CM2 BESS Quick Installation Guide

This quick installation guide is applicable for CM2 series commercial & industrial (C&I) all-in-one battery energy storage system (BESS). For more information, refer to the CM2 user manual.

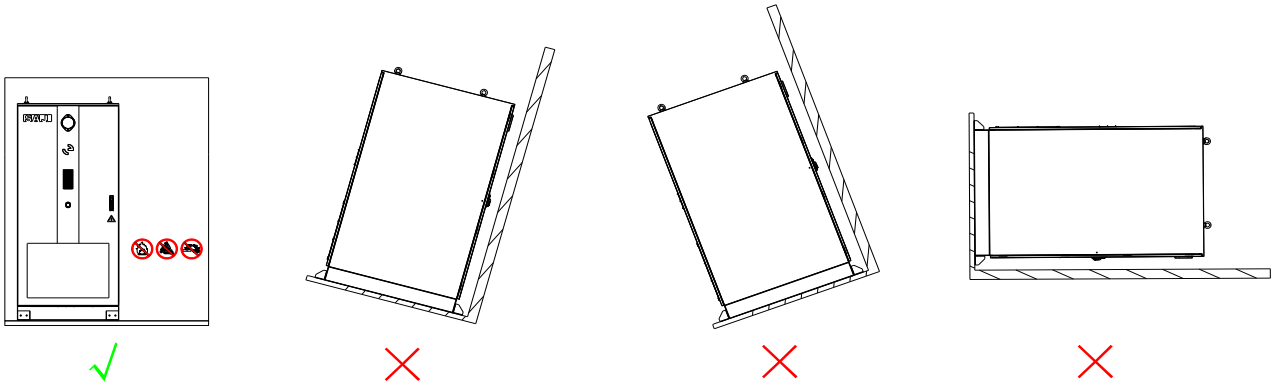
To get the latest CM2 series user manual and quick installation guide, scan the following QR code:

NOTICE

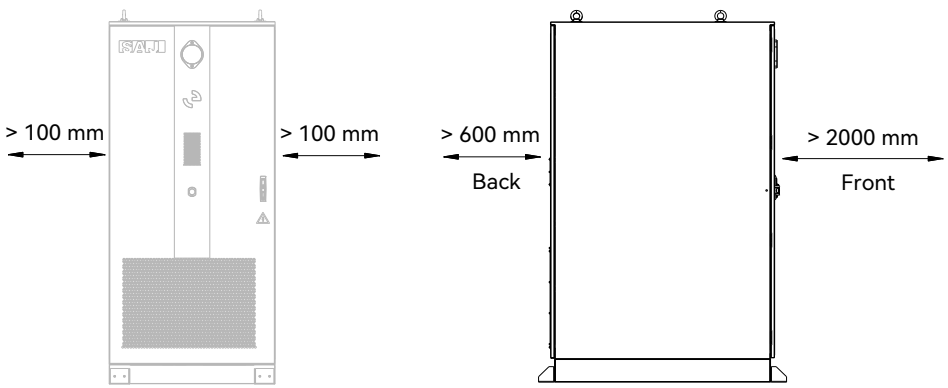
- Before installation and operation, read the product documentation carefully.
- ONLY qualified and trained electricians who have read and fully understood all safety regulations contained in this manual can install the equipment. The operation personnel should understand the system, its working principles, and relevant national and regional standards.
- During operations, wear personal protective equipment (PPE) and use dedicated tools.

☐ 1. Prepare the installation site

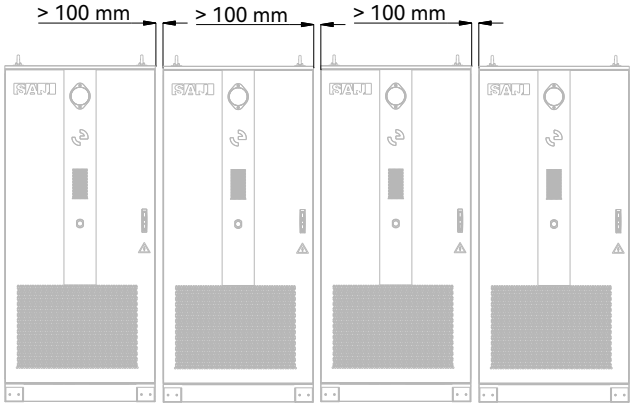
1. Reserve sufficient wiring space for cable outlet at the front or back side of the cabinet when constructing the equipment foundation.
2. Make sure that the flatness error of the top surface elevation of the foundation base (column) should not exceed 3 mm. Adjust the foundation height according to the equipment and on-site requirements, and it is recommended that the foundation protrudes at least 300 mm above the ground level.
3. Install the cabinet vertically. Do not install it backward-tilted, forward-tilted, or horizontally.



4. Reserve enough space around the CM2 cabinet to ensure proper ventilation.
   - Installation space requirement of a single cabinet:

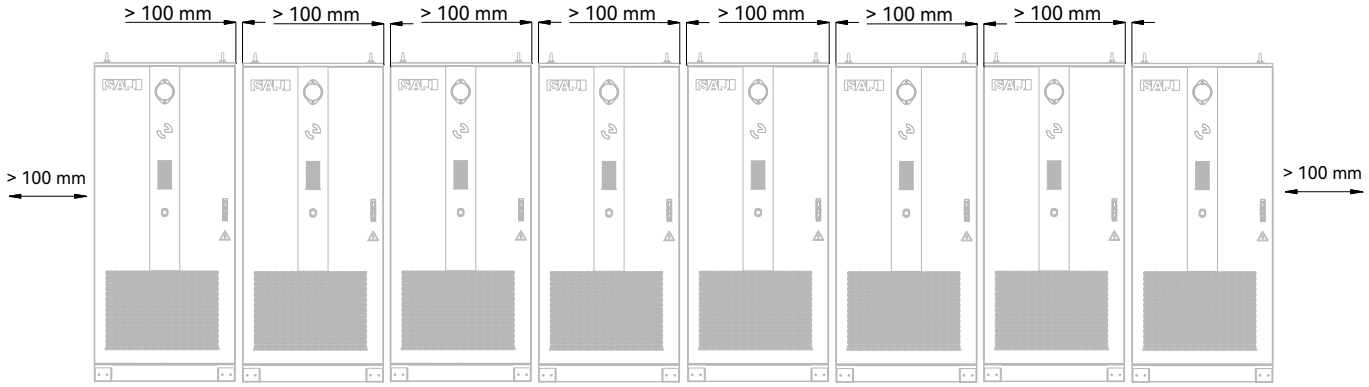


- Side-by-side space requirement of multiple cabinets:

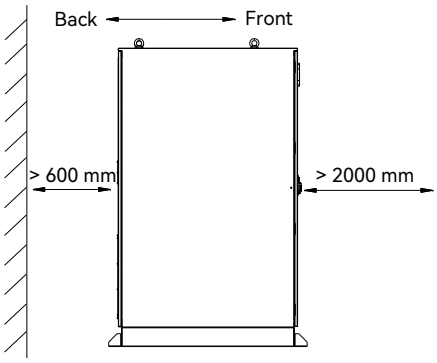


For less than 8 cabinets, recommend arranging the cabinets in one line as follows:

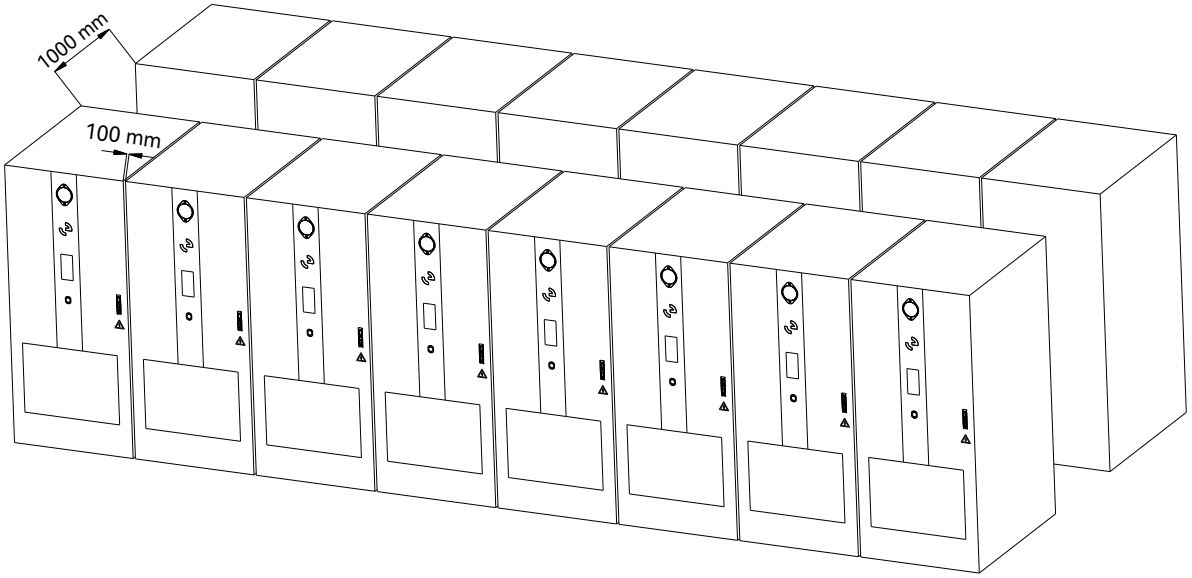
Front view



Left-side view

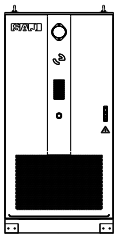


For more than 8 cabinets, recommend arranging the cabinets in two lines and back-to-back as follows:

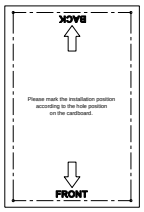


☐2. Unpack and check the package contents

1. Check the outer packing. If any serious damage is found or the model is not what you requested, do not unpack the product, and contact your dealer as soon as possible.
   - Check the outer packing package for any damage, such as holes and cracks.
   - Check the equipment model.
2. Check the product package.
   - **CM2 cabinet**

