

Technical Handover Document

Grid-Connected PV Inverter

SG305HX / SG320HX-20 / SG350HX-20



Project Information Form

table -1 Project Information Form

Project Name

Project Address

Contractor

Scope of Delivery

Device Model & Quantity

Handover Details

Signature of Receiver

Name:

Date (MM/DD/YYYY):

Signature of Issuer

Name:

Date (MM/DD/YYYY):

Safety Disclaimer and Symbol Descriptions

- Contents may be periodically updated or revised due to product development. The information in this guide is subject to change without notice. In no case shall this guide substitute for the user manual or related notes on the device.
- Make sure to read over, fully understand and strictly follow the detailed instructions of the user manual and other related regulations. Visit <http://www.sungrowpower.com/>, choose "PV Inverters" and search for the device model on the "Products" tab page to view or obtain the user manual.
- All operations can be performed only by qualified personnel, that must be trained in the installation and commissioning of the electrical system, as well as the dealing with hazards, have knowledge of the manual and of the local regulations and directives.
- Before installation, check that the package contents are intact and complete against the packing list. Contact SUNGROW or the distributor in case of any damaged or missing components.
- The cable must be intact and well insulated. Operation personnel must wear proper personal protective equipment (PPE) all the time.
- Any violation could result in personal death or injury or device damage, and will void the warranty.

Safety

Please follow the safety instructions related to the PV strings and the utility grid. Otherwise, SUNGROW shall not be held liable for any damage caused.

DANGER

Lethal voltage!

- PV strings will produce electrical power when exposed to sunlight and can cause a lethal voltage and an electric shock.
- Only qualified personnel can perform the wiring of the PV panels.
- All electrical connections must be in accordance with local and national standards.
- Only with the permission of the utility grid, the inverter can be connected to the utility grid.
- Do not open the enclosure at any time. Unauthorized opening will void guarantee and warranty claims and in most cases terminate the operating license.
- When the enclosure lid is removed, live components can be touched which can result in death or serious injury due to electric shock.

WARNING

All the warning labels and nameplate on the inverter body must be clearly visible and not be removed, covered or pasted.

CAUTION

Risk of burns due to hot components!

Do not touch any hot parts (such as heat sinks) during operation. Only the DC switch can safely be touched at any time.

NOTICE

Only qualified personnel can perform the country setting.

Unauthorized alteration of the country setting may cause a breach of the type-certificate marking.

	Disconnect the inverter from all the external power sources before service!		There is a danger from a hot surface that may exceed 60°C.
	Danger to life due to high voltages! Do not touch live parts for 25 minutes after disconnection from the power sources. Only qualified personnel can open and maintain the inverter.		Do not dispose of the inverter together with household waste.
	CE mark of conformity. EU/EEA Importer		UKCA mark of conformity.
			TUV mark of conformity.
	Additional grounding point.		Read the user manual before maintenance!
	RoHS labeling The product complies with the requirements of the applicable EU directives.		RCM mark of conformity.

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1 Pre-Installation Checklist

table 1-1

No.	Inspection Item	Inspection Details	Checked (✓) / Not Completed (×)
1	Unpacking Inspection	Inspect product exterior and structural components for damage, and check if the packing list matches the order placed. If any discrepancies or damage are found, do not install the device and contact SUNGROW immediately.	
2	Environmental Requirements	Do not install the device in a place prone to water leakage, e.g., under the air-conditioner vent, the air vent, or the cable outlet window of the machine room, so as to prevent device damage or short circuit caused by liquid ingress.	
3	Installation Space Requirements	Ensure the installation space meets the following requirements: - For standard inverters with air outlets on the side, refer to "4.5 Installation space required for the inverter with air outlets on the side (standard configuration)" - For inverters with air outlets on the top, refer to "4.6 Installation space required for the inverter with air outlets on the top (optional)"	

No.	Inspection Item	Inspection Details	Checked (✓) / Not Completed (✗)
4	External Grounding Cable Requirements	1 The external protective grounding point provides a reliable ground connection. Do not use an improper grounding conductor for grounding. Otherwise, it may cause product damage or personal injury. 2 Since the inverter is not equipped with a MV substation, neither the positive nor the negative terminals of the PV strings can be grounded. Otherwise, the inverter will not operate normally. 3 Grounding must be the first electrical connection made during installation. 4 Verify that grounding cable specifications meet design requirements.	
5	DC Side Requirements	1 The inverter does not support the full parallel connection of PV strings (Full parallel connection refers to a connection method in that strings are connected in parallel and then connected to the inverter separately). 2 To ensure safe operation, the DC switches must remain in the OFF position during AC side wiring. 3 Do not connect one PV string to multiple inverters. Otherwise, the inverters may be damaged. 4 Mixed use of different brand or model of PV modules in one MPPT circuit, or PV modules of different orientation or angles in a string will not necessarily damage the inverter but may degrade system performance. 5 If the DC input polarity is reversed or both the positive and	

No.	Inspection Item	Inspection Details	Checked (✓) / Not Completed (✗)
		negative terminals of different MPPTs are shorted to ground while the DC switches are set to the ON position, do not operate the inverter immediately, as this may cause damage. Wait until string current drops below 0.5 A, turn DC switches OFF, and disconnect the DC connectors to adjust string polarity.	
6	AC Side Requirements	1 If aluminum AC cables are used, OT/DT terminals must be copper-aluminum transition terminals. Using incorrect terminals will result in non-compliance. 2 Verify that the specifications and dimensions of OT/DT terminals meet the user manual requirements.	

No.	Inspection Item	Inspection Details	Checked (✓) / Not Completed (✗)
7	PLC Wiring Requirements	1 Cable from MV substation to inverter: If using multi-core AC cables, the length must be ≤ 990 m. 2 Cable from MV substation to communication box or external PLC module: • Use outdoor-type UV-resistant multi-core copper AC cables with a core diameter of 2.5 mm^2 to 4 mm^2. • Cable isolation voltage $> 1000 \text{ V}$. • Cable length $\leq 10 \text{ m}$. 3 When connecting the AC cables to the busbar of the MV Substation, it is recommended to take the circuit breaker corresponding to the middle point of the busbar as the coupling point.	
8	Inverter Storage Requirements	If the inverter is not installed immediately upon arrival: 1 Keep the inverter away from direct sunlight, rain, or strong electric fields. 2 Do not place the inverter in places with items that may affect or damage it. 3 Store the inverter in a clean, dry environment to prevent dust and moisture ingress. 4 Do not store the inverter in locations with chemical corrosion risks or pest infestations.	

1.1 Personnel Requirements

- 1 Each equipment installation should involve a team of at least 4 to 5 trained professionals, with at least one electrical specialist supervising the installation. Team size should be

adjusted based on terrain complexity. Maintain fixed crew assignments throughout the project. Avoid unnecessary personnel changes to ensure procedural continuity.

- 2 Personnel performing special tasks (e.g. electrical operations, working at heights, handling specialized equipment) must have relevant qualifications as required by the local regulations of the country/region.

2 Unpacking and Inspection

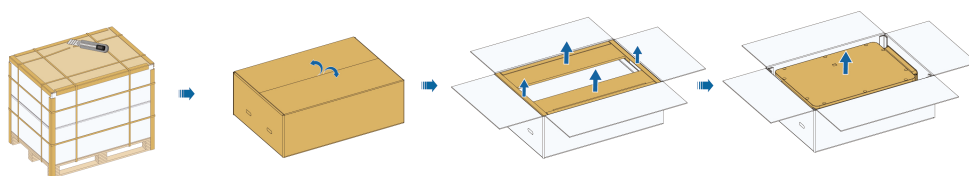
The product is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the product.

- Check the packing case for any visible damage.
- Check the scope of delivery for completeness according to the packing list.
- Check the inner contents for damage after unpacking.

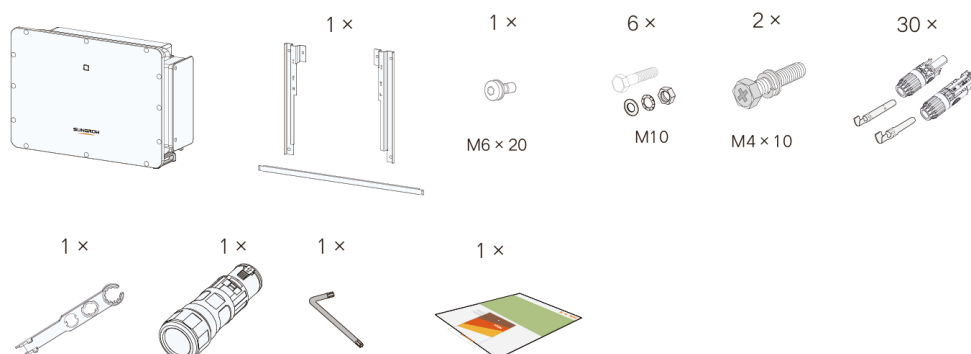
Contact SUNGROW or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the product is decommissioned.

2.1 Recommended Unpacking Procedure



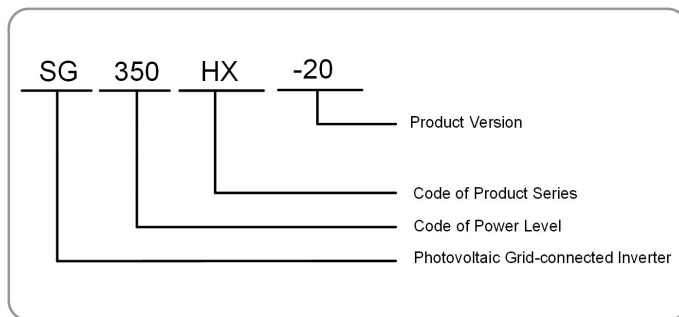
2.2 Scope of Delivery



2.3 Product Introduction

Model Description

The model description is as follows (with SG350HX-20 as an example).



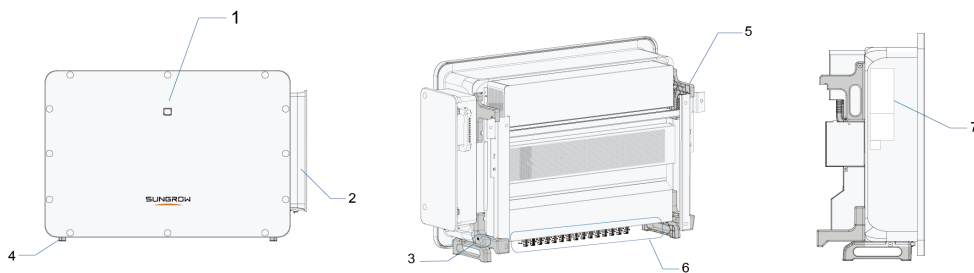
Appearance

The figure below illustrates the appearance of the inverter. The inverter is available in two variants: one with air outlets on the side and the other with air outlets on the top.

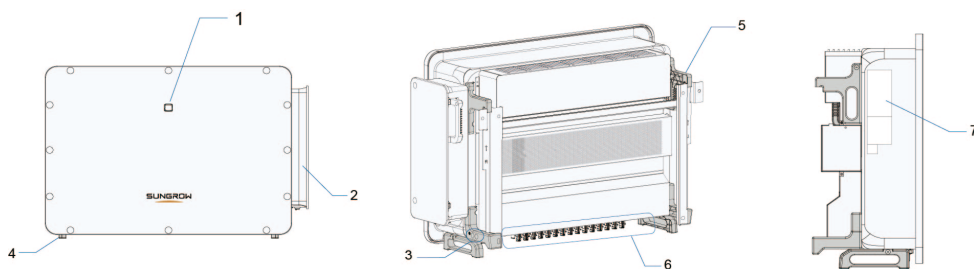


- The standard inverter with air outlets on the side can be converted to an inverter with air outlets on the top.
- The conversion to an inverter with air outlets on the top is a customized service and requires the purchase of specific professional accessories from SUNGROW.
- The accessories include detailed conversion instructions, and customers are required to complete the conversion based on the provided guidance.

