SUNGROW
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System Manual

MV Grid-Connected Inverter

SG6600UD-MV/SG6600UD-MV-20/

SG8800UD-MV/SG8800UD-MV-20

SG6600_8800UD-MV–20-SEN-Ver23–202312

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1 About This Manual

This manual describes the transportation and storage, mechanical installation, electrical connection, power up and shutdown, web operation, troubleshooting, and maintenance of the MV grid-connected inverter.

1.1 Validity

This manual applies to the following models:

- SG6600UD-MV
- SG8800UD-MV
- SG6600UD-MV-20
- SG8800UD-MV-20

Unless otherwise specified, this manual takes SG8800UD-MV as an example to briefly introduce the installation and operation methods of the product.

1.2 Target Group

This manual is intended for professional technicians who are responsible for the installation, operation, and maintenance of MV grid-connected inverters. The professional technician is required to meet the following requirements:

- Know electronic, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Should be familiar with the composition and working principles of the PV system and its front- and rear-level equipment.
- Have received professional training related to the installation and commissioning of electrical equipment.
- Be able to quickly respond to hazards or emergencies that occur during installation and commissioning.
- Be familiar with the relevant standards and specifications of the country/region where the project is located.

1.3 How to Use This Manual

Please read this manual carefully before using the product and keep it properly at a place for easy access.

The products and product manuals are always in the process of improvement and upgrade. If the manual received is slightly inconsistent with the product, it may be a result of a product

version upgrade, and the actual product shall prevail. For any questions, please contact Sungrow Customer Service.

1.4 Symbol Explanations

To ensure the safety of the users and their properties when they use the product and to make sure that the product is used optimally and efficiently, this manual provides users with the relevant safety information which is marked by the following symbols. The symbols that may be used in this manual are listed below. Please read carefully to make better use of this manual.

⚠ DANGER

DANGER indicates high-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ WARNING

WARNING indicates moderate-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ CAUTION

CAUTION indicates a slightly hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

NOTICE indicates potential risks that, if not avoided, may lead to device malfunctions or financial losses.

NOTE indicates additional information, emphasized contents or tips to help you solve problems or save time.

2 Safety Instructions

When installing, commissioning, operating, and maintaining the product, strictly observe the labels on the product and the safety requirements in the manual. Incorrect operation or work may cause:

- Injury or death to the operator or a third party.
- Damage to the product and other properties.

⚠ WARNING

- **Do not perform any operation on the product (including but not limited to, handling, installing, powering on, or maintaining the product, performing electrical connection, and working at heights) in harsh weather conditions, such as thunder and lightning, rain, snow, and Level 6 or stronger winds. SUNGROW shall not be held liable for any damage to the device due to force majeure, such as earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weathers.**
- **In case of fire, evacuate from the building or product area and call the fire alarm. Re-entry into the burning area is strictly prohibited under any circumstances.**

NOTICE

- **Tighten the screws with the specified torque using tools when fastening the product and terminals. Otherwise, the product may be damaged. And the damage caused is not covered by the warranty.**
- **Learn how to use tools correctly before using them to avoid hurting people or damaging the device.**
- **Maintain the device with sufficient knowledge of this manual and use proper tools.**

- The safety instructions in this manual are only supplements and cannot cover all the precautions that should be followed. Perform operations considering actual onsite conditions.
- SUNGROW shall not be held liable for any damage caused by violation of general safety operation requirements, general safety standards, or any safety instruction in this manual.
- When installing, operating, and maintaining the product, comply with local laws and regulations. The safety precautions in this manual are only supplements to local laws and regulations.
- During the product transport, installation, wiring, maintenance, etc., the materials and tools prepared by users must meet the requirements of applicable local laws and regulations, safety standards, and other specifications. SUNGROW shall not be held liable for any damage to the product caused by the adoption of materials and tools that fail to meet the above-mentioned requirements.
- Operations on the product, including but not limited to, handling, installing, wiring, powering on, maintenance, and use of the product, must not be performed by unqualified personnel. SUNGROW shall not be held liable for any damage to the product resulting from operations done by unqualified personnel.
- Where the transport of the product is arranged by users, SUNGROW shall not be held liable for any damage to the product that is caused by users themselves or the third-party transport service providers designated by the users.
- SUNGROW shall not be held liable for any damage to the product caused by the negligence, intent, fault, improper operation, and other behaviors of users or third-party organizations.
- SUNGROW shall not be held liable for any damage to the product arising from reasons unrelated to SUNGROW.

2.1 Unpacking and Inspection

⚠ WARNING

Check all safety signs, warning labels, and nameplates on products.

Ensure that the safety signs, warning labels, and nameplates are clearly visible and not removed or covered before the product is decommissioned.

NOTICE

After receiving the product, check whether the appearance and structural parts of the product are damaged, whether the transformer leaks oil, and whether the packing list is consistent with the actual ordered product. If there are problems with the above inspection items, do not install the product and contact SUNGROW in time.

2.2 Hoisting and Transportation

⚠ WARNING

Risk of personal injury or device damage due to incorrect operation!

- **Follow the procedure of work of heights when walking on the top of the product.**
- **All hoisting and transportation must comply with the relevant codes and regulations of the nation/region where the project is located.**

NOTICE

All equipment and tools used during operation must have been regularly maintained.

⚠ CAUTION

Improper hoisting may cause personal injury!

- **It is strictly prohibited to stand within 5m - 10m outside the operating area (i.e., under the boom and the hoisted machine) to avoid casualties.**
- **The product must be hoisted and moved by professional personnel. Before the operation, be sure to wear personal protective equipment.**
- **Stop hoisting in the event of severe weather, such as heavy rain, thick fog, or strong wind.**
- **When hoisting and moving the product, be aware of its size and weight and keep the balance to prevent it from turning over or falling.**

2.3 Electrical Connection

⚠ DANGER

Before electrical connections, please make sure that the product is not damaged. Otherwise, it may cause danger!

Before electrical connections, please make sure that the product switch and all switches connected to the product are set to "OFF", and use measuring equipment to ensure that there is no voltage at the connection. Otherwise, an electric shock may occur!

⚠ DANGER

PV modules will generate lethal high voltage when exposed to sunlight.

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Before performing an electrical connection, be sure to disconnect the PVS and use measuring equipment to ensure that cables are voltage-free.**
- **Respect the protection requirements and precautions of PV modules.**

⚠ DANGER

Danger to life due to a high voltage inside the inverter!

- **Be sure to use special insulation tools during cable connections.**
- **Note and observe the warning labels on the product, and perform operations strictly following the safety instructions.**
- **Respect all safety precautions listed in this manual and other pertinent documents.**

⚠ WARNING

Damage to the device caused by incorrect wiring is not covered by the warranty.

- **Electrical connection must be performed by professional personnel who wear personal protective equipment.**
- **All cables used in the PV generation system must be firmly attached, properly insulated, and adequately dimensioned.**

⚠ WARNING

Before connecting the PV module to this product, check and confirm the polarity correctness of the PV module, and then connect it to the corresponding position of this product.

During the installation and operation of the product, please ensure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in product damage. The damage caused by this is not covered by the warranty.

NOTICE

Comply with the regulations related to the local grid during wiring.

2.4 Operation

DANGER

When the product is working,

- **It is strictly forbidden to touch the live parts of the product. Otherwise, an electric shock may occur.**
- **It is strictly prohibited to disassemble any parts of the product. Otherwise, an electric shock may occur.**
- **It is strictly prohibited to touch any hot parts of the product (such as the heat sink). Otherwise, it may cause burns.**

2.5 Operation and Maintenance

DANGER

Risk of inverter damage or personal injury due to incorrect service!

- **Before maintaining the product, be sure to disconnect the output switch of the PVS and the load switch/disconnector of the transformer.**
- **After the inverter is powered off for 20 minutes, measure the voltage and current with measuring equipment. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter.**
- **During maintenance, be sure to check the warning labels in the product and comply with the requirements on them.**
- **Even if the inverter is shut down, it may still be hot and cause burns. Operating the inverter with protective gloves after it cools down.**

DANGER

The devices inside the inverter carry high voltage. Touching these devices may lead to fatal electric shock.

- **Live line measurement can only be performed by professional personnel who know the PV system well. Before measurement, be sure to take proper protection methods (e.g., wear insulating gloves, etc.);**
- **During live line measurement, the operator must be accompanied by others to ensure personal safety.**

DANGER

Electric shock or fire may occur due to device damage or system fault.

- **Visually inspect for device damages or other hazards before the operation**
- **Check whether other external devices or circuit connections are in a safe state.**
- **Make sure the device is in a safe state before operating.**

WARNING

If some devices need to be replaced during operation and maintenance, please contact SUNGROW.

WARNING

Wait at least 20 minutes after the product stops running and ensure that the voltage has dropped to within the safe voltage range, the low-voltage cabinet is connected with the grounding cable, the transfer switch, if any, is in the grounding position, the grounding switch, if any, is closed, and the load switch, if any, is open. After confirming that all inspection items meet the requirements, maintain or repair the product following the warning labels inside the product.

NOTICE

To avoid the risk of electric shock, do not perform any other maintenance operations beyond those described in this manual. If necessary, contact SUNGROW for maintenance. Otherwise, the losses caused are not covered by the warranty.

NOTICE

If work is carried out while the device is live, insulation protection is necessary and at least two personnel should be present at the site at the same time.
The PV plants where the inverter is located are usually located in off-city fields, and appropriate field rescue facilities should be prepared for use in need.

CAUTION

To prevent misuse or accidents caused by unrelated personnel, post prominent warning signs or demarcate safety warning areas around the device to prevent accidents caused by misuse.

2.6 Disposal

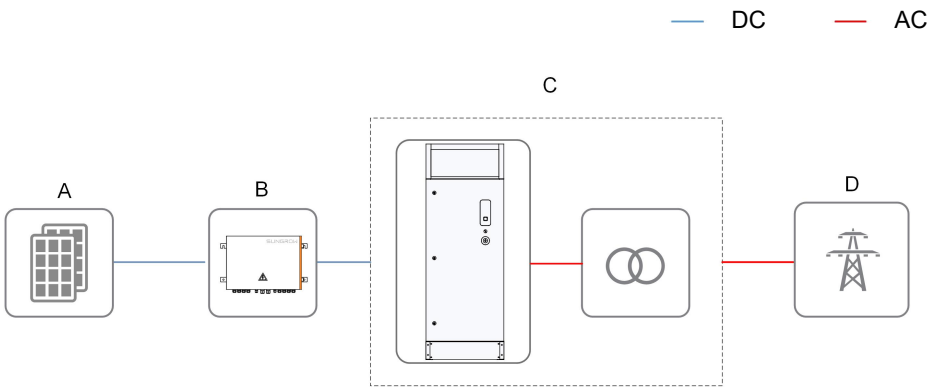
⚠ WARNING

Please scrap the inverter in accordance with relevant local regulations and standards to avoid property losses or casualties.

3 Product Description

3.1 Product Introduction

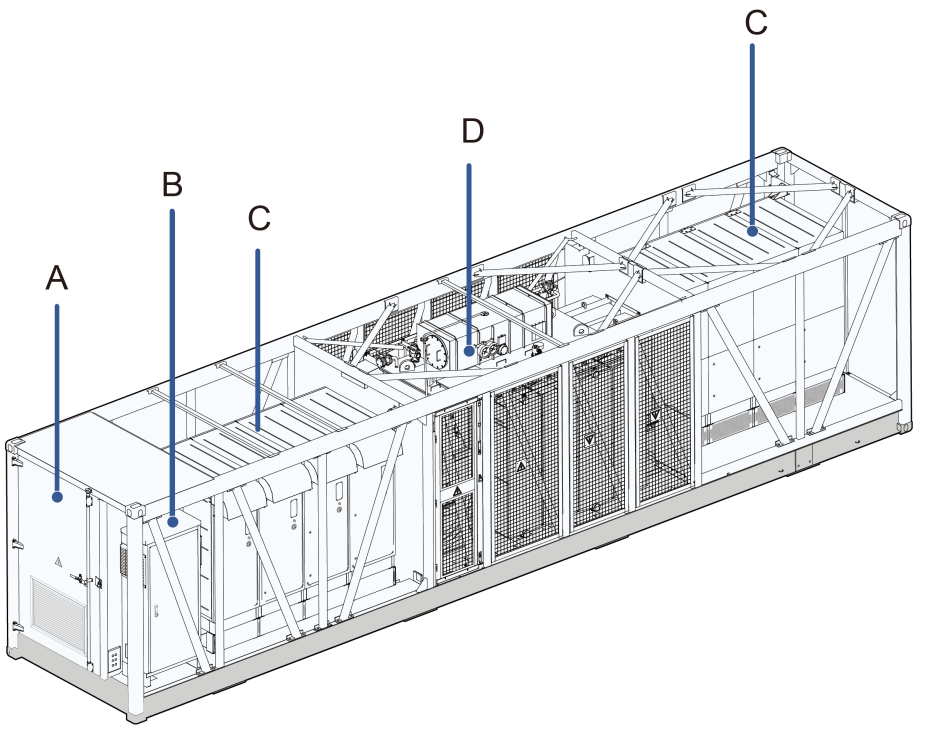
In large and medium-sized utility power plant systems, the MV grid-connected inverter, which contains multiple PV inverter units, transformers, and other equipment, provides a sound solution to convert the DC power generated by PV arrays into AC power, and feed it into the grid.



No.	Name	Description
A	PV array	Monocrystalline silicon, polycrystalline silicon, and thin film without grounding.
B	PVS	Combine the current of multiple PV strings and output.
C	MV grid-connected inverter	Include inverter units that convert the DC power from the PV arrays into AC power. Include a transformer that converts the low-voltage AC power output by inverter units into medium-voltage AC power.
D	Grid	-

3.2 Product Composition

SG8800UD-MV is taken as an example to introduce main devices inside the MV grid-connected inverter, The product consists of 8 inverter units.

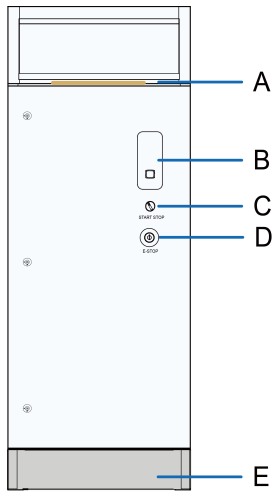


* The figure is for reference only. And the actual product received shall prevail.

No.	Name	Description
A	Switchgear	Connecting the grid to the transformer.
B	Power distribution cabinet	For communication and power distribution.
C	Inverter units	Convert the DC power generated by PV modules into AC power.
D	Transformer	Convert the low-voltage AC power output by inverter units into medium-voltage AC power.

3.3 Main Internal Equipment

3.3.1 Appearance of Inverter Unit



No.	Name
A	Top air inlet
B	Indicator panel
C	Start/Stop knob
D	Emergency stop button. In case of emergency, press this button to open the AC circuit breaker and DC load switch.
E	Base

LED Indicator

table 3-1 Indicator Status Description

Color	Status	Description
Blue	Steady on	The inverter is in grid-connected operation.
	Fast blinking (interval: 0.2s)	WiFi connection is established and data communication is in process. No fault is detected.
	Slow blinking (interval: 0.5s)	The inverter is in a deep standby state.
	Glowing and fading (interval: 2s)	The DC and AC side are powered on, or the AC side is powered on, the inverter is in a standby or is starting (not connected to the grid).

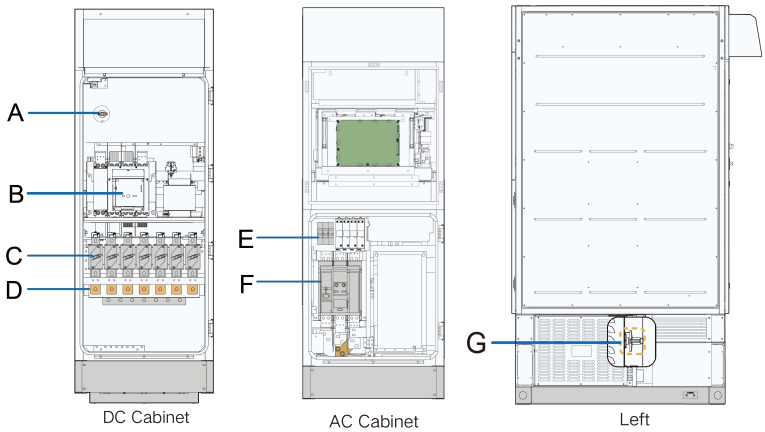
Color	Status	Description
 Red	Steady on	A fault occurred and the system cannot be connected to the grid for power generation.
	Blinking (Interval 0.2s)	WiFi connection is established and data communication is in process. A fault is detected.
 Grey	Off	The AC and DC power are disconnected.

⚠ WARNING

Voltage may still be present in AC side circuits after the indicator is off. Pay attention to the electrical safety during operating.

3.3.2 Internal Structure of Inverter Unit

Open the front door of the inverter unit cabinet to see the DC cabinet, as shown in the left figure below. Open the back door of the inverter unit cabinet to see the AC cabinet, as shown in the right figure below.



* The figure is for reference only. And the actual product received shall prevail.

