EMU200A-UEN-Ver12-202203

EMU200A

Energy Management Unit

User Manual

SUNGROW

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1 About This Manual

1.1 Intended Use

This manual is intended to provide the reader with detailed information and description of the installation and operation about the following products:

- EMU200A

It is referred to as "device" for short unless otherwise specified。

1.2 Target Group

This manual is intended for technically qualified persons who need to install and operate the device.

1.3 How to Use This Manual

Read this manual carefully before performing operation on the device. Keep the manual in a convenient place for future reference.

All rights reserved including the pictures, symbols, and markings used in this manual. Any disclosure, even partially, of the contents of this manual is strictly prohibited without prior written authorization of SUNGROW.

The content of the manual will be periodically updated or revised as per the product development. It is probably that there are changes in manuals for the subsequent module edition. If there any mismatch between the product and its manual, the actual product shall govern.

1.4 Additional Information

For more details about the equipment inside EMU200A, please scan the following QR code.

Device	Related documents
Logger4000	

1.5 Symbol Explanation

This manual contains important safety and operational instructions that must be accurately understood and respected during the installation and maintenance of the device. To ensure the optimum use of this manual, note the following explanations of the symbols used.

⚠ DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury

⚠ CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which, if not avoided, could result in equipment or property damage.

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

2 Safety Instructions

This chapter mainly introduces safety instructions that need to be respected during the operation of Energy Management Unit EMU200A.

The EMU200A has been designed and tested strictly according to international safety regulations. As electrical and electronic equipment, the EMU200A must be installed, commissioned, operated, and maintained in strict accordance with related safety instructions. Incorrect operation or misuse of the device may cause:

- damage to personnel safety of the operators or the third party
- damage to the EMU200A or other properties belong to the operators or the third party

Therefore, the following safety instructions must be read and always kept in mind prior to any work. All detailed work-related safety warnings and notes will be specified at the critical points in corresponding chapter.

⚠ WARNING

All operations and electrical work must only be performed by qualified personnel.

Before Installation

NOTICE

After receiving the device, please check if there is damage caused during transport. Contact SUNGROW or the forwarding company once any problem is found.

The related operators must be familiar with the safety instructions in this manual and other safety regulations about the installation, operation and maintenance of the EMU200A.

Move, transport, install, operate, and maintain the EMU200A correctly and appropriately.

During Installation

NOTICE

The EMU200A can only be used as described in this manual. Altering the product without authorization or using spare parts not sold or recommended by SUNGROW may lead to fire, electric shock or other damages.

NOTICE

Disconnect all electrical connections and the upstream input switch and make sure the EMU200A is voltage-free during installation.

Maintenance and Replacement

⚠ WARNING

The maintenance of the EMU200A can only be performed by qualified personnel from SUNGROW or other qualified personnel.
User can never maintain or replace the modules and other parts. Serious personal injury or property loss may follow if otherwise.

NOTICE

Never replace the internal components of the EMU200A without authorization. SUNGROW shall not be held liable for any possible damage caused by ignorance of this warning.

3 Product Description

3.1 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.

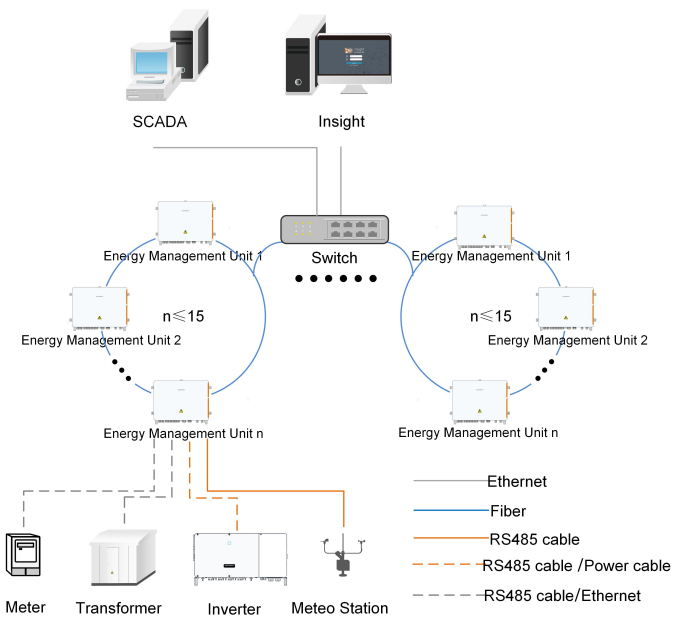


figure 3-1 Ring networking

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

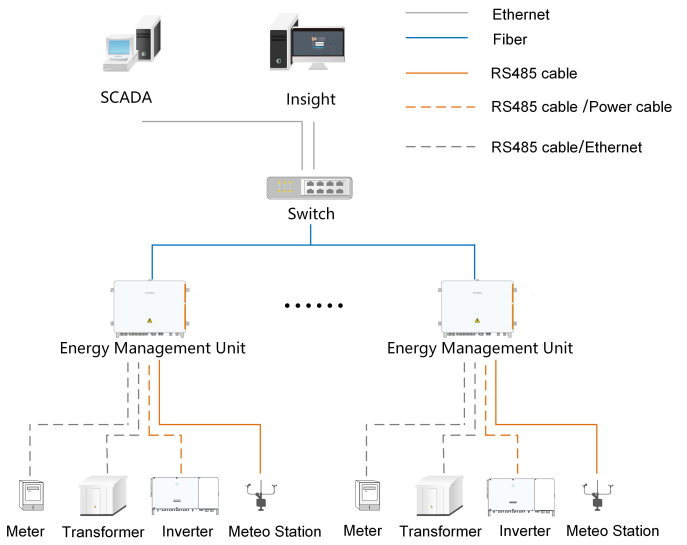
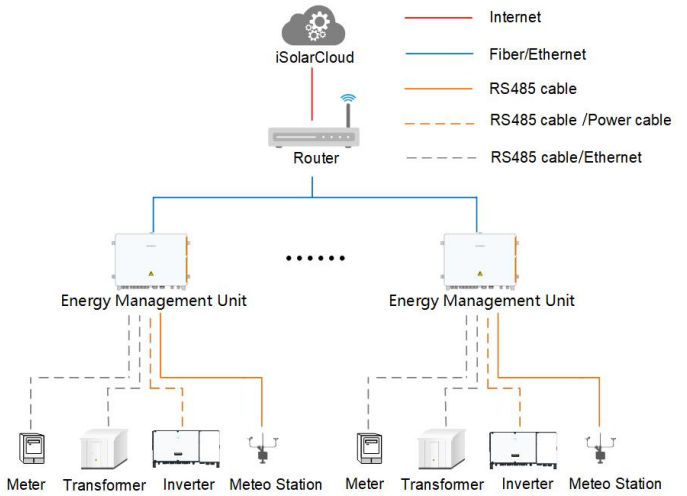


figure 3-2 Star networking

Connected to iSolarCloud through a router

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



3.2 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).
- IP65 protection.

3.3 Dimensions

The following figure shows the dimensions of the product.

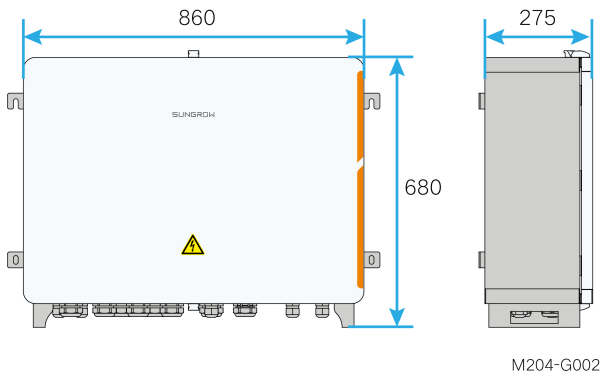


figure 3-3 Dimensions of the product(in mm)

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

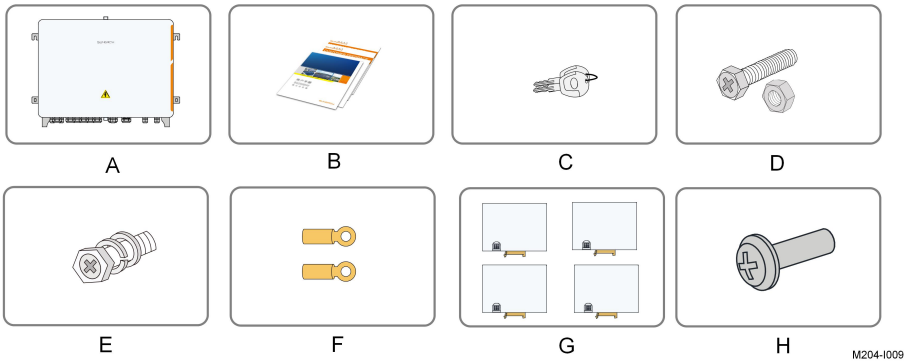
4 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

4.1 Inspection Before Installation

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



Item	Description	Sum
A	EMU200A	1
B	Documents, including certificate, warranty card, delivery inspection report, quick installation instruction, etc.	1
C	Keys	1
D	M10x45 bolt assembly	4
E	M6x14 bolt	1
F	OT terminal	1
G	IO module (optional)	⩽4
H	M4x25 bolt	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.

