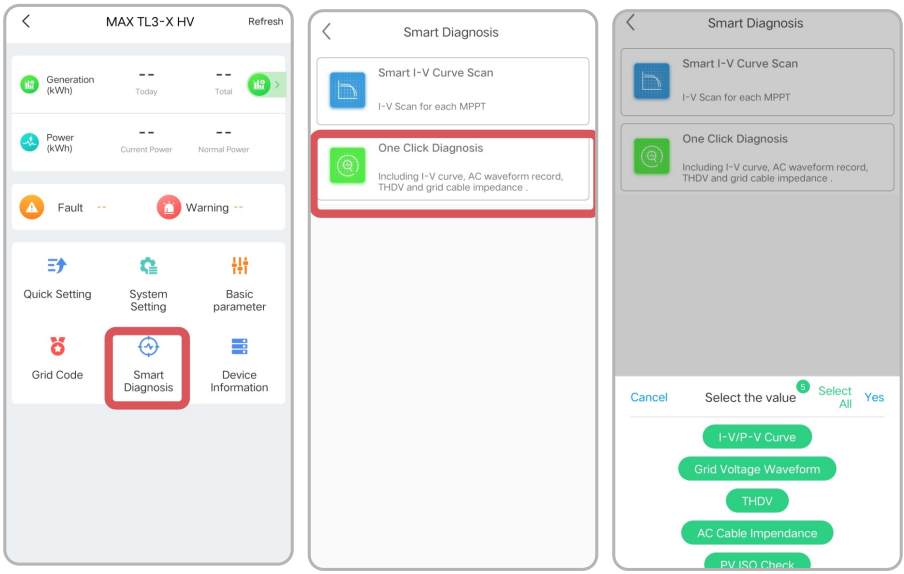




E. Smart I-V Curve Scan: capable of scanning each MPPT remotely.

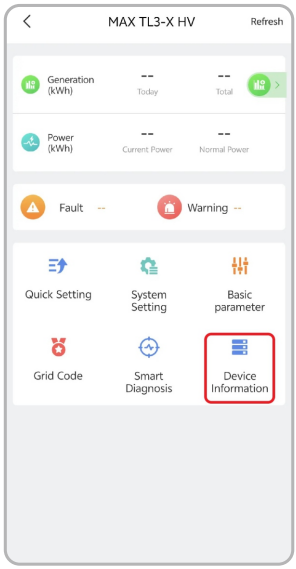


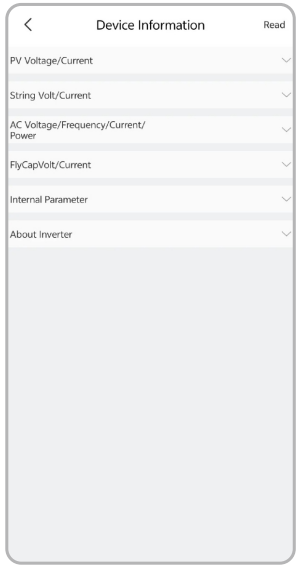
F. One Click Diagnosis: PV plant environment inspection, I-V curve diagnosis, grid waveform, THDV and cable impedance detection all at one click.



G. Advanced settings: Set parameters based on the register address.

H. Device information: Check device information, including the PV voltage/current, string voltage/current, AC voltage/current/power/frequency, PID voltage/current and internal parameters, etc.



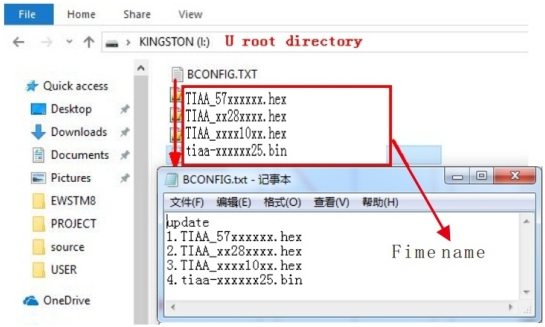


8.2.2 U Disk Monitoring

Refer to Section 6.8.2 to connect the USB to the inverter, supporting software programming, fault recording, curve diagnosis and real-time wave recording. Details are as follows:

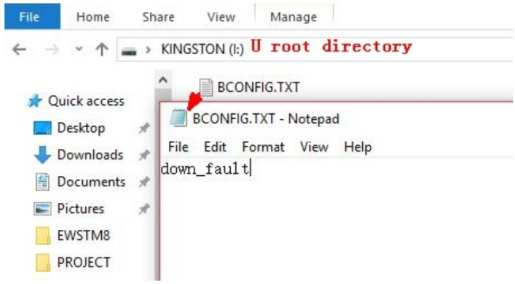
1> Software burning

Create BCONFIG.txt file under the root directory of the USB flash drive, and input the software file name. Plug in the USB flash drive to start the software burning.