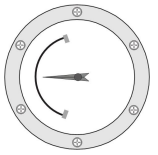
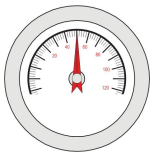
No.	Name	Description
A	Maintenance switch QS2	Disconnect it before maintenance and repair.
B	DC load switch QS1	Control the on/off of the DC side circuits of the inverter.
C	DC fuse	-
D	DC wiring copper bar	-

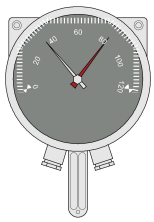
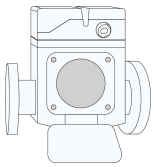
No.	Name	Description
E	Fuse of AC side SPD	-
F	AC circuit breaker QF1	Control the on/off of the AC side circuits of the inverter.
G	Maintenance switch QS3	Disconnect it before maintenance and repair.

Maintenance switch QS2 could also be located at the bottom left corner of the AC side. The real product may differ.

3.3.3 Main Parts of Transformer

The transformer is equipped with multiple protective devices such as the oil temperature gauge, the pressure gauge, and the oil level gauge.

Graphics	Name	Description
	Oil level gauge	Indicate the level of stored oil in the transformer.
	De-energized tap-changer	Adjust the output voltage of the transformer.
	Drain valve and sampling valve	Drain the oil from the transformer into a container through a clean hose.
	Winding thermometer	To obtain the temperature of the winding. The alarm temperature is set to be 105 ℃[a)] The tripping temperature is set to be 120 ℃[b)]

Graphics	Name	Description
	Automatic pressure relief valve	When a fault occurs inside the transformer, a large amount of gas is generated, and the pressure of the insulating oil rises sharply. This valve automatically opens to drain the oil when the pressure reaches the threshold, so that the internal pressure of the transformer can be rapidly reduced to a normal value. And a signal is sent to trip the circuit breaker.
	Oil temperature gauge	The alarm threshold is 95 ℃. An alarm signal is sent if the oil temperature reaches 95 ℃. The tripping threshold is 100 ℃. A tripping signal is sent if the oil temperature reaches 100 ℃.
	Gas relay	When a fault occurs in the transformer, the oil in the oil tank will be decomposed to generate gas, and the gas will rise and enter the gas relay. • In case the gas generated is light, the alarm signal contact will be connected, and alarm signal will be sent out. • In case the gas generated is heavy, the tripping signal contact will be connected, and the circuit breaker in the switchgear trips, so that the transformer will be disconnected from the grid to avoid device damage.

3.3.4 Main Parts of Power Distribution Cabinet

The power distribution cabinet is used for communication and power distribution.

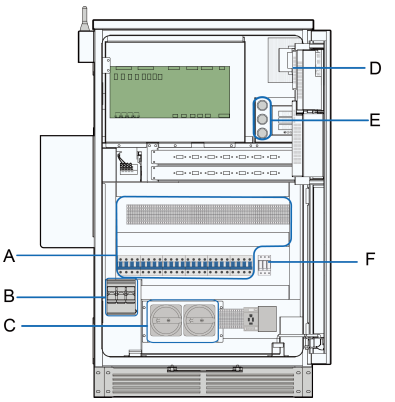


figure 3-1 Main Parts of 5K Power Distribution Cabinet

No.	Description
A	Wiring terminal block and micro circuit breaker
B	Fuse of power distribution cabinet SPD
C	QS4, main switch
D *	Switch port
E *	Ethernet port
F	Fuse of power distribution cabinet

* is optional.

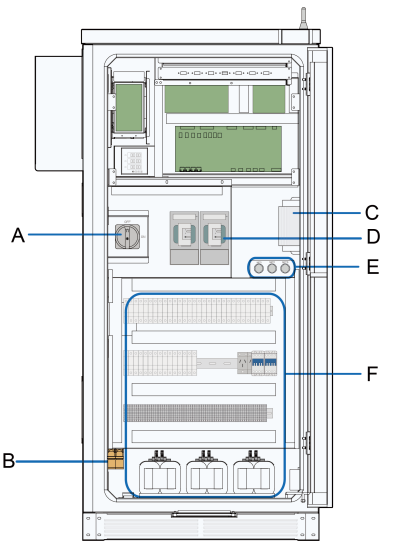


figure 3-2 Main Parts of 15K Power Distribution Cabinet

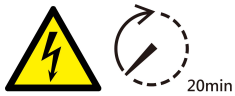
No.	Description
A	QS4, main switch
B	Fuse of power distribution cabinet SPD
C *	Switch port

No.	Description
D	Fuse of power distribution cabinet
E *	Ethernet port
F	Wiring terminal block and micro circuit breaker

* The figure is for reference only. The product received may differ.

* is optional.

3.4 Symbol on Products

Marks	Explanation
CE	Comply with CE certification.
	High voltage inside! Risk of electric shock by touching it!
	The temperature here is beyond the acceptable range for the human body, please do not touch it arbitrarily to avoid personal injury.
	Firmly ground the protective ground terminal to ensure the safety of operators.
	The inverter can only be maintained and overhauled after being powered off for 20 minutes.
	It is recommended to wear noise-cancellation earplugs since the product may generate noise during operation.
	It is strictly forbidden to touch the fan blades when the fan is rotating.
	Read this manual carefully before any operation on the product.
	Do not dispose of this product as household waste.

4 Transport and Storage

4.1 Precautions

⚠ CAUTION

Failure to transport and store the product in accordance with the requirements in this manual may invalidate the warranty.

4.2 Transportation Requirements

- Choose appropriate means of transportation according to the size and weight of the product.
- Place the product horizontally during transportation.
- Avoid collision or strong shock during transportation.
- Transport the product in accordance with relevant local regulations and standards.
- Wear proper personal protective equipment when operating the product.

4.3 Storage Requirements

4.3.1 Storage Environment

- The inverter should be stored in an environment with a temperature ranging from -40°C to 70°C. f the ambient temperature is too low, take necessary heating measures for the inverter's internal devices.
- The inverter should be stored in a warehouse with a humidity of less than 55%. If the average ambient humidity is lower than 55%, it is suggested to change the desiccants every three months; if the humidity is higher than 55%, change the desiccants every month. The montmorillonite desiccant should be used. Each inverter unit requires 8 bags of desiccant, 200g per bag. Before grid connection, take the desiccants out of the inverter.
- Keep the product on a dry, flat, and solid ground that has sufficient bearing capacity and is not covered by vegetation. The ground where the product is kept should be flat, with a horizontal error of less than 0.25%, and have an overall slope of less than 5 degree.
- Avoid storing the inverter in places where it may come in touch with rainwater, or in low-lying places, to prevent the accumulated rainwater from getting into it. If the inverter must be stored outdoors due to restrictions on site, elevate its base off the ground to a certain height. The height should be decided according to the geological, meteorological, and other conditions on site.

- Avoid storing the inverter in places where corrosive gas or dust may be produced or accumulated, or in places within 30 km (20 miles) of saline-alkaline land or pollution-generating industrial complex such as chemical plants and power plants (chemical gas class: 1C1, solid particle level: 1S2). Avoid storing the inverter in environments contaminated with halogen and sulfur pollutants.
- Do not install the inverter in places with vibration or a magnetic field strength of over 30A/m.
- Do not store the inverter in environments with flammables and explosives.
- To prevent the inverter from being stored for an overly long period of time, please apply the "first-in, first-out" method to product storage.

4.3.2 Protection During Storage

- During the process of product handling and storage, impacts or collisions to the product must be avoided.
- Before storage, make sure the doors of the product and its internal devices are all locked. During storage, avoid opening the doors, unless it is necessary.
- Seal off the product's air inlet/outlet and the DC cable inlet area. During the period of storage, make sure the protective films on the air inlet/outlet are intact. Meanwhile, take effective measures to prevent the ingress of rainwater, dust, and sand into the product.
- Do not have the inverter stressed with heavy weights. The containers should not be stacked in more than four layers, and heavy weights are not allowed on the top of the inverter, power distribution cabinet, transformer, and protective cover for low-voltage copper bars.

4.3.3 Routine Inspection for Long-term Storage

- Perform regular inspection, at least once every half a month. Check whether the dust cover is damaged and whether the product and its internal devices are intact.
- It is suggested that units that have not been put into operation (from the date of receipt by the customer) and the units shut down temporarily (from the date of shutdown) should not be stored for more than three months. If stored for a long period of time, sealing measures and necessary tests and inspections are required for the product. For products shut down temporarily, put desiccants inside them. It is needed to open the door and visually inspect the product and its internal devices for damage first.
- For a product shut down/stored for over six months, inspect its electrical components (IGBT module, switch, etc.), and take dehumidifcation and dedusting mesaures for the whole product. For detailed operation, please contact SUNGROW.

5 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

5.1 Safety Precautions

⚠ WARNING

Only install the product when it is complete and intact.

Before installation, ensure that the product and all internal equipment are intact, without any damage.

⚠ WARNING

Risk of personal injury or device damage due to incorrect operation!

- **Follow the procedure of work of heights when walking on the top of the MV grid-connected inverter.**
- **All hoisting and transportation must comply with the relevant codes and regulations of the nation/region where the project is located.**

NOTICE

- **If any tool is used for unpacking, be careful not to damage the product.**
- **After receiving the product, check whether the appearance and structural parts of the product are damaged, whether the transformer leaked oil, and whether the packing list is consistent with the actual ordered product. If there are problems with the above inspection items, do not install the product and contact SUNGROW in time.**

CAUTION

Improper hoisting may cause personal injury!

- **It is strictly prohibited to stand within 5m - 10m outside the operating area (i.e., under the boom and the hoisted machine) to avoid casualties.**
- **Only professional personnel can operate the product, and be sure to wear personal protective equipment when operating.**
- **Stop hoisting in the event of severe weather, such as heavy rain, thick fog, or strong wind.**
- **Be sure to hoist the product smoothly and evenly to avoid collision and vibration. Do not turn the product upside down, nor hoist it for a long time.**
- **When hoisting and moving the product, be aware of its size and weight and keep the balance to prevent it from turning over or falling.**

5.2 Inspection Before Installation

5.2.1 Scope of Delivery

Accessories delivered with the product are listed below:

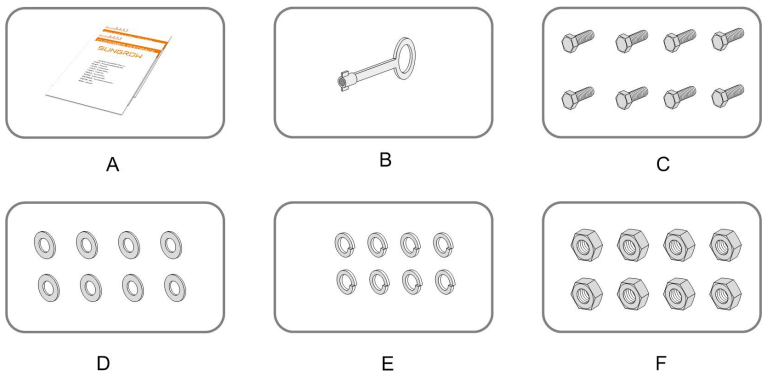


figure 5-1 Scope of Delivery

No.	Name
A	Relevant documents (the certificate of quality, warranty card, delivery inspection report, etc.)
B	Key
C	M16 x 45 bolt
D	M16 flat washer
E	M16 spring washer
F	M16 nut

The accessories shown in above figures are for reference only. The product received may differ.

5.2.2 Product Inspection

- Check whether the product received is the ordered one.
- Check that the scope of delivery is consistent with the contract against the packing list.
- Visually check the product for any damage.

If any problems are found or there is any question, please contact the forwarding company or SUNGROW.

WARNING

Only install the product when it is complete and intact.

Before installation, ensure that:

- **The product is in good condition, without any damage.**
- **The product and all internal equipment are intact, without any damage.**

5.3 Installation Environment Requirements

5.3.1 Installation Site

- The climate environment and geological conditions, such as stress wave emission and underground water level, should be fully considered when selecting the installation site.
- The installation site should be dry and well ventilated.
- There should be no trees around the installation site to prevent branches or leaves blown off by heavy winds from blocking the door or air inlet.
- The installation site should be away from areas where toxic and harmful gases are concentrated, and free from inflammable, explosive, and corrosive materials.
- The installation site should be far away from residential areas to avoid noise.

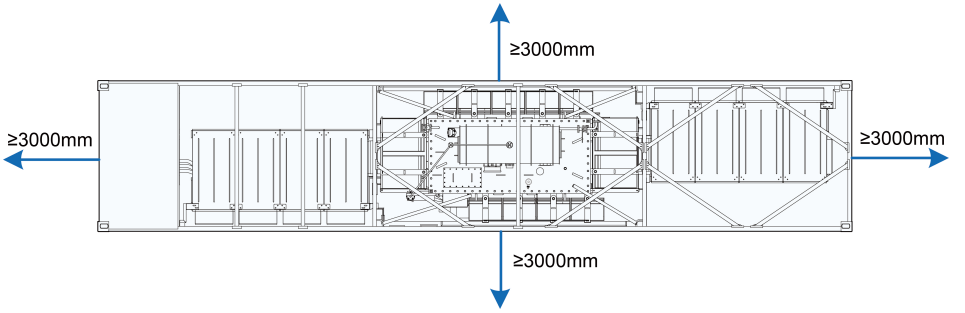
5.3.2 Foundation

- The soil at the installation site should be compact. It is recommended that the relative density of soil at the installation site be no less than 98%. Take relevant measures to ensure a stable foundation in case of loose soil.
- The foundation pit must be compacted and filled to provide sufficient and effective support for the product.
- The foundation should be higher than the horizontal ground to prevent the product base and the interior from rain erosion.
- The cross-sectional area and height of the foundation should meet the requirements.
- Cabling should be considered when building the foundation.

- Pre-bury the threading pipe at the bottom of the foundation according to the location of the cable inlet holes at the bottom of the product.
- A drainage system is necessary to prevent the bottom or internal equipment of the product from being soaked in water during the rainy season or during heavy rainfall.
- The dregs excavated during foundation construction should be removed immediately to avoid the latter impact on hoisting.
- Pre-bury the channel steel.

5.3.3 Installation Spacing

To ensure better heat dissipation and facilitate later maintenance, reserve enough space around the installation site.



5.4 Hoisting and Fixing

5.4.1 Preparation Before Hoisting

WARNING

Professional cranes must be used and must be operated by qualified personnel. Otherwise, personal injury or product damage may occur!

CAUTION

- **Improper hoisting may cause personal injury!**
- **It is strictly prohibited to stand within 5m - 10m outside the operating area (i.e., under the boom and the hoisted machine) to avoid casualties.**
- **Professional cranes must be used and must be operated by professional personnel.**
- **Stop hoisting in the event of severe weather, such as heavy rain, thick fog, or strong wind.**

5.4.2 Requirements for hoist and lifting rope

Cranes	Single cranes	Two cranes
Rated load	100t.	Each hoist bears at least 50t.
Ropes	Four sling ropes of equal length, the length of a single rope is not less than 13m. The load that a single rope can bear is not less than 60000kg, considering the safety factor of 6 times.	Two ropes of equal length and not less than 5m, or 4 ropes of equal length and no less than 2.5m can be used. The load that a single rope can bear is not less than 60000kg, considering the safety factor of 6 times.

5.4.3 During Hoisting

- Ensure safe and reliable connections of all slings.
- Ensure that the product is steady and not tilting during the whole hoisting process.
- The product should be hoisted vertically. Never drag the product on the ground or the top of the lower product, and never pull and push it on any surface.
- Suspend the hoisting when the product is hoisted 300 mm from the supporting surface to check the connection between slings and the product. Continue hoisting only after confirming a reliable connection.
- When the product is in place, place it lightly and smoothly. It is strictly forbidden to throw it to places outside the vertical landing place.
- The outdoor cabinet should be placed on a solid and flat site with good drainage and no obstacles or protrusions.
- Avoid scratching the product during hoisting.

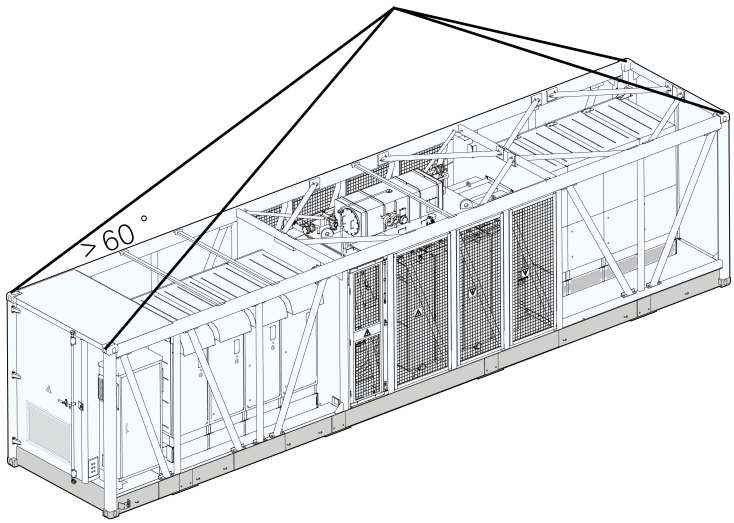


figure 5-2 Hoisting by One Crane

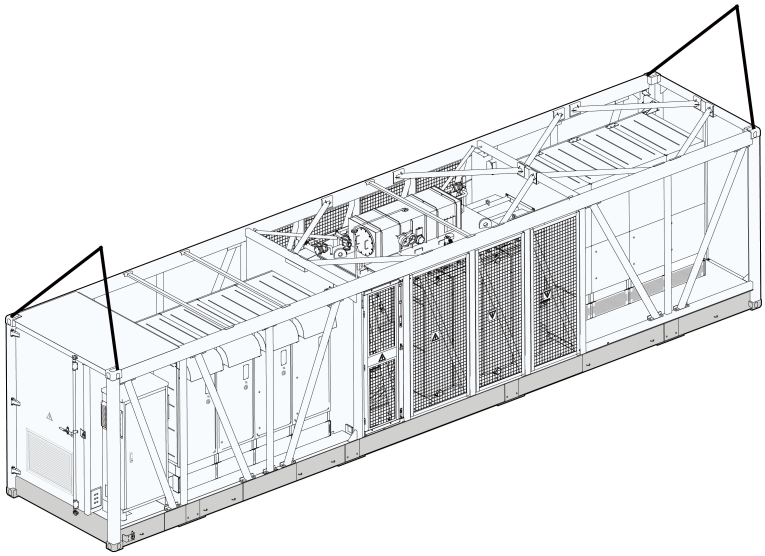


figure 5-3 Hoisting by Two Cranes

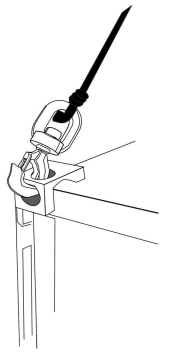
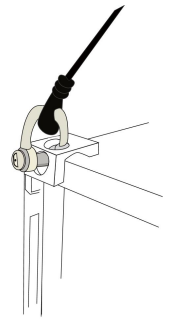
⚠ WARNING

Be sure to hoist the product smoothly and evenly to avoid collision and vibration. Do not turn the product upside down, nor hoist it for a long time. Otherwise, personal injury or product damage may occur!

