ZONERGY

User Manual

PV inverter

MERCURY series

3680~6000-S1

3000-S2

Document version 02

Date issued June 29, 2023

Contents

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Attention

For product version upgrade or other reasons, the contents of the document will be updated from time to time, and unless otherwise specified, the contents of the document cannot replace the safety precautions in the product label or user manual. All statements, information and suggestions herein will not constitute any express or implied warranty. All descriptions herein are only used as a guide.

1 Preface

This manual mainly describes the installation, electrical connection, debugging, maintenance and troubleshooting methods of Mercury (3680-6000)-S1. Please carefully read this manual, understand the safety information and know the functions and characteristics of the inverter before use. This manual will be updated from time to time, and please visit the official website for the latest version and more product information.

1.1 Applicable Product Model

This document applies to the following inverters:

- Mercury 3680-S1
- Mercury 4000-S1
- Mercury 4600-S1
- Mercury 5000-S1
- Mercury 6000-S1
- Mercury 3000-S2

1.2 Target Readers

The manual is applicable to the following personnel:

- User;
- Operating and maintenance personnel;
- Professionals who are familiar with the local regulations, standards and electrical systems, are trained professionally and know the knowledge related to this product.

1.3 Symbol Conventions

This manual uses the following symbols to highlight relevant important information, and please carefully read such symbols and description.

Danger
"Danger" is given for the high potential risk, which may cause personal casualty or serious injury if not avoided.
Warning
"Warning" is given for moderate potential risk, which may lead to death or serious personal injury if not avoided.
Caution
"Caution" is given for low potential risk, which may lead to moderate or mild personal injuries if not avoided.
Attention
"Attention" is given to lay stress on and supplement some contents or provide the product optimization and use skills, helping you solve a problem or save your time. "Attention" is not a kind of safety warning information and does not involve personal, equipment and environment injuries.

1.4 Version Record

The manual of the latest version includes all the updating contents of manuals of the previous versions.
Document version 01 (February 14, 2023), first release;
Document Version 02 (June 29, 2023), optimized user manual, Add product model, modify Communication Connection, modily System debugging, modify Technical Data.

2 Safety precautions

The equipment system operators must always abide by all the information in the safety precautions included in this document.

Danger

- The equipment system should be used in an environment required in the design specification, which may otherwise lead to equipment failure, and any abnormality in equipment functions or part damage, personal safety accident and property loss, etc. caused therefrom are not covered by the equipment warranty.
- The inverter is strictly prohibited from being installed when it is powered on.
- The outdoor equipment and cables (including but not limited to handling equipment, operating equipment and cables, plugging of signal interfaces connected to the outdoors, aerial work and outdoor installation) are strictly prohibited from being installed, used and operated in case of severe weather conditions such as thunder, rain, snow and strong breeze or more powerful wind.
- In case of a fire, it is necessary to evacuate from the building or equipment area and press the fire alarm, or call the fire alarm. It is prohibited from re-entering the burning building under any circumstance.
- The inverter has been designed and passed the test in strict accordance with the safety regulations, but the electrical equipment can be operated only after relevant safety instructions are followed, because any improper operation may cause serious injury or property loss.
- Any paint scratches occurred during equipment transportation and installation must be timely repaired and are strictly prohibited from being exposed outdoors for a long time.
- It is strictly forbidden to manually alter, damage or cover the equipment identifications and nameplates. It is strictly forbidden to open the panel of the inverter host.
- The "Caution", "Warning" and "Danger" matters in this manual do not represent all safety matters to be followed but are just supplements to all safety precautions. Zonergy Company will not undertake the responsibility for violations of the general operation safety requirements or for violations of equipment design, production and use safety standards.

2.1 General Safety

Attention

- For product version upgrade or other reasons, the contents of the document will be updated from time to time, and unless otherwise specified, the contents of the document cannot replace the safety precautions in the product label or user manual. All descriptions herein are only used as a guide.
- In any case, the equipment must be operated by professional and qualified electrical technicians, who should be familiar with the relevant standards and safety specifications of the project location.
- Be fully familiar with the composition and working principle of the whole grid-connected PV power generation system and the relevant standards of the country/region where the project is located.
- The operator should use the insulating tools and wear personal protective equipment when operating the inverter, so as to ensure his/her personal safety. The operator should wear antistatic gloves, antistatic wrist strap and antistatic clothing, etc. when touching the electronic devices, so as to protect the inverter from electrostatic damage.
- Reverse engineering, decompilation, disassembly, dismantling, adaptation, implantation or

other derivative operations are not allowed for the equipment software. It is also forbidden to study the interior of equipment, obtain the source code of the equipment software and steal the intellectual property rights, etc. in any way or to disclose the performance test results of any equipment software.

- ✧ If any personal injury or equipment damage may be caused during the operation of the equipment, such operation should be suspended immediately, this should be reported to the responsible person, and any effective protection measures should be taken.
- ✧ Before any use of tools, please know the correct use of such tools to avoid personal injury and equipment damage.
- ✧ When the equipment is running, the shell temperature is high, which may cause burning, so please do not touch it.
- ✧ Before the equipment installation, please carefully read this document to understand the product and precautions.

The local laws & regulations and specifications should be followed in the equipment installation,operation and maintenance. The safety precautions in this manual are only used to supplement the local laws & regulations and specifications. In case of any one of the following circumstances, Zonergy Company will take no responsibility:

1	The product is not operated under the service conditions given in this manual. The operation goes against the operating instructions and safety warnings in the product label and this document.
2	The installation and use environment does not meet the regulations in relevant international or national standards.
3	Any damages are caused during the customer's own transportation.
4	Arbitrarily assemble and disassemble the internal components of the inverter, change the product or modify the software code, causing equipment damage or personal injury.
5	Any equipment damages are caused by abnormal natural environment (force majeure events, such as earthquake, fire and storm).
6	Any damages are caused due to the non-conformance of the storage conditions to the requirements of product documents.

2.2 Operation and Wiring Safety of AC and DC Cables

⚠ Danger

- ✧ Please use the DC wiring terminal provided with the box to connect the DC cables of the inverter. If any use of other models of DC wiring terminals may cause serious consequences, the equipment manufacturer will be not responsible for the equipment damage and personal injury caused therefrom.
- ✧ It is forbidden to install and dismantle the power cords when they are powered on. The power cord core generates electric arc or spark at the moment of contact with the conductor, which can cause fire or personal injury.

Warning

- ✧ Before the power cords are connected, first confirm that the label identification of the power cord is correct.
- ✧ Ensure that the component frame and frame system are grounded well.
- ✧ Before the equipment is connected electrically, if any live parts may be touched, the disconnection device corresponding to the equipment preamplifier must be disconnected.
- ✧ Please ensure that the DC cables are connected firmly and not loose.
- ✧ A multimeter is used to measure the positive and negative poles of the DC cables, ensuring correct positive and negative poles, no reverse connection and voltage within the allowable range.
- ✧ Do not connect the same PV string to more than one inverter, otherwise the inverter may be damaged.
- ✧ If the equipment has multiple input circuits, all of them should be disconnected to wait for complete power-off before the operation of the equipment.
- ✧ The PV modules matched with the inverter must meet the IEC61730 A standard.

If the cables are used in hot environment, their insulation layers may be aged and damaged, and the distance between the cables and the periphery of heating device or heat source area should be 4cm at least. The similar cables should be tied together, and different cables should be laid at least 4cm apart and cannot be intertwined or crossed.
The cables used in the grid-connected PV power generation system must be connected firmly and well insulated with proper specifications.

2.3 Inverter Safety

Warning

- ✧ Ensure the voltage and frequency of the grid-connected access point conform to the specification of grid connection of the inverter.
- ✧ The protective ground wire of the inverter must be firmly connected. Protective devices such as circuit breaker or fuse are recommended on the AC side of the inverter. The specification of the protective devices should be 1.25 times greater than the rated AC output current of the inverter.
- ✧ If the inverter triggers less than 5 faults within 24 hours, the alarm can be cleared automatically. After the fifth arc fault occurs, the inverter stops for protection, and only after the fault is cleared can the inverter work normally.

Danger

After the inverter is installed, the label and warning signs on the box must be clear and visible and cannot be covered, altered and damaged.
The inverter box has the following identifications:

	The inverter surface is very hot, so it is strictly forbidden to touch it during the equipment running, otherwise scald injuries may be caused.		Caution, risk of electric shock,Energy storage timed discharge

	Before operating the equipment, please carefully read the product specification.		Caution, risk of danger
	The equipment cannot be disposed of as household waste, and should be disposed of according to the local laws and regulations or sent back to the manufacturer.		Connections of the protective ground wire

2.4 Personnel Requirements

Attention
✧ Personnel in charge of the equipment installation and maintenance must be strictly trained to understand various safety precautions and know the correct operation methods. The equipment or parts (including software) must be replaced by professionals or authorized personnel. ✧ The equipment or parts can only be installed, operated, maintained and replaced by qualified professionals or trained personnel, who should hold special operation qualifications required by local country, such as high-pressure operation, climbing and special equipment operation qualifications.

3 Product Introduction

3.1 Product Profile

Functional Overviewv

The PV inverter controls and optimizes energy flow through the integrated energy management system in the PV system. The electric power generated in the PV system can be transmitted to the grid.