4.2 Installation Tools

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

4.3 Location Requirements

- With the ingress of protection IP65, EMU200A can be installed outdoors.
- Ambient temperature: -30℃ to +60℃ , and ambient humidity: ≤ 95%, without condensation. Excessive moisture can damage internal components.
- Take anti-moisture and anti-corrosion measures.

4.4 Installation Method

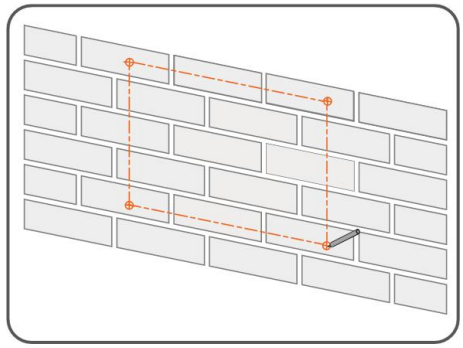
⚠ WARNING

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.

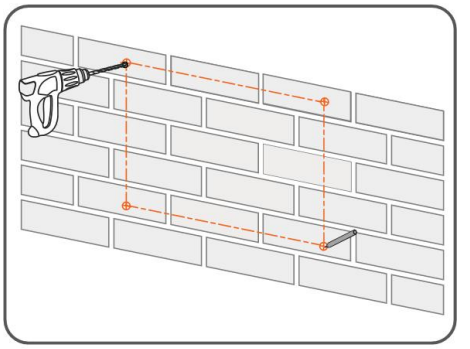
4.4.1 Wall Mounting

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



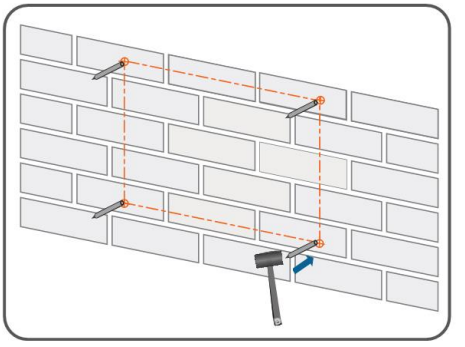
M200-I010

step 2 Drill holes on the marked locations.



M200-I011

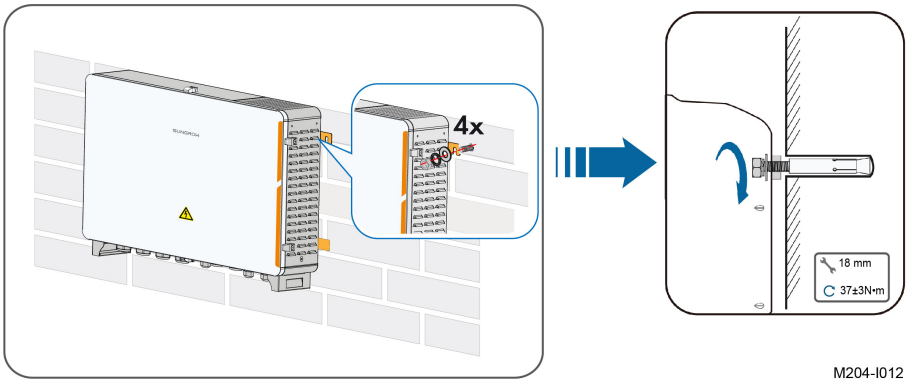
step 3 Place the M10X45 expansion sleeve(not included in the scope of delivery) into the hole, and tap it with a rubber hammer. Make it completely embedded in the wall.



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.

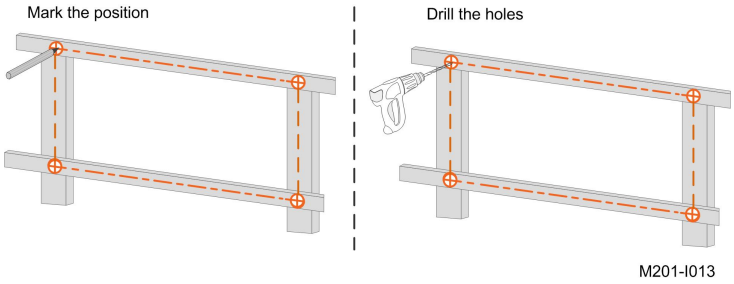


M204-I012

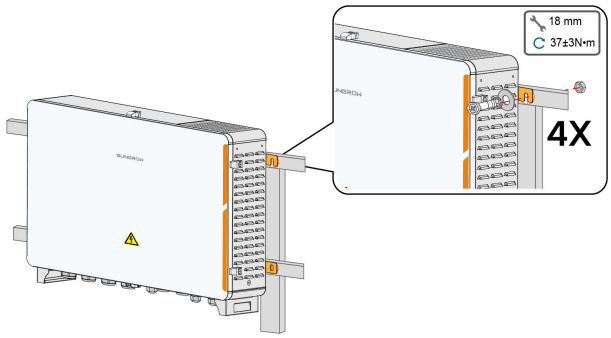
- - End

4.4.2 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.

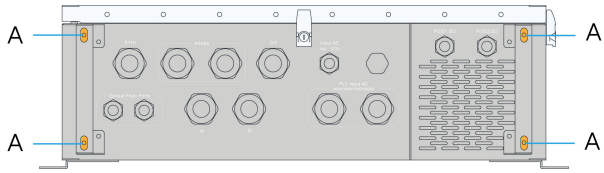


step 3 Check to ensure the device is firmly in place.

- - End

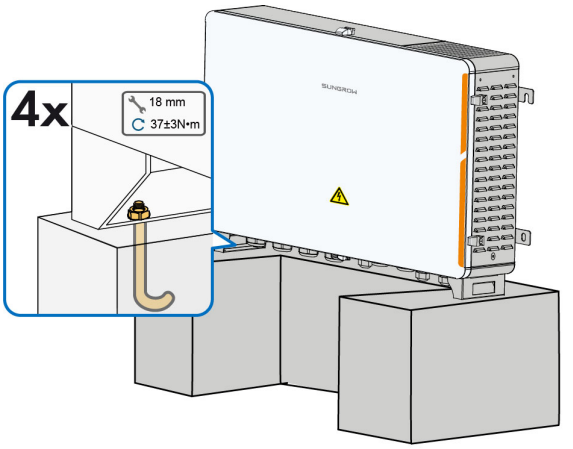
4.4.3 Ground Mounting

For the 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).



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.



M204-I016

The foundation bolts are not in the scope of delivery

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

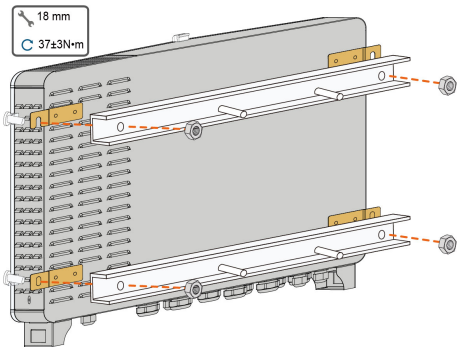
- - End

4.4.4 Pole Mounting

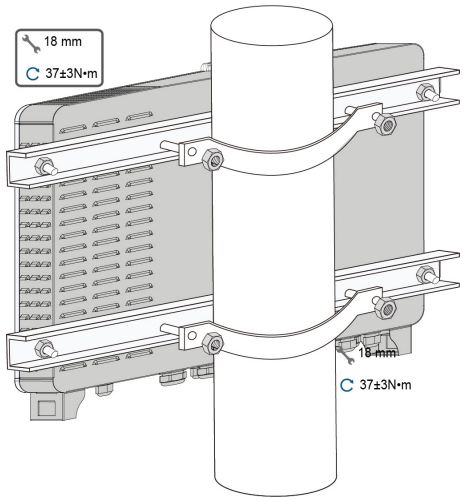
EMU200A supports pole mounting. If necessary, specify your requirements when placing an order. SUNGROW will design according to actual installation conditions.