5.4.4 Fastening of Connectors

Use slings with hooks or U-hooks to hoist the MV Station.

The lifting devices should be connected correctly to the MV Station.

Lifting device	Hook	U-hook
Connections		
Notice	Insert the hook from inside to outside.	Lateral pin of the U-hook should be tightened.

⚠ WARNING

- **National and local safety rules should be observed at all times.**
- **Regardless of relevant safety rules may void pertinent warranty claims from Sungrow.**

5.4.5 Fixing

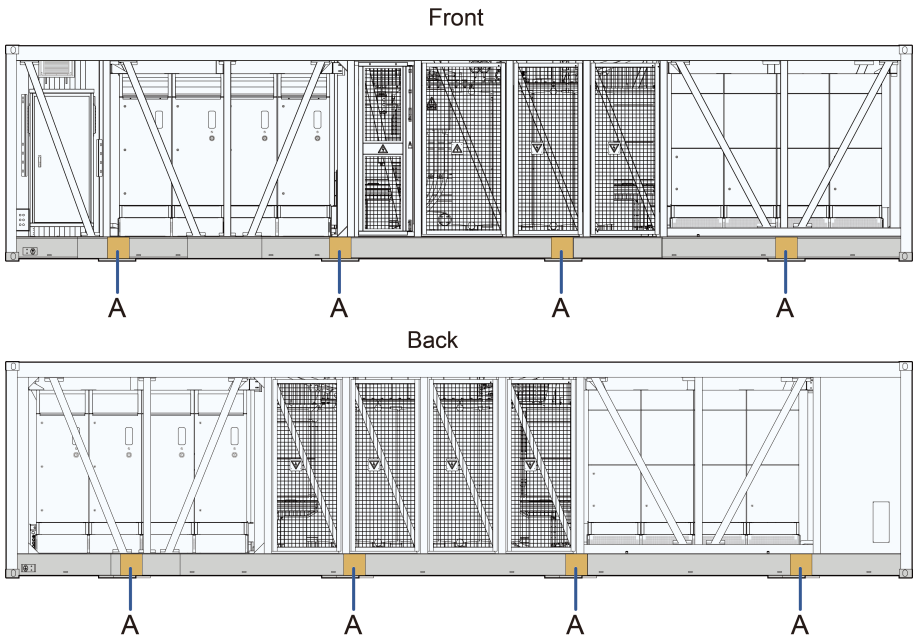
Hoist the product to the intended location and fix it.

Fixed by Welding

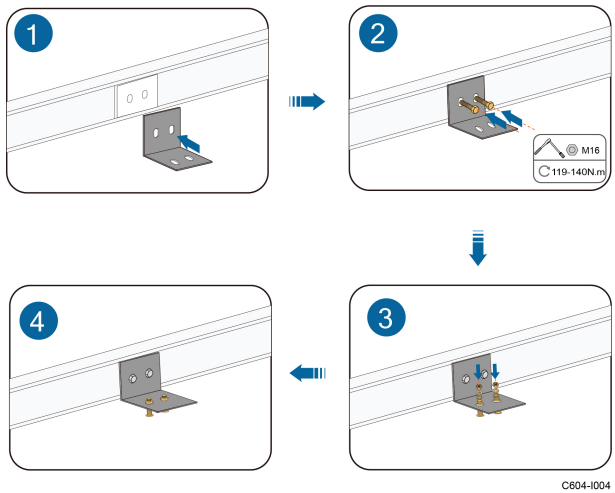
Secure the bottom of the product to the foundation by welding. Take proper measures to prevent the welding point from corrosion after welding.

Fixing by L mounting parts

Fix the fixing point at the bottom of the inverter (shown as A below) with the existing operating platform using L mounting parts.

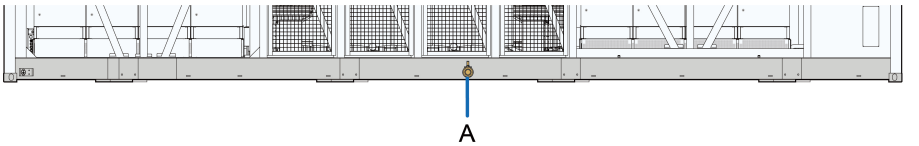


The steps to fixing the L mounting parts is shown in the following figure.



5.4.6 Installing Oil-Water Separator(Optional)

Generally, if there is no external oil tray, the base of the product is used as an oil tray, and the installation position of the oil-water separator is reserved at the bottom of the product, as shown in figure A below.



There are two oil-water separator installation positions reserved at the bottom of the product, one is connected to the oil-water separator, and the other installation position needs to be blocked with a plug.

If the installation of the oil-water separator is needed, please contact SUNGROW customer service.

6 Electrical Connection

6.1 Precautions

DANGER

- **Before electrical connections, please make sure that the inverter is not damaged, otherwise, it may cause danger!**
- **Before electrical connections, please make sure that the product switch and all switches connected to the product are set to "OFF", and use measuring equipment to ensure that there is no voltage at the connection. Otherwise, an electric shock may occur!**
- **All switches cannot be closed until the electrical connection is completed.**

DANGER

PV modules will generate lethal high voltage when exposed to sunlight.

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Before performing an electrical connection, be sure to disconnect the PVS and use measuring equipment to ensure that cables are voltage-free.**
- **Respect the protection requirements and precautions of PV modules.**

DANGER

Danger to life due to a high voltage inside the inverter!

- **Be sure to use special insulation tools during cable connections.**
- **Note and observe the warnings on the product.**
- **Respect all safety precautions listed in this manual and other pertinent documents.**

WARNING

Sand and moisture penetration may damage the electrical equipment in the product, or affect their operating performance!

- **Avoid electrical connections during sandstorms or when the relative humidity in the surrounding environment is greater than 95%.**
- **Carry out the electrical connection of the product on fine days with no wind and sand.**

⚠ WARNING

Damage to the device caused by incorrect wiring is not covered by the warranty.

- **Electrical connection must be performed by professional personnel who wear personal protective equipment.**
- **The cables used in the PV generation system must be firmly connected, in good condition, and well insulated to appropriate sizes.**

⚠ WARNING

- **Check and confirm the polarity correctness of the PV string, and then connect it to the corresponding position of this product.**
- **When installing and operating the product, make sure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in product damage. The damage caused by this is not covered by the warranty.**

NOTICE

- **Comply with the safety instructions related to PV strings and the regulations related to the local grid.**
- **During electrical connection, do not forcibly pull any wires or cables, as this may compromise the insulation performance.**
- **Ensure that all cables and wires have sufficient space for any bends.**
- **Adopt the necessary auxiliary measures to reduce the stress applied to cables and wires.**
- **Keep a sufficient distance between the cable and the heating device to avoid aging and damage of the insulation layer of the cable caused by high temperature.**

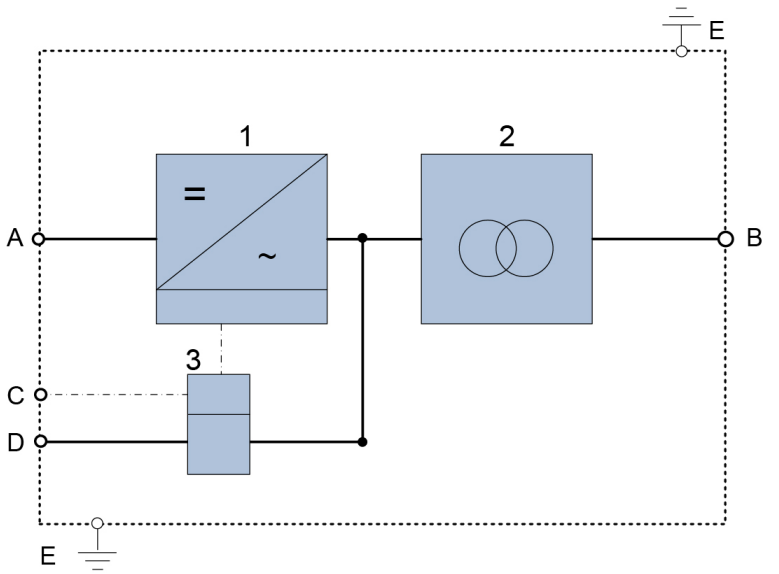
NOTICE

All electrical connections must comply with local and national/regional electrical standards.

- **Cables used by the user shall comply with the requirements of local laws and regulations.**
- **Only with the permission of the national/regional grid department, the inverter can be connected to the grid.**

6.2 Wiring Overview

—— Power cable –·– Communication cable



1- Inverter 2– Transformer 3– Power Distribution Cabinet

table 6-1 Interface Description

No.	Description	Recommended Cable Specifications
A	DC input port	400 mm ^{2} at most
B	AC output port	70 mm ^{2} — 400 mm ^{2}
C	Communication port	2 x 0.75 mm ^{2} —2 x 1.5 mm ^{2}shielded twisted pair cable
D	External power supply port	—
E	Grounding	60 mm x 100 mm hot-dip galvanized flat steel
		50 mm ^{2} — 95 mm ^{2} grounding cable

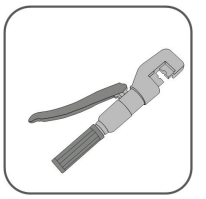
6.3 Preparation Before Wiring

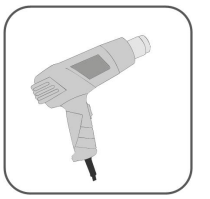
6.3.1 Installation Tools

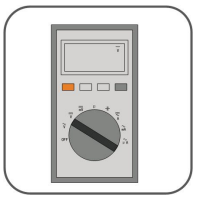
Installation tools include but are not limited to the following recommended ones. Use other auxiliary tools on site as needed.


Torque screwdriver


Wire stripper


Hydraulic clamp


Heat gun

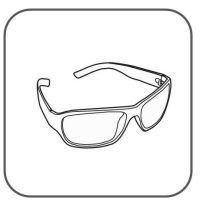

Multimeter


Screwdriver


Electric drill


Torque wrench


Protective gloves


Goggles

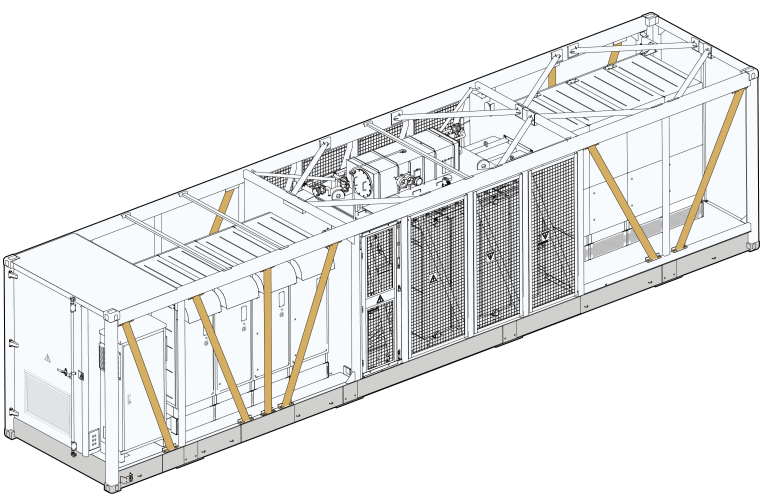

Insulated shoes


Protective clothing


Hard hat

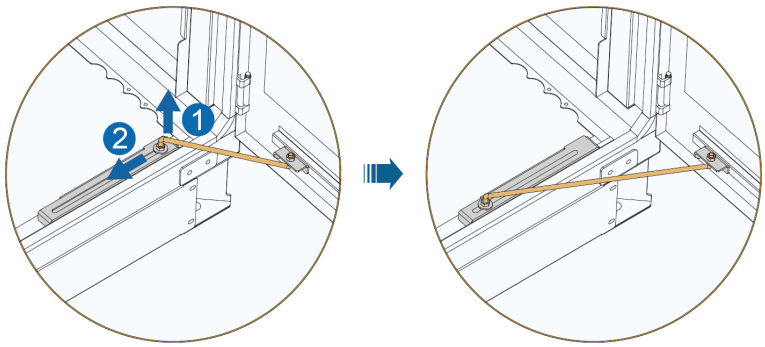
6.3.2 Open the Product Door

Step 1 Remove the vertical beams and inclined beams around the product.



Step 2 Open the cabinet door.

Step 3 Fix the doors of the inverter unit cabinet and power distribution cabinet.



Step 4 Remove the protective cover of the wiring area.

- - End

6.3.3 Cables

The cables must meet the following requirements:

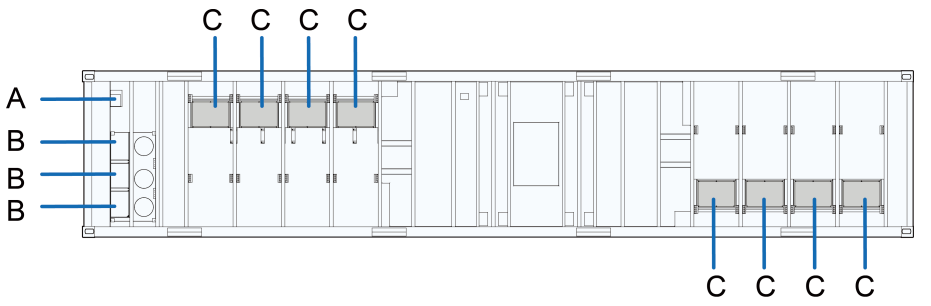
- The current carrying capacity of the cable should meet the requirements. Factors affecting the current-carrying capacity of a conductor include but are not limited to:
  - Environmental conditions
  - Type of the insulation material of the conductor
  - Cabling method
  - Material and cross-sectional area of the cable
- Select cables with a proper diameter according to the maximum load, and the cables should be long enough.
- All DC input cables must be of the same specifications and materials.
- AC output cables of three phases must be of the same specifications and materials.
- Only flame-retardant cables can be used.

NOTICE

Cables used shall comply with the requirements of local laws and regulations. The cable colors in figures in this manual are for reference only. Please select cables according to local cable standards.

6.3.4 Position of Cable Inlet

For easy wiring, cables between external devices and the product are routed into the product through the bottom cable inlet.



* The figure is for reference only. The product received may differ.

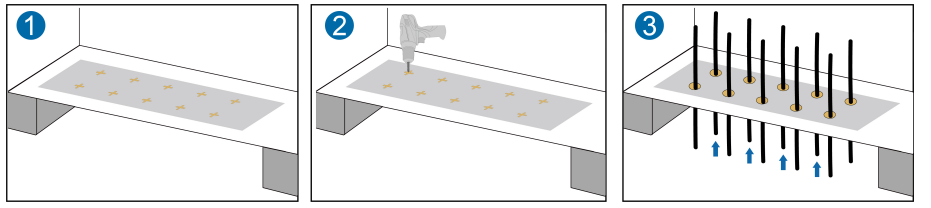
No.	Description
A	External power supply and communication cable inlet
B	AC output cable inlet
C	DC input cable inlet

6.3.4.1 Cable Inlet Preparation

Step 1 Identify the positioning marks on the bottom.

Step 2 Drill holes at the positioning marks.

Step 3 Lead cables through holes into the cabinet.



WARNING

When the wiring is completed, seal the gap between cables and holes with fire-proof/waterproof materials such as fireproof mud to prevent foreign matter or moisture from entering and affecting the long-term normal operation of the product!

- - End

6.4 Ground Connection

DANGER

Products must be reliably grounded!

- **The grounding cable must be reliably grounded, otherwise, it may cause a fatal electric shock to the operator.**
- **The grounding cable must be reliably grounded, otherwise, equipment may be damaged if struck by lightning.**
- **The grounding cable must be reliably grounded, otherwise, equipment may not operate normally.**

WARNING

- **Connect the grounding terminal to the protective grounding point before connecting AC cables, DC cables, and communication cables.**
- **Both grounding terminals on the side of the product must be connected to the protective grounding points reliably. SUNGROW shall not be held liable for any damage caused by the violation.**

NOTICE

Note the following during ground connection:

- **Observe specific codes and regulations of the country/region where the project is located to perform ground connections.**
- **All grounding connections inside the PV system must be secure and reliable.**
- **Measure to ensure the ground resistance is no more than 4Ω after ground connection.**

6.4.1 Overview

There are two grounding methods: fixing by welding with grounding flat steel and fixing with grounding cable.

