SUNGROW
Clean power for all

User Manual

Energy Management System

EMS3000CP

EMS3000CP-UEN-Ver21-202405

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:

- EMS3000CP

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.

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 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.

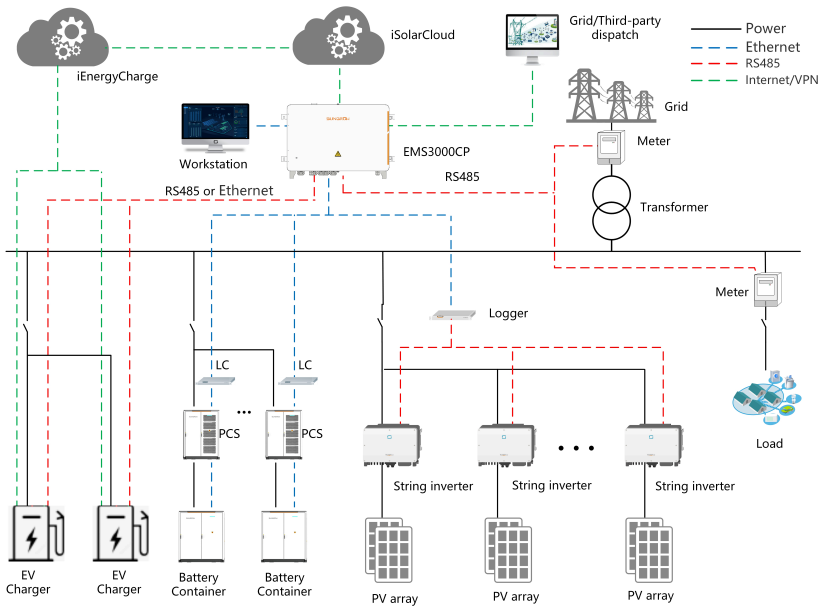
indicates additional information, emphasized contents or tips to help you solve problems or save time.

2 Product Description

2.1 Function Introduction

EMS3000CP is designed for a wide range of business scenarios, with diverse control strategies and high-precision algorithms. It provides an efficient O&M solution, along with top-rank personalized services, for each customer and helps to increase the revenue from energy storage.

The networking diagram of a system equipped with EMS3000CP is shown below.



2.2 Key Features

Efficient Operation & Maintenance

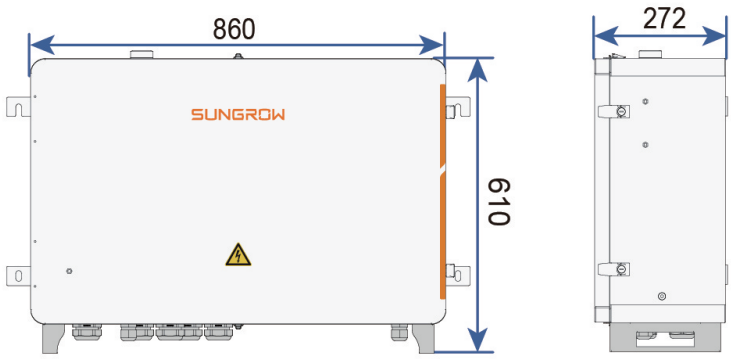
- Incorporate different O&M options such as WEB and APP.
- Allow local/cloud O&M to ensure stable device operation.
- Support one-click update of devices in the whole plant.

Safe and Reliable

- Support ESS SOC balancing control.
- Cloud-pipeline-edge three-layer data encryption.
- Support real-time device fault alarm.

2.3 Overall Dimensions

The overall dimensions of the EMS3000CP are shown below (unit: mm).



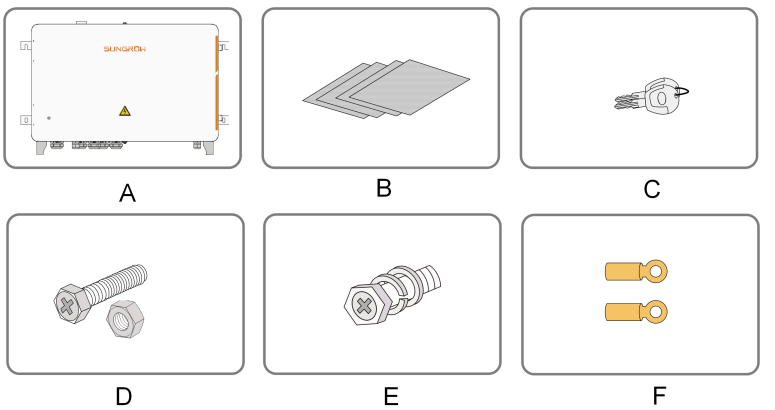
3 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

