SUNGROW
Clean power for all

User Manual

Energy Management Unit

EMU200A



EMU200A-UEN-Ver38-202604

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About This Manual

This manual gives instructions mainly on the transport, storage, installation, electrical connection, and regular maintenance of the product, yet not all-encompassing regarding all details. You may visit **www.sungrowpower.com** or the website of the equipment manufacturer for more information.

Declaration

To ensure safe use of the product, please read through the below information carefully:

1. This manual is intended for personnel who are responsible for product installation or other work on the product. Users must have certain electrical and mechanical expertise, and be familiar with the electrical and mechanical schematics and the characteristics of electronic components. SUNGROW shall not be held liable for any personal injury or economic loss arising from the installation carried out by non-qualified personnel or not in compliance with the safety instructions specified in this manual.
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3. The manual may be updated and revised from time to time, however, there still might be slight deviation from the real product or errors. In such cases, the actual product you have purchased should take precedence. You can find the latest version of user manual on the company's website, or reach your sales for it.
4. To ensure the safety of the installation personnel, the product, and the system, be sure to follow the safety instructions specified in this manual when installing the product. SUNGROW shall not be held liable for any personal injury or economic loss arising from failure to follow the instructions specified in this manual.
5. If maintenance on or alteration to this product is needed, please contact SUNGROW customer service in advance. The copyright of this user manual belongs to SUNGROW, and any rights not expressly granted are reserved. The content herein is subject to change without notice and may deviate from the actual up-to-date product.

Target Group

This manual is intended for qualified technical persons who are responsible for installation, electrical connection, and other relevant work on the product.

Installation can only be done by qualified technical persons. Qualified technical persons must:

- Have certain electrical wiring, electronic, and mechanical expertise, and be familiar with electrical and mechanical schematics;
- Have received professional training in the installation and commissioning of electrical equipment, and have the necessary experience;

- Be able to respond quickly to dangers or emergencies that may occur during the process of installation and commissioning;
- Read through this manual carefully and have a good understanding of the relevant safety instructions;
- Be familiar with applicable local standards and relevant safety regulations on electrical systems.

How to Use This Manual

Read through this manual carefully before using the product, and keep it properly in an easy-to-reach place.

The manual may be updated and revised from time to time, however, there still might be slight deviation from the real product or errors. In such cases, the actual product you have purchased should take precedence. You can find the latest version of the manual at **support.sungrowpower.com** or reach your sales for it.

Symbols in the Manual

To ensure the safety of life and property for users when using the product and to improve the efficiency of product use, the manual provides relevant safety information, which are highlighted by the following symbols.

Symbols used in this manual are listed below. Please review carefully for better use of this manual.

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a moderately hazardous situation which, if not avoided, will result in death or serious injury.

⚠ CAUTION

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

NOTICE

Indicates a potential hazard which, if not avoided, will result in device malfunction or property damage.

Indicates supplementary information, emphasis on specific points, or tips related to the use of the product that might help to solve your problems or save your time.

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1 Safety Instructions

Be sure to read through this manual carefully before proceeding with the transport, storage, installation, operation, use, and maintenance of the device. All work should be done by strictly following the safety instructions mentioned in this manual to ensure the personnel safety. Improper use or misoperation may result in:

- Injury to or death of the operator or other people;
- Damage to the device or the property of the operator or other people.

- Safety instructions in this manual should only serve as a supplement and not all-encompassing regarding all the norms that need to be followed. All work should be carried out considering the actual situation on the site.
- SUNGROW shall not be held liable for damages caused by violation of safe operation requirements, general safety standards, and safety instructions in this manual.

1.1 Safety Signs on the Product

Signs on the Product

Observe all warning signs on the product at all times, which are:

Symbol	Description
	High voltage inside. Risk of electrical shock hazard when it is touched.
	PE (Protective Earthing) terminal, which should be grounded properly to ensure the safety of operators.

Labels Inside the Product

Observe all labels inside the product at all times, which are:

Symbol	Description
	Warning Electric Shock.
	Must wear insulated protection supplies.

1.2 General Safety Instructions

Compliance with Laws and Regulations

NOTICE

All work, including transport, storage, installation, operation, use, and maintenance, should be done in compliance with the local laws, regulations, standards, and specifications.

Personnel Requirements

NOTICE

Persons who perform operations on the device must meet the following requirements:

- **Have received professional training in the installation and commissioning of electrical equipment, and have the necessary experience;**
- **Be able to respond quickly to dangers or emergencies that may occur during the process of installation and commissioning;**
- **Persons, who are responsible for device installation and maintenance, must be trained thoroughly and have a firm grasp of the correct operation methods and a good knowledge of safety precautions and applicable local standards of the country/region;**
- **Persons responsible for special types of work (e.g. electrical operations, working at heights) must have relevant qualifications as required by the local regulations of the country/region.**

⚠ DANGER

- **Do not wear any conductive object, such as watches, bracelets, bangles, rings, and necklaces, during the operation process, so as to avoid electrical burns.**
- **Do not smoke in the area where the device is located, so as to prevent fires, electric shocks, and explosions, which may result in personal injuries or property damages.**

⚠ DANGER

Use specialized insulated tools during operation to avoid electric shock hazards or short circuits. The tools should have an insulation withstand voltage rating that meets the requirements of the applicable local laws, regulations, standards, and specifications.

⚠ WARNING

Wear specialized personal protective equipment during the process of operation, such as protective clothing, insulated shoes, goggles, safety helmets, and safety gloves.

⚠ WARNING

Personnel except for those who perform operations on the device should stay away from the device.

Tools Requirements

⚠ WARNING

- **Ensure all necessary tools are ready, without any damage, and pass the inspection by a specialized agency. Do not use tools that have signs of damages or fail to pass the inspection. Make sure the tools are firm and secure.**
- **Understand how to use the tools correctly before starting using them to avoid personal injury or damage to the device.**

⚠ WARNING

- **Use a wooden or insulated ladder when working at heights to avoid getting an electric shock.**
- **Check if the ladder is in good shape and if its load capacity meets the requirements. Do not overload the ladder.**

Environment Requirements

⚠ DANGER

Do not place the device near heat or fire, so as to prevent damaging the device or causing fires.

⚠ DANGER

Do not store flammables and explosives in the device area. Do not place the device in an environment with flammable, explosive gas or smoke, or perform any operation in such environments.

⚠ WARNING

Do not install the device in an area close to liquids, so as to avoid device malfunction or short circuits caused by ingress of liquids.

⚠ WARNING

When installing the device, ensure the foundation is solid and stable and has a load-bearing capacity up to the requirements of the device.

⚠ WARNING

Do not perform any operation on the product (including but not limited to, handling, installing, powering on, and 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.

⚠ WARNING

The device should be kept in a clean, dry, and well-ventilated place and protected from dust and condensation.

⚠ WARNING

Do no install the device in a place with strong vibration, strong noise source, or strong electromagnetic field interference.

⚠ CAUTION

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signages or safety warning tapes around the product.

NOTICE

Ensure the safety signs, warning labels, and the nameplate of the device are clearly legible.

1.3 Packaging, Transport, and Storage Safety

Packaging

The product is packed in a cardboard box with orientation markings that provide loading and unloading instructions.

Transport

- All work related to transport must be carried out in compliance with the applicable local laws and regulations of the country/region.
- Measures should be taken to fasten the goods during transport, so as to avoid damages to product packaging due to strong shaking or bumping.
- Get prepared for carrying its weight before handling the device to avoid getting hurt. This device should be moved by at least 3 people together.

Storage

- The place where the product is stored should be kept dry, clean, and well-ventilated, protected from hazardous gases.
- Do not store the product in a place where corrosives are kept.
- The packaged product should be stored in an appropriate environment. See "Technical Data" for the corresponding environmental parameters.

Unpacking and Inspection

- Non-qualified personnel are forbidden from disassembling the device or moving its components.
- Check if the product you have received matches the order you placed.
- Inspect the product for external damages or damages to its structural parts.
- Check if the safety signs, warning labels, and the nameplate on the product are all legible.

In case of any problem with the above-mentioned inspection items, contact SUNGROW in time.

1.4 Installation Safety

⚠ DANGER

During installation, do not perform any operation on the device when it is powered on. Do not connect or disconnect the cables when the device is powered on, as electric arcs or sparks may occur immediately when the cable core is in contact with the conductor, which may cause fires or personal injuries.

NOTICE

Installation should be conducted in compliance with the applicable local laws, regulations, standards, and specifications.

Installation Requirements

⚠ WARNING

Poor operating environments will affect the device's system performance!

- **Install the product in a well-ventilated place.**
- **Ensure the product's heat dissipation system or air vent is not blocked.**
- **Do not install the product in an environment with flammables, explosives, or smoke.**

Pre-installation

NOTICE

- **Upon receiving the product, be sure to inspect it for damages. Contact SUNGROW or the transport company immediately in case of anything abnormal.**
- **Be sure to have a good understanding of the safety instructions in this manual before performing any operation on the product.**
- **Please load/unload, handle, install, operate, and maintain the device by referring to the descriptions in this manual to ensure the safe use of the device.**
- **Before installing the device, ensure the cabinet is stable and not tilted.**

During Installation

NOTICE

This product can only be used for purposes specified in this manual. Unauthorized alternations or use of parts and components not sold or recommended by SUNGROW may result in fires, electric shocks, and other hazards.

NOTICE

Disconnect all electrical connection and the upstream input switch before installation, and ensure the device is voltage-free.

NOTICE

If drilling is required during installation:

- **Wear goggles and safety gloves.**
- **Avoid the water pipes and electrical wires inside the wall when drilling.**
- **Cover the product to protect it from ingress of debris and dust.**

Post-installation

NOTICE

After the device is installed, clear away the empty packaging materials in the device area, such as the cardboard box, foam, plastics, and ties.

1.5 Electrical Safety

Improper wiring may result in personal injuries. Operators responsible for electrical wiring must read through the safety instructions carefully before proceeding with this work.

⚠ DANGER

Before carrying out electrical connection:

- **Make sure the product is not damaged; otherwise, it may lead to danger.**
- **Disconnect the upstream input switch and ensure the device is voltage-free; otherwise, it may lead to electric shocks.**

⚠ DANGER

Improper or incorrect electrical wiring may result in accidents such as fires or electric shocks.

⚠ DANGER

Danger to life due to high voltage inside the device!

- **When performing electrical wiring, operators must wear proper personal protective equipment and use specialized insulated tools, so as to avoid electric shock hazards or short circuits.**
- **Ensure the cables are voltage-free using a measurement instrument before touching them.**
- **Please observe the warning signs on the device, and perform operations by strictly following the corresponding safety instructions.**

⚠ WARNING

For the device that needs to be grounded, connect the PE cable as the first step when installing it, and disconnect the PE cable at the very end of the process when removing it.

⚠ WARNING

Before operating the device, inspect the electrical connection and ensure the device is reliably grounded.

⚠ WARNING

If the power cable is not long enough, replace it with a new one. Do not add joints or welding spots to the power cable.

⚠ WARNING

- **Electrical connection must be performed by qualified personnel.**
- **All work related to wiring must be conducted in compliance with the applicable local laws and regulations of the country/region.**
- **Please observe the warning signs on the device, and perform operations by strictly following the corresponding safety instructions.**
- **Damages to the product due to incorrect wiring will not be covered by the warranty.**

1.6 Operation Safety

There is high voltage inside the device when it is running, and improper operation may cause personal injuries or property damages. Please perform operations by strictly following the safety instructions specified in this manual and other relevant documentation.

⚠ DANGER

When laying cables, keep the cables at least 30 mm away from the outer edge of the heat-generating components or areas, so as to protect the insulation layer of cables from aging or getting damaged due to high temperature.

⚠ DANGER

When the device is running:

- **Do not touch any live component of the device; otherwise, it may lead to electrical shocks.**
- **Do not touch any wiring terminal on the device; otherwise, it may lead to electrical shocks.**
- **Do not touch any hot part of the device (e.g. heat sink); otherwise, it may cause burns.**

1.7 Maintenance Safety

Improper maintenance may lead to personal injuries or property damages. Therefore, it is necessary to power off the device before maintenance and perform operations by strictly following the safety instructions specified in this manual and other relevant documentation.

⚠ DANGER

- **Before maintenance, disconnect the upstream power supply and PLC power supply first; otherwise, it may cause personal injury.**
- **Wait 25 minutes after the device is powered off, then measure the voltage and current with a specialized measurement instrument. Only when no current or voltage is present, operators, who wear protective equipment, can perform operation and maintenance on the device.**
- **Even if the device is shut down, it may still be very hot and cause burns. Please perform operations on the device wearing safety gloves after it cools down.**

⚠ DANGER

Do not touch the grid or the contacts and terminals inside the product that are connected to the grid; otherwise, it may lead to electric shocks.

⚠ WARNING

Power off the device before proceeding with maintenance.