WARNING

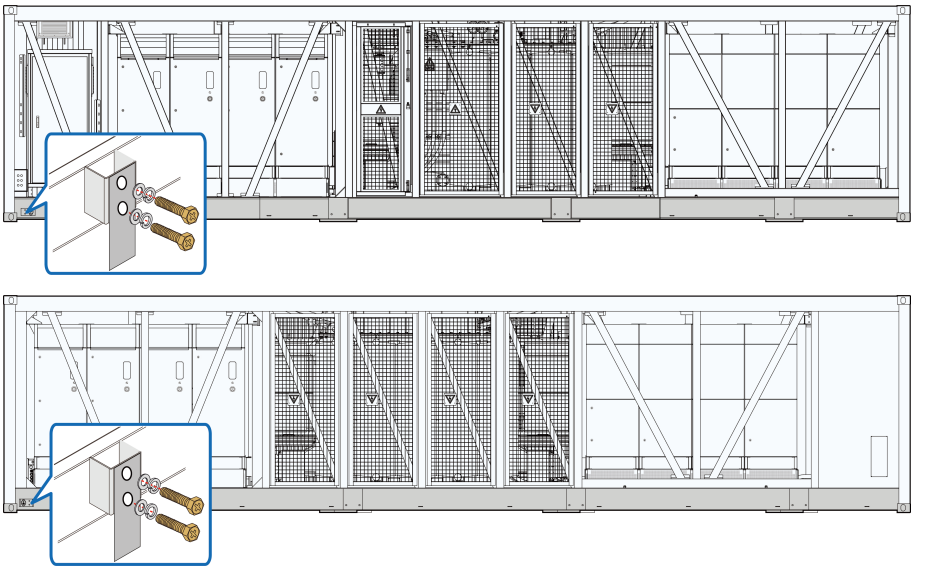
Before proceeding with the ground connection, tear off the protective film on grounding point.

NOTICE

After grounding is completed, whether made by using the flat steel or grounding cable, the exposed metal surface, except the fixing point of grounding connection, needs to go through anti-corrosion treatment.

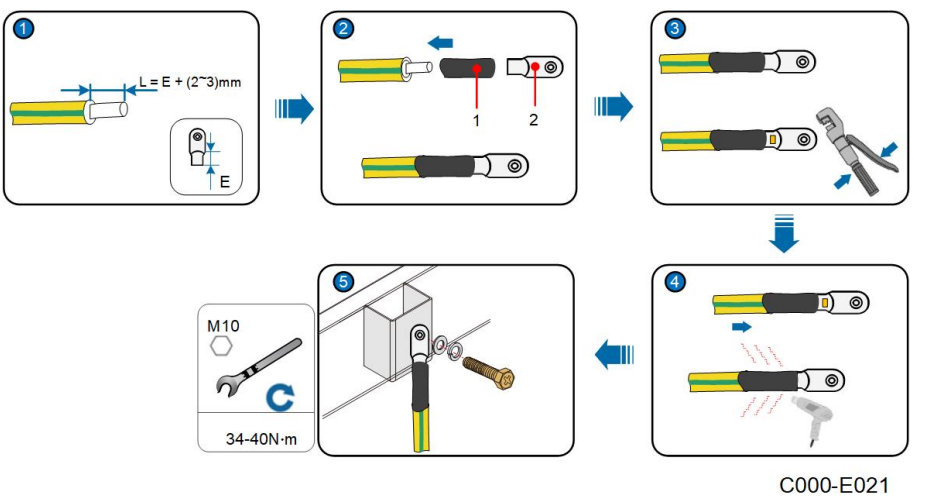
6.4.2 Grounding Flat Steel

Weld 60 mm x 100 mm hot-dip galvanized flat steel to the grounding point.



6.4.3 Grounding Cable

Use 50 mm² ~ 95mm² grounding cables to reliably connect the two grounding terminals to the grounding points of the system.



1: Heat shrink tubing 2: OT/DT terminal

6.5 DC Input Connection

DANGER

The PV string will generate lethal high voltage when exposed to sunlight.

Respect all safety instructions listed in relevant documents about PV strings.

WARNING

- **Make sure the PV array is well insulated to the ground before connecting it to the inverter.**
- **Make sure the maximum DC voltage and the maximum short circuit current of any string never exceed inverter permitted values specified in "Technical Parameters".**
- **Check and confirm the polarity correctness of the PV string, and then connect it to the corresponding position of this product.**
- **When installing and operating the product, make sure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in product damage. The damage caused by this is not covered by the warranty.**

6.5.1 Overview

DC wiring area

Negative Grounding

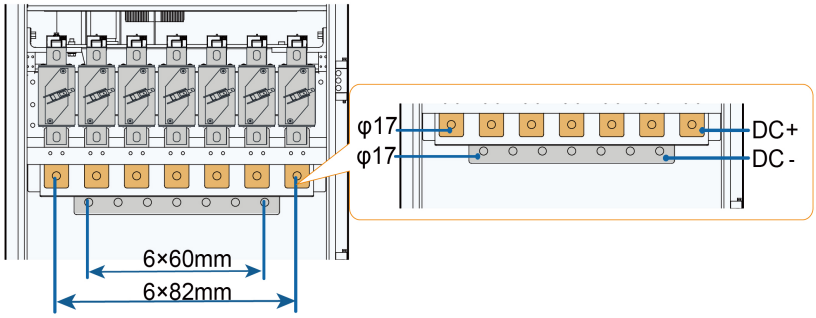


figure 6-1 7–way DC Input

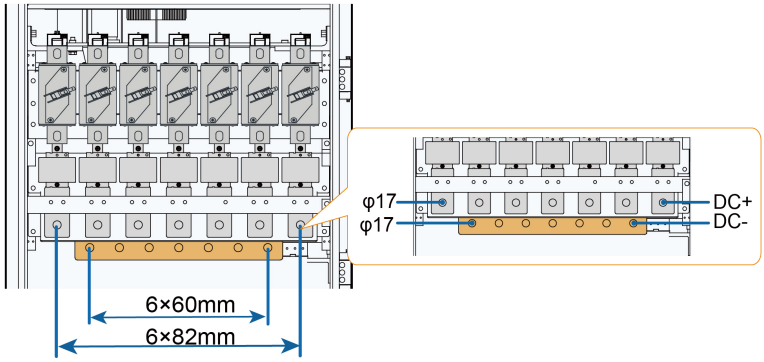


figure 6-2 7–way DC Input With MPLC

Floating Grounding

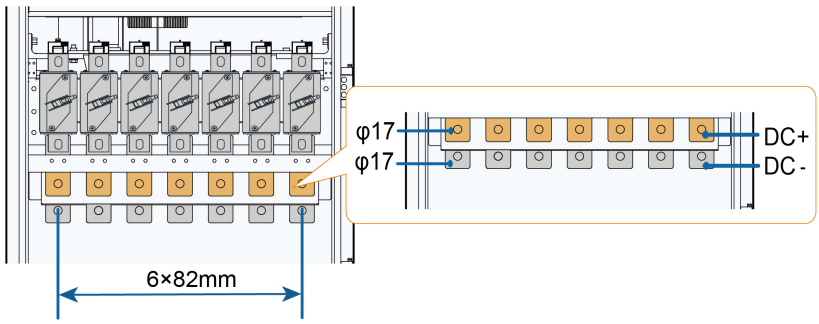


figure 6-3 7–way DC Input

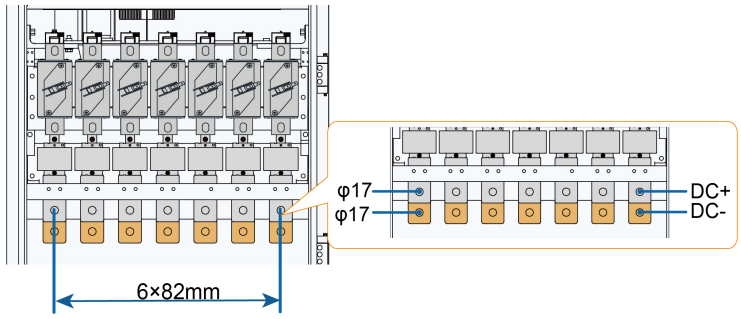


figure 6-4 7–way DC input With MPLC

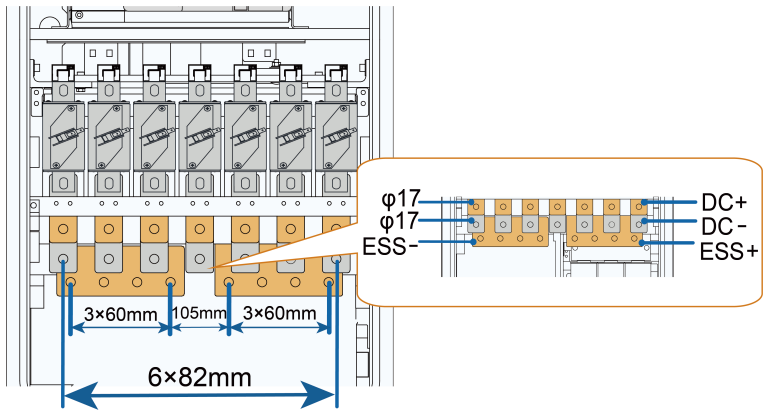


figure 6-5 7–way DC input With ESS

For the product with 6 DC inputs with ESS, in its DC wiring area, the first fuse and copper bar on the left in the illustration are removed.

* The wiring area is subject to the actual product.

Mark	Description
DC+	DC side positive cable connection area
DC-	DC side negative cable connection area

Mark	Description
ESS	Energy storage system port
φ17	Copper bar diameter

Wiring hole	Bolt	Torque(N.m)
φ17	M16	119–140N.m

Illustrations in the manual are for the product with 7 DC inputs only.

- For the product with 6 DC inputs, in its DC wiring area, the first fuse and copper bar on the right in the illustration are removed.
- For the product with 5 DC inputs, in its DC wiring area, the first fuse and copper bar on the left and right in the illustration are removed.

6.5.2 Installing Insulation Board before Connection

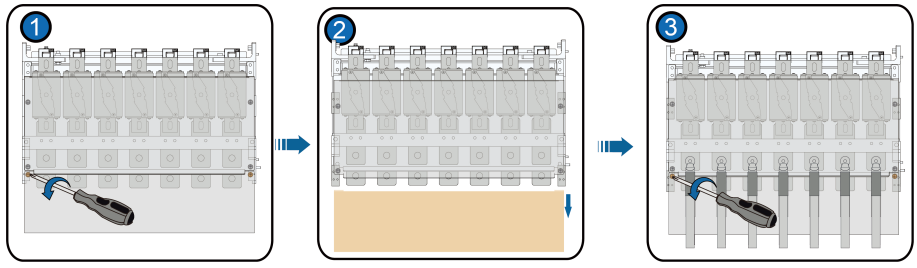
Installing insulation board before cable connections.

Step 1 Remove the two fixing screws on the insulation board with a screwdrive.

Step 2 Move insulation board down onto the bottom plate, and make sure it is placed between the positive and negative cables.

Step 3 Install the negative and positive DC cables.

Step 4 Move the insulation board upward to its original position and install the two fixing screws.



- - End

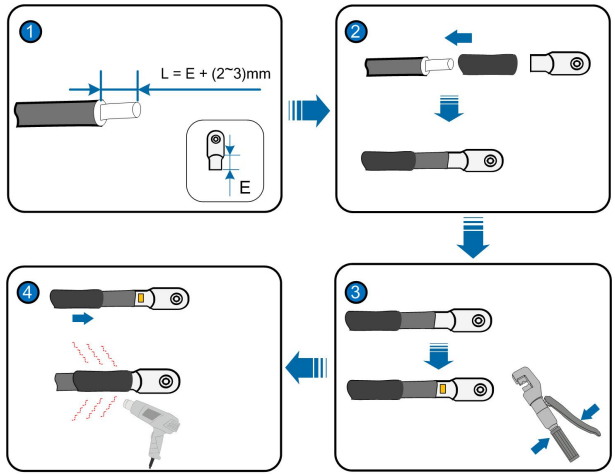
* The figure is for reference only. The product received may differ.

6.5.3 Procedure

Step 1 Lead the cable into the wiring area through the inlet hole, and mark the cable polarity.

Step 2 Strip the protective layer of the cable to expose the copper core of the wire with strippers.

Step 3 Install the OT/DT terminal to the wire and crimp them with a crimping tool. Install a heat shrink tubing to the terminal and heat it with a heat gun.



Step 4 Secure the OT/DT terminal to the copper bar by M16 x 45 bolts with a tightening torque of 119- 140 N.m.

- If copper wires are used, fasten the bolt assembly as shown below.

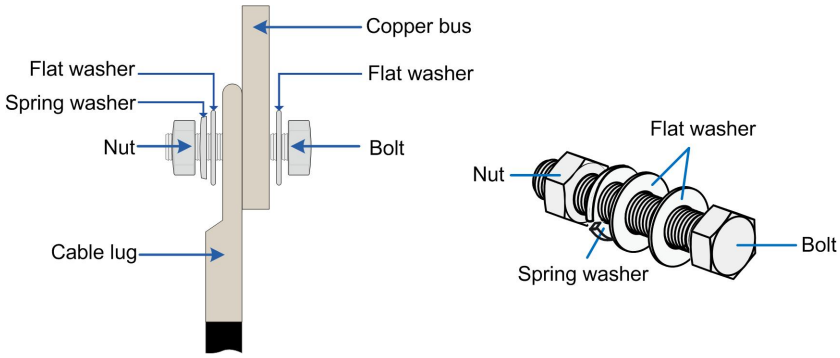


figure 6-6 Copper Wire Connection

- If aluminum wires are used, fasten the bolt assembly as shown below.

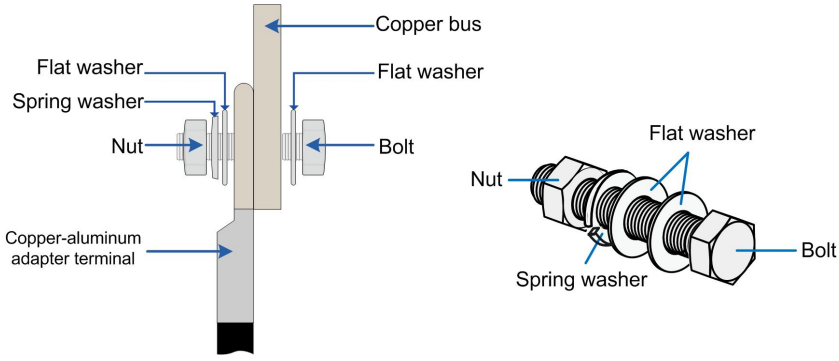


figure 6-7 Aluminum Wire Connection

Step 5 Pull the cable back slightly after wiring to ensure that the cable is long enough.

NOTICE

- **Ensure that the selected terminal can directly contact the copper bar. If there are any problems, contact the terminal manufacturer.**
- **Ensure that the copper bar is not in direct contact with the aluminum wire. Otherwise, electrochemical corrosion may occur, impairing the reliability of the electrical connections.**
- **If the two-core or multi-core cable is used as the DC input cable, split the cable cores into wires outside the inverter first, before leading the cable into the inverter.**

- Please ensure the upper and lower copper bars are kept in the same plane with a deviation of less than 10mm while performing DC wiring.
- Fix the cable after wiring, and reserve a certain length to avoid damage caused by excessive force on the wiring copper bar due to foundation sinking and other problems.

- - End

6.6 AC Side Connection

6.6.1 Inspection Before Wiring

- Check and ensure that the AC side of the inverter unit is disconnected.

  Refer to the transformer manual and use the special lever to disconnect the load switch of the transformer.
- Open the outer and inner doors of the HV compartment of the transformer. Check and ensure that the indicator on the inner door is off.
- Check and ensure that the sleeves and copper bars in the wiring area in the HV compartment are free from damage, deformation, and fracture.

6.6.2 Procedure

Step 1 Lead the cable from external device through the cable entry on the bottom of the cable compartment.

Step 2 Prepare the terminals and install them tightly, where reference can be made to the cable connector installation manual.

The wiring terminal can be connected with either copper cable or aluminium cable.

- In case of copper cable, use copper wiring terminals.
- In case of aluminium cable, use copper-to-aluminium adapter terminals.

The HV wiring terminal can be connected to a maximum of two cables. Select the terminal as needed.

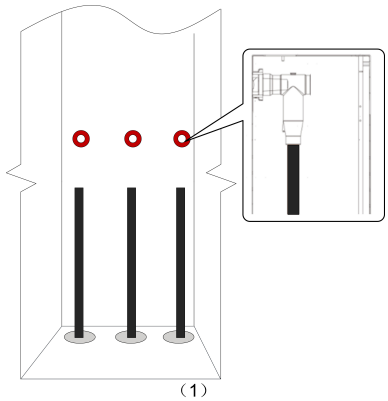


figure 6-8 One Cable

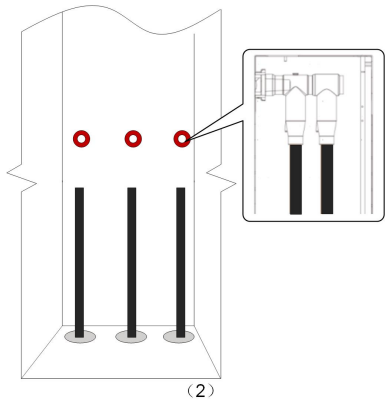


figure 6-9 Two Cables

- - End

Further Operations

Seal the bottom cable entries with fire-proof mud, clear sundries inside the cabinet, and reassemble the sealing plate of the cabinet.