Accessories supplied with EMU200A include matching screw combinations, nuts, brackets, clamps, and the like.

step 1 Fasten the mounting ears of EMU200A onto the brackets by using the matching screw combinations, as shown in the figure below.



step 2 Fix the brackets and the clamps by using the nuts.



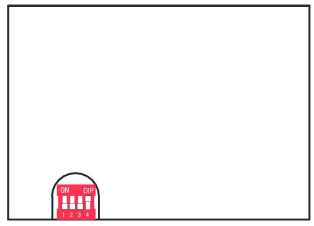
- - End

4.5 Installing IO Modules (Optional)

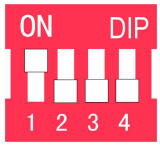
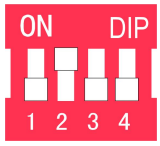
This operation is required if IO modules are ordered.

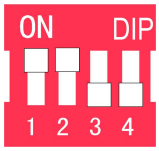
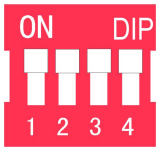
step 1 Remove the IO modules assembly from the IO module deliverables.

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.



M201-I021

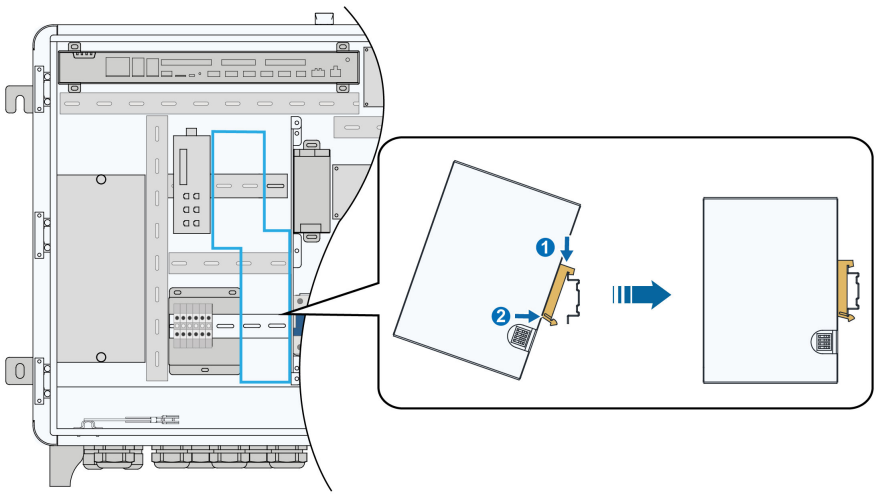
Example of communication address setting	Binary address	Decimal address
	0001	1 ($1 \times 2^0=1$)
	0010	2 ($1 \times 2^1+0 \times 2^0=2$)

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

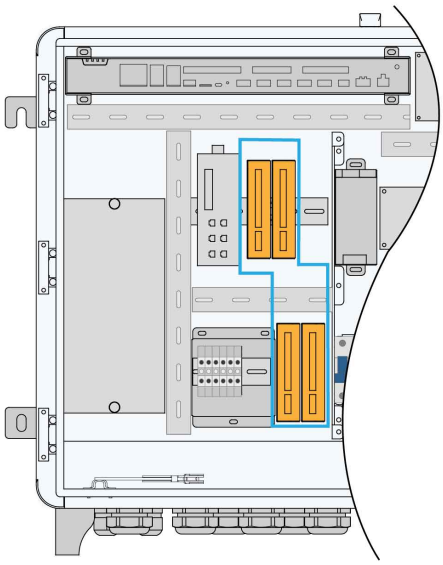
NOTICE

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

step 3 Insert IO modules into the reserved area.



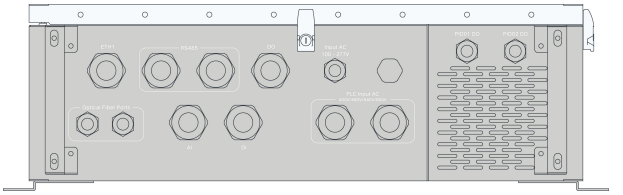
step 4 Install the four IO modules as shown in the following figure.



- - End

5 Electrical Connection

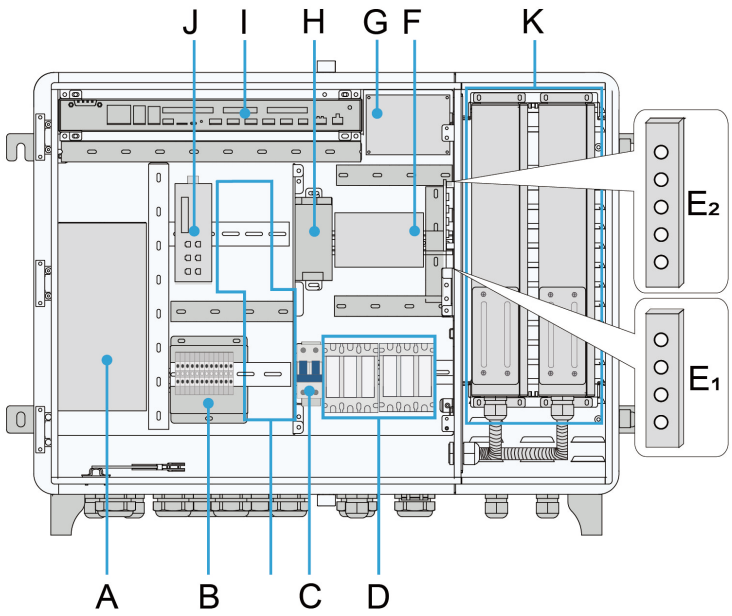
5.1 Waterproof Terminal Description



Mark	Description
ETH1	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
PLC Input AC 400V480V/540V/800V	Waterproof terminal for PLC communication cables
Input AC 100 – 277V	Waterproof terminal for AC 100 – 277V 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

5.2 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) mm² 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 mm² outdoor anti-ultraviolet wire	Cables not included in the scope of delivery
D	AC fuse box	Recommended cable specifications: 4mm² ~ 10mm², Cable withstand voltage: Cable grounding working voltage > 1000V	Cables not included in the scope of delivery
E	Grounding terminals	4mm² ~ 10mm²or 7 ~ 11AWG	Cables not included in the scope of delivery
F	SPD	—	—

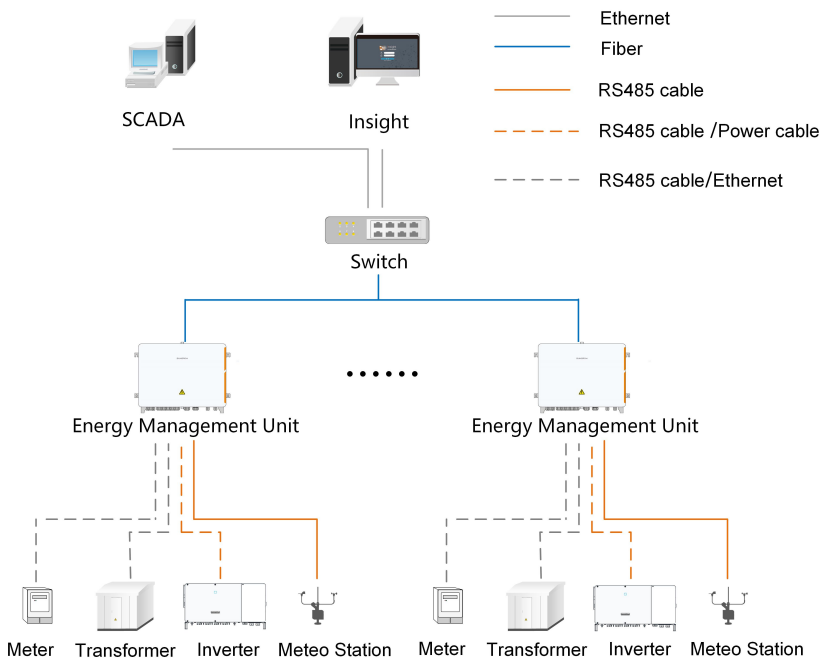
Item	Description	Recommended Cable Specification	Description
G	PLC module	—	—
H	Switch power	—	—
I	Logger4000	—	SFP optical module can be inserted into SFP1 and SFP2 of Logger4000 SFP optical module is optional
J	Optical fibre ring switch	—	Optional Must work with the optical fiber terminal box For more information, please visit the distributor's official website
K	PID module	—	Optional

NOTICE

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

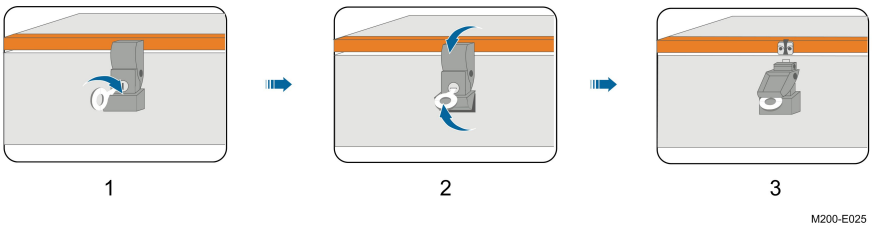
5.3 Connection Overview

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.