Model Description

This document is applicable to the following models of inverters:

- Mercury 3680-S1
- Mercury 4000-S1
- Mercury 4600-S1
- Mercury 5000-S1
- Mercury 6000-S1
- Mercury 3000-S2

3.1.1 Meanings and Naming Rules of Models:

Mercury 5000 - S1
1 2 3

1) Series name of products:

Serial No.	Product type	Series name
1	Household energy storage hybrid inverter	Venus
2	Single-phase grid-connected inverter	Mercury
3	Three-phase grid-connected inverter	Apollo

2) Power or electricity:

Serial No.	Power	Way of naming
1	<10kW	The power is represented by a four-digit number: For example, 4,000->4,000W, 5,000->5,000W
2	⩾10kW	Adopt 10K->10kW, 20K->20kW

3) Grid voltage and system:

Serial No.	Grid voltage system	Meaning
1	S1	Double-circuit MPPT, single-phase AC 220V/230V
2	S2	Single-circuit MPPT, single-phase AC 220V/230V
3	S3	Double-circuit MPPT, single-phase AC 110V
4	S4	Single-circuit MPPT, single-phase AC 110V
5	T1	Three-phase AC 380V/400V

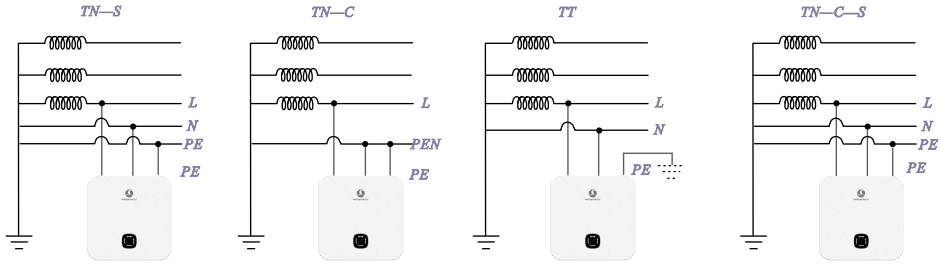
4) Regional Identification:

Marking is not mandatory, and in case of regionally customized version, the country or region could be given with two letters.

Serial No.	Abbreviations of regions	Country or region
1	AU	Australia
2	BR	Brazil
3	CN	China
4	DE	Germany
5	ES	Spain
6	IT	Italy
7	PK	Pakistan
8	UK	Britain

3.1.2 Form of Supported Grid

For the grid with a N line, the N-PE voltage should be less than 10V.



3.2 Application Scenarios

The inverter is designed to convert the direct current power generated from the PV modules into grid-compatible AC current and feeds the AC current to the utility grid.

Warning

- Inverter cannot connect the PV strings whose positive and negative terminalsneed to be grounded.
  Do not connect any local load between the inverter and the AC circuit breaker.
  Inverter is applicable only to the grid-connected PV system. Any other usage is strictly forbidden.

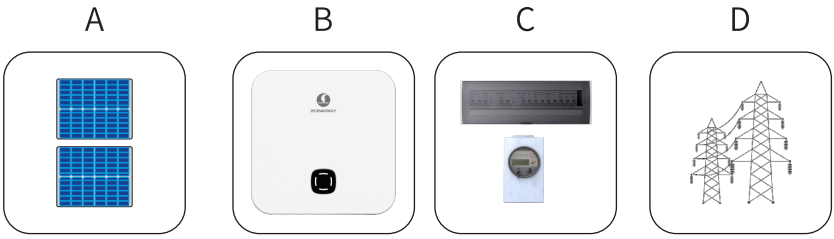


figure 3-2 Inverter application in PV power system

Serial No.	Component	Description
A	PV string	Monocrystalline silicon, polycrystalline silicon, and thin-film without grounding
B	Inverter	Mercury 3680~6000 S1, 3000 S2 series inverter
C	Metering device	Meter cupboard and Breaker
D	Utility grid	Match according to the power of the inverter

3.3 Functional Characteristics

Power derating

In order to ensure running safety of the inverter, the inverter will automatically reduce the output power under nonideal running environment. The following factors which may cause power derating should be avoided as much as possible in use.

- Adverse environmental conditions, such as direct solar radiation and high temperature.
- The percentage of output power of the inverter has been set.
- Over frequency and load reduction.
- The input voltage is high.
- The input current is high.

AFCI

The inverter is matched with AFCI function.

Communication

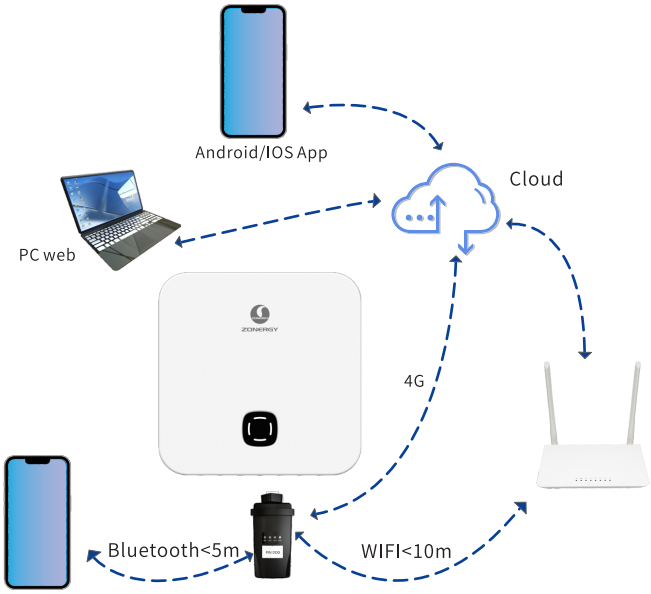
The inverter is equipped by WiFi and Bluetooth; It is connected with cloud side by WiFi to monitor the running state of inverter and operation state of power station and set the working parameters of inverter, remote debugging and diagnosis, and upgrade the firmware of inverter, etc.

- Bluetooth: It meets Bluetooth 4.2 standard.
- WiFi：It supports 2.4G frequency band, so the router is set to 2.4G or 2.4G/5G concurrent mode.

The maximum input of wireless signal name of the router is 40 bytes.

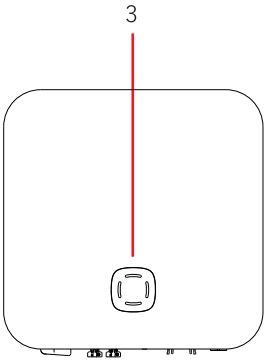
WiFi signal intensity can be checked by Zonergy App. When it is less than -60, it is recommended to move the router nearby the device or remove the signal obstacle to improve the signal intensity.

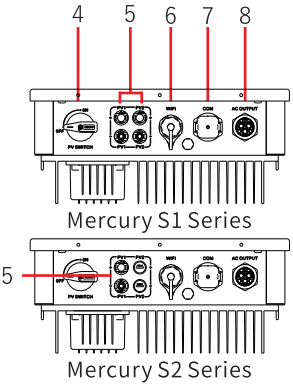
- 4G: support to connect cloud side by 4G communication mode and support LTE UE-Cat.4, LTE FDD, LTE TDD, WCDMA and GSM, depend on SIM card and local operator.



3.4 Description of appearance

3.4.1 Appearance introduction





1.Nameplate

2.Ground point

3.LED Indicator

4.DC switch

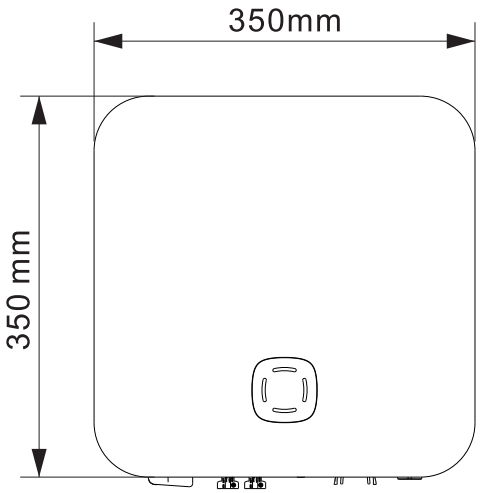
5.DC input terminal (PV1/PV2) * S2 Series only one PV

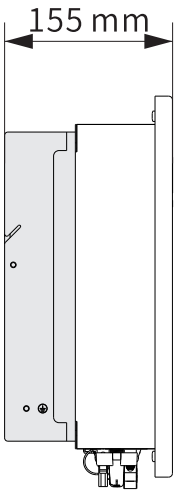
6.Interface of the collector (WIFI/4G)

7.Communication interface (COM)

8.Grid-connection output terminal (AC OUTPUT)

3.4.2 Size





3.4.3 LED indicator

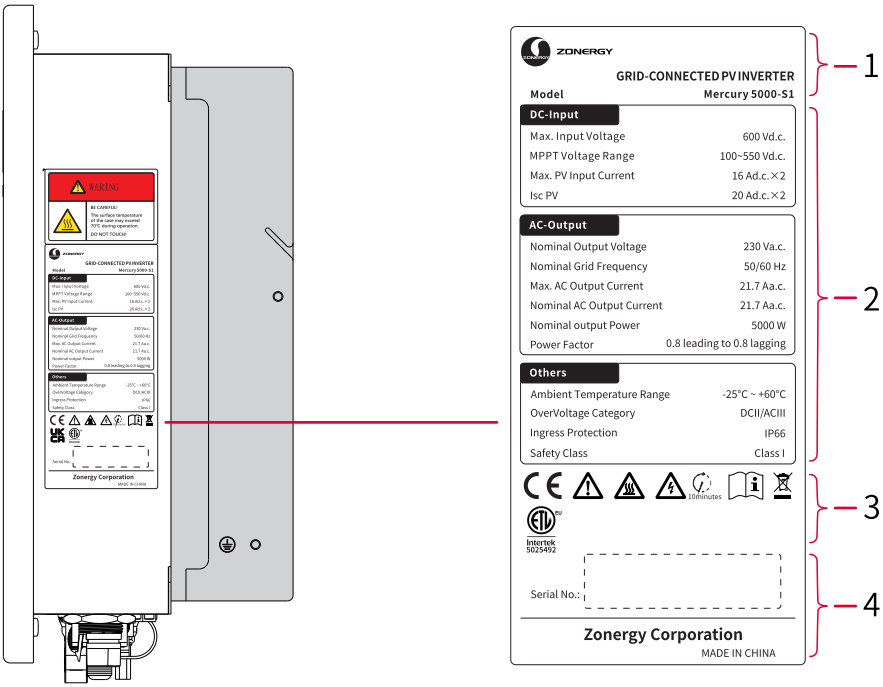
(Green) Steady on: The inverter is connected to the grid.
Blinking: The DC is powered on and the inverter is in standby or started state (not connected to the grid).

