

## **ESA Series 125kW/261kWh C&I Energy Storage System**

**GW125/261-ESA-LCN-G10**

**GW125/261-ESA-LCN-G11**

# **Maintenance Manual**

## CONTENTS

1 Safety Precaution .....	4
1.1 General Safety .....	4
1.2 Personnel Requirements .....	4
1.3 System Safety .....	5
1.3.1 Battery Safety .....	6
1.3.2 Emergency Measures .....	6
1.3.3 Fire Extinguishing .....	6
1.4 Safety Symbols and Certification Marks .....	7
2 Routine Maintenance Instructions .....	9
2.1 Preparation Before Maintenance .....	9
2.2 System Power-Off .....	10
2.3 Regular Maintenance .....	11
2.4 Fault Maintenance Process and Regular Inspection Process .....	15
2.5 Fault Localization Method .....	16
2.6 Verification Method .....	16
3 Replacement of the battery pack and internal components .....	16
3.1 Old Battery Pack Condition Inspection .....	18
3.2 Replacement of Battery Pack and Internal Components (Type I) .....	19
3.2.1 Replacement of the Entire Battery Pack .....	21
3.2.2 Replacement of the BMU Acquisition Board .....	27
3.3 Replacement of the Battery Pack and Internal components (Type II) .....	29
3.3.1 Replacement of the Entire Battery Pack .....	31
3.3.2 Replacement of the BMU Acquisition Board .....	36
3.3.3 Replacement of the Fuse .....	39
3.4 Subsequent Handling .....	41
4 Replacement of PCS .....	42
5 Replacement of the Distribution Box and Its Internal Components .....	48
5.1 Replacement of the Distribution Box .....	50
5.2 Replacement of the AC/DC Miniature Circuit Breaker .....	54
5.3 Replacement of the AC Molded Case Circuit Breaker .....	57
5.4 Replacement of DC Molded Case Circuit Breaker .....	62
5.5 Replacement of the Fuse .....	65

5.6 Replacement of the Transformer .....	67
5.7 Replacement of the Switching Power Supply .....	69
5.8 Replacement of the Distribution Box Cooling Fan .....	70
5.9 Replacement of the Water Leak Transmitter .....	72
5.10 Replacement of the Auxiliary Power Board .....	73
6 Replacement of Liquid Cooling Units and Internal Components .....	75
6.1 Replacement of Liquid Cooling Units .....	77
6.2 Replacement of Internal Components of Liquid Cooling Units .....	82
7 Replacement of EMS Main Control Box and Its Internal Components .....	82
7.1 Replacement of the EMS Control Box .....	83
7.2 Replacement of the 4G Card .....	85
7.3 Replacement of the 4G Board .....	85
7.4 Replacement of the Cloud Board .....	87
7.5 Replacement of the LC Board .....	89
7.6 Post-Replacement Handling .....	91
8 Replacement of Fire Protection System .....	91
8.1 Replacement of Fire Extinguisher Cylinders .....	91
8.1.1 Replacement of Fire Extinguisher Cylinder (Type I) .....	93
8.1.2 Replacement of Fire Extinguisher Cylinder (Type II) .....	94
8.2 Replacement of Smoke Detectors and Temperature Detectors .....	95
8.2.1 Replacement of Smoke Detectors and Temperature Detectors (Type I) .....	96
8.2.2 Replacement of Smoke Detectors and Temperature Detectors (Type II) .....	97
9 Replacement of Indicator Lights .....	98
10 Replacement of Emergency Stop Switch .....	101
11 Replacement of Dehumidification Device .....	104
12 Replacement of Cabinet Cooling Fan .....	107
13 Replacement of Water Leak Detector .....	109
14 Replacement of Access Control Switch .....	111
15 Replacement of Antenna .....	113
16 Replacement of Dust Filter .....	115
Contact Information .....	117

# 1 Safety Precaution

The safety precautions information contained in this document must always be followed when operating the equipment.

## WARNING

The energy storage systems are designed and tested strictly complying with related safety rules. Read and follow all the safety instructions and cautions before any operations. Improper operation might cause personal injury or property damage as the inverters are electrical equipment.

## 1.1 General Safety

### NOTICE

- The information in this document is subject to change due to product updates or other reasons. This document cannot replace the product labels or the safety precautions unless otherwise specified. All descriptions in the manual are for guidance only.
- Before installations, read through the user manual to learn about the product and the precautions.
- All operations should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations.
- Use insulated tools and wear personal protective equipment (PPE) when operating the equipment to ensure personal safety. Wear anti-static gloves, wrist strips, and cloths when touching electrical devices to protect the equipment from damage.
- Unauthorized dismantling or modification may damage the equipment, and the damage is not covered under the warranty.
- Please strictly follow the installation, operation, and configuration instructions in this manual or the user manual. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions. For more warranty details, please visit <https://www.goodwe.com/warrantyrelated.html>.

## 1.2 Personnel Requirements

### NOTICE

- Personnel who install or maintain the equipment must be strictly trained, learn about safety precautions and correct operations.
- Only qualified professionals or trained personnel are allowed to install, operate, maintain, and replace the equipment or parts.

## 1.3 System Safety

### DANGER

- Disconnect the upstream and downstream switches to power off the equipment before any electrical connections. Do not work with power on. Otherwise, an electric shock may occur. Do not work with power on. Otherwise, an electric shock may occur.
- Install a breaker at the voltage input side of the equipment to prevent personal injury or equipment damage caused by energized electrical work.
- All operations such as transportation, storage, installation, use and maintenance shall comply with applicable laws, regulations, standards and specifications.
- The energy storage system is heavy-duty equipment. Use appropriate tools and equipment and take protection measures during installation and maintenance. Improper operation may cause personal injury or product damage.
- Lethal high voltage in equipment poses an electric shock danger. Do not touch it without authorization.
- Unauthorized personnel are not allowed to open the cabinet door or touch internal components, as it may result in electric shock.
- There may be risks of electric shock and fire when the equipment is in a damaged state or fault state. Ensure that the equipment is undamaged and free from fault before operation.
- Lethal high voltage and electric shock danger will occur when the equipment indicates a grounding fault alarm.
- Ensure the system is reliably grounded before operating the equipment and all necessary protective measures are in place. Otherwise, there may be a risk of electric shock.
- Do not open the cabinet door or touch any wiring terminal or components during equipment operation. Otherwise, electric shock danger may occur.
- Ensure all switches of the equipment are disconnected before performing installation, wiring, or maintenance.
- Do not disassemble or modify any part of the equipment without authorization from the manufacturer. Damage caused by such actions will not be covered under warranty.

### WARNING

- Do not strike, pull, drag, or step on the equipment. Avoid puncturing the equipment casing with sharp objects, and refrain from placing unrelated items in any part of the cabinet.
- Battery will poses a fire hazard and trigger the automatic fire suppression system when the temperature inside the equipment exceeds 160°C.
- The equipment is equipped with an automatic fire suppression system. Do not trigger the fire control switch unless in an emergency.
- Please select cables that comply with local laws and regulations.
- Ensure that the voltage and frequency at the on-grid access point comply with energy storage system on-grid requirements.
- It is recommended to add breaker or fuses and other protection devices on the AC side of the equipment.
- Do not place the equipment in a high-temperature environment and ensure there are no heat sources near the equipment.

### 1.3.1 Battery Safety

#### WARNING

- High voltage is present inside the battery. Before operating any equipment in the system, ensure that the device has been power off to prevent electric shock danger.
- Do not subject the battery to vibration, impact, pulling, or compression, as this may cause damage to the battery or pose a fire hazard.
- For long-term storage, regularly charge the battery pack to prevent capacity loss or irreversible damage.
- Do not charge or discharge the battery at a current exceeding the nominal charge or discharge current.
- Do not use if the battery or high-voltage control unit shows obvious defects, cracks, damage, or other issues. Otherwise, it may cause personal danger.
- The battery current may be affected by factors such as temperature, humidity, and weather conditions, which could lead to current limiting in battery and impact load-carrying capacity.
- If the battery needs to be replaced, please contact the after-sales service center.
- If the battery fails to start, please contact the after-sales service center as soon as possible; otherwise, the battery may be permanently damaged.

### 1.3.2 Emergency Measures

#### WARNING

If the battery module leaks electrolyte, avoid contact with the leaking liquid or gas. The electrolyte is corrosive. It will cause skin irritation or chemical burn to the operator. Anyone contact the leaked substance accidentally has to do as following:

- Breath in the leaked substance: Evacuate from the polluted area, and seek immediate medical assistance.
- Eye contact: Rinse your eyes for at least 15 minutes with clean water and seek immediate medical assistance.
- Skin contact: Thoroughly wash the touch area with soap and clean water, and seek immediate medical assistance.
- Ingestion: Induce vomiting, and seek immediate medical assistance.

### 1.3.3 Fire Extinguishing















#### WARNING

- Battery may release toxic and harmful gases after catching fire.
- In case of fire, immediately call the fire emergency number, inform the firefighters, and provide relevant product information.
- In case of fire, it is recommended to promptly disconnect the upstream and downstream switches of the equipment while ensuring personnel safety.
- Do not use ABC dry powder fire extinguishers to extinguish the fire. Firefighters must wear protective clothing and self-contained breathing apparatus.

## 1.4 Safety Symbols and Certification Marks

### **DANGER**

- All labels and warning marks should be visible after the installation. Do not cover, scrawl, or damage any label on the equipment.
- The following descriptions are for reference only.

No.	Symbol	Meaning
1		Potential risks exist. Wear proper PPE before any operations.
2		HIGH VOLTAGE HAZARD Disconnect all incoming power and turn off the product before working on it.
3		High-temperature hazard. Do not touch the product under operation to avoid being burnt.
4		Operate the equipment properly to avoid explosion.
6		Delayed discharge. After power off the equipment, please wait for 5 minutes until it is completely Discharge.
7		Equipment should be kept away from open flames or ignition sources.
8		Keep away from children.
9		Do not extinguish with water.
10		Before operating the equipment, please read the product manual in detail.
11		During installation, operation, and maintenance, it is necessary to wear personal protective equipment.
12		The equipment must not be disposed of as household waste. Please handle the equipment in accordance with local laws and regulations or return it to the manufacturer.
13		Grounding point.
14		Recycling symbol.
15		CE marking.

## 2 Routine Maintenance Instructions

### 2.1 Preparation Before Maintenance

#### NOTICE

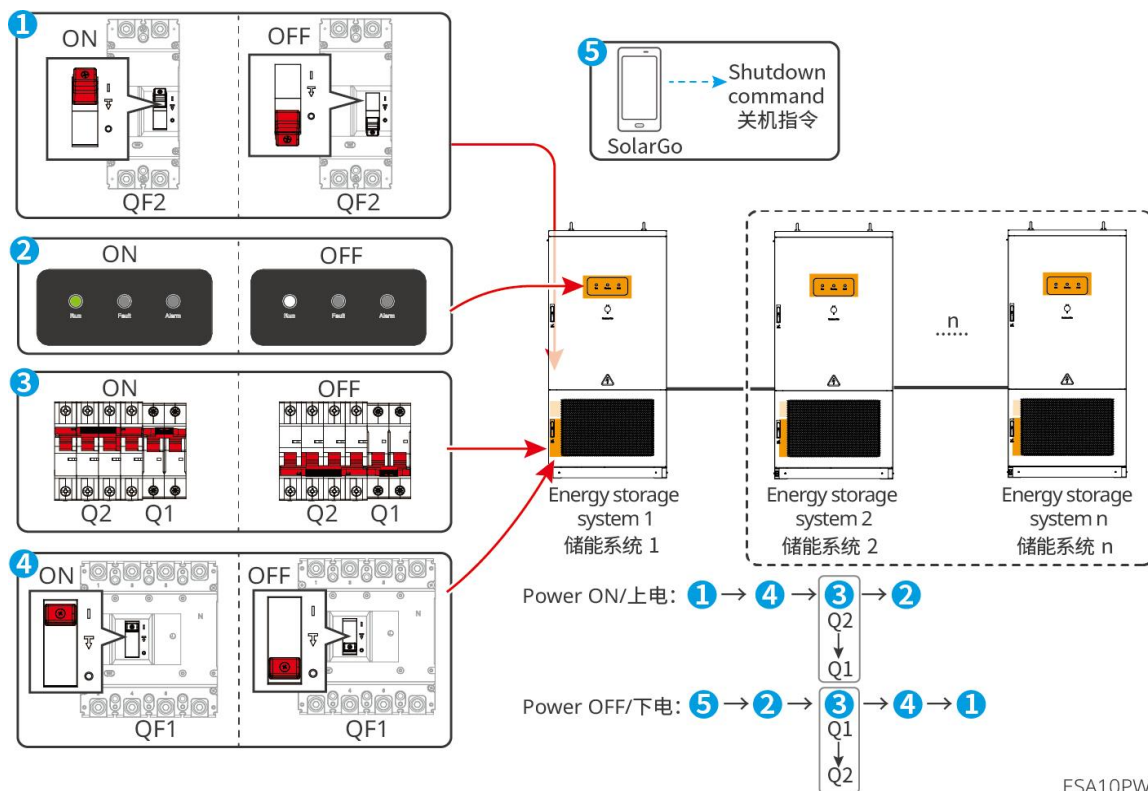
Wear personal protective equipment (PPE) properly before starting any maintenance operation!

Tool	Description	Tool	Description
	Insulated gloves, protective gloves		Dust mask
	Safety goggles		Safety shoes
	Safety helmet		Protective clothing

## 2.2 System Power-Off



- Power off the system before performing operation and maintenance on the equipment in the system, to avoid equipment damage or electric shock hazards.
- The internal components require a certain amount of time to discharge after the equipment is powered off. Please wait until the equipment is completely discharged in accordance with the time requirement specified on the label.
- Please strictly follow the battery system power-off requirements when shutting down the battery system to prevent damage to the battery system.
- Press the emergency stop switch in case of an emergency that requires shutting down the battery, and the battery will be powered off immediately.



ESA10PWR0001

**Step 1:** Send a shutdown command to the all-in-one energy storage cabinet via the SolarGo APP.

**Step 2:** Observe that the RUN indicator light changes from green to steady white.

**Step 3:** Turn off Q1 (AC auxiliary switch).

**Step 4:** Turn off Q2 (DC auxiliary switch).

**Step 5:** Turn off QF1 (AC molded case circuit breaker).

**Step 6:** Turn off QF2 (DC circuit breaker).

## 2.3 Regular Maintenance



- Please contact after-sales personnel. Do not disassemble without authorization, when identifying the issues that may affect the battery or energy storage inverter system.
- Do not touch exposed copper wires inside conductive cables to avoid high voltage hazard! Contact after-sales personnel and do not disassemble without authorization.
- In case of other emergencies, contact after-sales personnel immediately. Operate under their guidance or wait for their on-site support.

### ● Daily Maintenance

Log in to the SEMS+ / WE 3.0 platform regularly to check for faults and alarms in the energy storage system.

### ● Quarterly Maintenance

Table 1 Quarterly Maintenance Inspection List

Equipment Type	Maintenance Actions	Reference Standards	Power-off Required for System	Inspection Date & Personnel
Cabinet	Patrol Visual Inspection: <ul style="list-style-type: none"> <li>● Overall appearance</li> <li>● Rust condition</li> <li>● Door lock condition</li> <li>● Ventilation openings</li> <li>● Labels</li> </ul>	<ul style="list-style-type: none"> <li>● No obvious coating peeling, scratches, or paint chipping on the cabinet.</li> <li>● No rust on the cabinet and its interior.</li> <li>● Door locks function normally.</li> <li>● Ventilation openings are not blocked.</li> <li>● Label fonts are clearly visible.</li> </ul>	Yes	
Liquid Cooling Unit	<ul style="list-style-type: none"> <li>● Appearance inspection</li> </ul>	<ul style="list-style-type: none"> <li>● No obvious damage, paint chipping, or rust on the</li> </ul>	Yes	

	<ul style="list-style-type: none"> <li>● Inspection of water inlet and outlet</li> <li>● Inspection of communication cables</li> </ul>	<p>appearance; no loose or missing screws; compressor and water pump operate normally without jamming or other abnormalities.</p> <ul style="list-style-type: none"> <li>● No liquid leakage or blockage at water inlet and outlet.</li> <li>● No damage to the insulation of communication cables or other abnormalities.</li> </ul>		
Liquid Cooling Pipes	<ul style="list-style-type: none"> <li>● Appearance inspection</li> </ul>	<ul style="list-style-type: none"> <li>● No damage to the pipes; no liquid leakage.</li> </ul>	Yes	
Power Distribution Box	<ul style="list-style-type: none"> <li>● Appearance inspection of the cabinet</li> <li>● Cable inspection</li> </ul>	<ul style="list-style-type: none"> <li>● No damage or deformation on the cabinet appearance.</li> <li>● Cables are securely connected; no cuts on the insulation of cables in contact with metal surfaces; ground cables are reliably grounded.</li> </ul>	Yes	
SOC Calibration (Required only when the battery frequently fails to fully charge once)	Forcefully charge the battery to 100% every 15 days	No SOC jump during operation.	No	
<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. In high-temperature (<math>\geq 35^{\circ}\text{C}</math>) or low-temperature (<math>\leq 0^{\circ}\text{C}</math>) environments, it is recommended to perform monthly maintenance following the above maintenance methods.</li> <li>2. In case of sand and dust weather, it is recommended to clean the equipment once after each sand and dust event to ensure that the filter and condenser of the liquid cooling unit are not blocked.</li> </ol>				

## ● Semi-Annual Maintenance

Table 2 Semi-Annual Maintenance Inspection List

Maintenance Category	Maintenance Actions	Reference Standards	Power-off Required for System	Inspection Date & Personnel
Liquid Cooling Unit	<ul style="list-style-type: none"> <li>● Patrol Visual Inspection:</li> <li>● Appearance</li> <li>● Rust condition</li> <li>● Screws</li> <li>● Condensing fan</li> <li>● Filter</li> </ul>	<ul style="list-style-type: none"> <li>● No obvious damage to the appearance.</li> <li>● No obvious paint chipping or rust.</li> <li>● No loose or missing screws.</li> <li>● The condensing fan rotates normally without jamming or other abnormalities.</li> <li>● The filter surface is clean and free of blockages.</li> </ul>	Yes	
PCS	<ul style="list-style-type: none"> <li>● Appearance inspection of the cabinet</li> <li>● Cable inspection</li> </ul>	<ul style="list-style-type: none"> <li>● No damage or deformation on the cabinet appearance.</li> <li>● Cables are securely connected; no cuts on the insulation of cables in contact with metal surfaces; ground cables are reliably grounded.</li> </ul>	Yes	
Temperature Sensor/Smoke Sensor	The red indicator light of the temperature sensor stays on; the red indicator light of the smoke sensor stays on.	The red indicator light of the temperature sensor stays on; the red indicator light of the smoke sensor stays on.	No	
Fire Protection Device	<ul style="list-style-type: none"> <li>● Perform necessary</li> </ul>	<ul style="list-style-type: none"> <li>● Clean and free of dust</li> </ul>	Yes	

	cleaning on the module <ul style="list-style-type: none"> <li>● Check if cables are loose or disconnected</li> </ul>	<ul style="list-style-type: none"> <li>● Cables are undamaged and securely connected.</li> </ul>		
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**Note:**

It is strictly prohibited to trigger the smoke sensor and temperature sensor simultaneously. Once both are triggered, the fire protection device will be activated!

## ● Annual Maintenance

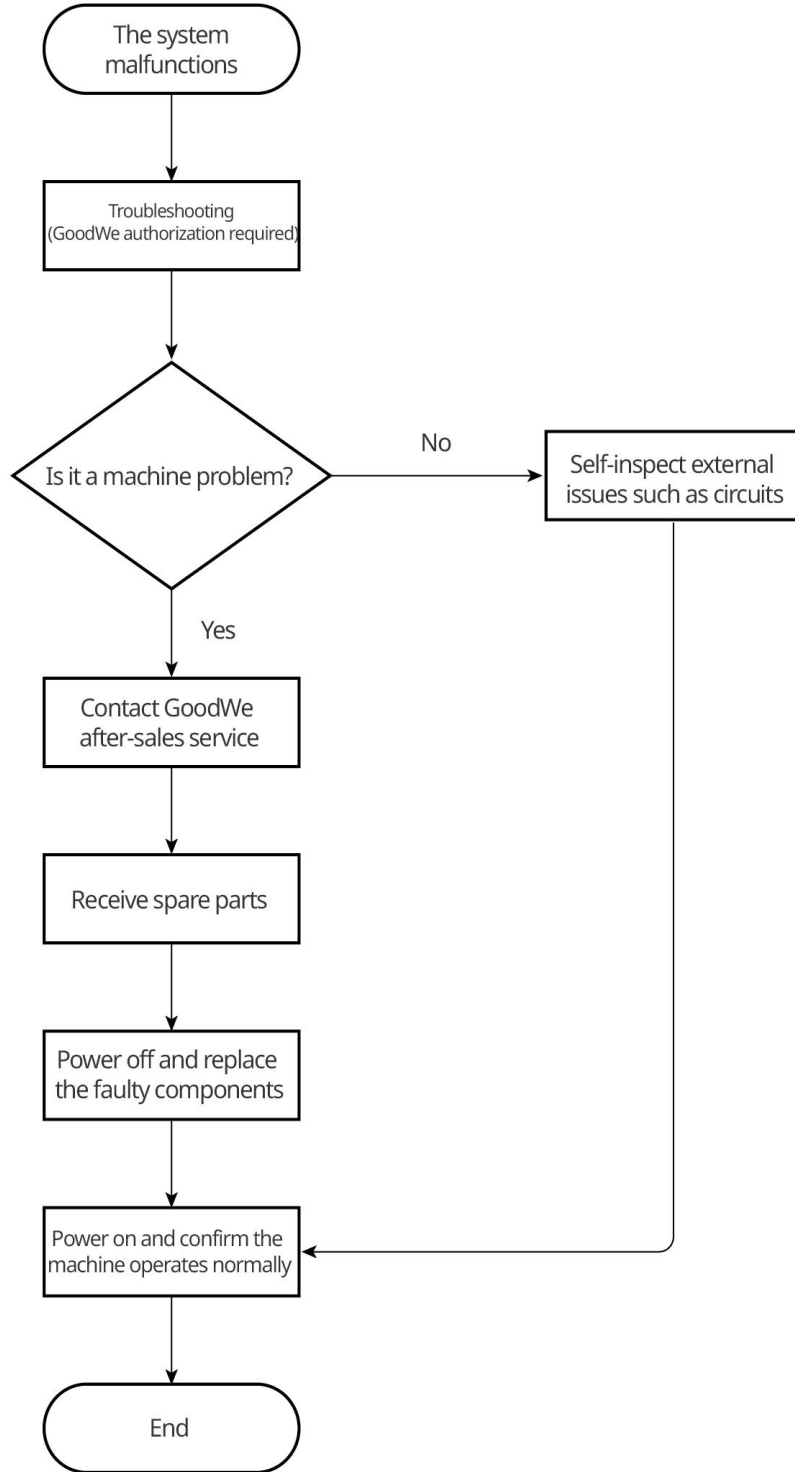
Table 3 Annual Maintenance Inspection Checklist

Maintenance Category	Maintenance Actions	Reference Standards	Power-off Required for System	Inspection Time & Personnel
PACK	<ul style="list-style-type: none"> <li>● Appearance inspection</li> <li>● Inspection of PACK water inlet and outlet</li> <li>● Cable inspection</li> </ul>	<ul style="list-style-type: none"> <li>● No obvious damage, paint chipping, or rust on the appearance.</li> <li>● No liquid leakage at the PACK coolant inlet/outlet and the metal edge at the bottom of the PACK.</li> <li>● Cables are securely connected; no cuts on the insulation of cables in contact with metal surfaces; ground cables are reliably grounded.</li> </ul>	Yes	
MSD Switch (Optional), Molded Case Switch, Auxiliary Power Switch, Emergency Stop Switch	Press the MSD Switch, Molded Case Switch, Auxiliary Power Switch, and Emergency Stop Switch	Toggle each switch on and off continuously for 3 times. Ensure all switches function normally.	No	

## 2.4 Fault Maintenance Process and Regular Inspection

### Process

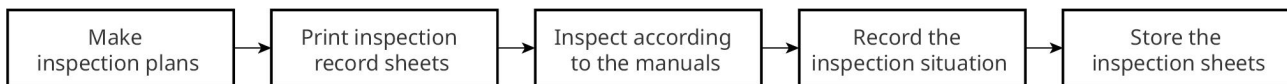
- When equipment fails, please follow the maintenance procedures below:



BAT10MTN0023

- When the equipment is working normally, please follow the process below and refer to the

Routine Maintenance chapter to make an inspection plan and conduct regular inspections:



BAT10MTN0024

## 2.5 Fault Localization Method

**Step 1:** Log in to the Solargo or SEMS+ / WE 3.0 platform to view alarm information.

**Step 2:** Locate the fault position based on the alarm information.

**Step 3:** Perform troubleshooting with reference to the corresponding fault handling suggestions in the alarm list.

## 2.6 Verification Method

**Step 1:** Power on the system. For specific steps, refer to the User Manual for [ESA261 Series Industrial and Commercial Energy Storage Systems](#).

**Step 2:** Log in to the Solargo or SEMS+ / WE 3.0 platform, or check the alarm/fault indicator lights on the cabinet door to confirm whether the fault has been eliminated.

**Step 3:** Perform charge and discharge operations on the energy storage system to check if the system functions normally.

# 3 Replacement of the battery pack and internal components



- Power off the energy storage system before replacing the battery pack; otherwise, there is a risk of electric shock.
- Use dedicated protective equipment and special insulated tools to avoid electric shock or short-circuit faults.
- Do not smoke or use open flames near the battery.
- Do not use a damp cloth to clean exposed copper bars or other conductive parts.
- Do not clean the battery with water or any solvents.
- Pay attention to the positive and negative poles during battery installation. Never short-circuit the positive and negative poles of a single battery or battery string, as this will cause a battery short circuit.

 **WARNING**

- Do not perform maintenance on the battery while it is energized. Power off the battery before performing operations such as screw torque verification and tightening. Explain the risks to the customer, obtain their written consent, and take effective preventive measures before carrying out these operations.
- Do not use the battery's terminals, bolts, or cables for lifting when handling it; avoid damaging the battery.
- Handle the battery in the specified direction. Do not invert, tilt, drop, mechanically impact, expose to rain/snow, or submerge it in water.
- Take and place the battery gently when handling it. Do not knock or collide with the battery, and pay attention to personal safety.
- Be careful when cutting cable ties to avoid accidentally cutting other cables. Please record the positions of the cable ties to ensure the cables can be correctly secured again after the replacement.
- When installing the wire harness, arrange the harness neatly, fix it back to its original position with cable ties, and ensure there are no crossed wires.
- During the operation, special protective equipment and dedicated insulated tools must be used to avoid electric shock or short-circuit faults.
- During the operation, ensure that there is no contact between tools, the battery pack shell, and the positive/negative main power components to prevent short circuits between the positive/negative main power components and the chassis.

**NOTICE**

To ensure the airtightness of the battery pack, please make sure:

- Securely fasten the communication terminals and panel screws; do not miss any installation.
- Carefully inspect the condition of the sealing strip before installing the screws to ensure it is intact.
- Ensure that the installation process is supervised by two people, and take photos to record the replacement result.

**NOTICE**

- Before installation, ensure the battery pack is stored indoors and meets other storage requirements specified in the user manual.
- Before installation, inspect the condition of the battery pack. Do not use the battery pack if its outer carton is rained on, damaged, or deformed, or if the battery pack leaks, is dropped, or has similar issues.
- Once the battery is unpacked, complete the installation within 24 hours. If installation cannot be done promptly, repack the battery and store it in an indoor, dry environment free of corrosive gases. Power on the energy storage system within 24 hours after its installation is completed. The process from unpacking the battery to powering on the energy storage system must be finished within 72 hours. During regular maintenance later, the power-off time must not exceed 24 hours.
- Do not install the battery pack or its components in rainy, snowy, foggy, or similar weather to prevent the battery pack from being eroded by moisture or rainwater.