Inverter with air outlets on the side



Inverter with air outlets on the top



The image shown here is for reference only. The actual product received may differ.

No.	Name	Description
1	LED indicator	To indicate the current working state of the inverter.
2	AC junction box	To connect AC cable and tracking system power cable in this area.
3	External protective grounding terminals	2, use at least one of them to ground the inverter.
4	Bottom handles	2, used to move the inverter.
5	Mounting lugs	2, used to hang the inverter onto the mounting-bracket.
6	Wiring area	DC switches, DC terminals, and communication terminals.
7	Labels	To clearly identify the product, including nameplate, warning symbols and QR code.

Dimensions

The following figure shows the dimensions of the inverter.

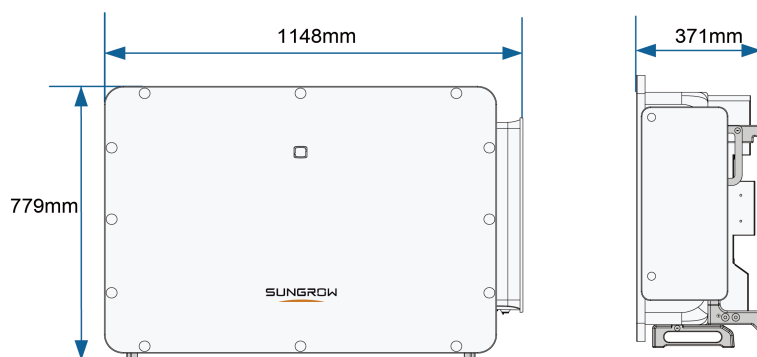


figure 2-1 Product Dimensions (in mm)

Model	Dimensions	Weight
SG305HX/SG320HX-20/ SG350HX-20	1148 mm * 779 mm * 371 mm	≤ 106 kg*

Terminal Description

All electrical terminals are located at the side and bottom of the inverter.

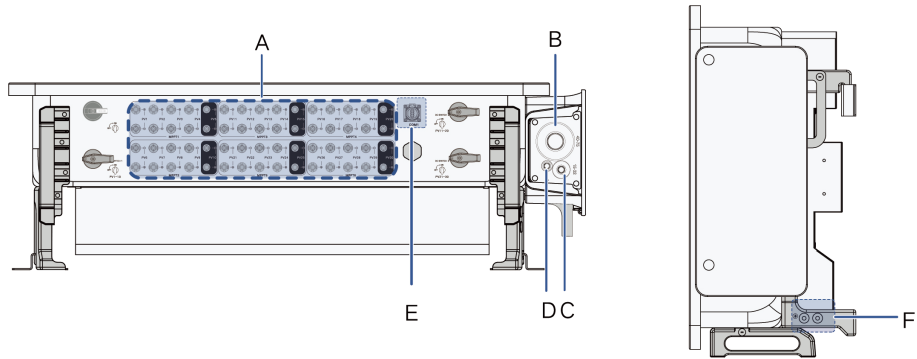


figure 2-2 Terminal Description

Item	Terminal	Mark	Note
A	PV terminals	+ / -	30, PV connector The number of PV terminals varies, subject to actual product received
B	AC wiring terminal	—	Used for AC output cable connection.
C	Standby grounding terminal	—	If the PE cable is an independent single-core cable, it should be led into the AC junction box for cable wiring through the standby grounding terminal
D	Tracker terminal	—	For the power cord wiring of the Tracking system
E	Communication terminal	COM1	For RS485 communication wiring.
F	External protective grounding terminal		For reliable grounding 2, use at least one of them to ground the inverter.

3 Inverter Storage

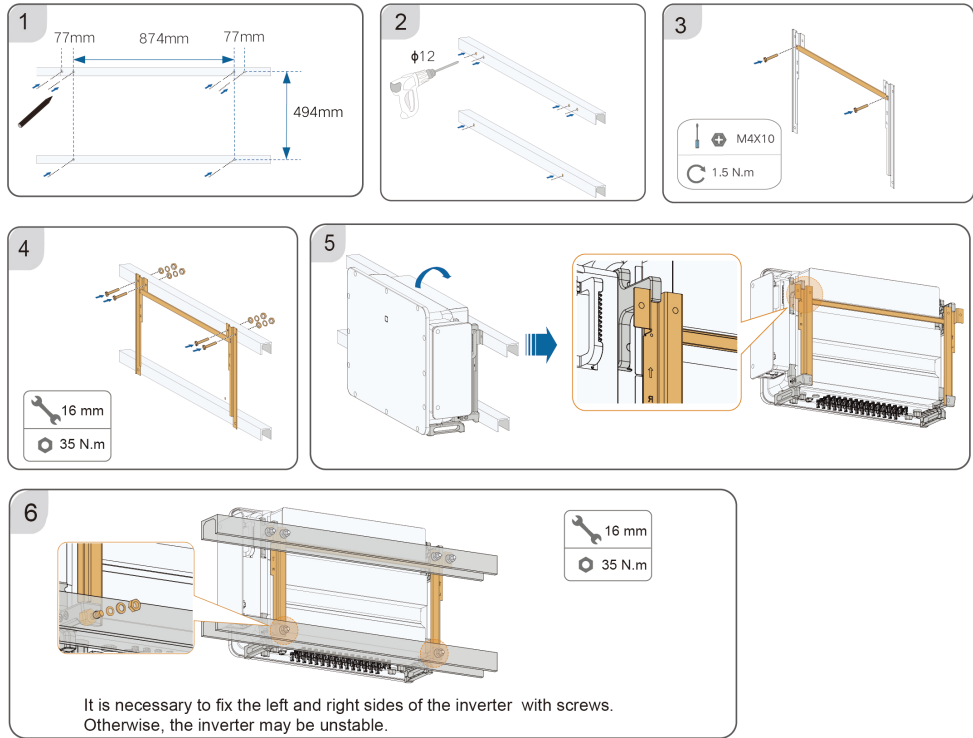
Proper storage is required if the inverter is not installed immediately.

- Store the inverter in the original packing case with the desiccant inside.
- The storage temperature must be always between -40°C and +70°C, and the storage relative humidity must be always between 0 and 95 %, non-condensing.
- In case of stacking storage, the number of stacking layers should never exceed the limit marked on the outer side of the packing case.
- The packing case should be upright.
- If the inverter needs to be transported again, pack it strictly before loading and transporting it.
- Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.
- Do not place the inverter in places with items that may affect or damage the inverter.
- Store the inverter in a clean and dry place to prevent dust and water vapor from eroding.
- Do not store the inverter in places with corrosive substances or susceptible to rodents and insects.
- Carry out periodic inspections. Inspection shall be conducted at least once every six months. If any insect or rodent bites are found, replace the packaging materials in time.
- If the inverter has been stored for more than a year, inspection and testing by professionals are required before it can be put into operation.

NOTICE

Please store the inverter according to the storage requirements. Product damage caused by failure to meet the storage requirements is not covered by the warranty.

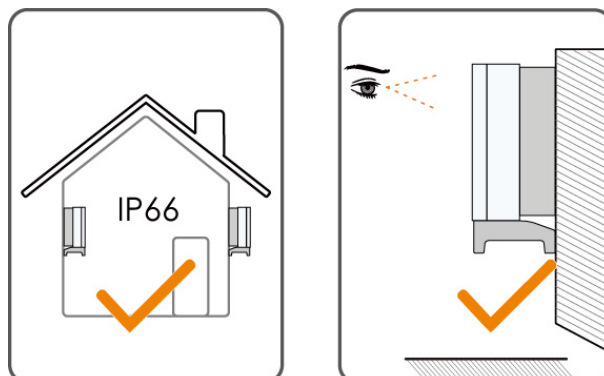
4 Installing the Inverter



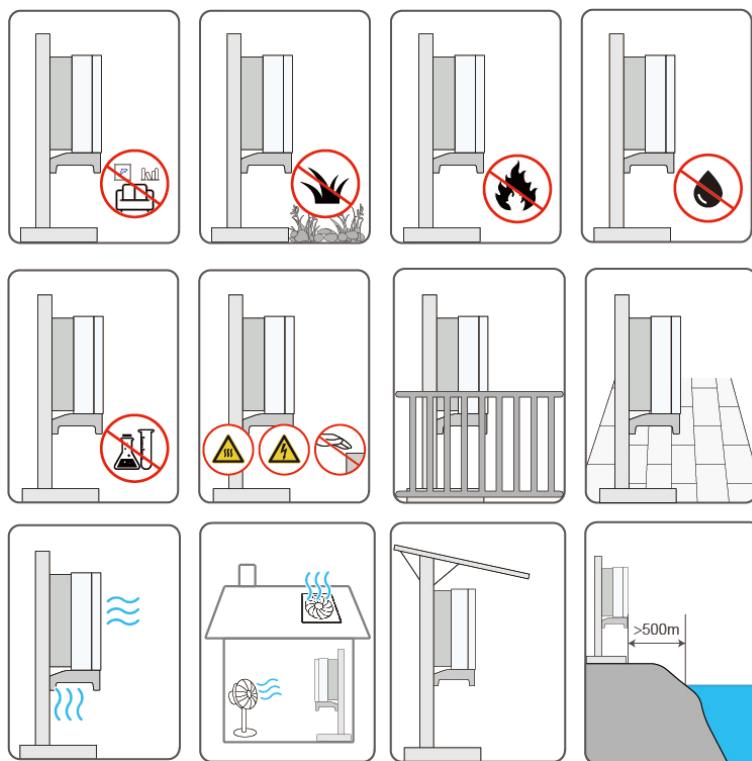
4.1 Location Requirements

To a large extent, a proper installation location ensures safe operation, service life, and performance of the inverter.

- The inverter should be installed at a height that allows easy viewing of the LED indicator panel, as well as easy electrical connection, operation and maintenance.



4.2 Installation Environment Requirements

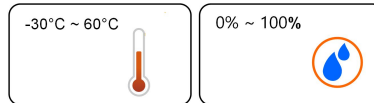


- The inverter produces noise during operation, thus it is not recommended to install it in places for residential purpose. If this cannot be avoided, it is recommended to install the inverter in a place over 25 meters away from the residential area, or take noise mitigation measures.
- If the inverter is installed in a place with lush vegetation, weed on a regular basis. In addition, the ground beneath the inverter needs to undergo certain treatment, such as laying cement or gravel, etc. (an area of 3m×2.5m is recommended).
- The installation site must have solid ground, free of rubber-like soils (which cannot be effectively compacted) or weak soils, and should not be prone to subsidence. Also, avoid low-lying areas where water or snow may easily accumulate. Ensure the site is located above the highest recorded water level in the area.
- Do not install the inverter in a position that could be flooded.
- To prevent vegetation or water on the ground from impacting inverter operation, if the space above meets the designated requirements, elevate the inverter to an appropriate height.
- Install the inverter in a place with shelter, so as to prevent it from getting impacted by direct sunlight and severe weather (e.g. snow, rain, and lightning). The inverter will derate in high temperatures for self-protection. If installed in a place directly exposed to sunlight, as the temperature rises, the inverter may witness power reduction.