(Red) Steady on: The system is faulty (cannot be connected to the grid to generate power).

(Gray) No light: The DC power is powered off.

3.5 Identifying the Inverter

The nameplate can be found on both the inverter and the packing case. It provides information on model of inverter, important specifications, marks of certification institutions, and serial number which are available and identified by Zonergy.



Technical parameters of product

Item	Description
1	Zonergy logo and product model
2	Technical data of inverter
3	Instructions and marks of conformity
4	Company name, website and country of manufacture

4 Equipment Examination and Storage

4.1 Examination Before Signing

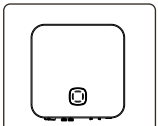
Before signing for receiving the product, the user should check the following contents carefully:

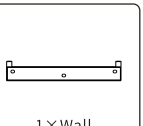
1. Check whether the outer package is broken, such as deformation, tapping, crack or other signs which may cause equipment damage in the packaging box. In case of damage, please don't open the package, and contact your dealer.
2. Check whether the model of inverter is correct, in case of unconformity, please don't open the package, and contact your dealer.
3. Check whether the type and quantity of the deliverable are correct and the appearance is broken. In case of damage, please contact your dealer.

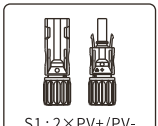
4.2 Deliverables

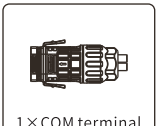
Warning

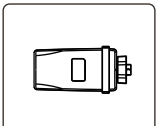
- ✧ Please use the wiring terminal shipped with box during electrical connection. The equipment damage caused by incompatible model of connector is not guaranteed.
- ✧ The material marked with * is optional accessory.


1×Inverter

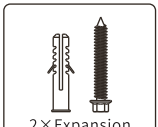

1×Wall -mounted shelf

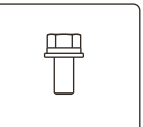

S1:2×PV+/PV-
S2:1×PV+/PV-


1×COM terminal (Optional)


1×Dongle


1×AC OUTPUT connector


2×Expansion screw


4×M5*12 Screw


1×Product documentation


1×PV Tool

4.3 Equipment Storage

If the inverter cannot be used immediately for the time being, the inverter should be stored under the following conditions:

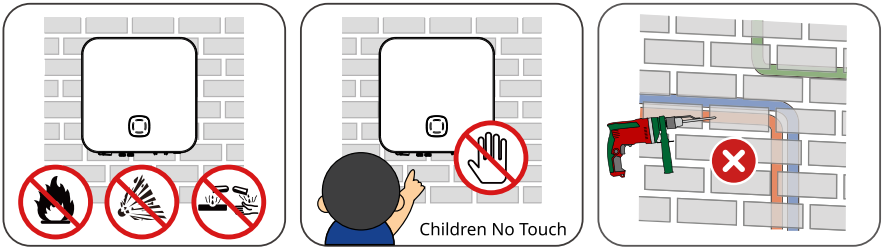
1. Please don't remove the outer packaging box, and ensure the drying agent in the box not to be lost.
2. Please ensure the clean and dry storage environment, and prevent the corrosion of dust and water vapor. It is suggested to carry out inspection once every three months. In case the package is found to be damaged, the packaging material shall be timely replaced.
3. It shall be ensured that storage temperature keeps between –40°C and +70°C and relative humidity shall keep between 5% RH and 95% RH, with no condensation.
4. It shall be ensured that the inverters are placed according to the stacking height and direction stipulated in the label of packaging box, with no falling risk, so as to avoid equipment from falling, causing personal injury or equipment damage.
5. When resting period of the inverter is more than 2 years, it shall not be put into use until it is inspected and tested by the professional personnel.

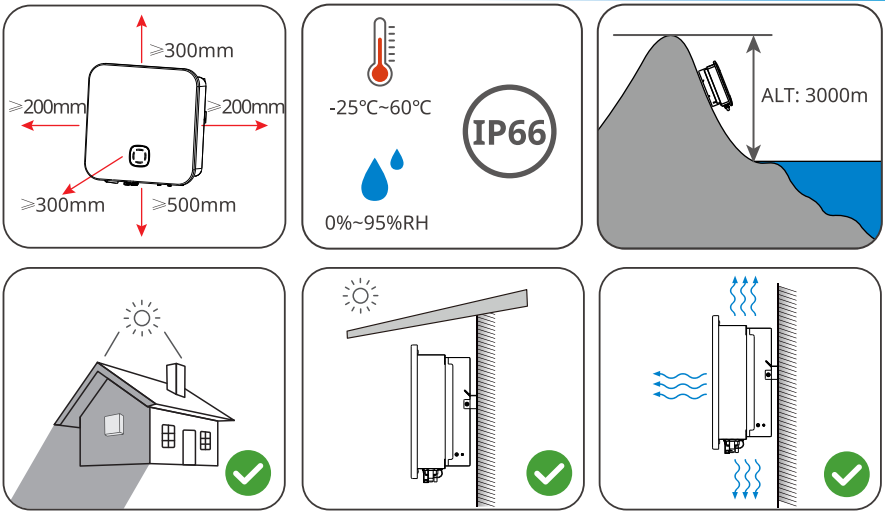
5 Installation

5.1 Installation Requirements

Installation environmental requirements

1. The equipment shall not be installed in inflammable, explosive and easy-corrosive environment.
2. Its installation position shall keep away from range where children can touch as well as keep away from the position where children are easy to touch. There is possibly high temperature on equipment surface in case of operation. You should avoid scalding.
3. The installation position shall keep away from water pipes and cables in the wall, for fear of any danger in case of perforation.
4. The inverter shall not be installed in sunshine, rainy or snowy environment. It is recommended to be installed in a sheltered position. If needed, a sunshade can be set up.
5. The installation space shall meet equipment ventilation and heat dissipation requirements and operation space requirement.
6. Equipment prevention level shall conform to indoor and outdoor installation and temperature and humidity of the installation environment shall be within a suitable range.
7. The equipment shall be installed in a height where it is easy to maintain; equipment indicator light and all labels are convenient for viewing and terminals are easy to operate.
8. Installation altitude of the inverter is lower than the highest working altitude – 3,000m.
9. Please ensure installation environment of the equipment keeps a good ventilation.
10. Do not cover ventilation opening or heat-removal system when the equipment works, so as to prevent fire arising from high temperature.
11. It is prohibited from placing the equipment in an environment of flammable and explosive gas or smoke, and it is prohibited from performing any operation in such an environment.
12. Keep away from high magnetic field environment, so as to avoid electromagnetic interference. If there is radio station or wireless communication equipment below 30MHz nearby the installation position, the equipment shall be installed according to the following requirements:
    ◆ Ferrite core with multi-coil winding or low-pass EMI filter is increased at DC input line or AC output line of the inverter.
    ◆ The distance between the inverter and wireless electromagnetic interference equipment is more than 30m.



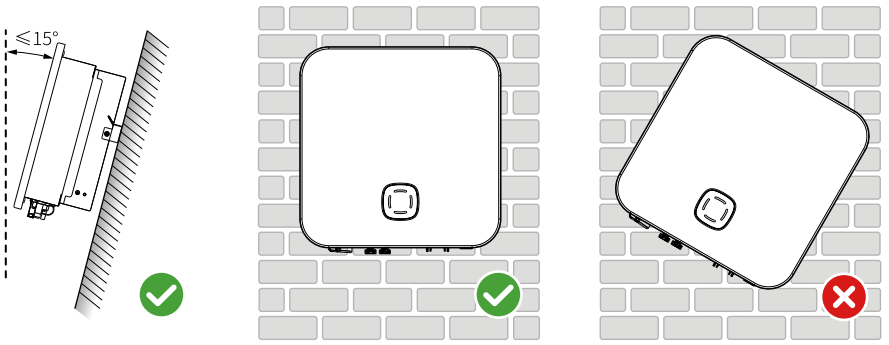


Installation carrier requirements

- The installation carrier shall not be made of combustible materials, and it shall be fireproof.
- The installation carrier shall be solid and reliable, and be able to bear weight of the inverter.
- The equipment will vibrate when it works. Do not install it on a carrier with poor property of sound insulation, so as to prevent residents in living area from being troubled by noise generated by the equipment in case of working.

Installation angle requirements

- Recommended installation angle of the inverter: Vertical or hypsokinesis angle ⩽ 15°.
- The inverter shall not be installed by an upside-down or horizontal way, or not with an anteversion or hypsokinesis angle beyond the specified range.



Installation tools requirements

In case of installation, the following tools are recommended to use. When necessary, other auxiliary means can be used at site.