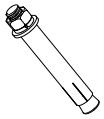


CM2 cabinet

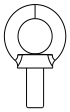


Positioning cardboard

M10*20 screw x8



M12*80 expansion bolt x4

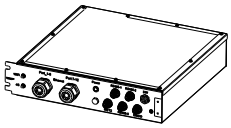


Eye bolt x4

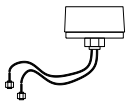
Protective panel x2

Printed documents

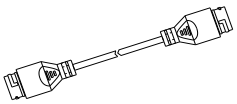
   - **EMS unit**



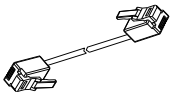
EMS unit



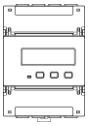
Antenna



24V DC power cable



Communication cable



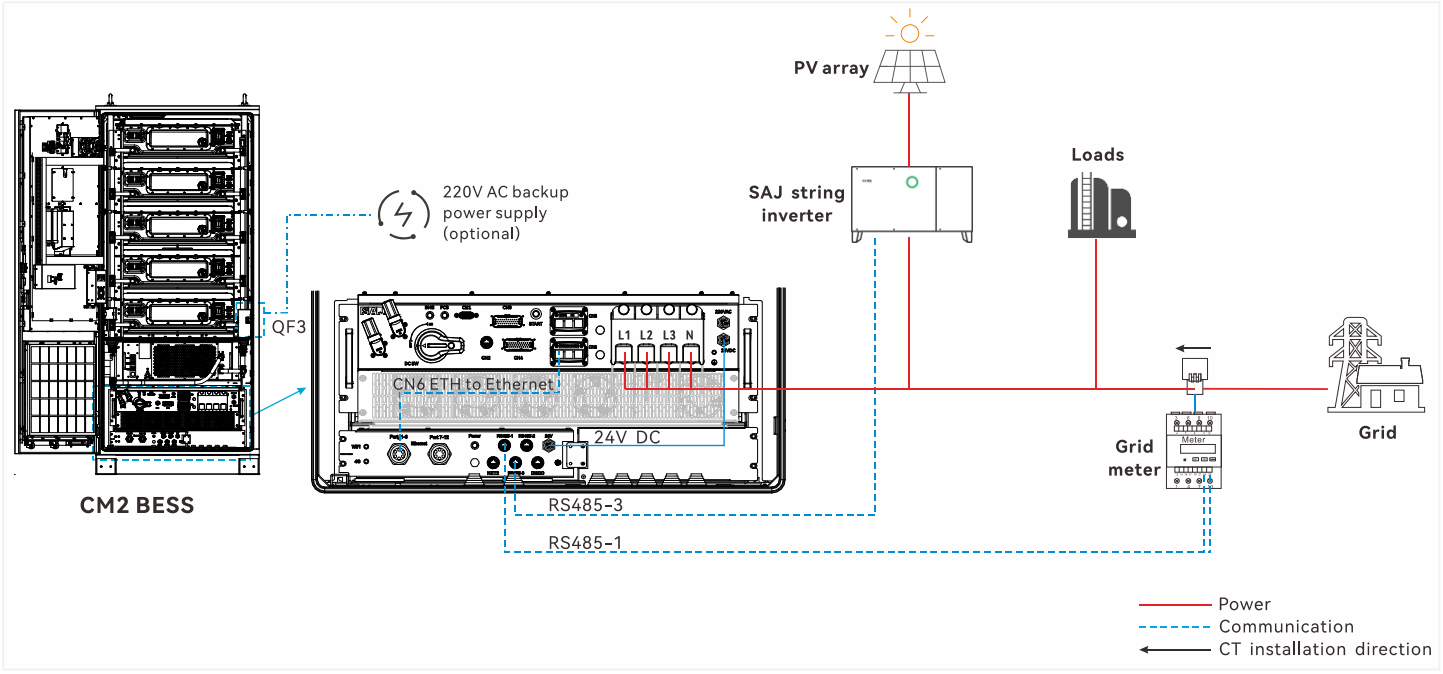
Grid meter

Printed documents

Note: The optional EMS package includes the components marked with *. The EMS unit is only equipped with a switch.

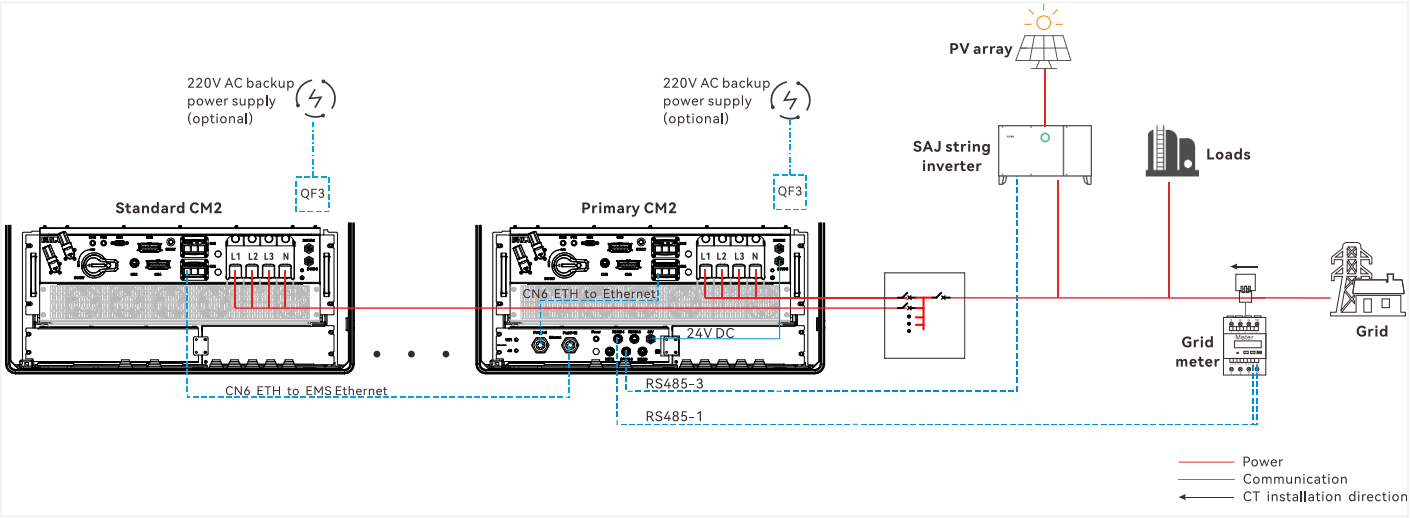
☐3. Plan the cable connections

The following figure shows the cable connections of a single CM2 cabinet:

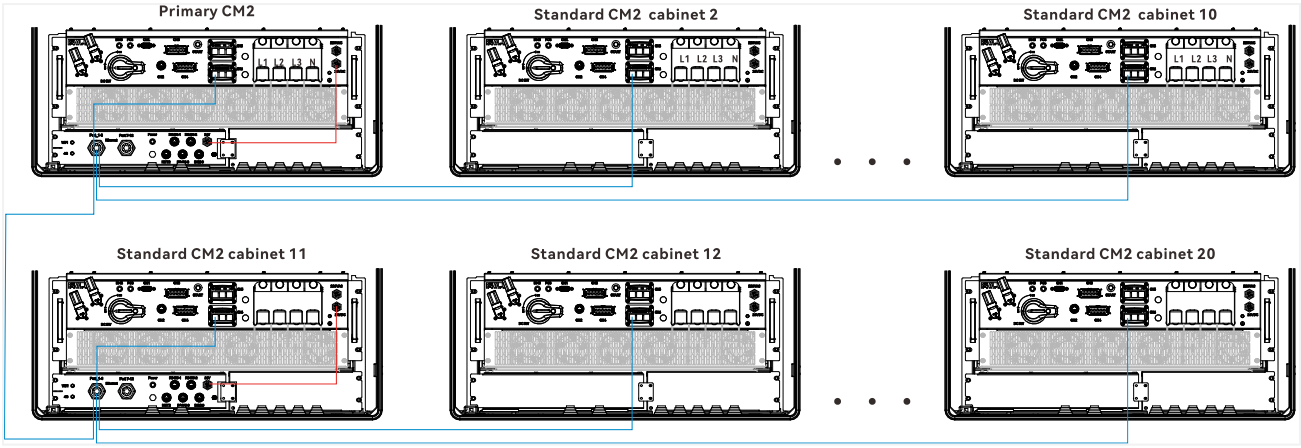


The following figure shows the cable connections of multiple CM2 cabinets in parallel. The primary CM2 is equipped with the EMS unit, and the standard CM2 cabinets all connect to the EMS unit on the primary CM2 for system communication.

A maximum of 20 CM2 cabinets can be deployed as one BESS. When 12 or less cabinets are deployed, follow the diagram below for cable connections.



When more than 12 cabinets are deployed, follow the diagram below for EMS cable connections. In this case, the customer needs to order an optional EMS unit equipped only with a switch and install it in a standard CM2 cabinet (cabinet 11) as the following example shows.



☐4. Mount the cabinet

Before you start

1. Select one of the following options to mount and secure the cabinet:

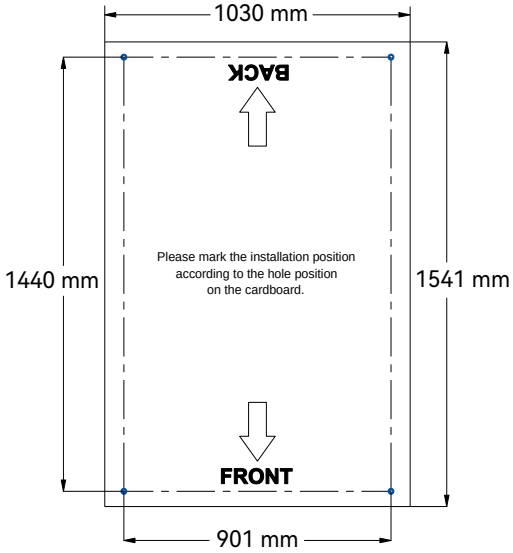
   • Mark and drill the mounting positions with the positioning cardboard, and then move the cabinet to the mounting position. In this case, take the steps in this section first.

   • Mark and drill the mounting positions with the support bracket after moving the cabinet to the mounting position. In this case, move the cabinet to the mounting position with a crane first.

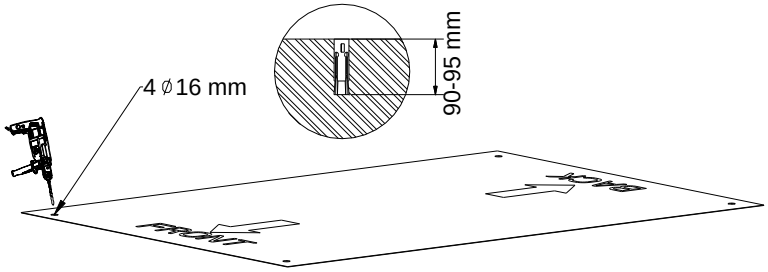
2. Make sure that enough space is reserved at the front or back end of the cabinet bottom for the cables and wires passing through.

Procedure

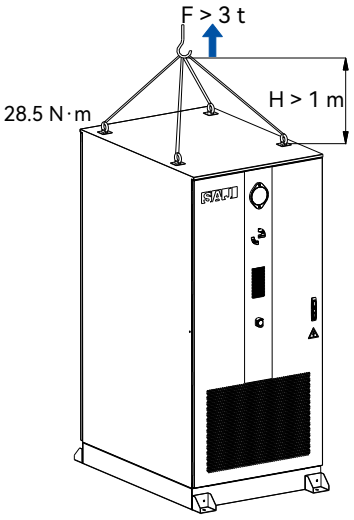
Step 1. Use the positioning cardboard to mark the four drilling holes for mounting the cabinet.