3.1 Check Before Installation

Check that all components have been delivered based on the packing list in the package. The delivered components shall include:



No.	Description	Quantity
A	EMS3000CP	1 set
B	Relevant documents, including the certificate of quality, warranty card, delivery inspection report, and user manual.	1 set
C	Key	1 set
D	M10x45	4 sets
E	M6x12	1
F	OT terminal	1

NOTICE

Although we will always perform detailed product testing and inspection before shipment, components may be damaged during shipment, so the device must be inspected before installation. Please contact SUNGROW or the shipping company in case of any damage.

3.2 Location Requirements

- With the ingress of protection IP66.
- Ambient humidity: 5%–95%. Excessive moisture can damage internal components.
- Take anti-moisture and anti-corrosion measures.
- The product should be installed in a shaded and ventilated environment to avoid direct sunlight exposure.

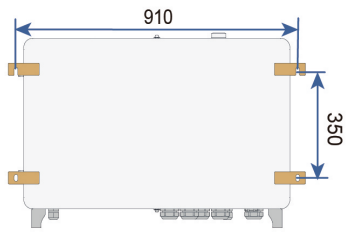
3.3 Installation Method

⚠ 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!

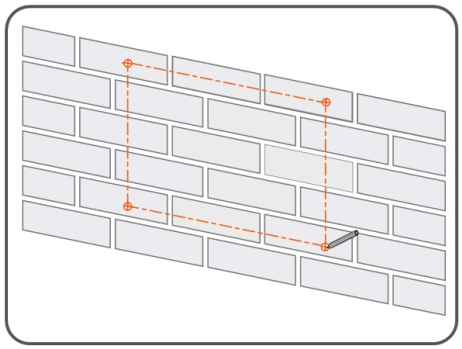
The installation dimensions of mounting ears on the back of the device are shown in the following figure (unit: mm).



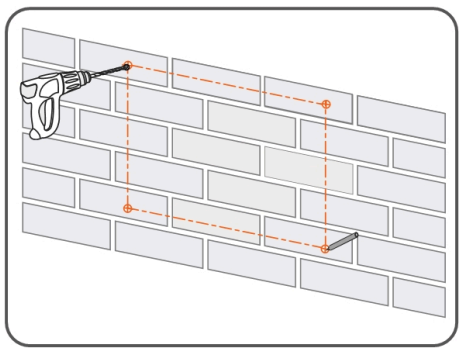
Choose the corresponding installation method according to actual needs.

3.3.1 Wall Mounting

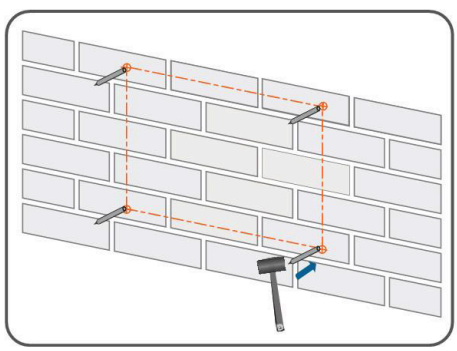
step 1 Mark the hole locations on the installation wall according to the foregoing installation dimensions.



step 2 Drill holes on the marked locations.

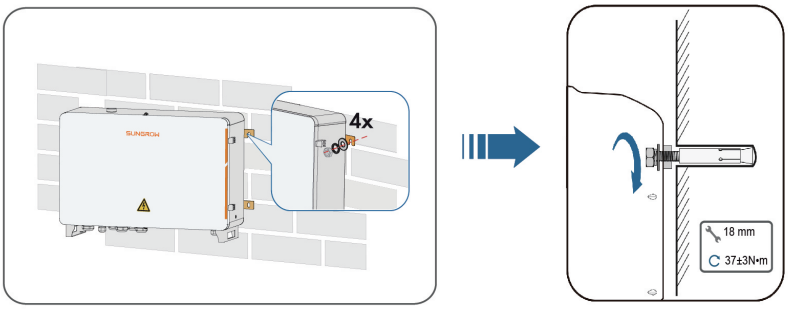


step 3 Place the M10x45 expansion sleeve (not included in the scope of delivery) into the hole, and tap it with a rubber hammer. Make it completely embedded in the wall.