5.2 Installing equipment

5.2.1 Handling equipment

Caution

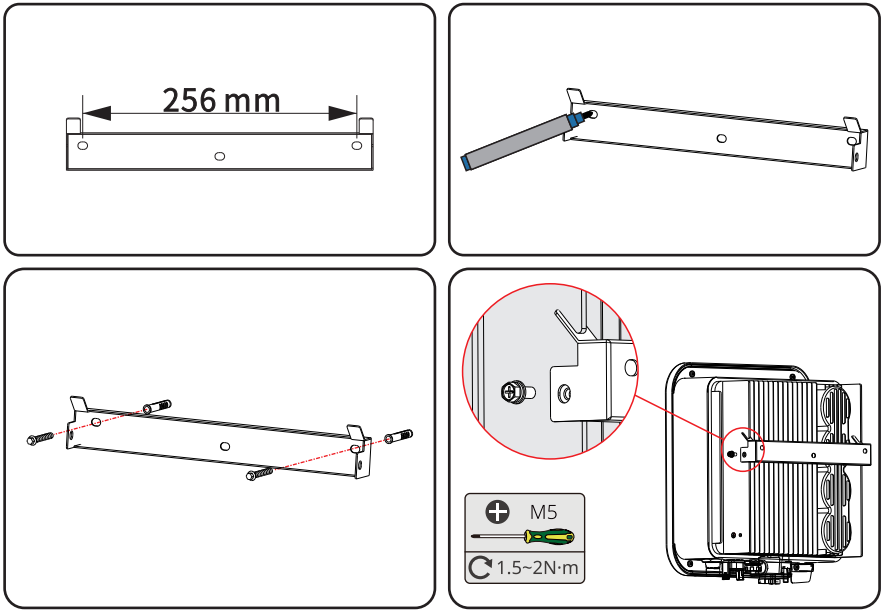
- ✧ Transportation, turnround and installation process shall meet requirements of laws, regulations and related standards of the country and region where the equipment is located.
- ✧ Before installation, the inverter needs to be handled to the installation site. In order to avoid personal injury or equipment damage during handling process, please note the following items:
- ✧ Corresponding personnel shall be allocated according to equipment weight, for fear of that the equipment weight is beyond the weight range that can be carried by the human, injuring the personnel.
- ✧ Please wear safety gloves to avoid injury.
- ✧ Please ensure that the equipment keeps balance during handling process, to avoid equipment falling.

5.2.2 Installing equipment

Attention

- In case of perforation, it shall be ensured that the boring position keeps away from water pipes and cables in the wall, for fear of any danger.
- It shall be ensured that the inverter is installed firmly, so as to avoid it from falling and injuring people.
- The personnel shall wear goggles, protective gloves and dust mask in case of boring on the wall and ground, so as to avoid dust from being inhaled into respiratory tract or falling into eyes. Meanwhile, the equipment shall be covered, to prevent chippings from falling into the equipment. After boring, the personnel shall timely sweep and clear chippings.

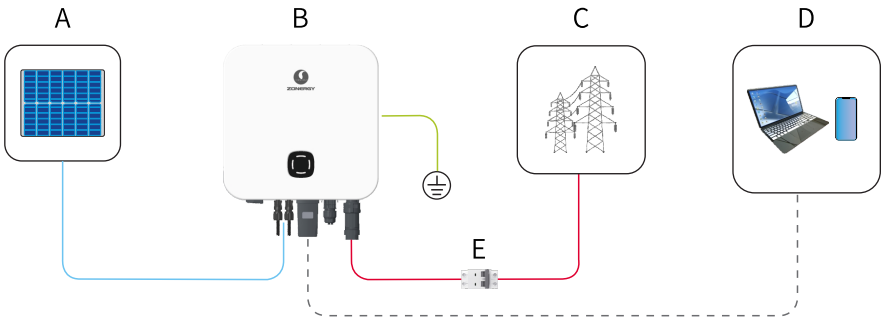
Step 1: The backboard is placed on the wall horizontally, and boring position will be marked by a marker pen.
Step 2: The hammer drill with drill diameter of 10mm (0.39in) is used for boring, to ensure hole depth of about 80mm (3.15in).
Step 3: Backboard of the inverter is fixed on the wall by expansion screws.
Step 4: The inverter is hung on the backboard.
Step 5: The backboard and inverter will be fixed, to ensure the inverter is installed firmly.



6 Electrical Connection

6.1 System Connection Diagram

N and PE lines are wired respectively in the distribution box.



Item	Description
A	PV String
B	Mercury Inverter
C	Utility Grid
D	Monitor Devices
E	AC Breaker

6.2 Safety Precautions

Danger

- ✧ All operations, specification of cables and parts used during electrical connection process shall meet local laws and regulations.
- ✧ Before electrical connection, it shall be ensured that DC switch, AC switch of the inverter and all switches connected with the inverter are under disconnected sate. Otherwise, high voltage of the inverter will possibly cause electric shock.
- ✧ The similar cables should be tied together, and arranged separately from cables of different types and cannot be intertwined or crossed.
- ✧ If the cable bears excessive tension, it will possibly cause poor wiring. In case of wiring, a certain length of cable shall be reserved before the cable is connected with wiring port of the inverter.
- ✧ In case of wiring terminals, it shall be ensured that conductive part fully contacts the wiring terminals. And insulated skin of cable shall not be wired together with the wiring terminals. Otherwise, it will possibly cause that the equipment fails to work, or the equipment heats after working arising from unreliable connection, thereby causing damage of terminal strip of the inverter.

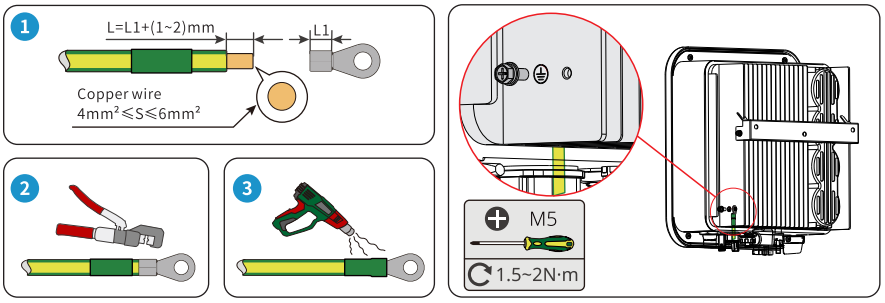
Attention

- In case of electrical connection, personnel shall wear safety shoes, protective gloves, insulating gloves and other personal protective articles as required.
- Only professional personnel are allowed to carry out electrical connection related operations.
- Color of cables in graph in this article is for reference only. Specific cable specification shall meet requirements of local regulations.

6.3 Connect protective earth wire.

Warning

- Protective grounding of chassis shell can not replace protective grounding of AC output port. In case of wiring, it shall be ensured that protective ground wires at two parts are connected reliably.
- In case there are multiple inverters, it shall be ensured that protective grounding points of all inverter chassis shells are under equipotential connection.
- According to requirements of IEC62109, protective ground wire of the inverter shall be connected correctly and at least meet one of requirements below in order to avoid the inverter from failure of safe application when the grounding wire of the inverter is damaged or disconnected:
- If PE terminal in AC connector is not connected, protective ground wire on shell shall be single-core outdoor copper cable with conductor cross area ⩾ 10mm^2.
- PE terminal in AC connector and grounding screw on shell are grounded respectively at the same time by the cable with same diameter with AC output line.
- It is required that the inverter shall be provided with additional ground wire in some countries/ regions. In this case, PE terminal in AC connector and grounding screw on shell shall be grounded respectively at the same time by the cable with same diameter with AC output line.
- In order to improve corrosion resistance of terminals, it is recommended that the exterior of the ground terminal should be applied with silica gel or paint for protection after protection ground wire is connected.
- Please prepare a protective ground wire by yourself. Recommended specification: Type: Outdoor single-core copper wire; Cross sectional area of the conductor: ⩾10mm^2.

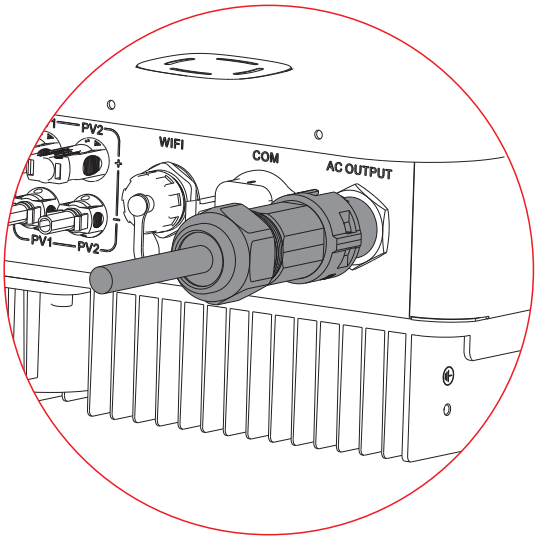


6.4 Connect AC Line

Warning

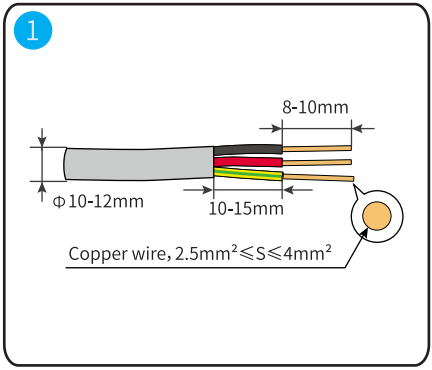
- ✧ An AC switch must be configured outside the AC side of the inverter, to ensure the inverter safely disconnects from the grid. And it is prohibited to connect loan between the inverter and AC switch directly connected with the inverter.
- ✧ Residual current monitoring unit (RCMU) is integrated into the inverter. When the inverter detects leak current higher than the allowed value, it will rapidly disconnect from the grid.
- ✧ In case of adopting over-size AC switch against requirements for recommended value of Zonergy or local standards and regulations, it is possible that they can not safely disconnect under abnormal situation, causing major failure.
- ✧ It is prohibited to use knife switch as AC switch. It is prohibited that multiple inverters are connected with an AC switch at the same time. An inverter needs to be provided with an AC output switch.
- ✧ If external AC switch is provided with current leakage protection function, its rated leakage current is required to be ⩾ 100mA.