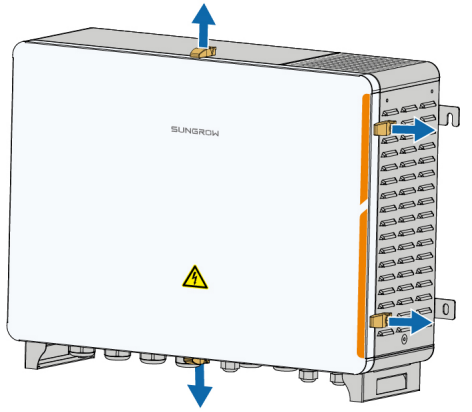


5.4 Preparation Before Connection

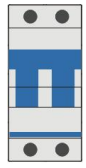
step 1 Open the cabinet. Unlock the door with the specific key, as shown in the following figure.



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

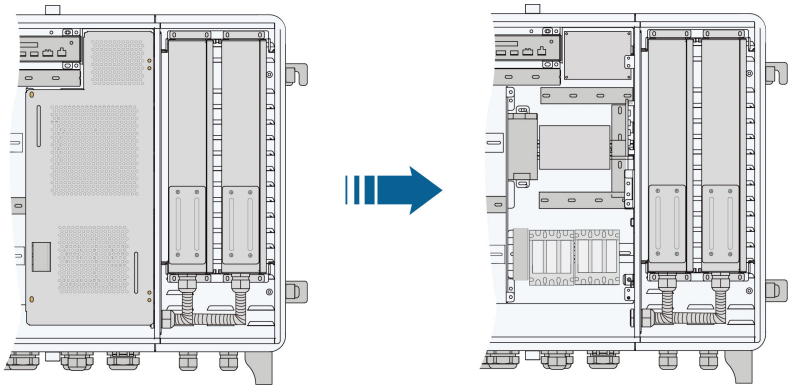


step 3 Disconnect the upstream input switch of the device, and turn the power switch inside the device to the "OFF" position to ensure the device is voltage-free.



step 4 Disconnect the switch of the transformer side.

step 5 Remove the protective cover inside the cabinet.



- - End

5.5 Connection Steps

5.5.1 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!**

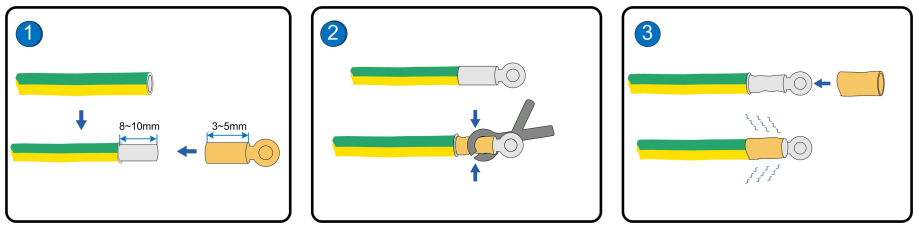
Brief Introduction

The device is designed with two grounding terminals: grounding copper bar inside the cabinet and external PE point.
On site, connect both grounding terminals reliably.

Preparation Before Installation

- Prepare the grounding cable.

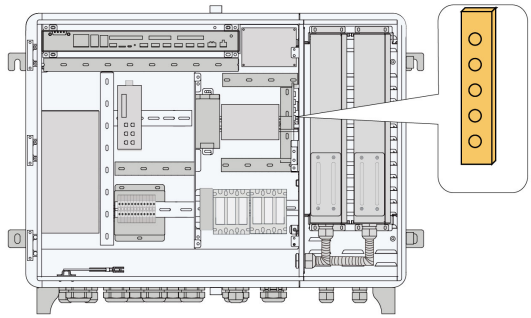
- Strip the cable and crimp the OT terminal, and then use heat shrink tubing to tighten the cable and the OT terminal.



5.5.1.1 Cooper Bar Grounding

Position Description

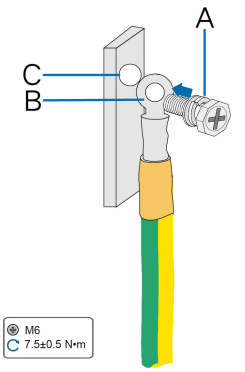
The grounding copper bar is located inside the cabinet, as shown in the figure below.



Wiring Steps

step 1 Unscrew the waterproof terminal "PLC Input AC 400V/480V/540V/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 "PLC Input AC 400V/480V/540V/800V".



Item	Definition	Remark
A	M6x12 bolt	Not 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.

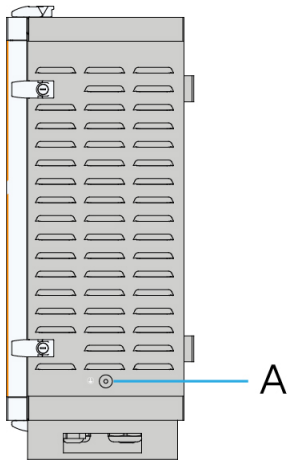
step 4 Screw the waterproof terminal at the bottom of the device.

- - End

5.5.1.2 PE Point Grounding

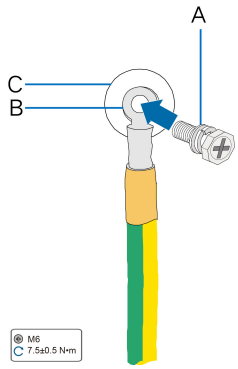
Position Description

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 14 bolt assembly	Included in the scope of delivery
B	OT terminal	Included in the scope of delivery
C	Grounding hole	-

5.5.2 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

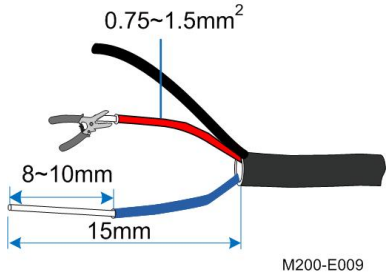
Cables connected to the device must be 2 x (0.75~1.5)mm² in cross-sectional area.

Wiring Steps

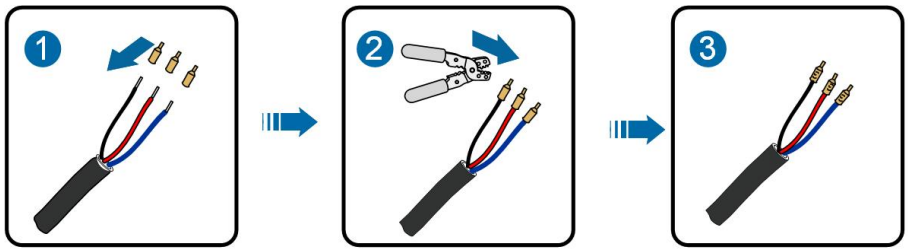
step 1 Unscrew the "RS485" waterproof terminal at the bottom of the device.

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.

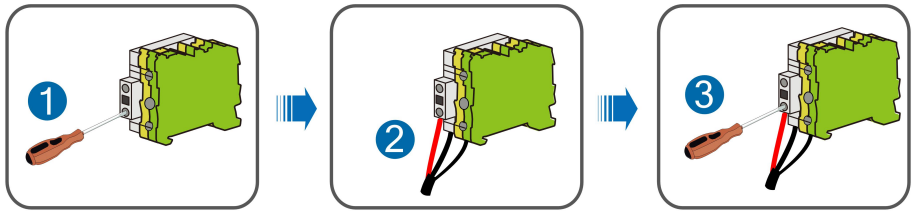


step 4 Assemble proper cord end terminals to communication cable whose protective layer is stripped off and crimp them with a crimping tool.