#### NOTICE

- Remove the cables, then wrap the cable terminal heads with insulating materials to prevent short circuits or foreign objects from falling.
- When binding wire harnesses at close range or cutting the binding wires of wire harnesses, do not cut through the wire harness sheath to prevent electric leakage.
- Prevent nuts from falling during disassembly and assembly. After disassembly, ensure foreign objects are cleaned up completely with no residues to avoid circuit short circuits.

## 3.1 Old Battery Pack Condition Inspection

Before replacing the battery pack, inspect the condition of the old one. Only replace it yourself if the faulty battery pack has no leakage, damage, or similar issues; otherwise, contact GoodWe after-sales service for handling.

### Prerequisites

- The energy storage system has been powered off. For specific operations, refer to 2.2 System Power-Off.
- The status inspection of the old battery pack has been completed, and the battery pack is confirmed to be in normal condition.
- The status inspection of the old battery pack has been completed, and the battery pack is confirmed to be in normal condition.

- Tool Preparation:

Tool Name	Tool Specification	Acquisition Method
Infrared Meter	-	Prepared by the User

## Operation Steps:

**Step 1:** Open the front door of the energy storage system and check the status of the old battery pack.

**Step 2:** Use an infrared device to detect the temperature of the main power interfaces (BAT+, BAT-) on the front panel of the battery pack. Ensure the temperature is below 55°C. If the temperature is too high, wait for it to cool down before proceeding to the next step.

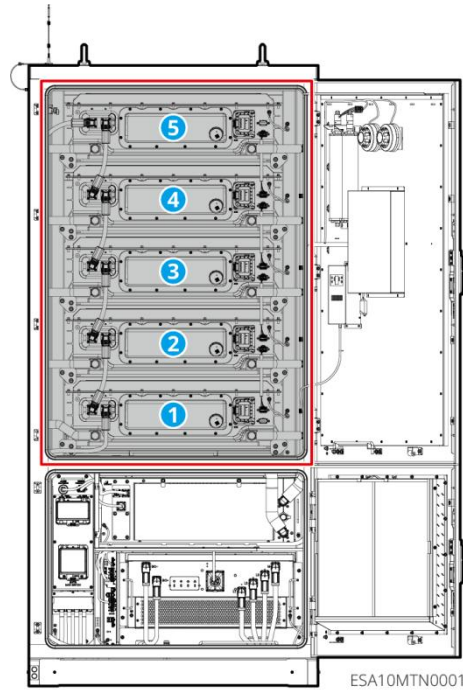
**Step 3:** Inspect the old battery pack:

- If the battery pack has a strong pungent odor, liquid leakage, obvious bulging, or damage, contact the company's after-sales engineers for handling.
- If there are signs of sparking or burning at the main power interfaces (BAT+, BAT-) on the front panel of the battery pack or the MSD switch terminals, contact the company's after-sales engineers for handling.
- If there is no liquid leakage from the battery pack's liquid-cooled base plate, and the battery pack has a normal shape and no pungent odor, the faulty battery pack can be removed for replacement.

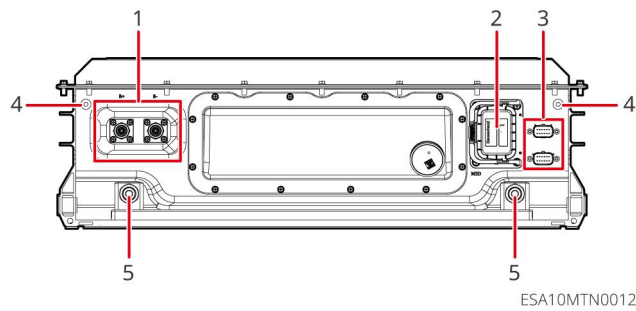
## 3.2 Replacement of Battery Pack and Internal Components (Type I)

### Background Information:

- Battery Pack Location:

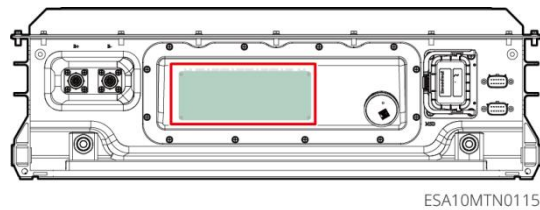


● Battery Pack Appearance:



No.	Description	No.	Description
1	Power Cable Connection Port Between Battery Packs	2	MSD Switch
3	Communication Port Between Packs	4	Grounding Port
5	Liquid-Cooling Pipeline Connection Port	-	-

● BMU Acquisition Board Location:



**Prerequisites**

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- Make sure the [Old Battery Pack Status Inspection](#) has been completed, and confirm that the battery pack status is normal.
- When replacing the battery pack, ensure there are at least 3 personnel on-site; when replacing the BMU acquisition board, ensure there are at least 2 personnel on-site. Do not operate alone.
- Tool Preparation:

Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	Size 10 (M6), Size 13 (M8), with extension rod $\geq 80\text{mm}$	Prepared by User
Forklift	Load Capacity $\geq 1\text{t}$	Prepared by User
Wire Cutter	-	Prepared by User
Cable Tie	-	Prepared by User
Elevating Ladder (Optional)	-	Prepared by User

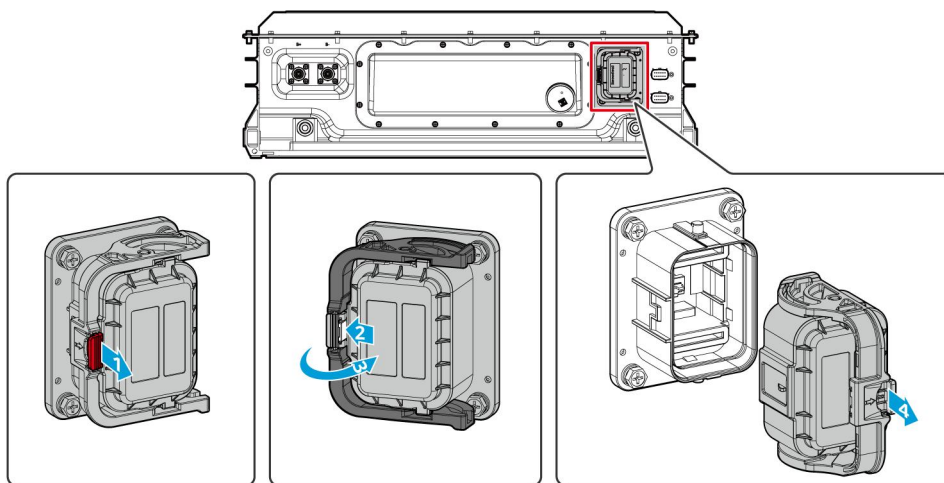
### 3.2.1 Replacement of the Entire Battery Pack

- **Removing the Old Battery Pack**

**Step 1:** Drain the coolant from the liquid-cooled unit. For specific operations on draining the coolant, refer to the relevant steps in Section 6.1 Replacement of Liquid-Cooled Unit.

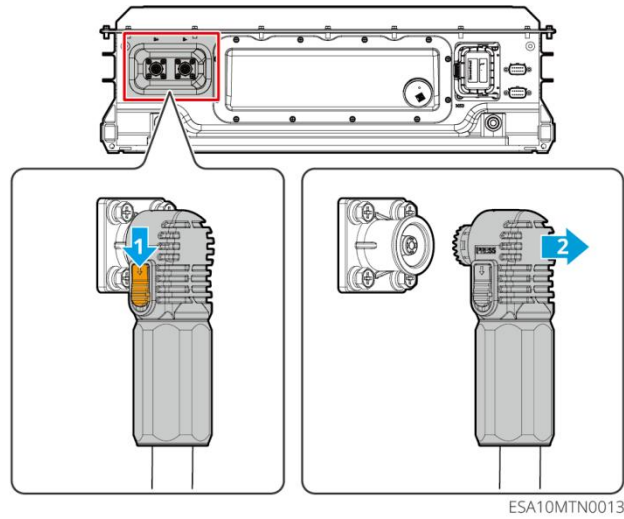
**Step 2:** Disconnect the cable and pipeline connections on the battery pack.

1. Remove the MSD switch from the faulty battery pack.

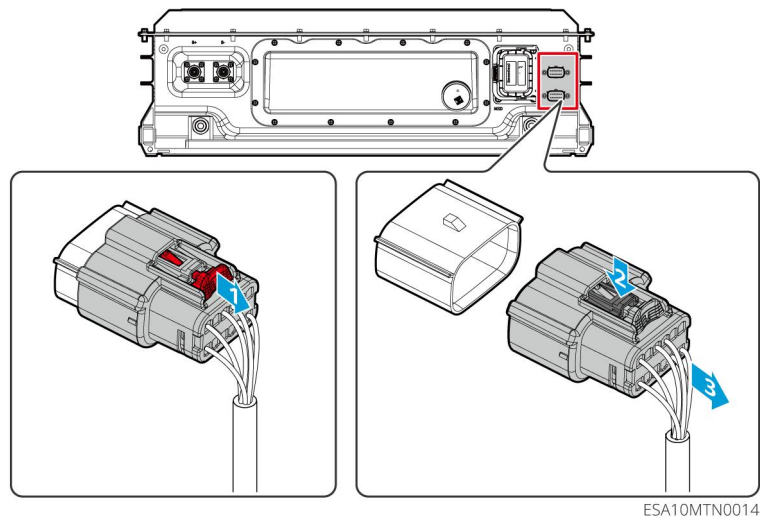


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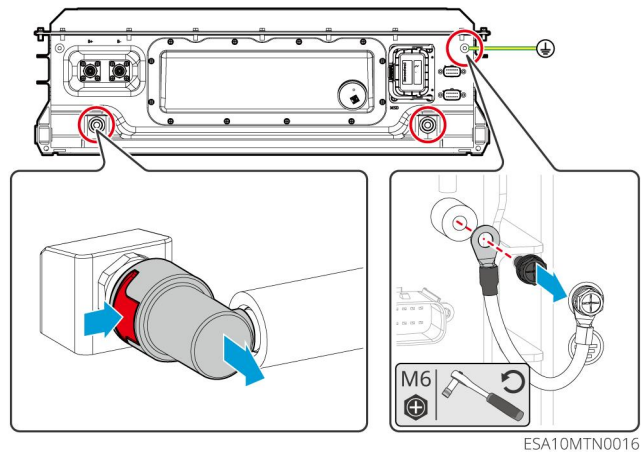
2. Disconnect the positive and negative power cable connection.



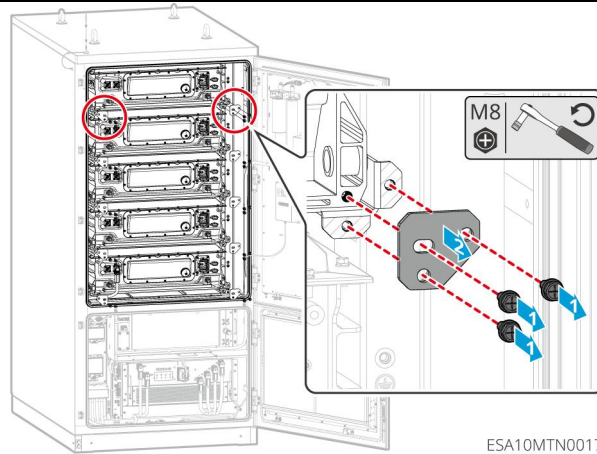
3. Disconnect the communication cable connection.



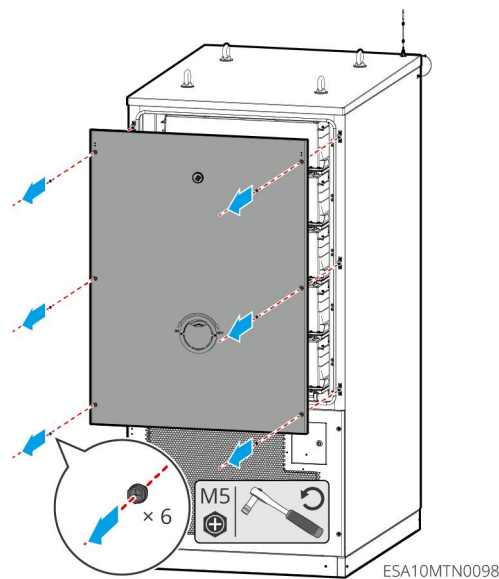
4. Disconnect the liquid-cooling pipeline and ground cable connection.



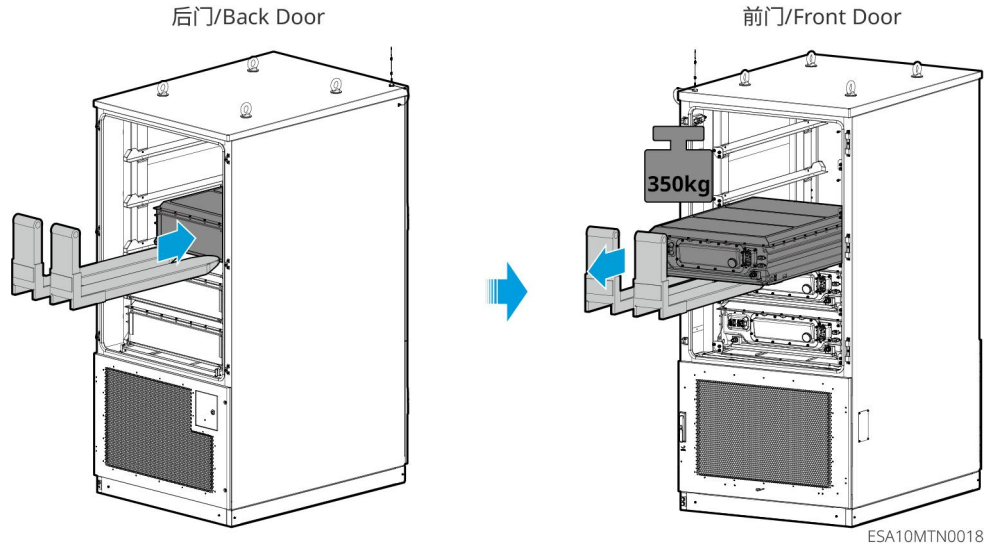
**Step 3:** Unscrew the fixing screws on the left and right sides of the battery pack.



**Step 4:** Open the rear door.

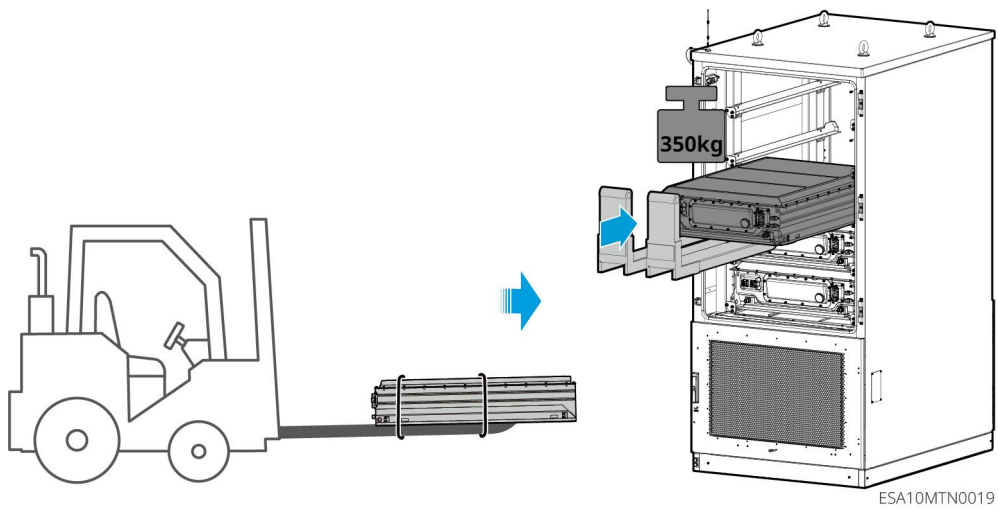


**Step 5:** Use a forklift to gently push the battery pack from the rear of the cabinet (it is recommended to place a buffer such as a foam pad between the forklift tines and the battery pack). When approximately half of the battery pack is pushed out, move the forklift to the front of the cabinet, lift it to a position flush with the bottom of the battery pack, and move the battery pack onto the forklift. If there is insufficient space at the rear of the cabinet, move the energy storage system to a location with sufficient space for maintenance in accordance with the handling requirements.

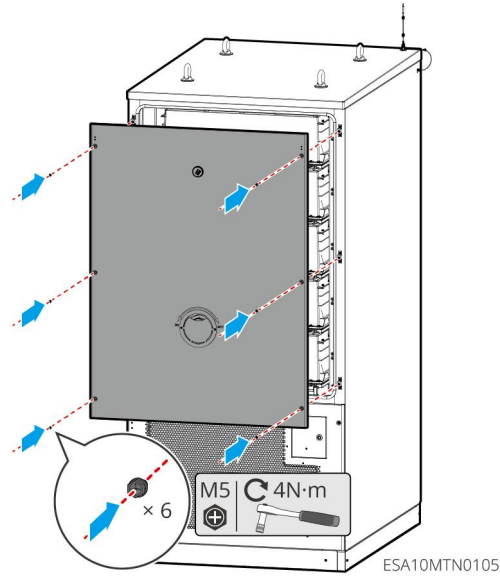


- **Installing the New Battery Pack**

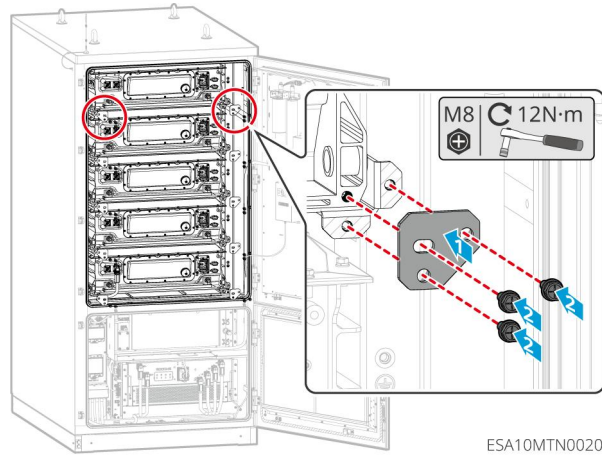
**Step 1:** Place the new battery pack to be replaced on the forklift, use the forklift to lift the new battery pack to the planned installation position, then slowly push the new battery pack into the cabinet.



**Step 2:** Close the rear door.

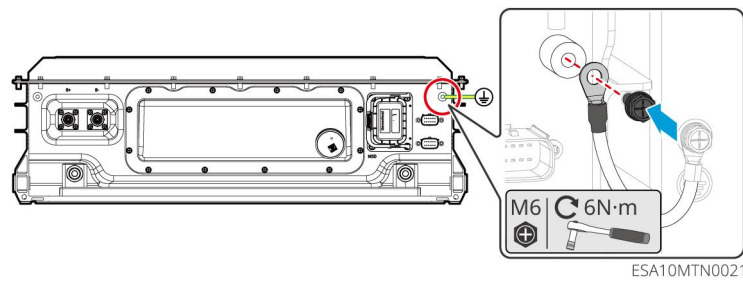


**Step3:** Tighten the fixing screws on the left and right sides of the battery pack.

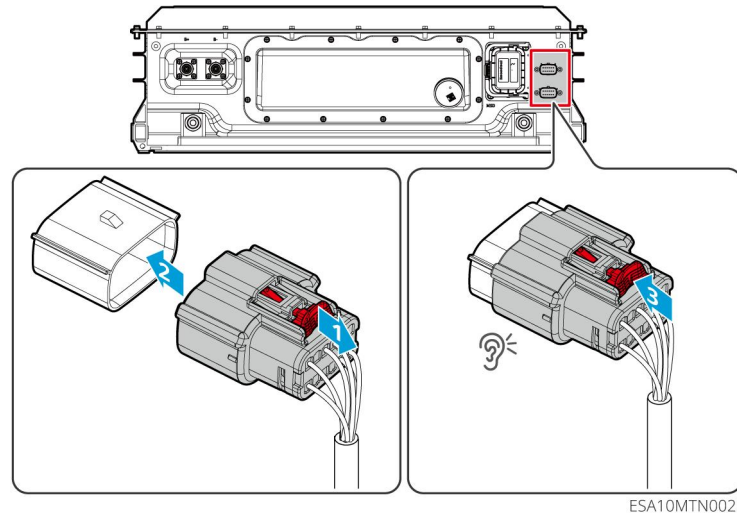


**Step 4:** Connect the cables and pipelines on the battery pack.

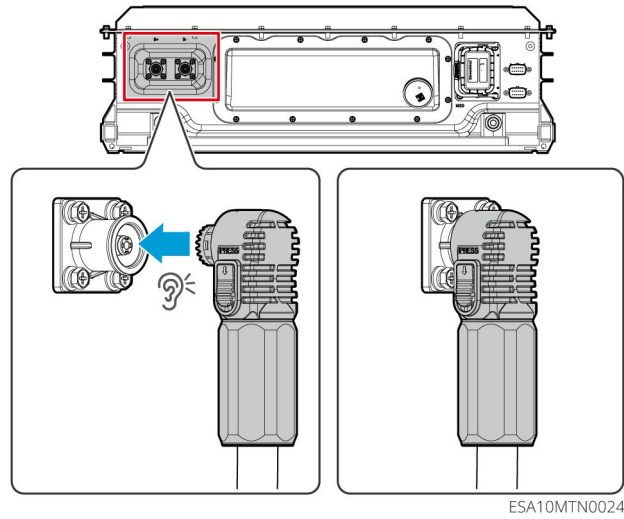
1. Connect the ground cable.



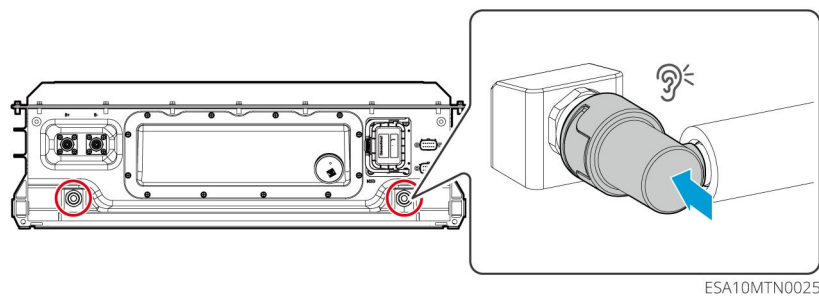
2. Connect the Communication Cable.



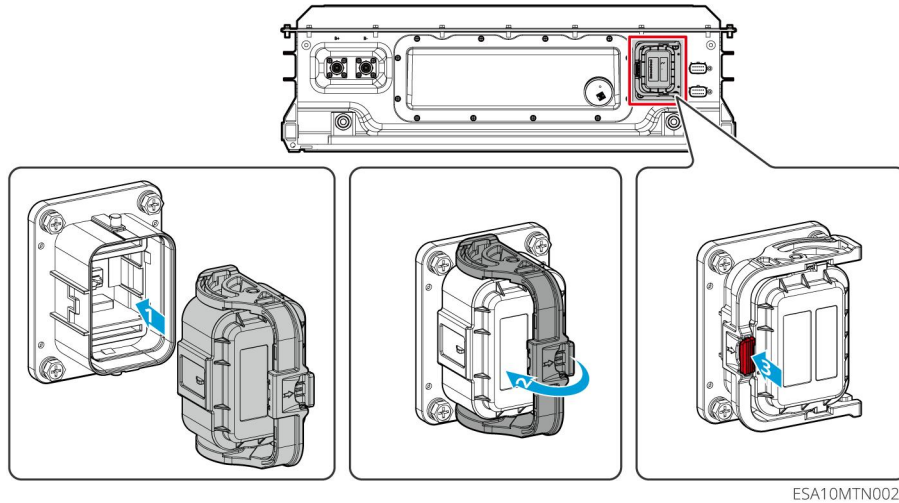
3. Connect the Power Cable.



4. Connect the liquid-cooling pipelines.



5. Install the MSD Switch.

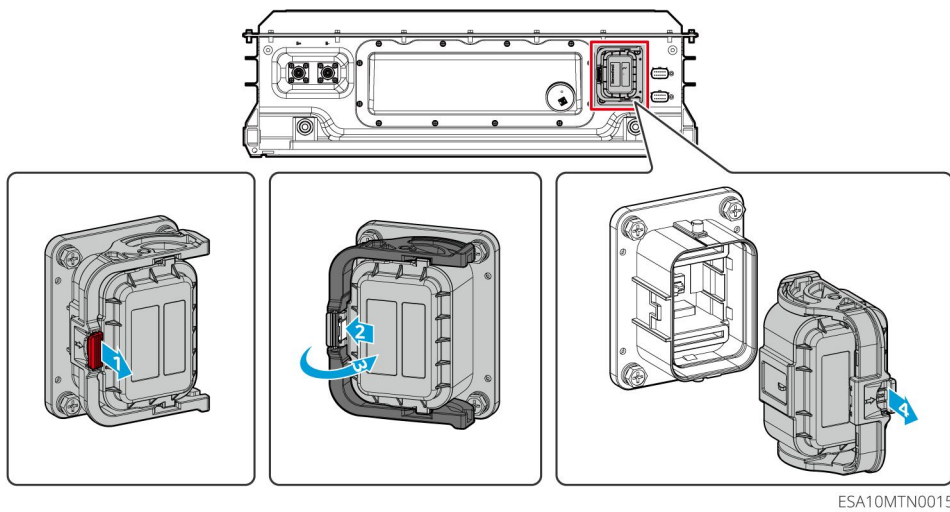


**Step 5:** Refill the coolant. For specific operations, refer to the relevant steps in [6.1 Replacement of Liquid-Cooled Unit](#).

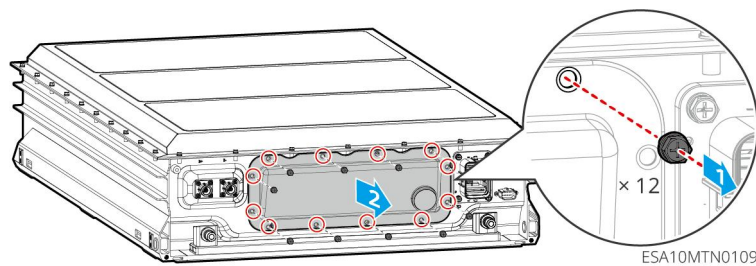
### 3.2.2 Replacement of the BMU Acquisition Board

- **Removing the Old BMU Acquisition Board**

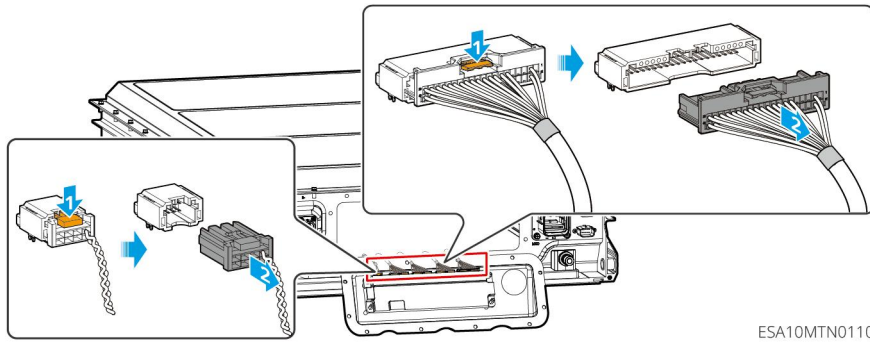
**Step 1:** Remove the MSD switch.