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, and expansion sleeve with a fastening torque of 37±3N.m.

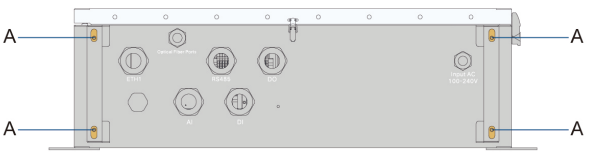


- - End

3.3.2 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).

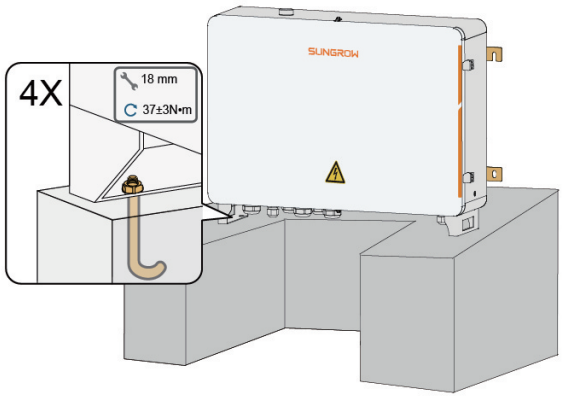
To avoid excessive bending of cables, it is recommended that the bottom of EMS3000CP be 30 cm from the ground.



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.

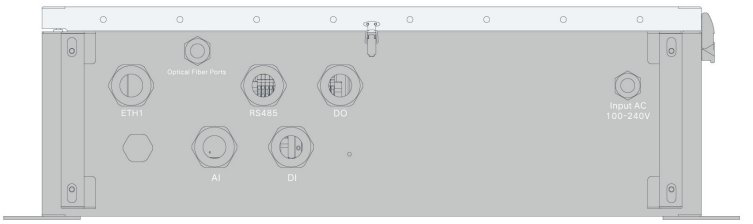


step 3 Secure the installation holes in bottom of the device to the foundation.

- - End

4 Electrical Connection

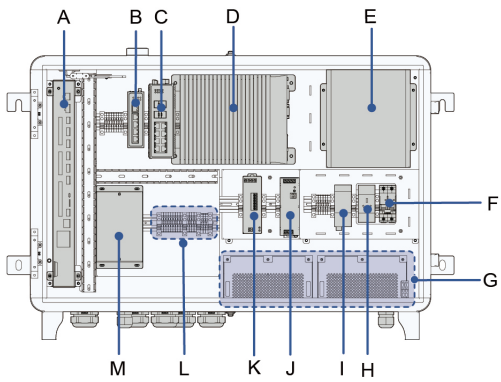
4.1 Waterproof Connector Overview



Mark	Description
ETH1	Waterproof connector for the Ethernet cable
RS485	Waterproof connector for the RS485 communication cable
DO	Waterproof connector for the dry contact output cable
AI	Reserved; waterproof connector for the analog input cable
DI	Reserved; waterproof connector for the dry contact input cable
Optical Fiber Ports	Waterproof connector for the fiber optic cable
Input AC 100–264V	Waterproof connector for the AC 100–264V power cable

4.2 Internal Structure

The internal structure of the device is shown below.

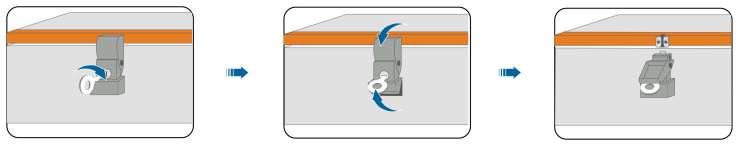


The internal structure of the device is shown below.