M204-E012

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.



M201-E010

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

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

5.5.3 Optical Fibre (Optional)

Preparation Before Installation

Before installation, prepare the required components. Components listed below are for reference only, and the actual situation may differ.

No.	Component
1	Pigtail: 24-input single-mode ST, 600mm
2	Jumper: Single-mode single-core ST-SC, 500mm
3	ST flange
4	Network cable, 460mm

Installation Steps

step 1 Unscrew the waterproof terminal "Optical fiber ports", 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 "Optical fiber ports".

- - End

5.5.4 Power Supply Connection

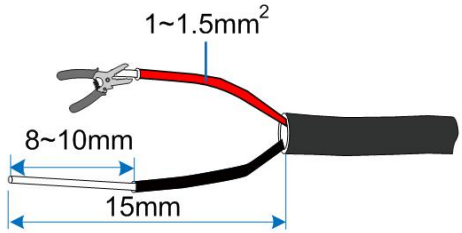
Preparation Before Installation

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

Installation Steps

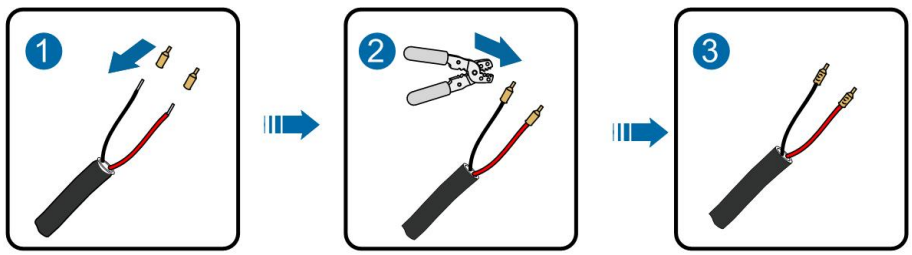
step 1 Unscrew the waterproof terminal "Input AC 100 – 277V", and lead the external power supply cable through the terminal.

step 2 Strip the cable with a wire stripper.



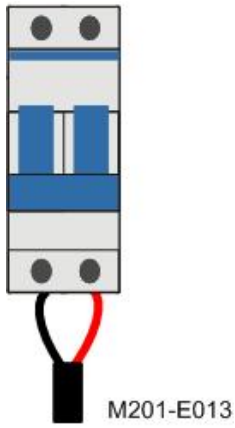
M200-E011

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



M200-E012

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

5.5.5 PLC Port Connection

Wiring Diagram

EMU200A can be connected to a double-split transformer, as shown in the following wiring diagram. PLC1 is the MPLC node built in Logger4000, and PLC2 is the external PLC module. To better demonstrate the wiring principle, all wiring is illustrated outside the Logger4000.

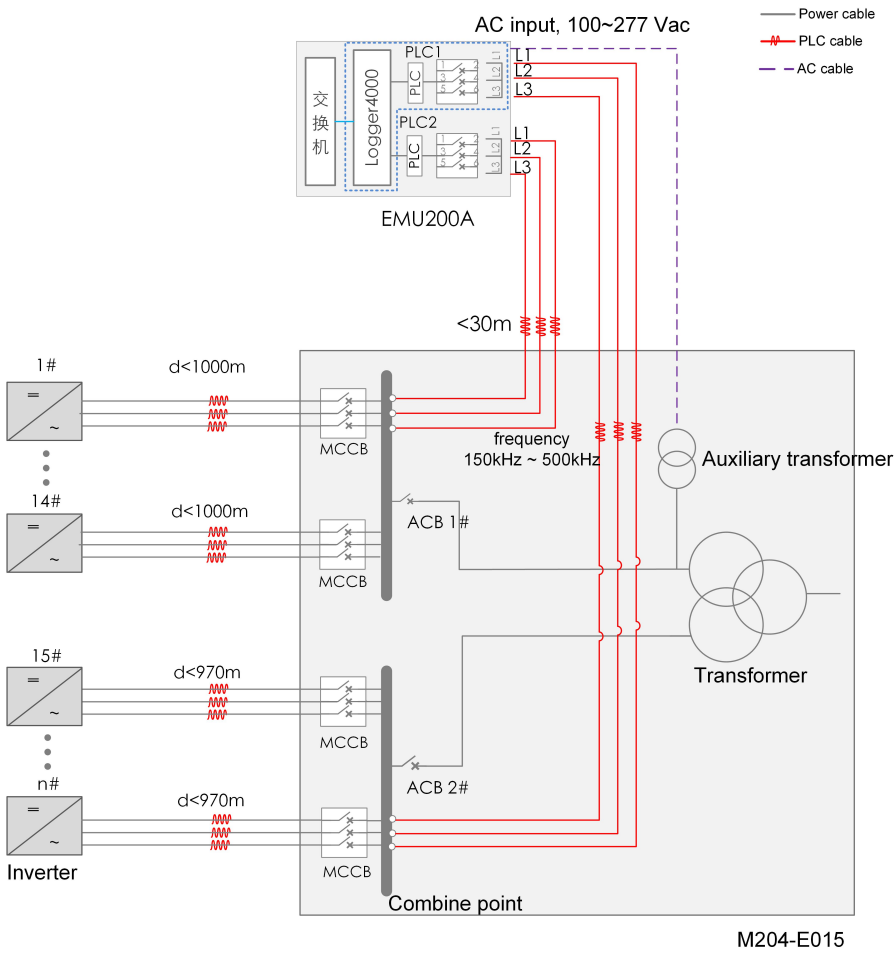


figure 5-1 Connection to double-split transformer

The PLC cable between the box-type transformer and the communication box should be outdoor anti-ultraviolet multi-core copper wire with a core diameter of 0.75mm²~10mm², and the cable can withstand isolation voltage of more than 1000V.

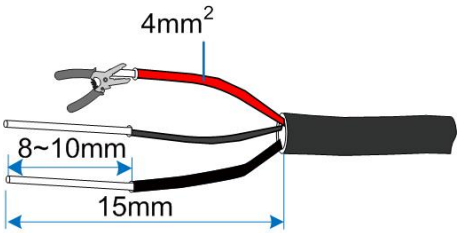
Preparation Before Installation

Before wiring, ensure that upstream AC switches and circuit breakers inside the device are all disconnected.

Installation Steps

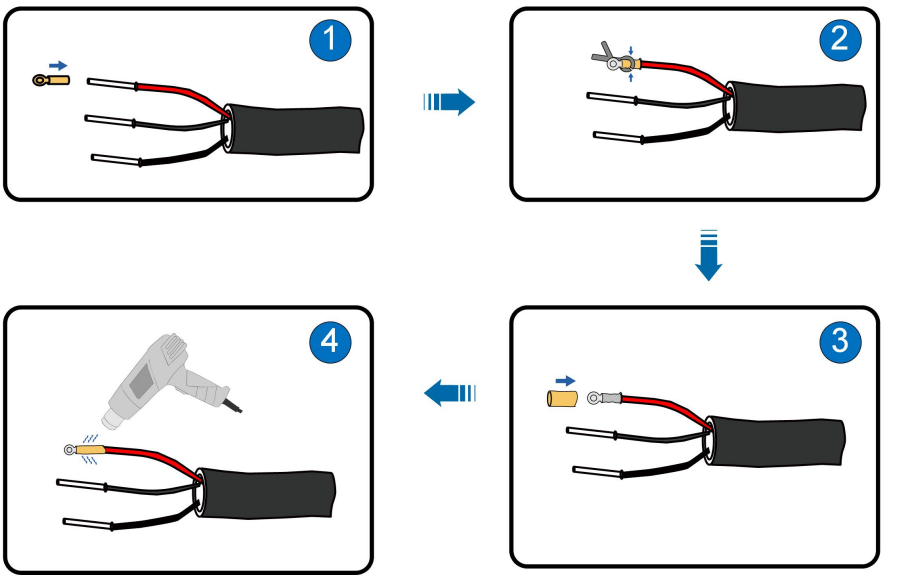
step 1 Unscrew the waterproof terminal "Input AC 400V/480V/540V/800V" at the bottom of the device, and lead external AC cable through the terminal.

step 2 Strip the cable jacket with a wire striper to reveal the copper core as shown in the figure below.



M201-E015

step 3 Crimp the OT terminal, whose specification is recommended to be OT2.5-6.



M201-E017

step 4 Connect the cable to corresponding terminals. When connect it to the transformer, there are two connection methods: three-phase three-wire and three-phase four-wire, as shown in the figure below.