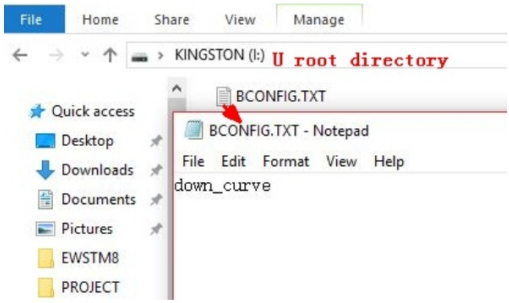
2> Fault wave-recording

Create BCONFIG.txt file under the root directory of the USB flash drive, and input "down_fault". Plug in the USB flash drive, then you are allowed to read the fault recording information.



3> Curve analysis

Create BCONFIG.txt file under the root directory of the USB flash drive, and input "down_curve". Plug in the USB flash drive, then you are allowed to read the I-V curve. A table will be generated under the root directory.



System Maintenance 9

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

 **DANGER**	• Before maintaining the system, make sure all DC-side switches and AC-side AC circuit breakers are in the "OFF" state.
	• 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.

9.1 Power Off

9.1.1 Maintenance Power Off

 **WARNING**	• When the inverter detects a fault, it will trigger the DC switch to automatically disconnect, do not turn on the DC switch before troubleshooting. • If the AC switch between the inverter and the grid has been automatically disconnected, do not turn on the AC switch until troubleshooting. • Only qualified professionals are allowed to access the equipment. • In the case of abnormal noise, burnt smell, smoke and other abnormal conditions of the inverter, it is strictly forbidden to open the front panel of the inverter or the AC junction box for maintenance.

Follow the following steps to power off the system:

Step 1 Professionals wear personal protective equipment.

Step 2 If the inverter is not shut down due to a fault, send a shutdown command to the inverter on the APP, Web, etc. If the inverter is already in Failure Mode and powered off, go to the next step.

Step 3 Turn off the AC circuit breaker between the inverter and the grid.

Step 4 Use a clamp meter to measure the DC current of each PV string input to the inverter. If the current is higher than 0.5 A, wait until the solar irradiance decreases and the PV string current decreases below 0.5 A at night, and then go to the next step. If the current is less than or equal to 0.5 A, go to the next step.

Step 5 Place the "DC SWITCH" on the inverter in the "OFF" status.

Step 6 Wait for 15 minutes, use the testing equipment to detect no voltage and current, and then perform fault analysis or maintenance operations on the inverter.

9.1.2 Shut down and Power Off

To shut down the system, please follow these steps:
Step 1: Send a shutdown command to the inverter via the app, web interface, etc.
Step 2: Disconnect the AC circuit breaker between the inverter and the grid.
Step 3: Set the two DC switches on the inverter to the “OFF” position.

9.2 Resetting and Turning On the DC SWITCH

When the alarm of "reverse connection of string", "reverse current of string" or internal fault of the inverter is viewed through the mobile APP or remote monitoring, and the DC switch is in the "TRIP" state, it can be judged that the DC switch of the inverter is in the automatic disconnection state. In this case, you need to troubleshoot according to the alarm or fault handling suggestions, and you must reset and turn on the DC switch after troubleshooting.

After troubleshooting, follow these steps to turn on the DC SWITCH:
Step 1 The inverter "AUX. SWITCH" switch is placed in the "ON" position, and a click is heard to indicate that the switch is completely closed.
Step 2 Observe the LED indicator, if the PV voltage LED Indicator is solid green and the AC voltage LED Indicator is solid red, rotate "DC SWITCH1" and "DC SWITCH2" to the "OFF" position, and then to the "ON" position.
Step 3 Turn off the "AUX.SWITCH “。
Step 4 Turn on the AC switch between the inverter and the grid.
Step 5 Check the LED indicator to confirm that the inverter is operating properly. If the inverter is operating normally, the alarm/fault indicator will not flash red slowly, and the power indicator will remain lit.