- It is suggested to install the inverter in a place with shelter, or build a sunshade for it. However, if the ambient temperature around the inverter is $>45^{\circ}\text{C}$ and the irradiance is greater than $1000\text{W}/\text{m}^2$, install it in a place with shelter only, to avoid derating caused by direct sunlight.

((The ambient temperature is determined as the average temperature measured from at least four evenly distributed temperature monitoring points, located at least 1 meter from the device and at a height halfway up the device. The temperature sensors must be shielded from airflow, thermal radiation, and rapid temperature fluctuations to prevent inaccuracies in the readings.))

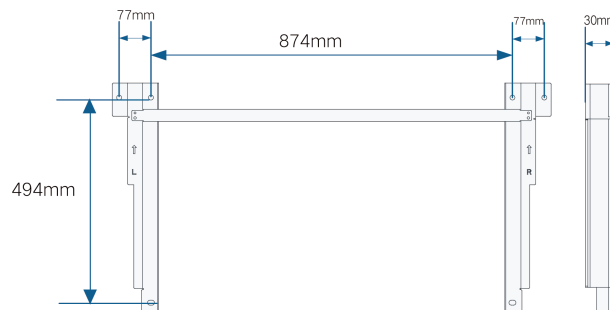
- Good heat dissipation is very important to the inverter. Please install the inverter in a ventilated environment.
- If the inverter needs to be installed in a closed or semi-closed environment, please install additional heat dissipation or ventilation devices. Furthermore, while the inverter is operating, ensure the indoor ambient temperature does not exceed the outdoor ambient temperature. A semi-closed environment refers to a special space where natural ventilation is limited and gas or heat may easily accumulate, although it is not fully enclosed on all six sides.
- It is suggested to install the device in a place with shelter, or build a sunshade for it.
- Please consult SUNGROW before installing inverters outdoors in areas prone to salt damage, which mainly are coastal areas within 500 meters of the coast. The sedimentation amount of salt spray is correlated to the characteristics of the seawater, sea winds, precipitation, air humidity, topography, and forest coverage in the adjacent sea areas, and there are substantial differences between different coastal areas.
- Do not install the inverter in an environment contaminated with chemicals such as halogen and sulfide.
- Do not install the inverter in an environment with vibration and strong electromagnetic field. Strong-magnetic-field environments refer to places where magnetic field strength measures over 30 A/m .
- In dusty environments such as places full of dust, smoke, or floc, particles may cling to the device's air outlet or heat sink, thus impacting its heat dissipation performance or even getting it damaged. Therefore, do not install the inverter in dusty environments. If the inverter has to be installed in such environments, please clean its fans and heat sink on a regular basis to ensure a good heat dissipation performance.
- To avoid disturbing residents in living areas with noise generated during the operation of the device, do not install the inverter in noise-sensitive areas such as bedrooms. It is preferable to choose an open location that is far away from the living and resting areas.
- The inverter should be installed in a place over 30 m away from the third party wireless communication facilities and environments for living.
- The average temperature approximately 1 m around the inverter should be taken as its ambient operating temperature. The temperature and humidity should meet the requirements below:



- Requirements for the inverter which has been installed but not put into use for a long time:
 - 1 After connecting the DC cables, turn on the DC switches by referring to steps 1 to 4 in [Commissioning Procedure](#).
 - 2 Be sure to use the blue plugs, which come with the inverter, to close off the unused DC terminals.
 - 3 If the inverter is installed in a sandy and windy environment, please add safeguards against sand and dust on the air inlet and outlet of the air duct, so as to avoid impacts on fan operation caused by air duct blockage. Please remove the safeguards before putting the inverter into operation.

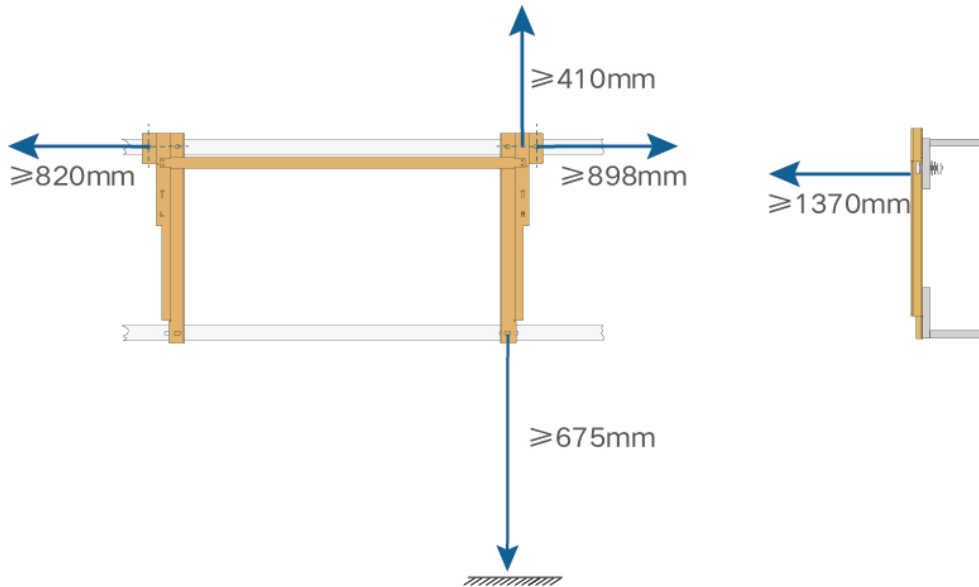
4.3 Installing Mounting-bracket

The inverter can be installed on a bracket, a wall, and a pole by means of mounting-bracket. Dimensions of the assembled mounting-bracket are as follows.

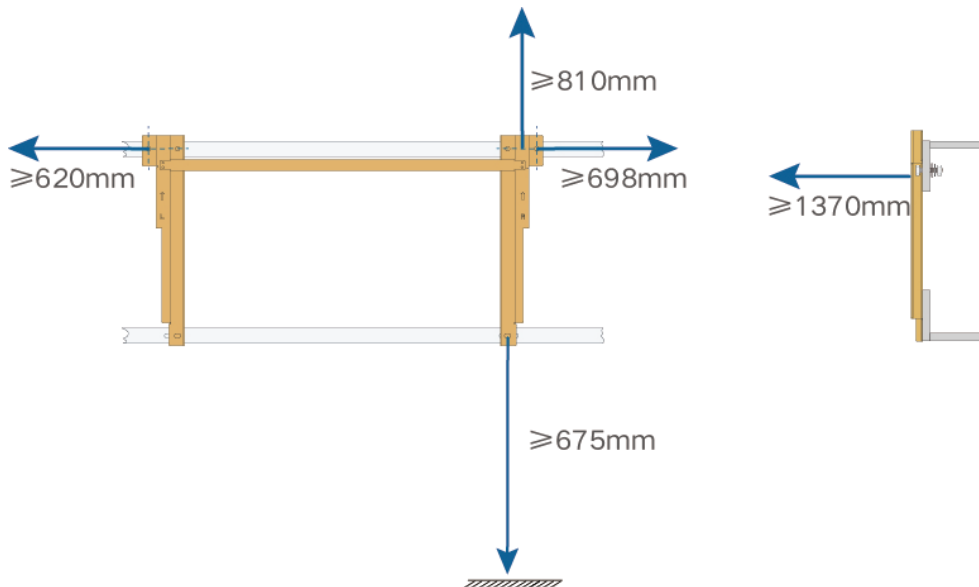


Reserve enough space when installing the mounting-bracket to meet the installation space requirements of the inverter.

Installation space required for the inverter with air outlets on the side

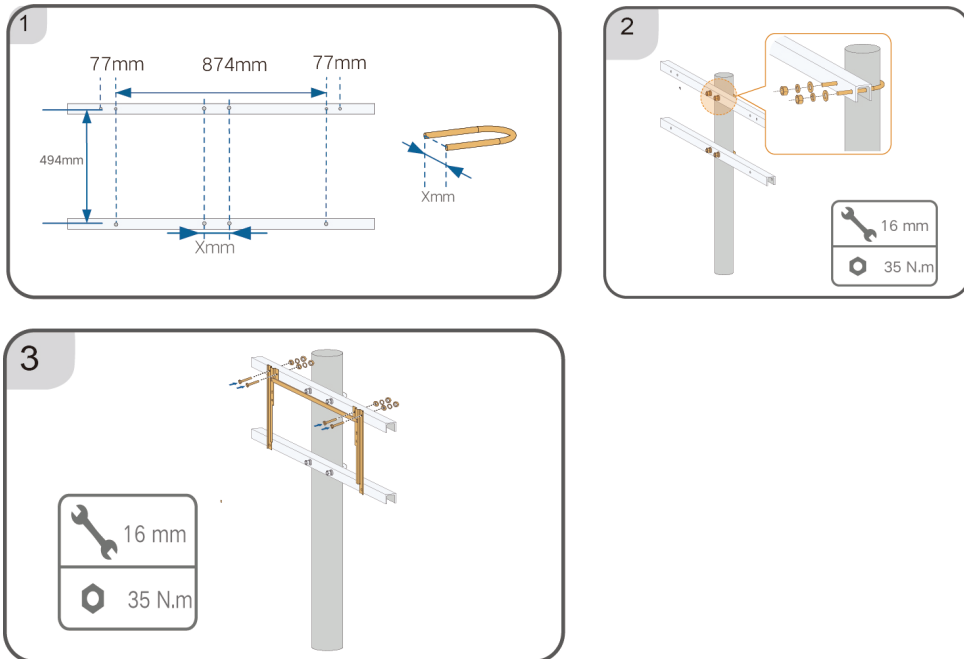


Installation space required for the inverter with air outlets on the top



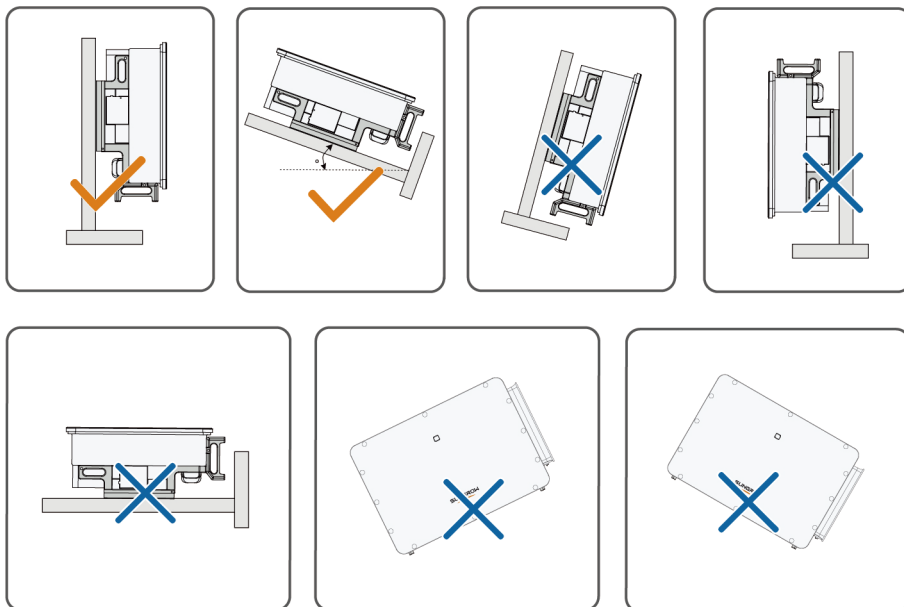
4.3.1 Bracket-Mounted Installation

4.3.2 Pole-Mounting

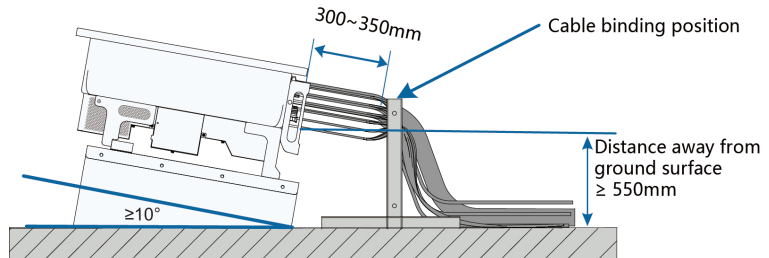


4.4 Angle Requirements

Install the inverter vertically or tilt backwards. Do not install the inverter horizontally, forward, excessively backward, sideways, or upside down.