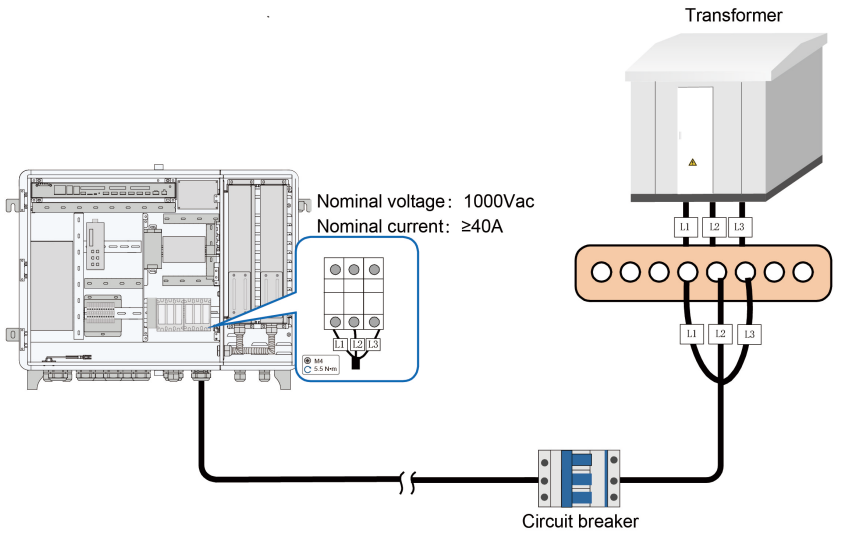


figure 5-2 Three-phase three-wire connection

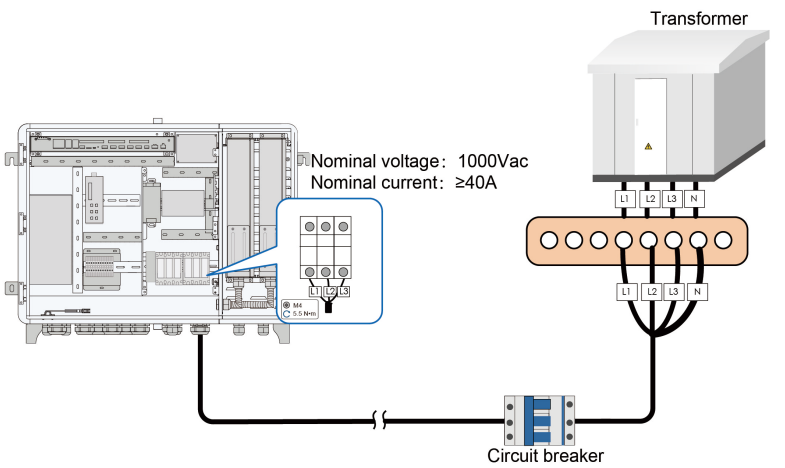


figure 5-3 Three-phase four-wire connection

For parameters of the circuit breaker on transformer side, refer to those of the circuit breaker inside EMU200A shown in the figure above.

When wiring, be sure to pay attention to the phase sequence of cables and terminals.

step 5 Check the cable for correct connection, and then secure it with a screw with a fastening torque of 5.5N · m.

- - End

5.5.6 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.

5.5.7 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 relay is initially at the NC terminal. It trips to another contact when a fault occurs to the device. However, the relay does not trip when an alarm occurs. External LED indicators or other equipment can be used for easier judging whether the inverter is in the faulty state.
- The following figures show the typical applications of normally open contact and normally closed contact.

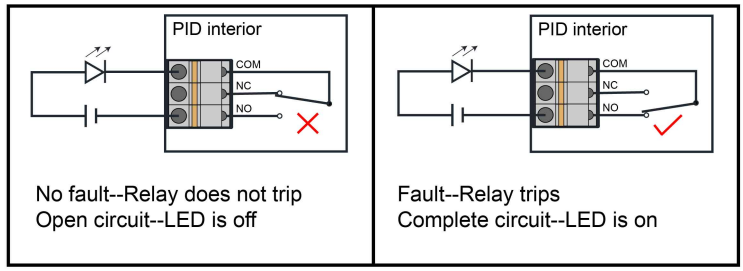


figure 5-4 Normally open contact

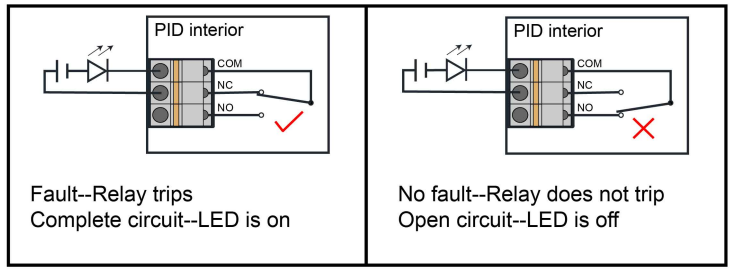
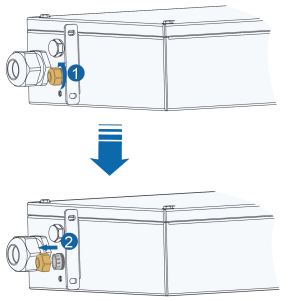


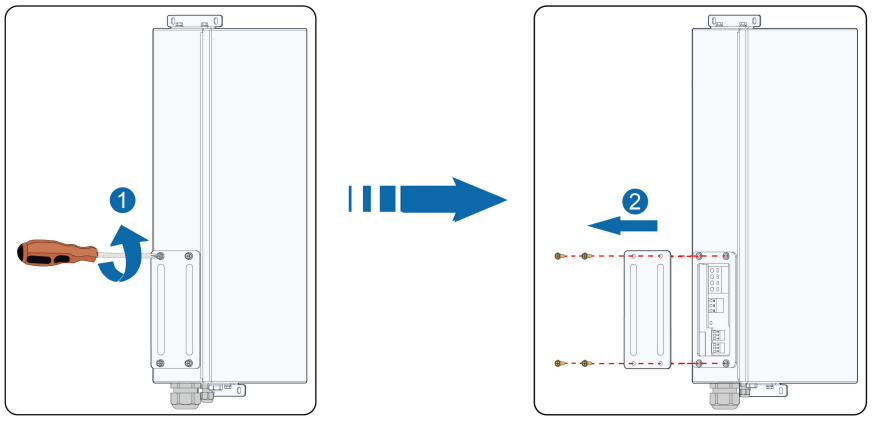
figure 5-5 Normally close contact

The cable is not included in the scope of delivery, and the recommended cable specification is 1~1.5 mm².

step 1 Unscrew the nut of the "DO" waterproof terminal at the bottom of the PID module.



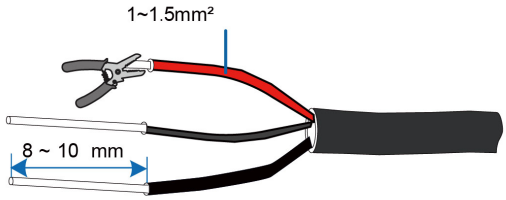
step 2 Open the maintenance door of the PID module with a Phillips screwdriver.



NOTICE

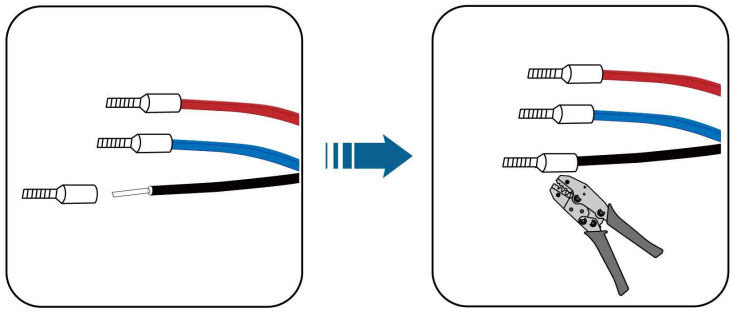
Store the removed nuts, maintenance door, and bolt assemblies in an accessible location and install and tighten them after the wiring is completed.

step 3 Lead the cable through the "PID01 DO" / "PID02 DO" waterproof terminal at the bottom of EMU200A and the "DO" waterproof terminal at the bottom of the PID module, and use a wire stripper to strip off the protective layer.