Step 2. Drill the four holes on the foundation at the depth of 90-95 mm.



Step 3. Move the cabinet to the mounting positioning with forklift or crane. For example:



☐ 5. Check the battery power cable connections

The battery power cables and manual service disconnect (MSD) switches are installed before delivery. Before any electrical connections on site, check that the battery power cables and the MSD switches on each battery pack are securely installed.

☐ 6. Prepare the cables, connecting terminals, and meters

- When the third-party string inverters are connected with the CM2 BESS, prepare a PV meter between the inverter and the CM2 cabinet according to the actual requirement of the customer. The PV meter is required to support RS485 communication with the CM2 cabinet.
- The grid meter is delivered in the EMS package. Prepare three current transformers (CT) according to the following specification:

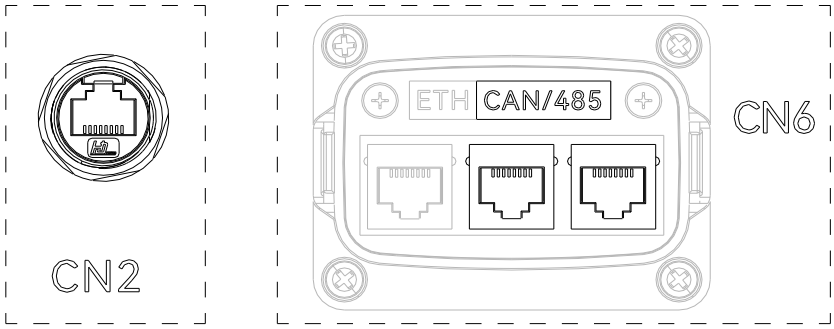
Accuracy class	Secondary-side current (A)
0.5	1 or 5

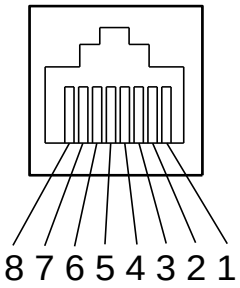
Note: For more details about the grid meter specification and CT requirement, refer to *DTSU666 Smart Power Sensor Quick Guide* that is delivered in the EMS package.

- When it is necessary to deploy over 12 CM2 cabinets as one BESS, order from SAJ an optional EMS that is only equipped with a switch for Ethernet communication between the CM2 cabinets.
- Prepare the following cables and connecting terminals according to the recommended specifications. Crimp and assemble the cable ends on the installation site.

Function	Recommended type	Cross-sectional area range (mm^2)		Recommended conductor material	Connecting terminal stud size	Crimping tool
		Range	Recommended			
Grounding cable	Unshielded high voltage cable or other standard outdoor cables	35-120	35	Copper	M12 RNBS38-8 OT terminal	· 70 mm^2 stripping plier · 70 mm^2 hydraulic crimper
AC L1/L2/L3/N cables		70-240	70	Copper		
AC PE cable		35-120	35			
Ethernet communication cable	CAT 5E outdoor shielded network cable with internal resistance ≤1.50 Ω/10m				Shielded RJ45 connector	Network cable stripping plier and crimper
Communication cable for parallel deployment						
QF3 220V backup power supply	Stranded copper wire for over 300V	1.3-3.3	2.5	Copper	E2508 insulated cord-end terminal	Stripping plier

The following table describes the pin definitions of the PCS communication ports:

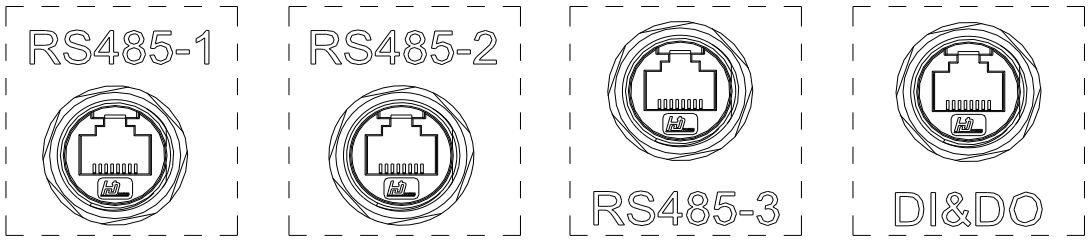


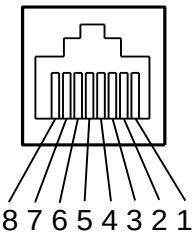


CN2	
1	EXT_MODE_DI2_COM
2	EXT_MODE_DI2
3	RackADDR_DO
4	RackCANH
5	RackCANL
6	Rack_GND
7	Rack_GND
8	RackADDR_DI

CN6 – CAN/485		
1	HMI_RS485_A	HMI_RS485_A
2	HMI_RS485_B	HMI_RS485_B
3	DC_CAN_H	DC_CAN_H
4	DC_CAN_L	DC_CAN_L
5	NC	NC
6	NC	NC
7	NC	NC
8	NC	NC

The following table describes the pin definitions of the EMS communication ports:





RS485-1	
1	RS485-1A
2	RS485-1B
3	RS485-1G
4	NC
5	NC
6	NC
7	NC
8	NC

RS485-2	
1	RS485-2A
2	RS485-2B
3	RS485-2G
4	NC
5	NC
6	NC
7	NC
8	NC

RS485-3	
1	RS485-3A
2	RS485-3B
3	RS485-3G
4	NC
5	NC
6	NC
7	NC
8	NC

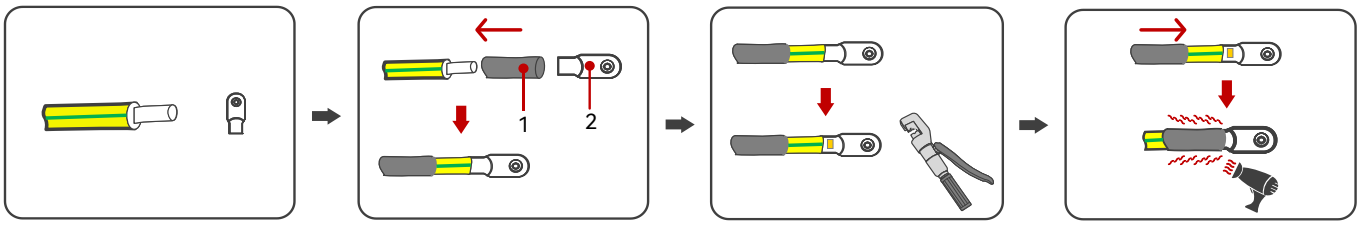
DI/DO	
1	LDI1+
2	LDI1-
3	LDI2+
4	LDI2-
5	DO1
6	DO1
7	DO2
8	DO2

☐ 7. Connect the ground cable

Follow this procedure to connect the grounding cable of each CM2 cabinet.

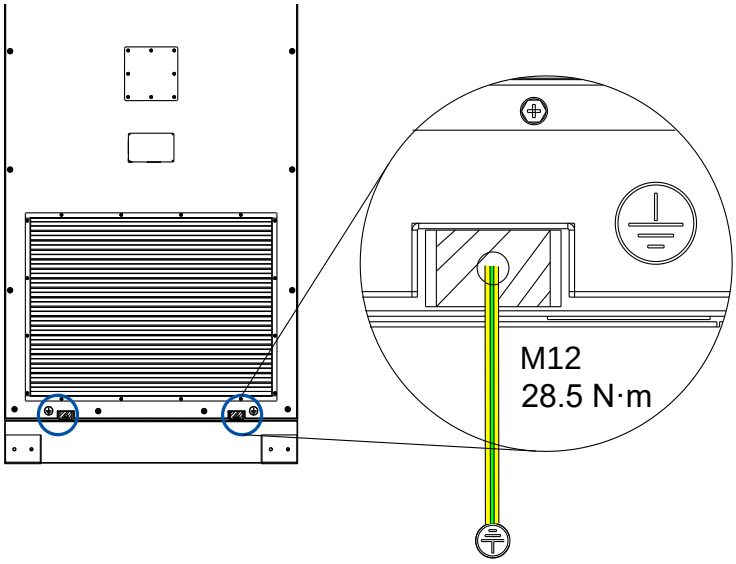
⚠ WARNING
Connect the grounding cable before other electrical connections.

Step 1. Assemble the cables with the terminals as follows:



1. Heat shrink tubing 2. Terminal

Step 2. Secure the grounding cable to one of the grounding ports at the back bottom of the cabinet.



Step 3. Connect the other cable end to the external earthing bar.

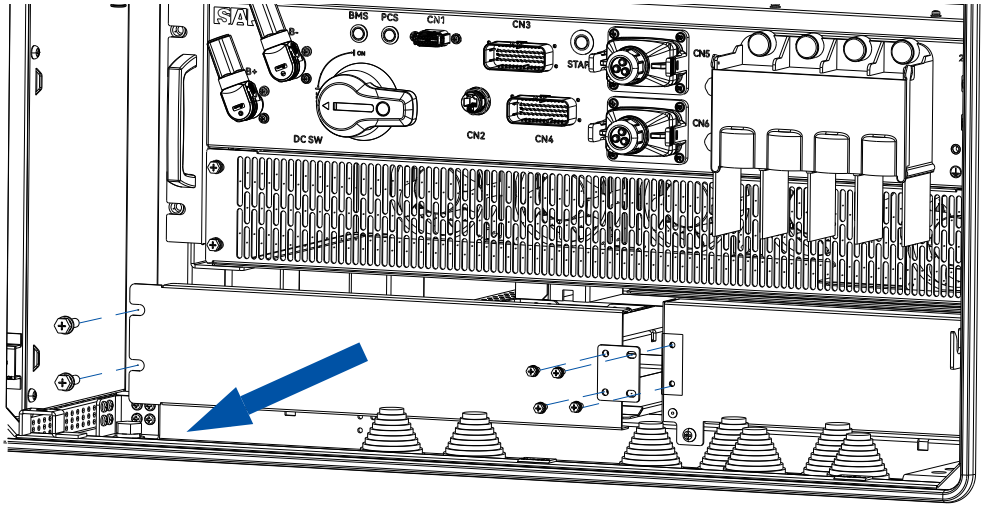
☐8. Connect the EMS unit cables

The EMS unit needs to be ordered and installed at the bottom of the CM2 cabinet for both single-cabinet deployment and parallel deployment of multiple CM2 cabinets.