Important Notes:
If a fault occurs in the photovoltaic inverter and you are unable to resolve it yourself, you must disconnect the power supply to avoid safety risks or further damage to the equipment caused by improper operation.
Operational Requirements:
1> To disconnect the power supply, you must simultaneously switch off the PV switch (inverter DC input switch) and the AC switch (power distribution switch). Ensure that the inverter is in a completely powered-off state;
2> Immediately report the fault through the official after-sales channels indicated in the manual after a power outage, and wait for professionals to handle it.

Safety Instructions:
1> Please wear insulated protective equipment during operation to avoid the risk of electric shock.
2> Failure to switch off both the PV and AC switches simultaneously may result in the equipment remaining live, posing a risk of electric shock or exacerbating the equipment fault.

9.3 Maintenance Intervals

Inspection item	Scope of examination	Interval
Cleaning	Check the radiator and fan regularly for dust blockage.	Once a year
Working State	1. Check whether the appearance of the inverter is damaged or deformed; 2. Check for any abnormal sound during the operation.	Once every half a year
	Check the system running status on the APP.	Fixed period
Wiring	1. Check for poor cable contact or loose connection. 2. Check the cable for damage. 3. 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 ports.	Once every half a year
Environment	Patrol the environment around the inverter and remove weeds in time	Once a year

9.3.1 Clean Up the Inverter

DANGER	• Please disconnect the AC and DC switches for at least 15 minutes before the capacitance discharge is fully operated. If the inverter is contaminated with dust, please wipe the housing with clean water.

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

2> Observe if air intake or exhaust vents are normal. If necessary, clean the vents, or clean the fan. For instructions, see Chapter 9.3.2.

9.3.2 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 fans, and may cause fans 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> Use a Phillips screwdriver to remove the external fan panel and dust net screws, as shown below:

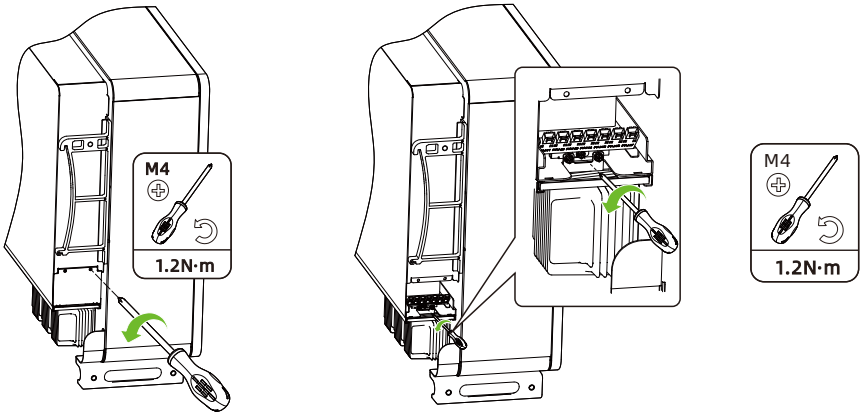


Figure 9.1 Replace the Dust Net 1

2> Remove the dust net and the connecting screw with a cross screwdriver.

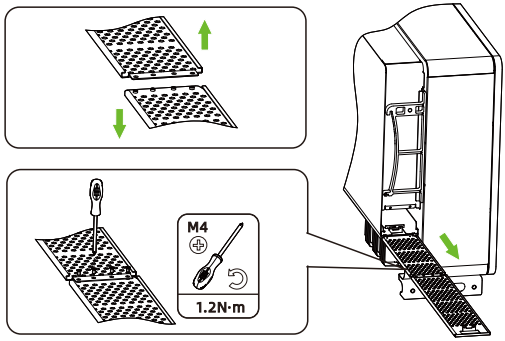


Figure 9.2 Replace the Dust Net 2

3> Remove the top dust net.