⚠ WARNING

- **Repair of the device can only be performed by SUNGROW's service team or qualified personnel.**
- **Users are forbidden from performing repair and maintenance or replacing modules by themselves. Otherwise, it may cause severe personal injuries or property damages.**

⚠ CAUTION

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signages or safety warning tapes around the product.

NOTICE

- **Do not use cleaning agents to clean up the device. Otherwise, the device may be damaged, and losses caused therefrom will not be covered by the warranty.**
- **If the paint on device's enclosure peels off or the enclosure gets rusty, repair it in time. Otherwise, the device performance may be affected.**
- **No component inside the device requires maintenance. Do not open the device (except for the junction box) or replace any internal components without authorization. Otherwise, damages caused therefrom will not be covered by the warranty.**
- **To minimize the risk of electric shocks, do not perform maintenance operations that are not specified in this manual. If needed, please contact SUNGROW for maintenance and repair services. Otherwise, damages caused therefrom will not be covered by the warranty.**

1.8 Disposal Safety

Please scrap the product in accordance with relevant local regulations and standards to avoid property damages or personal injuries.

NOTICE

- **All work related to product scrapping must be done in compliance with the applicable local laws and regulations of the country/region.**
- **Ensure the safety signs, warning labels, and the nameplate on the product are all legible before scrapping it.**

2 Product Description

2.1 Networking Scenarios

EMU200A is equipped with a Logger4000 inside, whith which EMU200A can be applied to various networking scenarios. It can access the inverter, box-type transformer, meteo station and meter in the PV power generation system through RS485 bus, and can also access the string inverter with PLC function produced by SUNGROW through PLC bus.

- EMU200A can transmit the collected device data to the background plant controller, such as Insight and SCADA, through the core switch.
- EMU200A can also transmit the collected device data directly to iSolarCloud through the 4G router.

Connected to background plant controller through a core switch

EMU200A can be connected to Insight or SCADA through a core switch, as shown below.

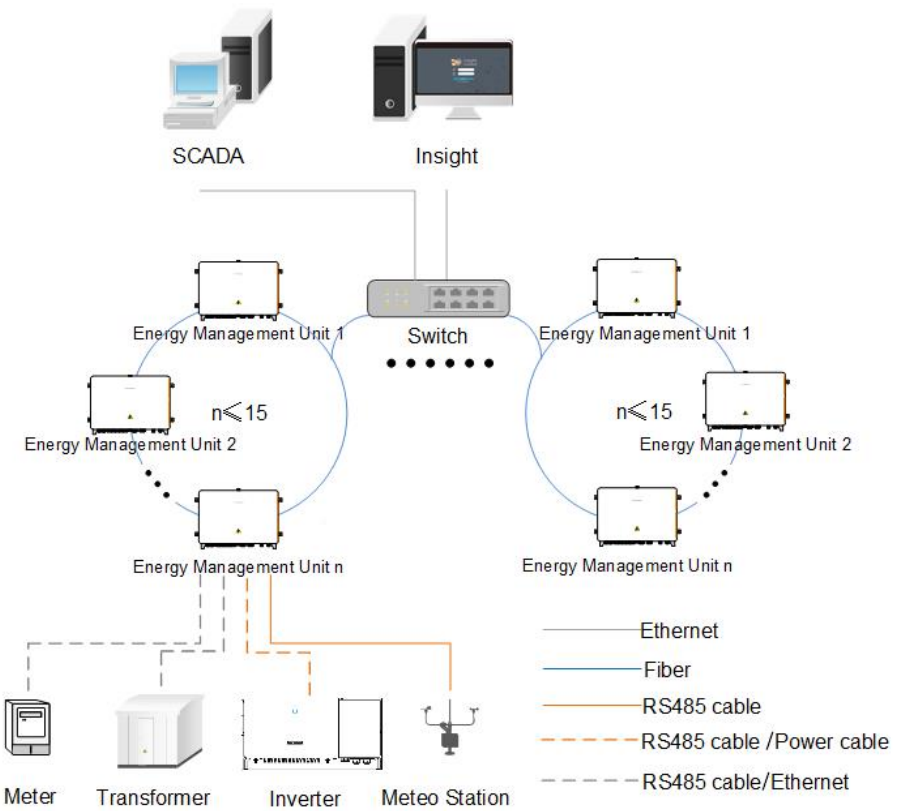


Figure 2-1 Ring networking

When the ring networking is used, a maximum of 15 EMU200A can be connected to a ring network.

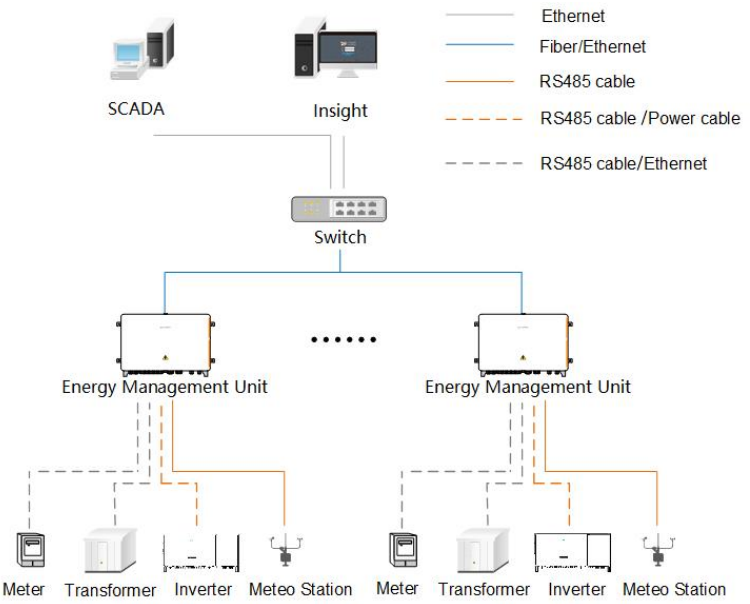
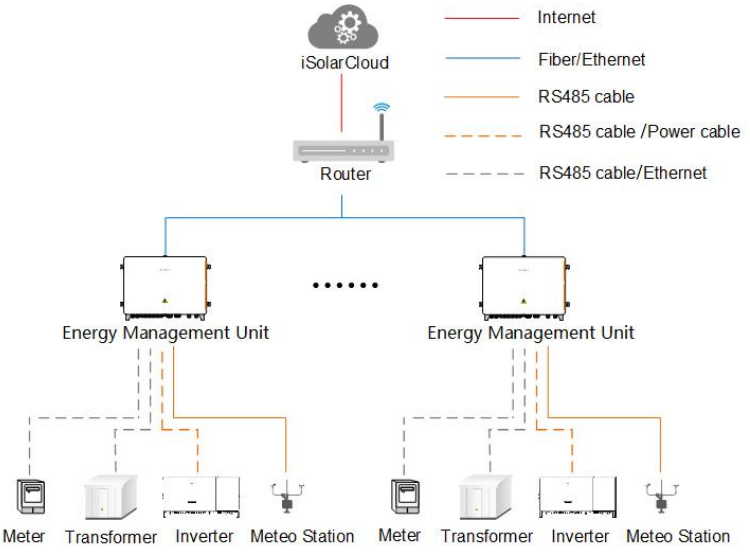


Figure 2-2 Star networking

Connected to iSolarCloud through a router

EMU200A can be directly connected to the iSolarCloud through a router, as shown below.



The function of the data collector to forward data to iSolarCloud is disabled by default. Prior to activation, the user must provide explicit consent with full awareness and establish a secure connection to the public network through encrypted authentication. Remote access is only valid after authorization, and all operations are logged for audit and traceability purposes.

2.2 Main Features

Flexible networking

- Support of RS485, Ethernet and MPLC communication.
- Support access of tracking system, box-type substation measurement and control, meter, meteo station and other equipment.

Convenient O&M

- Inverter batch parameter settings and firmware updates.
- Grid control instructions and power factor control, 30ms fast reactive power scheduling.

Safe and reliable

- Electrical isolation and SPD for every port.
- (Optional) Built-in anti-PID and insulation resistance detection (ISO).
- IP66 protection.

2.3 Dimensions

The following figure shows the dimensions of the product.

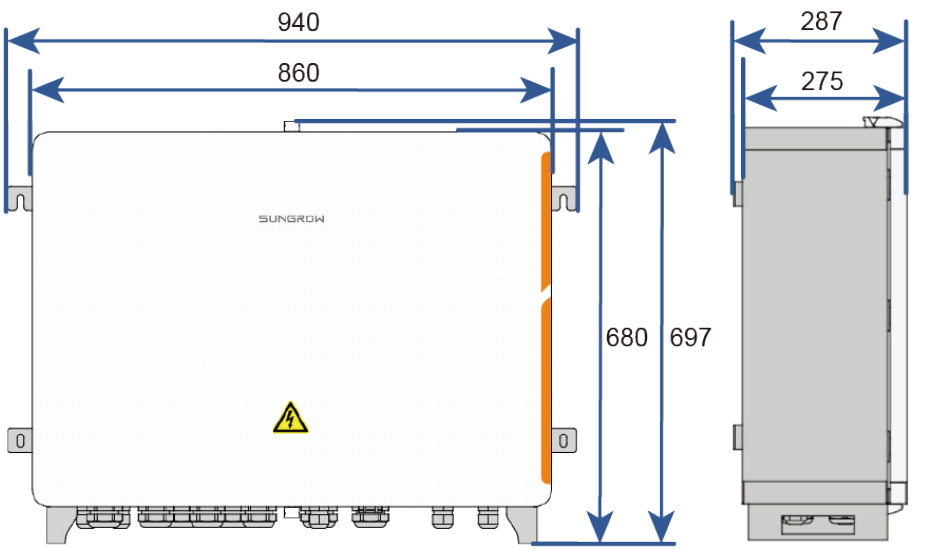


Figure 2-3 Dimensions of the product(in mm)

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

3 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

3.1 Installation Notices

Before installing the device, read through the “General Safety Instructions” first and ensure the requirements listed therein, as well as requirements mentioned in "Installation Safety", are all met.

⚠ DANGER

During installation, do not perform any operation on the device when it is powered on. Do not connect or disconnect the cables when the device is powered on, as electric arcs or sparks may occur immediately when the cable core is in contact with the conductor, which may cause fires or personal injuries.

⚠ WARNING

- **Install the product in a well-ventilated place.**
- **Ensure the product’s heat dissipation system or air vent is not blocked.**

NOTICE

Disconnect all electrical connection and the upstream input switch before installation, and ensure the device is voltage-free.

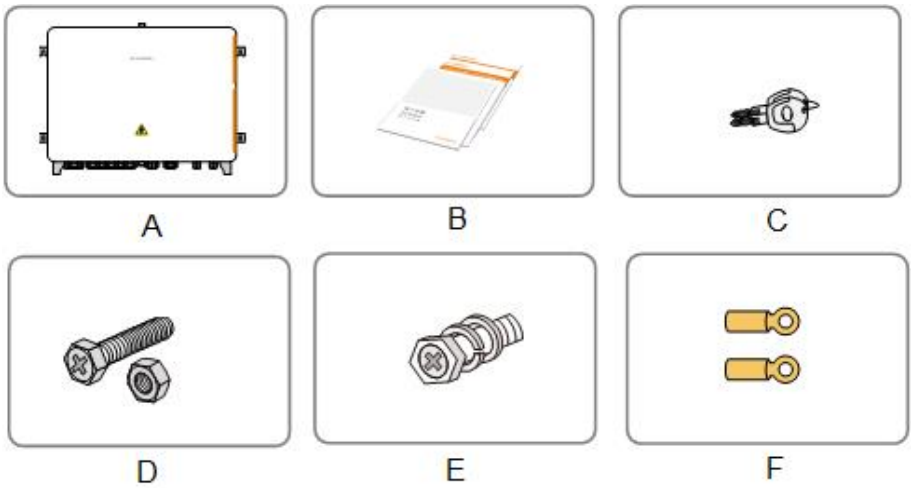
NOTICE

If drilling is required during installation:

- **Wear goggles and safety gloves.**
- **Avoid the water pipes and electrical wires inside the wall when drilling.**
- **Cover the product to protect it from ingress of debris and dust.**

3.2 Inspection Before Installation

Check the scope of delivery for completeness according to the packing list. The following items should be included:



Item	Description	□□
A	EMU200A	1
B	Documents, including certificate, warranty card, delivery inspection report, quick installation instruction, etc.	1
C	Keys	4
D	M10x45 bolt assembly	4
E	M6x12 bolt	1
F	OT terminal	1

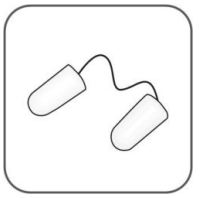
NOTICE

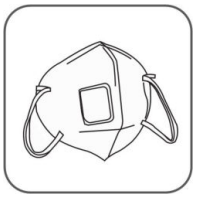
The device is carefully tested and inspected before delivery, but damage may be caused during shipping. Therefore, inspect the device before installation. If there any damage, contact the forwarding company or SUNGROW.