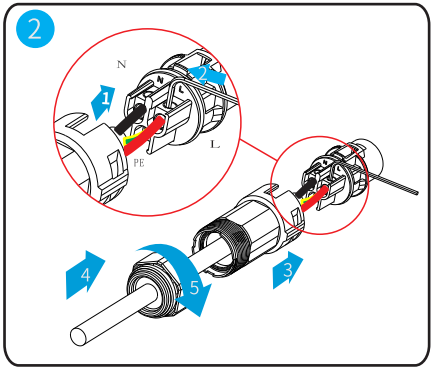
Choose whether to connect RCD equipment according to local laws and regulations. The inverter can externally connect Type A RCD (residual current-monitoring device) to provide protection when DC component of leakage current is beyond the limiting value. The following RCD specification is for reference:

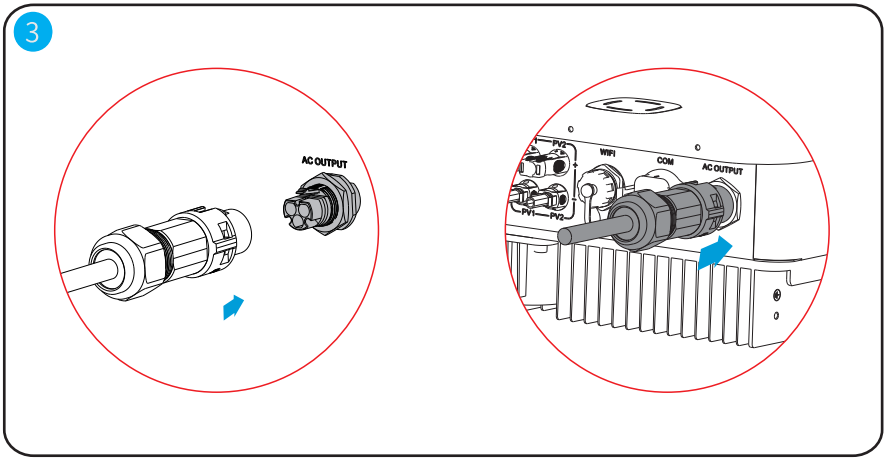


Warning

- In case of wiring, "L", "N" and "PE" ports of AC line and AC terminal are fully matched. Wrong cable connection will cause equipment damage.
- It shall be ensured that core of the cable fully accesses to the terminal connection hole, with no any exposure.
- It shall be ensured that the cable is connected firmly. Otherwise, it will cause terminal overheated when the equipment works, thereby causing equipment damage.
- It shall be ensured that DC switch at the bottom of the inverter and all switches connecting with the inverter are under disconnected state before AC connector is removed.







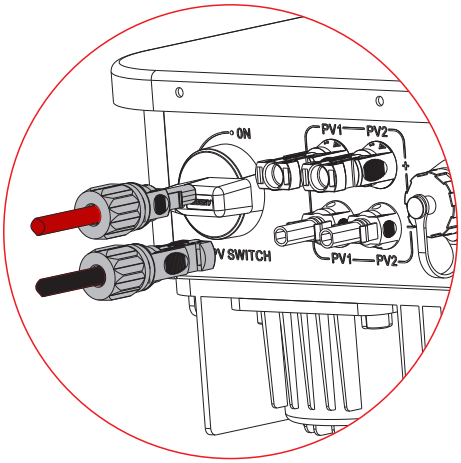
6.5 Connect the DC input line (PV)

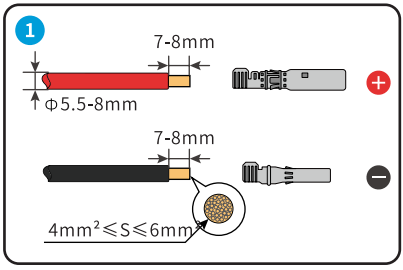
Danger

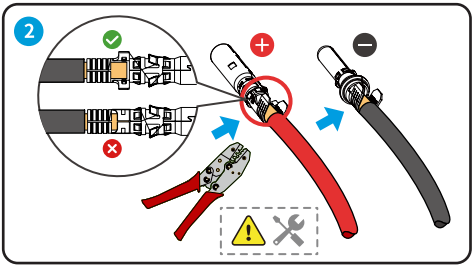
- If DC input terminal of the inverter fails to access to PV string, do not remove waterproof cover of DC input terminal. Otherwise, it will affect equipment protection level.
- Do not connect the same PV string to more than one inverter, otherwise the inverter may be damaged.
- It shall be ensured that DC-side voltage is within a safe voltage range (namely, below 60V DC) and DC switch of the inverter is disconnected before DC input line is connected. Otherwise, high voltage generated will possibly cause electric shock.
- It shall be ensured that the maximum short-circuit current and the maximum input voltage of each MPPT are within allowable range of the inverter before PV string connects the inverter. Meanwhile, it shall be ensured that positive pole of PV string connects PV+ of DC input terminal of the inverter and negative pole connects with PV- of DC input terminal of the inverter. Otherwise, it possibly causes permanent damage of the inverter and can cause fire, thereby causing personnel and property losses in severe case.
- If DC input line is incorrectly connected, do not immediately operate DC switch and connectors at PV+ and PV-. It is needed to disconnect DC switch, take down connectors at PV+ and PV- and correct polarity of DC input line when solar irradiance decreases at night and PV string current is reduced to below 0.5A.
- It is prohibited to carry out maintenance for DC input line when the inverter works, such as, connecting or removing certain string or certain component in string. Otherwise, it will cause electric shock.

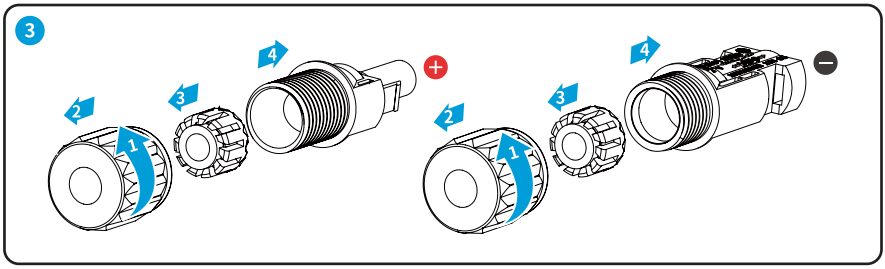
Warning

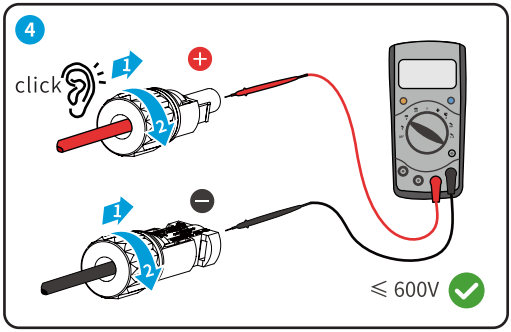
- PV string output does not support grounding. Before connecting PV string to the inverter, please confirm that the minimum insulation resistance to ground of PV string meets the minimum insulation impedance requirements (R=maximum input voltage / 30mA). If the insulation impedance value is less than the requirement, the inverter may trigger the insulation impedance alarm.
- During the installation of PV string and inverter, if the positive or negative pole of PV string is short circuited to the ground due to unqualified installation or wiring of distribution cables, AC/DC short circuit may be caused during the operation of inverter, which will result in equipment damage or other serious consequences. The equipment damage caused thereby is not within the scope of equipment warranty.

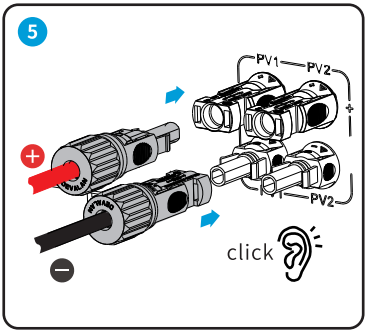

ON
PV1
PV2
V SWITCH
PV1
PV2


1
7-8mm
Φ5.5-8mm
7-8mm
4mm²≤S≤6mm


2


3
1
2
3
4
1
2
3
4


4
click
1
2
1
2
≤ 600V


5
PV1
PV2
PV2
click

6.6 Communication Connection

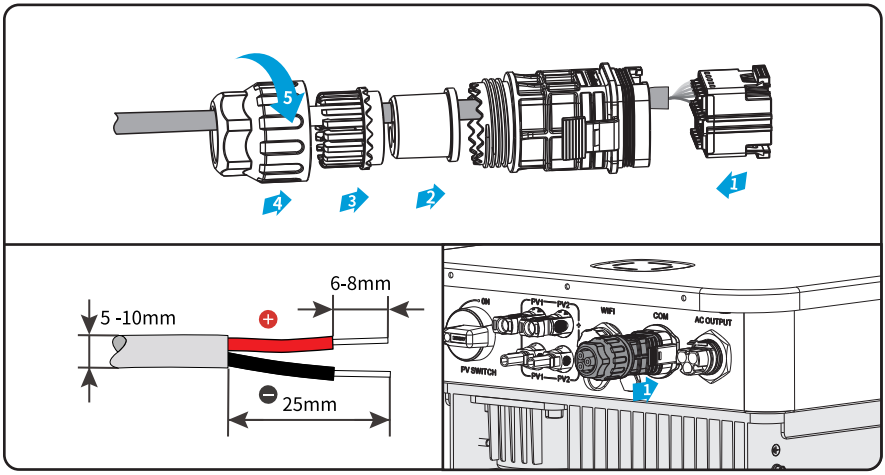
Attention

✧ When connecting the communication line, please ensure that the definition of the wiring port is fully matched with the equipment, and the cable wiring path shall avoid interference sources, power lines, etc., so as not to affect the signal reception.