In case the installation site is a level surface, mount the inverter to the bracket to meet the mounting angle requirements, as shown in the figure below.



Take the following items into account when designing the bracket scheme:

- Consider onsite climate conditions and take anti-snow and anti-rain measures if necessary.
- Ensure that the waterproof connectors are at least 550 mm higher than the ground surface.
- Bind the cables at the positions 300~350 mm away from the DC connector, AC waterproof terminal, and communication waterproof terminal.
- The various waterproof terminals should be tightened with the torque specified in this manual to ensure that they are securely sealed.

Contact SUNGROW if you have any question.

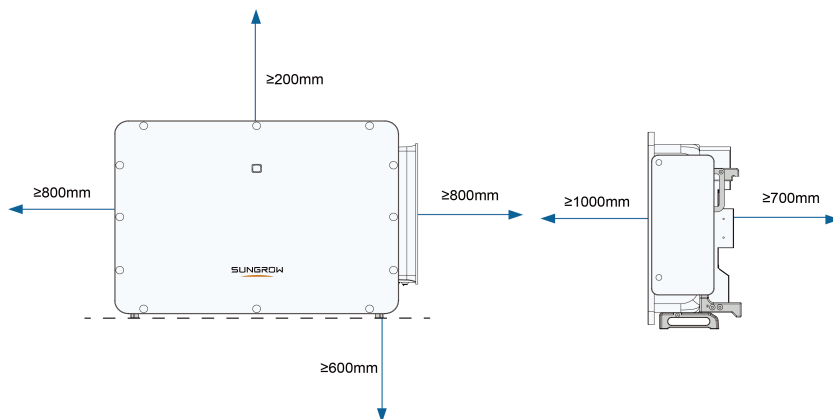
4.5 Installation space required for the inverter with air outlets on the side (standard configuration)



The inverter with air outlets on the side is the standard configuration. For related installation space requirements, please refer to the following details.

Space around the inverter

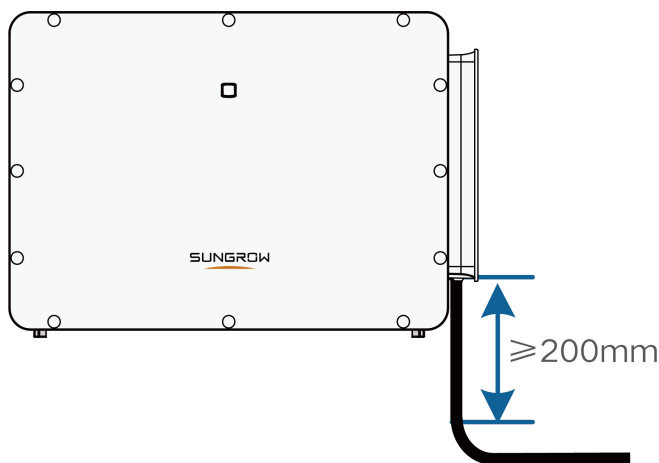
Make sure there is sufficient space around the inverter for good ventilation. The space requirements for installing a single inverter are shown in the figure below.



NOTICE

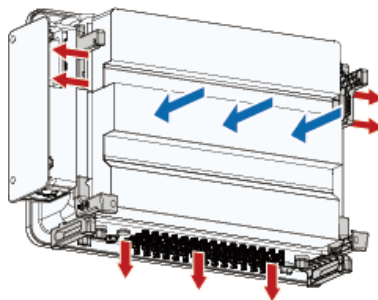
- To prevent vegetation or water on the ground from impacting inverter operation, if the space above meets the designated requirements, elevate the inverter to an appropriate height.
- The space at the bottom of the inverter must accommodate the required bending radius for the AC output cables.

Run the AC cable into the AC terminal vertically, and make sure the cable is kept vertical for a length of $\geq 200\text{mm}$.



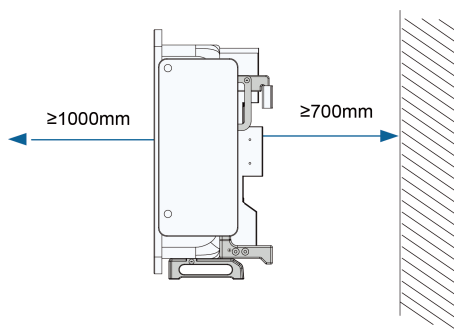
Air inlets/outlets of the inverter

Make sure there is no obstruction to the inverter's air inlets/outlets, to avoid impacting its heat dissipation. The air inlets/outlets of the inverter are shown in the figure below.



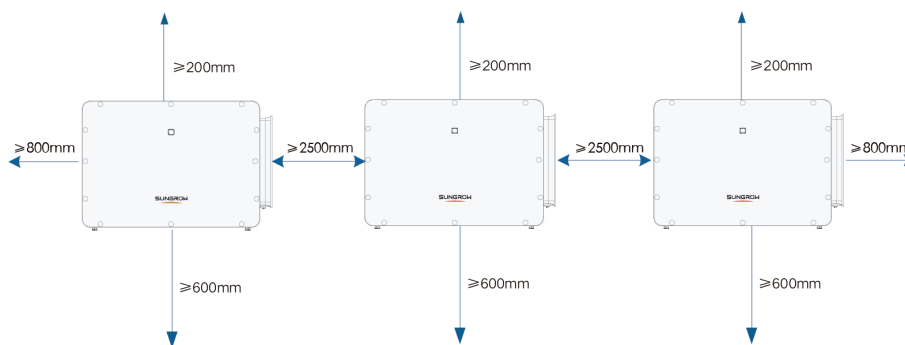
Inverters installed against the wall

If the inverter is installed against the wall, keep it at least 700mm away from the wall.



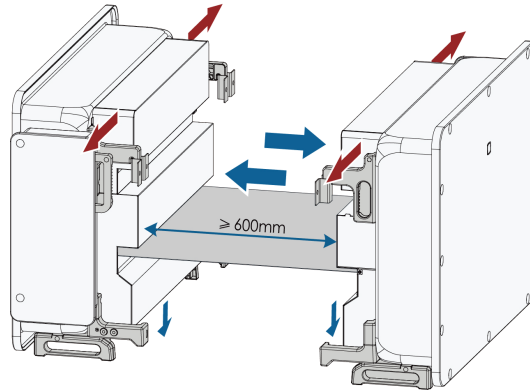
Inverters installed in one row

When installing multiple inverters, reserve sufficient space between the inverters. It is recommended to position them in one row.

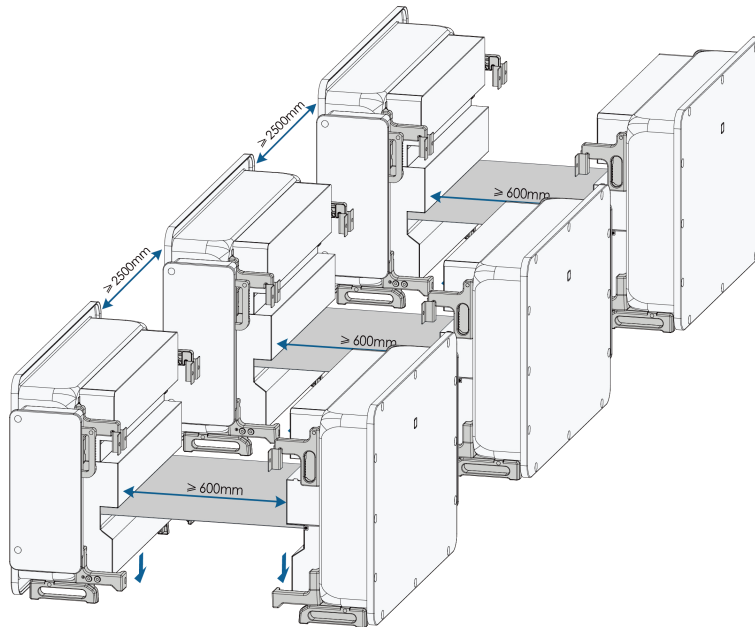


Inverters installed back-to-back

For two inverters installed back-to-back, the distance between them should be at least 600mm.



When installing more than two inverters back-to-back, sufficient space should be reserved between the adjacent inverters.



If the above installation requirements cannot be met, please contact SUNGROW for support.

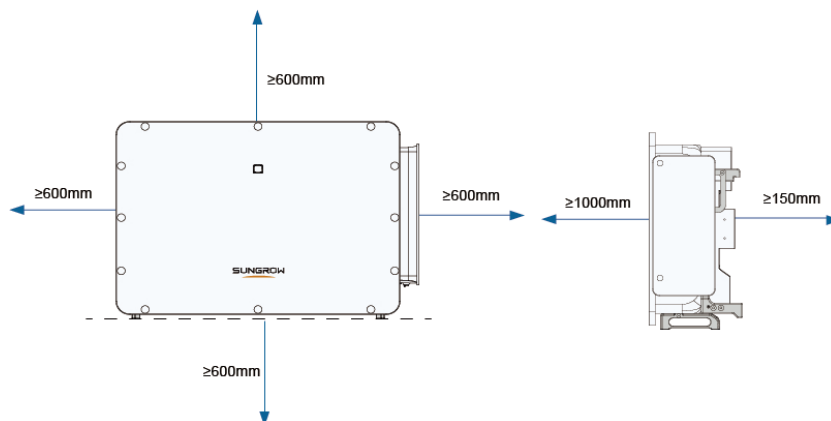
4.6 Installation space required for the inverter with air outlets on the top (optional)



- The standard inverter with air outlets on the side can be converted to an inverter with air outlets on the top.
- The conversion to an inverter with air outlets on the top is a customized service and requires the purchase of specific professional accessories from SUNGROW.
- The accessories include detailed conversion instructions, and customers are required to complete the conversion based on the provided guidance.
- The installation space requirements for the inverter with air outlets on the top are as shown below.

Space around the inverter

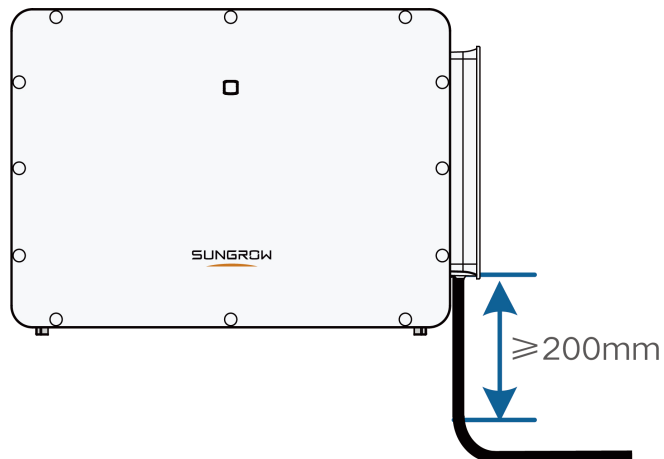
Make sure there is sufficient space around the inverter for good ventilation. The space requirements for installing a single inverter are shown in the figure below.