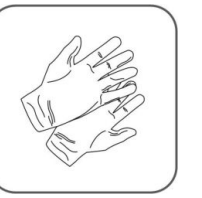
3.3 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.


Goggles


Earplugs

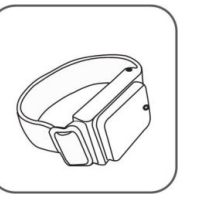

Dust mask


Dust mask


Insulated shoes


Utility knife


Marker


Wrist strap


Level


Hammer drill (φ12)

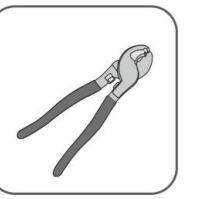

Phillips screwdriver (M4, M6)


Slotted screwdriver (M2)


Rubber mallet


Wrench (18 mm, 21 mm)

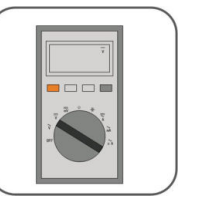

Pliers


Wire cutter


Wire stripper


Tube crimp


Heat gun


Multimeter (≥ 1500 Vdc)

3.4 Location Requirements

- The device is IP66 rated and can be installed outdoors.
- Install the device in a well-ventilated place to ensure good heat dissipation. If the device needs to be installed in a closed environment, please install additional heat dissipation or ventilation devices.
- The ambient temperature must be between -30°C and +60°C, and the relative humidity must be ≤ 95% (non-condensing). Overly high humidity may cause damage to internal components.
- Ensure the device is well protected against moisture and humidity. 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.
- Do not install the device in a place that is flammable, explosive, or smoky, including but not limited to areas with combustible gases, dust or smoke, near pressure vessels or flammable materials, etc.
- Do not install the device in a place with corrosives such as corrosive gas and organic solvent, etc.
- Do not install the device in a place contaminated with chemicals such as halogen, sulfide, etc.
- Please consult Sungrow before installing the device outdoors in areas prone to salt damage,

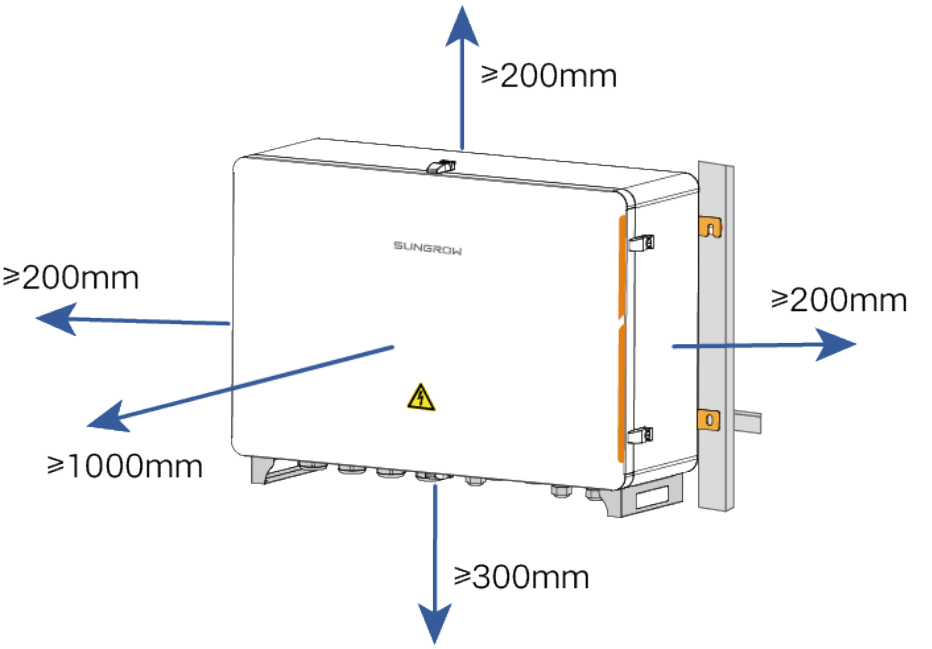
  which mainly are coastal areas within 500 meters of the coast. The sedimentation amount of salt spray is correlated to the characteristics of the seawater, sea winds, precipitation, air humidity, topography, and forest coverage in the adjacent sea areas, and there are substantial differences between different coastal areas.

- Do not install the device on a structure that may generate resonance. Ensure the device is free from vibration after installation.
- Install the device in a place with shelter, or under a sunshade.

  If the ambient temperature around the device exceeds 50°C and the solar irradiance is greater than 1000 W/m², the device must be installed in a sheltered area or fitted with a sunshade to avoid internal overheating caused by direct sunlight. When the device is installed indoors, the ambient temperature around the device must not exceed 60°C. Exceeding this limit may lead to internal overheating. (Ambient temperature around the device refers to the average temperature measured approximately 1 meter from the device.)

- Keep the device away from heat sources. Do not install it near heat sources such as transformers, hot air outlets, etc. Maintain a minimum clearance of at least 1 meter from such heat sources.
- There must be no obstacles such as brackets, railings, etc. within 1 meter in front of the device that may interfere with door opening and maintenance.

- Ensure the installation site has a solid and stable ground surface. Do not install the device on unstable geological conditions such as soft soil, loose soil, soil prone to subsidence, etc. Do not install the device in places at risk of water submersion. Damage caused by water submersion is not covered by the warranty.
- If a sunshade is required, please contact Sungrow.

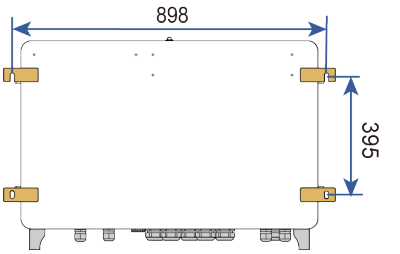


3.5 Installation Method

⚠ WARNING

Beware of the weight of the device throughout the installation process! Tilting or falling of the device due to inappropriate processing can cause personal injury!

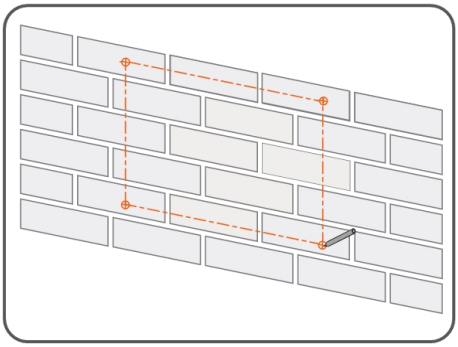
The installation dimensions of mounting ears on the back of the device are shown in the following figure (unit: mm).



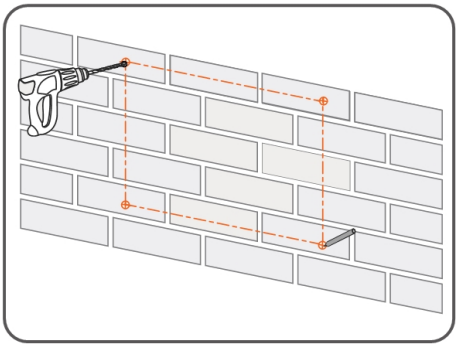
Wall mounting and bracket mounting are both available. Choose the corresponding installation method according to actual needs.

3.5.1 Wall Mounting

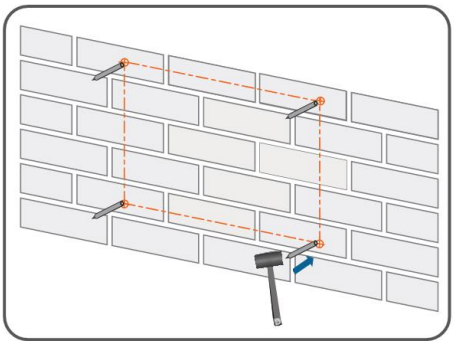
Step 1 Mark the hole locations on the installation wall according to the foregoing installation dimensions.



Step 2 Drill holes on the marked locations.



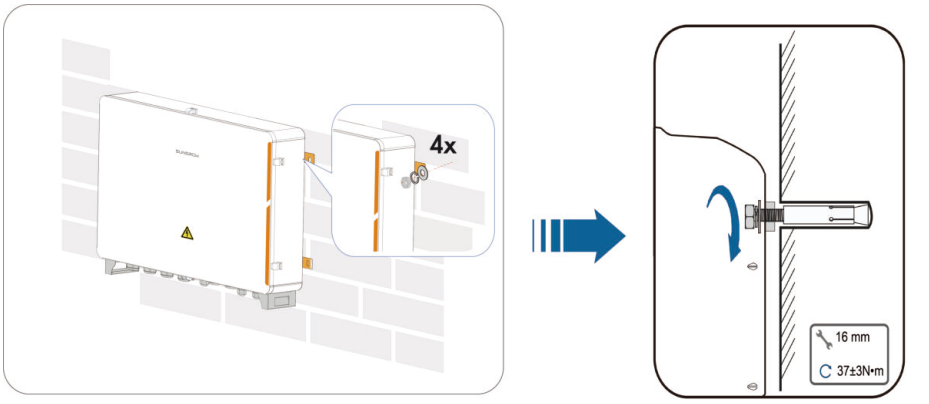
Step 3 Place the M10X45 expansion sleeve(not included in the scope of delivery) into the hole, and tap it with a rubber hammer. Make it completely embedded in the wall.



M204-I011

Select expansion bolts with proper length according to the depth of drilling.

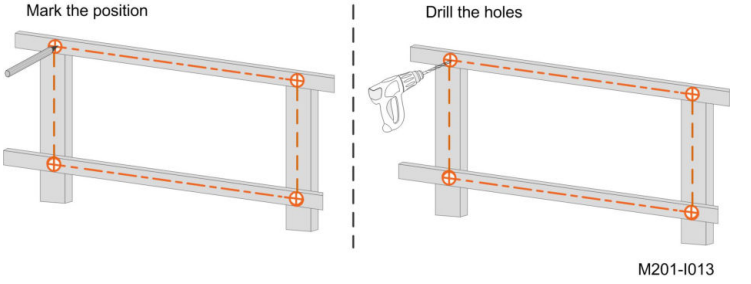
Step 4 Fasten the device on the wall in the order of nut, lock washer, flat washer, mounting ear.



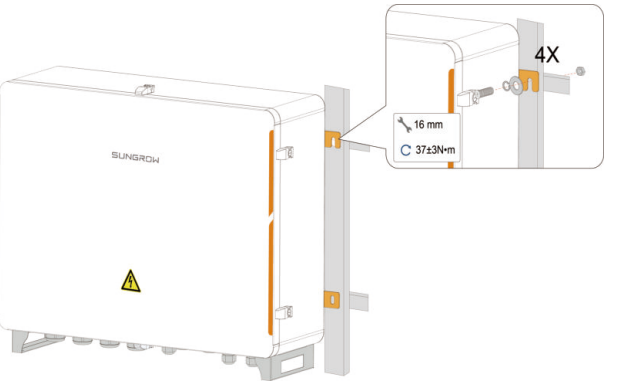
--End

3.5.2 Bracket Mounting

Step 1 Mark the hole locations on the mounting brackets according to the installation dimensions of mounting ears and drill holes on the marked locations according to bolt specifications.



Step 2 Fasten the device on the brackets in the order of M10x45 bolt, mounting ear, mounting bracket.



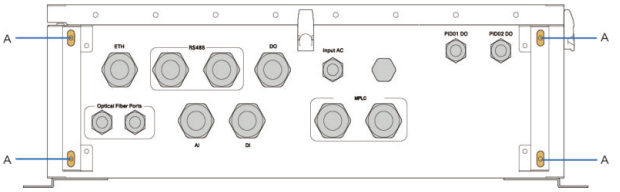
Step 3 Check to ensure the device is firmly in place.

--End

3.5.3 Ground Mounting

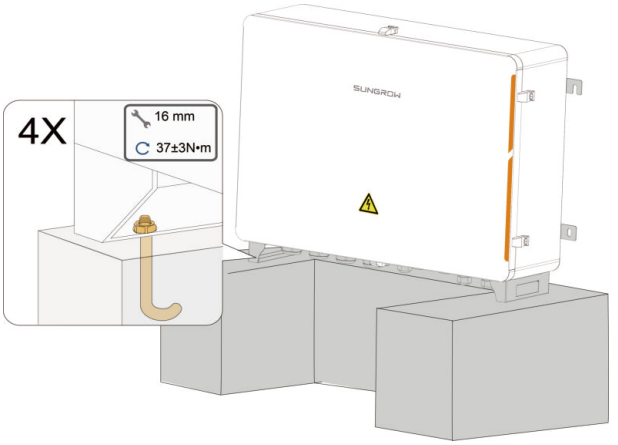
For ground mounting, the device is fixed to the foundation via the installation holes in the bottom of the device (shown as A in the figure below).

To avoid excessive bending of cables, it is recommended that the bottom of EMU200A be 30 cm from the ground.