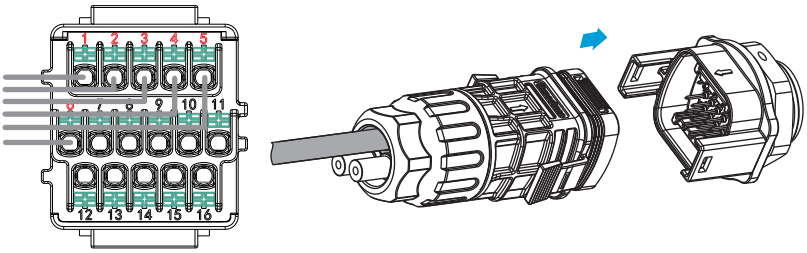
6.6.1 Connecting the communication line

Serial No.	Port definition	Functional description	Serial No.	Port definition	Functional description
1	GND	Meet DRED grid dispatch requirements in Australia, and DRED diagram wiring method is only used in Australia	9	485A_METER	External power meter function reserved port.
2	DRMS0/0		10	485B_METER	
3	DRM1/5		11	CT+	External CT function reserved port.
4	DRM2/6		12	CT-	
5	DRM3/7		13	485A_WIFI	Data collector communication reserved port.
6	DRM4/8		14	485B_WIFI	
7	485A	RS485 function reserved port.	15	5V	5V power supply interface.
8	485B		16	GND	Ground connection.

Please refer to the following for the connection method of accessories containing COM external connectors, and it is not necessary to do without accessories.

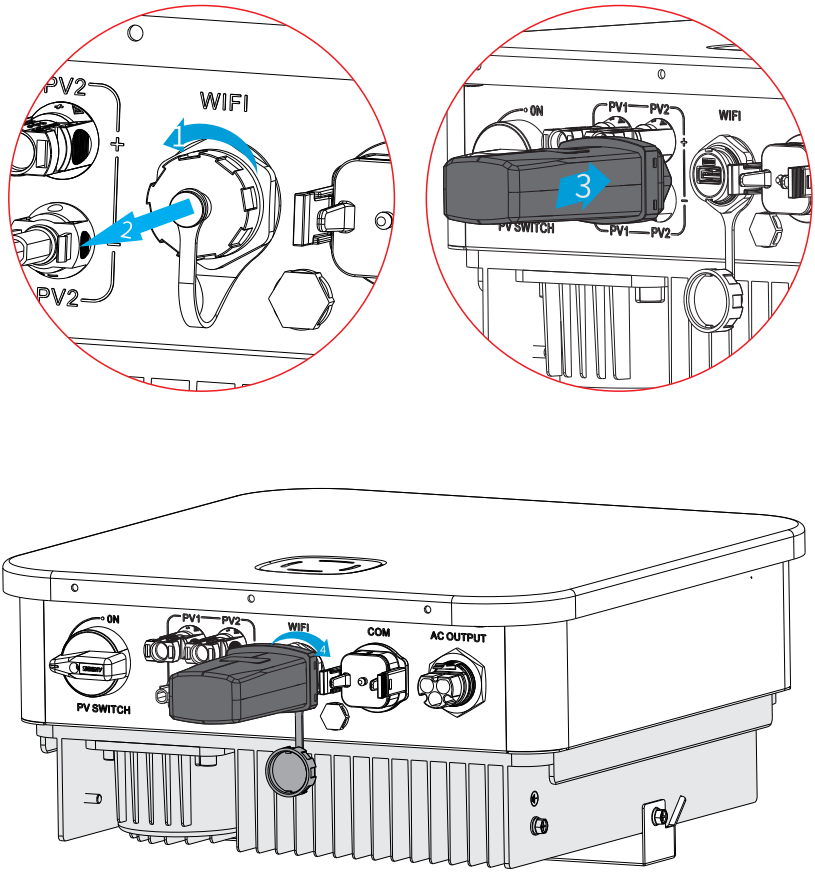


Serial No.	Port definition	Functional description
1	GND	Meet DRED grid dispatch requirements in Australia, and DRED diagram wiring method is only used in Australia
2	DRMS0/0	
3	DRM1/5	
4	DRM2/6	
5	DRM3/7	
6	DRM4/8	



6.6.2 Install the communication module

Attention
✧ It is supported to set inverter parameters and connect cloud to monitor inverter operation status, power station operation, etc. through WiFi Kit, Wi Fi/LAN Kit, and 4G module. For the detailed introduction of the communication module, please refer to the materials provided with the corresponding module. For more details, please log on the official website.



7 Commissioning of Equipment

7.1 Pre-power-on Check

No.	Check items
1	The installation space of inverter shall be reasonable with no leftover from construction. The installation shall be firm; the installation position shall be convenient for operation and maintenance; the installation space shall be convenient for ventilation and heat dissipation, and the installation environment shall be clean and tidy.
2	Protective ground wire, DC input wire, AC output wire, communication line shall be correctly and firmly connected. The cable binding shall meet the wiring requirements, be reasonably distributed and free of damage. The cable binding tape shall be uniform, and no sharp corner shall be left at the cutting point. Meet customer requirements. Make sure that waterproof covers have been installed for unused wire passing holes. The used wire hole shall be sealed.
3	The ground wire shall be connected correctly, firmly and reliably. The PV DC switch and all switches connected to the inverter shall be disconnected.
4	The voltage and frequency of grid connection access point of inverter shall meet the grid connection requirements.

7.2 Power on of the equipment

Attention
✧ Before closing the DC switch between the inverter and the PV module, it is necessary to measure whether the DC voltage of the PV module is within the allowable range with the DC voltage gear of the multimeter. ✧ Before closing the AC switch between the inverter and the grid, it is necessary to measure whether the AC voltage is within the allowable range with the AC voltage gear of the multimeter.

Step 1: Close the AC circuit breaker of inverter ON-GRID.
Step 2: Close the DC switch of the inverter.

8 System debugging

When the equipment is powered on for the first time, the parameters shall be set correctly by professionals. Incorrect settings may result in equipment not conforming to national/regional certification and affect the normal operation of the equipment.

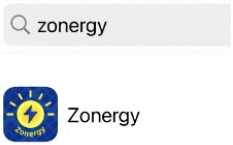
Access to cloud monitoring platform through Zonergy App

Attention
✧ To ensure the normal operation and monitoring of the equipment, please use the Zonergy App to set the parameters and access to the cloud platform

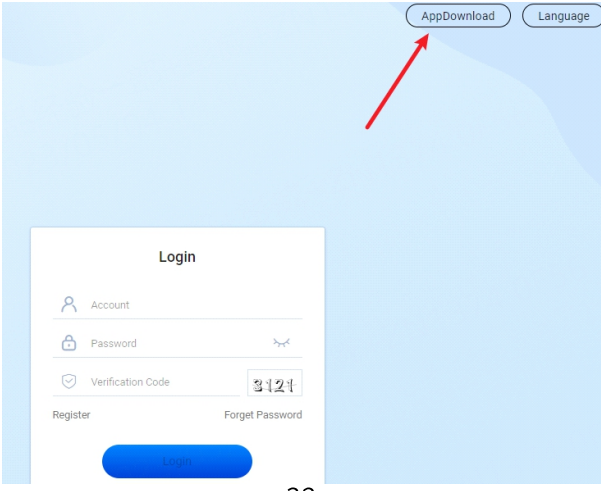
Zonergy App is a mobile phone application software that can communicate with the inverter through Bluetooth module, WiFi module and 4G module. The followings are the common functions of the Zonergy App: View the operation data, software version, alarm information, etc. of the equipment.
View the information such as grid parameters and communication parameters of the equipment.

Install "Zonergy" App

Option 1. Download from APP store (iOS/Android).
1)Download Zonergy APP by searching "Zonergy" from app store, then install.
Choose your language after installation.

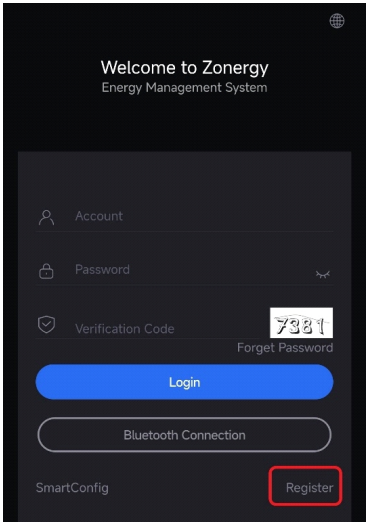


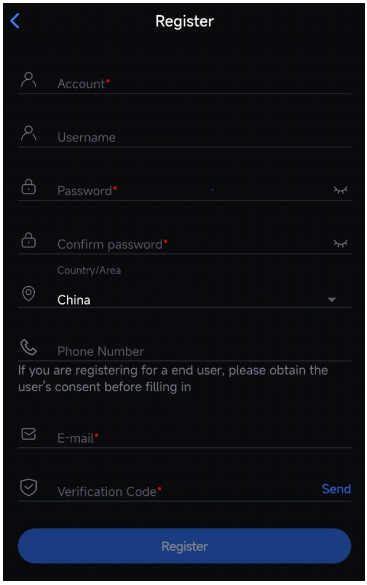
Note:
If you have already installed Zonergy App, please check the App version whether it is latest version, whether need to update or not by searching the "Zonergy" at app store.
Option 2. the Android mobile devices could download the installation file from website.
Download the Zonergy APP(.apk file) from website https://energycloud.zonergy.com,
then install the .apk file. Choose your language after installation.