NOTICE

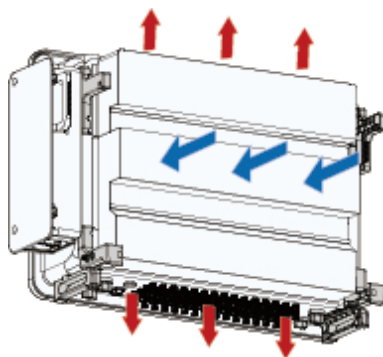
- To prevent vegetation or water on the ground from impacting inverter operation, if the space above meets the designated requirements, elevate the inverter to an appropriate height.
- The space at the bottom of the inverter must accommodate the required bending radius for the AC output cables.

Run the AC cable into the AC terminal vertically, and make sure the cable is kept vertical for a length of $\geq 200\text{mm}$.



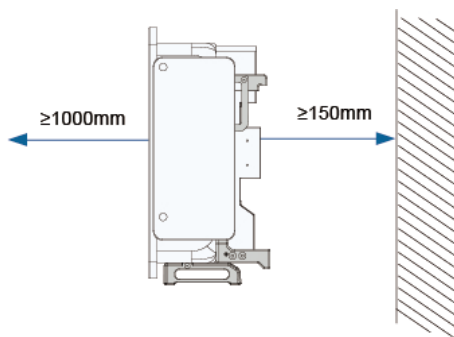
Air inlets/outlets of the inverter

Make sure there is no obstruction to the inverter's air inlets/outlets, to avoid impacting its heat dissipation. The air inlets/outlets of the inverter are shown in the figure below.



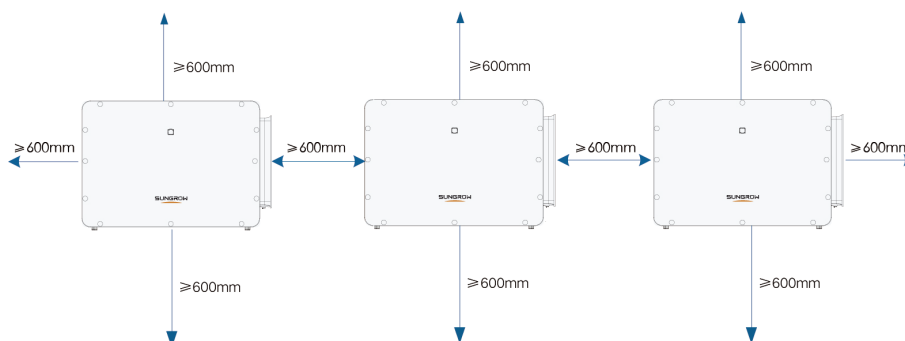
Inverters installed against the wall

If the inverter is installed against the wall, keep it at least 150mm away from the wall.

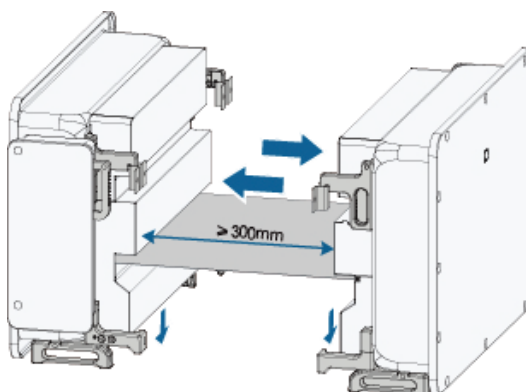


Inverters installed in one row

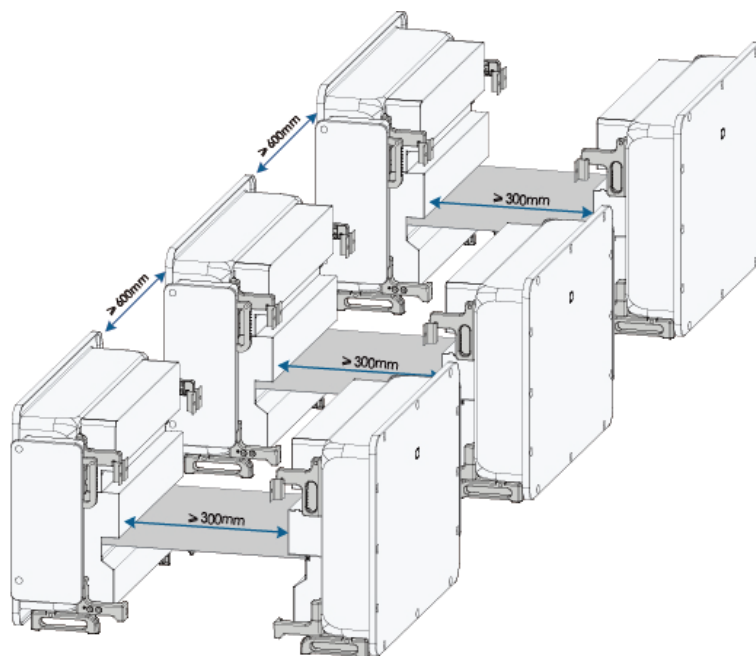
When installing multiple inverters, reserve sufficient space between the inverters. It is recommended to position them in one row.

**Inverters installed back-to-back**

For two inverters installed back-to-back, the distance between them should be at least 300mm.



When installing more than two inverters back-to-back, sufficient space should be reserved between the adjacent inverters.



If the above installation requirements cannot be met, please contact SUNGROW for support.

4.7 Safety During Mounting

- Make sure there is no electrical connection before installation.
- When moving the product, be aware of its weight and keep the balance to prevent it from tilting or falling.
- Wear proper protective equipment before performing operations on the product.
- The bottom terminals and interfaces of the product cannot directly contact the ground or other supports. The product cannot be directly placed on the ground.
- For specific requirements for the installation environment, see [Installation Environment Requirements](#). In case the environment where the product is installed does not meet the requirements, SUNGROW shall not be held liable for any property damage arising therefrom.
- During installation, ensure that no device in the system causes it hard for the DC switch and the AC circuit breaker to act or hinders maintenance personnel from operating.
- Cables are not allowed to pass through the air inlet and outlet of the equipment.
- If drilling is required during installation:
 - Wear goggles and protective gloves when drilling holes.
 - Make sure to avoid the water and electricity wiring in the wall before drilling.
 - Protect the product from shavings and dust.

5 Electrical Connection

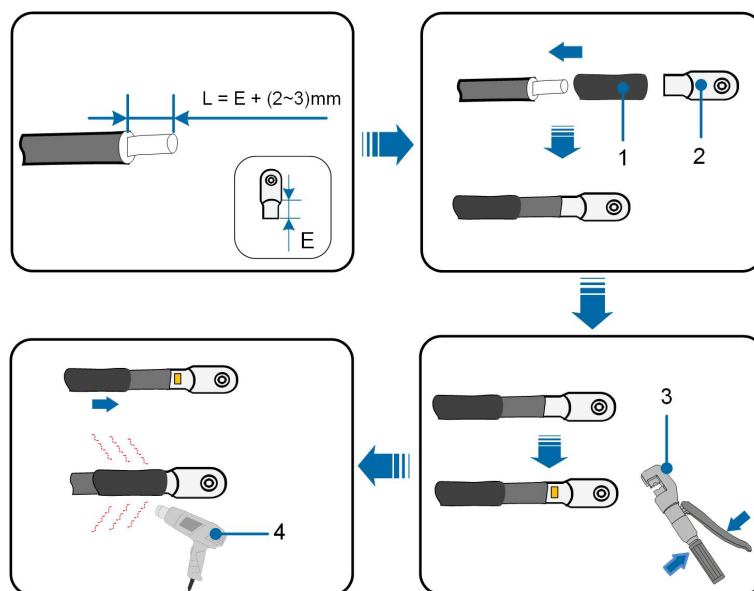
5.1 Electrical Connection Precautions

- Must ensure that cables are voltage-free with a measuring instrument before touching DC cables.
- Respect all safety instructions listed in relevant documents about PV strings.
- Before electrical connections, please make sure that the inverter switch and all switches connected to the inverter are set to "OFF", otherwise electric shock may occur!
- To avoid personal injury and equipment damage, before troubleshooting or replacing the inverter, use a current clamp to check the DC cables for voltage. Only after confirming there is no current in the strings should the terminals be disconnected and reconnected for adjustments.
- Ensure that the inverter is undamaged and all cables are voltage free before performing electrical work.
- Do not close the AC circuit breaker until the electrical connection is completed.
- Do not damage the ground conductor. Do not operate the product in the absence of a properly installed ground conductor. Otherwise, it may cause personal injury or product damage.
- Please use measuring devices with an appropriate range. Overvoltage can damage the measuring device and cause personal injury.
- Electrical connection must be performed by professionals.
- Operators must wear proper personal protective equipment during electrical connections.
- All cables used in the PV generation system must be firmly attached, properly insulated, and adequately dimensioned. Cables used shall comply with the requirements of local laws and regulations.
- 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.
- Install the external protective grounding cable first when performing electrical connection and remove the external protective grounding cable last when removing the inverter.
- Comply with the safety instructions related to PV strings and the regulations related to the utility grid.
- After being crimped, the OT terminal must wrap the wires completely, and the wires must contact the OT terminal closely.
- When using a heat gun, protect the device from being scorched.

- Before connecting a power cable (such as the AC cable, the DC cable, etc.), confirm that the label and identifier on the power cable are correct.
- When laying out communication cables, separate them from power cables and keep them away from strong interference sources to prevent communication interruption.
- All vacant terminals must be covered with waterproof covers to prevent affecting the protection performance.
- Ensure that AC output cables are firmly connected. Failing to do so may cause inverter malfunction or damage to its AC connectors.
- When the wiring is completed, seal the gap at the cable inlet and outlet 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 inverter.
- Ensure AC output cables are securely fastened with proper insulation protection. Failure to comply may result in inverter malfunction or damage to the AC connectors. Such damage is not covered under the warranty.
- The cable colors in figures in this manual are for reference only. Please select cables according to local cable standards.

5.2 Crimp OT/DT terminal

Crimp OT/DT terminal



1. Heat shrink tubing

2. OT/DT terminal

3. Hydraulic pliers

4. Heat gun

Aluminum Cable Requirements

If an Aluminum cable is selected, use a copper to Aluminum adapter terminal to avoid direct contact between the copper bar and the Aluminum cable.

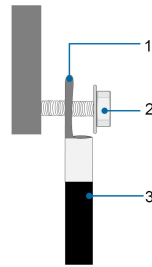


figure 5-1 Aluminum Cable Connection

1. Copper to Aluminum adapter terminal

2. Flange nut

3. Aluminum cable

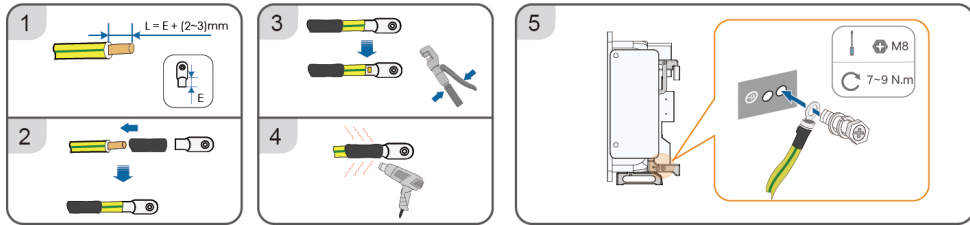
NOTICE

Ensure that the selected terminal can directly contact with 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 electrical connection.