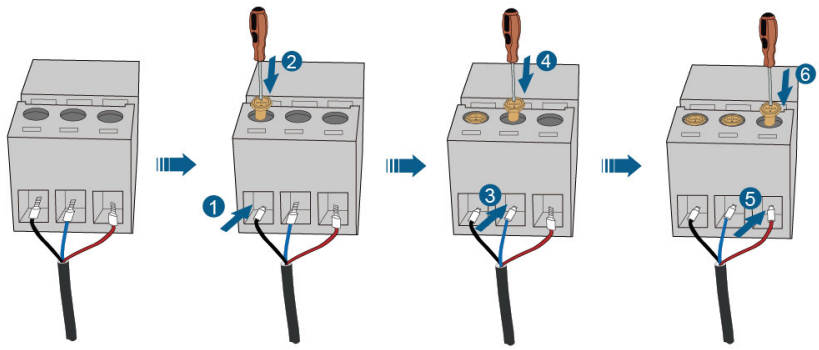
The cable is not included in the scope of delivery, and the recommended cable specification is 1~1.5 mm²。

step 4 Install the cord-end terminal and press them with crimping pliers.

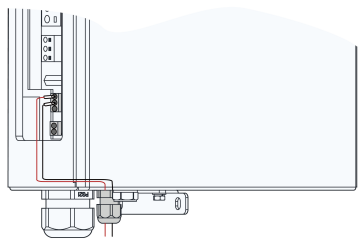


step 5 Unplug the terminals from the COM, NC, and NO interfaces on the PID module.

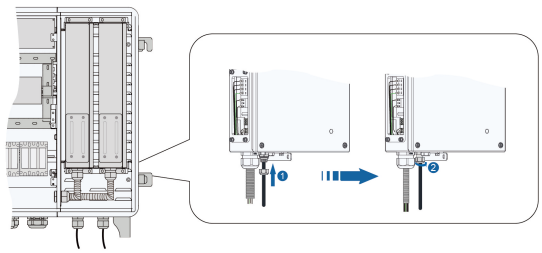
step 6 (Take NC contact as an example) Crimp the wiring terminals with a tightening torque of 0.2N.m.



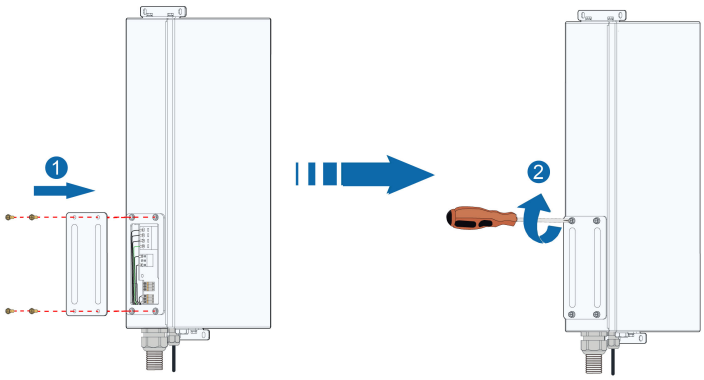
step 7 Connect the crimped terminals to the NC and COM terminals of the PID module.



step 8 Gently pull the cable to ensure that it is connected firmly, and secure the nut.



step 9 Install the maintenance door using the removed M4 screws with a tightening torque of 1.2N.m.



step 10 Tighten the “PID01 DO” / “PID02 DO” waterproof terminal at the bottom of the EMU200A.

- - End

5.6 Post-wiring processing

Gently pull the cable backwards to ensure firm connection when finish wiring.

Restore the protective cover inside the cabinet.

6 Commissioning

6.1 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.

6.2 Commissioning Steps

6.2.1 Power-on Operation

Item	Description
1	Connect the internal fuse of EMU200A.
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 steady on and the FAULT indicator off, the EMU200A runs normally.
5	Connect the transformer-side circuit breaker.

6.2.2 Logger Commissioning

Item	Description
1	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 14.14.14.14
2	Configure the IP addresses of the PC and ports FE1~FE4 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.
3	Enter the IP of the Logger4000, such as 12.12.12.12. or 14.14.14.14, in the PC address bar, to enter the corresponding Web interface.
4	Configure serial port parameters.
5	Add devices.

Item	Description
6	Configure device IP.
7	Configure iSolarCloud address if inverter data needs to be uploaded to iSolarCloud. • Accessed iSolarCloud site is "Chinese Server" by default. • In mainland China, set the site to "Chinese Server"; • In Europe, set the site to "European Server". • In Australia, set the site to "Australian Server". • In other regions, set the site to "International Server".
8	Access the Web interface of Logger3000 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.

6.2.3 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.

6.2.3.1 Operating Environment Requirements

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

6.2.3.2 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 (FE1 ~ FE4) of the Logger4000 to the same network segment. 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.

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

If you accidentally forget the IP address of the Ethernet ports, you can log in with the virtual IP.

The virtual IP of the Ethernet port is 14.14.14.14.

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

User types include **Ordinary User** and **O&M User**.

Ordinary users can view basic information, real-time fault, and device monitoring information of the logger.

O&M users not only have the permissions of the ordinary users, but also can set and modify information of devices connected to the logger.

In this manual, description is given by using permissions of O&M users as an example.

It is recommended to change the login password when logging in for the first time. The method of changing the password: click **O&M User→Modify Password** 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

6.2.3.3 Commissionng Steps

step 1 Click “Device Monitoring” and select the PID module to be set in the left device bar.

- Realtime Values: You can view real-time data information such as AC insulation impedance, power output voltage, power output current, internal temperature, fault status and alarm status of the device.
- Initial Parameter: Complete the setting of relevant parameters of the device, and click **Save**.

Parameter	Description
Anti-PID Time(h)	– The duration of the PID suppression when it and ISO detection work in turn. – PID suppression duration can only be integer values. – When the PID suppression is enabled, the ISO detection (daytime) is disabled.
ISO Detection Time (Day)(min)	– The duration of the ISO detection when it and PID suppression work in turn. – ISO detection duration can only be integer values. – When the ISO detection (daytime) is enabled, the PID suppression is disabled.
PID Recovery Time(h)	– The duration of the PID recovery when it and ISO detection work in turn. – PID recovery duration can only be integer values. – When the PID recovery is enabled, the ISO detection (night) is disabled.
ISO Detection Time (Night)(min)	– The duration of the ISO detection when it and PID recovery work in turn. – ISO detection duration can only be integer values. – When the ISO detection (night) is enabled, the PID recovery is disabled.
AC Insulation Alarm Threshold(kΩ)	– The resistance threshold of AC insulation alarm of the device. – The alarm threshold can only be integer values. – When the protection threshold <detection value <- alarm threshold for longer than the insulation alarm duration, the device will report the alarm code.
AC Insulation Alarm Time(s)	– Trigger duration of AC insulation alarm of the device. – The alarm duration can only be integer values. – When the protection threshold < detection value <- alarm threshold for longer than the insulation alarm duration, the device will report the alarm code.

Parameter	Description
AC Insulation Alarm Recovery Value(kΩ)	– The value that indicates the AC insulation resistance returns to normal. – The alarm recovery value can only be integer values. – When the alarm recovery value < detection value for longer than the insulation alarm recovery duration, the alarm of the device is cleared.
AC Insulation Alarm Recovery Time(s)	– The duration when the AC insulation resistance of the device keeps normal. – The AC insulation alarm recovery duration can only be integer values. – When the alarm recovery value < detection value for longer than the insulation alarm recovery duration, the alarm of the device is cleared.
AC Insulation Protection Threshold (kΩ)	– The resistance threshold of AC insulation protection alarm of the device. – The protection threshold can only be integer values. – When the detection value < protection threshold for longer than the insulation protection duration, the device will report the fault code and the protection is triggered.
AC Insulation Protection Time(s)	– Trigger duration of AC insulation protection alarm of the device. – The protection duration can only be integer values. – When the detection value < protection threshold for longer than the insulation protection duration, the device will report the fault code and the protection is triggered.
AC Insulation Protection Recovery Value	– The value that indicates the AC insulation resistance returns to normal. – The protection recovery value can only be integer values. – When the protection recovery value < detection value for longer than the insulation protection recovery value, the fault of the device is cleared and the protection is stopped.