Should there be any unused wiring terminals, block them with insulating caps.

When connecting the AC cable, do not use the hole on the pressure relief plate as a substitute for the AC cable inlet.

6.7 Communication Connection

6.7.1 Overview

There is an RS485 communication terminal block inside the power distribution cabinet.

table 6-2 Port Mark and Definition (Example)

Marks	Plug-compatible Devices
Reserved RS485	PVS, meteo station, electricity meter, transformer, etc.

6.7.2 Procedure

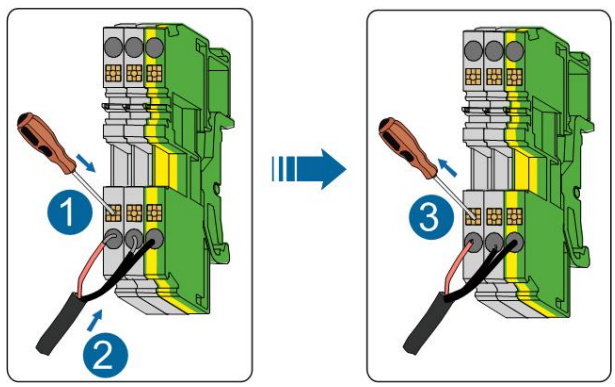
Take one cable as an example.

Step 1 Use a wire stripper to strip off the RS485 shielded twisted pair.

Step 2 Press the metal plate above the terminal with a screwdriver.

Step 3 Insert the cable into the corresponding wiring hole.

Step 4 Loosen the screwdriver, the metal plate returns and compresses the cable.



* The figure is for reference only. The product received may differ.

- - End

6.8 Switch/Ethernet Communication

Overview

The switch or Ethernet port is set inside the power distribution cabinet, marked respectively as A and B in the figure below. Please adopt switch or Ethernet communication according to the actual situation on site.

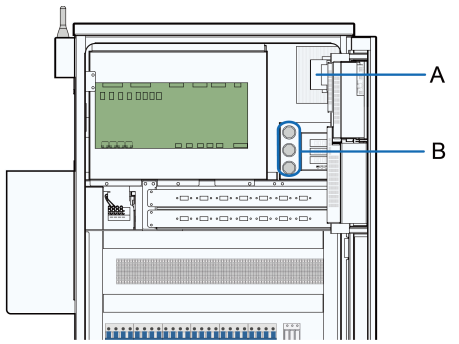


figure 6-10 Ethernet Communication Port In 5K Power Distribution Cabinet

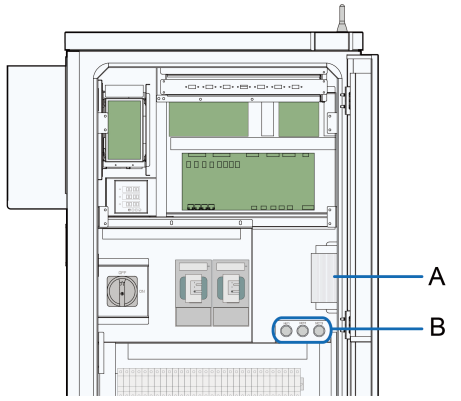


figure 6-11 Ethernet Communication Port In 15K Power Distribution Cabinet

Connect external monitoring devices to the Ethernet port by a CAT-5e cable.

6.9 Check After Wiring

6.9.1 Inspection

Check the wiring thoroughly and carefully when all electrical connections have been completed.

- Seal the gap between cables and the wiring holes with fireproof and waterproof materials.
- Put all protective covers back in place firmly.

⚠ WARNING

When the wiring is completed, check for the wiring correctness and then seal the gap between cables and inlet and outlet holes with fireproof/waterproof materials such as fireproof mud to prevent foreign matter or moisture from entering and affecting the long-term normal operation of the inverter.

6.9.2 Locking Cabinet Door

Step 1 Release the fixing doors of the inverter unit cabinet and the power distribution cabinet. Unfix in reverse of the fixing method, refer to "6.3.2 Open the Product Door".

NOTICE

It is forbidden to close the door forcibly when the door is fixed.

Step 2 Lock the cabinet door and pull out the key.

DANGER

Electric shock hazard!

Be sure to lock the cabinet door. Otherwise, non-professionals may be exposed to the running machine, and it may cause casualties.

- - End

7 Powering up and Powering down

7.1 Safety Instructions

DANGER

When the product is working:

- **It is strictly forbidden to touch the live parts of the product. Otherwise, an electric shock may occur.**
- **It is strictly prohibited to disassemble any parts of the product. Otherwise, an electric shock may occur.**
- **It is strictly prohibited to touch any hot parts of the product (such as the heat sink). Otherwise, it may cause burns.**

DANGER

Even if the inverter is shut down, it may still be hot and cause burns. Operating the inverter with protective gloves after it cools down.

WARNING

Press the emergency stop button only when the product fails or an emergency occurs to ensure that the product responds quickly.

WARNING

The product can only be put into operation after confirmed by a professional and approved by the local power department.

WARNING

For the product with a long shutdown time, it must be checked thoroughly and carefully to ensure all indexes are acceptable before being powered on.

7.2 Powering Up Operations

7.2.1 Removing Film on Product

The highlighted parts of the product in the figures below are covered with films. Be sure to remove the films before the product is officially put into operation.

Films Distribution Area of Product

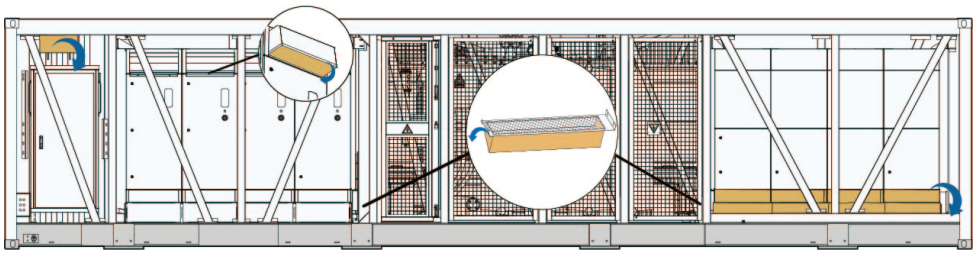


figure 7-1 Remove Film from the Product

Films Distribution Area of Power Distribution Cabinet

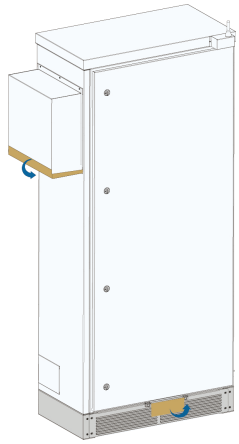
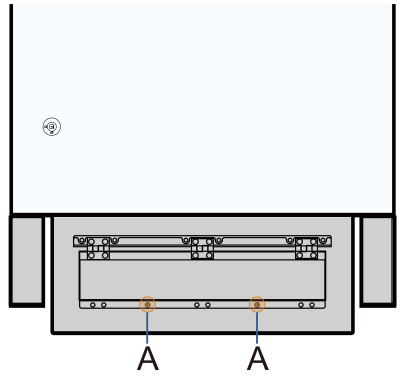


figure 7-2 Remove Film at Air Inlet/Outlet of Power Distribution Cabinet

* The figure is for reference only. And the actual product received shall prevail.

7.2.2 Removing Pressure Relief Screw

Be sure to remove the pressure relief screws at the bottom of the inverter unit(marked as A in the figure below) before the product is officially put into operation.

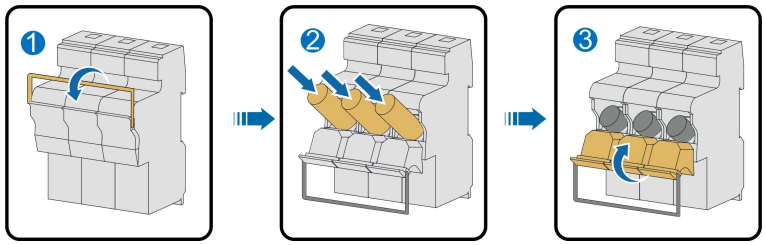


7.2.3 Installing Fuse in AC SPD

Step 1 Open the fuse holder in the AC side. (SPD fuse position, see "3.3.2 Internal Structure of Inverter Unit")

Step 2 Insert fuses.

Step 3 Close the fuse holder in the AC side SPD.



- - End

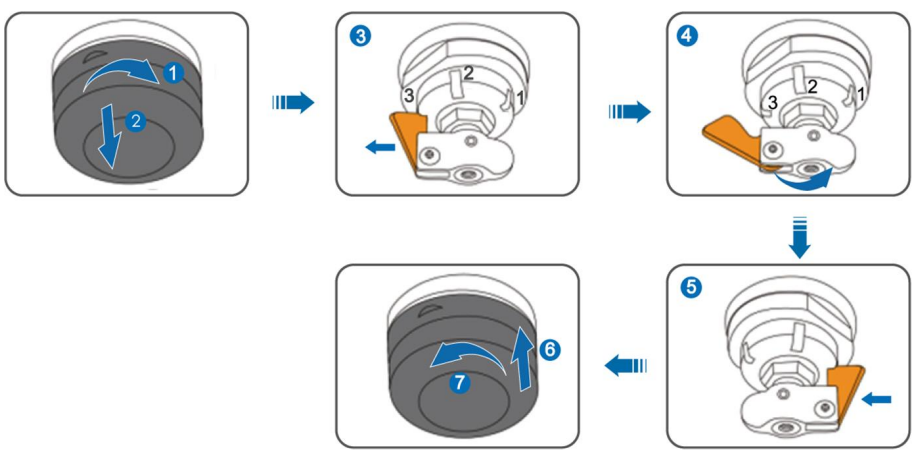
7.2.4 Adjusting De-energized Tap Changer

Adjust the output voltage of the transformer. When operating the de-energized tap changer, ensure that the transformer is in a non-excitation state, that is, the high and low voltage sides of the transformer are uncharged.

When the voltage on the LV side remains unchanged, the output voltage on the HV side under different gears is:

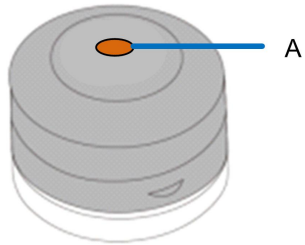
Gear	Output Voltage
1 (A)	Standard voltage x 1.05
2 (B)	Standard voltage x 1.025
3 (C)	Standard voltage x 1.0
4 (D)	Standard voltage x 0.975
5 (E)	Standard voltage x 0.95

Take adjusting to gear 1 as an example, operate the de-energized tap changer as follows.



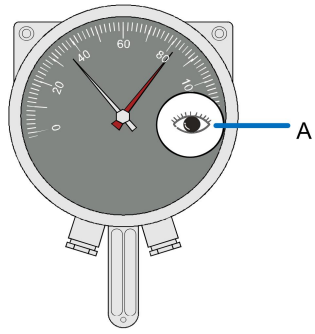
7.2.5 Opening Pressure Relief Valve

Open the cap on the pressure relief valve (marked as A below).



7.2.6 Removing Foam Part from Oil Thermometer

Remove the protective cover on the oil thermometer and remove the foam parts in the protective cover before the inverter is officially put into operation.



After removal, re-install the protective cover.

7.2.7 Draining Oil from Transformer

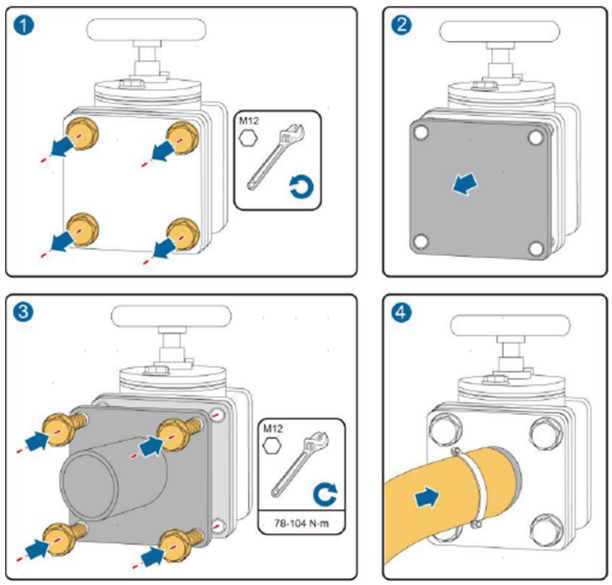
If the transformer is transported with a full oil tank, drain some oil from the transformer after the product is transported to the site.

No.	Device	Source
1	Clean hoses and oil tank	Not included in the scope of supply
2	Cleaning cloth	
3	Wrench	
4	Adjustable wrench	
5	Hose connector	
6	Pipe clamp	

Step 1 Ensure that the drain valve is closed.

Step 2 Remove the cover plate of the drain valve.

Step 3 Remove the cover plate of the drain valve.



Step 4 Open the drain valve and the oil in the transformer slowly flows from the transformer into the tank.

Step 5 Check the position of the oil level gauge according to the temperature-level curve according to the local ambient temperature. Stop draining when the oil in the transformer is reduced to the required level.

Step 6 Close the drain valve and remove the drain hose connector and the hose.

Step 7 Re-install the cover plate of the drain valve.

- - End

7.3 Inspection Before Powering Up

7.3.1 Inverter

- Ensure that the AC and DC switches and all internal miniature circuit breakers are disconnected.
- Check and ensure that the emergency stop button is released .
- Check various upstream and downstream electrical switches and buttons, as well as those on the inverter, to make sure that they can be operated flexibly and meet the requirements.
- Check whether the film at the air inlet and outlet are removed.
- Check whether the pressure relief screw has been removed.
- Check whether the fuse is installed in the AC SPD.

7.3.2 PV Array

The DC side voltage shall not exceed the maximum DC voltage allowed for the inverter. Otherwise, the inverter may be damaged and even cause safety accidents.

To ensure the stable and efficient operation of the whole system, it is recommended that batteries connected to an inverter should be of the same type and from the same manufacturer, and the number of batteries connected in series should be the same.

7.3.3 Checking Grid Voltage

- Measure accurately the grid 3-phase line-to-line voltages: L1-L2, L1-L3, and L2-L3. The voltages should not exceed the grid permissible voltage and the three phases are in balance.

> Adjust the transfer ratio of the transformer by qualified personnel if the grid voltage deviation is large.

- Measure and record the grid frequency. Measured data should not exceed the grid permissible frequency.
- Measure the THD and check the curve if possible. The inverter will stop running if the THD is serious.
- Record accurately all the measured data.

7.3.4 Transformer

- Ensure that there are no oil leaks on the transformer surface.
- Check and ensure that the pointer of the oil level gauge is in the normal range.
- Check whether the safety tab of the pressure relief valve has been removed.
- Check and ensure that the temperature measurement circuit is complete.
- Check and ensure that the SPD is firmly and reliably installed.
- Check and ensure that the foam in the oil temperature dial is removed.
- Check and ensure that the oil leakage port of the transformer room is not clogged.
- Check the external air-insulated gap distance, and whether the air-insulated distance between the bushings of different voltage levels and the ground meets the relevant standards.

7.4 Powering Up Steps

Step 1 Turn on the maintenance switch QS2 of all inverter units, the maintenance switch QS3 at the bottom of the inverter unit, and the QS4 switch inside the power distribution cabinet.

Step 2 Turn on the load switch of the transformer.

Step 3 Choose"**Overview→General Information**" and click**Shutdown** in the**Shortcut Menu** on the Web interface to shut down the inverter.

Step 4 Check and ensure that the "**Access Protection Enabling**" switch is off on the Web interface.

Step 5 Turn on the output switch of the upstream PVS.

Step 6 Turn on the DC load switch QS1 inside all inverter units, and close the cabinet doors.

Step 7 Rotate the**START/STOP** knob to the**START** position.

Step 8 Start the inverter up on the Web interface, and the inverter will then work in grid-connected state.

For the position of the above switches, please see "3.3.2 Internal Structure of Inverter Unit" and "3.3.4 Main Parts of Power Distribution Cabinet".

- - End

7.5 Powering Down Operations

7.5.1 Planned Powering Down

Step 1 Click"**Overview→General Information**" and click **Shutdown**in the **Shortcut Menu** on the Web system to shut down the inverter.

Step 2 Rotate the **START/STOP** knob to the **STOP** position.

Step 3 Open the AC cabinet door, check and ensure that the AC circuit breakers QF1 of all inverter units are all in the open state.

Step 4 Turn off the maintenance switch QS2 of all inverter units, the maintenance switch QS3 at the bottom of the inverter unit, and the QS4 switch inside the power distribution cabinet.

Step 5 Open the DC cabinet door, turn off the DC load switch QS1 inside all inverter units.

Step 6 Turn off the load switch of the transformer.

Step 7 Turn off the output switch of the upstream PVS.

For the position of the above switches, please see "3.3.2 Internal Structure of Inverter Unit" and "3.3.4 Main Parts of Power Distribution Cabinet".

- - End

7.5.2 Unplanned (Emergency) Powering Down

Step 1 Press the emergency button.

DANGER

Upon pressing the emergency stop button, only the AC circuit breaker and DC load switch will open. The internal auxiliary power supply and PCB board will still carry voltage. Do not touch them!

Step 2 Rotate the **START/STOP** knob to the **STOP** position.

Step 3 Open the AC cabinet door, check and ensure that the AC circuit breakers QF1 of all inverter units are all in the open state.