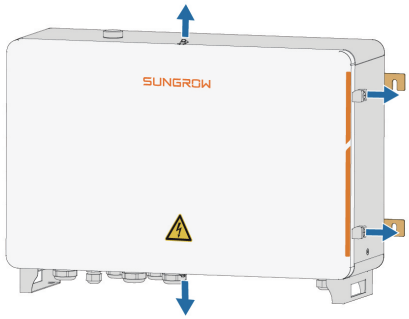
No.	Item	Notes
A	EMS300 controller	—
B	4G router	—
C	Switch	Must work with the fiber termination box For more information, please visit the distributor's official website
D	Industrial Personal Computer (IPC)	Optional
E	Firewall	Optional
F	Air circuit breaker	Control the on/off of the external 220V AC power supply
G	Battery	—
H	Socket	Used by field operation and maintenance personnel only
I	SPD	—
J	24V power box	Used to convert 220V into 24V
K	UPS	Optional Uninterruptible power supply
L	Terminal block	—
M	Fiber termination box	Must work with the fiber ring network switch For more information, please visit the distributor's official website

4.3 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

4.4 Connection Steps

4.4.1 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!**

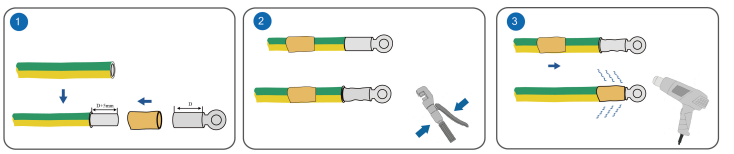
Brief Introduction

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

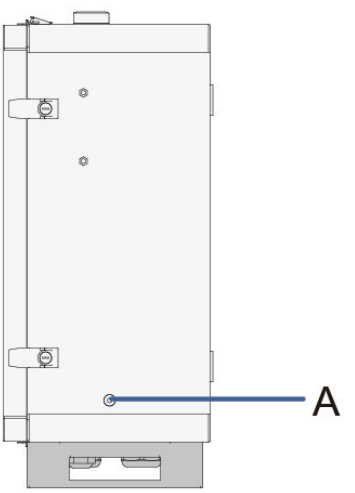
- Prepare the grounding cable.
- Strip the cable and crimp the OT terminal, and then use heat shrink tubing to tighten the cable and the OT terminal.



4.4.1.1 Grounding of Grounding Points

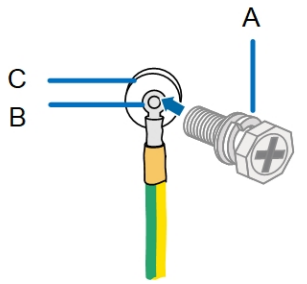
Position

Positions of grounding points outside the device are shown in Figure A.



Wiring steps

Tighten the prepared OT terminal and the grounding hole with bolt assembly with a tightening torque of 7.5±0.5 N.m.



No.	Definition	Remarks
A	M6x12 bolt	Included in the scope of delivery
B	OT terminal	Beyond the scope of delivery.
C	Grounding hole	-

4.4.2 Wiring of RS485 Communication Terminal

Pre-wiring Requirements

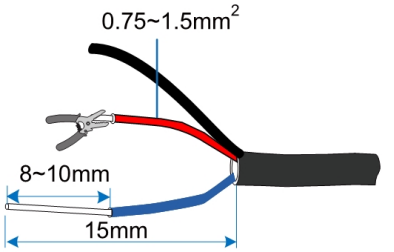
NOTICE

To connect an external device via RS485, ensure this device has a surge protection feature.

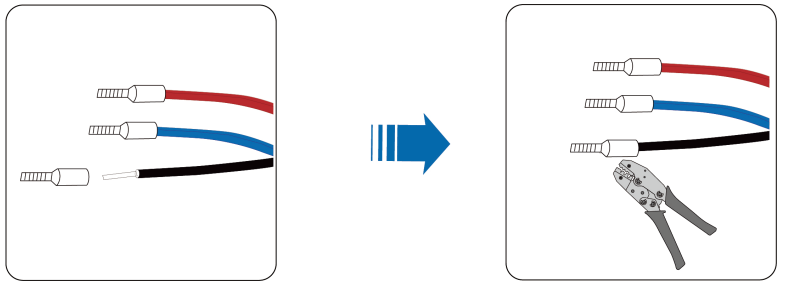
Wiring Steps

Positions in the upper part of the XZ3 terminal block have been used to connect the EMS controller before delivery. At the site, users may connect an external device to the lower part of the XZ3 terminal block based on actual needs. If there is no unused position in the terminal block, the external device can be connected to the RS485 port of the EMS controller.