Parameter	Description
AC Insulation Protection Recovery Duration (s)	– The duration when the AC insulation resistance of the device keeps normal. – The protection recovery duration can only be integer values. – When the protection recovery value < detection value for longer than the insulation protection recovery duration, the fault of the device is cleared and the protection is stopped.
Trip Switch Enabling	– Enable: Trip RMU VCB – Disable: It is forbidden to trip the VCB of RMU
DO Associated with Trip Switch	Click the drop-down box and select the DO associated with trip switch.
DO Associated with AC Insulation Detector	Select the DO associated with AC insulation detector.
Port of Associated Inverter	Select the inverter interfaces to be associated.
Number of Overcurrent Faults Within Seven Days	When the number of overcurrent faults exceeds 5 within 7 days, the PID stops working. Check whether insulation impedance is normal. If so, click "Clear" to clear the number of overcurrent faults for the PID to continue working.

Note: The setting of DO associated with the trip switch can take effect only after the trip switch is enabled.

- Device information: You can view the device model and software version.

- - End

7 Troubleshooting and Maintenance

7.1 Troubleshooting

Fault	Possible Cause	Corrective Measures
According to the background monitoring device, some devices in the PV array are abnormally disconnected.	1. RS485 cable is abnormal.	1. Measure the voltage between RS485 – A and RS485 – B with a multimeter, and check whether the voltage is about 5V.
	2. There are repeated device addresses in the PV array.	2. Check whether there are repeated device addresses.
	3. Parameters of Logger3000 are incorrectly configured.	3. Check, through the WEB interface "**System**" -> "**Port Parameter**" -> **RS485**", whether the PLC access is enabled.
	4. Master and slave node modules of the MPLC are abnormal.	4. Check whether the indicator D12 keeps steady red while the indicator D8 flickers green. If not, the modules are abnormal.
	5. Other causes	If the fault persists, please contact SUNGROW.
According to the background monitoring device, some devices in the PV array are unstably connected.	1. There are repeated device addresses in the PV array.	1. Check whether there are repeated device addresses.
	2. Parameters of Logger3000 are incorrectly configured.	2. Check, through the WEB interface "**System**" -> "**Port Parameter**" -> **RS485**", whether the PLC access is enabled.
	3. Other causes	If the fault persists, please contact SUNGROW.

7.2 PID Module Replacement (Optional)

Prerequisites

- Make sure the device is unavailable.
- Confirm that there is a spare PID module, the model is matched, and it can work normally.
- Professional and technical personnel must wear protective equipment that meets safety regulations when maintaining and replacing the device.
- Tools used during maintenance must be covered with an insulating protective layer.
- Before maintaining and replacing the device, make sure that the AC circuit breaker of the PID module is disconnected.

  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

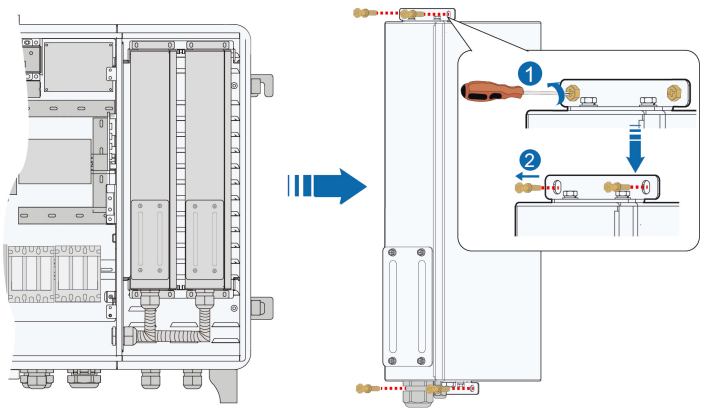
step 1 Open the EMU200A cabinet door referring to "5.4 Preparation Before Connection".

step 2 Loosen the nut of the "INPUT-OUTPUT" waterproof terminal at the bottom of the device referring to "5.5.7 PID Dry Contact Connection (Optional)".

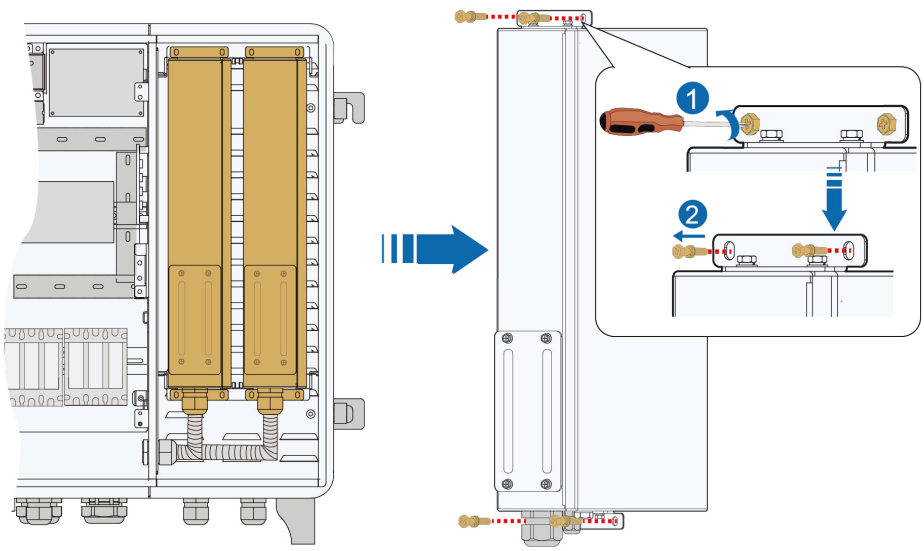
step 3 Open the maintenance door of the device with a Phillips screwdriver referring to "5.5.7 PID Dry Contact Connection (Optional)".

step 4 Remove cables of the faulty PID module.

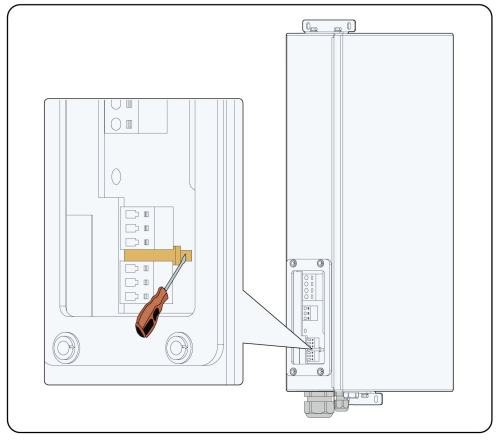
step 5 Unscrew the four fixing screws up and down the PID holder, and then remove the faulty PID module.



step 6 Install a new PID module.



step 7 (Optional) To replace the PID module on the right, use a slotted screwdriver to flip the DIP switch of the PID module to "ON".



step 8 Connect the removed cables to the PID module.

step 9 Tighten the nut on the waterproof terminal.

step 10 Reinstall the maintenance door with the M4 screws with a tightening torque of 1.2N/m.

step 11 Adjust the limit rod and close the EMU200A cabinet door when the PID module works normally.

--End

Web Operations

1 Delete the original faulty PID module through "Device" -> "Device List" on the Web page.

2 Add the new PID module and set relevant parameters.

8 Appendix A: Technical Parameters

Communication	
Max. number of devices	300
RS485 interface	5
MPLC Interface	2
Fiber port	2*100 / 1000Mbps
Ethernet port	4*10 / 100Mbps
Fast dispatch port (ETH)	1*10 / 100Mbps
PID & ISO Control Box	2
Fiber Switch (optional)	2 Fiber ports and 6 Ethernet ports
Fiber Splice Box (optional)	4-Input and 24-Output ST Single mode
SFP Module (optional)	100 / 1000Mbps
I/O Module (optional)	4-DI, 2-PT100, 2-AI (0 – 10 V), 2-DO
MPLC communication	
Max. communication distance	⩽ 1000 m
Max. number of each channel devices	⩽ 80inverters
Rated voltage	400 – 800 Vac
Max. withstands voltage	⩽ 1000 Vac
Power supply	
AC input	100 – 277 Vac, 50 / 60 Hz
Power consumption	max. 900 W
Ambient conditions	
Operating Temperature	-30 ℃ – +60 ℃
Storage Temperature	-40 ℃ – +70 ℃
Relative air humidity	⩽95 % (non-condensing)
Elevation	⩽ 4000 m
Protection class	IP65
Mechanical parameters	
Dimensions (W x H x D)	860 × 680 × 275mm（ ± 5mm ）
Weight	36kg
Mounting type	Wall mounting, bracket mounting, ground mounting, and pole mounting
Cable in and out mode	Bottom in, bottom out

9 Appendix B: General Information

9.1 Quality Assurance

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

Evidence

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

Conditions

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

Exclusion of Liability

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

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

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

9.2 Contact Information

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

- Model of the device

- Serial number of the device
- Fault code/name
- Brief description of the problem

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