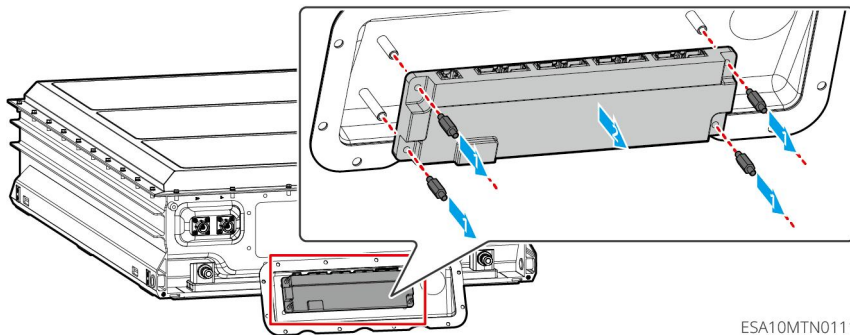
**Step 2:** Unscrew the fixing screws on the front cover of the battery pack.



**Step 3:** Disconnect the communication cable connections on the BMU acquisition boards.

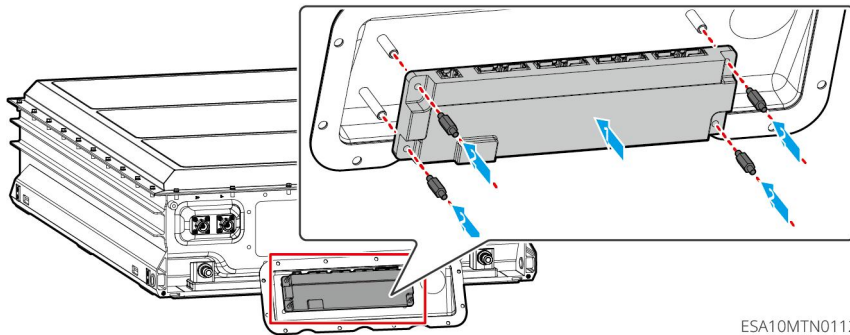


**Step 4:** Unscrew the fixing screws of the BMU acquisition board and remove the BMU acquisition board to be replaced.

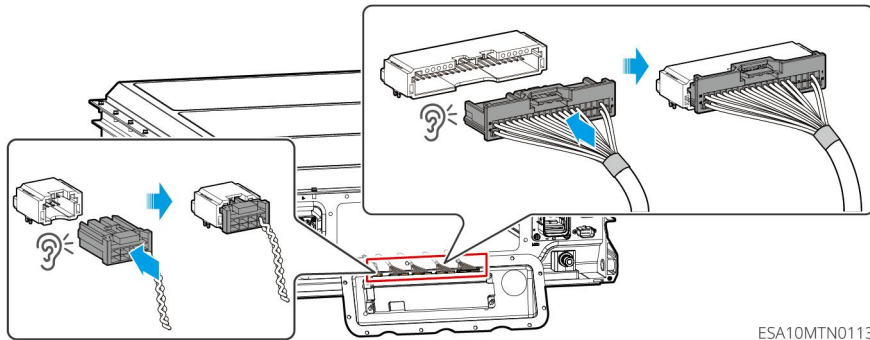


● **Installing the New BMU Acquisition Board**

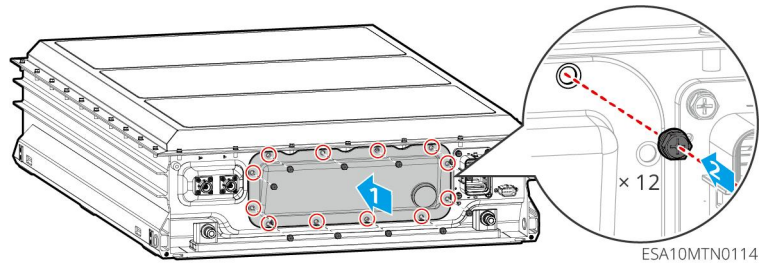
**Step 1:** Put the new BMU acquisition board back in place and tighten its fixing screws.



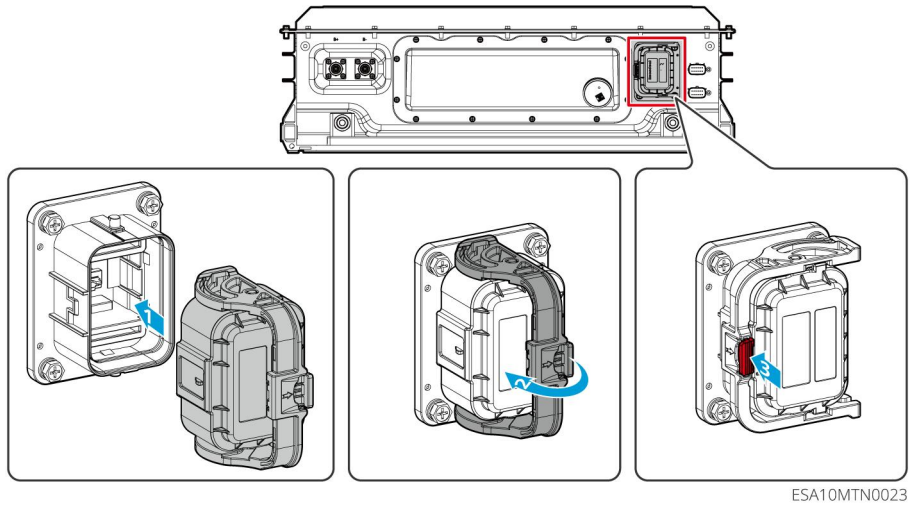
**Step 2:** Connect the communication cables on the BMU acquisition board.



**Step 3:** Tighten the fixing screws on the front cover of the battery pack.



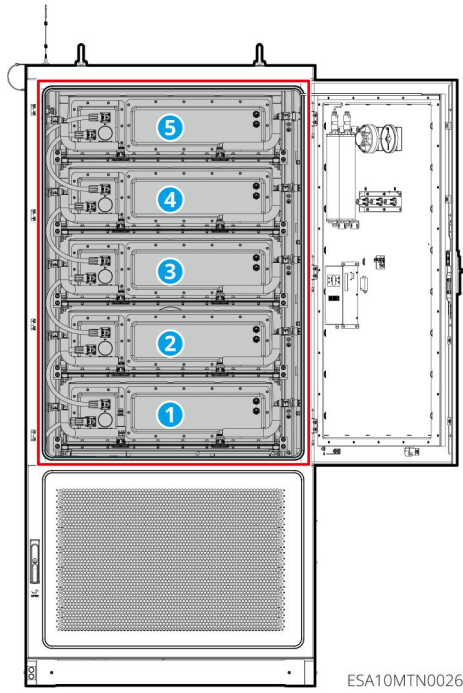
**Step 4:** Install the MSD Switch.



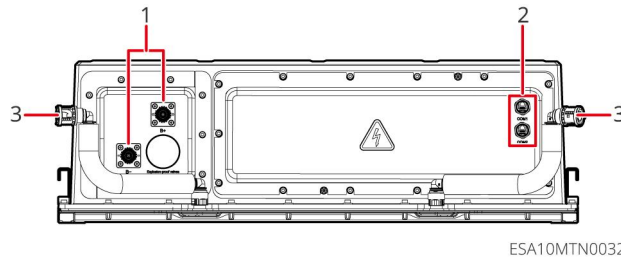
### 3.3 Replacement of the Battery Pack and Internal components (Type II)

#### Background Information:

- Battery Pack Position:

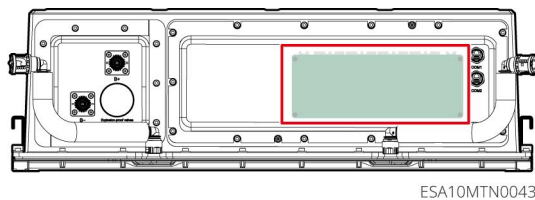


● Battery Pack Appearance Diagram:

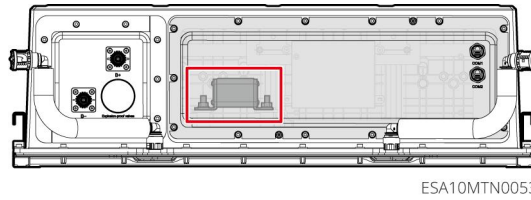


No.	Description	No.	Description
1	Power Cable Connection Port Between Battery Packs	2	Communication Port Between Packs
3	Female Connector of Liquid-Cooling Pipeline	-	-

● BMU Acquisition Board Position:



● Fuse Position:



## Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- Make sure the [3.1 Old Battery Pack Status Inspection](#) has been completed, and confirm that the battery pack status is normal.
- When replacing the battery pack, ensure there are at least 3 personnel on-site; when replacing the BMU acquisition board, ensure there are at least 2 personnel on-site. Do not operate alone.
- Tool Preparation:

Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	Size 10 (M6), with extension rod $\geq 80\text{mm}$	Prepared by User
Multimeter	-	Prepared by User
Wire Cutter	-	Prepared by User
Cable Tie	-	Prepared by User
Forklift	Load Capacity $\geq 1\text{t}$	Prepared by User
Elevating Ladder (Optional)	-	Prepared by User

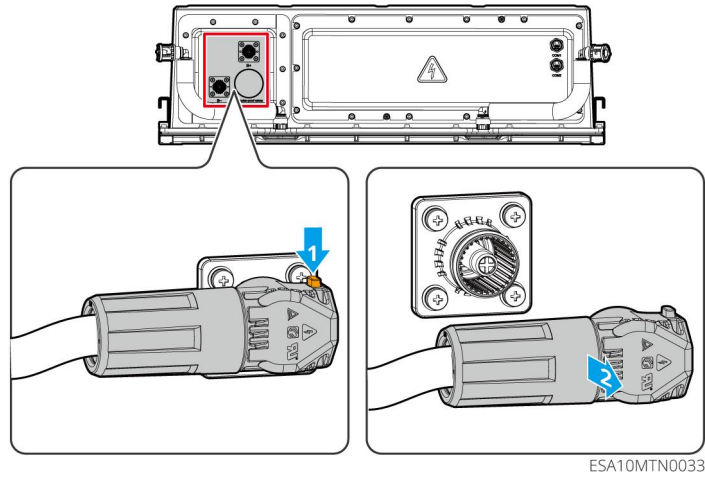
### 3.3.1 Replacement of the Entire Battery Pack

- **Removing the Old Battery Pack**

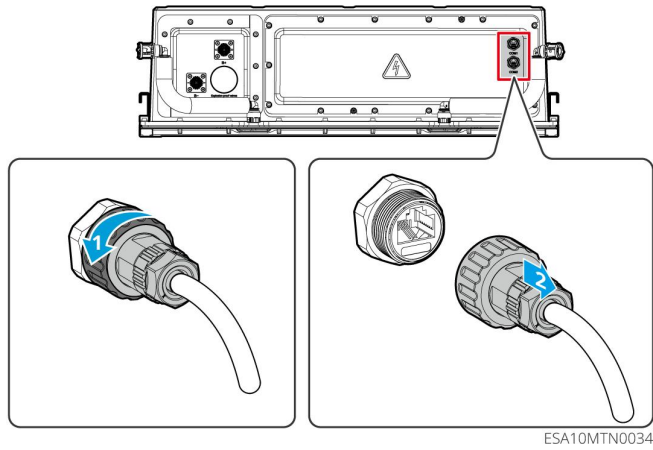
**Step 1:** Drain the coolant from the liquid-cooled unit. For specific operations on draining the coolant, refer to the relevant steps in 6.1 Replacement of Liquid-Cooled Unit.

**Step 2:** Disconnect the cable and pipeline connections on the battery pack.

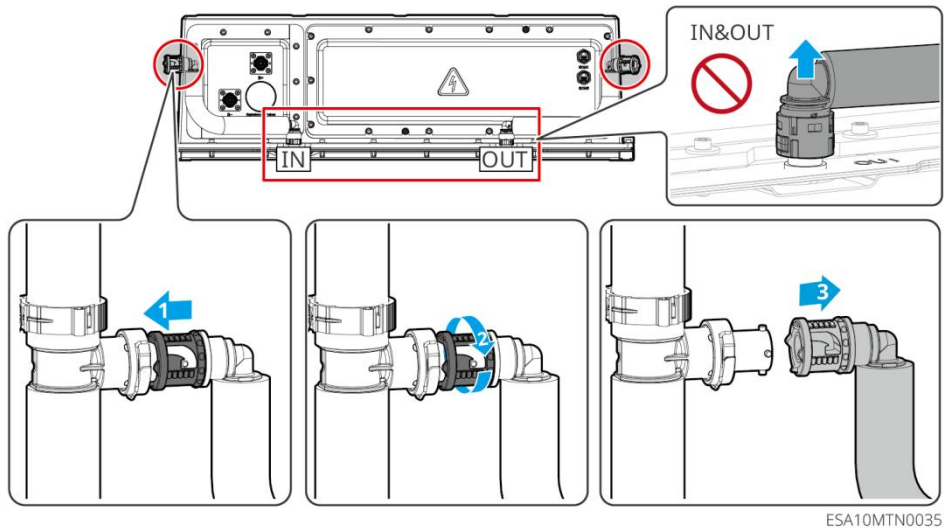
1. Disconnect the positive and negative power cables.



2. Disconnect the communication cables.



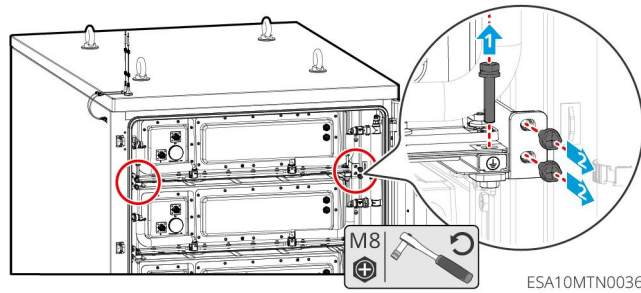
3. Disconnect the liquid cooling pipe connections on the left and right sides of the battery pack



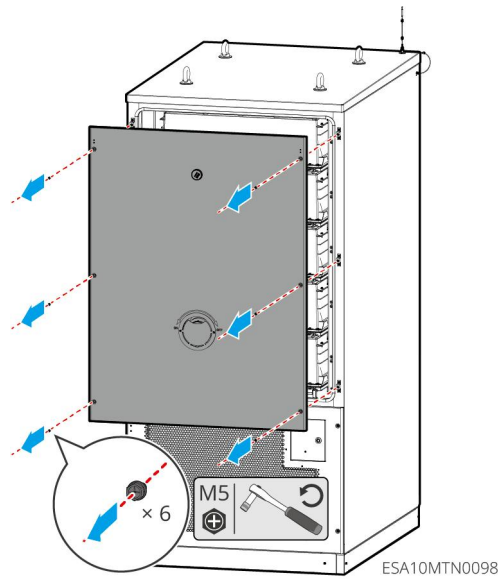
**! WARNING**

Do not disconnect the liquid cooling pipe joints at the bottom of the battery pack to prevent the cooling liquid inside the battery pack from spilling.

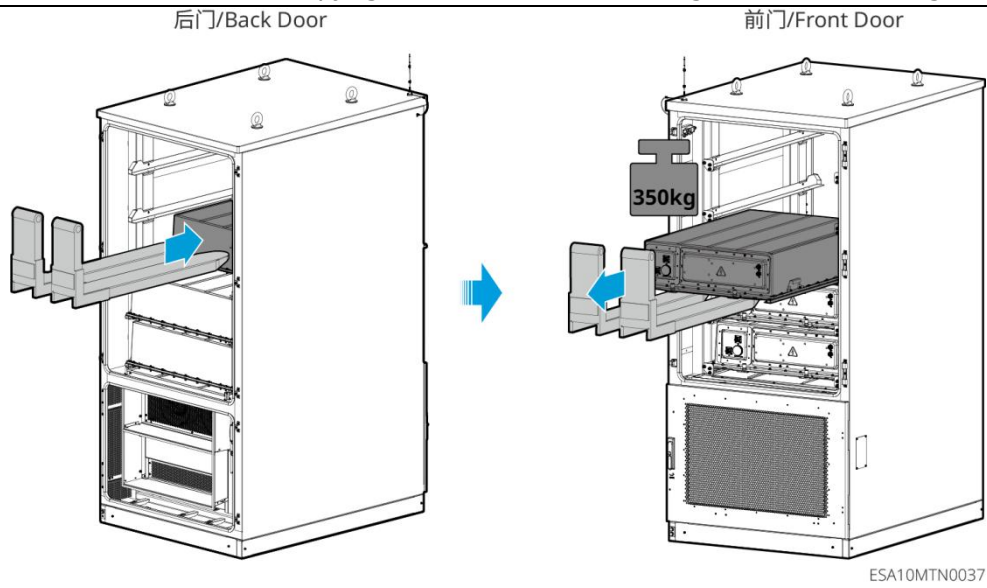
**Step 3:** Unscrew the fixing screws on the left and right sides of the battery pack.



**Step 4:** Open the rear door.

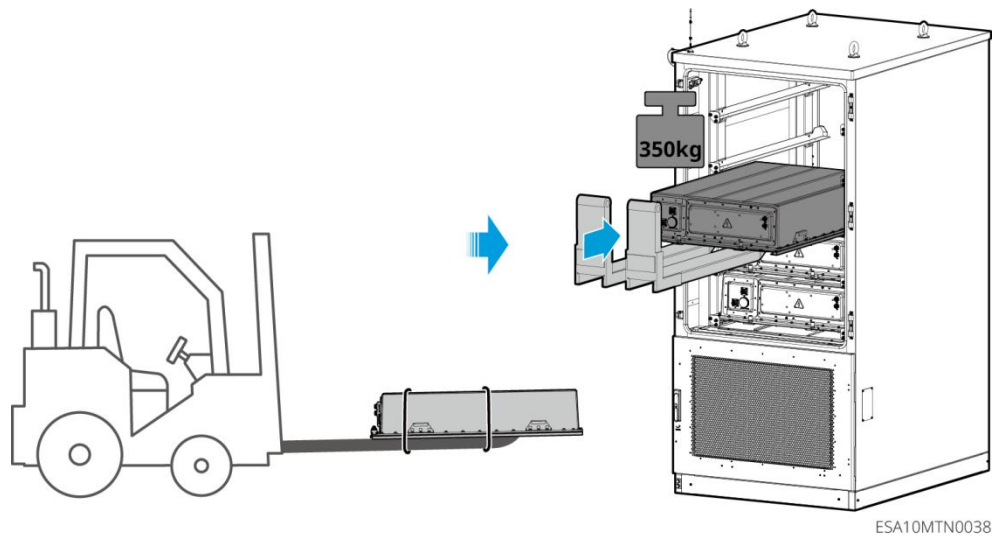


**Step 5:** Use a forklift to gently push the battery pack from the rear of the cabinet (it is recommended to place a buffer such as a foam pad between the forklift tines and the battery pack). When approximately half of the battery pack is pushed out, move the forklift to the front of the cabinet, lift it to a position flush with the bottom of the battery pack, and move the battery pack onto the forklift. If there is insufficient space at the rear of the cabinet, move the energy storage system to a location with sufficient space for maintenance in accordance with the handling requirements.

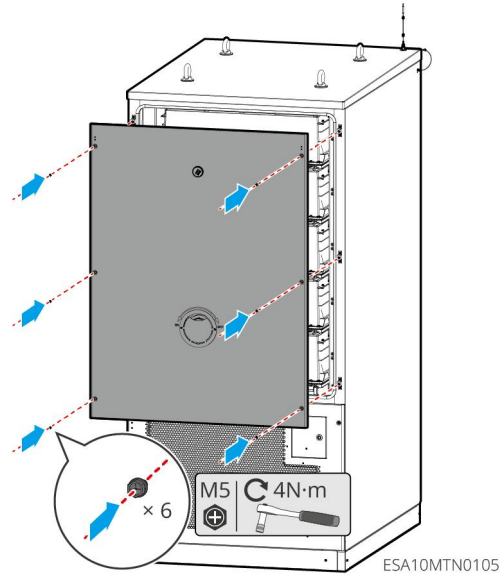


● **Installing the New Battery Pack**

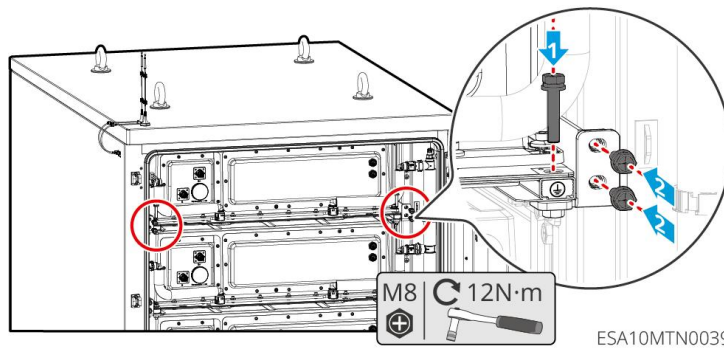
**Step 1:** Place the new battery pack to be replaced on the forklift, use the forklift to lift the new battery pack to the planned installation position, then slowly push the new battery pack into the cabinet.



**Step 2:** Close the cabinet door.

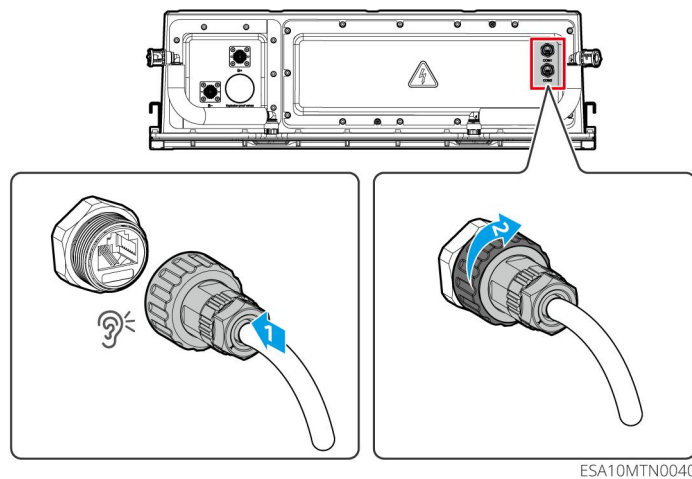


**Step 3:** Tighten the fixing screws on the left and right sides of the battery pack.

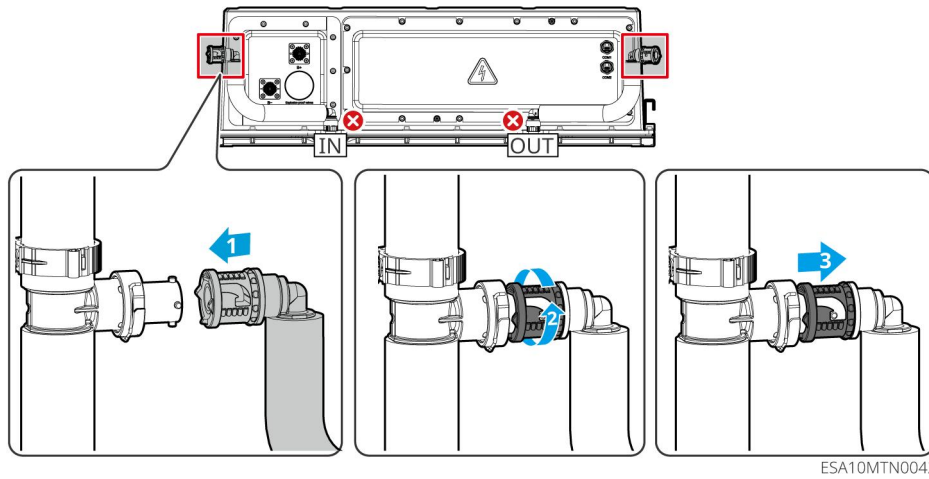


**Step 4:** Connect the cables and pipelines on the battery pack.

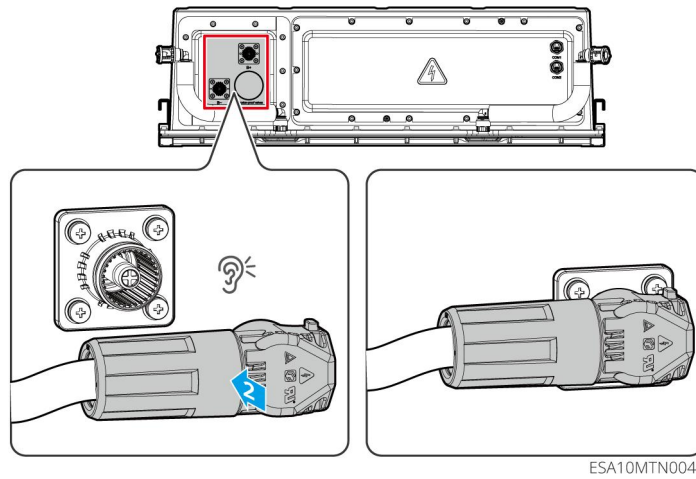
1. Connect the communication cable.



2. Connect the liquid cooling pipes.



3. Connect the power cable.

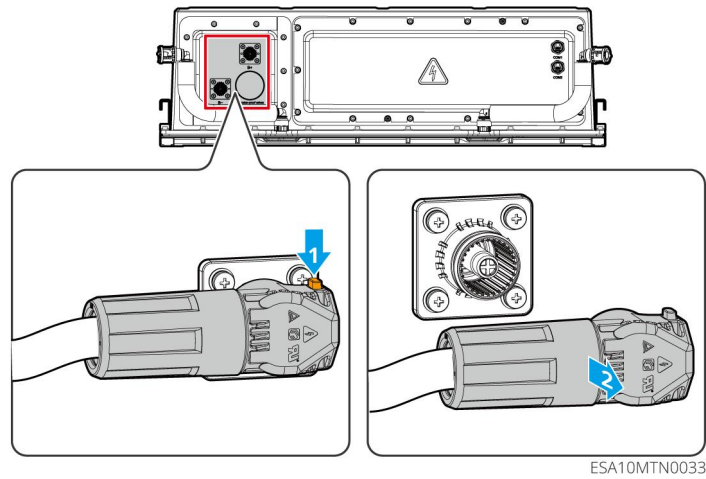


**Step 5:** Refill the cooling liquid. For specific operations, please refer to the relevant steps in [6.1 Replacing the Liquid Cooling Unit](#).

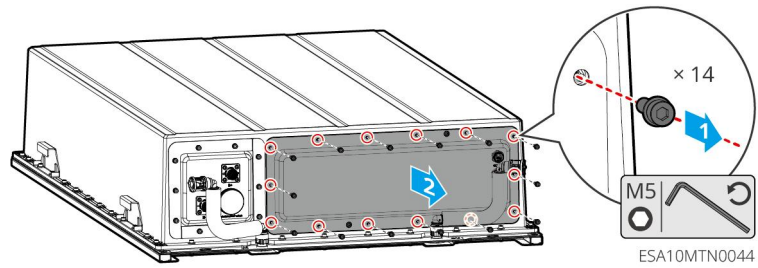
### 3.3.2 Replacement of the BMU Acquisition Board

- **Removing the old BMU acquisition board**

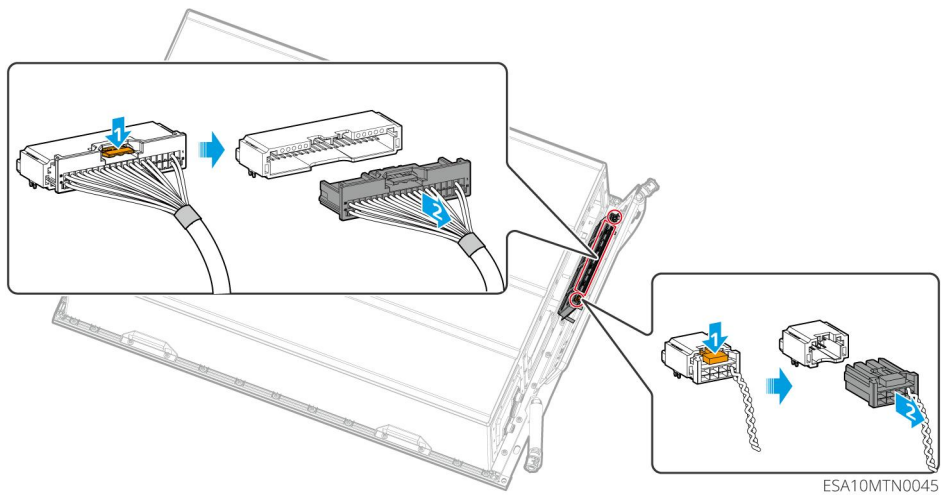
**Step1:** Disconnect the power cable.