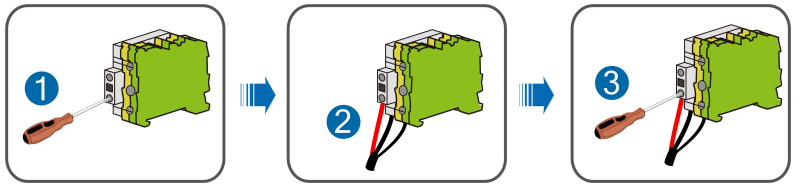
1. Unscrew the “RS485” waterproof connector at the bottom of the device.
2. Lead the RS485 cable through the opening to the communication terminal inside the device.
3. Use wire strippers to strip the protective layer of the cable by a proper length, as shown in the figure below.



4. Attach appropriate cold-pressed terminals to the stripped wires and crimp them using a crimping tool.



5. Connect the wires to the corresponding positions. Then, secure the wiring terminals using a screwdriver at a tightening torque of 0.5–0.6 N.m.



Port Mark	Description
A	Upper terminal, connected to RS485-A.
B	Lower terminal, connected to RS485-B.
GND	Used for the grounding of the cable shielding layer.

6. Pull the cable gently to make sure the connection is secure.
7. Fit and tighten the “RS485” waterproof connector at the bottom of the device.

4.4.3 Wiring of Optical Fiber Port

Wiring Steps

step 1 Unscrew the "Optical Fiber Ports" waterproof connector, and pass the fiber optic cable through the opening.

step 2 Splice the fiber optic cable inside the termination box.

For details, contact SUNGROW.

step 3 Fit and tighten the waterproof connector.

- - End

4.4.4 Wiring of Ethernet Port (Switch)

Port definition

Ethernet ports are reserved on switches.

Use CAT-5e cables to connect external devices, such as communication boxes and power conversion system, to switches as required on-site.

4.4.5 Wiring of DI Signal

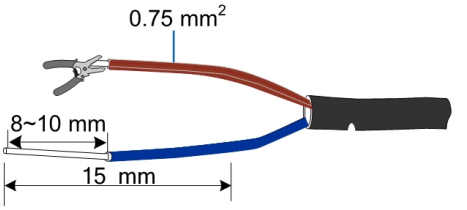
The DI port is intended for wiring digital input (DI) signals such as remote grid schedule commands and alarms. Only passive dry contact signals are supported. It is recommended that the distance of signal transmission does not exceed 10 meters.

Positions in the upper part of the XZ4 terminal block have been used to connect the EMS controller before delivery. At the site, users may connect an external device to the lower part of the XZ4 terminal block based on actual needs. If there is no unused position in the terminal block, the external device can be connected to the DI port of the EMS controller.

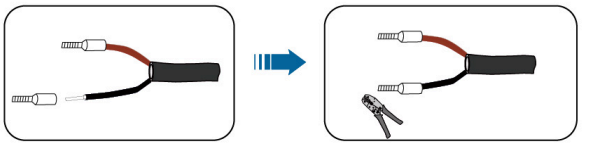
step 1 Unscrew the “DI” waterproof connector at the bottom of the device.

step 2 Lead the external DI signal cable through the opening to the XZ4 terminal block or the DI port of the controller.

step 3 Use wire strippers to strip the protective layer and insulation layer of the signal cable by a proper length, as shown in the figure below.



step 4 Attach appropriate cold-pressed terminals to the stripped wires and crimp them using a crimping tool.



step 5 Connect the wires to the corresponding positions.

step 6 Pull the cable gently to make sure the connection is secure.

step 7 Fit and tighten the “DI” waterproof connector at the bottom of the device.

- - End

4.4.6 Wiring of DO Signal

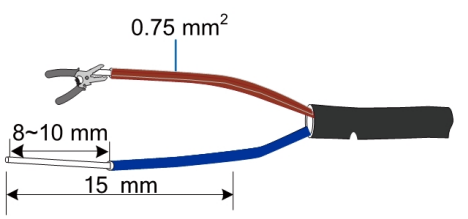
Position 1 corresponds to "NO", Position 2 to "NC" and Position 3 to "COM". "NO/COM" indicates a normally open contact point and "NC/COM" indicates a normally closed contact point. It is recommended that the distance of signal transmission does not exceed 10 meters.