Step 1 Construct the foundation according to the exterior dimensions of the device.

Step 2 Pre-embed the foundation bolts in the four corners of the foundation, and the bolts used are M10.



The foundation bolts are not in the scope of delivery.

Step 3 Secure the installation holes in the bottom of the device to the foundation with a fastening torque of 37±3N.m.

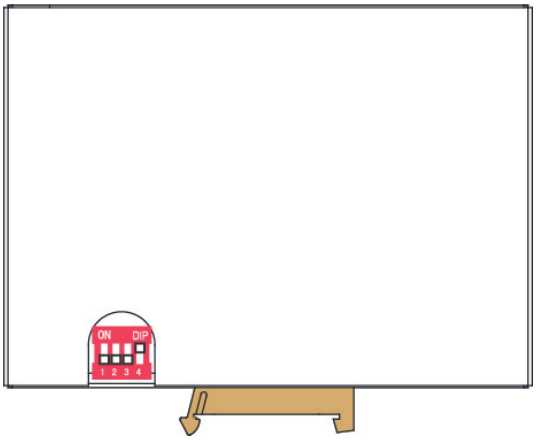
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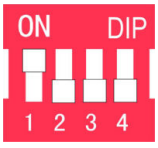
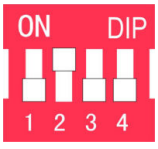
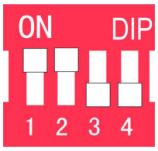
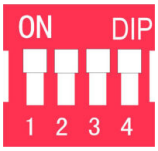
3.6 Installing IO Modules (Optional)

This operation is required if IO modules are ordered.

Step 1 Remove the IO modules assembly from the IO module deliverables.

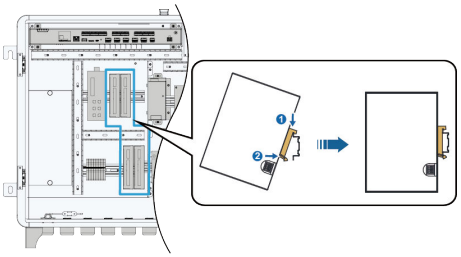
Step 2 Set communication address. Find the dip switch on the back, and set the communication address through the dip switch. The setting range of the communication address is from 1 to 15.



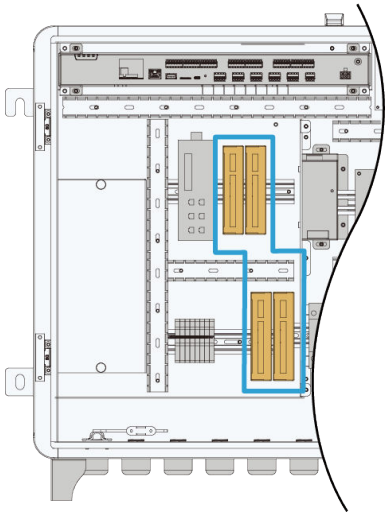
Example of communication address setting	Binary address	Decimal address
	0001	1 ($1\times2^0=1$)
	0010	2 ($1\times2^1+0\times2^0=2$)
	0011	3 ($1\times2^1+1\times2^0=3$)
⋮	⋮	⋮
	1111	$1x2^3+1x2^2+1x2^1+1x2^0=15$

The dip switch addresses on each IO module must be different.

Step 3 Insert IO modules into the reserved area.



Step 4 Install the four IO modules as shown in the following figure.



--End

4 Electrical Connection

4.1 Electrical Connection Notices

Before performing electrical connection, read through the “General Safety Instructions” first and ensure the requirements listed therein, as well as requirements mentioned in "Electrical Safety", are all met.

⚠ DANGER

Before carrying out electrical connection:

- **Make sure the product is not damaged; otherwise, it may lead to danger.**
- **Disconnect the upstream input switch and ensure the device is voltage-free; otherwise, it may lead to electric shocks.**

⚠ DANGER

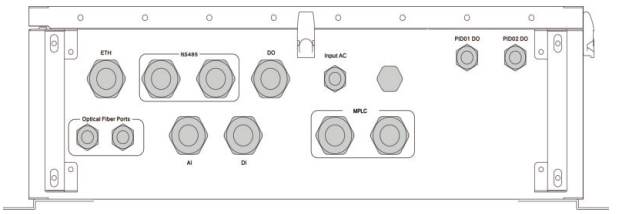
Danger to life due to high voltage inside the device!

- **When performing electrical wiring, operators must wear proper personal protective equipment and use specialized insulated tools, so as to avoid electric shock hazards or short circuits.**
- **Ensure the cables are voltage-free using a measurement instrument before touching them.**
- **Please observe the warning signs on the device, and perform operations by strictly following the corresponding safety instructions.**

⚠ WARNING

- **Electrical connection must be performed by qualified personnel.**
- **Please observe the warning signs on the device, and perform operations by strictly following the corresponding safety instructions.**

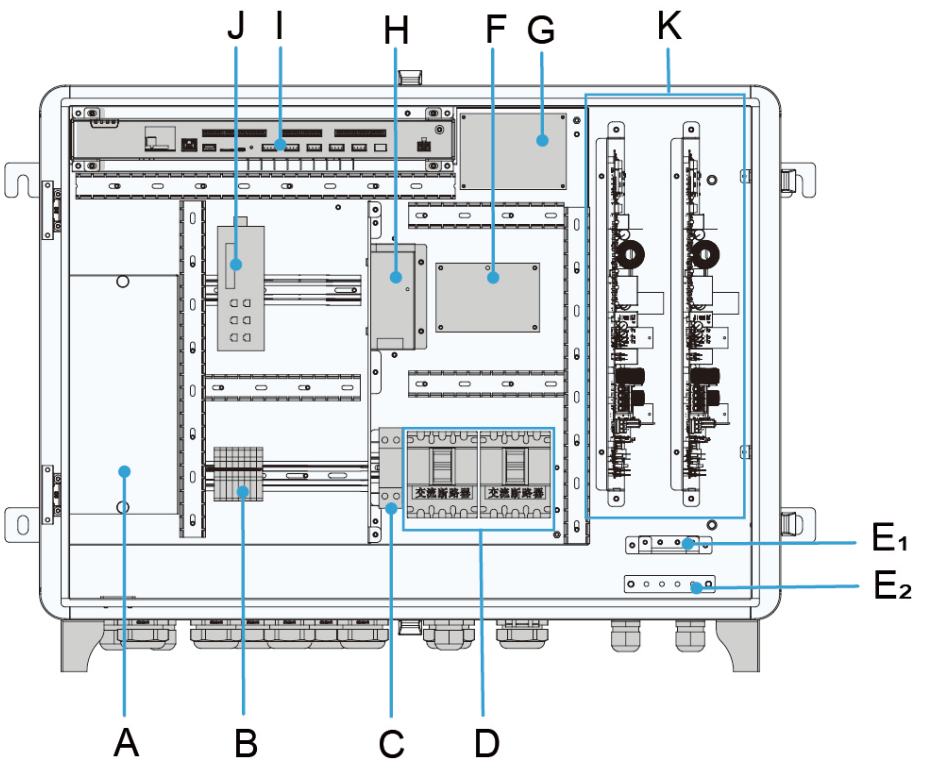
4.2 Waterproof Terminal Description



Mark	Description
ETH	Waterproof terminals for Ethernet communication cables
RS485	Waterproof terminals for RS485 communication cables
DO	Waterproof terminals for dry contact output cables
AI	Waterproof terminals for analog input cables
DI	Waterproof terminals for dry contact input cables
Optical Fiber Ports	Waterproof terminals for optical fibers
MPLC	Waterproof terminal for PLC communication cables
Input AC	Without anti-PID module: Waterproof terminal for AC 100Vac–277Vac power cables With anti-PID module: Waterproof terminal for AC 198Vac–242Vac power cables
PID01 DO	Waterproof terminal for PID dry contact output
PID02 DO	Waterproof terminal for PID dry contact output
	Grounding point, on the right side of the device

4.3 Internal Structure

The internal structure of EMU200A is shown in the following figure.



Item	Description	Recommended Cable Specification	Description
A	Optical fiber terminal box	—	Optional Must work with optical fibre ring switches For more information, please visit the distributor's official website
B	RS485 communication terminals	2 x (0.75~1.5) mm^2 outdoor anti-ultraviolet twisted pair with a shielding layer	Cables not included in the scope of delivery
C	220Vac power supply terminals	1~1.5 mm^2 outdoor anti-ultraviolet wire	Cables not included in the scope of delivery
D	AC fuse box	Recommended cable specifications: 4mm²~10mm², Cable withstand voltage:	Cables not included in the scope of delivery

Item	Description	Recommended Cable Specification	Description
		Cable grounding working voltage > 1000V	
E	Grounding terminals	4mm²~10mm²or 7~11AWG	Cables not included in the scope of delivery
F	SPD	—	—
G	PLC module	—	—
H	Switch power	—	—
I	Logger4000	—	—
J	Optical fibre ring switch	—	Optional Must work with the optical fiber terminal box For more information, please visit the distributor's official website
K	PID module	—	Optional • The rated input voltage should be about 198~242 V if PID related functions are to be used. • The rated input current is 0.8 A if there is no PID module; The rated input current is 2.8 A if there are two PID modules.

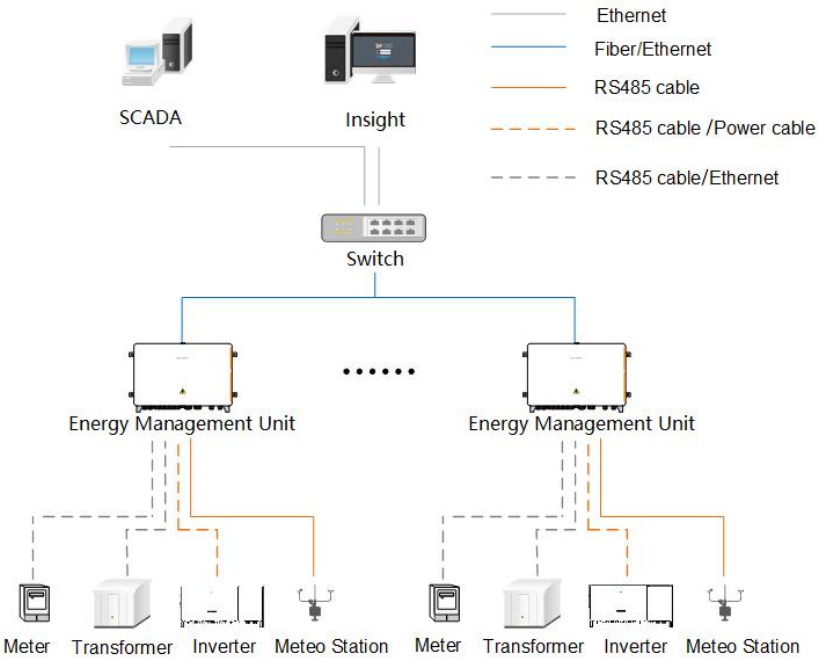
NOTICE

Internal components may differ as per selected product module. For details, refer to the product received.

4.4 Connection Overview

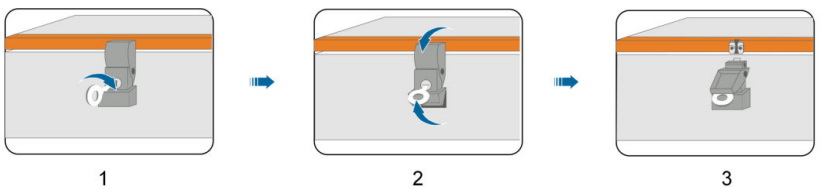
EMU200A can collect information of the inverter, the transformer, and other devices in the system, and upload it to the background monitoring system or iSolarCloud.

EMU200A supports various communication methods. The following describes the scenario where data is transferred to the background plant controller through a switch. Through RS485 cable or power line, EMU200A can realize RS485 communication and power line carrier communication (PLC), and collect device information, which can be transmitted to the back plant controller through optical fiber or Ethernet.

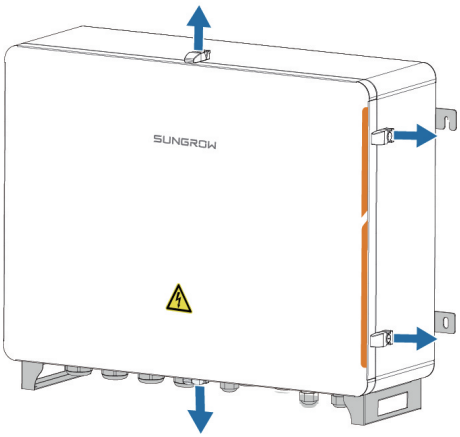


4.5 Preparation Before Connection

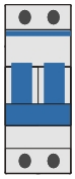
Step 1 Open the cabinet. Unlock the door with the specific key, as shown in the following figure.



Step 2 Unclip the top and bottom clips of the cabinet.