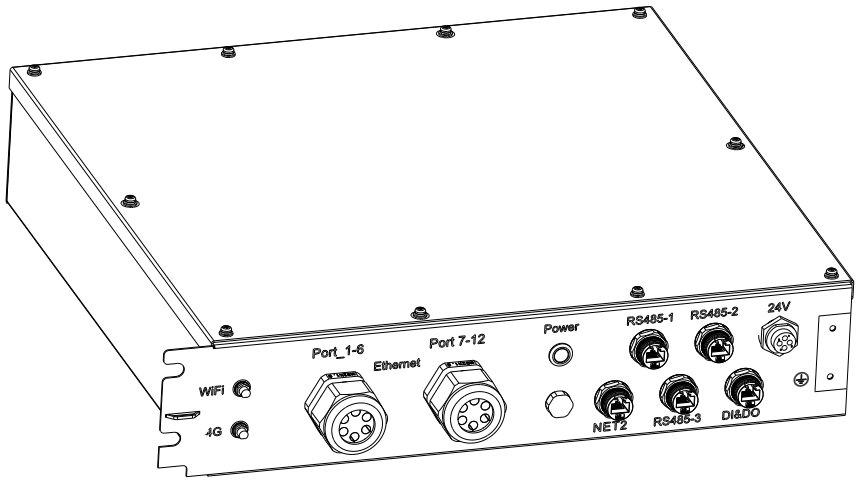
Before you start

- Prepare a 4G nano SIM card for 4G communication with the EMS when 4G communication with the EMS is required.
- Prepare the package contents of the EMS unit.
- Prepare the Ethernet communication cables and connecting terminals according to the recommended specifications. One Ethernet cable is required for each CM2 cabinet to connect to the EMS unit.
- Determine whether to install the antenna on the left or right side of the cabinet depending on the actual installation environment. Point the antenna to an open area to ensure smooth signal reception. Avoid pointing the antenna to the other CM2 cabinets in parallel.

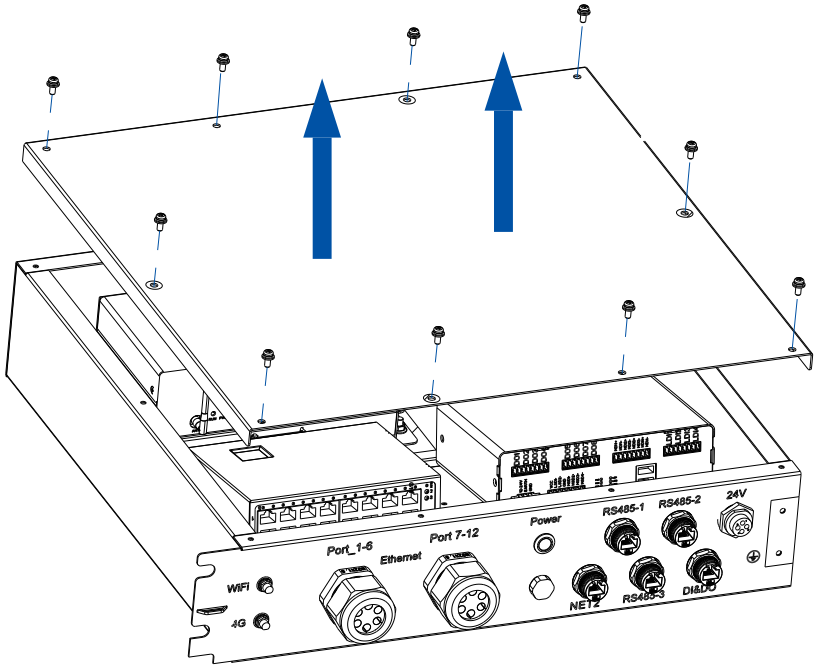
Step 1. Remove the left cover and the metal plate from the slot that is reserved for the EMS unit. Keep the six screws and the plate at a proper place.



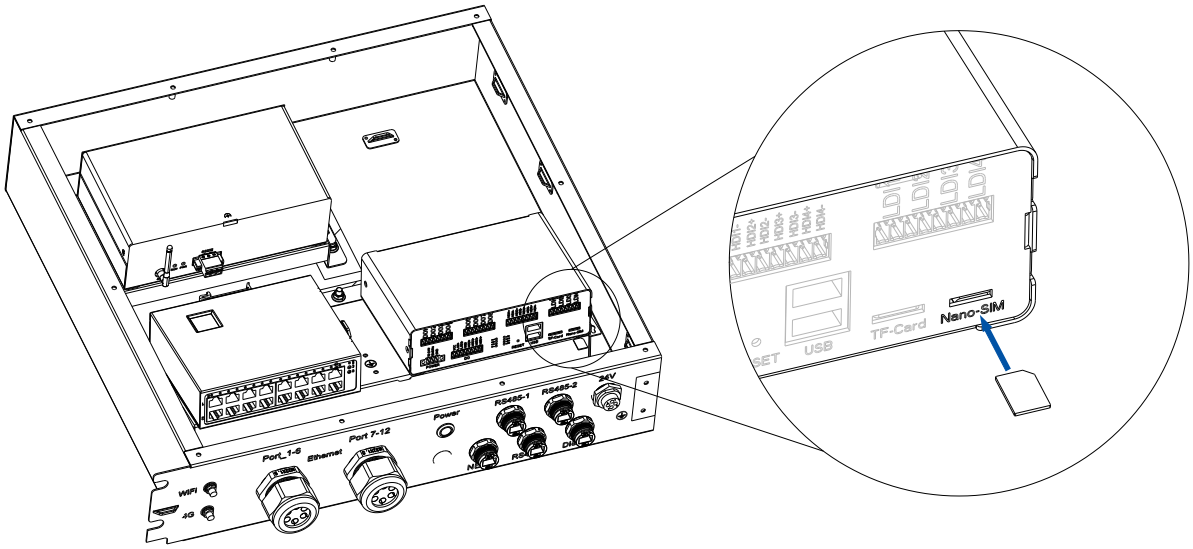
Step 2. Place the EMS unit on the floor with protective cloth or cover.



Step 3. Loosen the 10 M4 screws on top of the EMS unit to remove the upper cover.

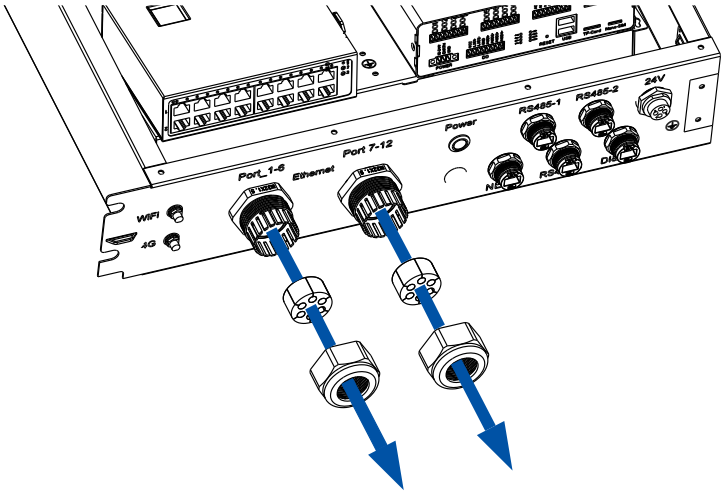


Step 4. Insert the 4G nano SIM card into the **Nano-SIM** slot on the eManager module when 4G communication is required. Otherwise, skip this step.

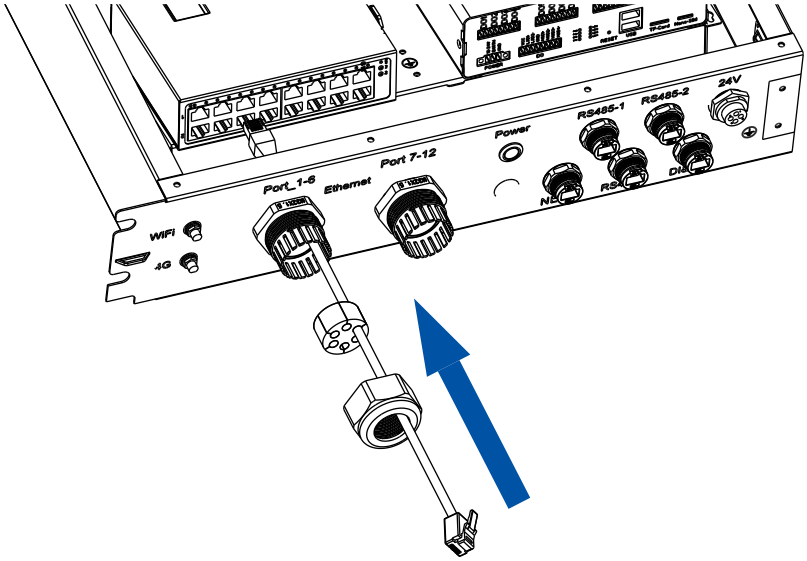


Step 5. Connect the Ethernet cables between the EMS unit and each PCS in parallel:

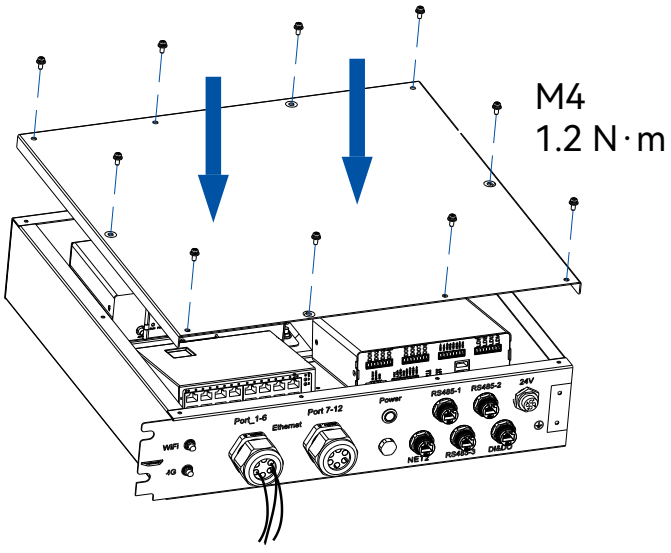
a. Loosen the **Port 1-6** or **Port 7-12** cable gland from the EMS unit; pass the Ethernet cable through the gland, the water-proof nut, and then **Port 1-6** or **Port 7-12**.



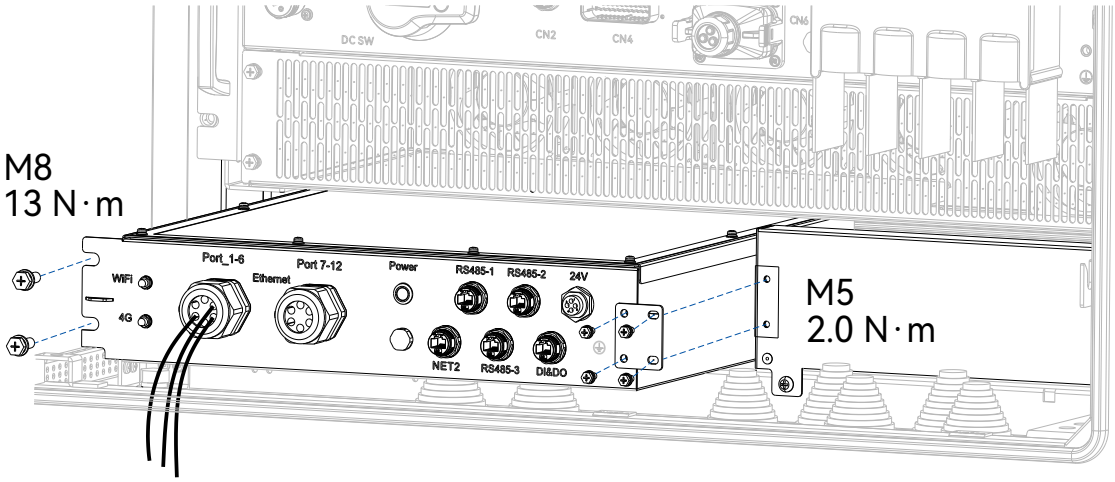
b. Insert the RJ45 plugs to the Ethernet ports inside the EMS unit until you hear a “click” sound. Fasten the water-proof nut and the cable gland back to the port.



c. Install the upper cover back to the EMS unit and tighten the 10 M4 screws.