Positions in the upper part of the XZ5 terminal block have been used to connect the EMS controller before delivery. At the site, users may connect an external device to the lower part of the XZ5 terminal block based on actual needs. If there is no unused position in the terminal block, the external device can be connected to the DO port of the EMS controller.

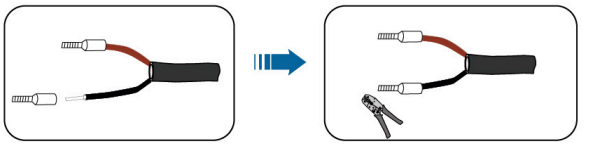
step 1 Unscrew the “DO” waterproof connector at the bottom of the device.

step 2 Lead the external dry contact output signal cable through the opening to the XZ5 terminal block or the DO port of the controller.

step 3 Use wire strippers to strip the protective layer and insulation layer of the signal cable by a proper length, as shown in the figure below.



step 4 Attach appropriate cold-pressed terminals to the stripped wires and crimp them using a crimping tool.



step 5 Connect the wires to the corresponding positions.

step 6 Pull the cable gently to make sure the connection is secure.

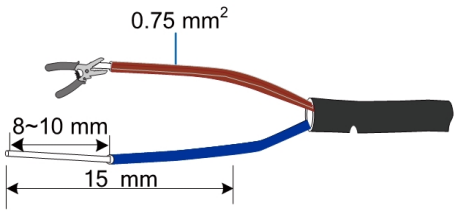
step 7 Fit and tighten the “DO” waterproof connector at the bottom of the device.

- - End

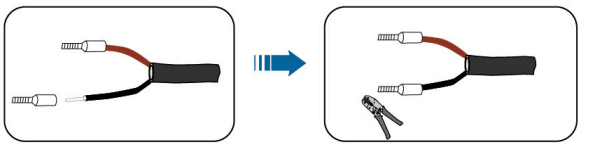
4.4.7 Wiring of AI Signal

The AI port is used to connect analog input (AI) signals of devices such as environmental monitoring sensors. It is recommended that the distance of signal transmission does not exceed 10 meters.

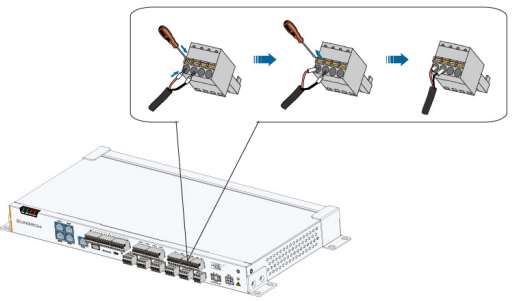
step 1 Strip the protective layer and insulation layer of the AI signal cable by a proper length using wire strippers, as shown in the figure below.



step 2 Attach appropriate cold-pressed terminals to the stripped wires and crimp them using a crimping tool.



step 3 Connect the wires to positions "AI1"~"AI4" on the controller, as shown below. "AI1" is taken as an example.



- - End

Port	Designation	Description
AI	AI1	Supported voltage input range: 0V ~ 10Vdc
	AI2	Supported current input range: 4mA ~ 20mA
	AI3	
	AI4	

Connect the positive wire of the AI signal cable to the "+" of the AI port, and negative wire to the "-" of the port.

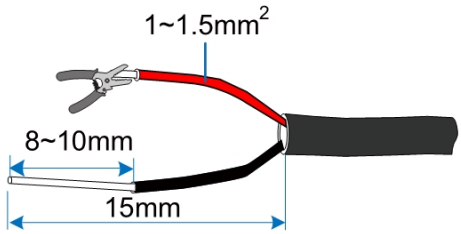
4.4.8 Wiring of 220Vac Power Supply

Preparation Before Wiring

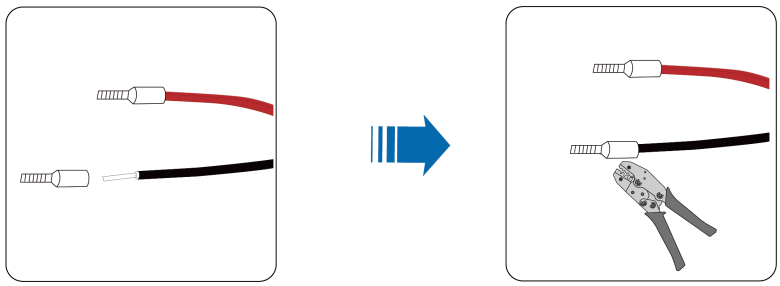
- Verify that the circuit breaker is set to "OFF" before AC power supply wiring.
- Prepare the AC cable accordingly.