Step 4 Turn off the maintenance switch QS2 of all inverter units, the maintenance switch QS3 at the bottom of the inverter unit, and the QS4 switch inside the power distribution cabinet.

Step 5 Check and ensure that the DC side load switches QS1 of all inverter units are turned off.

Step 6 Turn off the load switch of the transformer.

Step 7 Turn off the output switch of the upstream PVS.

For the position of the above switches, please see "3.3.2 Internal Structure of Inverter Unit" and "3.3.4 Main Parts of Power Distribution Cabinet".

- - End

8 O&M on WEB

It is recommended to perform O&M on the WEB interface after the device is powered on.

8.1 Communications Diagram

The wiring between the internal devices of the MV grid-connected inverter has been completed before delivery. Connect the PC with the switch inside the power distribution cabinet with the CAT-5e cable on site. After that, the WEB interface can be accessed on a PC.

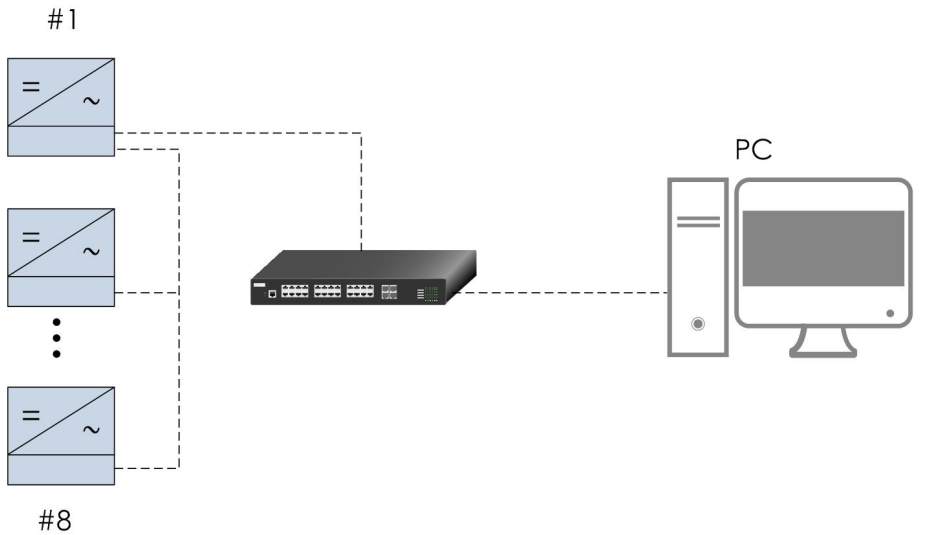


figure 8-1 Wired Communication Diagram

A wireless communication module is embedded inside the inverter, and the WEB interface can also be accessed through mobile devices such as mobile phones.

Note: Ensure that the distance d between the front of the #1 inverter and the mobile device meets the requirements:

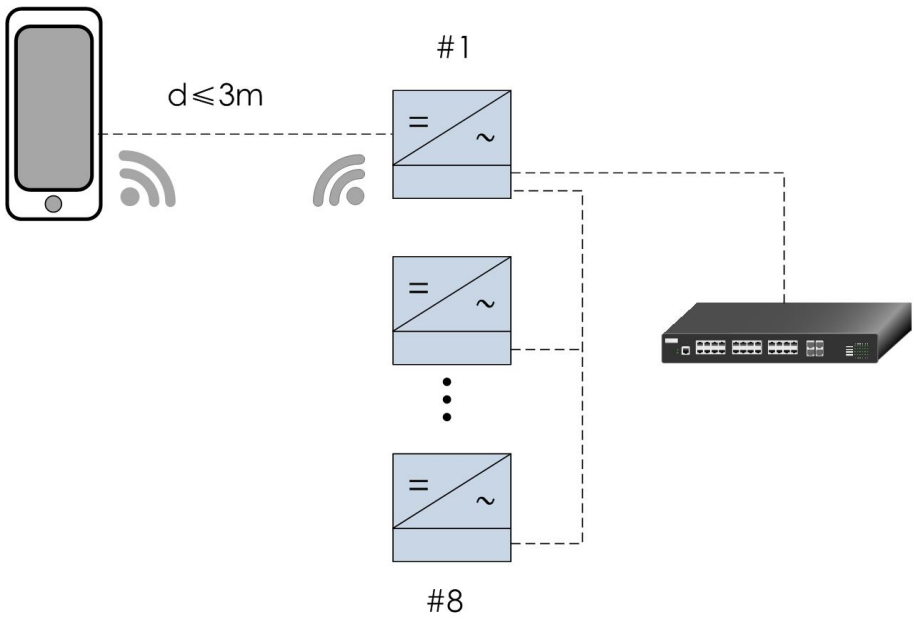


figure 8-2 Wireless Communication Diagram

8.2 Preparation Before Login

8.2.1 Login (PC)

Step 1 To connect the PC to the product, connect the network cable to the network port of the PMD switch.

Step 2 Configure the IP address of the PC. Set the IP address of the PC to the same network segment as the NET1 address of the smart unit board.

Default IP address of the NET1 port: 12.12.12.12.

Default IP address of the NET2 port: 14.14.14.14.

- - End

8.2.2 Login (Mobile Device)

Step 1 Enable WiFi on the mobile device (such as a mobile phone), search for the hotspot, such as SG-xxx (xxx represents the device SN), and enter the password. The password is **ESPWifi@123**.

Step 2 Open a browser on the mobile phone and enter the address (11.11.11.1) or domain (sungrow.net) to access the WEB interface.

- - End

8.3 Login Steps

Step 1 Enter the server address to enter the homepage as a visitor by default.

PC:

- NET1 port, URL: 12.12.12.12.
- NET2 port, URL: 14.14.14.14.

Mobile device:

URL:11.11.11.1.

Step 2 Click and select the desired language in the upper right corner of the interface.

Step 3 Click to enter the login interface.

Step 4 Enter the password and click **Login** to enter the interface as a general user.

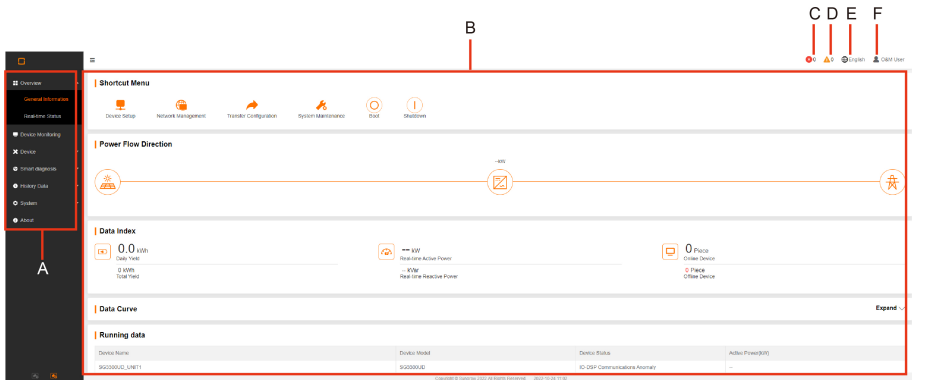
PC password: pw8888.

After the initial login, please change the password in a timely manner to avoid pop-up modify password prompts.

- - End

8.4 Interface Introduction

8.4.1 Homepage



No.	Description
A	Navigation bar
B	Function display area
C	Fault number
D	Alarm number

No.	Description
E	Language switching options
F	User center

8.4.2 Viewing Fault Information

Step 1 Click **"Overview"** → **"General Information"** on the left navigation bar to enter the homepage.

Step 2 Click  in the upper-right corner of the interface to view information such as the name and time of the fault event.

- - End

8.4.3 Viewing Alarm Information

Step 1 Click **"Overview"** → **"General Information"** on the left navigation bar to enter the homepage.

Step 2 Click  in the upper-right corner of the interface to view information such as the name and time of the fault event.

- - End

8.4.4 Boot/Shutdown

Step 1 Click **"Overview"** → **"General Information"** on the left navigation bar to enter the homepage.

Step 2 Click **Boot** or **Shutdown** in the **Shortcut Menu**. Taking SG8800UD as an example.

- If an inverter unit needs to be started, e.g., Unit 1, check **SG8800UD_Unit1** and click **Save** to turn on the unit. If the whole inverter needs to be started, check the inverter model, e.g., **SG8800UD** and click **Save** to turn on the inverter.
- If an inverter unit needs to be shut down, e.g., Unit 1, check **SG8800UD_Unit1** and click **Save** to shut down the unit. If the whole inverter needs to be shut down, check the inverter model, e.g., **SG8800UD** and click **Save** to shut down the inverter.

- - End

8.4.5 Setting Initial Parameters

Step 1 Click **"Device Monitoring"** in the left navigation bar.

Step 2 Pull down **"Country /Region"** to set according to the product location, and pull down **"Machine Choose"** to set according to the actual product model. Click **"Settings"** to complete the initial parameter setting.

The above parameters have been configured before the product leaves the factory.

- - End

8.4.6 Setting Operation Parameters

Step 1 Click **"Device Monitoring"** in the left navigation bar.

Step 2 Select a device in the left device list in the function display area. Click **"Operation Parameters"** on the right. enter a value in **"Current Value"**, and then click **"Settings"**

> Click **"Configure Synchronization"**to synchronize the settings to other devices of the same type.

- - End

8.4.7 Setting System Parameters

Step 1 Click **"Device Monitoring"** in the left navigation bar.

Step 2 Select a device in the left device list in the function display area. Click **"System Parameters"** on the right. enter a value in **"Current Value"**, and then click **"Settings"**

> Click **"Configure Synchronization"**to synchronize the settings to other devices of the same type.

- - End

8.4.8 Setting Protection Parameters

Step 1 Click **"Monitoring"** in the left navigation bar.

Step 2 Select a device in the left device list in the function display area. Click **"Protection Parameters"** on the right. enter a value in **"Current Value"**, and then click **"Settings"**

> Click **"Configure Synchronization"**to synchronize the settings to other devices of the same type

- - End

8.5 Modifying Password

PC

Click in the upper-right corner of the interface, select **Modify Password**, enter the original password and new password, and click **Save**.

Mobile Device

Through the PC interface, select **System** → **WLAN** → **Password**, delete the original password, and enter the new password, click **Save** to complete the password modification.

> The password should be a combination of 6 to 32 letters and digits.
>
> Reconnect and log in after password change.

8.6 Logout

To protect the account security, it is recommended to log out in time after the operation is completed.

Exit Method

Click and select **Logout** in the upper right corner of any interface.

9 Troubleshooting

If the inverter fails to output as expected or the power yield changes abnormally, check the following items before consulting SUNGROW:

- The open-circuit voltage of PV arrays
- Whether the emergency stop button is pressed
- Whether the inverter limits the output of active power

If the problem still persists or there are any other questions, please contact SUNGROW. It would be helpful if the following information is provided during a call:

- Model and S/N of the inverter and internal equipment
- Manufacturer and model of the upstream PVS and PV modules that connected to the inverter
- Communication and connection scheme of the inverter
- Fault information and a brief description of the fault
- Pictures of the fault occurrence site (if on-site conditions permit)

9.1 Inverter Troubleshooting

9.1.1 Viewing Fault/Alarm Information

View the fault and alarm information referring to "8.4.2 Viewing Fault Information" and "8.4.3 Viewing Alarm Information".

9.1.2 Check Method

There are three levels of anomalies:

- Important fault: The inverter fails, shuts down, and stops grid-connected power generation.
- Secondary fault: Some parts of the inverter fail, but the inverter can still generate power in a grid-connected state.
- Prompt for fault: The inverter works normally, but its output power decreases due to external factors.

Fault Name	Fault Cause	Fault Level	Corrective Method
Module fault	The drive board generates a fault signal or a hardware over-current occurs.	Important	1. Check whether a short circuit occurs on the AC or DC sides of the inverter. 2. Check the grid for any exceptions. 3. Check whether the appearance of the internal module is normal.
Contactor fault	The contactor is faulty.	Important	Disconnect the AC and DC side switches of the inverter, and check whether the appearance of the AC contactor is obviously abnormal after the inverter is completely discharged.
AC current imbalance fault	AC current is unbalanced.	Important	Check the grid for anomalies. Check if there is a phase loss.
Reactor overtemperature	The temperature of the reactor is excessively high.	Important	1. Use a thermometer to check whether the current ambient temperature is within the temperature range advertised by the inverter. 2. Check whether the air inlet of the inverter and the inverter unit is normal. Make sure that the air inlet is not blocked, and replace the filter screen if necessary. 3. In the shutdown state, check whether the internal cooling fan of the inverter is stopped by foreign objects.

Fault Name	Fault Cause	Fault Level	Corrective Method
Control cabinet temperature fault	The temperature inside the control cabinet is excessively high	Important	1. Check whether the grid voltage is normal. 2. Check whether the control fan is normal. 3. Check the AC filter system. Check whether there are abnormalities on the surface of the AC filter capacitor, such as cracking. If necessary, check whether the three-phase current of the capacitor is balanced.
DC under-voltage	DC input voltage is excessively low.	Important	1. In the shutdown state, check whether the DC voltage displayed on the inverter is consistent with the measured value. 2. If not, check whether the DC side cables are shorted or wrongly connected.
DC (Bus) under-voltage	DC bus voltage is excessively low.	Important	Please refer to the troubleshooting method of “DC under-voltage”.
Neutral point shift	Voltage exists between the positive and negative poles of the DC side of the inverter and the neutral point potential.	Important	1. Check whether the DC side voltage of the inverter is short-circuited, whether the input voltage exceeds the allowable range, and whether the grid voltage is abnormal. 2. Check whether DC over-voltage, DC under-voltage, module fault, AC over-current, and other faults exist at the same time in the historical fault interface. If so, refer to the troubleshooting methods of related faults.

Fault Name	Fault Cause	Fault Level	Corrective Method
Abnormal temperature	If the temperature at the inverter inlet exceeds the protection threshold, this fault is triggered.	Important	1. Check whether the ambient temperature is normal; Use a thermometer to check whether the current ambient temperature is within the temperature range advertised by the inverter. 2. Check whether the air inlet of the inverter and the inverter unit is normal; Make sure that the air inlet is not blocked, and replace the filter screen if necessary. 3. In the shutdown state, check whether the cooling fan inside the inverter/inverter unit is stopped by foreign objects.
DC cabinet over-temperature	The temperature inside the DC cabinet is excessively high	Important	Refer to the troubleshooting method of “Abnormal Temperature”.
Grid over-voltage	The grid voltage is higher than the set protection value.	Important	1 Check whether the protection parameters in **Parameter Settings** -> **Protection Parameters** meet the grid standards of the location where the inverter is installed. 2 Disconnect the AC switch and measure whether the actual grid voltage is within the normal range. 3 In the shutdown state, check whether the grid voltage displayed on the inverter is consistent with the measured value.
Grid under-voltage	The grid voltage is lower than the set protection value.	Important	Refer to the troubleshooting method of "Grid over-voltage”.

Fault Name	Fault Cause	Fault Level	Corrective Method
Frequency fault	The grid frequency is abnormal.	Important	1 Check whether the protection parameters on the interface meet the grid standards of the location where the inverter is installed. 2 In the shutdown state, check whether the grid frequency displayed on the inverter is consistent with the actual value.
Islanding protection	The power grid fails or the AC instantaneous voltage exceeds the protection threshold.	Important	1. Check the grid for any exceptions. 2. Check whether a short circuit occurs on the AC side of the inverter. 3. Check whether the AC circuit breaker of the inverters is disconnected.
Control power exception	The control power is abnormal.	Important	1 Check whether the internal and external power supply control switches of the inverter are closed or disconnected at the same time. If they are closed at the same time, please disconnect one of the switches. If they are disconnected at the same time, please close one of the switches. 2 Check whether the internal and external power supply terminals are loose or poorly contacted. Tighten them if necessary.
DC voltage sampling fault	The DC voltage sampling is abnormal.	Important	In the shutdown state, check whether the DC voltage displayed on the inverter is consistent with the measured value.

Fault Name	Fault Cause	Fault Level	Corrective Method
Soft start fault	The inverter fails to start.	Important	Check whether the power grid is abnormal, such as harmonics and voltage balance.
DC SPD fault	The DC side SPD of the inverter fails.	Important	Check the status indicator of the SPD. 1. If the indicator changes from green to red, the SPD is damaged. It may be caused by local thunderstorms. Measure the AC and DC voltage and current. If voltages between the positive and negative poles to the ground are normal, replace the SPD. 2. If the indicator is normal, the SPD may be in poor contact with its holder. Replug the SPD and tighten it.
AC SPD fault	The AC side SPD of the inverter fails.	Important	1. Refer to the troubleshooting method of "DC SPD fault" to conduct preliminary troubleshooting. 2. Check whether the miniature circuit breaker is connected in series with the SPD trips. 3. If not, measure the AC and DC voltage and current. Ensure that there is no exception, and close the miniature circuit breaker again.