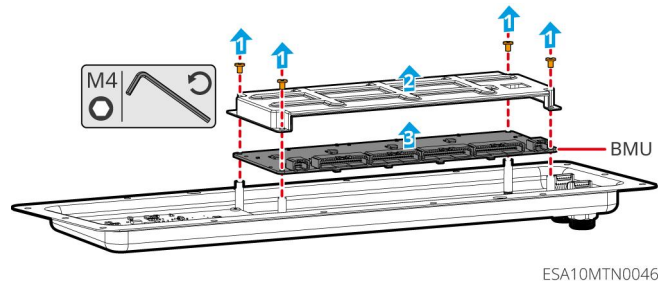
**Step 2:** Unscrew the fixing screws of the front cover plate of the battery pack.



**Step 3:** Disconnect the communication cable connections on the BMU acquisition board and record their positions.

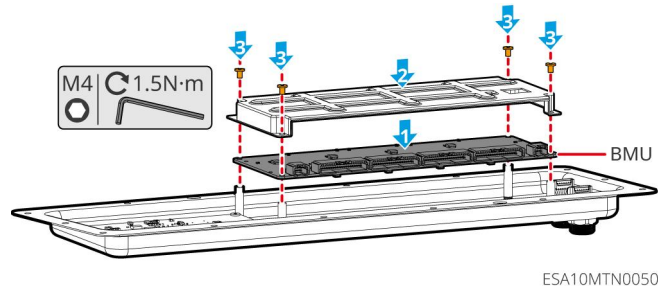


**Step 4:** Unscrew the fixing screws of the BMU acquisition board, and remove the protective cover and the BMU acquisition board to be replaced.

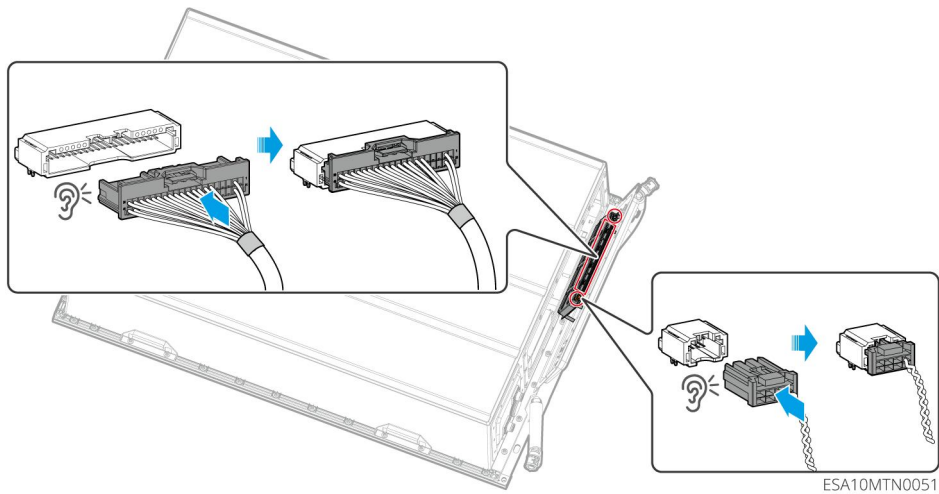


- **Installing the new BMU acquisition board**

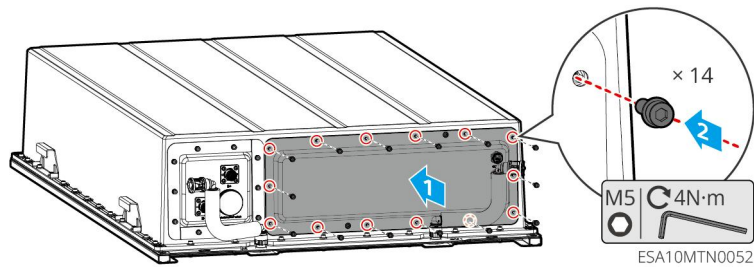
**Step 1:** Put the new BMU acquisition board and protective cover back to their original positions, and tighten the fixing screws of the new BMU acquisition board.



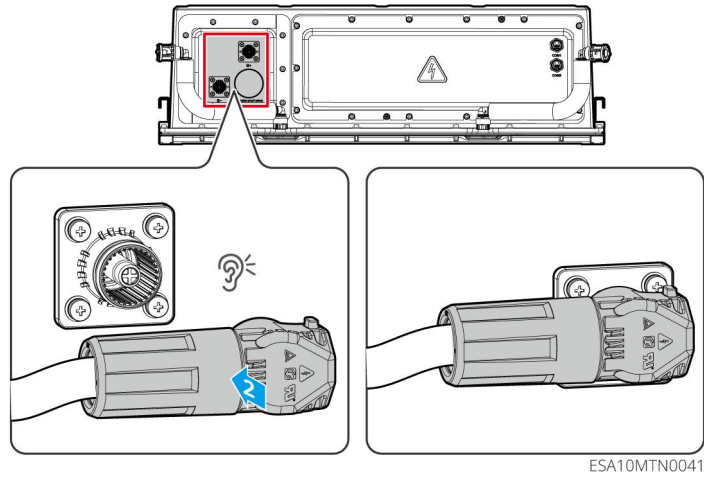
**Step 2:** Connect the communication cables on the BMU acquisition board.



**Step 3:** Tighten the fixing screws of the battery pack's front cover plate.



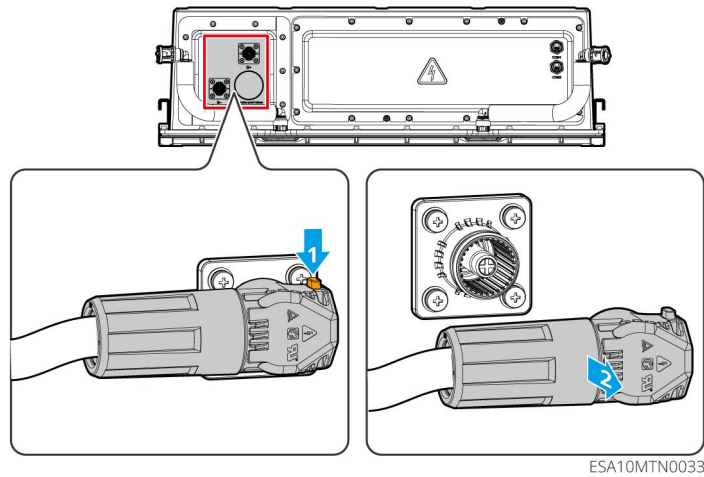
**Step 4:** Connect the power cables.



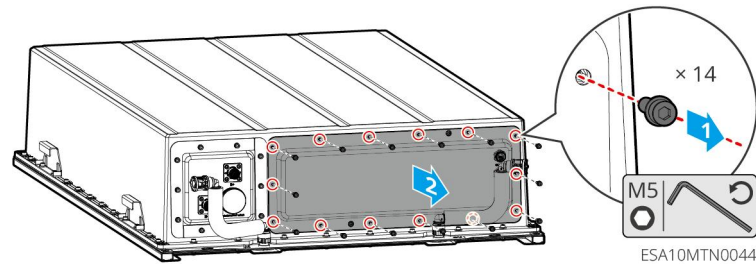
### 3.3.3 Replacement of the Fuse

- Removing the old fuse

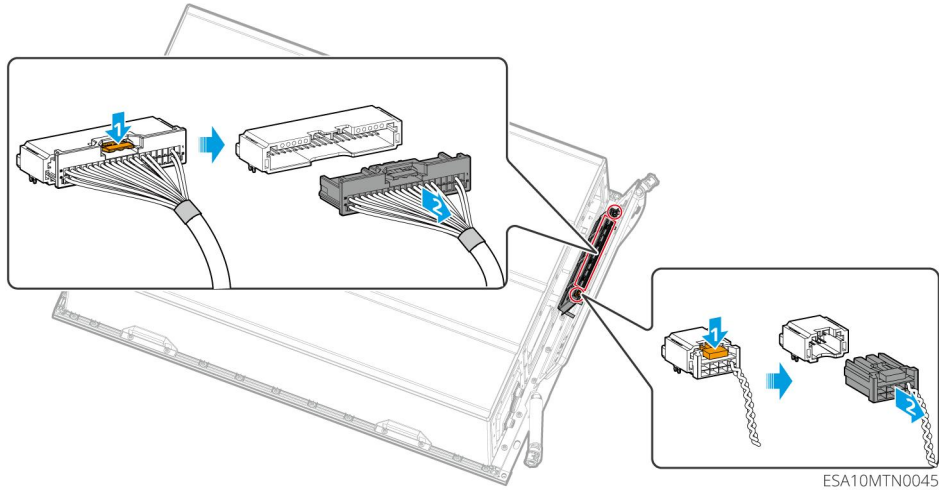
**Step 1:** Disconnect the power cable connections.



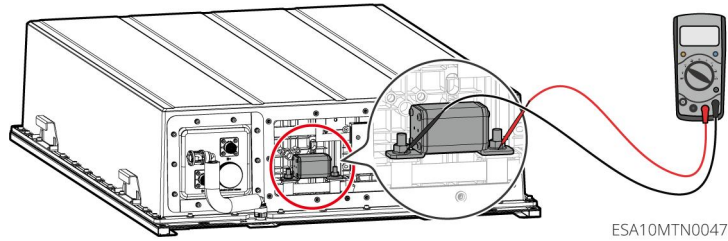
**Step 2:** Unscrew the fixing screws of the battery pack's front cover plate.



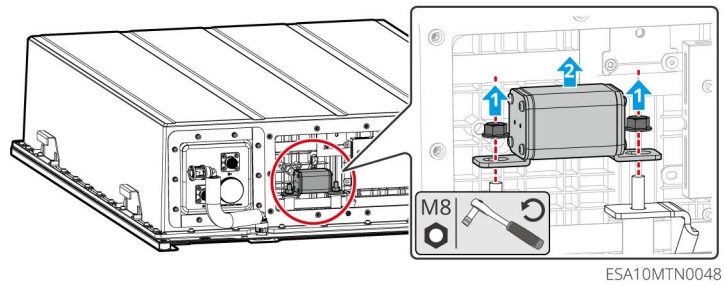
**Step 3:** Disconnect the communication cable connections on the BMU acquisition board and record their positions.



**Step 4:** Use the continuity test function of a multimeter to check if both ends of the fuse are conductive. If not, the fuse is damaged.

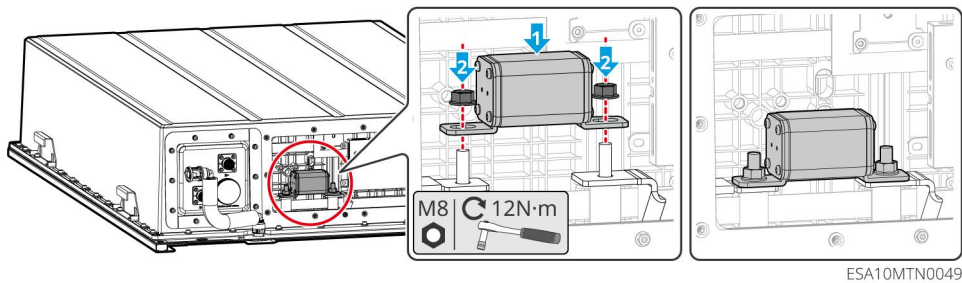


**Step 5:** Unscrew the fuse's fixing screws.

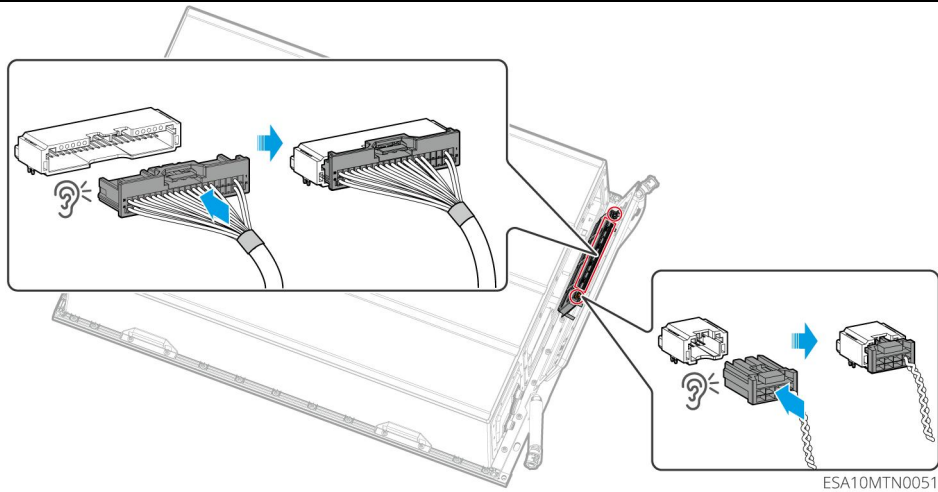


● **Installing the new fuse**

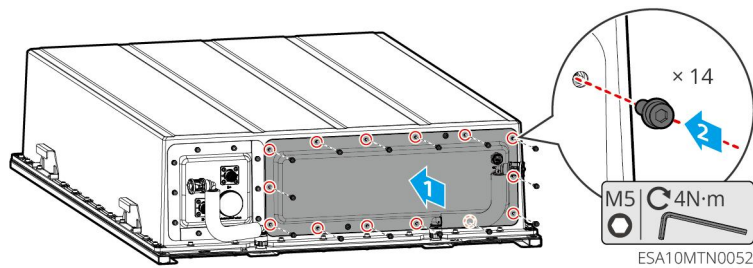
**Step 1:** Tighten the fixing screws of the new fuse.



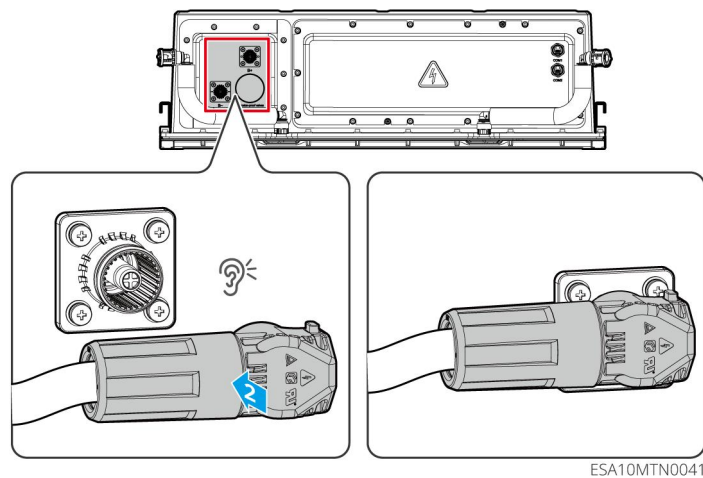
**Step 2:** Connect the communication cables on the BMU acquisition board.



**Step 3:** Tighten the fixing screws of the battery pack's front cover plate.



**Step 4:** Connect the power cables.



### 3.4 Subsequent Handling

**Step 1:** Power on the system. For specific operations, refer to Chapter 7 of the [User Manual for ESA261 Series Industrial and Commercial Energy Storage Systems](#).

**Step 2:** Configure the corresponding SN. The following two methods can be referenced:

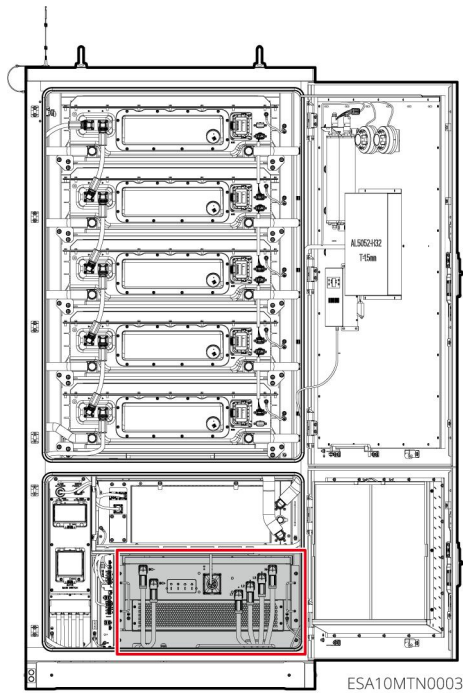
- Find the corresponding register via Modbus and write the SN.
- Through the IOT management platform → Device debugging → Transparent transmission control → Enter the battery pack's SN → Write to the corresponding battery

pack register → Complete SN writing.

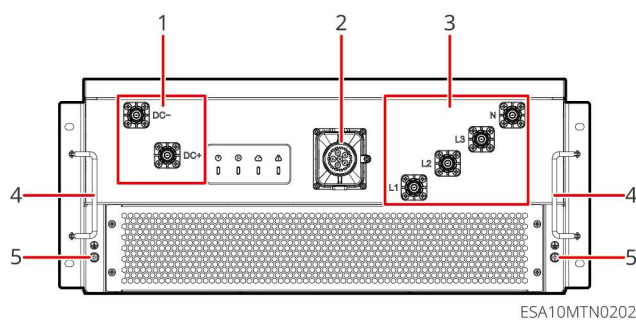
# 4 Replacement of PCS

## Background Information

- PCS Position:



- PCS Appearance:



No.	Description	No.	Description
1	DC Connection Port	2	Communication Port
3	AC Connection Port	4	Handle
5	Grounding Point	-	-

## Prerequisites

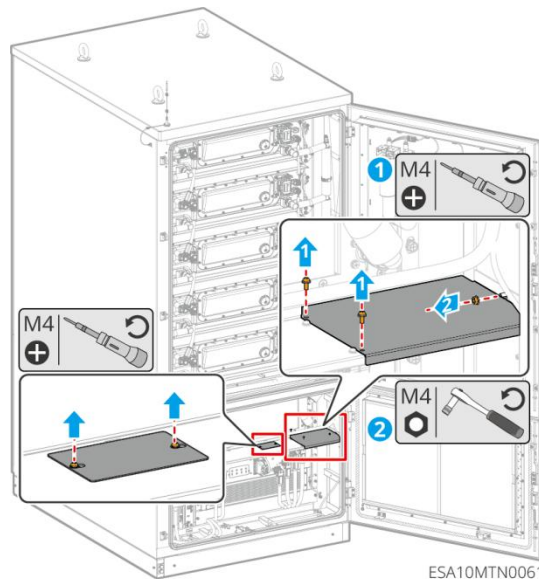
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- When replacing the PCS, ensure that there are at least 3 personnel on site.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Insulated torque socket wrench	Size 7 (M4), Size 10 (M6)	Provided by the user
Cross insulated torque screwdriver	M4	Provided by the user

## Operating Steps:

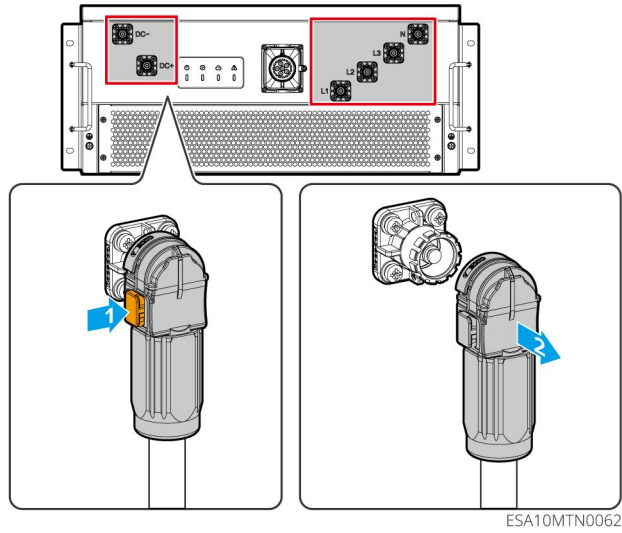
- **Removing the old PCS**

**Step 1:** Remove the right upper baffle and the middle small baffle of the PCS.

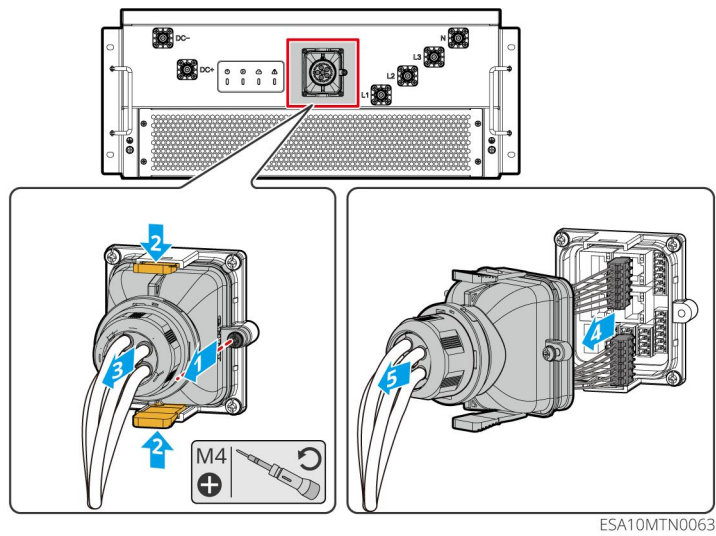


**Step 2:** Disconnect the cable connections on the PCS.

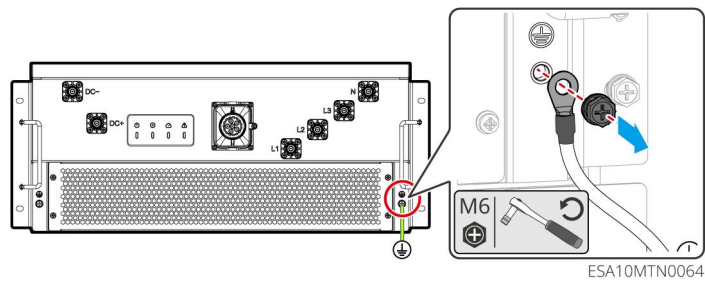
1. Disconnect the power cable.



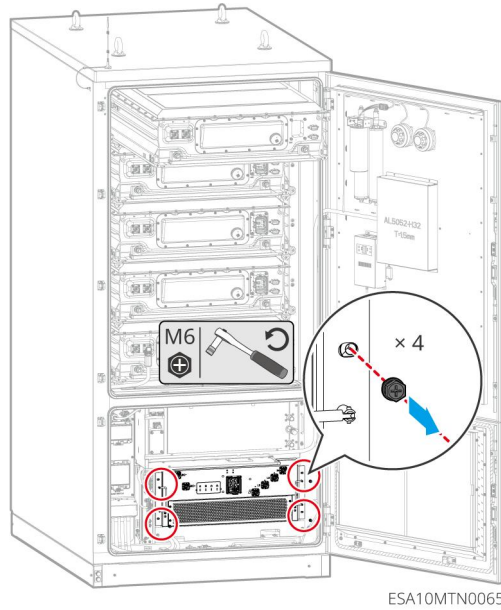
2. Connect the power cable.



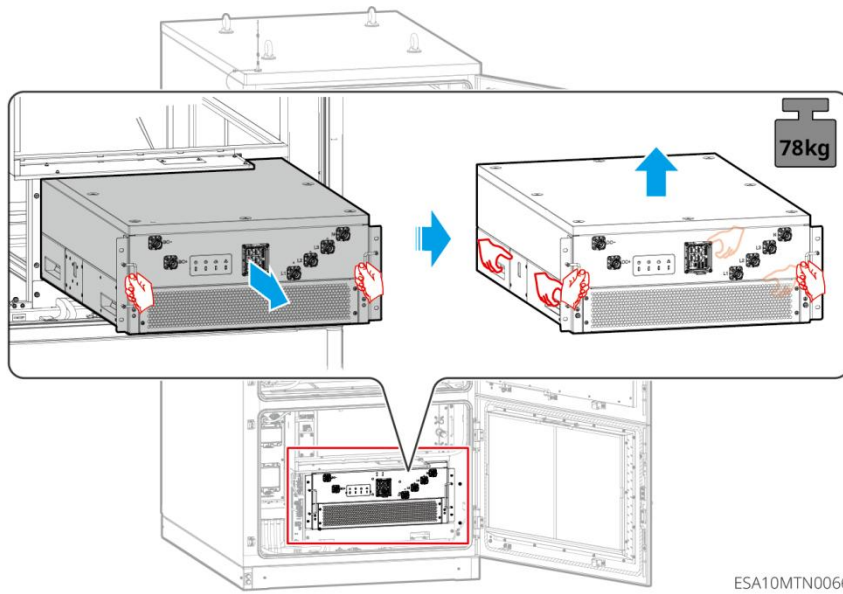
3. Disconnect the grounding cable.