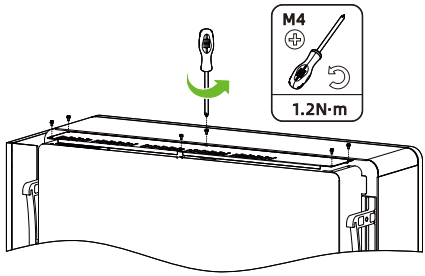


Figure 9.3 Replace the Top Dust Net

2. Replace the fan

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

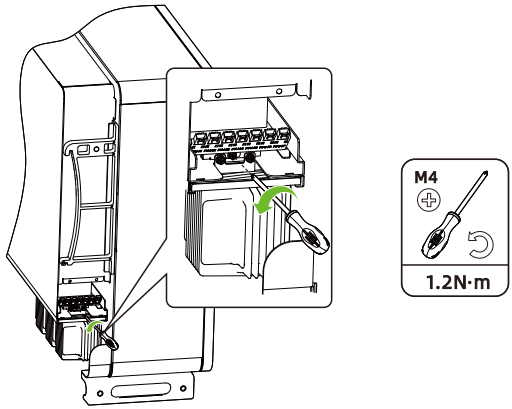


Figure 9.4 Replace the Fan 1

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:

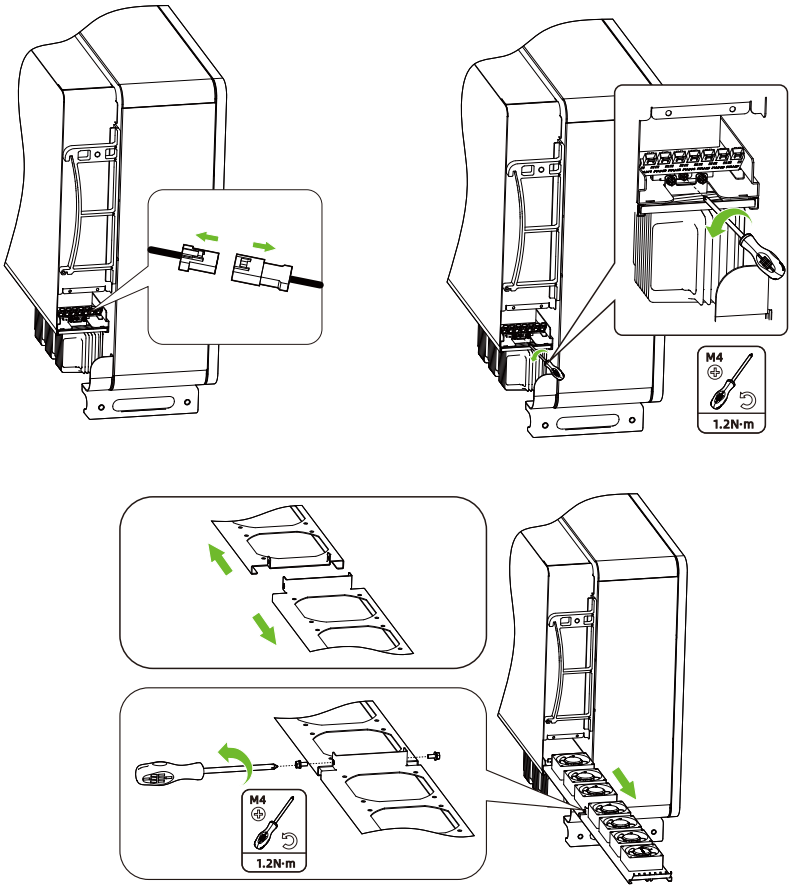


Figure 9.5 Replace the Fan 2

3. 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;

4. Reinstall the fan and related accessories.

Shutdown and Disposal 10

10.1 Shutdown

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 cables.
5> Remove the DC cables.
6> The inverter is removed from the wall.

10.2 Packing

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.

10.3 Store

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

10.4 Disposal of 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.

11 Specifications

Specifications \ Model	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	800V-1330V			
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	330000VA @35℃ 300000VA @45℃	352000VA@ 30℃ 320000VA@ 45℃	366300VA@ 25℃ 333000VA@ 35℃	352000VA@ 30℃ 320000VA@ 45℃
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%			
AC grid connection type	3W+PE			

Model / Specifications	MAX 300K-X	MAX 320K-X	MAX 333K-X	MAX 350K-X
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	139kg			
Operating temperature range	-30℃ - +60℃			
Altitude	5000m (>4000m derating)			
Nighttime power consumption	<1W(Note1)			
Topology	Transformerless			
Cooling	Smart air cooling			
Protection degree	IP66			

Model / Specifications	MAX 300K-X	MAX 320K-X	MAX 333K-X	MAX 350K-X
Relative humidity	0~100%			
DC connection	H4/MC4(Optional)			
AC connection	OT/DT terminal(Max.400mm^2)			
Interfaces				
Display	LED/WIFI+APP			
RS485/USB	Yes			
PLC/WIFI/4G	Optional			
Warranty: 5 / 10 years	Yes/Optional			
Note1: With AC power supply, the night loss is <25W.				