Fault Name	Fault Cause	Fault Level	Corrective Method
DC over-voltage	The DC side voltage of the inverter exceeds the protection threshold.	Important	Disconnect the DC switch of the inverter and check whether the open-circuit voltage of the PV arrays is normal; If not, the PV array configuration may be faulty. 2. Check and ensure that the AC side transformer is connected in a “Y” shape, and that the neutral point is not grounded. 3. In the shutdown state, check whether the DC voltage displayed on the inverter is consistent with the measured value.
PV polarity reversal	The polarity of the positive and negative poles of the PV strings is reversed.	Important	Check whether the DC side cables of the inverter are connected reversely.
Hardware fault	Inverter internal hardware fault	Important	Measure the DC voltage of the inverter and check whether a short circuit occurs in the inverter.
AC over-current	AC side current of the inverter is excessively high.	Important	1. Check whether cables on the AC and DC sides of the inverter are loose. 2. Check whether the insulation layer of cables is damaged. 3. Check whether terminals are short-circuited and grounded.
Overload protection	The output of the inverter exceeds the load limit.	Important	Refer to the troubleshooting method of "AC over-current”.
AC leakage current protection	The leakage current sampling value on the AC side of the inverter exceeds the protection threshold.	Important	1. Check whether the AC cable is damaged. 2. If the LV side of the transformer is connected in a “Y” shape, ensure that the neutral point is not connected.

Fault Name	Fault Cause	Fault Level	Corrective Method
Module over-temperature	The temperature of modules inside the inverter is excessively high.	Important	1. Check the air inlet. 2. Check whether the air outlet of the inverter is blocked. Replace the air filter screen if necessary. 3. Check whether the cooling fan is running during the operation of the inverter.
Fan/ Fan 2 exception	Fan/fan 2 inside the inverter fails.	Important	1. Check whether the grid voltage is normal. Use a multimeter to measure the grid voltage and check for phase loss. 2. Check whether the power supply of the cooling fan is normal. Use a multimeter to measure the three-phase power supply to ensure that the rated input voltage is 400 Vac.
Grounding fault	A grounding fault occurs.	Important	1 Check the DC cables. Check whether the positive grounding cable of each DC branch is damaged. Check whether the DC cable resistance to the ground is normal. 2 Check AC cables. Measure the three-phase voltage to ground and observe whether the voltage value is the same. Check the inverter and the box-type substation side SPD for damage.

Fault Name	Fault Cause	Fault Level	Corrective Method
AC switch fault	AC switch fails.	Important	1. Check whether the AC switch trips. 2. Check whether the appearance of the switch is normal. 3. Check whether the AC switch can be normally closed/disconnected. 4. Use a multimeter to measure whether the AC switch normally controls the on/off of the circuit.
Heat sink over-temperature	The temperature of the heat sink inside the inverter is excessively high.	Important	Check whether the cooling fan is normal. If so, check the air duct for blockage.
GFDI-pro	The DC grounding protection fails.	Important	1. The negative terminal of the inverter is not reliably grounded. 2. Check whether the negative grounding fuse is blown.
AC fuse fault	The fuse on the AC side of the inverter fails.	Important	Check whether the AC fuse is normal.
Grid voltage imbalance	Grid voltage is unbalanced.	Important	Measure the grid voltage and check for any imbalance.
Current Imbalance 2/Current Imbalance 3	The alternating current is unbalanced.	Important	Measure the grid voltage and check for phase loss.
AC cabinet over-temperature	The temperature of the AC cabinet exceeds the protection threshold.	Important	1. Check whether the fans inside the AC cabinet work normally. 2. Check whether the air inlet of the AC cabinet is blocked. 3. Check whether there is dust in the air inlet of the AC cabinet. Clean it if necessary.
DC fuse anomaly	The fuse on the DC side of the inverter fails.	Secondary	Check whether the DC fuse is blown. If so, please contact SUNGROW to replace the fuse.

Fault Name	Fault Cause	Fault Level	Corrective Method
Anti-PID power abnormality	The anti-PID power is abnormal.	Secondary	1. Check the insulation of AC cables. 2. Check the AC SPD. 3. Check and make sure that the neutral point on the LV side of the box-type substation is not grounded.
External power supply abnormal	The external power supply is abnormal.	Secondary	Use a multimeter to measure and check whether the voltage of the external power supply is abnormal.
Branch air switch abnormal	The air switch of the DC branch of the inverter is abnormal.	Secondary	Check whether the branch air switches are all closed, and check whether the state of them is **Closed** on the interface.
CT imbalance	The three-phase grid current is out of balance.	Secondary	Check whether the three-phase AC current is balanced on the interface.
Grounding fuse anomaly	The grounding fuse is abnormal.	Secondary	Remove the negative grounding fuse after the inverter is fully discharged. Check whether this fuse is blown. If so, check whether the neutral point of the transformer is not connected and whether the neutral point of PT/CT on the LV side of the box-type substation is grounded.
Meter communication abnormal alarm	The meter communication is abnormal.	Secondary	1. Check whether the communication cable of the meter is damaged. 2. Check the communication terminal of the meter is loose.
DC fuse fault	The fuse on the DC side of the inverter fails.	Secondary	Check whether the DC fuse is blown. If so, please contact SUNGROW to replace the fuse.

Fault Name	Fault Cause	Fault Level	Corrective Method
Branch fuse abnormal	The branch fuse of the inverter is abnormal.	Secondary	Please refer to the troubleshooting method of “DC fuse fault”.
Low insulation resistance	The insulation resistance is low.	Secondary	Please refer to the troubleshooting method of “Insulation resistance”.
DC switch anomaly	The DC switch of the inverter is abnormal.	Secondary	Check whether the branch air switches are all closed, and check whether the state of them is **Closed** on the interface.
Frequency deviation active power regulation	The active power of the inverter is regulated according to the change of the grid frequency.	Prompt	Check whether the power reduction at over-frequency is enabled on the interface. If so, it indicates that over-frequency occurs during operation.
Voltage deviation reactive power regulation	The reactive power of the inverter is regulated according to the change of the grid voltage.	Prompt	Check whether the reactive power regulation is set to **QU Mode** on the interface.
GFRT operation	The inverter runs through high voltage and low voltage.	Prompt	Check whether the grid voltage exceeds the set threshold of HVRT or LVRT.

If the fault/alarm cannot be cleared following the above corrective methods and still persists, please contact SUNGROW directly.

Fault Name	Fault Cause	Fault Level	Corrective Method
AC switch off	The AC switch is disconnected.	Important	Please contact SUNGROW.
Carrier sync flt	The carrier signal transmission is abnormal.	Important	Please contact SUNGROW.
Drive board fault	The drive board inside the inverter fails.	Important	Please contact SUNGROW.
Parallel machine communication failure	The communication inside the inverter is abnormal.	Important	Please contact SUNGROW.

Fault Name	Fault Cause	Fault Level	Corrective Method
Machine code repetition fault	The addresses of the inverter units inside the inverter are the same.	Important	Please contact SUNGROW.
Temperature and humidity board communication abnormal	The communication of the temperature and humidity board is abnormal.	Secondary	Please contact SUNGROW.
Branch reverse over-current	The branch reverse current is excessively large.	Secondary	Please contact SUNGROW.
DSP communication exception	The communication between inverter internal control board and smart unit board is abnormal.	Secondary	Please contact SUNGROW.

9.2 Other Faults

Fault Detail	Possible Cause	Corrective Method
The inverter shuts down shortly after startup	The DC input voltage is just enough to start the inverter. If the inverter is connected to loads, and the voltage cannot meet the requirements, causing the inverter to shut down.	Design and connect the battery panel series based on the recommended open-circuit voltage, increase the DC voltage input, and avoid applying the critical voltage value.
Upper computer communication failure	There are many possible reasons, please check one by one according to the description of "Corrective Method".	Check whether the local address, baud rate, and other parameters on the interface are consistent with those on the host computer. Check whether all wiring is good. If RS485 communication is adopted, check whether the A and B terminals are connected reversely. Replace the communication adapter and try again if the communication adapter does not match. If the fault is not caused by the foregoing reasons and still persists, please contact SUNGROW as soon as possible.
WiFi connection unresponsive/failed	Equipment is not compatible.	1. Refresh the Web page manually. 2. Restart or replace the mobile device and try connecting again. 3. Power off and restart the inverter to connect again.

Fault Detail	Possible Cause	Corrective Method
Failed is displayed on the operation or protection parameter setting interfaces	There are many possible reasons, please check one by one according to the description of "Corrective Method".	1. Check whether an inverter unit cannot work normally. 2. Check whether the inverter unit that works normally can normally accept instructions. 3. Please refer to the troubleshooting method of “DSP communication fault”. If the fault is not caused by the foregoing reasons and still persists, please contact SUNGROW as soon as possible.
Fail to export measuring point logs in batches	The amount of data exported at a single time is too large.	1. Export data in batches multiple times. 2. The time interval for exporting data shall not exceed 7 days.

10 Routine Maintenance

10.1 Safety Instructions

DANGER

Risk of inverter damage or personal injury due to incorrect service!

- **Disconnect the switches between the product and all power supplies before maintenance.**
- **After the inverter is powered off for 20 minutes, measure the voltage and current with measuring equipment. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter.**

DANGER

The devices inside the inverter carry high voltage. Touching these devices may lead to fatal electric shock.

Therefore,

- **Live line measurement can only be performed by professional personnel who know the PV system well. Before measurement, be sure to take proper protection methods (e.g., wear insulating gloves, etc.).**
- **During live line measurement, the operator must be accompanied by others to ensure personal safety.**

DANGER

Electric shock or fire may occur due to device damage or system fault.

- **Visually inspect for device damages or other hazards before the operation**
- **Check whether other external devices or circuit connections are in a safe state.**
- **Make sure the device is in a safe state before operating.**

⚠ WARNING

If some devices need to be replaced during operation and maintenance, please contact SUNGROW.

Do not open the door to maintain the product on rainy, humid, or windy days. SUNGROW shall not be held liable for any damage caused by a violation of the notice.

For products with long downtime, a comprehensive and detailed inspection of the products must be carried out before powering up the product. First, the product and internal equipment as well as the film at the air inlet and outlet need to be checked for intactness. Then the product should be checked and tested by professionals before commissioning.

⚠ WARNING

Do not open the door to maintain the product on rainy, humid, or windy days. SUNGROW shall not be held liable for any damage caused by a violation of the notice.

⚠ WARNING

Wait for at least 20 minutes after shutdown and then open the cabinet door. Make sure that the inside of the product is completely uncharged before maintaining the product.

NOTICE

Do not leave screws, washers, or other metal parts in the inverter after the maintenance work. Otherwise, damage may be caused to the product!

NOTICE

To avoid the risk of electric shock, do not perform any other maintenance operations beyond those described in this manual. If necessary, contact SUNGROW for maintenance. Otherwise, the losses caused are not covered by the warranty.

⚠ CAUTION

To prevent misuse or accidents caused by unrelated personnel, post prominent warning signs or demarcate safety warning areas around the device to prevent accidents caused by misuse.

10.2 Maintenance Period

10.2.1 Maintenance (Once Every Three Years)

Item	Check method
Monitoring and protective equipment of the transformer	• Oil thermometer: Alarm temperature and tripping temperature. • Pressure relief valve: Check whether the pressure relief valve is in good contact. • Oil level: Check whether the oil level is at a normal range. • Pressure gauge: Check if the pressure gauge is normal.
Transformer oil leakage	Check these components for oil leakage: • De-energized tap-changer • Pressure gauge • Oil level gauge • Oil temperature gauge • Sleeve • Pressure relief valve and sample oil • Sealing part

10.2.2 Maintenance (Every two years)

Item	Check method
System status and cleaning	Check the following items, and correct immediately those failing to meet the relevant requirements: • Check whether there is any damage or deformation of the inverter and internal equipment. • Check if there is abnormal noise during the operation of internal equipment. • Check whether the temperature inside the inverter is excessively high. • Check whether the humidity and the amount of dust inside the inverter are within the normal range. Clean it if necessary. • Check whether the air inlet and outlet of the inverter are blocked.
Warning marks	Check whether the warning labels and marks are clearly visible and free of stains and damage. Replace them if necessary.
Ground of the shielded layer of cables	Check whether the cable shielding layer is in good contact with the insulation sleeve and whether the copper bus bar is firmly fixed.
Wiring between the terminal box and switch *	Check whether the terminal box and the switch are connected correctly.
SPD and fuse	Check whether the SPD and fuse are properly fastened.
Corrosion	Check whether there is oxidation or rust inside the inverter.

Note: * means optional.

10.2.3 Maintenance (Once A Year)

Item	Check method
Exterior of the inverter	Check the following items, and correct immediately those failing to meet relevant requirements: • Check whether there are flammable objects on the top of the inverter. • Check whether the welding points between the inverter and foundation steel plate are firm and if there is corrosion. • Check whether the enclosure of the inverter is damaged, painted, or oxidized. • Check whether the monitoring window and cabinet door can be opened flexibly. • Check whether the sealing strip is fixed properly.
Interior of the inverter	Check whether there are foreign objects, dust, dirt, and condensed water inside the inverter.
Wiring and cable layout	Start to inspect after completely powering down the internal devices of the inverter. For any non-conformances found during the inspection, correct them immediately. • Check whether the cable layout is normal and whether there is a short circuit. For any non-conformances found during the inspection, correct them immediately. • Check whether all inlet and outlet holes of the inverter are well sealed. • Check whether water leaks into the inverter. • Check whether the power cables are loose, and fasten them again by the torque specified previously. • Check whether the power cables and control cables are damaged, especially the part in contact with the metal enclosure. • Check whether the insulation tapes on the power cable terminals fell off.
Ground connection and equipotential connection	• Check whether the ground connection is correct and the grounding resistance shall be no more than 4 Ω. • Check whether the internal equipotential connection is correct.
Fan	• Check the running status of fans. • Check whether the fan blade rotates smoothly. • Check whether there is abnormal noise during the operation of the fans.

Item	Check method
Screw	Check whether internal screws fell off.
Exterior of the inverter	Check the following items, and correct immediately those failing to meet relevant requirements: • Check whether there are flammable objects on the top of the inverter. • Check whether the welding points between the inverter and foundation steel plate are firm and if there is corrosion. • Check whether the enclosure of the inverter is damaged, painted, or oxidized. • Check whether the monitoring window and cabinet door can be opened flexibly. • Check whether the sealing strip is fixed properly.
Interior of the transformer	Sample the internal oil at the oil leakage port to analyze the operation status of the transformer.

10.2.4 Maintenance (Every half a year to once a year)

Item	Check method
Safety function	• Check whether the shutdown key on the touchscreen and the e-stop button work normally. • Simulate shutdown. • Check the warning marks and other device marks, and replace them timely if they are fuzzy or damaged.
Software maintenance	Check the settable parameters on the touchscreen.
Internal components inspection	• Check whether the circuit board and other components are clean. • Check the temperature of the heat sink and the amount of dust accumulated. Clean heat-dissipation modules with a vacuum cleaner if necessary. • Replace the air filter screen if necessary. Note! Be sure to check the ventilation of the air inlet. Otherwise, the fault may be caused due to overheating if the module cannot be cooled effectively.

Item	Check method
Air inlet and outlet	Check the temperature of the heat sink and the amount of dust accumulated. Clean heat-dissipation modules with a vacuum cleaner if necessary.
Device maintenance	• Carry out regular inspection for corrosion of all metal components. • Check the contactor to ensure a normal mechanical operation. • Check the operation parameters (especially voltage and insulation).

The recommended routine maintenance periods in the table are only for reference. The actual maintenance period shall be determined reasonably in consideration of the specific installation environment of the product.

Power plant scale, location, site environment, and other factors also affect the maintenance period of the product. It is necessary to shorten the maintenance period and increase the maintenance frequency in the event of a heavy sandstorm or dust in the operating environment.

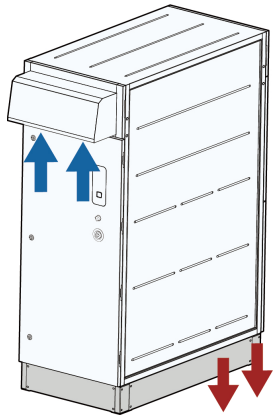
10.3 Common Maintenance Items

It is recommended to clean the inverter once every six months. If the inverter works in harsh environments, such as desert areas, the maintenance cycle should be shortened.

10.3.1 Cleaning Air Inlet of Inverter

Overview

The following figure shows the heat dissipation mode of the inverter. The air inlet is located at the higher parts of the DC cabinet while the air outlet is located at the lower parts of the AC cabinet.

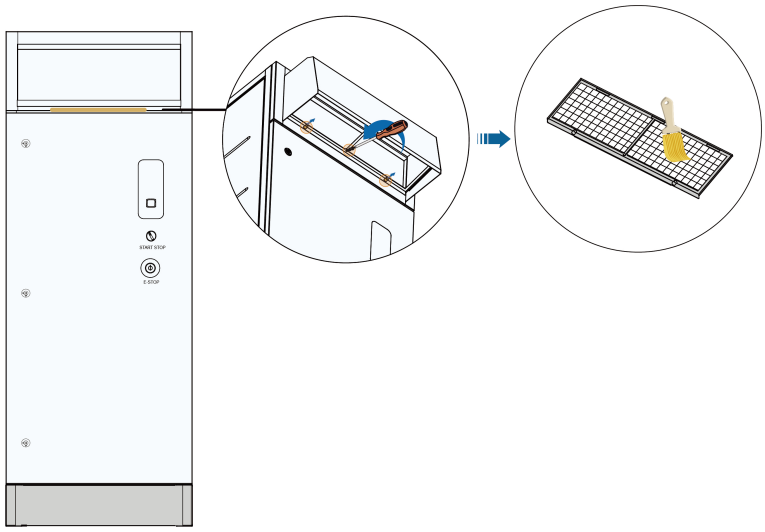


Procedure

Step 1 Use a screwdriver to remove the M5 fixing screws for the first maintenance.

Step 2 Pull the spring plunger at both ends of the filter at the air inlet outward and tilt the filter downward to remove it.

Step 3 Clean and install the filter.