8.1 Register Account

On the home page of the Zonergy App, click the “register” to enter the register page.





Fill in the information which includes the signal “ * ”, the email address should be correct.

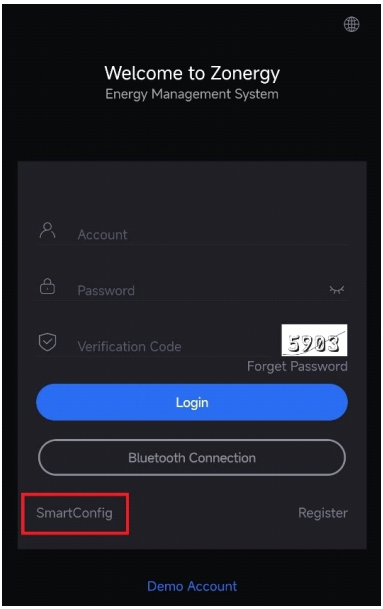
8.2 Power on and networking of equipment

The monitoring communication module on the equipment does not have communication capability, so it cannot directly transmit data after being powered on. To enable your communication module to have communication capability, you need to configure the networking of your communication module by downloading Zonergy App. The steps for networking are as follows:

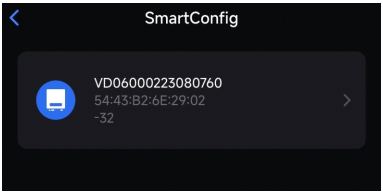
1. After the equipment is powered on, the communication module will be powered on automatically.

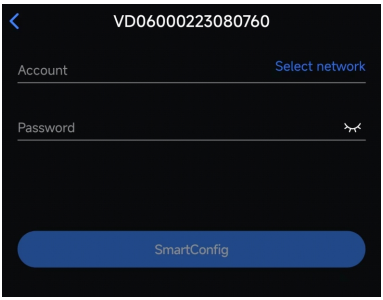
When the PWR light is constantly on, it indicates that smart dongle works well.
When the COM light is constantly on, it indicates that the communication works properly between smart dongle and the hybrid inverter.

2. Connect Bluetooth, WiFi and open the App on the mobile phone, and click "SmartConfig" on the login page。



3. On the App, search for nearby devices through Bluetooth, find the device to be networked, and click to enter the networking page,on the networking page, select the WiFi you want to connect and enter the WiFi password.





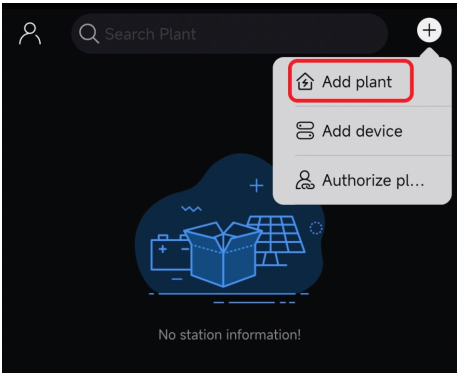
4. After the networking is completed, it means that the communication module has the communication ability to transmit the collected equipment data to the server. After above steps, all 4 lights on the smart dongle should be turned on, as shown in the picture below.

The NET light is constantly on, indicating that the smart dongle is connected to the network;
The SRV light is constantly on, indicating that the smart dongle is connected to the server.

8.3 Create Power Station

Log in to the account after the registration

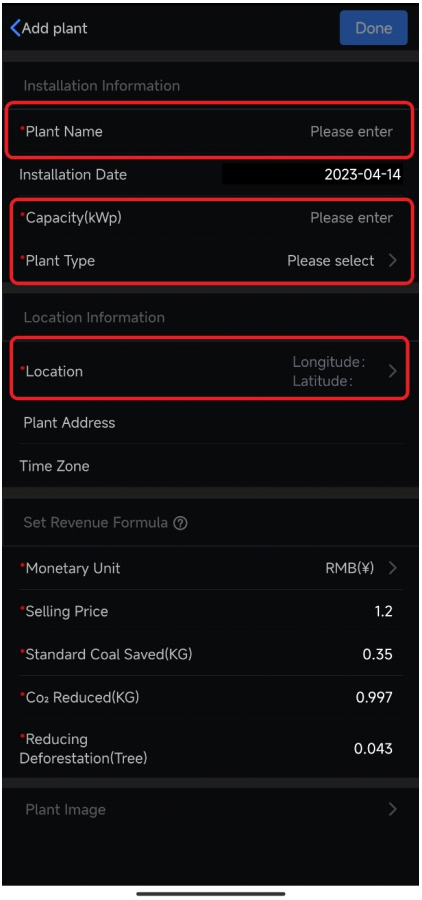
1.On the home page of APP, click the " ⊕ " icon in the upper right corner → click " Add plant ".



2. On the page of "Create power station", fill in the real information of the power station. In order to facilitate the calculation and statistics of power station data, the information that needs to be filled by users is roughly as follows:

1)Name your power station
2)Select your power station type
3)Determine your installed capacity
4)Determine the location of your power station
5)Set income formula of power station

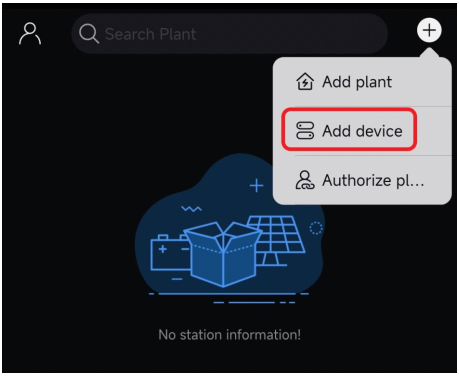
For the accuracy of data, please fill other information on the page as much as possible



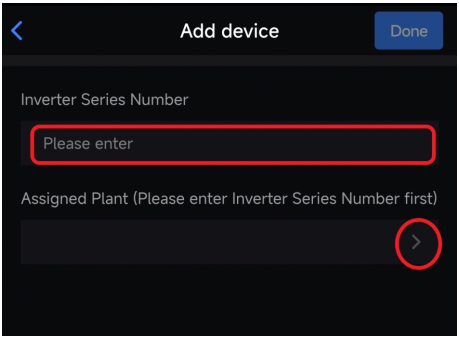
After clicking "OK", it means that you have successfully created your own power station, but the power station will not have any data temporarily, because you have not added any equipment to this power station and there is no data source.

8.4 Add Equipment to Power Station

1.On the home page of APP, click the " " icon in the upper right corner → click " Add device ".

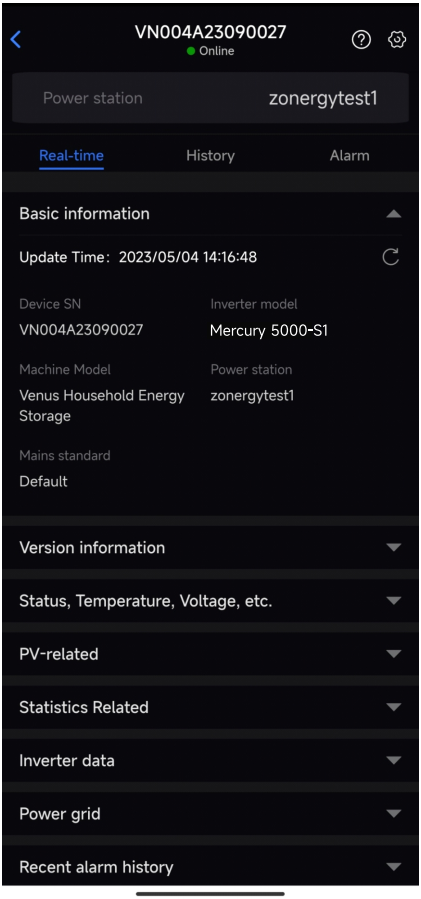


2. Enter the serial number of equipment and select the power station to which the equipment will be added



3. Finish adding

After adding, you can view the data of the equipment on the App to facilitate the management of your equipment.



9 System Maintenance

Danger

- During the operation of the equipment, there is high voltage, which may cause electric shock, death, serious personal injury or serious property loss. Therefore, before any maintenance, the equipment must be powered off and operated in strict accordance with the safety precautions listed in this manual and other relevant documents. Electrically operated equipment may cause damage to the inverters or the risk of electric shock.
- After the inverter system is powered off, the chassis still has residual power and residual heat, which may cause electric shock or burns. Therefore, after the inverter system is powered off for 5 minutes, you can operate the inverter with protective gloves.

Attention

- Please maintain the equipment after you are familiar with the contents of this manual and have appropriate tools and test devices.
- Before maintenance, please power off the equipment, then follow the instructions of the delay discharge label and wait for the appropriate time to ensure that the device is powered off before operating the device.
- During the maintenance, please try to avoid irrelevant personnel entering the maintenance site, and temporary warning signs or fences must be shown for isolation.
- The AC and DC switch of the inverter needs to be disconnected when maintaining the power equipment or distribution equipment behind the inverter.
- In case of any equipment failure, please contact your dealer for treatment.
- Only after the failure has been dealt with can the equipment be powered on again, otherwise the failure may become more serious or the equipment is damaged.

9.1 Power off of the inverter

Step 1: Disconnect the AC circuit breaker of inverter ON-GRID.
Step 2: Disconnect the DC switch of the inverter.

9.2 Dismantlement of the inverter

Warning

Ensure that the inverter is powered off and the maintenance personnel have worn personal protective equipment.