Troubleshooting 12

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 voltage hazards, beware of electric shock.

12.1 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	Protect Description	Troubleshooting
Protect 200	PV string fault	1. Check if the PV panels are normal after shutdown. 2. If the error message persists, contact GROWATT.
Protect 202	DC SPD function abnormal	1. Check the DC SPD after shutdown. 2. If the error message persists, contact GROWATT.
Protect 203	PV Circuit short	1. Check if PV is short circuited. 2. If the error message persists, contact GROWATT.
Protect 206	AC SPD function abnormal	1. Check the AC SPD after shutdown. 2. If the error message persists, contact GROWATT.
Protect 222	DC Switch Abnormal	Do not turn on the DC SWITCH by yourself, contact GROWATT.
Protect 310	N-PE Volt Abnormal	1. Check if the PE cable is reliably connected after shutdown. 2. If the error message persists, contact GROWATT.
Protect 400	Fan failure	1. Check if the fan is properly connected after shutdown. 2. If the error message persists, contact GROWATT

Protect Code	Protect Description	Troubleshooting
Protect 407	Over-temperature	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Protect 408	NTC temperature sensor is broken	1. Restart the inverter. 2. If the error message persists, contact GROWATT.

NOTE: If the problem persists, please contact Growatt support.

12.2 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 GROWATT.

Error Code	Error Description	Troubleshooting
Error 200	AFCI Fault	1. After shutdown, check the connection of the PV string. 2. Restart the inverter. 3. If the error message persists, contact GROWATT.
Error 201	Residual I High	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 202	PV Voltage High	1. Disconnect the DC switch immediately and check the voltage. 2. If the PV input voltage is within the permissible range and the error message persists, contact GROWATT.
Error 203	PV Isolation Low	1. Check if the PV strings are properly grounded. 2. If the error message persists, contact GROWATT.
Error 300	AC V Outrange	1. Check the grid voltage. 2. If the grid voltage is within the permissible range and the error message persists, contact GROWATT.

Error Code	Error Description	Troubleshooting
Error 301	AC reversed	1. Check the connection of the AC output terminals. 2. If the error message persists, contact GROWATT.
Error 302	No AC Connection	1. After shutdown, check the AC wiring. 2. If the error message persists, contact GROWATT.
Error 303	NE abnormal	1. After shutdown, check if the ground cable is reliably connected. 2. If the error message persists, contact GROWATT.
Error 304	AC F Outrange	1. Check the grid frequency and restart the inverter. 2. If the error message persists, contact GROWATT.
Error 402	Output High DCI	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 404	Bus voltage abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 405	Relay failed	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
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, contact GROWATT.
Error 409	Bus sample abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 410	Flying Capacitor abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.

Error Code	Error Description	Troubleshooting
Error 411	Communication failure	1. Check the wiring of the communication board after shutdown. 2. If the error message persists, contact GROWATT.
Error 415	Auxiliary supply abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 416	DC/AC over current	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 420	GFCI module abnormal	1. Check the GFCI module after shutdown. 2. If the error message persists, contact GROWATT.
Error 421	CPLD abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 423	PWM failure	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 425	AFCI self-test failed	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 426	PV current abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.
Error 427	AC current abnormal	1. Restart the inverter. 2. If the error message persists, contact GROWATT.

Contact Information 13

In order to provide you with the necessary support, please provide the following information:

Serial number of the inverter	XX
Model of the inverter	XX
Protect code/Error code	Protect XXX/Error XXX
Grid voltage	XX V
DC input voltage	XX V
Can you reproduce the issue?	Yes or No
Has this issue come up before?	Yes or No
What were the environmental conditions at the time of the problem?	XX

Information about photovoltaic panels:

Name and model of the PV panel	XX
PV panels output power	XX kW
Voc of PV panels	XX V
Vmp of PV panels	XX V
Imp of PV panels	XX A
Number of PV panels in each PV string	XX PCS

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For local customer support, please visit https://en.growatt.com/support/contact

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Manual

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