Wiring Steps

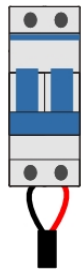
1. Unscrew the “Input AC 100–264V” waterproof connector and lead the external power supply cable through the opening.
2. Use wire strippers to strip the cable by a proper length, as shown in the figure below.



3. Crimp cold-pressed terminals onto the wires.



4. Connect the wires to the corresponding positions and secure them with screws at a torque of 2.0 N·m.



5. Fit and tighten the waterproof connector.

5 Commissioning

5.1 Inspection Before Commissioning

No.	Description
1	Check that the connections of wiring terminals are secure.
2	Check that the 220Vac power supply cable is correctly connected.
3	Check that the internal and external grounding points of the device are properly connected for reliable grounding.

5.2 Commissioning Steps

For the operations described in this chapter, only Sungrow Power Supply Co., Ltd. is responsible for completing the operations.

step 1 Open the cabinet door and close the micro-circuit breaker.

step 2 Connect PC to the free port of the switch.

step 3 Configure the IP address of the PC so that it is in the same network segment as the IP address of the ETH1 network interface of the EMS controller.

step 4 Open the browser, enter the IP address of the ETH1 network port of the EMS controller, enter the user name and password, and log in to the WEB interface.

The user name and password can be obtained from Sungrow Power Supply Co., Ltd.

step 5 After entering the interface, click each navigation bar on the left side of the interface in turn to check whether the operating data of the device is normal.

- - End

6 Routine Maintenance

table 6-1 Maintenance List

Item	Method
Operation environment	• Check to ensure that there is no strong EMI device around the device. • Check to ensure that there is no hot source around the device. • Check to ensure that there is no corrosive materials around the device.
Hardware maintenance	• Check to ensure that the power supply voltage is normal. • Check to ensure that the cables are connected firmly. • Check to ensure that the cable is grounded well.
System cleaning	• Clean the enclosure and components. • Check that all heat dissipation channels of the cabinet are unblocked and free from blockage. If there is any blockage, please clean it up in time.
Terminal and cable connection	• Check if the screws of the terminals are loose, and refasten them with screwdriver if necessary. • Check if the connection copper bar or screws are discolored. • Check the wiring layout and the device terminal connections.
Software maintenance	• Log into the WEB to check the device communication status. • Log into the WEB to check parameter settings of the device. • Log into the WEB to check the software version of the device.

7 Appendix A: Technical Parameters

System	
Controller	EMS300CP
OS	Linux
Typical functions	• Controller Functions: On/off grid, Zero export, Demand charge control, Peak-valley arbitrage, P/Q/PF control, SOC intelligent management, FCAS,Emergency backup power function • iSolarCloud Functions: Real-time monitoring, Remote upgrade, Smart O&M for remote
Communication	
RS485 interface	7
DI / DO	16 / 4
Fiber port	4*100 / 1000 Mbps
Ethernet port	5*10 / 100 Mbps
Fiber Splice Box	2-Input and 8-Output LC Single mode
Communication	IEC60870-5-104, Modbus TCP
Power supply	
AC input	100 V ~ 264 V, 50 / 60 Hz
Power consumption	max. 100 W
UPS (Optional)	2h
Ambient conditions	
Operating Temperature (without UPS inside)	-20℃ ~ +50 ℃
Storage Temperature (without UPS inside)	-40 ℃ ~ +70 ℃
Operating Temperature (with UPS inside)	0℃ ~ +40 ℃
Storage Temperature (with UPS inside)	-15 ℃ ~ +50 ℃
Relative air humidity	0%~95% (non-condensing)
Elevation	≤ 5000 m
Protection class	IP66
Mechanical parameters	

System	
Dimensions (W*H*D)	860 mm x 610 mm x 272 mm
Weight	≤55 kg
Mounting type	Wall hanging, ground mounting，outdoor and indoor
Box material	Metal

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.

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 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**

SUNGROW

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