5.3 External Protective Grounding Connection

- Since the inverter is not equipped with a transformer, neither the negative electrode nor the positive electrode of the PV string can be grounded. Otherwise, the inverter will not operate normally.
- Connect the grounding terminal to the external protective grounding point before AC cable connection, PV string connection, and communication cable connection.
- Depending on Local Rules, please also ground the PV panel subconstruction to the same common grounding point (PE Bar) in addition to local lightning protection rules.
- When there is only one inverter in the PV system, connect the external protective grounding cable to a nearby grounding point.
- When there are multiple inverters in the PV system, connect the external protective grounding terminals of all inverters and the grounding points of the PV module brackets to ensure equipotential connections to ground cables (according to the onsite conditions).
- It is suggested that the external protective grounding terminal and the AC side grounding terminal are both connected to ground. Other grounding schemes, which meet the local standards and safety regulations, may also be adopted. However, SUNGROW shall not be held liable for any consequence caused thereby.



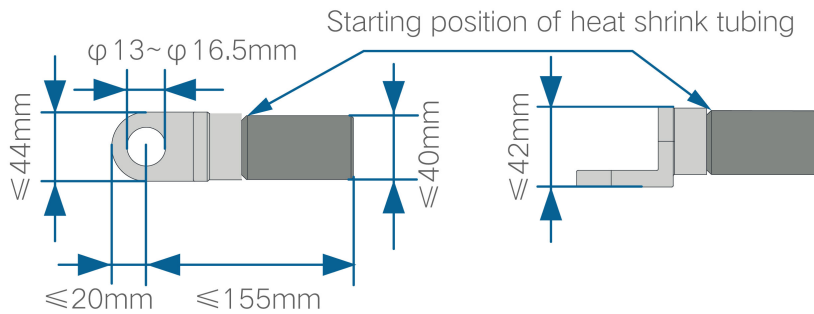
5.4 AC Cable Connection

5.4.1 Requirements for OT/DT Terminal

OT/DT terminals (not included in the delivery scope) are required for fixing AC cables to the terminal block. Purchase the OT/DT terminals according to the following requirements.

OT/DT Terminals of Phase Wire (One Wire per Phase with Multi-core Cable)

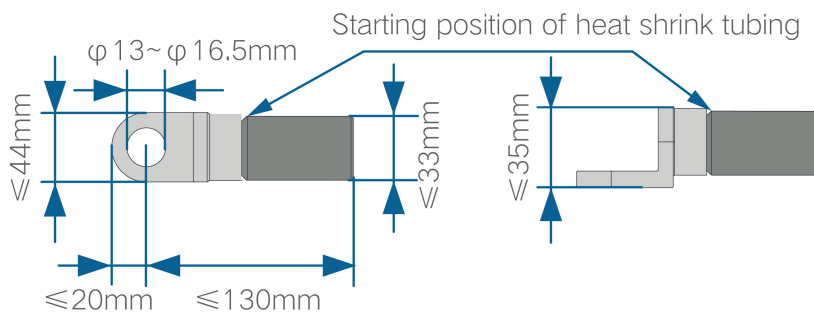
- Specification: M12



S325-E032

OT/DT Terminals of Phase Wire (Two Wires per Phase with Multi-core Cable)

- Specification: M12



S325-E033

Requirements for Flat Washer

If the OT terminal's hole diameter is between 16.5mm and 21mm, add a flat washer made of 316/304 stainless steel between the OT terminal and the M12 nut. The size of the flat washer and the connection method are provided below.

Size of Flat Washer

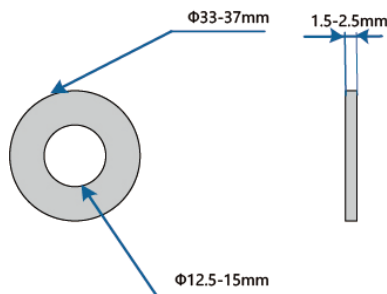


figure 5-2 Size of Flat Washer

Installation of Flat Washer

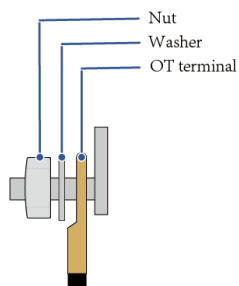


figure 5-3 Installation of Flat Washer

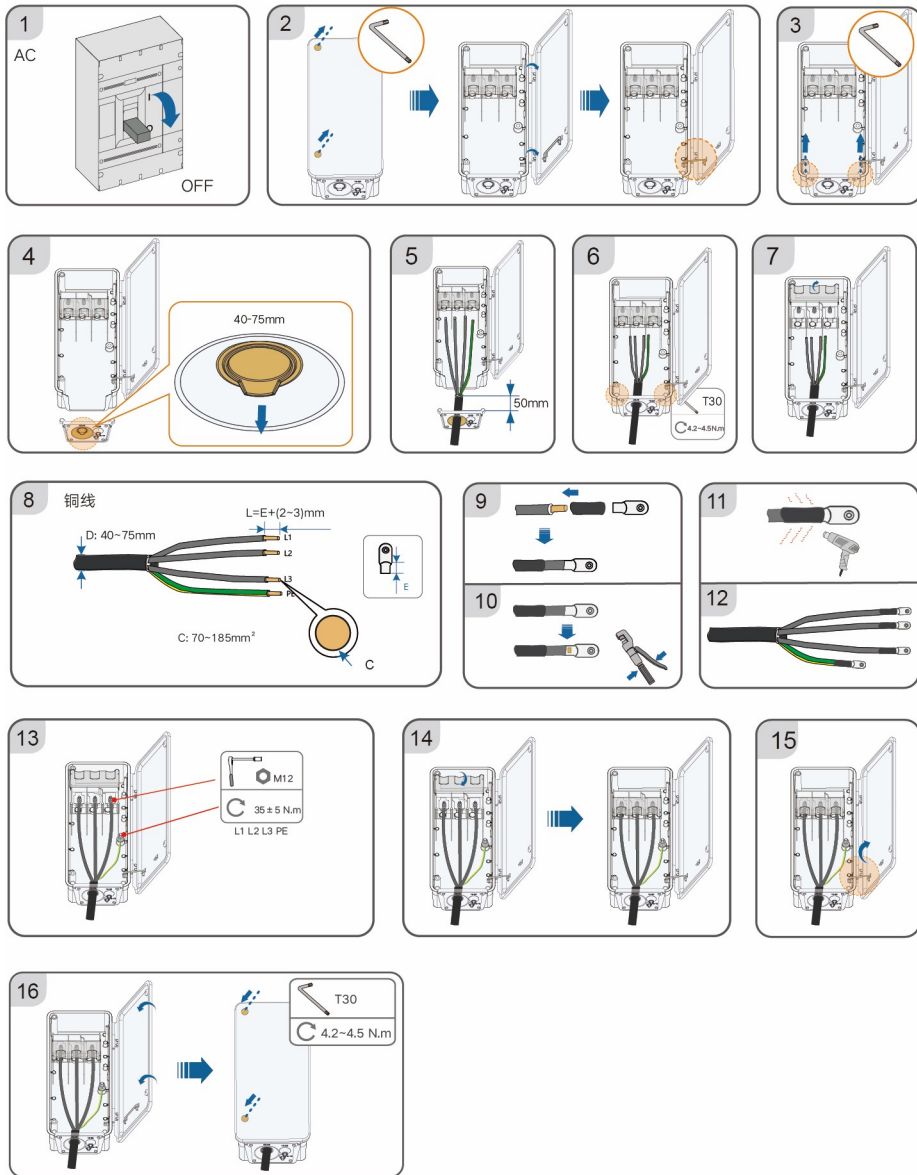
OT/DT Terminal of PE Wire

- Specification: M12

5.4.2 One-wire-per-phase Wiring (with Multi-core Cable)



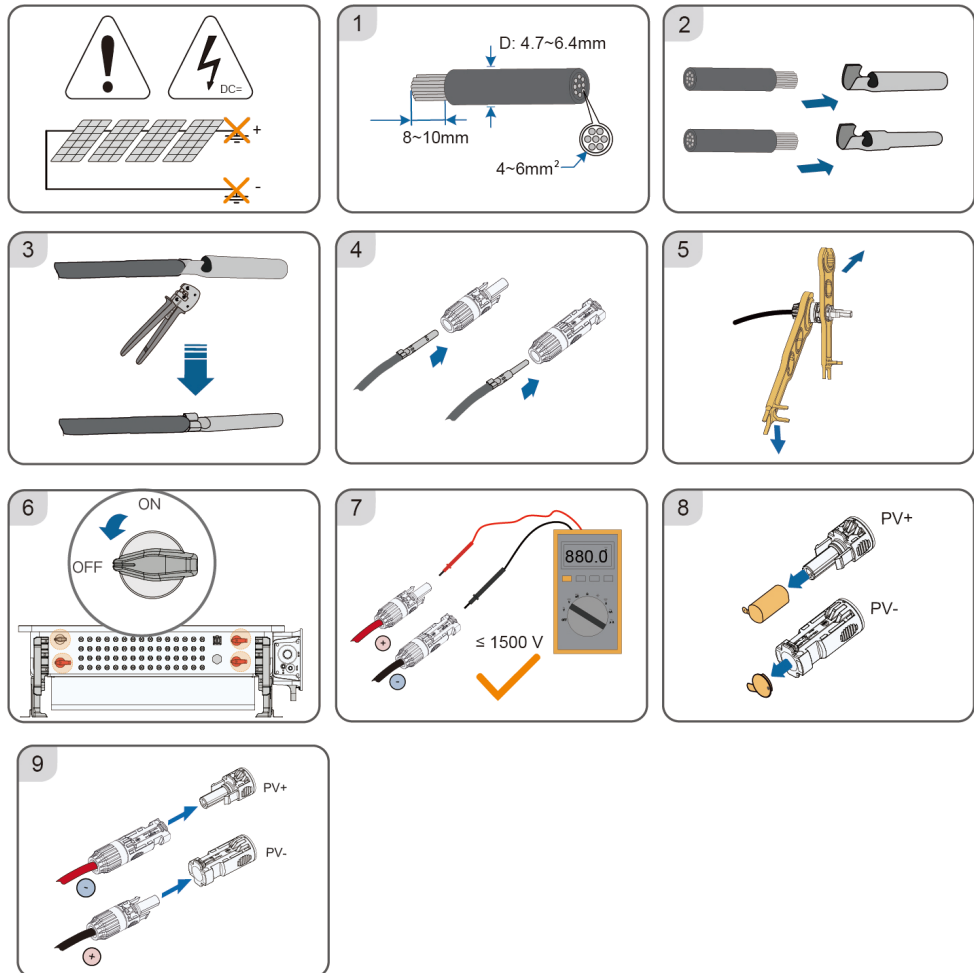
This section introduces the connection steps with four-core cable as an example, and the wiring method for three-core cable is the same.



After completing the AC side wiring, seal the AC cable entry points with fireproof mud and ensure that the AC output cables and PE wires are securely fastened. Failure to do so may result in operational failure, or terminal block damage caused by overheating from unreliable connections during operation. Such damage is not covered under the product warranty.

5.5 DC Cable Connection

5.5.1 Installing PV Connector



Terminal Configuration Description

Please refer to the following requirements for PV terminal connection:

- Y-type PV connectors cannot be used on this inverter.
- The PV1 terminal must be used for connection.
- Make sure the PV terminals connected are relatively evenly distributed across the MPPTs.
- While performing connection, please give priority to terminals in the white areas. If terminals in the white areas are all connected, connect the terminals in the black areas, as shown in the figure below.