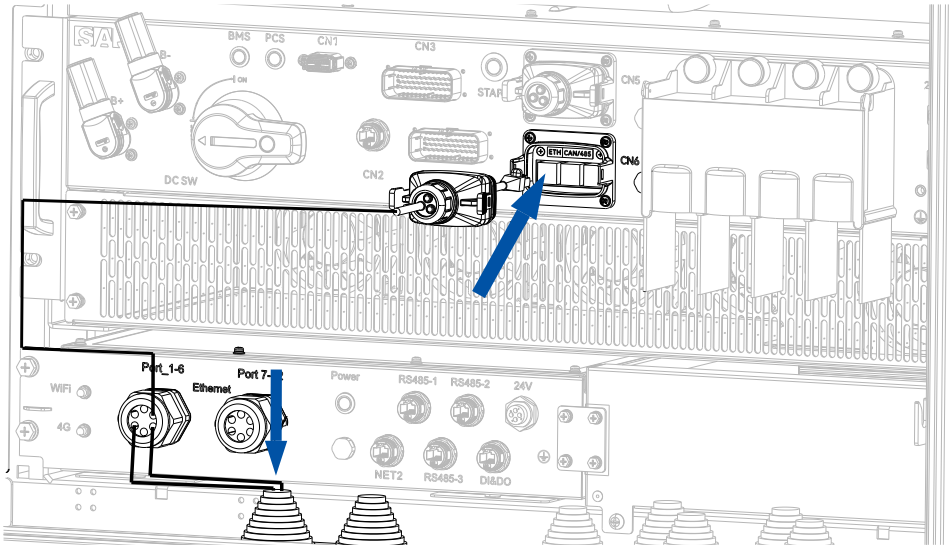


d. Insert the EMS unit into the slot and secure the unit with the metal plate and the screws.

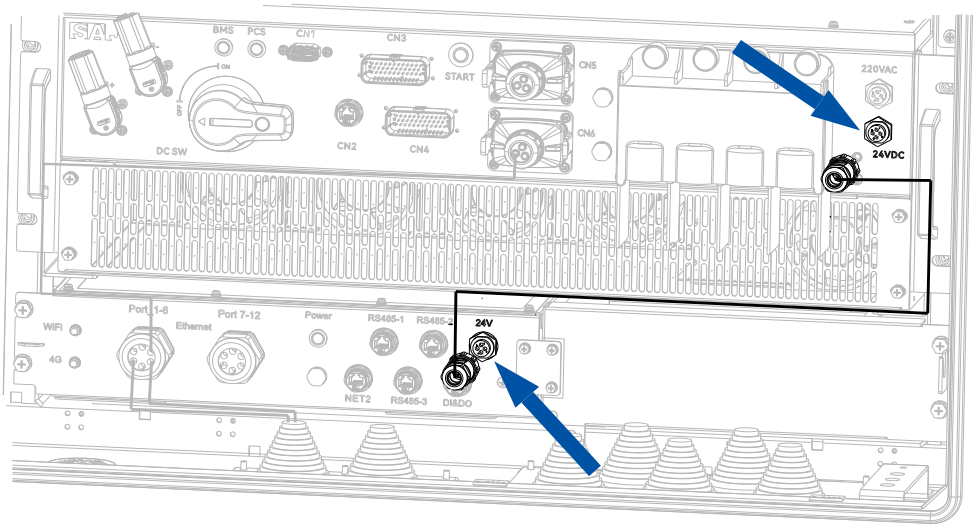


Step 6. Cut the threaded cable gland for communication cables according to the actual number of cables for the other PCS in parallel. Pass the Ethernet cables through the threaded cable gland and then the cabinet bottom entry hole.

- Connect the other cable ends to the **ETH** port of **CN6** of other PCS in parallel or to the optional EMS unit in deployment with over 12 cabinets.
- On the current (primary) CM2 cabinet, connect one of the cables to the **ETH** port of **CN6** on the PCS.

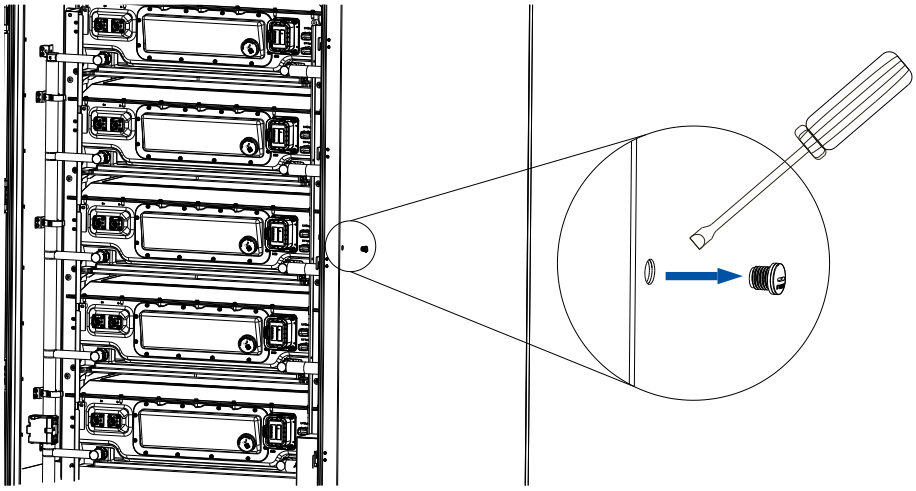


Step 7. Connect the 24V power cable from the **24V** port on the EMS unit to the **24VDC** port on the PCS.

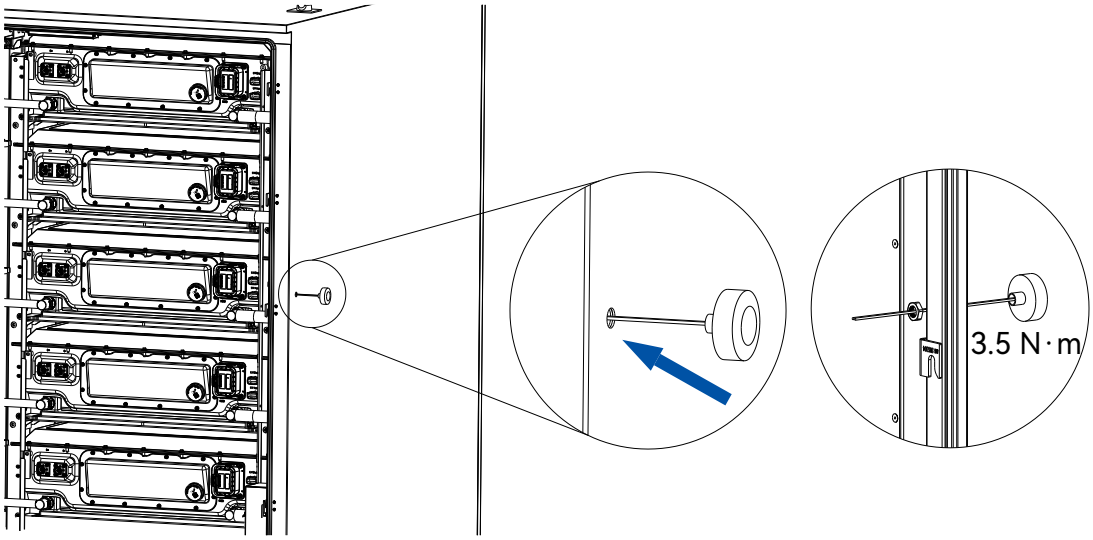


Step 8. Take the following steps to connect the antenna:

a. Remove the water-proof plate on top of the antenna entry hole on either the left or right side of the cabinet. For example, install the antenna on the right side as follows:

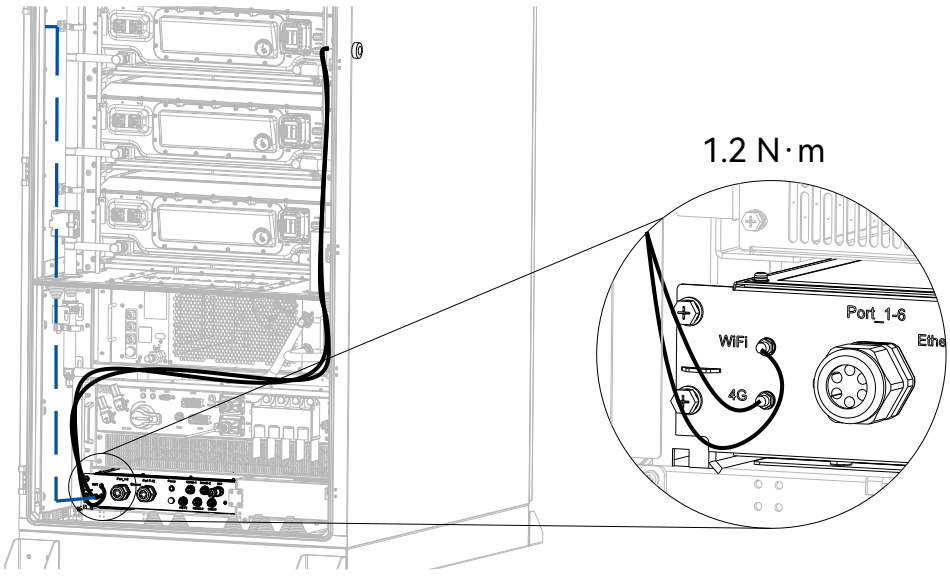


b. Pass the antenna cables from the outer surface of the cabinet, stick the antenna receiver on the outer surface of the entry hole, and fasten the screw nut with a 16 mm wrench.