**Step 3:** Unscrew the fixing screws of the PCS.

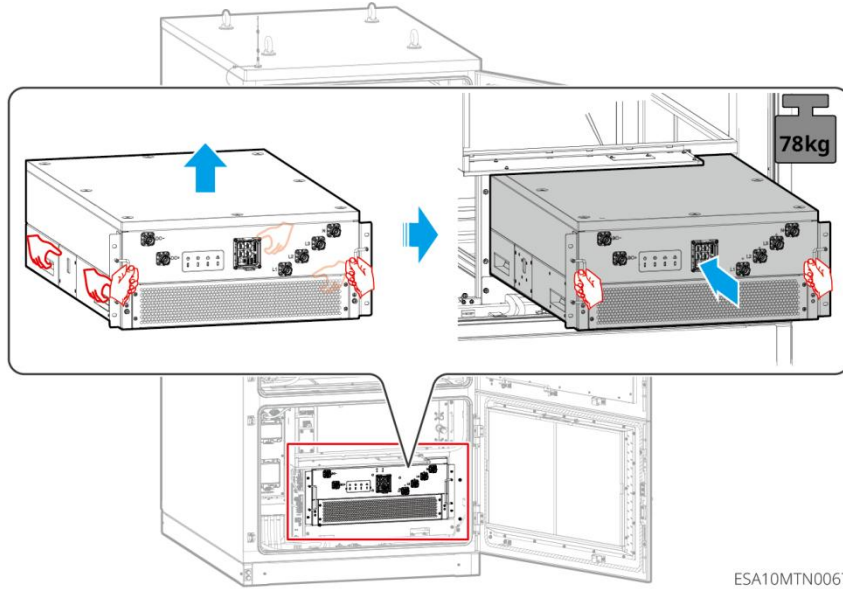


**Step 4:** Pull the handles on both sides of the PCS to pull it out, then lift the PCS and place it on a safe ground.

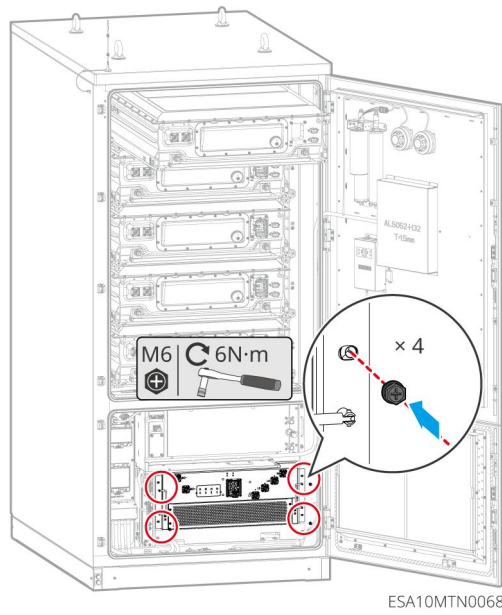


- **Installing new PCS**

**Step 1:** Slowly push the new PCS into the all-in-one cabinet.

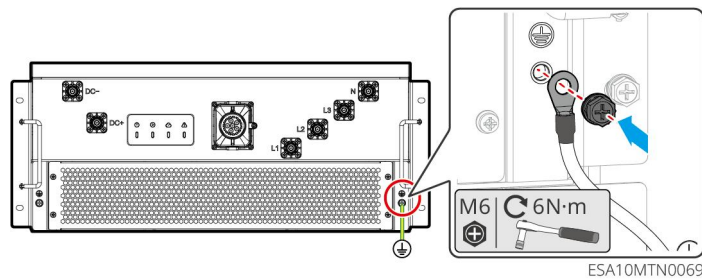


**Step 2:** Tighten the fixing screws of the PCS.

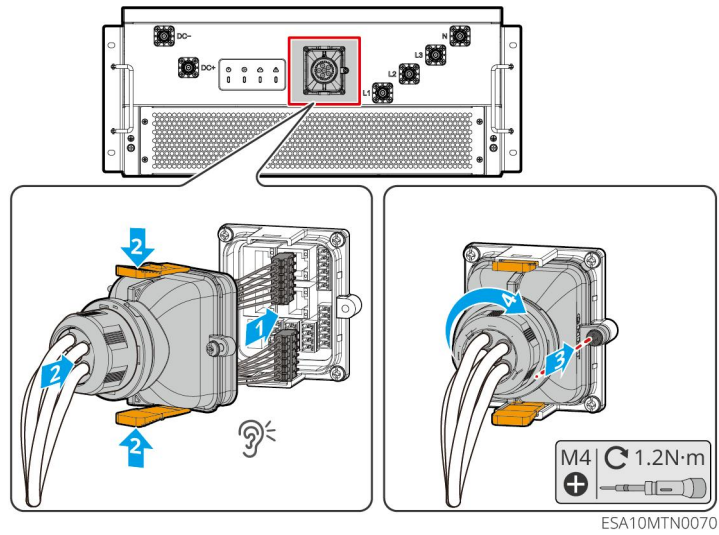


**Step 3:** Connect the PCS cables.

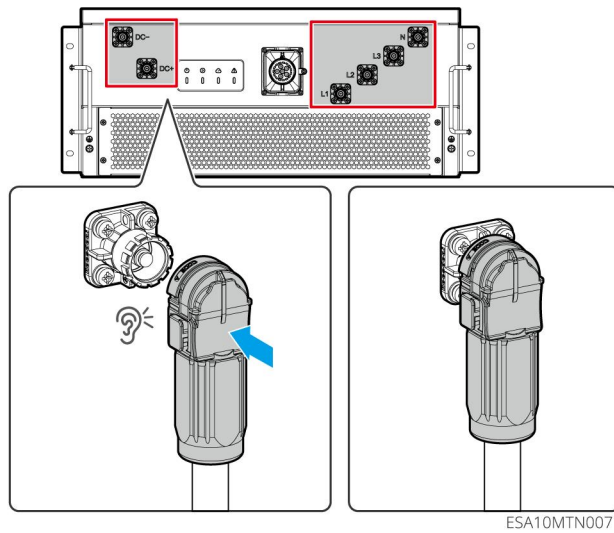
1. Connect the grounding cables.



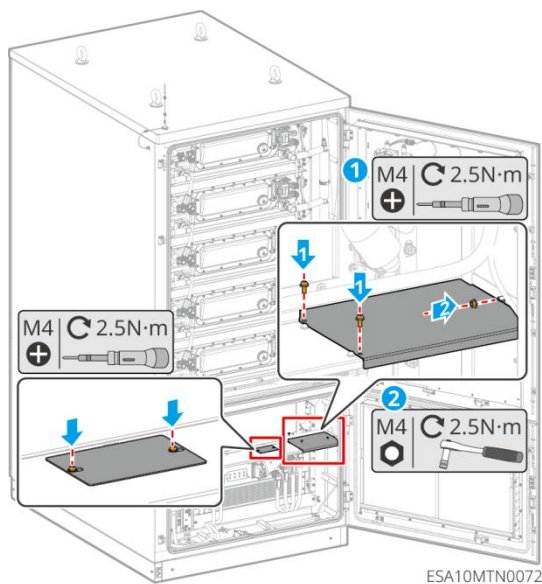
2. Connect the communication cables and install the communication cover.



3. Connect the power cables.



**Step 4:** Install the right upper baffle and the middle small baffle of the PCS.



## Subsequent Handling

**Step 1:** Power on the system. For specific steps, refer to the [User Manual for ESA261 Series Industrial and Commercial Energy Storage Systems](#).

**Step 2:** Configure the SN corresponding to the PCS. The following two methods can be referenced:

- Find the corresponding register via Modbus and write the SN.
- Through the IOT management platform → Device debugging → Transparent transmission control → Enter the SN of the PCS on the device → Write to the corresponding PCS register → Complete SN writing.

**Step 3:** Query firmware information. The following three methods can be referenced:

- Through Solargo → Bluetooth devices → Settings → Query firmware information.
- Through the IOT management platform → Find the corresponding register → Query firmware information.
- Through the WE 3.0 / SEMS+ platform → Energy storage monitoring → PCS monitoring → View firmware information version.

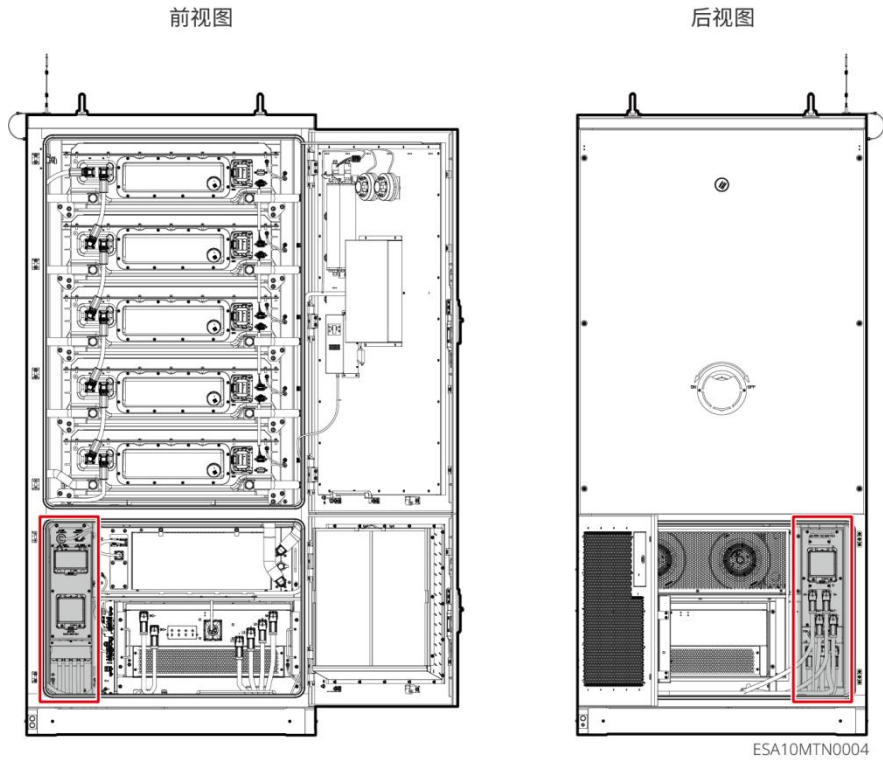
**Step 4:** Burn the program. The following two methods can be referenced:

- Insert a USB flash drive into the USB port of the EMS local control box
- Burn via IOT.

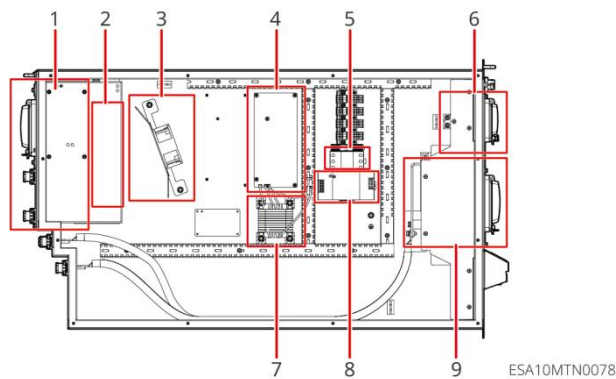
## 5 Replacement of the Distribution Box and Its Internal Components

### Background Information

- Distribution Box Position:



● Internal Components Position:



No.	Description	No.	Description
1	DC molded case circuit breaker	2	Fuse
3	Fan	4	Auxiliary power board
5	Water immersion transmitter	6	AC/DC miniature circuit breaker
7	Transformer	8	Switching power supply
9	AC molded case circuit breaker		

**Prerequisites**

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).

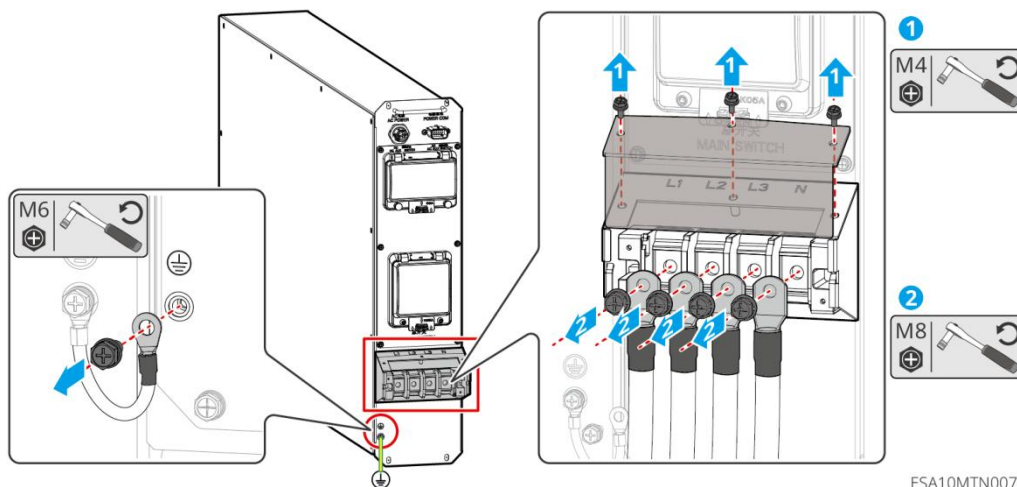
- At least 2 personnel are required for replacing distribution box components.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Insulated torque socket wrench	Size 7 (M4), Size 8 (M5), Size 10 (M6), Size 13 (M8), with an extension rod of $\geq 80\text{mm}$	Provided by the user
Hex key wrench	M8	Provided by the user
Flat-blade insulated screwdriver	3mm、5mm	Provided by the user
Cross insulated torque screwdriver	M4	Provided by the user
Hex key wrench	M8	Provided by the user
Wire cutters / utility knife	-	Provided by the user
Cable ties	-	Provided by the user

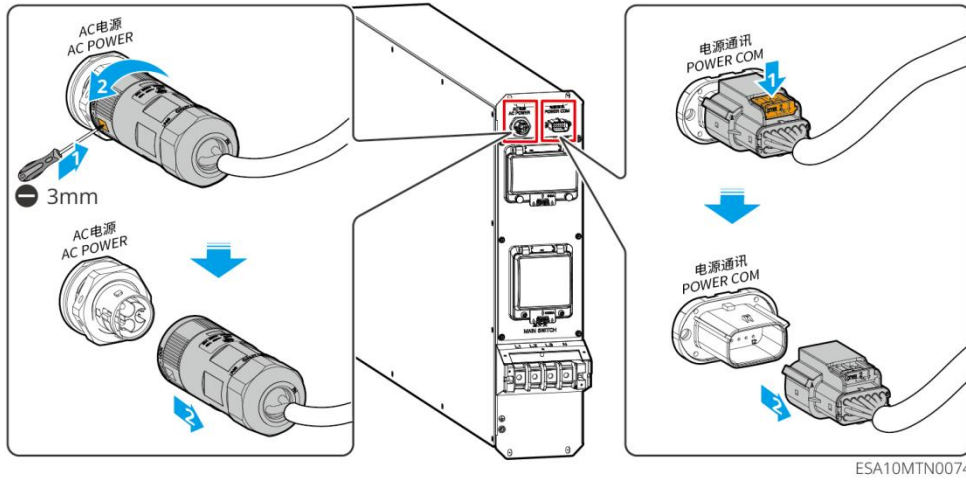
## 5.1 Replacement of the Distribution Box

- **Removing the old distribution box**

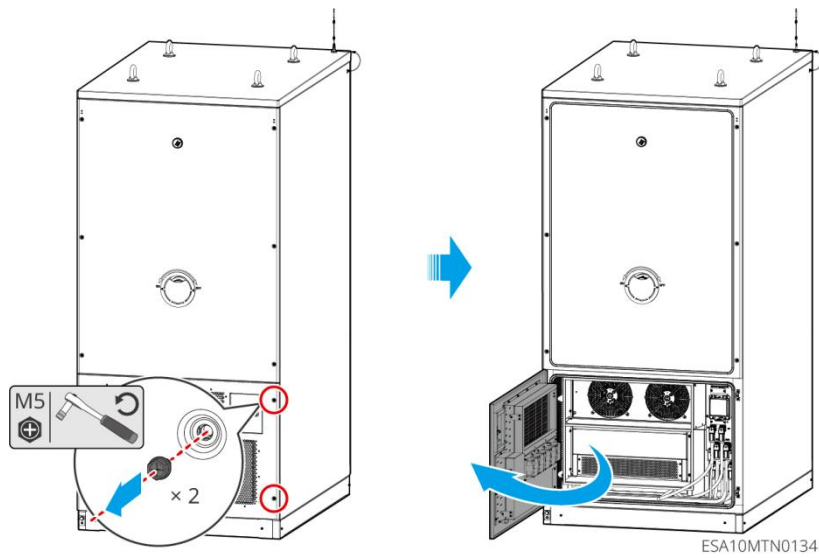
**Step 1:** Remove the AC cable protective baffle on the front side of the distribution box, and disconnect the AC cables and ground wires.



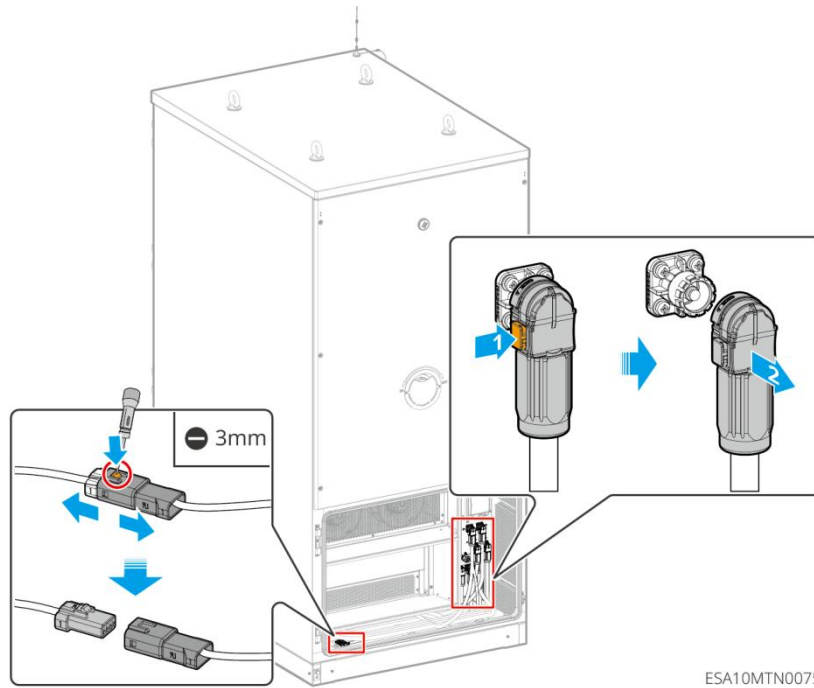
**Step 2:** Disconnect the AC power cables and power communication cables on the front side of the distribution box.



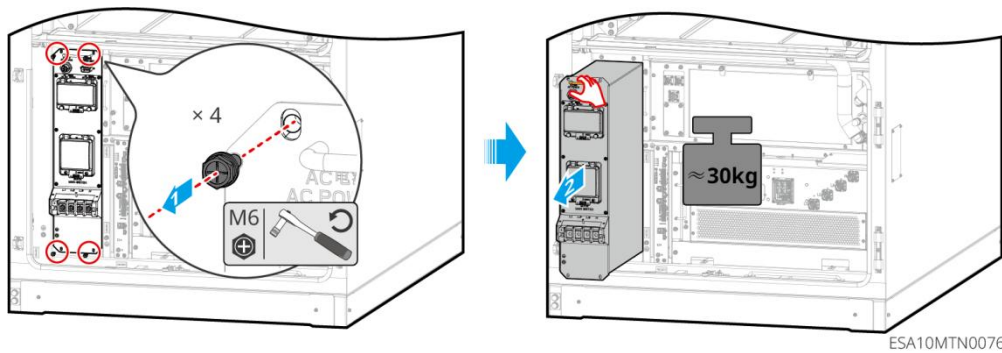
**Step 3:** Open the rear door.



**Step 4:** Unplug the 8 power cables on the rear side of the distribution box, and disconnect all fan power cables.

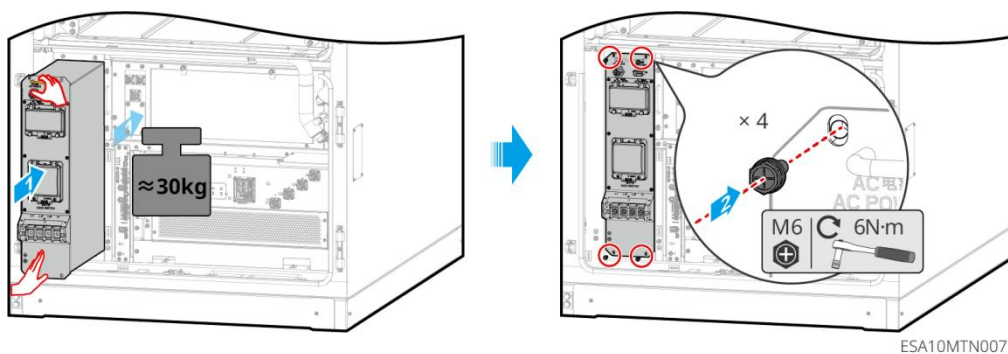


**Step 5:** Unscrew the fixing screws on the front side of the distribution box, grasp the handle, and slowly pull out the distribution box.

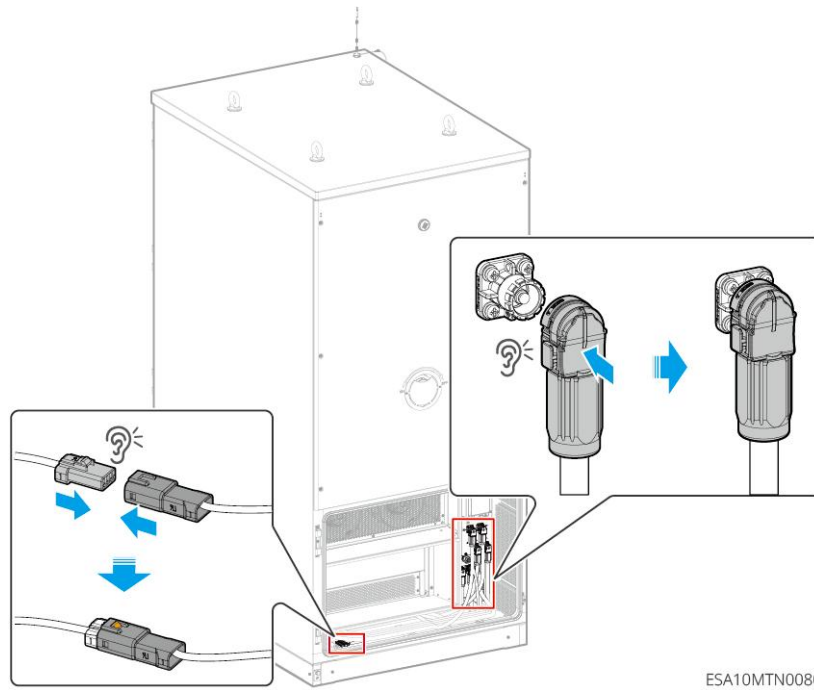


● **Installing the new distribution box**

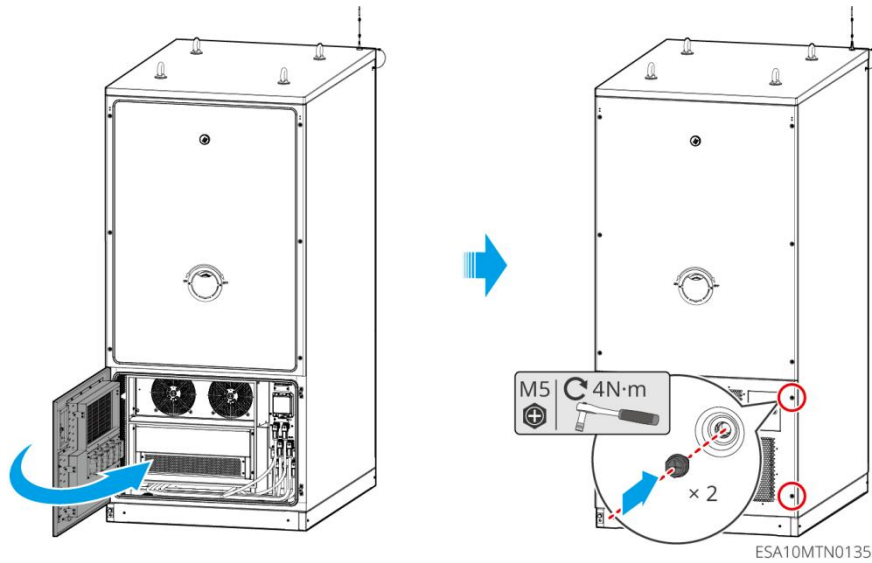
**Step 1:** Slowly push the distribution box into the all-in-one cabinet and install the fixing screws. (It is recommended to be operated by two maintenance personnel. When the distribution box is pushed in 2/3 of the way, one person grasps the lifting lugs from the front side and pushes backward, and the other person grasps the lifting lugs from the rear side and pulls backward until the distribution box is fully in place.)



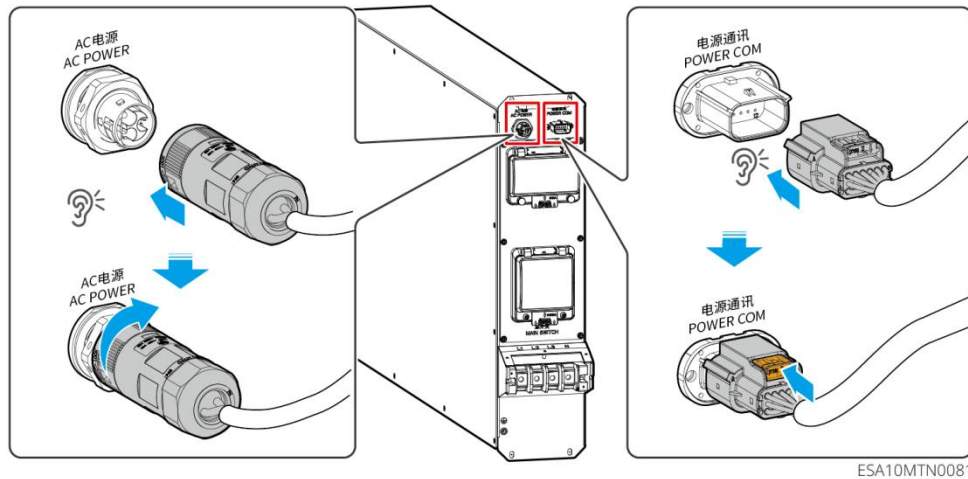
**Step 2:** Install the 8 power cables on the rear side of the distribution box, and connect all fan power cables.



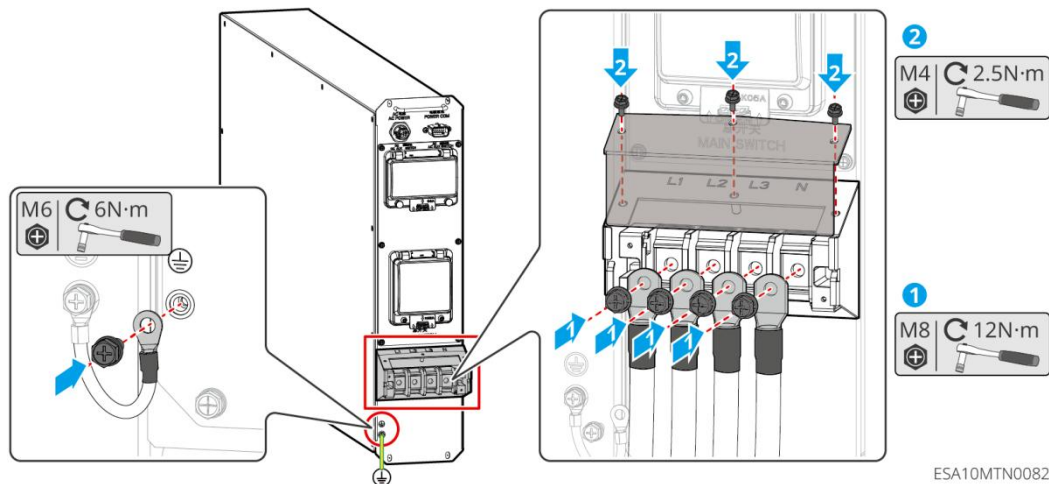
**Step 3:** Close the rear door.



**Step 4:** Connect the AC power cables and power communication cables on the front side of the distribution box.



**Step 5:** Connect the ground wires and AC cables on the front side of the distribution box, and install the AC cable protective baffle.

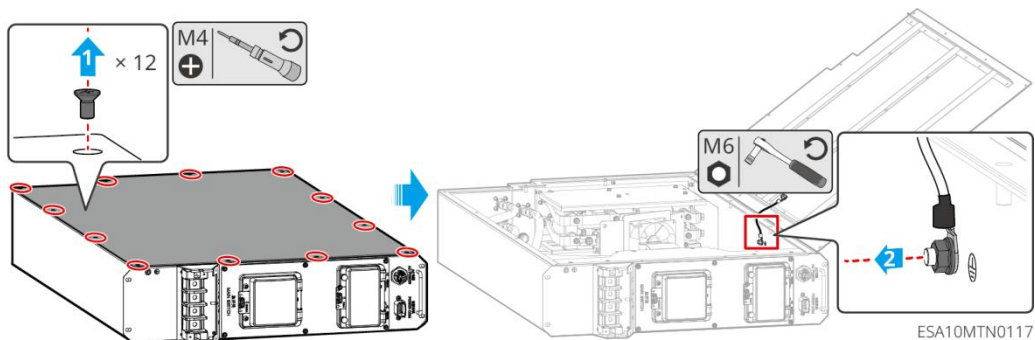


## 5.2 Replacement of the AC/DC Miniature Circuit Breaker

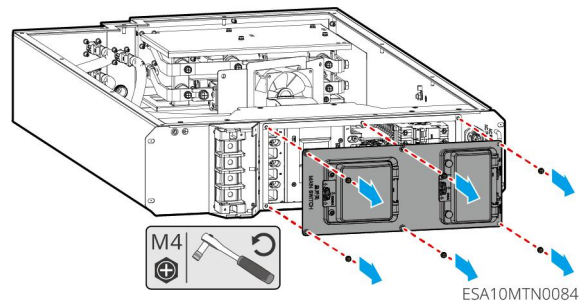
### ● Removing the old AC/DC miniature circuit breaker

**Step 1:** Remove the distribution box. For specific operations, refer to the relevant steps in [5.1 Replacing the Distribution Box](#) (Note: Place the distribution box horizontally after removal).