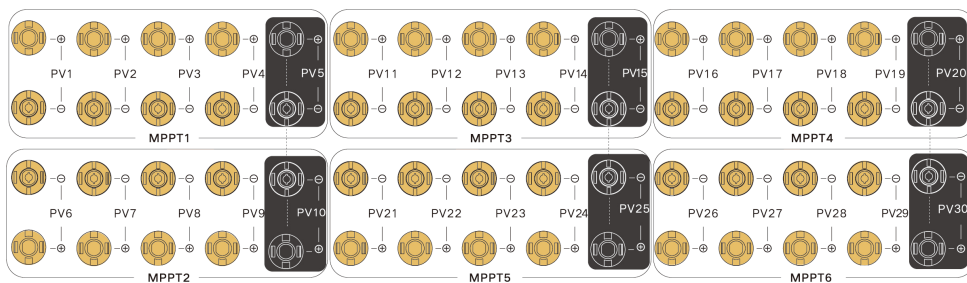
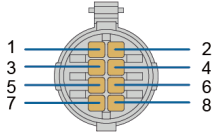


figure 5-4 Terminal Connection Schematic for 210 Module

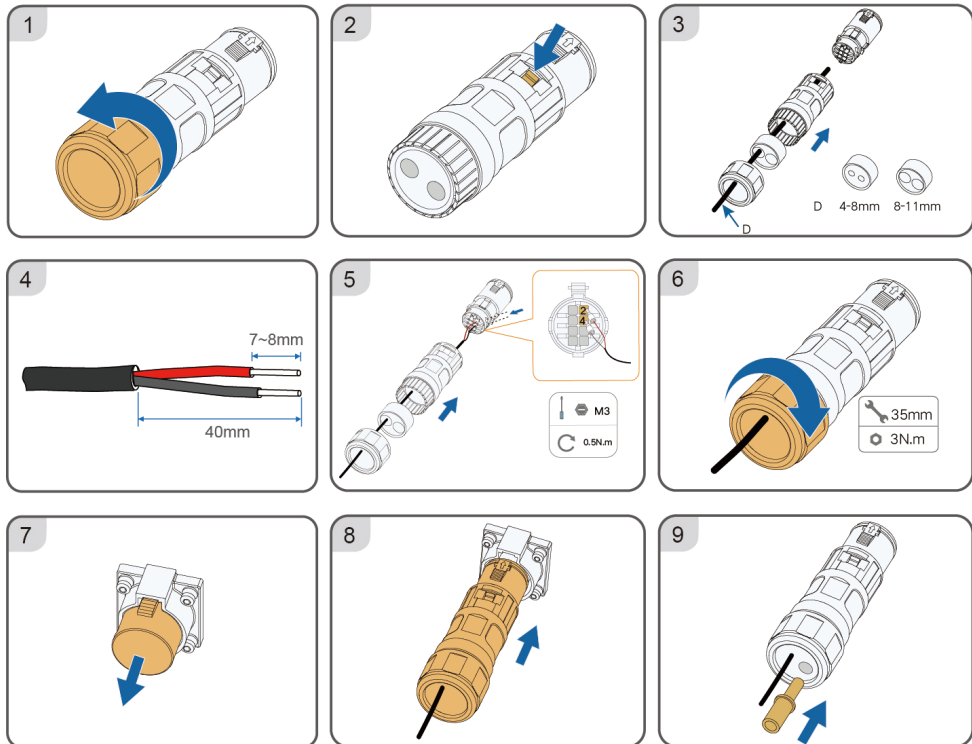
NOTICE

- **Make sure the PV array is well insulated to 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 Data".**
- **Check the positive and negative polarity of the PV strings, and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.**
- **Electric arc or contactor over-temperature may occur if the DC connectors are not firmly in place, and the loss caused is not covered by the warranty.**
- **The axial tension exerted by DC cables on DC PV connectors must not exceed 80 N. Avoid prolonged axial stress on the connectors.**
- **Radial stress or torque on the connectors is prohibited, as this may lead to waterproofing failure and reduced reliability of the connectors.**
- **Route DC cables through the cable tray, and leave at least 150 mm of slack near the inverter. This restricts cable movement, thereby avoiding poor contact, damage, and fracture caused by stress on terminals.**
- **After completing the DC wiring, ensure that unused DC terminals are sealed with waterproof plugs.**
- **Any equipment damage resulting from failure to comply with the aforementioned requirements during DC wiring will not be covered under the product warranty.**

5.6 RS485 Connection



Port	PIN	Definition	Description
RS485_1	1	RS485A IN, RS485 differential signal+	Used for cascading inverters or connecting to devices such as the Data Logger.
	2	RS485A IN, RS485 differential signal+	
	3	RS485B OUT, RS485 differential signal-	
	4	RS485B OUT, RS485 differential signal-	
PE	5	PE, shielding ground	—
	6	PE, shielding ground	
RS485_2	7	RS485A, RS485 differential signal+	Communication device for connection to the tracking system
	8	RS485B, RS485 differential signal-	



5.7 PLC Communication Connection

With a PLC communication module built inside, the inverter can communicate with the Data Logger provided by SUNGROW. For specific wiring method, refer to the user manual for the data logger.



- The Data Logger is an optional device that can be ordered from SUNGROW.
- The Data Logger conducts data communication by directly using the AC output cable of the inverter and thus saves the trouble to lay and maintain the special communication cables. The RS-485 port of the Data Logger supports the transparent transmission of the MODBUS-RTU and is completely compatible with the monitoring devices and software of the original RS-485 communication method.

5.7.1 Application Scenarios

Device can be connected to a double-split transformer and a double-winding transformer. Wiring diagrams under these two scenarios are shown as follows. PLC1 refers to the MPLC node built in Logger4000. All cables run outside Logger 4000 in the wiring diagram, only for a clear illustration of the wiring principles.

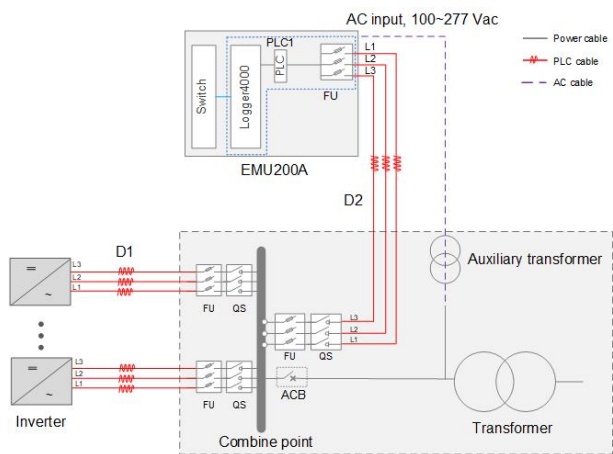


figure 5-5 PLC wiring diagram for a double-winding transformer

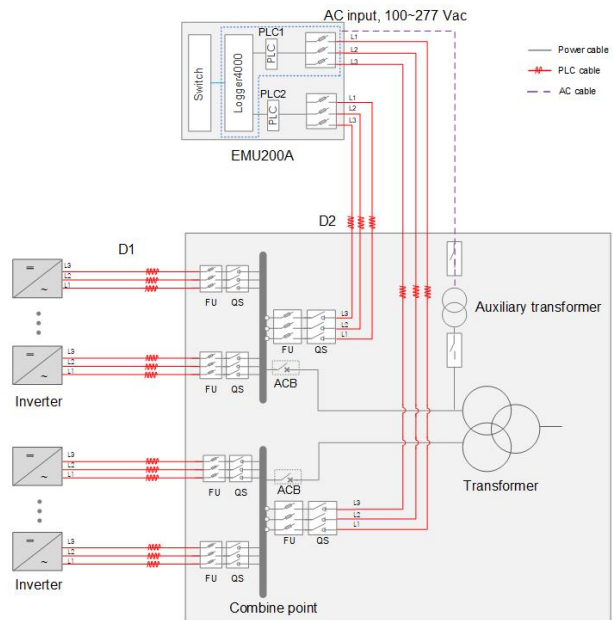


figure 5-6 PLC wiring diagram for a double-split transformer

Description of parameters in the diagrams is listed in the table below.

Parameter	Description	Cable Specification
D1	Length of PLC cable from communication box to box-type transformer	- If using multicore AC cable, the length should be $\leq 990\text{m}$. - If using single-core AC cable: - When $D2 \leq 3\text{m}$, the single-core cable length should be $\leq 790\text{m}$. - When $3\text{m} < D2 \leq 10\text{m}$, the single-core cable length should be $\leq 690\text{m}$. - If the two-wire-per-phase wiring scheme is adopted, the cable length requirements are the same as above.
D2	PLC cable from box-type transformer to communication box or external PLC module	- Outdoor UV-resistant multicore copper AC cable should be used, with a recommended core diameter of 2.5mm^2 to 4mm^2. - Cable isolation voltage $> 1000\text{V}$. - Cable length $\leq 10\text{m}$.
NOTICE The shorter the cable, the better the communication quality. If the cable length exceeds 10m, there is a risk of communication disconnection.		
PLC module	Port input voltage	$\leq 800\text{ Vac}$
	Port supply voltage	24 Vdc
	Maximum number of inverters connected	80

5.7.2 PLC Wiring Rules

Wiring from box-type transformer to inverter

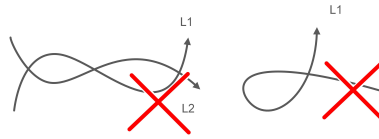
General requirements

The box-type transformer can be connected to the inverter using multi-core AC cables or single-core AC cables, or adopting the two-wire-per-phase wiring scheme, as required by the project.

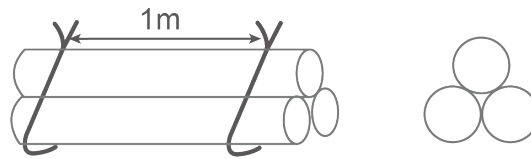


To ensure communication quality, the use of multi-core cables is recommended.

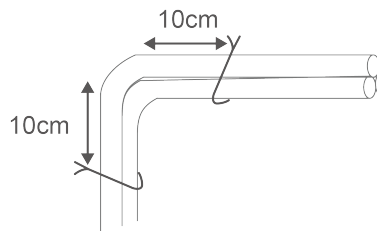
- The cable should be laid in cable trenches, cable ducts, or conduits.
- The cables should be laid parallel without any knots or twists.



- For three-phase single-core cables, they should be fixed every 1 meter and arranged in a "triangular" shape.



In this scenario, the cables are not easily bent. It is recommended to tie them separately at positions 10cm before and after the bend.



- If the single-core cables exceed 400 meters, log into the Web UI of Logger4000, on the **MPLC** page, set the PLC master node's frequency to **Band2** or **Band3**.

Requirements for two-wire-per-phase wiring

If two-wire-per-phase wiring is adopted, to ensure the MPLC communication quality, the length difference between the two sets of cables must not exceed 5 meters. For two-wire-per-phase wiring using single-core cables, the requirements for both sets of cables and the frequency band settings are the same as mentioned above.