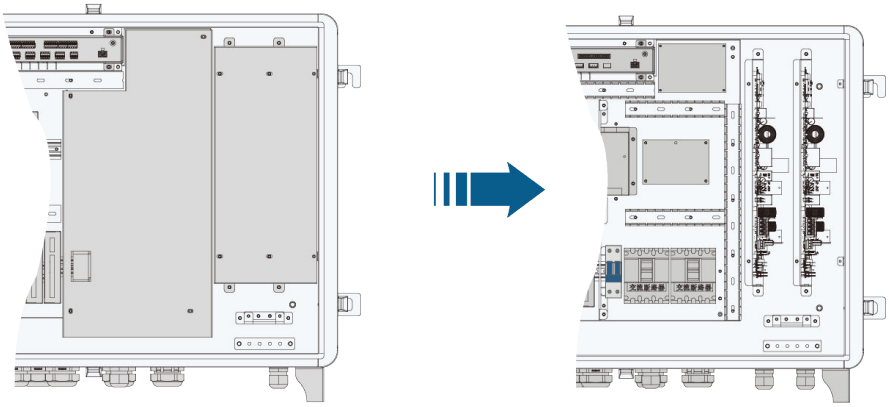


Step 3 Disconnect the upstream input switch of the device, and turn the power switch inside the device to the "OFF" position to ensure the device is voltage-free.



Step 4 Disconnect the switch of the transformer side.

Step 5 Remove the protective cover inside the cabinet.



--End

4.6 Connection Steps

4.6.1 Grounding

Safety Instructions

⚠ WARNING

The grounding cable must be grounded reliably! Otherwise,

- **Lethal electrical shock can be caused when a fault occurs!**
- **The device may be damaged by lightning!**

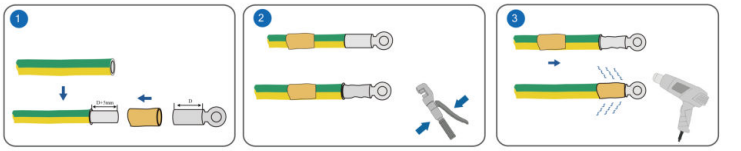
Brief Introduction

The EMU200A provides two grounding terminals: the functional earth bar inside the enclosure and the grounding point outside the enclosure.

During on-site installation, both grounding terminals must be reliably grounded.

Preparation Before Installation

- Prepare the grounding cable.
- Strip the cable and crimp the OT terminal, and then use heat shrink tubing to tighten the cable and the OT terminal.

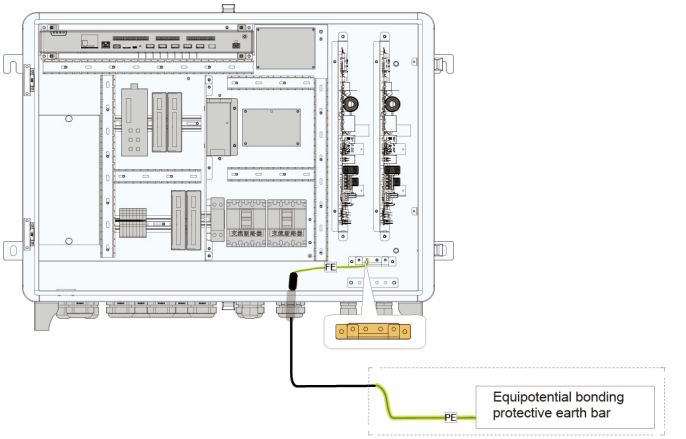


4.6.1.1 Cooper Bar Grounding

Prerequisite

Position Description

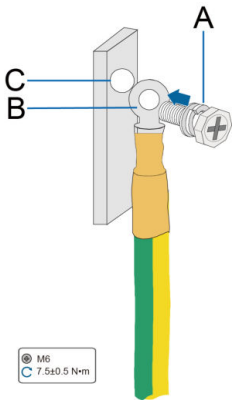
The grounding copper bar is located inside the cabinet, as shown in the figure below.



Wiring Steps

Step 1 Unscrew the waterproof terminal “MPLC 800V” at the bottom of the device.

Step 2 Connect the yellow-green grounding cable led from outside to the grounding copper bar inside the device through the internal waterproof terminal “MPLC”.



Item	Definition	Remark
A	M6x12 bolt	Included in the scope of delivery
B	OT terminal	Included in the scope of delivery
C	Grounding hole	-

Step 3 Secure the cable with bolt with a fastening torque of 7.5±0.5N·m.

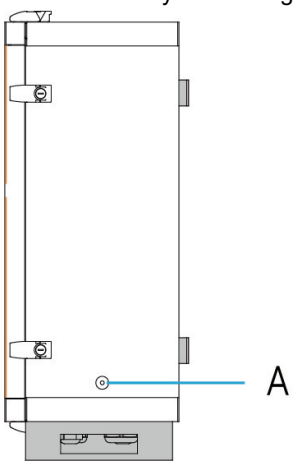
Step 4 Screw the waterproof terminal at the bottom of the device.

--End

4.6.1.2 PE Point Grounding

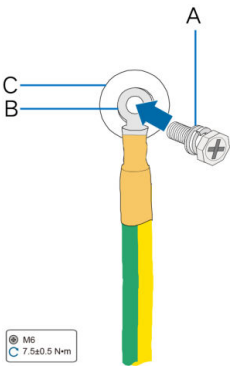
Position Description

The external PE point of the device is shown by A in the figure below.



Wiring Steps

Anchor the prepared OT terminal to the grounding hole with bolt assembly with a fastening torque of 7.5±0.5N·m.



Item	Definition	Remark
A	M6 x 12 bolt assembly	Included in the scope of delivery
B	OT terminal	Included in the scope of delivery
C	Grounding hole	-

4.6.2 RS485 Communication Terminal Connection

Preparation Before Connection

NOTICE

When the EMU200A is connected to external devices by RS485, make sure that the external devices are protected against lightning.

Cable Requirements

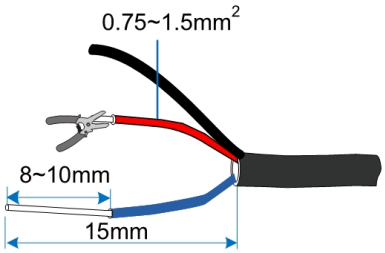
Cables connected to the device must be 2 x (0.75~1.5)mm^2 in cross-sectional area.

Wiring Steps

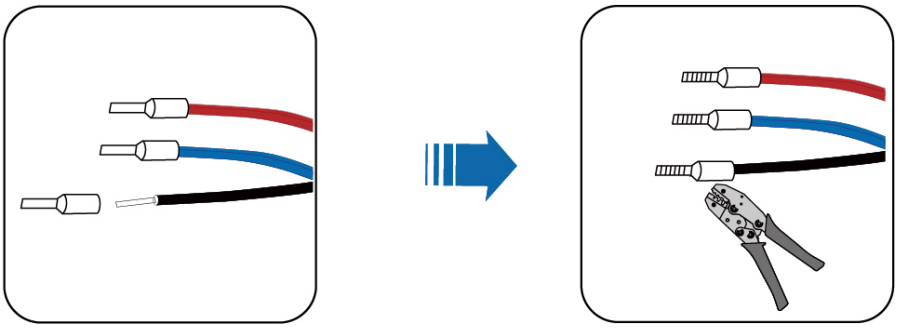
Step 1 Unscrew the "RS485" waterproof terminal at the bottom of the device.

Step 2 Connect the RS485 cable led from outside to the communication terminal inside the device through the "RS485" waterproof terminal.

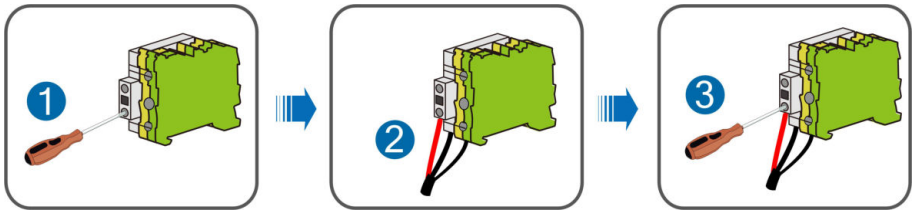
Step 3 Strip the cable jacket with a wire stripper.



Step 4 Assemble proper cord end terminals to communication cable whose protective layer is stripped off and crimp them with a crimping tool.



Step 5 Connect the cable to the corresponding terminal, and secure it with a screwdriver with a fastening torque between 0.5N·m and 0.6N·m.



Mark	Definition
A	Connected to RS485–A, corresponding to upper-layer terminal
B	Connected to RS485–B, corresponding to lower-layer terminal
GND	Connected to RS485 cable shield

For Weidmuller and Janitza meters, it is necessary to reverse the A and B terminals when connecting EMU200A.

Step 6 Gently pull the cable backwards to ensure firm connection.

Step 7 Screw the "RS485" waterproof terminal at the bottom of the device.

--End

4.6.3 Optical Fibre (Optional)

Step 1 Unscrew the waterproof terminal, and lead the optical fibre through the terminal.

Step 2 Splice the optical fibre inside the splice box.

For details, contact SUNGROW.

Step 3 Screw the waterproof terminal.

--End

4.6.4 Power Supply Connection

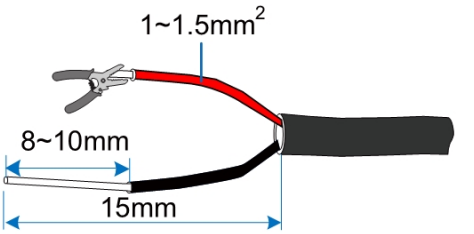
Preparation Before Installation

- Before wiring power supply, ensure that the micro circuit breaker is in the OFF position.
- Prepare the AC cable.

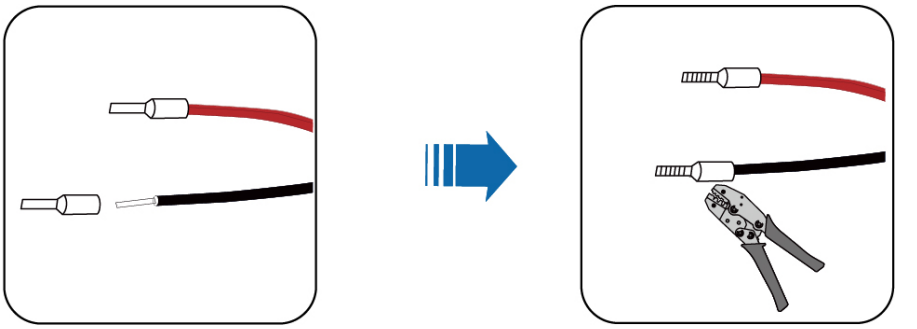
Installation Steps

Step 1 Unscrew the waterproof terminal "Input AC 100–277V", and lead the external power supply cable through the terminal.

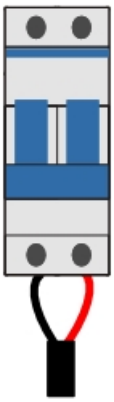
Step 2 Strip the cable with a wire stripper.



Step 3 Crimp the cord end terminal, and the recommended terminal model is LT015008.



Step 4 Connect the cord end terminal to the corresponding terminal, and secure it with a screw with a fastening torque of 2.0N·m.



Step 5 Screw the waterproof terminal "Input AC 100–277V".

--End

4.6.5 PLC Wiring

4.6.5.1 Application Scenarios

The device can be connected to a double-split transformer or 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.

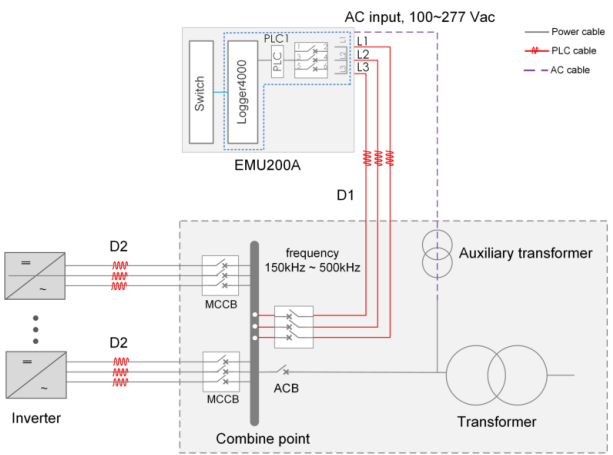


Figure 4-1 PLC wiring diagram of a double-winding transformer

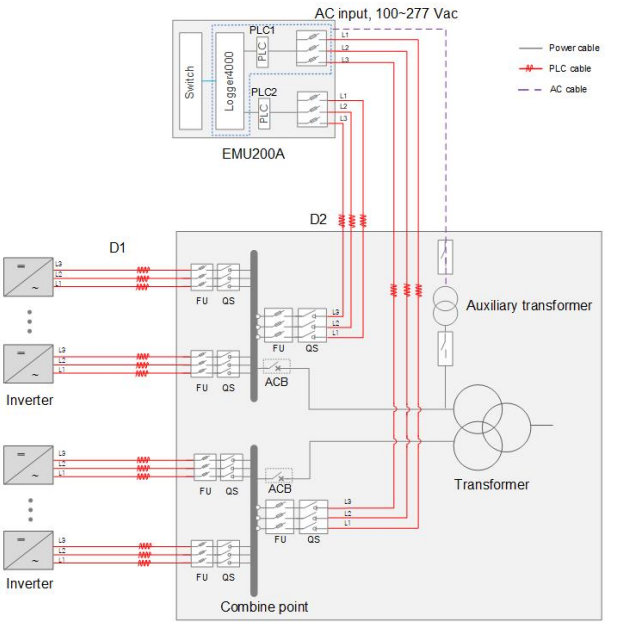


Figure 4-2 PLC wiring diagram of a double-split transformer

No ACBs (air circuit breakers) are used in application scenarios in North America. Actual on-site conditions should take precedence.