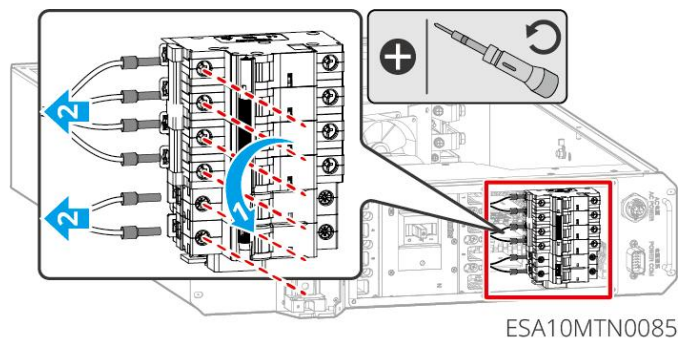
**Step 2:** Remove the upper cover plate and ground wire of the distribution box.



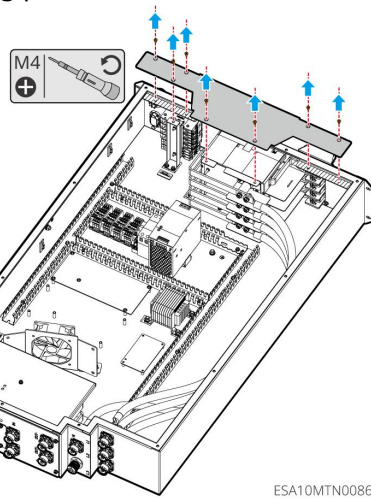
**Step 3:** Remove the front cover plate of the distribution box.



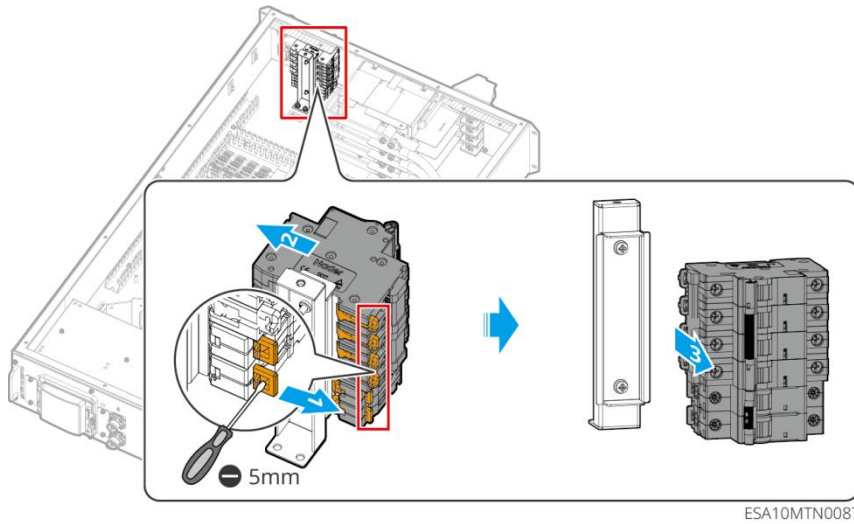
**Step 4:** Disconnect the cable connections on the AC/DC miniature circuit breaker: first loosen the screws, then unplug the tubular terminals.



**Step 5:** Remove the circuit breaker fixing plate.

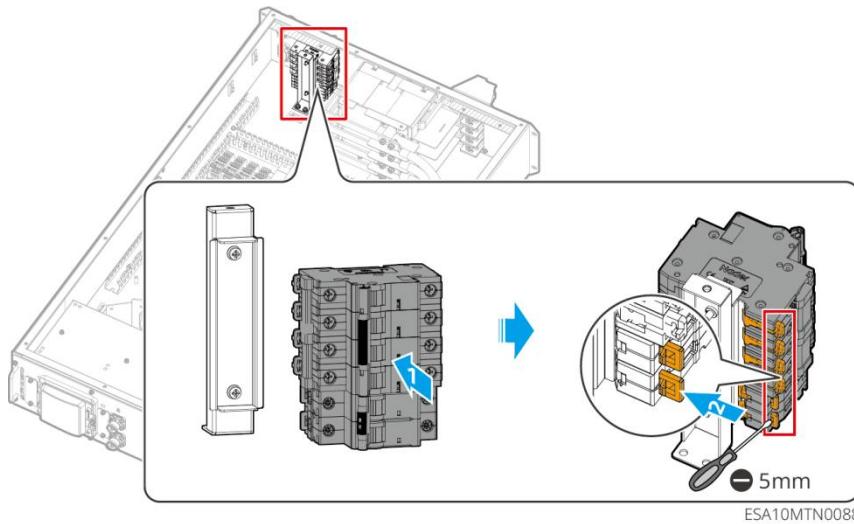


**Step 6:** Use a flat-blade insulated screwdriver to push against the lower side of the AC/DC miniature circuit breaker and pull outward, then take out the AC/DC miniature circuit breaker from the front side of the distribution box.

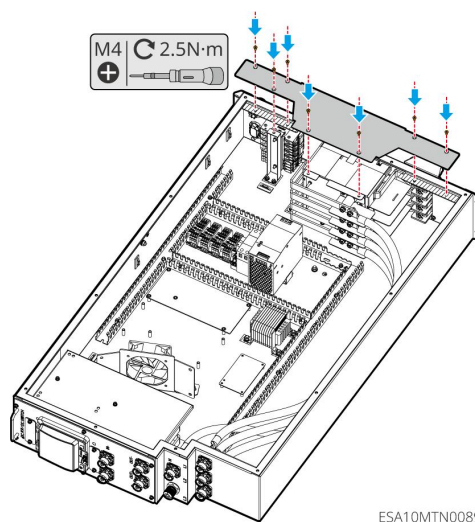


● **Installing the new AC/DC miniature circuit breaker**

**Step 1:** Put the new AC/DC miniature circuit breaker back to its original position from the front side of the distribution box and clamp it on the guide rail.

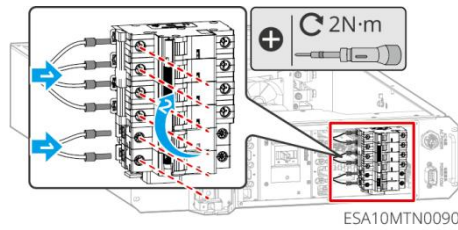


**Step 2:** Install the circuit breaker fixing plate.

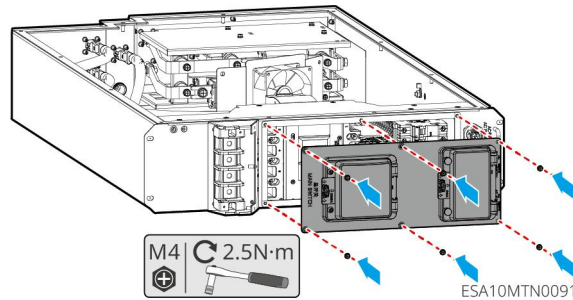


**Step 3:** Connect the cables on the AC/DC miniature circuit breaker: first insert the tubular terminals,

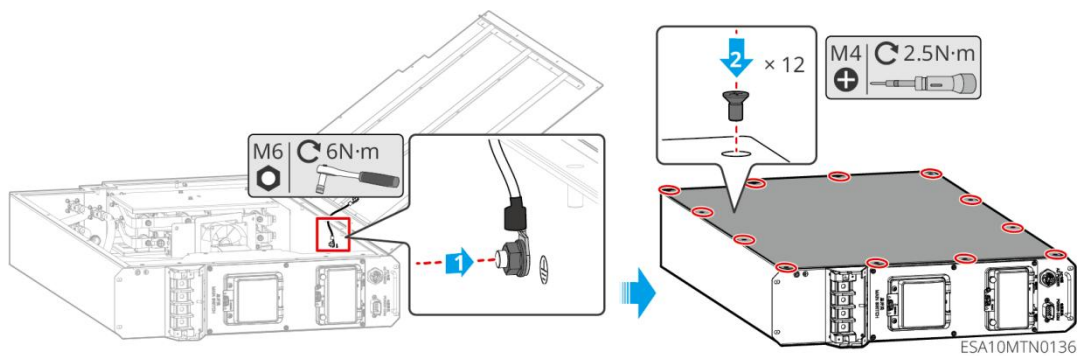
then tighten the screws.



**Step 4:** Install the front cover plate of the distribution box.



**Step 5:** Connect the ground wire of the distribution box and install the upper cover plate.



**Step 6:** Install the distribution box. For specific operations, refer to the steps for [5.1 Replacing the Distribution Box](#).

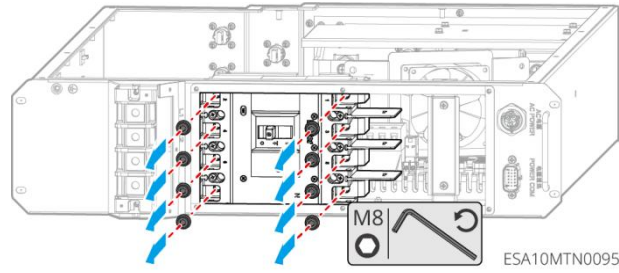
## 5.3 Replacement of the AC Molded Case Circuit Breaker

- **Removing the old AC molded case circuit breaker**

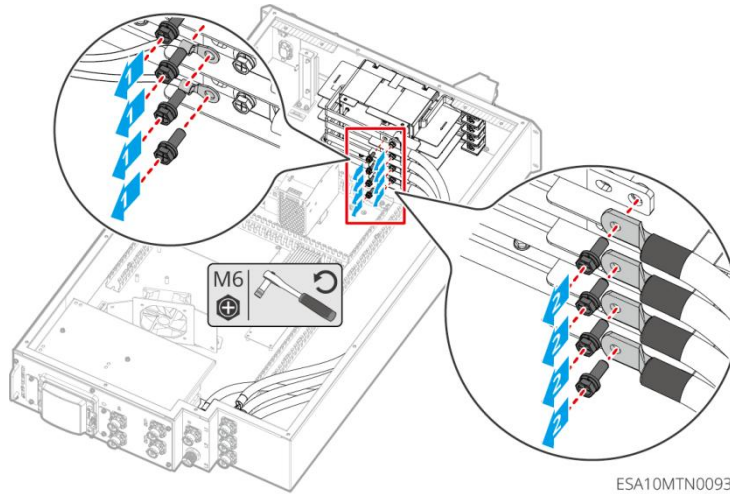
**Step 1:** Remove the distribution box. For specific operations, refer to the steps for [5.1 Replacing the Distribution Box](#) (Note: Place the distribution box horizontally after removal).

**Step 2:** Remove the front cover plate, upper cover plate, ground wire, and circuit breaker fixing plate of the distribution box. For specific operations, refer to the relevant steps in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

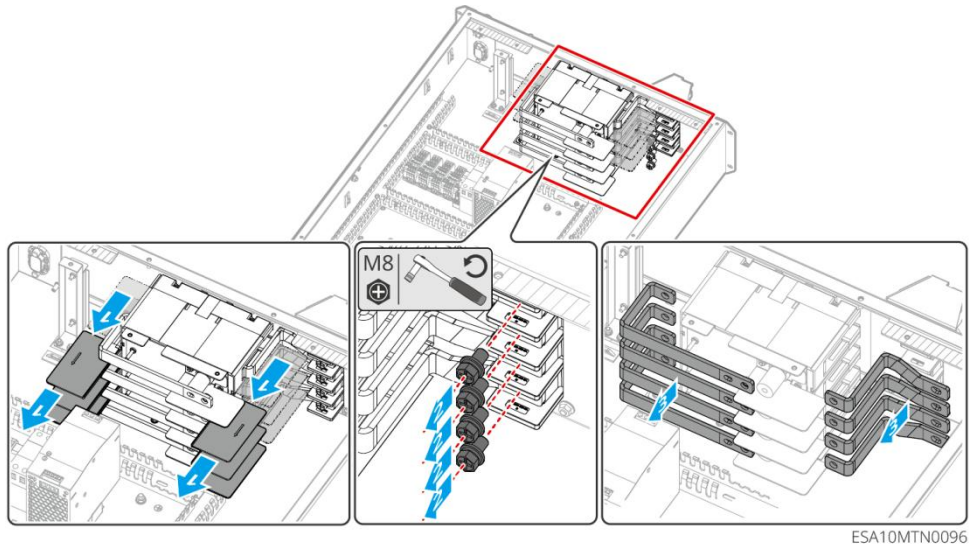
**Step 3:** Unscrew the screws of the fixed copper bars at the upper and lower incoming line terminals of the AC molded case circuit breaker.



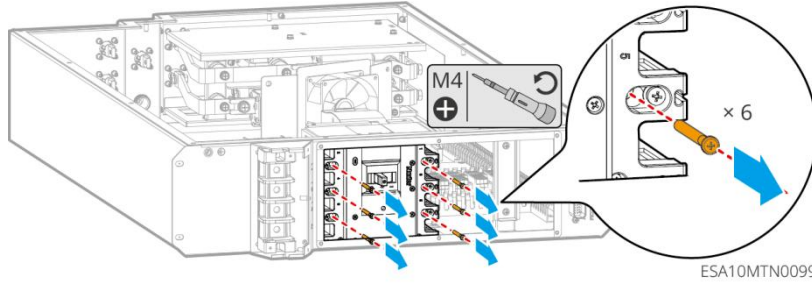
**Step 4:** Remove the screws fixing the copper bars on the AC molded case circuit breaker, and disconnect the power cable connections.



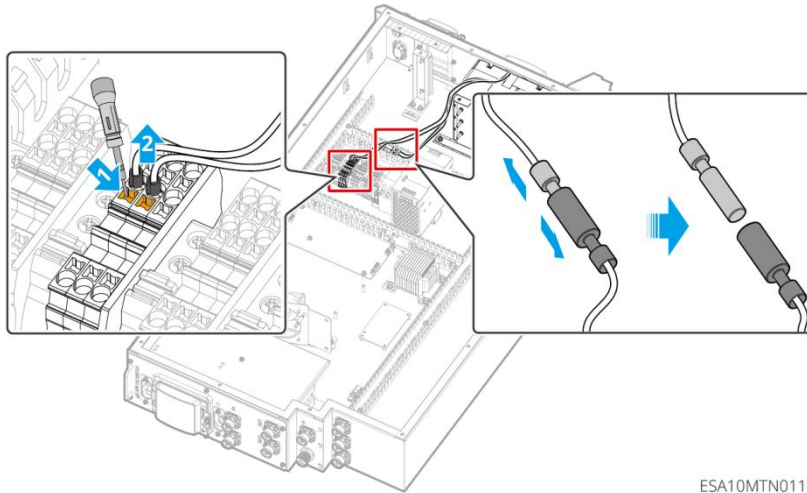
**Step 5:** Take out the partition, then remove the copper bars.



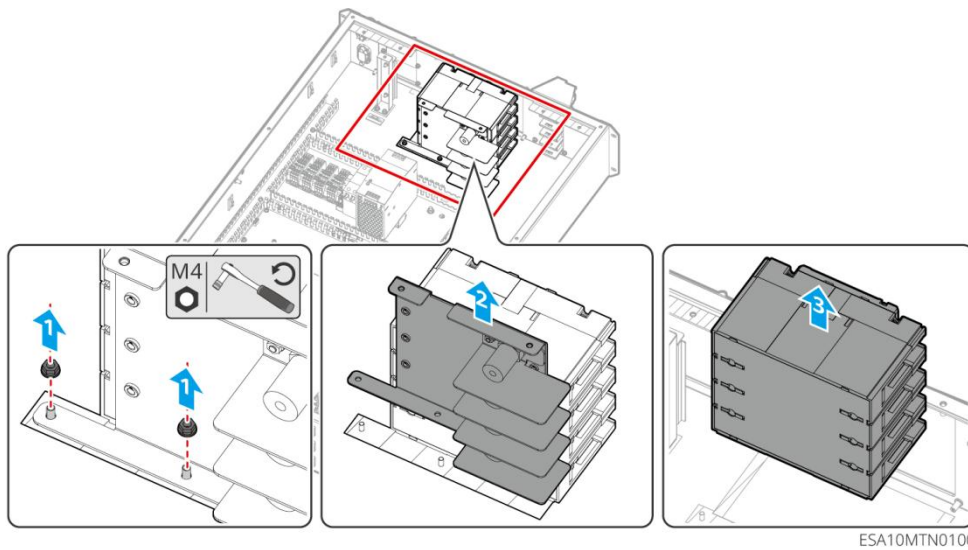
**Step 6:** Unscrew the fixing screws of the AC molded case circuit breaker.



**Step 7:** Disconnect the cable connections on the AC molded case circuit breaker.

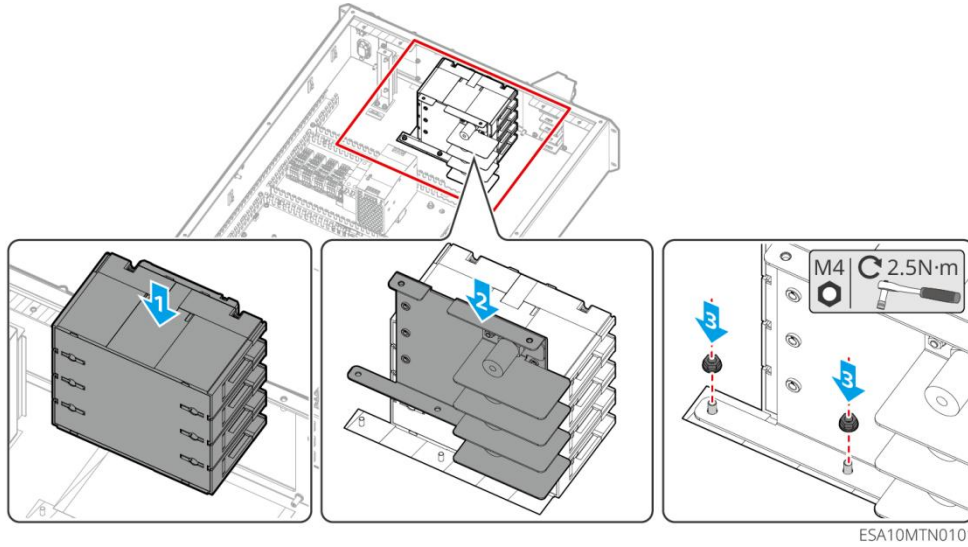


**Step 8:** Remove the circuit breaker mounting plate and take out the AC molded case circuit breaker.

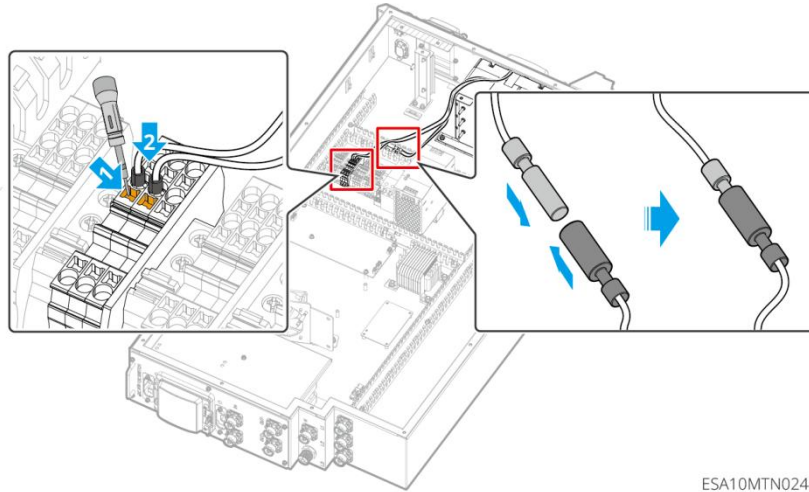


● **Installing the new AC molded case circuit breaker**

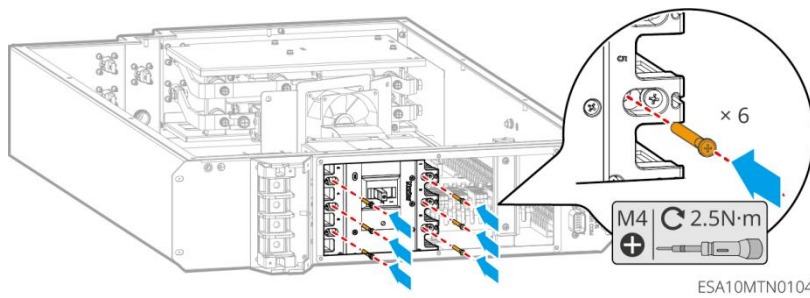
**Step 1:** Install the AC molded case circuit breaker and the circuit breaker mounting plate.



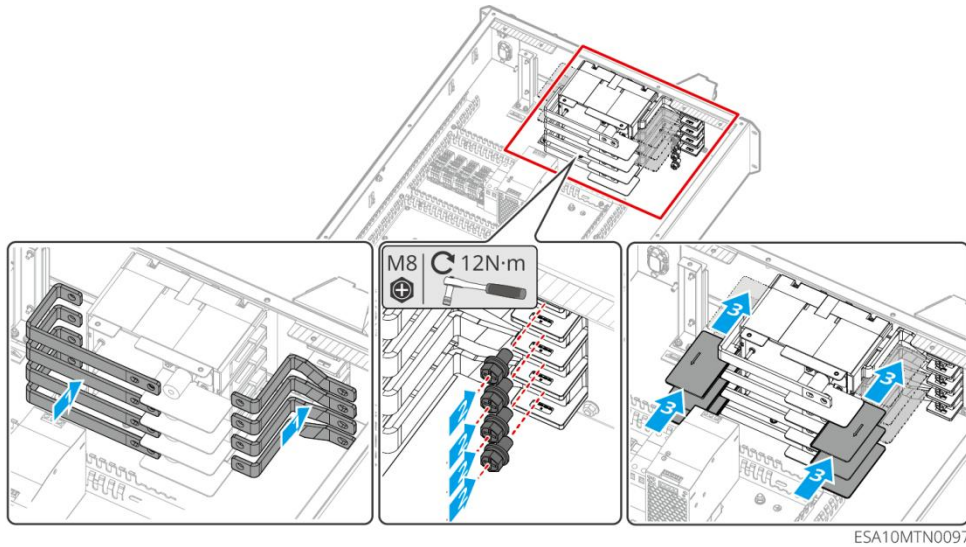
**Step 2:** Connect the cables on the AC molded case circuit breaker.



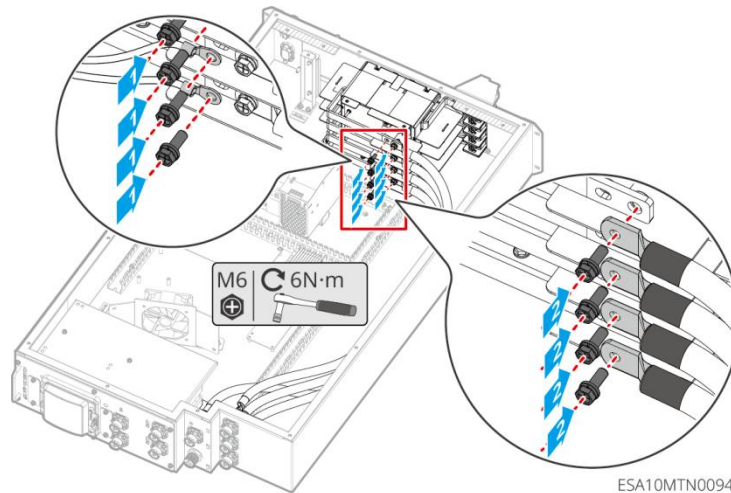
**Step 3:** Tighten the fixing screws of the AC molded case circuit breaker.



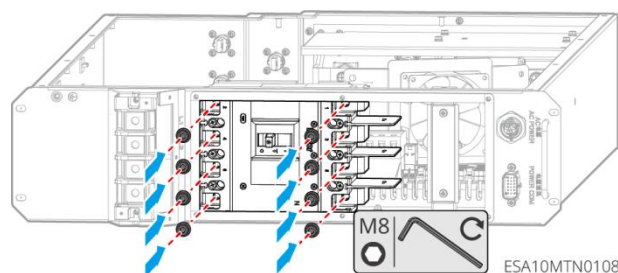
**Step 4:** Install the fixed copper bars and insert the partition.



**Step 5:** Tighten the screws fixing the copper bars on the AC molded case circuit breaker, and connect the power cables.



**Step 6:** Tighten the screws of the fixed copper bars at the upper and lower incoming line terminals of the AC molded case circuit breaker.



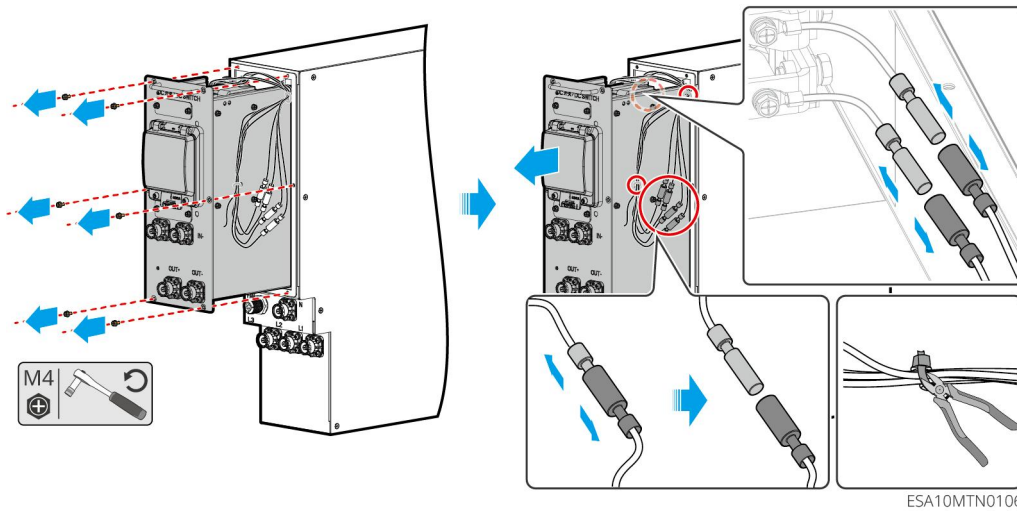
**Step 7:** Install the front cover plate, upper cover plate, ground wire, and circuit breaker fixing plate of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacing the AC/DC Miniature Circuit Breaker](#).

**Step 8:** Install the distribution box. For specific operations, refer to [5.1 Replacing the Distribution Box](#).

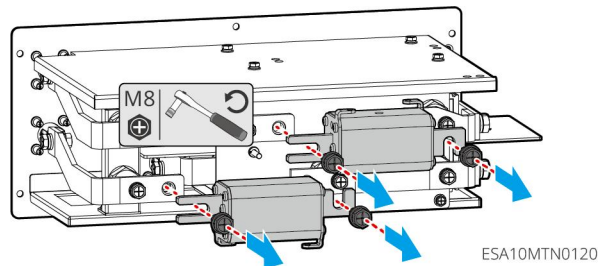
## 5.4 Replacement of DC Molded Case Circuit Breaker

### ● Dismantling the Old DC Molded Case Circuit Breaker

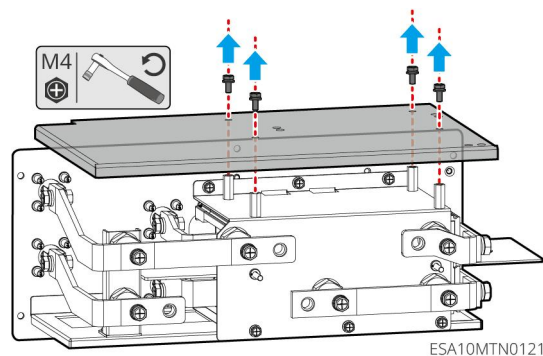
**Step 1:** Unscrew the fixing screws of the DC circuit breaker module and pull it out slowly. When pulled out by approximately two-thirds, disconnect the cable connections on the DC circuit breaker module, then take out the module completely.