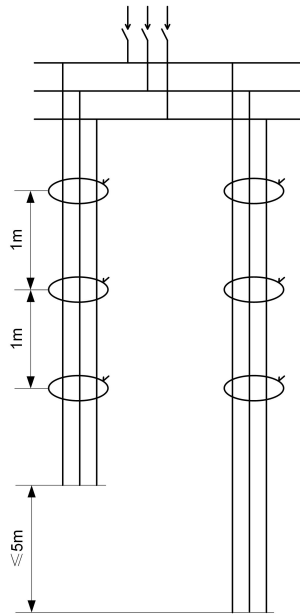
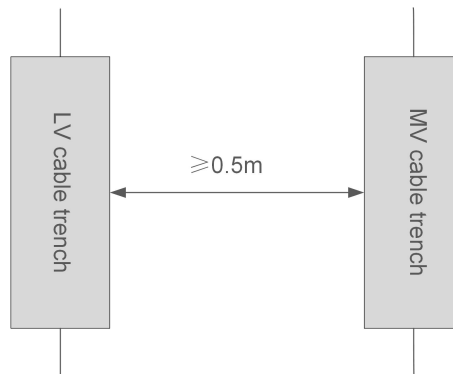


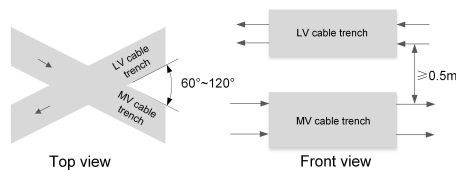
figure 5-7 Two-wire-per-phase wiring scheme

PLC wiring requirements

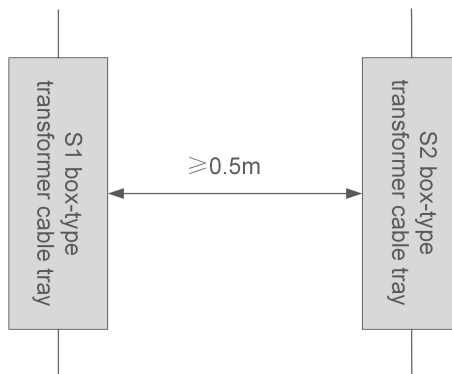
- The distance between low-voltage AC cables and medium-voltage AC cables should meet the following requirements:
 - Maintain a minimum horizontal distance of 0.5m between low-voltage AC cables and medium-voltage AC cables when laid parallel.



- If two cables are laid in a crossing manner, the angle of crossing should be between 60° and 120°, and the vertical distance should be no less than 0.5m.



- Only AC cables under the same box-type transformer can be laid in the same cable trench.
- When using different box-type transformers, the distance between the low-voltage side cable trays should meet the following requirements:
 - Maintain a minimum horizontal distance of 0.5m between cable trays from different box-type transformers.



- If two cables are laid in a crossing manner, the angle of crossing should be between 60° and 120°, and the vertical distance should be no less than 0.5m.

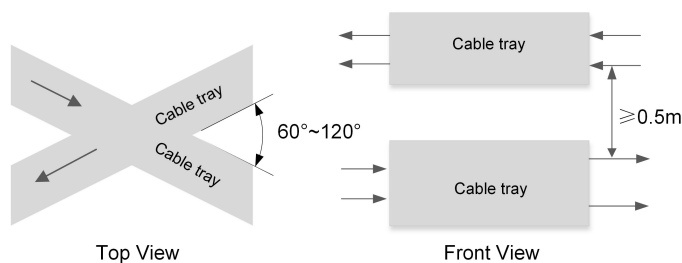


figure 5-8 Vertical crossing distance between PLC cables

Wiring from communication box to box-type transformer

- The AC cable between the box-type transformer and the communication box should be laid parallel without being twisted within the cable trench.
- The coupling point for the PLC cable connecting to the box-type transformer busbar should ideally be at the breaker corresponding to the middle position of the busbar. For example, this would be the 4th or 5th branch in an 8-branch setup, or the 5th branch in a 9-branch setup.

5.7.3 PLC Wiring

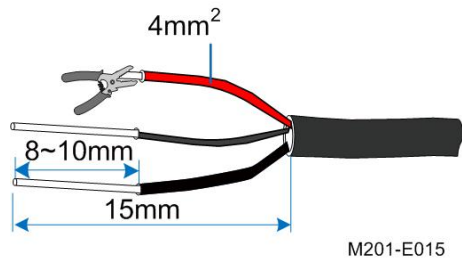
Pre-wiring preparation

- Before performing AC wiring, please ensure that upstream AC switches and fuses inside the device are all in the open state.
- Please refer to ["5.7.1 Application Scenarios"](#) for PLC application scenarios and cable specifications.

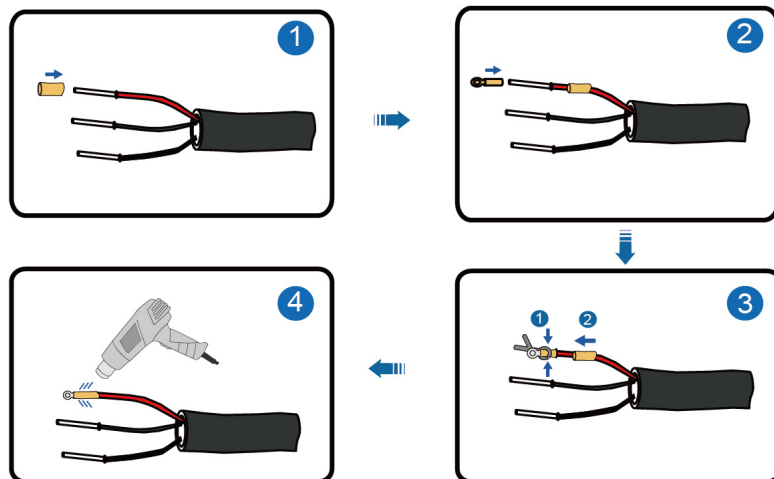
- Please refer to "[5.7.2 PLC Wiring Rules](#)" for wiring diagrams under different application scenarios.

Steps of wiring

- 1 Unscrew the "MPLC 800V" waterproof terminal at the bottom of the device, and lead the external AC cable through the waterproof terminal.
- 2 Remove the protective layer of the cable using a wire stripper to expose the copper core, as shown in the figure below.



- 3 Crimp the OT terminals (OT2.5-6 is recommended).



- 4 Connect the cable to the corresponding terminal, as shown in the figure below.

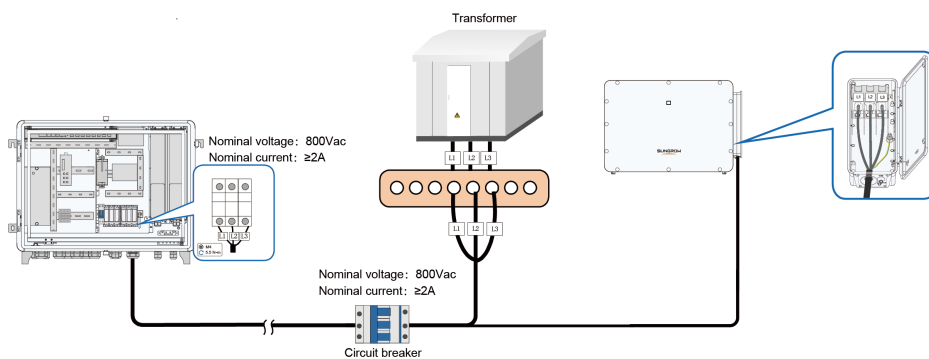


figure 5-9 Three-phase three-wire method



The coupling point for connecting the PLC cable to the box-type transformer busbar is recommended to be arranged in the position corresponding to the middle of the busbar.



- For parameters of the circuit breaker on the box-type transformer side, you may refer to the parameters of EMU200A's internal circuit breaker in the above figure.
- Please pay attention to the phase sequence of cables and terminals in the wiring process.

- Fasten the cables with screws after confirming the cables are properly prepared. Tightening torque: 5.5N·m

6 Commissioning Procedure

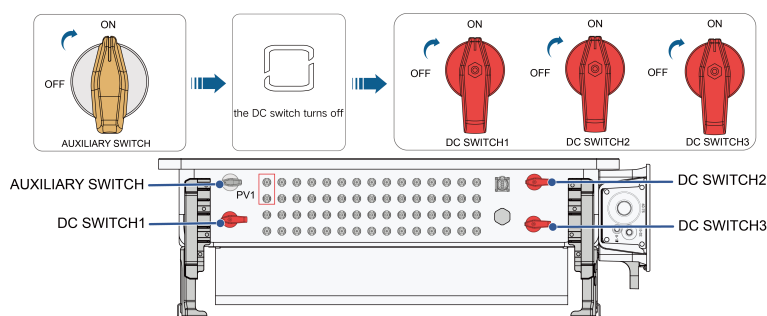
If the requirements for the above-mentioned items are all met, proceed as follows to start up the inverter for the first time.

step 1 Make sure there is string connected to PV1.

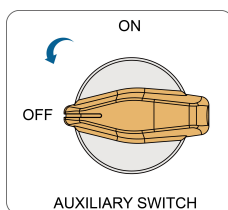
step 2 Turn the auxiliary switch on the bottom of the inverter to "ON". Check the indicator on the inverter.

step 3 If the indicator is on, turn the other DC switches to "ON".

- In case the DC switch turns off by itself, see ["7 DC Switch Maintenance"](#).
- If the inverter indicator is not on after 30 seconds, do not close the DC switches (SWITCH1, SWITCH2, SWITCH3 with red knobs), and meanwhile turn off the auxiliary switch. Check if the input cable is connected in reversed polarity, or if the input voltage meets the requirements for startup voltage. After inspections, go through again the commissioning procedure. If the indicator is still not on, turn off the auxiliary switch and contact SUNGROW for technical support.



step 4 Turn the auxiliary switch on the inverter to "OFF".



NOTICE

- **Please follow the above steps strictly in order. Otherwise, the product may get damaged, and the loss caused will not be covered by the warranty.**
- **If the DC side is powered up while the AC side is not, the inverter indicator may turn red, and the inverter will report a “Grid Power Outage” fault (the fault information can be viewed on the iSolarCloud App. See “Records” for details). The fault will be cleared automatically once the AC circuit breaker between the inverter and the grid is closed.**
- **Before closing the AC circuit breaker between the inverter and the power grid, measure the AC voltage with a multimeter set to “AC voltage”, making sure it is within the allowable range. Otherwise, the inverter may be damaged.**



The auxiliary switch needs to be closed only when the system is first powered on, and should be open during operation.

step 5 Close the AC circuit breaker between the inverter and the grid.

step 6 Install the iSolarCloud App.

step 7 It is required to set initial protection parameters on the iSolarCloud App when the inverter is connected to the grid for the first time. If, with sufficient light, the grid conditions meet the grid connection requirements, the inverter will work normally.

step 8 The home page is automatically displayed when the setting is completed. The indicator is steady blue, and the inverter is in grid-connected operation.

 WARNING

It is strictly forbidden to close the DC switch if the inverter is in grid-connected status. Otherwise, the inverter may be damaged due to the lack of insulation impedance detection, and the loss caused is not covered by the warranty.

- - End

7 DC Switch Maintenance



The DC switch is able to interrupt the circuits automatically when the device detects reverse polarity or back-feeding in the strings or a fault inside the inverter.

In case the DC switch on the inverter turns to the “OFF” position automatically, please proceed with the following steps:

- step 1 Check the fault information on the iSolarCloud App or in the energy monitoring system.
- step 2 In case of reverse polarity or back-feeding in the strings connected to the inverter, please perform troubleshooting according to the fault alarm information. You can close the DC switch after the fault is cleared.
- step 3 In case of a fault inside the inverter, please contact SUNGROW for technical support.

-- End