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

Parameter	Description	Specification
D1	PLC cable from box-type transformer to inverter	• If using multicore AC cable, the length should be ≤990m. • If using single-core AC cable: - When D2 ≤ 3m, the single-core cable length should be ≤790m. - When 3m < D2 ≤ 10m, the single-core cable length should be ≤690m. • 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

Parameter	Description	Specification
		used, with a recommended core diameter of 2.5mm² to 4mm². • Cable isolation voltage > 1000V. • Cable length ≤ 10m. **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	≤800 Vac
	Port supply voltage	24 Vdc
	Maximum number of inverters connected	80

4.6.5.2 PLC Wiring Rules

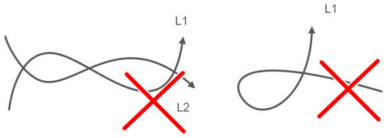
Wiring from box-type transformer to inverter

General requirements

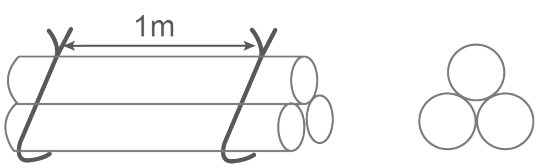
The box-type transformer can be connected to the inverter using multi-core AC cables or single-core AC cables, or adopting the two-wire-per-phase wiring scheme, as required by the project.

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

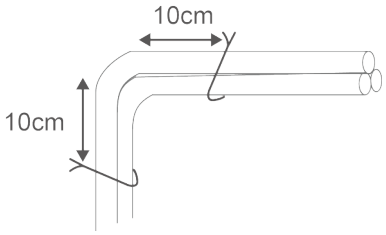
- The cable should be laid in cable trenches, cable ducts, or conduits.
- The cables should be laid parallel without any knots or twists.



- 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 **System** > **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.

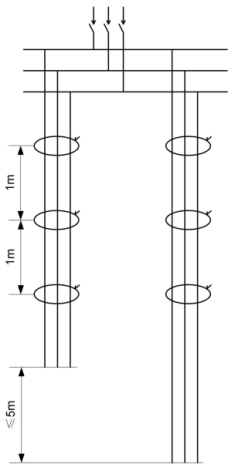
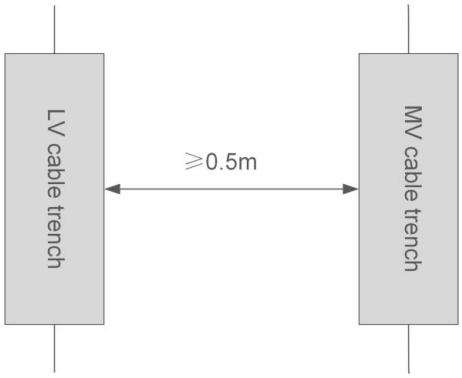


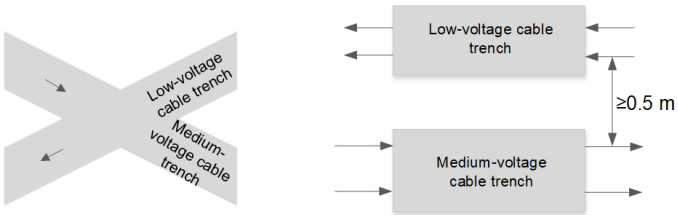
Figure 4-3 Two-wire-per-phase wiring scheme

PLC wiring requirements

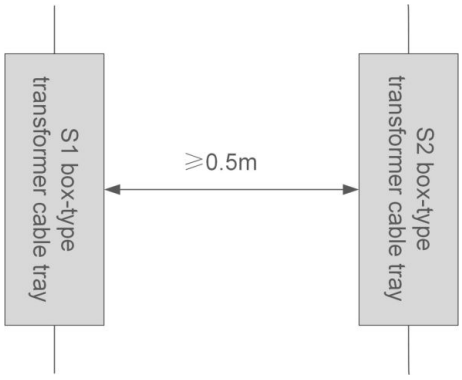
- The distance between low-voltage AC cables and medium-voltage AC cables should meet the following requirements:
  - Maintain a minimum horizontal distance of 0.5m between low-voltage AC cables and medium-voltage AC cables when laid parallel.



- If two cables are laid in a crossing manner, the 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, vertical distance should be no less than 0.5m.

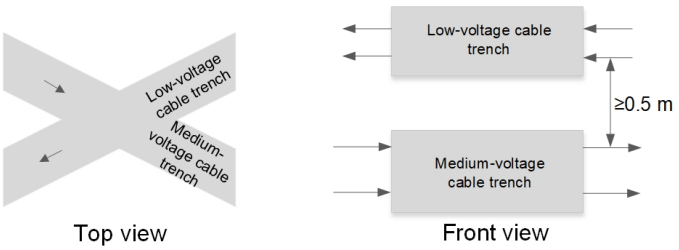


Figure 4-4 Vertical crossing distance between PLC cables

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.

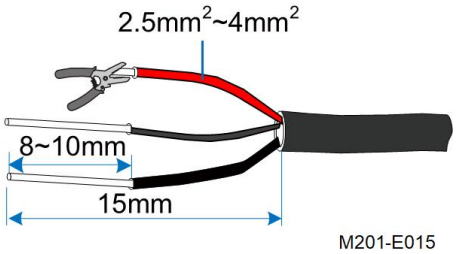
4.6.5.3 PLC Wiring

Pre-wiring preparation

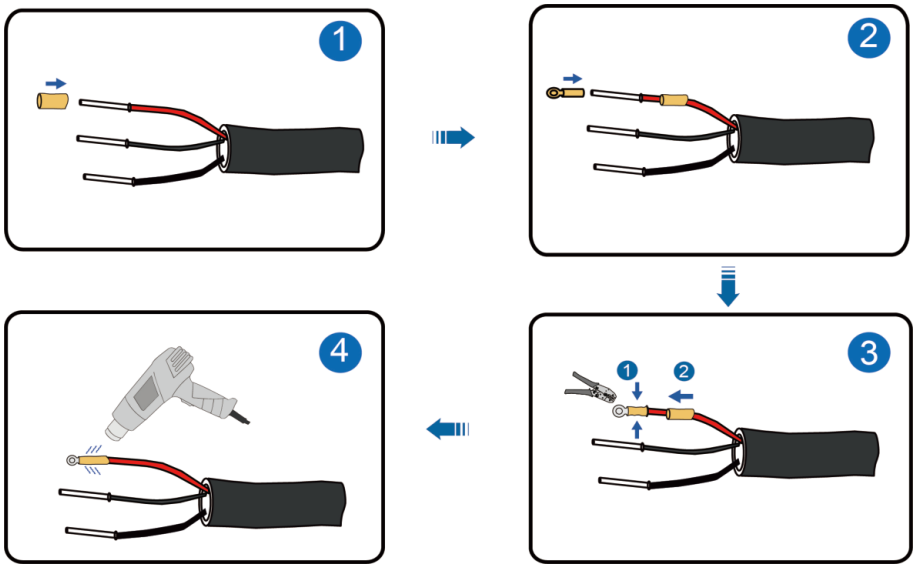
- Before performing AC wiring, please ensure that upstream AC switches and fuses inside the device are all in the open state.
- Please refer to 4.6.5.1 Application Scenarios for PLC application scenarios and cable specifications.
- Please refer to 4.6.5.2 PLC Wiring Rules for wiring diagrams under different application scenarios.

Steps of wiring

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



3. Select an appropriate OT terminal based on the cable diameter, and crimp the OT terminal to the cable.



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

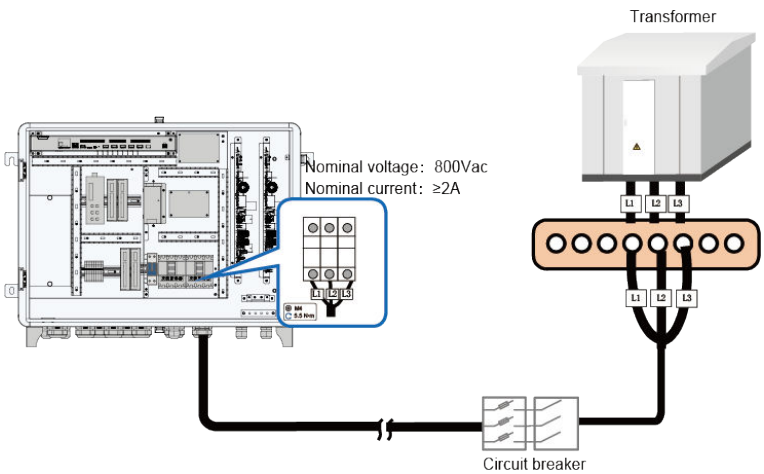


Figure 4-5 Three-phase three-wire system

When connecting the PLC cable to the busbar of the box-type transformer, it is recommended to take the circuit breaker corresponding to the middle of the busbar as the coupling point.

- Please pay attention to the phase sequence of cables and terminals in the wiring process.
- 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.

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

4.6.6 DI/DO Port Connection

If the purchased model is not equipped with the IO module, the DI/DO port must be directly connected to the logger. For details about how to connect the DI/DO port, scan the following QR code to view the *User Manual* of Logger4000.

If the purchased model is equipped with an IO module, the DI/DO port must be connected to the IO module. For details about how to connect the DI/DO port, scan the following QR code to view the *Quick Installation Guide* of IO Module.

4.6.7 PID Dry Contact Connection (Optional)

- The relay can be set as fault alarm output, and user can configure it to be a normally open contact (NO&COM) or a normally closed contact (NC&COM).
- The initial position of the relay is at the NC terminal. In case the AC insulation impedance is lower than the AC insulation Protection threshold, the relay reacts by switching to another contact, which can be indicated by use of external LED indicators or other devices.
- Examples of fault output via DO dry contact are illustrated in the figures below. Two wiring methods are available:

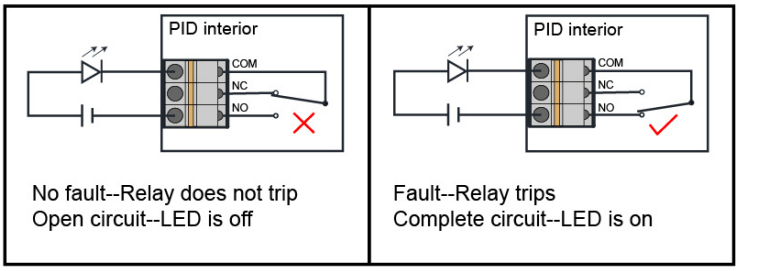


Figure 4-6 NO Wiring Diagram

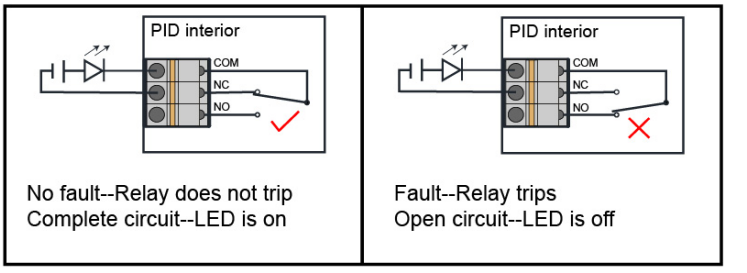
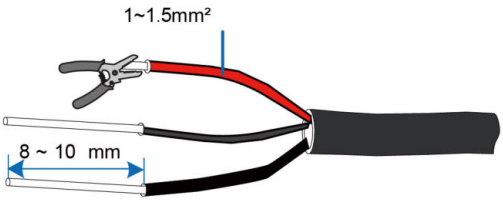


Figure 4-7 NC Wiring Diagram

Note: In the above diagrams, "X" indicates that the circuit is not on, while "√" indicates that the circuit is on.