Step 1: Make the system power off, and disconnect all electrical connections of the inverter, including all electrical cables such as DC lines, AC lines, communication lines, communication modules and protective ground wires.
Step 2: Remove the inverter from the back hanging panel.
Step 3: Dismantle the back hanging panel.
Step 4: If you still have the original package of the inverter, please use the original package for packaging and then seal the package securely with adhesive tape. If the original package of the inverter is not available, please use a hard carton suitable for the weight and size of the inverter to seal it securely.
Step 5: Property keep the inverter. If the inverter needs to be put into use later, please ensure its storage conditions meet the requirements.

9.3 Inverter scrapping

If the inverter has reached its service life and needs to be scrapped, please dispose of the inverter according to the electrical waste disposal requirements give in the regulations of the country/region where the inverter is located.

9.4 Fault handling

Please troubleshoot the failures according to the following methods. If the troubleshooting method is not helpful, please contact the after-sales service center.
When contacting the after-sales service center, please collect the following information to quickly solve the problems.
1. Information of the inverter, such as serial number, software version, equipment installation time, failure time and failure frequency.
2. Equipment installation environment, such as weather conditions, components blocked or not and shadows. The installation environment can be provided with photos, videos and others to help analysis.
3. Grid condtion.

Serial No.	Fault name	Fault cause	Solutions
1	Busbar over-voltage	PV voltage is too high The internal BUS voltage of the inverter is too high	Check whether the input voltage of PV is too high. If the PV voltage is normal, wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
2	Hardware overcurrent	1. Assembly is configured incorrectly 2. Hardware damage	Turn off the AC input side switch and DC input side switch, and close the AC output side switch and DC input side switch after 5 minutes. If the failure cannot be solved still, please contact your dealer or after-sales service center.
3	Output short circuit	Output short circuit of Backup side	Check whether the Backup terminal is circuit-shorted or overloaded, and turn off the Backup AC output side switch and wait for machine restarting to see if the machine can start normally. If the failure cannot be solved still, please contact your dealer or after-sales service center.
4	Overpower fault	Output power is excessive	Check whether the Backup load exceeds the allowable maximum power. Check whether the meter or CT is normal.
5	Overload fault	Overload is too large	Check whether the Backup load exceeds the allowable maximum power.
6	DC component is too high	DC component is too high	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
7	Slave DSP failure	The slave DSP detects a failure	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please c ontact your dealer or after-sales service center.
8	Inverter bridge damaged	The inverter bridge does not pass the self-inspection during the inverter starting	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.

9	Soft starting failure of the BuckBoost	The internal BuckBoost circuit fails	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
10	Soft starting failure of the LLC	The internal LLC circuit fails	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
11	Overtemperature of the inverter	1. The installation location of the inverter is not ventilated 2. The ambient temperature is too high and exceeds 60°C 3. The internal fan cannot work normally	1. Check whether the installation location of the inverter is well ventilated and whether the ambient temperature exceeds the allowable maximum ambient temperature. 2. In case of no ventilation or too high ambient temperature, please improve its ventilation and heat dissipation conditions 3. If the ventilation and ambient temperature are normal, please contact your dealer or after-sales service center.
12	Over-temperature at the DCDC side		
13	PV1 overvoltage	The inverter detects that the input voltage of PV exceeds the nominal voltage range	Check the corresponding PV assay string for its series configuration, to ensure that the open circuit voltage of the string is not higher than the maximum working voltage of the inverter.
14	PV2 overvoltage		
15	Reversed Pv1	The PV string is reversed	Check whether the PV string is reversed.
16	The PV2 is reversed		
17	Soft starting failure of the Boost1	Check that the booster circuit fails during the soft starting of the inverter	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
18	Soft starting failure of the Boost2		
19	The Boost1 current sensor fault	Find abnormal current sensor during the inverter self-inspection	
20	The Boost2 current sensor fault		
21	Inverting current sensor fault		
22	The leakage current is too big	The input insulation resistance of the inverter to the ground becomes low during its running.	If this occurs occasionally, the reason may be the occasional abnormality in external lines, and it will work normally after troubleshooting and no manual intervention is required. In case of frequent or long-term failure to recover, please check whether the insulation resistance of PV string is too low.
23	The leakage current sensor fault	The inverter fails to correctly detect the reference current of 50mA during its self-inspection	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.

24	PV1 insulation impedance fault	1. The PV string is short-circuited to the ground 2. The installation environment of the PV string is humid for a long time and the insulation of lines to the ground is poor.	1. Check the impedance of PV string to the ground, in which the normal impedance value should be greater than 50kΩ. If it is found that the impedance value is less than 50kΩ, please troubleshoot the short-circuit points and rectify them. 2. Check whether the protective ground wire of the inverter is correctly connected.
25	The PV2 insulation impedance fault		
26	Relay pull fault	It is found that the grid-connected relay cannot be closed normally during self-inspection of the inverter	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
27	Relay adhesion fault	It is found that the grid-connected relay cannot be closed normally during self-inspection of the inverter	Wait for the inverter to restart and self-inspect. If the failure cannot be solved still, please contact your dealer or after-sales service center.
28	internal communication lines disconnection	The communication between the internal DSPs is abnormal	Turn off the AC input side switch and DC input side switch, and close the AC output side switch and DC input side switch after 5 minutes. If the failure cannot be solved still, please contact your dealer or after-sales service center.

9.5 Routine Maintenance

Warning
Ensure that the inverter is powered off and the maintenance personnel have worn personal protective equipment.

Maintenance contents	Maintenance method	Maintenance period
System cleaning	Check whether there are foreign matters or dust in the radiation fin and air inlet/output.	1 time/half a year ~ 1 time/year
System running state	◆ Observe whether the inverter is damaged or deformed. ◆ Listen to the inverter for any abnormal voice during its running. ◆ Check whether various parameters of the inverter are correct during its running.	1 time/year
Electrical connection	◆ Check whether the electrical connection is loose and disconnected, whether the cables are damaged in appearance, whether any leakage of copper occurs and whether the surface of the cable in contact with the metal surface has cut marks. ◆ Check whether the grounding cables are reliably grounded. ◆ Check whether the waterproof covers of the unused DC input terminal, COM interface, other interfaces and monitoring boxes are locked.	1 time/half a year ~ 1 time/year
Airtightness	Check whether the airtightness of the equipment entrance hole meets the requirements, and in case of too big or not blocked gap, it should be blocked again.	1 time/year

10 Technical Data

MERCURY series technical data

Model	Mercury 3680-S1	Mercury 4000-S1	Mercury 4600-S1	Mercury 5000-S1	Mercury 6000-S1	Mercury 3000-S2
Maximum PV input power recommended (kW)	4900Wp	6000Wp	6900Wp	7500Wp	9000Wp	4900Wp
PV input voltage limitation (V)	600					
Maximum input current of each MPPT (A)	16					
Short circuit current of each string (A)	20					
No. of MPPT / strings	2/2					1/2
Start-up voltage (V)	120					
PV Voltage range(V)	100-550					
MPPT voltage range (V)	100-550					
Rated input operating voltage (V)	360					
Output parameters (AC)						
Rated output Power (Kw)	3680W	4000W	4600W	5000W	6000W	3000W
Output connection type	L+N+PE					
Rated AC voltage (V)	230/180~276					
Rated grid frequency	50Hz / 45~ 55Hz 60Hz / 54~ 66Hz (According to local standards)					
Rated output current(A)	16 Aa.c.	17.4 Aa.c.	20 Aa.c.	21.7 Aa.c.	26 Aa.c.	13 Aa.c.
Maximum output current (A)	16.7 Aa.c.	18.2 Aa.c.	20.9 Aa.c.	22.7 Aa.c.	27.3 Aa.c.	13.6 Aa.c.
Power Factor (settable)	> 0.99 @ full power (adjustable range: 0.8 leading ~ 0.8 lagging)					

Total Harmonic Distortion THDi (full load)	＜3% (full load)					
Efficiency						
MPPT efficiency	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Maximum efficiency	97.6%	97.6%	97.7%	97.8%	97.8%	97.6%
Protection function						
DC switch	YES	YES	YES	YES	YES	YES
Output short circuit protection	YES	YES	YES	YES	YES	YES
Power grid fault monitoring	YES	YES	YES	YES	YES	YES
DC reverse connection protection	YES	YES	YES	YES	YES	YES
DC lightning protection	type II	type II	type II	type II	type II	type II
AC lightning protection	type III	type III	type III	type III	type III	type III
DC insulation impedance detection	YES	YES	YES	YES	YES	YES
AC leakage current detection	YES	YES	YES	YES	YES	YES
Over-temperature protection	YES	YES	YES	YES	YES	YES
DCI protection	YES	YES	YES	YES	YES	YES
Fuse	NO	NO	NO	NO	NO	NO
Islanding detection	YES	YES	YES	YES	YES	YES
Display and communication						
Display mode	LED+ APP					
Communication mode	RS485/4G/WIFI					
General parameters						
Dimension (mm) (W×H×D)	350×350×155					
Weight（Kg)	11					10.5
Operating tem perature range	-25°C～+60°C (＞45°derating)					

Cooling mode	Nature cooling
Maximum altitude for product operation	3000m
Relative Humidity	0~100%
Degree of protection	IP66
Self power consumption at night	<10W
Noise (dB)	<29
Topology	Transformerless
Certification	
Standards	EN 61000-6-1, EN 61000-6-3,IEC62109-1, IEC62109-2, IEC61727IEC62116, IEC-61683, VDE-AR-N 4105, VDE V 0124-100, As4777，Ordiance 140:2022
Warranty	5 Year Product Warranty

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