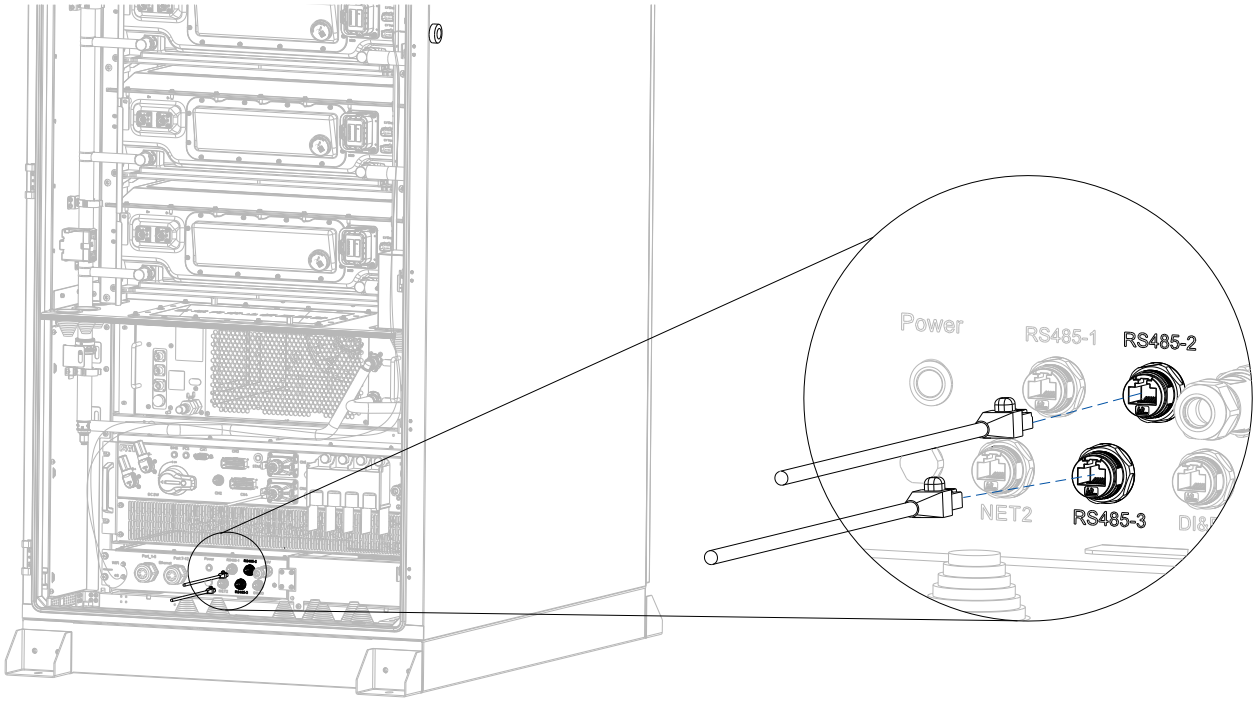
c. Inside the cabinet, fix the cable along the interior surface of the cabinet. Fasten the 2.4G cable to the **WiFi** port; fasten the 4G cable to the **4G** port with an 8 mm wrench.

Note: The dotted line in the diagram below shows the cable routing when the antenna is installed on the left side of the cabinet.



Step 9. Connect the PV meters.

- When the SAJ string inverter is connected with CM2, connect the inverter RS485 communication port to the **RS485_3** port on the EMS unit.
- When the third-party inverter is connected with CM2, connect the PV meter RS485 communication port to the **RS485_2** port on the EMS unit.



☐9. Connect the grid meter

Before you start

Prepare the grid meter that is delivered in the EMS package and the compatible CTs as needed.

For details, see step 6. "Prepare the cables, connecting terminals, and meters" on page 6.

Procedure

Step 1. Follow the diagram below to connect the cables:

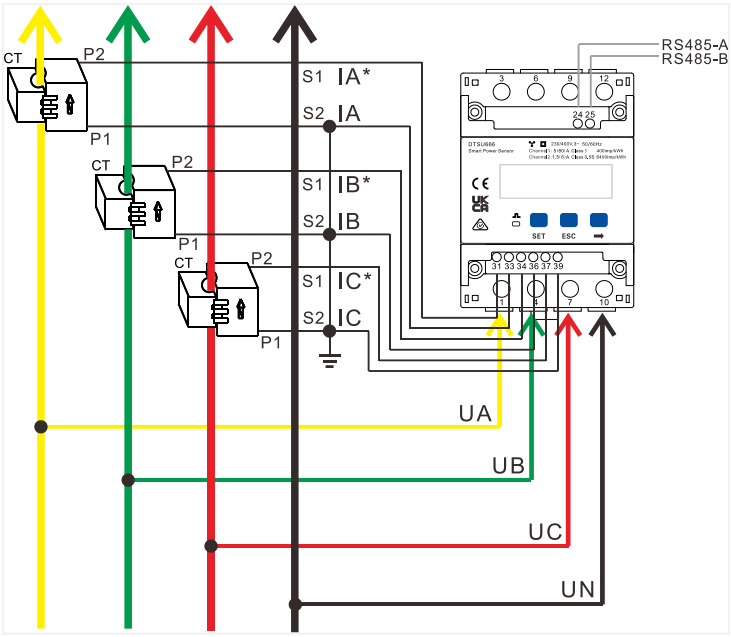
- Connect the grid cables to the UA, UB, UC, and UN terminals on the meter.
- Connect the cables of three CTs to terminals 31, 33, 34, 36, 37 and 39 on the meter.

From (CT)	To (meter)
IA*	31
IA	33

From (CT)	To (meter)
IB*	34
IB	36

From (CT)	To (meter)
IC*	37
IC	39

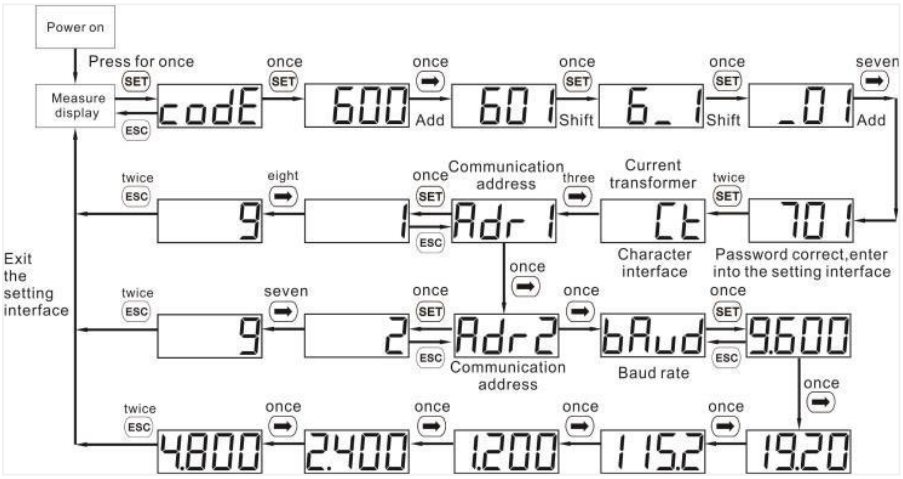
- Connect RS485 to the following pins of **RS485-1** port on the EMS unit:
  - RS485-A: pin 1
  - RS485-B: pin 2



Step 2. Set the following meter parameters:

Display	Parameter	Value
CE	Current transformer ratio	Set the value according to the actual requirement.
Pt	Potential transformer ratio	
Prot	Communication protocol switchover	**n.1**
Adr 1	Modbus communication address 1	**1**
bAud	Baud rate	**115.2** (115200 bps)
nEt	Wiring mode	• **n.34** (three-phase four-wire) • **n.33** (three-phase three-wire)
SPEC	Channel switchover	**ct** (Transformer connection)

For example, take the following steps to set the communication address to **1**:



a. Power on the meter and enter **Measure display**, and then press **SET** twice to enter the password 701.
b. Press the → button to adjust the value of the first digit. One increment per pressing.
c. Press **SET** once to shift to the second digit and adjust the value in the same way. Set the default password to **701**.
d. When the password is entered correctly, press **SET** twice to enter the port interface and press the → button three times to enter the address page. Then, press **SET** once to start the meter address setting.
e. Press the → button to adjust the value of the address. One increment per pressing. Set the grid meter address to **1**.
f. After all the settings are completed, press **ESC** twice to exit **Measure display** for the meter to start working.

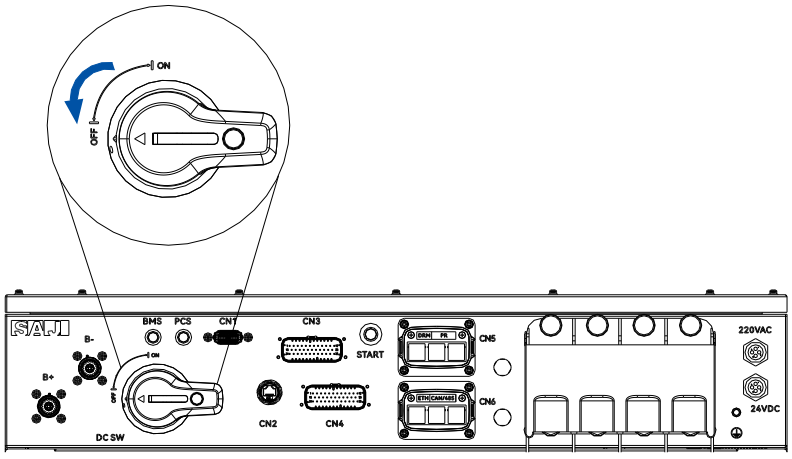
☐ 10. Connect the AC cables

Before you start

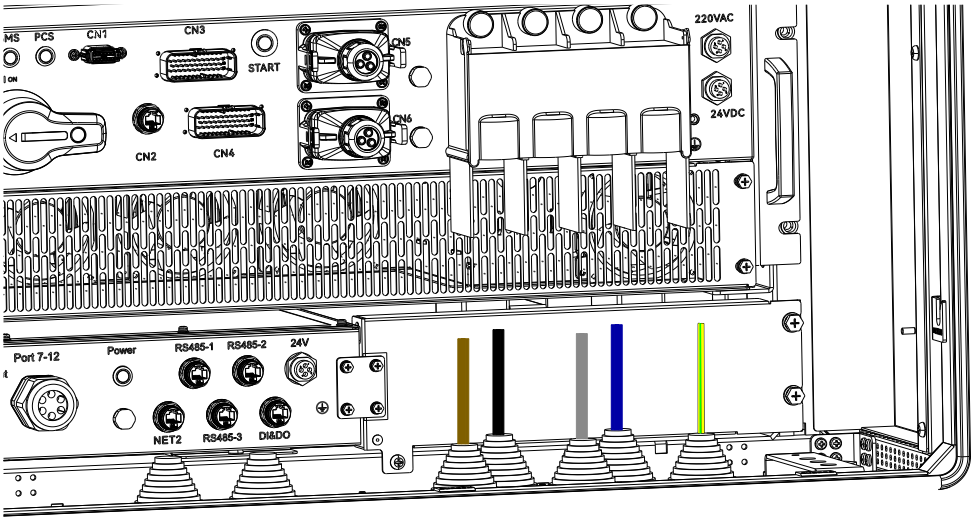
Prepare the L1, L2, L3, N, and PE AC cables and connecting terminals according to the recommended specifications.