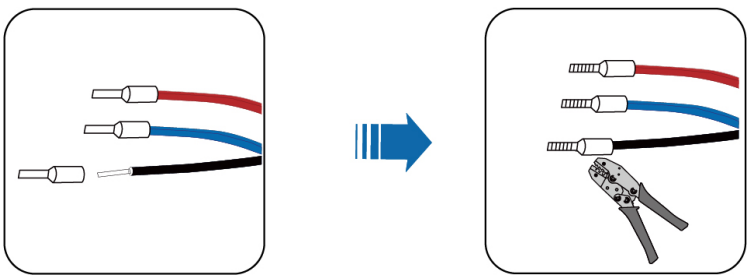
The cable is not included in the scope of delivery, and the recommended cable specification is 1~1.5 mm^2.

Step 1 Lead the cable through the “PID01 DO” / “PID02 DO”waterproof terminal at the bottom of EMU200A, and use a wire stripper to strip off the protective layer.



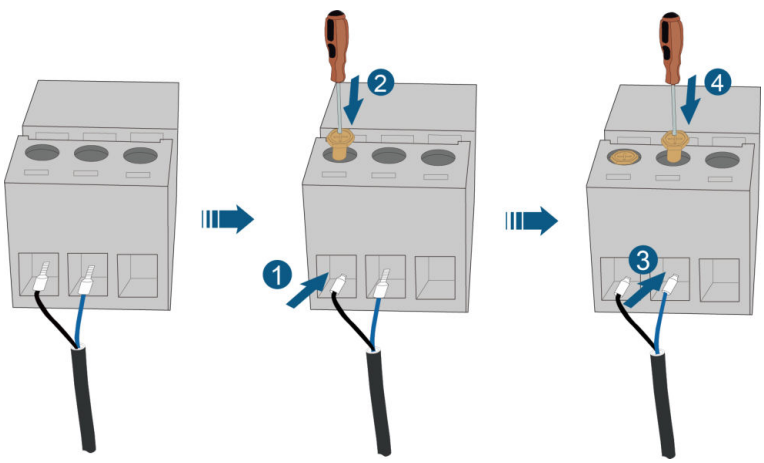
The cable is not included in the scope of delivery, and the recommended cable specification is 1~1.5 mm^2。

Step 2 Install the cord-end terminal and press them with crimping pliers.

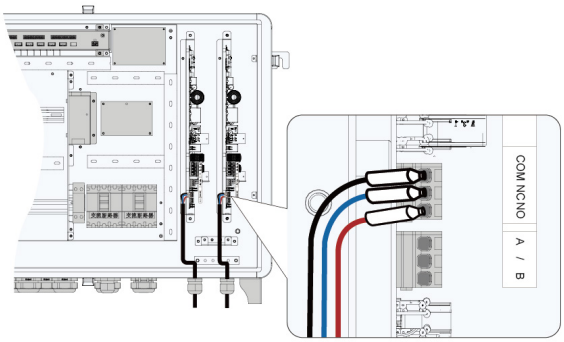


Step 3 Unplug the terminals from the COM, NC, and NO interfaces on the PID module.

Step 4 (Take NC contact as an example) Crimp the wiring terminals with a tightening torque of 0.2N.m.



Step 5 Connect the crimped terminals to the NC and COM terminals of the PID module.



Step 6 Gently pull the cable to ensure that it is connected firmly, and secure the nut.

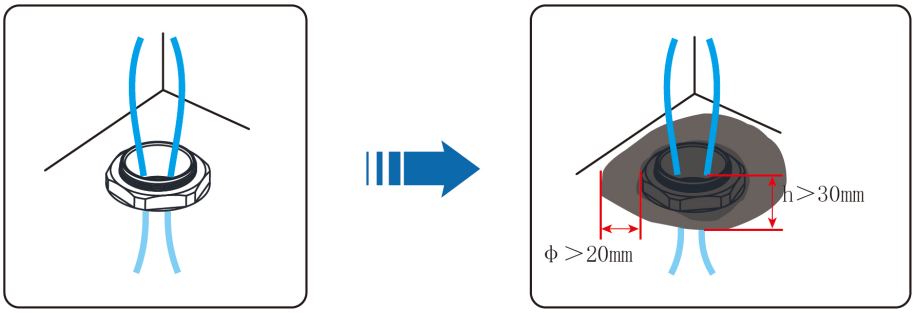
Step 7 Tighten the “PID01 DO” / “PID02 DO” waterproof terminal at the bottom of the EMU200A.

--End

4.7 Post-wiring Processing

NOTICE

Check whether the electrical wiring is completed correctly. If so, seal the cable inlet by filling the clearance around the cable with fireproof mud. The correct construction standard for the sealing mud seal is as shown in the following figure.



Step 1 Gently pull the cable backwards to make sure the connection is secure after finishing wiring.

Step 2 Install back the protective cover inside the cabinet.

Step 3 Close the cabinet door.

--End

5 Commissioning

5.1 Operation Notices

Before the device is put into operation, read through the “General Safety Instructions” first and ensure the requirements listed therein, as well as requirements mentioned in "Operation Safety", are all met.

⚠ DANGER

When the device is running:

- **Do not touch any live component of the device; otherwise, it may lead to electrical shocks.**
- **Do not touch any wiring terminal on the device; otherwise, it may lead to electrical shocks.**
- **Do not touch any hot part of the device (e.g. heat sink); otherwise, it may cause burns.**

5.2 Inspection Before Commissioning

No.	Inspection item
1	All cables are connected correctly and firmly.
2	The phase sequence of all cables is correct.
3	The internal and external grounding points of the device are reliably grounded.

5.3 Commissioning Steps

5.3.1 Power-on Operation

⚠ DANGER

Operators must wear proper personal protective equipment and use specialized insulated tools when powering on the system, so as to avoid electric shock hazards or short circuits.

Item	Description
1	Connect the internal fuse of EMU200A.

Item	Description
2	Connect the control switch of AC power supply.
3	Check whether the switch and 24V switch-mode power supply operate normally.
4	Observe running indicators of Logger4000. If the PWR indicator is steady on, RUN indicator flashing, WLAN indicator off, and the FAULT indicator off, the EMU200A runs normally.
5	Connect the transformer-side circuit breaker.
6	Please lock the case and keep the key properly after commissioning.

5.3.2 Logger Commissioning

Item	Description
1	• The EMU200A has an internal switch: Connect PC to the Ethernet port of the switch inside EMU200A by using a network cable. The default IP address of Ethernet ports is 12.12.12.12, and the virtual IP address is 15.15.15.15. • The EMU200A has no internal switch: Connect the PC to the Ethernet port of Logger4000 inside the EMU200A using a network cable. The IP address and virtual address of Ethernet port ETH1 are 12.12.12.12 and 15.15.15.15. The IP address and virtual address of ETH2 are 13.13.13.13 and 16.16.16.16.
2	• The EMU200A has an internal switch: Configure the IP addresses of the PC and ports of the Logger on the same network segment. The IP address of the PC can be set to 12.12.12.X. The value of X ranges from 1 to 255 and cannot be 12. The subnet mask is 255.255.255.0. Or it can be set to 14.14.14.X. The value of X ranges from 1 to 255 and can not be 14. The subnet mask is 255.255.255.0. • The EMU200A has no internal switch: Set the IP address of the PC and the Ethernet port to which the logger is connected on the same network segment. For example, the IP address of ETH1 can be set to 12.12.12.X, where X ranges from 1 to 255 and cannot be 12. The subnet mask is 255.255.255.0.
3	Enter the IP address of the Ethernet port on the logger in the PC address bar to go to the default interface.

Item	Description
	Take the IP address 12.12.12.12 as an example: • You can log in to the Logger4000 Web interface by directly entering 12.12.12.12, http://12.12.12.12, or https://12.12.12.12 in the PC address bar. • It is recommended to access securely via HTTPS.
4	Configure serial port parameters.
5	Add devices.
6	Configure device IP.
7	Configure iSolarCloud address if inverter data needs to be uploaded to iSolarCloud. • Accessed iSolarCloud site is "ChineseServer" by default. • In mainland China, set the site to "ChineseServer"; • In Europe, set the site to "EuropeanServer". • In Australia, set the site to "AustralianServer". • In other regions, set the site to "InternationalServer".
8	Access the Web interface of Logger4000 and check whether the running data of string inverters manufactured by SUNGROW is normal.
9	Create power plants through iSolarCloud App, and check whether the data displayed on iSolarCloud is normal.

Additional Description

To create power plant through iSolarCloud App, download and install the App and then proceed as follows:

1. Log into the Web interface of Logger4000 and click "About", to obtain the QR code.
2. Scan the QR code with the App or manually input the S/N to add communication device.

For more details, refer to Logger4000 User Manual, which can be obtained by scanning the foregoing QR code.

5.3.3 PID Commissioning (Optional)

Parameters of the PID module can be set on the embedded web of the logger.

Log in to the web and ensure that the PID module is online.
For more details, please refer to the user manual of the logger.

5.3.3.1 Operating Environment Requirements

Item	Parameter
Browser	IE11 above, Chrome65 above, Safari11 above
Minimum resolution	1024x768

5.3.3.2 Login Steps

Step 1 Connect the Logger4000 to the PC network card.

Step 2 Configure the IP address of the PC and that of the Ethernet ports of the Logger4000 to the same network segment.

- The EMU200A has an internal switch: The default IP address of Ethernet ports is 12.12.12.12. The IP address of the PC can be set to 12.12.12.X and the subnet mask to 255.255.255.0.
- EMU200A has no internal switch: For example, the IP address of ETH1 can be set to 12.12.12.X, where X ranges from 1 to 255 and cannot be 12. The subnet mask is 255.255.255.0.

Step 3 Enter the IP address of the Ethernet port on the logger in the PC address bar to go to the default interface.

Take the IP address 12.12.12.12 as an example:

- You can log in to the Logger4000 Web interface by directly entering 12.12.12.12, http://12.12.12.12, or https://12.12.12.12 in the PC address bar.
- It is recommended to access securely via HTTPS.

Step 4 Select the desired language in the upper right corner. Click and enter the login password pw1111 to enter the Web interface.

The following roles are provided:

- O&M user
- System administrator
- Developer Account

The developer Account is reserved only for SUNGROW's technical support engineers.

Please change the initial password upon first login. The method of changing the password: click **O&MUser > ModifyPassword** to set a new password.
If you forgot login password, contact SUNGROW and inform us the S/N and system time of the current device to obtain the dynamic password.

--End

5.3.3.3 Commissioning Steps

Add PID device on the Logger4000 interface and set its initial parameters to enable PID suppression, recovery, and ISO functions.

Step 1 Click **Device maintenance** > **Device list**.

Step 2 Connect PID device.

a. Click **Add device** tab, and set the device information on the pop-up.

Table 5-1 Set parameters of the PID device

Parameter	Description
Device type	Choose **PID**.
Port	Select COM5 as the port to be connected to Logger4000.
Device model	Choose **PID100**.
Beginning Address	Enter the beginning address according to the parameters of DIP switch of the PID device, usually set as 250 or 251.
Quantity of Device	Set as the number of PID devices actually connected.

b. Click **Save**.

After the PID device is connected, check its communication status under Device List. If the indicator reads as , the device is connected successfully, as shown below.



Step 3 Click **Device monitoring** and select the PID module to be set in the left device bar.

- Click the **Realtime Values** tab to check real-time data information such as AC insulation impedance, power output voltage, power output current, internal temperature, fault status, and alarm status of the PID device.
- Set parameters of the PID device to enable Anti-PID, recovery, and ISO functions.

a. Click the **Initial Parameter** tab to set relevant parameters of the PID device.

Table 5-2 PID Module Parameters

Parameter	Description
Anti-PID Time (h)	- The duration of PID protection, in the event of PID protection and ISO detection working in turn. - Anti-PID time can only be integer values. - When the PID protection is enabled, the ISO detection (day) is disabled.

Parameter	Description
ISO Detection Time (Day) (min)	- The duration of ISO detection, in the event of PID protection and ISO detection working in turn. - ISO detection time can only be integer values. - When ISO detection (day) is enabled, PID protection is disabled.
PID Recovery Time (h)	- The duration of PID recovery, in the event of PID recovery and ISO detection working in turn. - PID recovery time can only be integer values. - When PID recovery is enabled, ISO detection (night) is disabled.
ISO Detection Time (Night) (min)	- The duration of ISO detection, in the event of PID recovery and ISO detection working in turn. - ISO detection time can only be integer values. - When ISO detection (night) is enabled, PID recovery is disabled.
AC Insulation Alarm Threshold (kΩ)	- Resistance threshold to trigger the AC insulation alarm of the PID module. - The alarm threshold can only be integer values. - If the protection threshold < detection value < alarm threshold for a period longer than the insulation alarm time, the PID module will report the alarm code.
AC Insulation Alarm Time (s)	- Duration needed to trigger the AC insulation alarm of the PID module. - The alarm time can only be integer values. - If the protection threshold < detection value < alarm threshold for a period longer than the insulation alarm time, the PID module will report the alarm code.
AC Insulation Alarm Recovery Value (kΩ)	- The value that indicates the AC insulation resistance of the PID module returns to normal. - The alarm recovery value can only be integer values. - If the alarm recovery value < detection value for a period longer than the insulation alarm recovery time, the alarm of the PID module is cleared.
AC Insulation Alarm Recovery Time (s)	- Duration needed to clear the fault alarm, in which the AC insulation resistance of the PID module should be in the normal range.