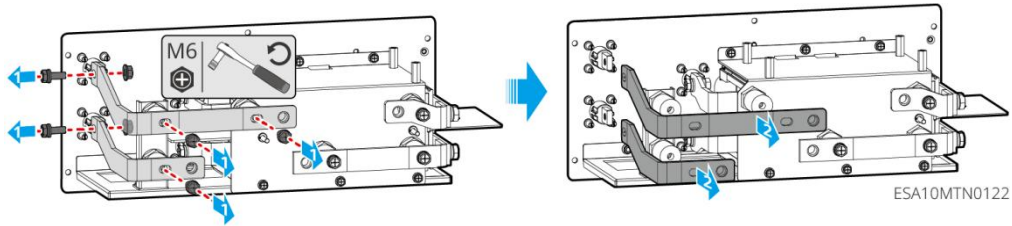
**Step 2:** Remove the fuse.



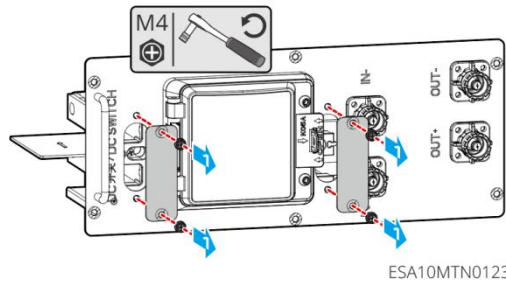
**Step 3:** Remove the PC protective shield.



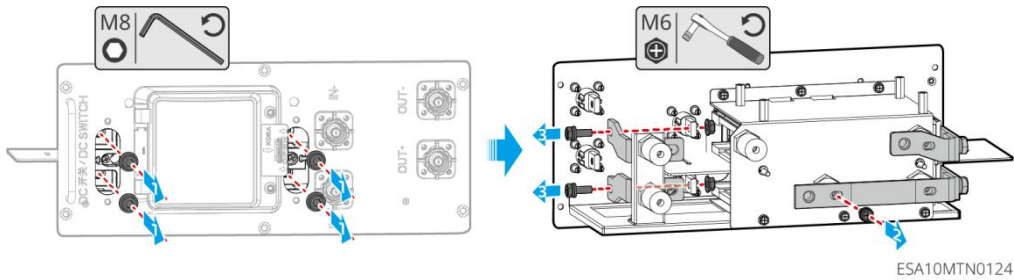
**Step 4:** Remove the left busbar.



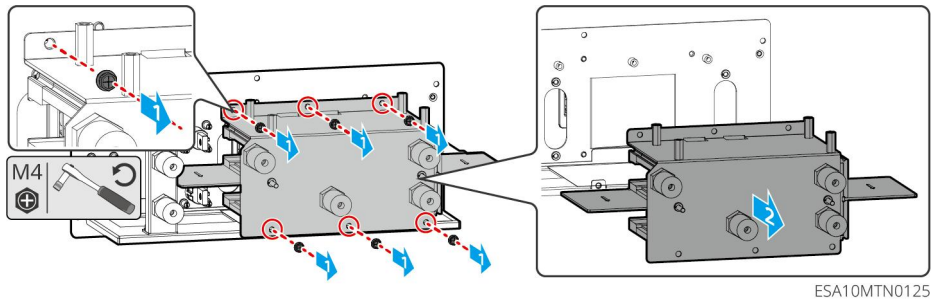
**Step 5:** Remove the two small baffles in front of the DC circuit breaker module.



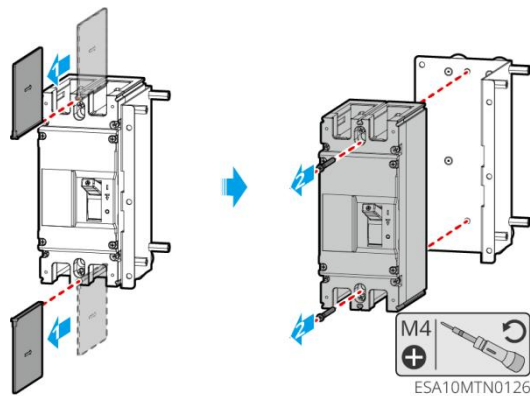
**Step 6:** Remove the middle and right busbars.



**Step 7:** Remove the mounting bracket.

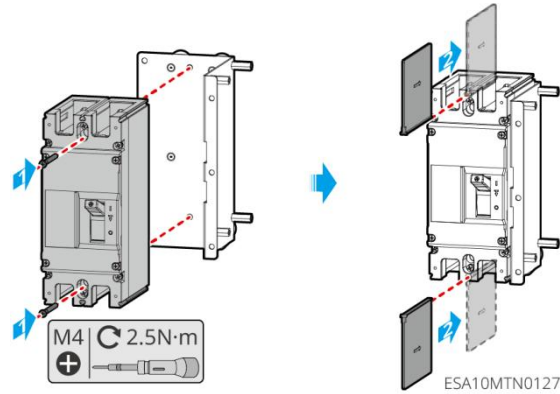


**Step 8:** Pull out the partition and remove the faulty DC circuit breaker.



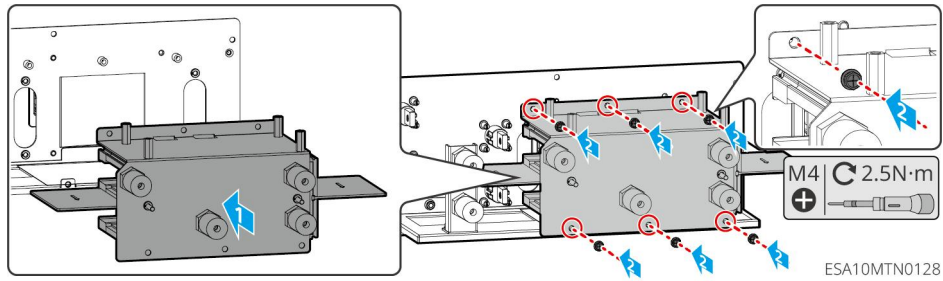
● **Installing the New DC Molded Case Circuit Breaker**

**Step 1:** Secure the DC circuit breaker to the mounting bracket and insert the partition.

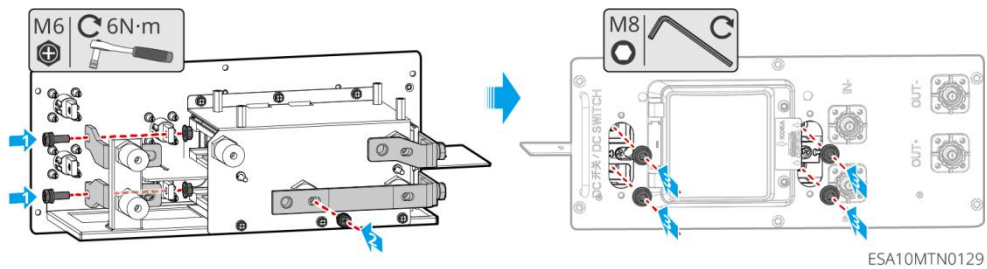


● **Installing the New DC Molded Case Circuit Breaker**

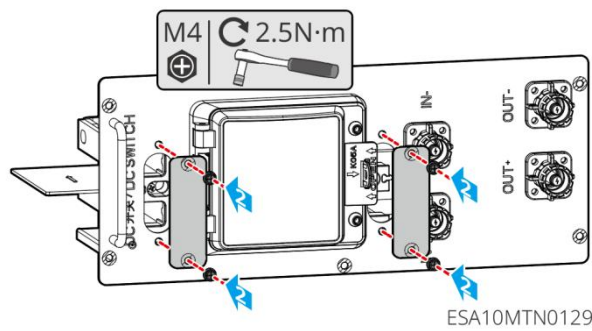
**Step 1:** Secure the DC circuit breaker to the mounting bracket and insert the partition.



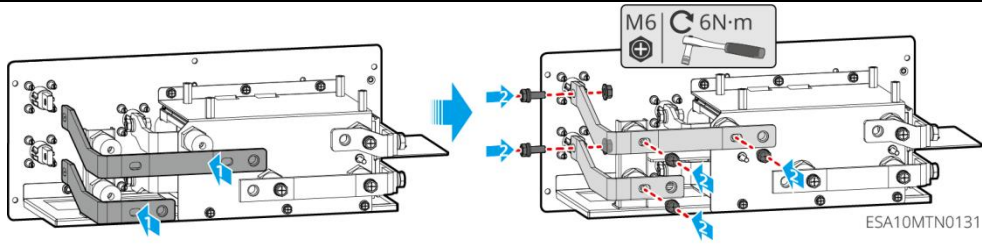
**Step 2:** Install the middle and right busbars.



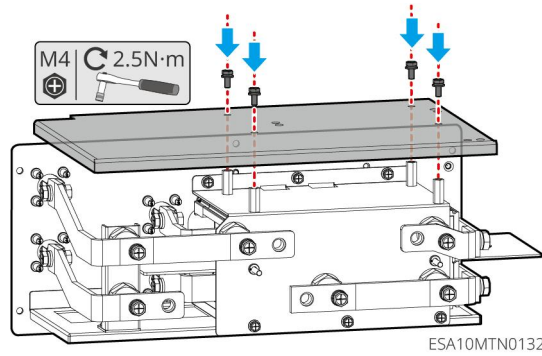
**Step 3:** Install the two small baffles in front of the DC circuit breaker module.



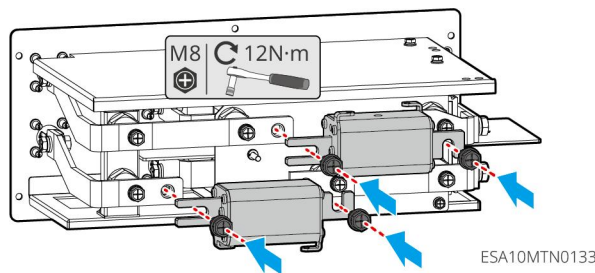
**Step 4:** Install the left busbar.



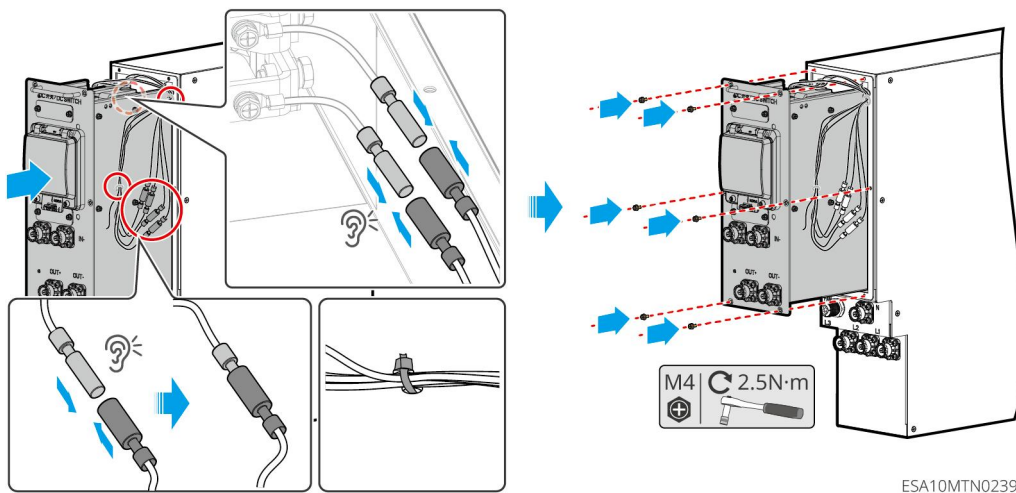
**Step 5:** Install the PC protective baffle.



**Step 6:** Install the fuse.



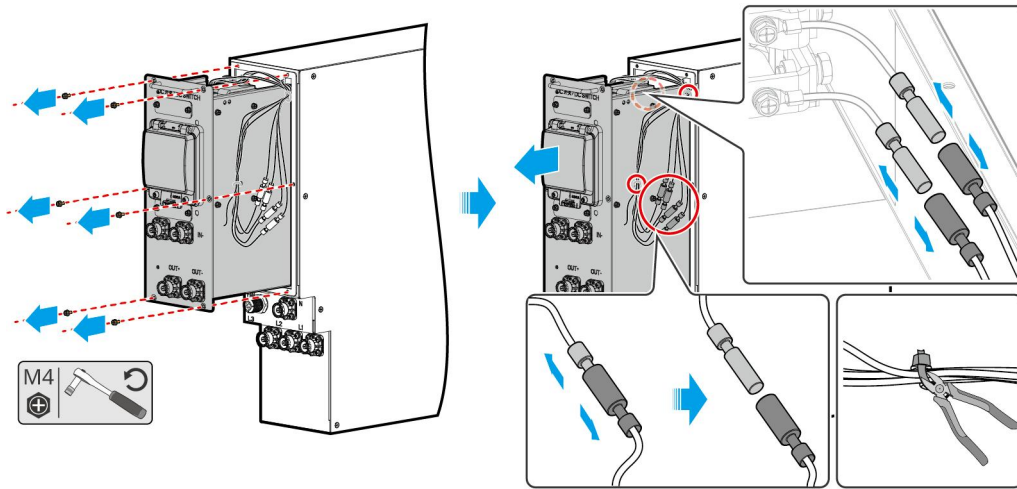
**Step 7:** Connect the cables on the DC circuit breaker module and tighten the fixing screws of the DC circuit breaker module.



## 5.5 Replacement of the Fuse

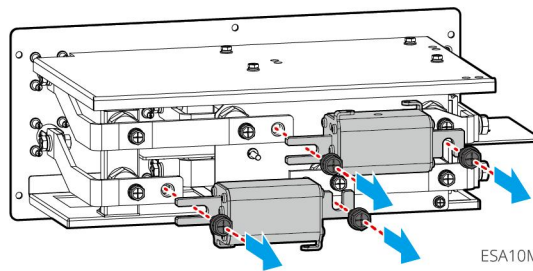
- Dismantling the Old Fuse

**Step 1:** Unscrew the fixing screws of the DC circuit breaker module and pull it out slowly. When it is pulled out by approximately two-thirds, disconnect the cable connections on the DC circuit breaker module, and then take out the module completely.



ESA10MTN0106

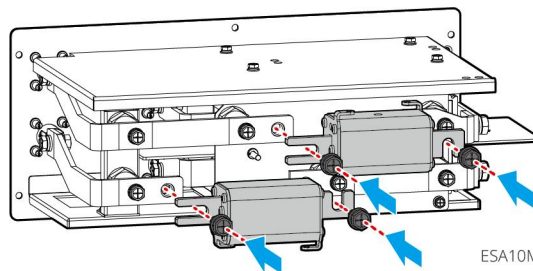
**Step 2:** Remove the fuse.



ESA10MTN0120

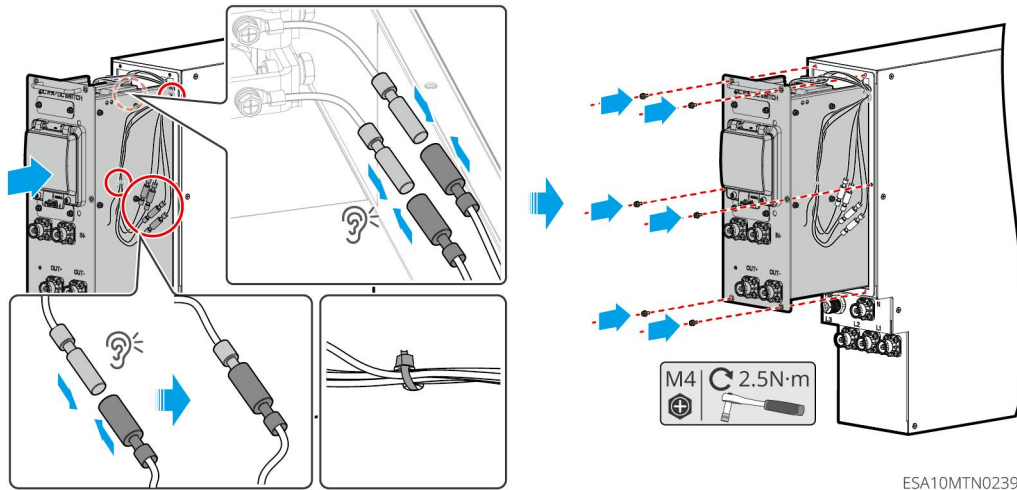
## ● Installing the New Fuse

**Step 1:** Install the new fuse.



ESA10MTN0133

**Step 2:** Connect the cables on the DC circuit breaker module and tighten the fixing screws of the DC circuit breaker module.



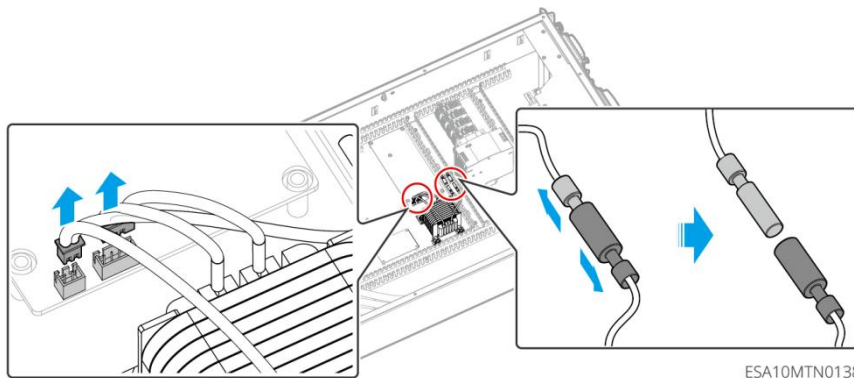
## 5.6 Replacement of the Transformer

- **Dismantling the Old Transformer**

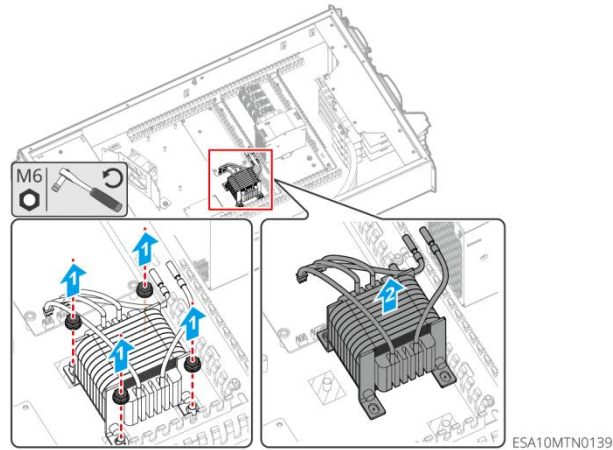
**Step 1:** Dismantle the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#) (Note: Place the distribution box horizontally after dismantling).

**Step 2:** Remove the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of AC and DC Miniature Circuit Breakers](#).

**Step 3:** Disconnect the cable connections on the transformer.

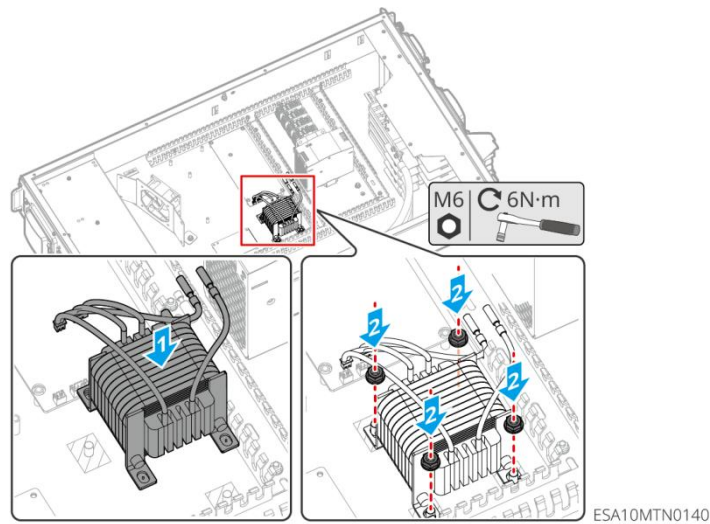


**Step 4:** Unscrew the fixing nuts of the transformer and take out the transformer.

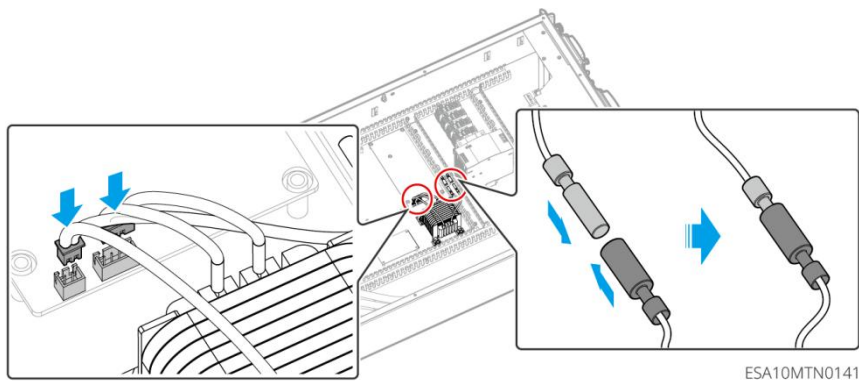


- **Installing the New Transformer**

**Step 1:** Tighten the fixing screws of the transformer.



**Step 2:** Connect the cables on the transformer.



**Step 3:** Install the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of AC/DC Miniature Circuit Breaker](#).

**Step 4:** Install the distribution box. For specific operations, refer to the [5.1 Replacement of the Distribution Box](#).

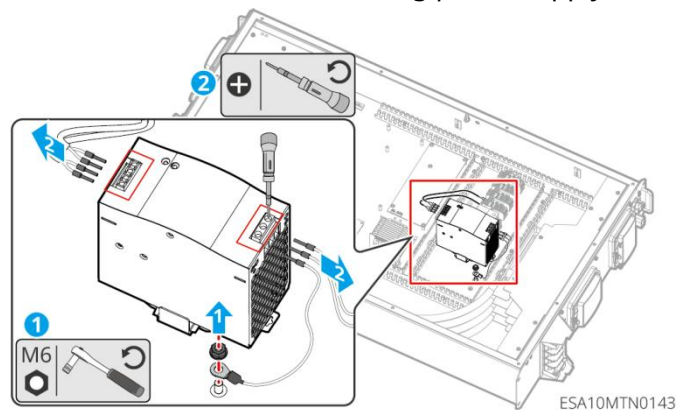
## 5.7 Replacement of the Switching Power Supply

### ● Dismantling the Old Switching Power Supply

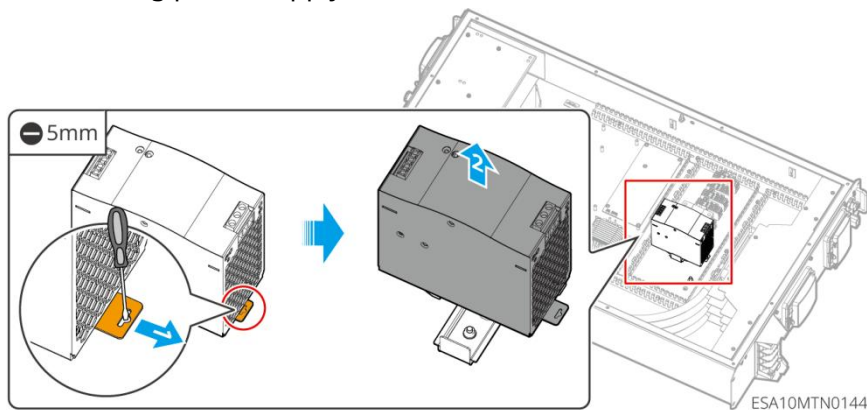
**Step 1:** Dismantle the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#) (Note: Place the distribution box horizontally after dismantling).

**Step 2:** Remove the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 3:** Disconnect all cable connections on the switching power supply.

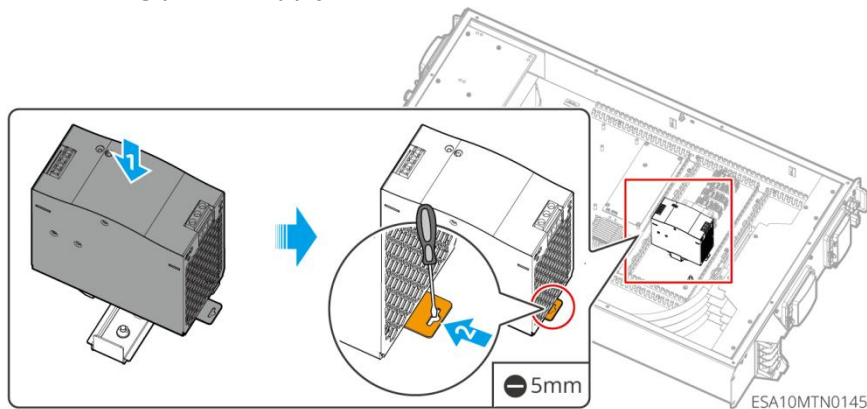


**Step 4:** Remove the switching power supply.

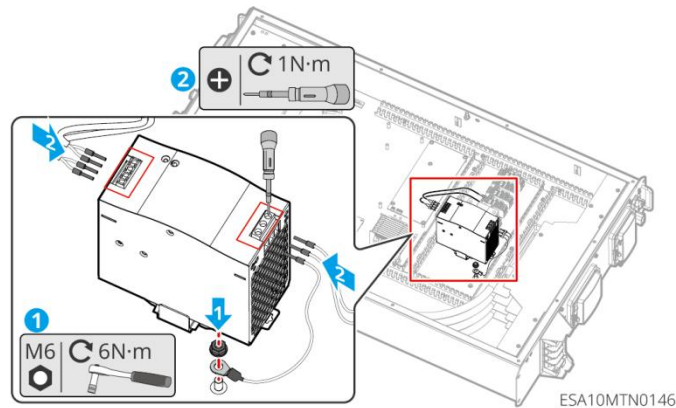


### ● Installing the New Switching Power Supply

**Step 1:** Install the switching power supply.



**Step 2:** Connect the cables on the switching power supply.



**Step 3:** Install the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 4:** Install the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#).

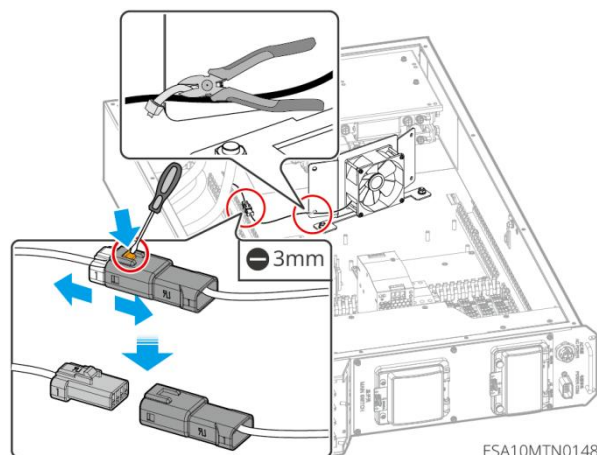
## 5.8 Replacement of the Distribution Box Cooling Fan

### ● Dismantling the Old Fan

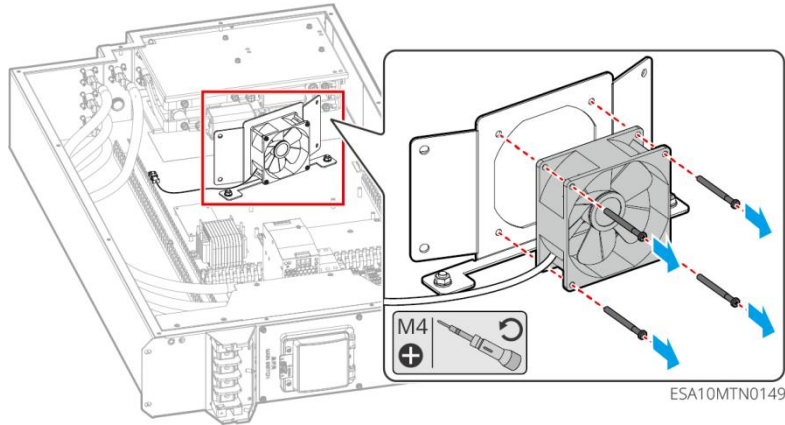
**Step1:** Dismantle the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#) (Note: Place the distribution box horizontally after dismantling).