Procedure

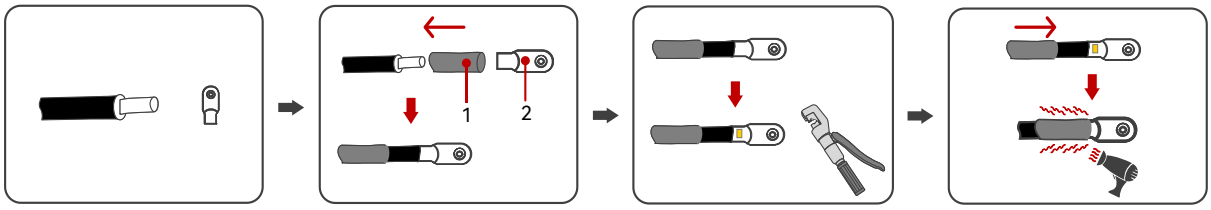
Step 1. Make sure that the PCS DC switch is at the **OFF** position.



Step 2. Cut the threaded cable gland for AC power cables at the cabinet bottom according to the actual cable diameter. Pass the AC L1, L2, L3, N, and PE cables through the cabinet bottom entry hole; then pass each cable through each threaded cable gland.

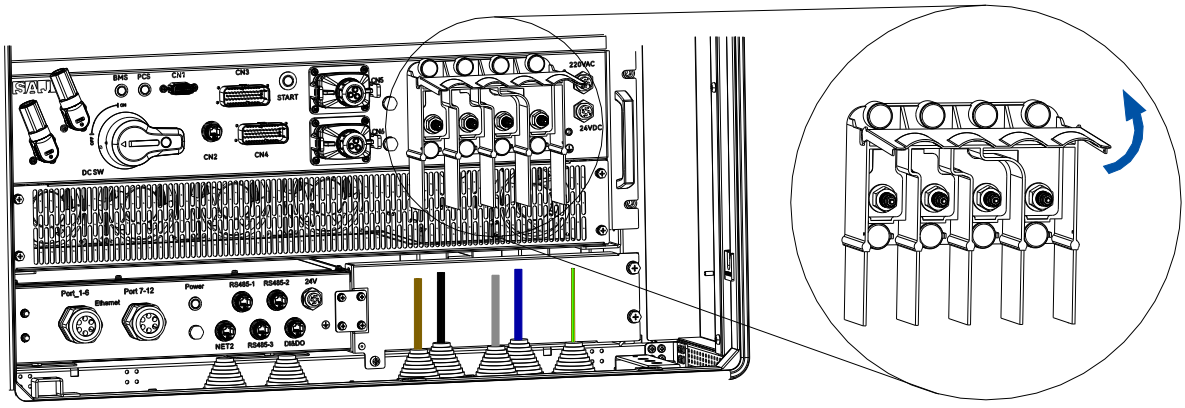


Step 3. Assemble the L1, L2, L3, N, and PE AC cable terminals as follows:

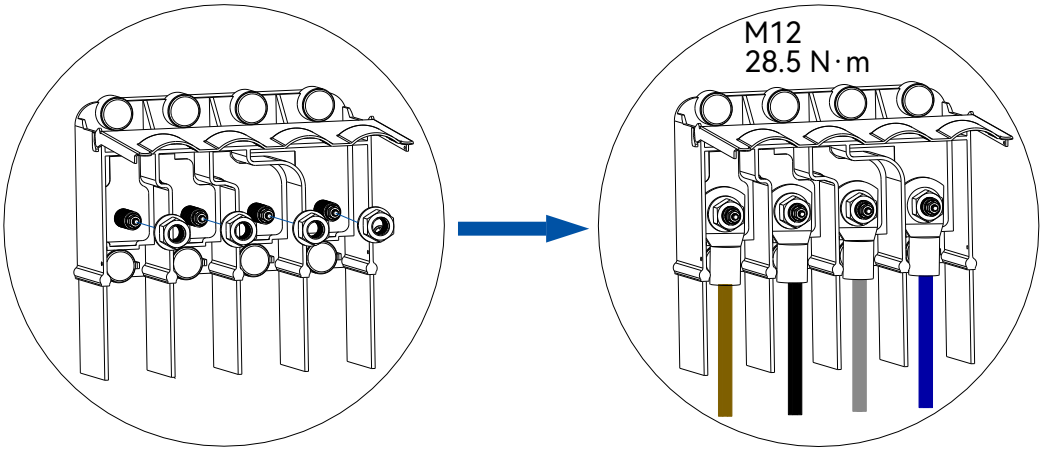


1. Heat shrink tubing 2. Terminal

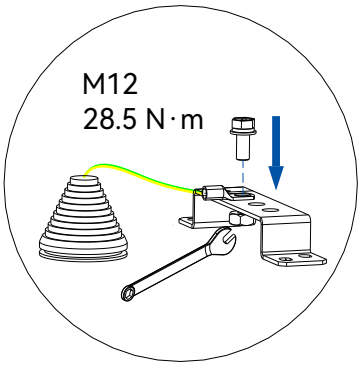
Step 4. Open the plastic protective cover on top of the AC connectors.



Step 5. Loosen the M12 screws on the L1, L2, L3, and N connectors, insert the terminals to the corresponding ports, and secure the terminals with the M12 screws nuts.

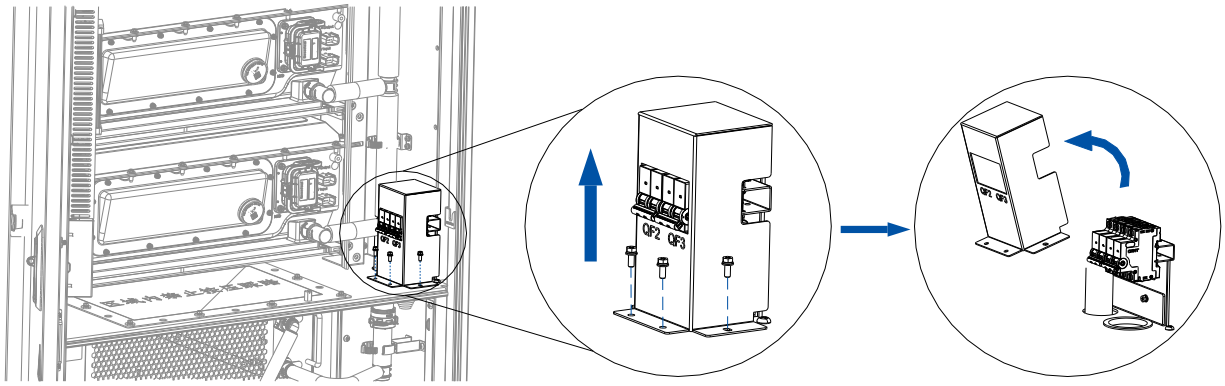


Step 6. Secure one end of the PE cable to the metal plate on the cabinet bottom with an M12 screw. Connect the other cable end to the external earthing bar.

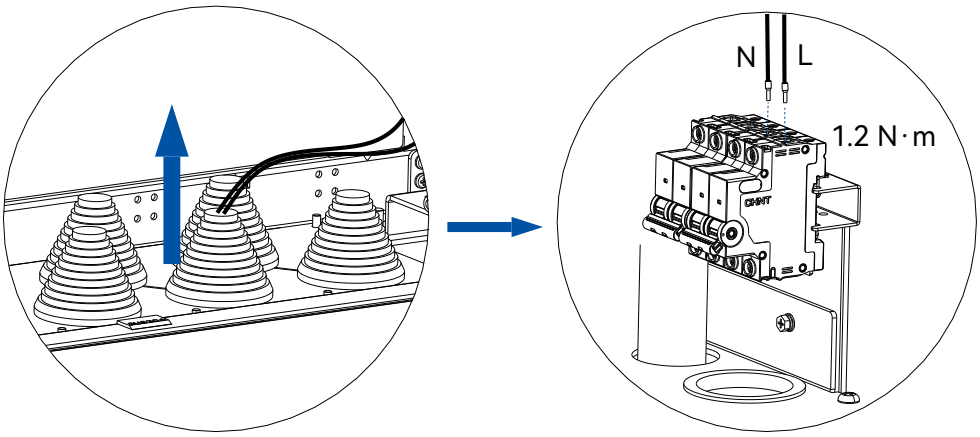


Step 7. (Optional) Take the following steps to connect the external 220V backup power supply to **QF3** for cabinet monitoring and fire detection components if necessary.

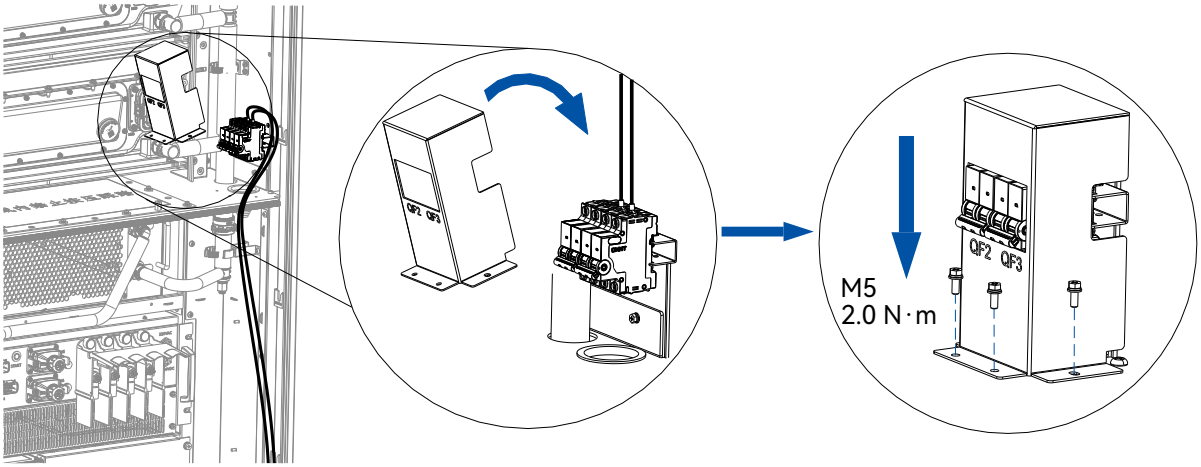
a. Loosen the three screws at the foot of the QF2 and QF3 switch box. Remove the cover.



b. Pass the two cables through one of the threaded cable glands at the cabinet bottom and secure the two cables to the **QF3** ports.



c. Install the cover back to the QF2/QF3 switch and secure the cover with the three M5 screws.



☐ 11. Connect the dehumidifier drainpipe

Connect the dehumidifier drainpipe to an external liquid drainage channel if needed. Avoid draining excessive liquid under the cabinet bottom.

☐ 12. Secure the cabinet to the ground

Step 1. Place the 2 protective panels and 4 support brackets at the bottom of the cabinet.