Parameter	Description
	- The AC insulation alarm recovery time can only be integer values. - If the alarm recovery value < detection value for a period longer than the insulation alarm recovery time, the alarm of the PID module is cleared.
AC Insulation Protection Threshold (kΩ)	- Resistance threshold to trigger the AC insulation protection alarm of the PID module. - The protection threshold can only be integer values. - If the detection value < protection threshold for a period longer than the insulation protection time, the PID module will report the fault code and the protection will be triggered.
AC Insulation Protection Time (s)	- Duration needed to trigger the AC insulation protection alarm of the PID module. - The protection time can only be integer values. - If the detection value < protection threshold for a period longer than the insulation protection time, the PID module will report the fault code and the protection will be triggered.
AC Insulation Protection Recovery Value	- The value that indicates the AC insulation resistance of the PID module returns to normal. - The protection recovery value can only be integer values. - If the protection recovery value < detection value for a period longer than the insulation protection recovery time, the fault of the PID module is cleared and the protection is stopped.
AC Insulation Protection Recovery Time (s)	- Duration needed to clear the fault and stop the protection, in which the AC insulation resistance of the PID module should be in the normal range. - The protection recovery time can only be integer values. - If the protection recovery value < detection value for a period longer than the insulation protection recovery time, the fault of the PID module is cleared and the protection is stopped.
Trip Switch Enabling	- **Enable**: In the event of AC insulation faults, trip the RMU circuit breaker via DO port.

Parameter	Description
	- **Disable**: In the event of AC insulation faults, no action is taken and the RMU circuit breaker will not be tripped.
DO Associated with Trip Switch	In the event of AC insulation faults, trip the RMU switch via DO port. Click the drop-down box and select DO associated with trip switch (DO which outputs trip signal). Setting of DO associated with trip switch can only take effect with trip switch enabled.
Port of Associated Inverter	Set the port number to which the associated inverter is connected according to actual conditions. Inverter shutdown or restart command is executed via this port in the event of the PID module detecting any abnormality. Select the port of the data logger connected in the inverter link corresponding to PID100. Otherwise, the function cannot operate properly.
Number of Overcurrent Faults Within Seven Days	The PID module will stop working in the case of over 5 overcurrent faults occurring within seven days. Please check whether the insulation resistance is normal. If it is normal, please click **Clear** to clear the count of overcurrent faults, and the PID module will resume work.
Disconnection Detection Switch	- **Enable**: When communication between the PID device and the Logger is interrupted or a PID sampling exception occurs, the inverter will be shut down and the ACB switch will trip. - **Disable**: When communication between the PID device and the Logger is interrupted or a PID sampling exception occurs, the inverter will not be shut down and the ACB switch will not trip.

Parameter	Description
	The settings for **Disconnection trip switch**, **Disconnection Protection Time Threshold**, and **DO associated with disconnection trip switch** can be configured only when the **Disconnection detection switch** is enabled. The firmware version P029 and later versions of the Logger4000 support this parameter.
Disconnection Trip Switch	- **Enable**: When communication between the PID device and the Logger is interrupted or a PID sampling exception occurs, the ACB switch will trip. - **Disable**: When communication between the PID device and the Logger is interrupted or a PID sampling exception occurs, the ACB switch will not trip. The firmware version P029 and later versions of the Logger4000 support this parameter.
Disconnection Protection Time Threshold	The time for triggering the protection function when communication between the PID device and the Logger is interrupted or a PID sampling exception occurs. Range: 0-600. Unit: Seconds. Default value: 30. The firmware version P029 and later versions of the Logger4000 support this parameter.
DO Associated with Disconnection Trip Switch	When communication between the PID device and the Logger is interrupted or a PID sampling exception occurs, click the drop-down box and select DO Associated with Disconnection Trip Switch (DO which outputs trip signal). Setting of DO Associated with Disconnection Trip Switch can only take effect with **Disconnection trip switch** enabled. The firmware version P029 and later versions of the Logger4000 support this parameter.

b. Click **Save** to apply the parameter settings.

- Click the **Device information** tab to check the device model and software version.

--End

5.3.3.4 More

Users can export logs regarding PID100 for further analysis and view its real-time information, including faults and alarms, on the Logger4000 Web interface.

Export logs

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Log export**, then select **Log file type selection** in the **PID100** window.

Step 3 Click **Confirm**.

You can view the following information:

- **Log type**: Event Log, Fault Log, Operation Log.
- **Log Name**: The numbers at the end of the log name (xxx251_2) indicate the device address (251) and forwarding address (2) unique to the PID100, which distinguish it from other devices.
- **Event Log**: Records the operational status of the PID100, including PID protection, PID recovery, ISO detection, and shutdown events.
- **Fault Log**: Records the fault codes reported during PID100 operation, such as 1 (AC insulation fault) and 4 (overcurrent fault).
- **Operation log**: Captures the real-time data of PID100 at five-minute intervals. Data collected include AC insulation resistance, output voltage and current of power supply, and device's internal temperature.

--End

View alarms and faults

Choose **Device monitoring** > **Realtime Values**, click "All Devices" to expand the drop-down list, and select “PID100”. You can then check whether there is a fault or alarm in the device under **Realtime Values**.

You can upload the device's running status and fault and alarm information to a local monitoring system over IEC104 or Modbus TCP.

6 Troubleshooting and Maintenance

6.1 Maintenance Precautions

Before performing maintenance operations, please read and comply with the precautions in the "General Safety Instructions" section and also comply with the precautions in the "Maintenance Safety" section.

⚠ DANGER

Improper maintenance operations may cause personal injury or equipment damage!

- **When performing high-voltage operations, be sure to use dedicated insulated tools.**
- **Before maintenance, disconnect the upstream power supply and PLC power supply first; otherwise, it may cause personal injury.**
- **Wait 25 minutes after the device is powered off, then measure the voltage and current with a specialized measurement instrument. Only when no current or voltage is present, operators, who wear protective equipment, can perform operation and maintenance on the device.**

⚠ WARNING

Before performing maintenance work, please power off all equipment within the relevant system (including inverters, EMU, MVS, etc.) before operating on the equipment.

⚠ CAUTION

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signages or safety warning tapes around the product.

When performing maintenance on the AC side of the inverter or the low-voltage cabinet, please power off the circuit breaker and ensure that AC PID and ISO are powered down, see 6.3 PID Module Replacement (Optional). After maintenance is completed, please manually enable the ISO function in the Logger5000 embedded web.

6.2 Common Faults and Troubleshooting

Fault Phenomenon	Possible Causes	Troubleshooting Method
Check if there are devices with abnormal interruptions in the array through the backend monitoring equipment.	1. RS485 cable abnormal.	1. Measure the voltage between RS485–A and RS485–B with a multimeter and observe whether it is around 5V.
	2. The device address is duplicated in the array.	2. Check if the device addresses in the array are duplicated.
	3. The parameter configuration of the data logger is incorrect.	3. Through the data logger Web interface**System** > **Port parameter** > **RS485**interface, check whether the PLC connection status is enabled. If**PLC access**is**Enable**, it should be configured as**Disable**.
	4. MPLC master and slave node module abnormal.	4. Check the MPLC master node: D12 red light is on constantly, D8 green light is blinking normally; otherwise, it is abnormal.
	5. Others reason.	If the issue is not resolved through the above methods, please contact Sungrow Customer Service immediately.
Check the array for devices that are intermittently connected and disconnected through the backend monitoring equipment.	1. The device address is duplicated in the array.	1. Check if the device addresses in the array are duplicated.
	2. The parameter configuration of the data logger is incorrect.	2. Through the data logger Web interface**System** > **Port parameter** > **RS485**interface, check whether the PLC connection status is enabled.
	3. Others reason.	If the issue is not resolved through the above methods,

Fault Phenomenon	Possible Causes	Troubleshooting Method
		please contact Sungrow Customer Service immediately.
1. Check if the background monitoring equipment displays a lightning protection fault indication.	Lightning strikes cause the lightning protection module or varistor to fail.	Contact Sunlight customer service to replace critical components.
2. Open the cover on-site to observe whether the lightning protection module shows a red pop-up window, whether the voltage-sensitive resistance appears cracked, and other phenomena.		

6.3 PID Module Replacement (Optional)

Prerequisite

Prerequisites

- Confirm that the device is no longer usable.
- Make sure there is a spare PID module of the matching model, and it can work normally.
- Qualified personnel, while maintaining and replacing the device, should wear protective equipment up to relevant safety standards.
- Tools used during maintenance must be covered with a protective insulating layer.
- Before maintaining and replacing the device, make sure that the AC circuit breaker of the PID module is open.
  For an intelligent sub-array controller with a PID module, first, disconnect the power switch in the box-type substation corresponding to FU1 (800Vac), and then disconnect Q1(220Vac).

Steps

Step 1 Open the cabinet door and remove the protective cover inside EMU200A by referring to 4.5 Preparation Before Connection.

Step 2 Remove the cables connected to the faulty PID module.

Step 3 Unscrew the fixing screws on the faulty PID module, and take the module out.

Step 4 Install a new PID module.

Step 5 Connect the removed cables to the new PID module.

Step 6 Check whether the PID module can work normally. If so, adjust the limit rod and close the cabinet door of EMU200A.

--End

Web Operations

1. Choose **Device maintenance** > **Device list** on the Web interface, and delete the faulty PID module.
2. Add the new PID module and complete parameter settings accordingly.

7 Appendix A: Technical Parameters

Type designation	EMU200A
Communication	
Max. number of devices	300
RS485 interface	7
MPLC interface	2
Ethernet port	5 * 10 / 100 Mbps ETH 1 / 2 / 5 Ethernet port ETH 3 / 4 Fast dispatch port ETH 5 Debug interface
PID&ISO control box (optional)	1 / 2
Fiber switch (optional)	2*100 / 1000 Mbps Fiber ports and 6*10 / 100 Mbps Ethernet ports
Fiber splice box (optional)	4-Input and 24-Output ST Single mode
Access voltage for AC Anti-PID	
Rated grid voltage	800 Vac
Voltage range	720 Vac - 880 Vac
Grid type	IT (corner grounded delta system is not included)
AC ISO response inaccuracy	
7 kΩ - 100 kΩ	±15 % @ 25 ℃
0.2 kΩ - 7 kΩ	±1 kΩ @ 25 ℃
MPLC Communication	
Max. communication distance	≤ 1000 m
Max. number of each channel devices	≤ 80
Rated voltage	400 Vac - 800 Vac

Type designation	EMU200A
Max. withstands voltage	≤ 1000 Vac
Power supply	
AC input	100 Vac - 277 Vac, 50 Hz / 60 Hz (Without PID) 198 Vac - 277 Vac, 50 Hz / 60 Hz (With PID)
Power consumption	Max. 50 W (No PID module) / 240 W (1 PID module) / 450 W (2 PID modules)
Ambient conditions	
Operating temperature	-30 ℃ - +60 ℃ (Solar Irradiance ≤ 1000 W/m²)
Storage temperature	-40 ℃ - +70 ℃
Relative air humidity	≤ 95 % (non-condensing)
Elevation	≤ 4000 m
Protection class	IP66
Mechanical parameters	
Dimensions (W*H*D)	860 mm * 680 mm * 287 mm
Weight	Max.51 kg
Mounting type	Wall hanging, rack mounting, ground mounting, outdoor and indoor
Box material	Metal
Cable specification	AC cable: outdoor UV protection cable of 1 - 1.5 mm² MPLC cable: outdoor UV protection cable of 2.5 - 10 mm² Fiber optic: outdoor UV protection cable, outside diameter ≤ 18mm RS485 cable: 2 * outdoor UV protection shielded twisted pair (STP) of 0.75 - 1.5 mm²
EMU200A	The EMU200A includes Logger4000, AC adapter, SPD, MCCB, MPLC, PID&ISO Control Box (optional), Fiber Switch (optional), Fiber Splice Box(optional) Apply to Overseas

8 Appendix B: General Information

8.1 Quality Assurance

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

The software security update period for this product aligns with the warranty period. During the warranty, security patches or updates will be provided if any vulnerabilities or compatibility issues are identified.

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.

Product data such as product dimensions are subject to change without prior notice. The latest documentation from SUNGROW should take precedence in case of any deviation.

8.2 Contact Information

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

- Model of the device
- Serial number (S/N) of the device
- Fault code/name
- Brief description of the fault

For detailed contact information, please visit: **https://www.sungrowpower.com/en/about-us/contact-us**

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www.sungrowpower.com

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