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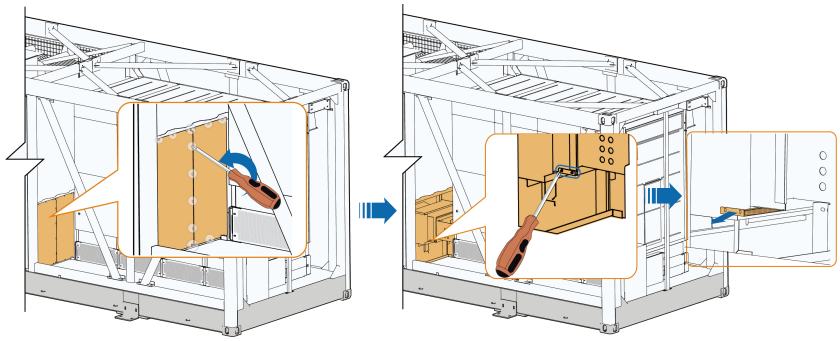
10.3.2 Cleaning Air Outlet of Inverter

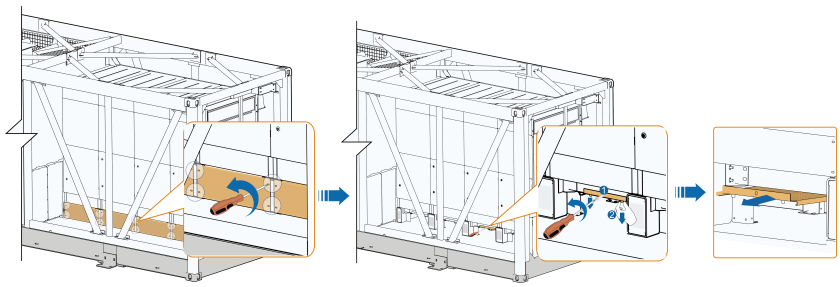
Overview

There are multiple air outlets in this product, which are located between the inverter and the transformer and at the bottom of the AC side of each inverter, as shown in the following figures.

Step 1 Clean the air outlet between the inverter and transformer.



Step 2 Clean the air outlets at the bottom of the AC side of the inverters.



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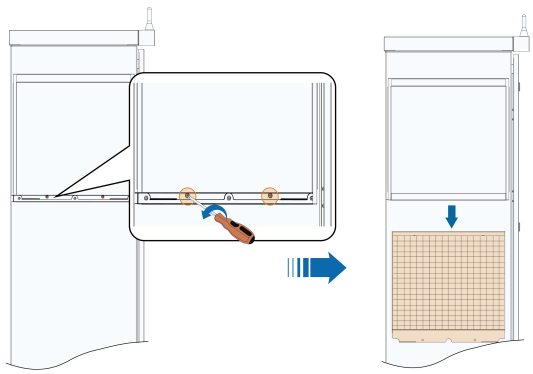
10.3.3 Cleaning Air Inlet of Power Distribution Cabinet

Step 1 Remove the screws from the upper air inlet of the power distribution cabinet using a screwdriver.

Step 2 Move the filter cotton at the air inlet downward, take out the filter cotton and clean it.

Step 3 Reinstall the filter cotton in reverse steps.



* The figure is for reference only. And the actual product received shall prevail.

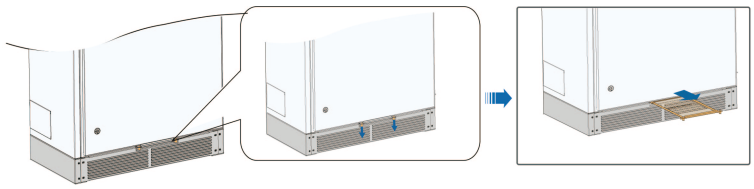
- - End

10.3.4 Cleaning Air Outlet of Power Distribution Cabinet

Step 1 Pull downward the spring plunger on the air outlet at the bottom of the power distribution cabinet.

Step 2 Pull out the filter at the air outlet and clean it.

Step 3 Reinstall the filter in reverse steps.



* The figure is for reference only. And the actual product received shall prevail.

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10.3.5 Appearance Repair

Check the appearance of the Smart Switchgear. If there is any damage to the appearance, please repair it in a timely manner.

Check the appearance of the product:

Case 1: Erasable traces

Case 2: Indelible traces

Case 3: Broken primer

Check whether the protective paint sprayed on the casing of the product fell off or peeled off. If so, repair it timely.

10.3.5.1 Erasable Traces

Tools

No.	Name	Source
1	Cleaning cloth	Beyond the scope of supply
2	Water	
3	Alcohol or other non-corrosive detergents	

Step 1 Wet the cleaning cloth (or other scrubbing tools) with water, and scrub the dirty parts on the surface.

Step 2 If the dirt cannot be cleaned with water, scrub with 97% alcohol till the surface is acceptable. (Or try to use non-corrosive detergents that are generally used locally)

- - End

10.3.5.2 Indelible Traces

Tools

No.	Name	Source
1	Abrasive paper	Beyond the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	
5	Brush	
6	RAL7035 oil paint	

Step 1 Polish the paint surface with blistering or scratches with abrasive paper for a smooth surface.

Step 2 Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains.

Step 3 Perform paint repair for the scratched parts with a soft brush after the surface is dried; brush the paint as uniform as possible.

- - End

10.3.5.3 Broken Primer

Tools

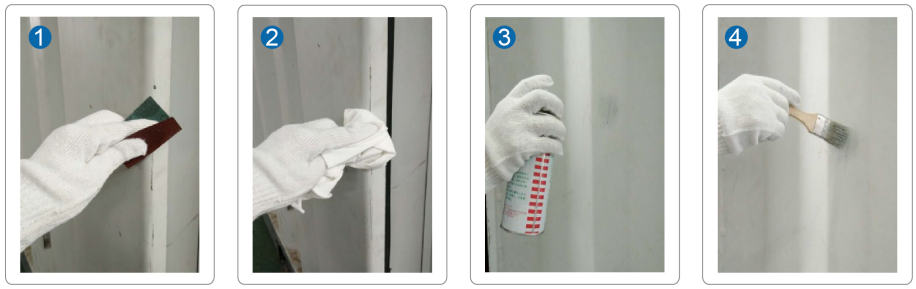
No.	Name	Source
1	Abrasive paper	Beyond the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	
5	Zinc primer	
6	Brush	
7	RAL7035 oil paint	

Step 1 Polish the damaged parts with abrasive paper to remove rust and other burrs for a smooth surface.

Step 2 Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains and dust.

Step 3 Spray the parts with base material exposed with zinc primer for protection after drying the surface. Ensure to spray to cover the bare base material completely.

Step 4 Perform paint repair for the damaged parts with a soft brush after the primer is dried, and brush the paint uniformly.



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10.3.6 Checking Door Locks and Hinges

Check if the door locks and hinges of the inverter can be used normally after cleaning. Lubricate the door lock holes and hinges properly if necessary.

10.3.7 Checking Sealing Strips

If the sealing strip is in good condition, it can effectively prevent water seepage inside the product. Therefore, carefully check the sealing strip and replace it immediately if there is any damage.

10.4 Replacing Fuse

Before replacing the fuse, ensure that the product is de-energized.

10.4.1 Replacing DC Side Fuse

Step 1 Power off the product according to the normal shutdown steps, refer to"7.5.1 Planned Powering Down".

DANGER

Make sure the PVS is disconnected from the inverter unit.

Step 2 Wait for 20 minutes for the internal capacitors to be completely discharged.

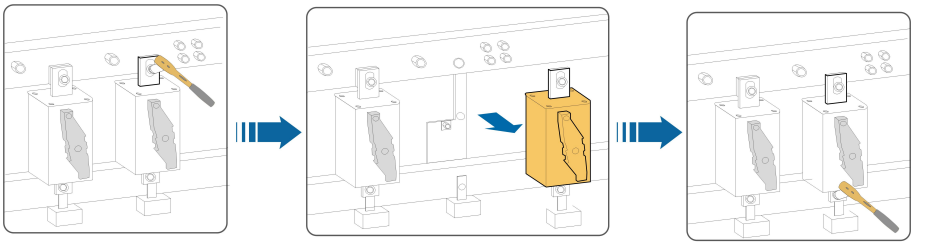
Step 3 Unlock the DC cabinet door and remove the protective cover on the DC fuse.

Step 4 Use a multimeter with a range of 1500 Vdc to measure the DC side voltage of the inverter. Check and ensure that the positive voltage, negative voltage, positive to ground voltage, and negative to ground voltage are all zero.

Step 5 Use a multimeter to measure each DC input voltage and ensure that the terminals are uncharged before performing the next operation.

Step 6 Identify the faulty fuse,use a socket wrench to unscrew the fastening bolt of the fuse to be replaced,and remove the faulty fuse.

Step 7 Secure the new fuse with M10×30 * bolts with a tightening torque of 34 - 40 N.m.



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* When the DC input of the inverter is equipped with MPLC, the bolts specifications used are M8×30 and M10×30.

10.4.2 Replacing Fuse Inside Power Distribution Cabinet

As for the replacement of the fuse inside the distribution cabinet, please refer to the "3.3.4 Main Parts of Power Distribution Cabinet" and "7.2.3 Installing Fuse in AC SPD" .

10.5 Replacing Fans

Overview

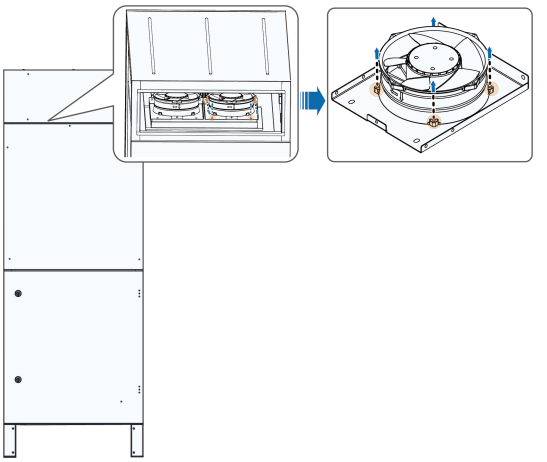
This section describes how to replace fans with an example of replacing the fan at the top right end of the AC side of the inverter as an example.

Procedure

Step 1 Remove the bolts from the top door on the AC cabinet and open the cabinet door.

Step 2 Remove the M5 bolts between the fan fixing plate and the bottom platform and take down the fan.

Step 3 Remove the four M5 bolts connecting the fan and the fixing plate, and remove the fan.



Step 4 Install a new fan in reverse steps.

- - End

11 Appendix

11.1 Technical Parameters

SG6600UD-MV/SG6600UD-MV-20

Model	SG6600UD-MV	SG6600UD-MV-20
Input (DC)		
Max. PV input voltage	1500 V	
Min. PV input voltage / Start-up input voltage	895 V / 905 V	938 V / 950 V
MPP voltage range	895 / 1500 V	938 V /1500 V
No. of independent MPP inputs	6	
No. of DC inputs	30 (optional: 36/42 inputs negative grounding)	
Max. PV input current	6 x 1435 A	
Max. DC short-circuit current	6 x 3528 A	
PV Array Configuration	Negative grounding or floating	
Output (AC)		
AC output power	6600 kVA @ 45 ℃, 6798 kVA @ 40 ℃, 7590 kVA @ 22.5 ℃	6600 kVA @ 51 ℃, 7920 kVA @ 23 ℃
Max. inverter output current	6 x 1160 A	6 x 1155 A
Max. AC output current	438.3 A	229 A
AC voltage range	10 kV – 35 kV	20 kV – 35 kV
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz	
Harmonic (THD)	< 3 % (at nominal power)	
Power Factor at Nominal Power / Adjustable Power Factor	> 0.99 / 0.8 leading - 0.8 lagging	
Feed-in phases / AC connection	3 / 3–PE	
Efficiency		
Inverter max. efficiency / Inverter European efficiency	99.0 % / 98.7 %	
Transformer		
Transformer rated power	6600 kVA	

Model	SG6600UD-MV	SG6600UD-MV-20
Transformer max. power	7590 kVA	7920 kVA
LV / MV voltage	0.63 kV / 0.63 kV / (10 – 35) kV	0.66 kV / 0.66 kV / (20 – 35) kV
Impedance	8 % (0 – ±10 %) @ 6600 kVA	
Transformer vector	Dy11y11	
Transformer cooling type	ONAN	
Oil type	Mineral oil (PCB free) or degradable oil on request	
Protection & Function		
DC Input Protection	Load break switch + fuse	
Inverter Output Protection	Circuit breaker	
AC MV Output Protection	Circuit breaker	
Overvoltage Protection	DC Type II / AC Type II	
Grid Monitoring / Ground Fault Monitoring	Yes / Yes	
Insulation Monitoring	Yes	
Overheat Protection	Yes	
Q at night function	Optional	
General Data		
Dimensions (WxHxD)*	12192 x 2896 x 2438 mm	
Weight *	≤27.5 T	
Degree of Protection	Inverter: IP65 / Others: IP54	
Auxiliary Power Supply	5 kVA (optional: max. 40 kVA)	
Operating Ambient Temperature Range	-35 to 60 ℃ (>45 ℃ derating)	-35 to 60 ℃ (> 51 ℃ derating)
Allowable Relative Humidity Range	0 - 100 %	
Cooling Method	Temperature controlled forced air cooling	
Max. Operating Altitude	1000 m (standard) / > 1000 m (optional)	
Display	LED Indicators, WLAN+WebHMI	
Communication	Standard: RS485, Ethernet; Optional: optical fiber; MPLC	
Grid Support	Q at night (Optional), L/HVRT, active & reactive power control and power ramp rate control	

*: Subject to actual delivery of products.

SG8800UD-MV/SG8800UD-MV-20

Model	SG8800UD-MV	SG8800UD-MV-20
Input (DC)		
Max. PV input voltage	1500 V	
Min. PV input voltage / Start-up input voltage	895 V / 905 V	938 V / 950 V
MPP voltage range	895 – 1500 V	938– 1500 V
No. of independent MPP inputs	8	
No. of DC inputs	40 (optional: 48/56 inputs negative grounding)	
Max. PV input current	8 x 1435 A	
Max. DC short-circuit current	8 x 3528 A	
PV Array Configuration	Negative grounding or floating	
Output (AC)		
AC output power	8800 kVA @ 45 ℃,9064 kVA @ 40 ℃, 10120 kVA @ 22.5 ℃	8800 kVA @ 51℃, 10560 kVA @ 23 ℃
Max. inverter output current	8 x 1160 A	8 x 1155 A
Max. AC output current	292.2 A	305 A
AC voltage range	20 kV – 35 kV	
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz	
Harmonic (THD)	< 3 % (at nominal power)	
Power Factor at Nominal Power / Adjustable Power Factor	> 0.99 / 0.8 leading - 0.8 lagging	
Feed-in phases / AC connection	3 / 3–PE	
Efficiency		
Inverter max. efficiency / Inverter European efficiency	99.0 % / 98.7 %	
Transformer		
Transformer rated power	8800 kVA	
Transformer max. power	10120 kVA	10560 kVA
LV / MV voltage	0.63 kV / 0.63 kV / (20 – 35) kV	0.66 kV / 0.66 kV / (20 – 35) kV
Impedance	9.5 % (0 – ±10 %) @ 8800 kVA	
Transformer vector	Dy11y11	
Transformer cooling type	ONAN	

Model	SG8800UD-MV	SG8800UD-MV-20
Oil type	Mineral oil (PCB free) or degradable oil on request	
Protection & Function		
DC Input Protection	Load break switch + fuse	
Inverter Output Protection	Circuit breaker	
AC MV Output Protection	Circuit breaker	
Overvoltage Protection	DC Type II / AC Type II	
Grid Monitoring / Ground Fault Monitoring	Yes / Yes	
Insulation Monitoring	Yes	
Overheat Protection	Yes	
Q at night function	Optional	
General Data		
Dimensions (WxHxD)*	12192 x 2896 x 2438 mm	
Weight *	31.5 T	33 T
Degree of Protection	Inverter: IP65 / Others: IP54	
Auxiliary Power Supply	5 kVA (optional: max. 40 kVA)	
Operating Ambient Temperature Range	-35 to 60 ℃ (>45 ℃ derating)	-35 to 60 ℃ (>51 ℃ derating)
Allowable Relative Humidity Range	0 - 100 %	
Cooling Method	Temperature controlled forced air cooling	
Max. Operating Altitude	1000 m (standard) / > 1000 m (optional)	
Display	LED Indicators, WLAN+WebHMI	
Communication	Standard: RS485, Ethernet; Optional: optical fiber; MPLC	
Grid Support	Q at night (Optional), L/HVRT, active & reactive power control and power ramp rate control	

*: Subject to actual delivery of products.

11.2 Tightening Torques

Tighten the cable with proper torque shown below to prevent the poor contact, high contact resistance, or fire caused by the looseness of cable lugs:

Bolt	Torque(N·m)	Bolt	Torque(N·m)
M3	0.7~1	M8	18~23
M4	1.8~2.4	M10	34~40
M5	4~4.8	M12	60~70
M6	7~8	M16	119~140

*The torque values listed in the table are for the combination of bolt and nut, and do not apply to riveted nuts or riveted screws, etc. Please refer to the actual situation!
**Secure the cable in proper place to reduce pressure of cable lug.

11.3 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.
- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

11.4 Contact Information

In case of questions about this product, please contact us.
We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device

- Fault code/name
- Brief description of the problem

For detailed contact information, please visit: **https://en.sungrowpower.com/contactUS**

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Sungrow Power Supply Co., Ltd.

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M-D-000537