Skip step 2 and 3 if the drilling positions are already marked with the positioning cardboard.

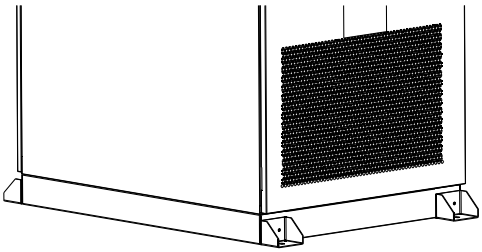
Step 2. Mark the drilling positions at the bottom of each support bracket, and then remove the support brackets.

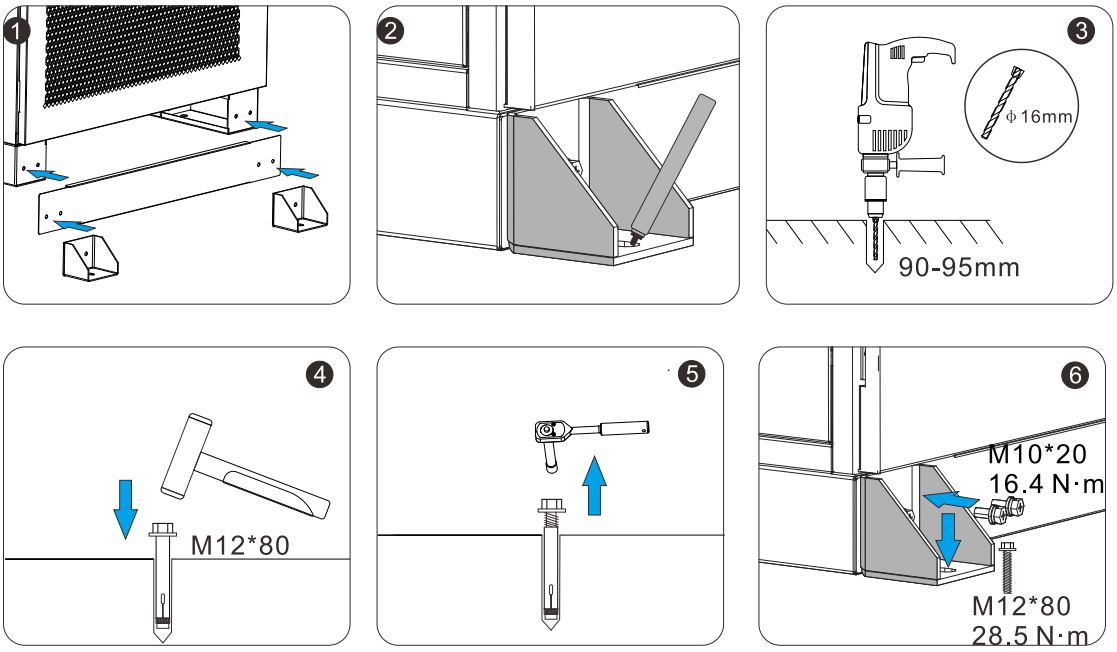
Step 3. Drill screw holes at the 4 marked positions at the depth of 90-95 mm.

Step 4. Insert the M12*80 expansion bolts into the foundation using a rubber magnet.

Step 5. Unscrew the M12*80 nuts using a torque wrench.

Step 6. Place the 4 support brackets back into their securing positions, ensuring that the screw holes on their bottoms align with the expansion bolts. Tighten the 3 nuts on each bracket.



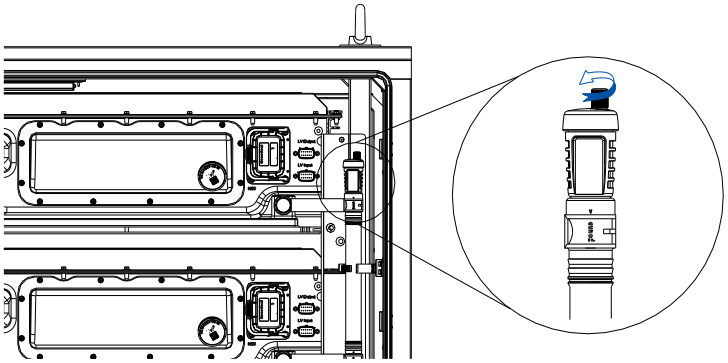


☐ 13. Start up the system

Before you start

Before starting up the CM2 cabinet, check that the following items meet the corresponding acceptance criteria:

No.	Item	Acceptance Criteria
1	Equipment appearance	• The equipment appearance is intact with no damage, rust, or paint peeling. Any areas of paint peeling should be repainted. • Equipment labels are clear and visible; any damaged labels should be replaced promptly.
2	Cable appearance	• The cable sheath is intact without obvious damage. • The conduit for cabling is undamaged.
3	Cable connection	• Cable connections match the design specifications. • Terminal fabrication complies with relevant standards, ensuring secure and reliable connections. • Labels at both ends of each cable are clear and consistent in orientation. • Cables are not overly taut, allowing for appropriate slack to prevent stress concentration.
4	Cable routing	• Wiring adheres to the principle of separating strong and weak electrical circuits to avoid electromagnetic interference. • Cables are neatly arranged and aesthetically pleasing. • Cable ties are trimmed evenly, with no sharp edges exposed. • Cable bend radii are within reasonable limits; extra length should be left at bends to prevent tension. • Wiring is straight and smooth, with no crossing cables inside the cabinet.
5	Switch	• The switch for the upstream AC equipment is in the **OFF** position. • The switch for the high-voltage box is in the **OFF** position.
6	Liquid cooling system	Loosen the breather valve by rotating the valve anti-clockwise for 5 full turns. See figure below for the location of the breather valve.



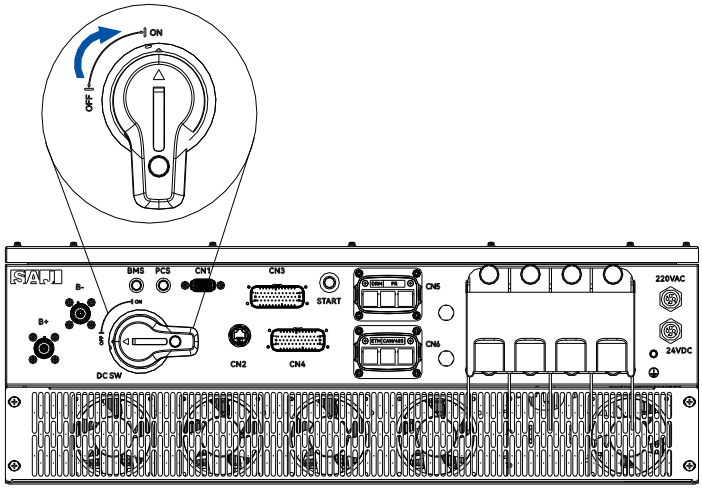
Step 1. Power on the main circuit:

a. Turn on the switch of the upstream AC equipment.

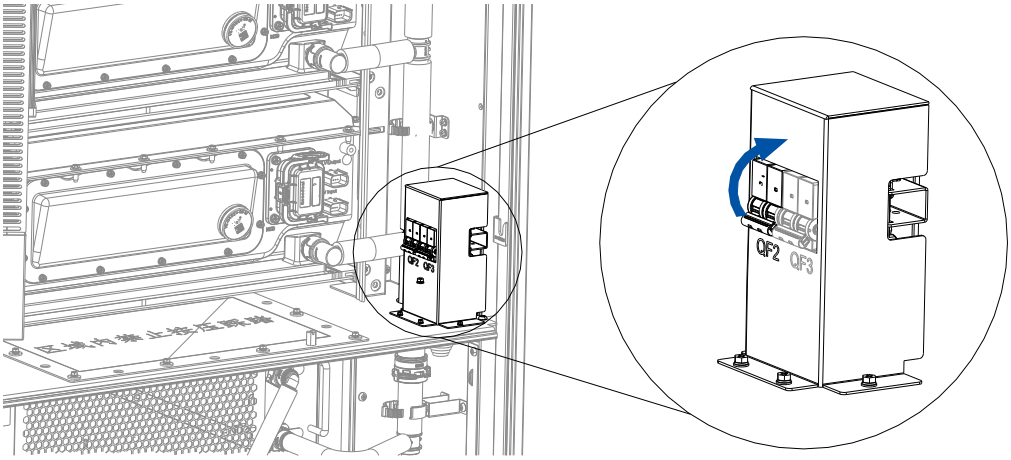
b. Turn on the AC switch, if configured.

The LED indicator light on the front door of CM2 lights up, indicating successful power-on of the main circuit.

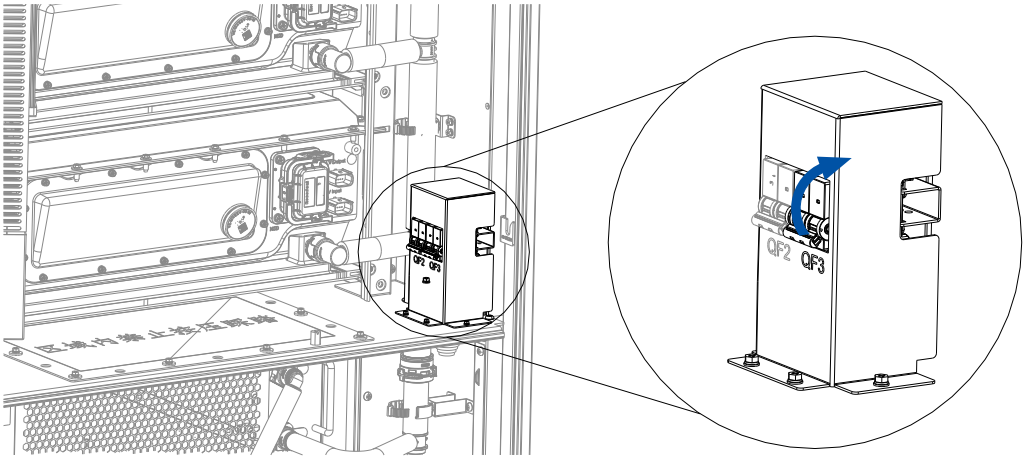
Step 2. Turn the DC switch on the PCS to the **ON** position to power on the DC side connection.



Step 3. Push upward the QF2 micro-circuit breaker to power on the liquid temperature control system and the dehumidifier.



Step 4. When external 220V AC backup power supply is connected, push upward the QF3 micro-circuit breaker to power on the backup power supply for cabinet monitoring and fire detection components.



Step 5. Push forward the air switch on the liquid temperature control system.

Step 6. Continue with the commissioning procedure on the elekeeper App or web platform. For details, see section 7 "Commissioning on App" in the *User Manual*.

Step 7. After the CM2 BESS is powered on for 30 minutes, test the temperature of the following terminals with a thermal detector to ensure that the temperature is within proper range:

- PCS AC terminals
- PCS DC terminals
- Battery pack DC terminals
- AC terminals connecting to the external power distribution cabinet.

Installer: _____