**Step 2:** Remove the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 3:** Use wire cutters to cut the cable ties that fix the cables, and disconnect the fan's cable connections.

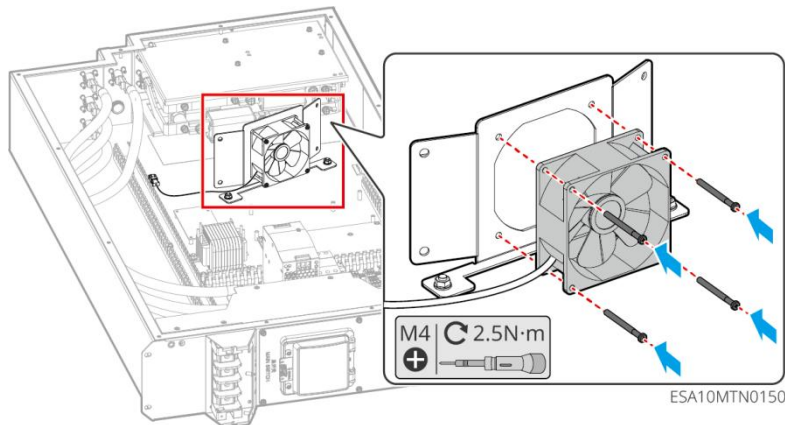


**Step 4:** Unscrew the fan's fixing screws.

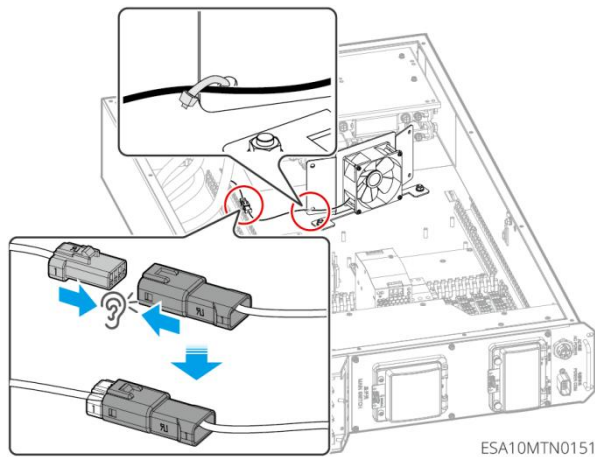


- **Installing the New Fan**

**Step 1:** Tighten the fan's fixing screws.



**Step 2:** Connect the fan cables and fix the cables with cable ties.



**Step 3:** Install the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 4:** Install the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#).

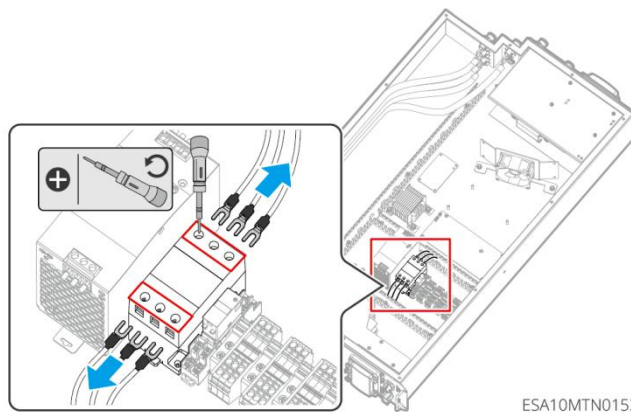
## 5.9 Replacement of the Water Leak Transmitter

### ● Dismantling the Old Water Leak Transmitter

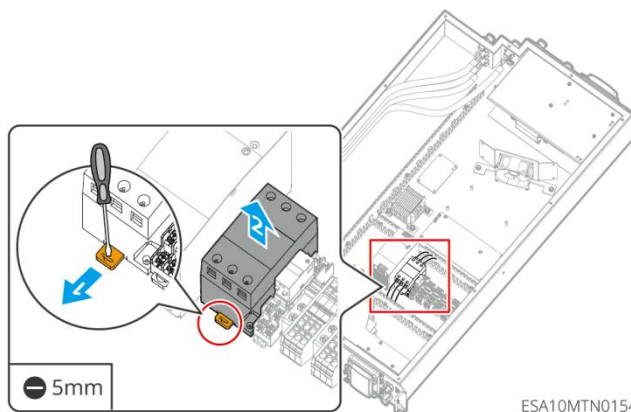
**Step 1:** Dismantle the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#) (Note: Place the distribution box horizontally after dismantling).

**Step 2:** Remove the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 3:** Disconnect the cable connections on the water leak transmitter: first loosen the screws, then take out the Y-type terminals.

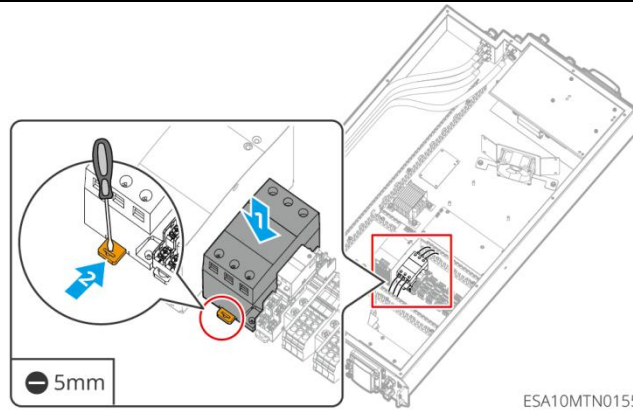


**Step 4:** Use a flat-blade insulated torque screwdriver to push against the clips of the water leak sensor and pull outward to remove the water leak transmitter.

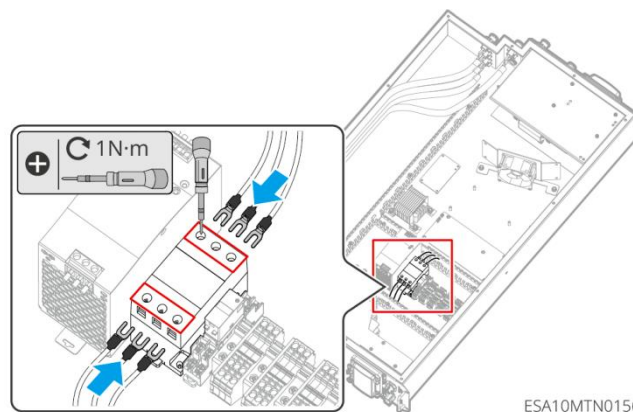


### ● Installing the New Water Leak Transmitter

**Step 1:** Install the water leak transmitter.



**Step 2:** Connect the cables on the water leak transmitter: first insert the Y-type terminals, then tighten the screws.



**Step 3:** Install the upper cover plate and ground wire of the distribution box. For specific operations, refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

**Step 4:** Install the distribution box. For specific operations, refer to the relevant content in [5.1 Replacement of the Distribution Box](#).

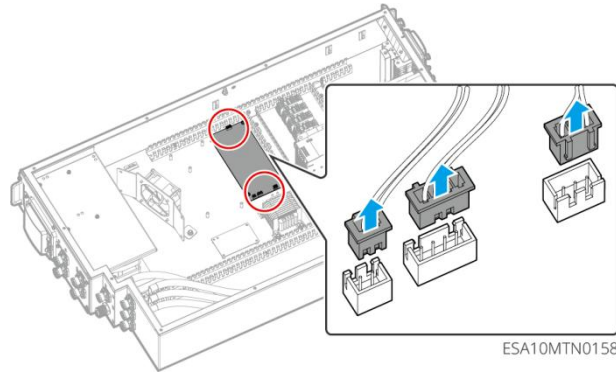
## 5.10 Replacement of the Auxiliary Power Board

### ● Dismantling the Old Auxiliary Power Board

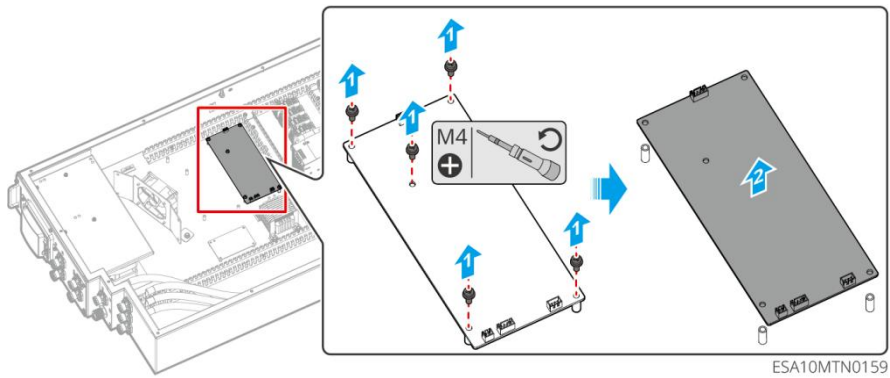
**Step 1:** Dismantle the distribution box. For specific operations, refer to the Dismantling of the old distribution box (Note: Place the distribution box horizontally after dismantling).

**Step 2:** Remove the upper cover plate and ground wire of the distribution box. For specific operations, refer to Step 2 in the Replacement of AC and DC Miniature Circuit Breakers.

**Step 3:** Disconnect the cable connections on the auxiliary power board.

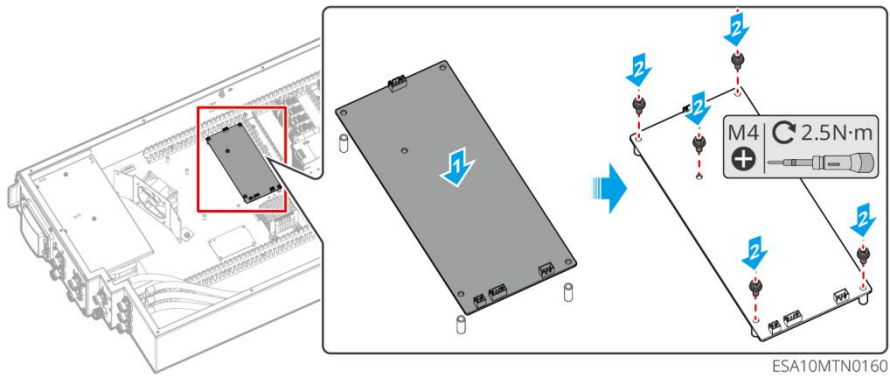


**Step 4:** Remove the auxiliary power board.

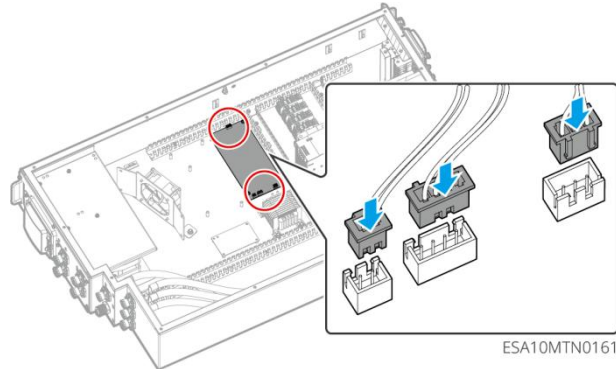


- Installing the New Auxiliary Power Board

**Step 1:** Install the new auxiliary power board.



**Step 2:** Connect the cables on the auxiliary power board.



**Step 3:** Install the upper cover plate and ground wire of the distribution box. For specific operations,

refer to the relevant content in [5.2 Replacement of the AC/DC Miniature Circuit Breaker](#).

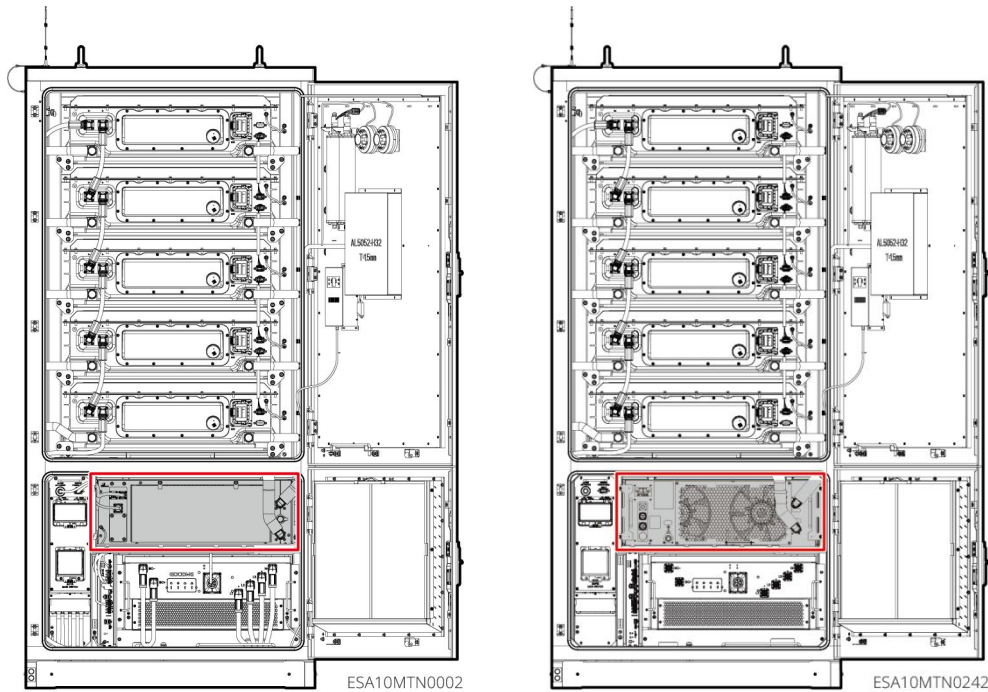
**Step 4:** Install the distribution box. For specific operations, refer to the relevant content in [5.1](#)

[Replacement of the Distribution Box](#) .

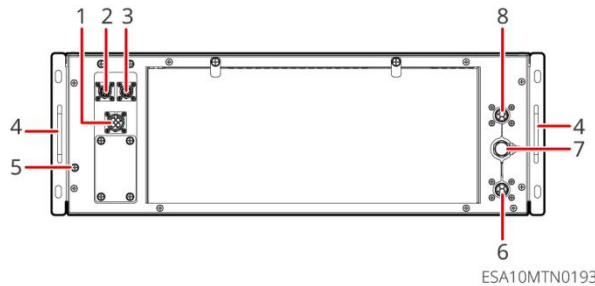
# 6 Replacement of Liquid Cooling Units and Internal Components

## Background Information

- Locations of Vertiv Liquid Cooling Units & Tonfei Liquid Cooling Units:



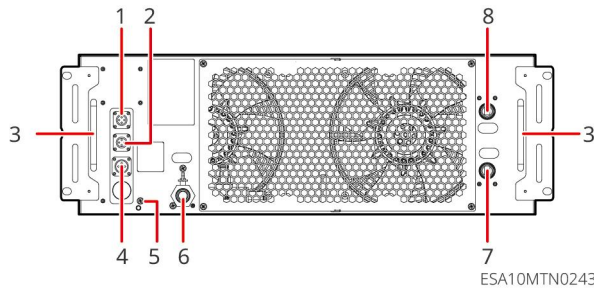
- Introduction to Vertiv Liquid Cooling Units:



No.	Description	No.	Description
1	Power Port	2	Debug Port
3	Communication Port	4	Handle

5	Grounding Point	6	Water Outlet
7	Make-up/Drain Port	8	Water Inlet

### ● Introduction to Tongfei Liquid Cooling Unit:



No.	Description	No.	Description
1	Debug Port	2	Communication Port
3	Handle	4	Power Port
5	Grounding Point	6	Make-up/Drain Port
7	Liquid Inlet	8	Liquid Outlet

### Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- At least 3 personnel are required for replacing the liquid cooling unit.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	Size 7 (M4), Size 10 (M6), with extension rod $\geq 80\text{mm}$	Prepared by the user
Flat-Blade Insulated Screwdriver	5mm	Prepared by the user
Phillips Insulated Torque Screwdriver	M4	Prepared by the user
Vacuum Gauge	-	Provided by the manufacturer during replacement
Vacuum Pump	-	Provided by the manufacturer during replacement
Pressure Gauge	-	Provided by the manufacturer during replacement
Liquid Filling/Draining Tool	-	Provided by the manufacturer during replacement
Coolant	-	Provided by the manufacturer

Tool Name	Tool Specification	Acquisition Method
		during replacement
Storage Bucket	≥20L	Self-prepared

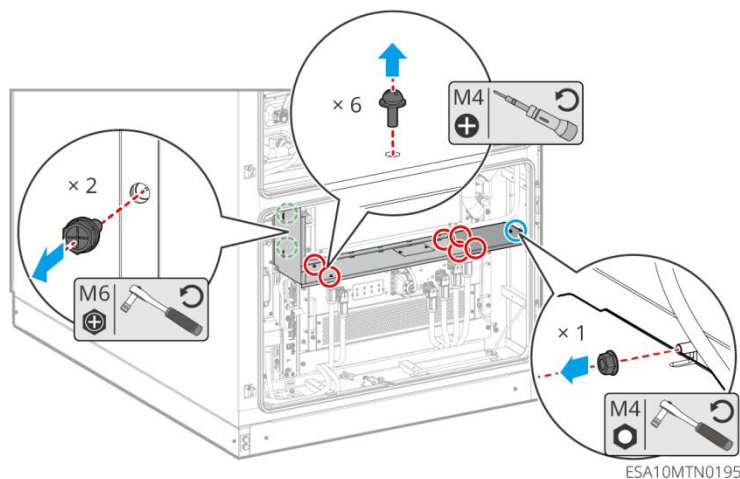
## 6.1 Replacement of Liquid Cooling Units

### NOTICE

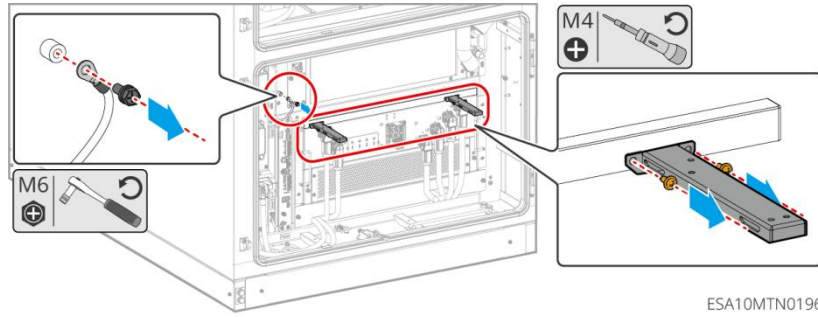
- The liquid cooling unit must be kept in an upright position during transportation and handling. Laying it flat or upside down is strictly prohibited.
- Do not allow the coolant to come into contact with soil or flow into drainage ditches. For transfer or storage, use transportation tools, recovery devices, treatment or storage equipment approved by authoritative departments. Heating empty containers may cause explosions.
- The coolant is irritating and slightly toxic. Wear personal protective equipment during operation.
- This chapter takes the replacement of Vertiv liquid cooling units as an example. The replacement steps for Tonfei liquid cooling units are similar.

### ● Dismantling the Old Liquid Cooling Unit

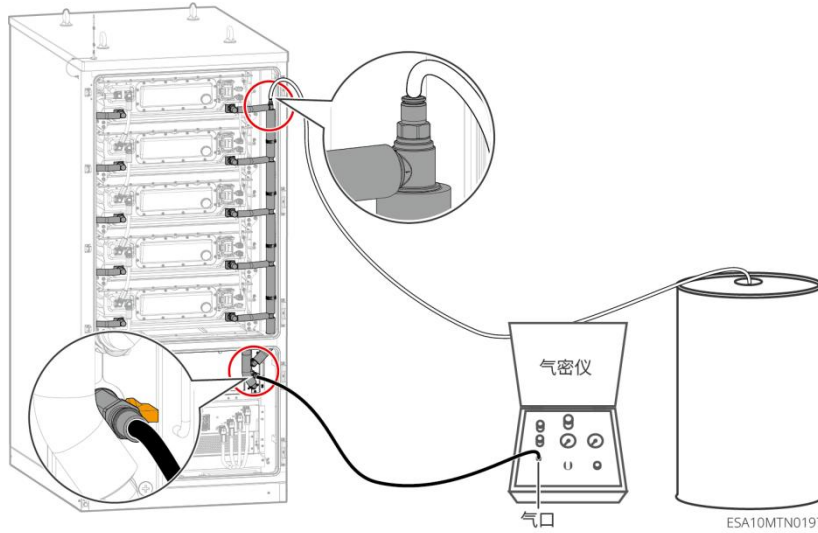
**Step 1:** Remove the front wind deflector.



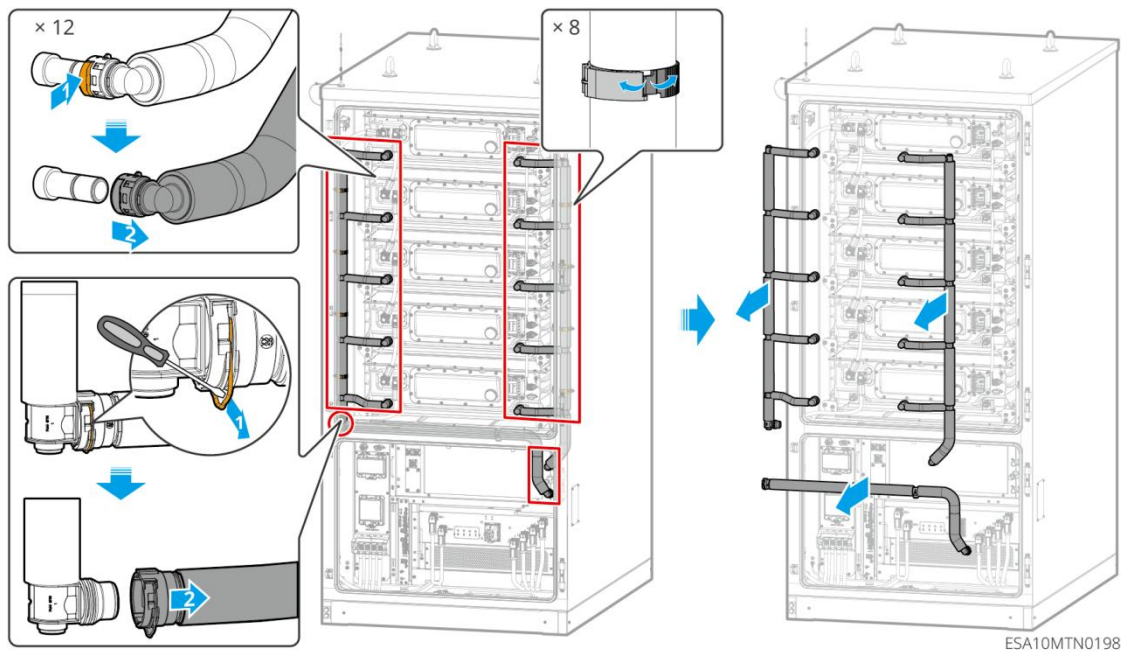
**Step 2:** Remove the ground wire and the front wind deflector bracket.



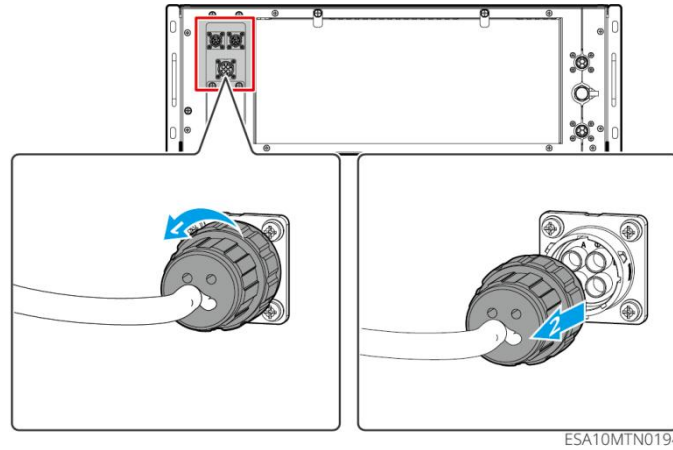
**Step 3:** Drain the coolant from the entire cabinet.



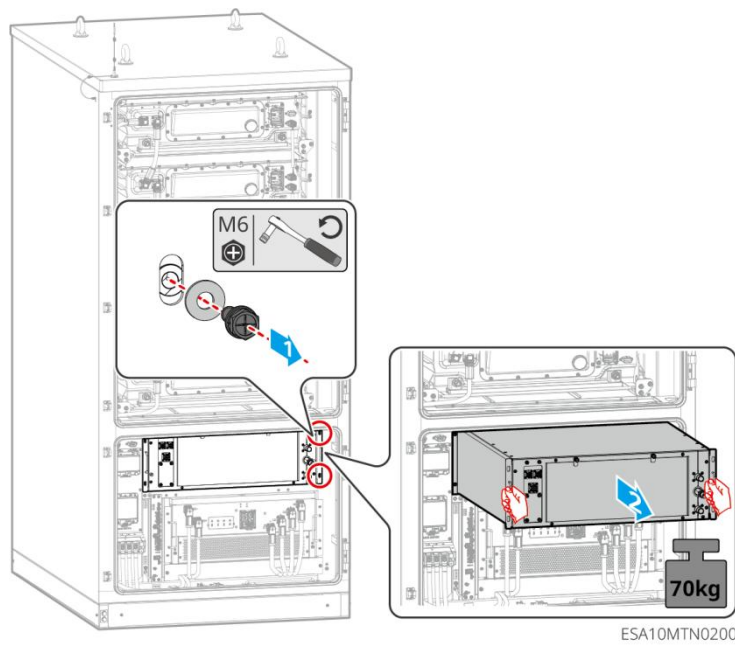
**Step 4:** Remove the liquid cooling pipes.



**Step 5:** Disconnect all cable connections on the liquid cooling unit.

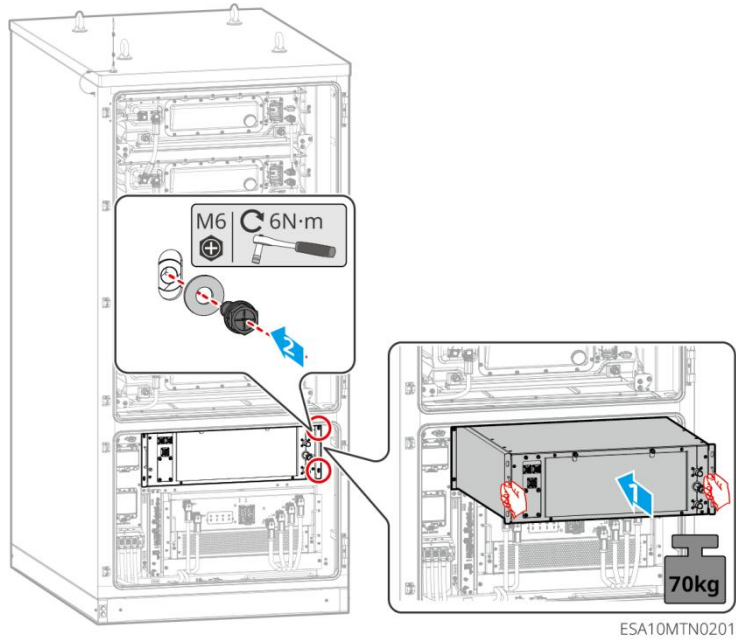


**Step 6:** Unscrew the fixing screws of the liquid cooling unit and take out the unit.

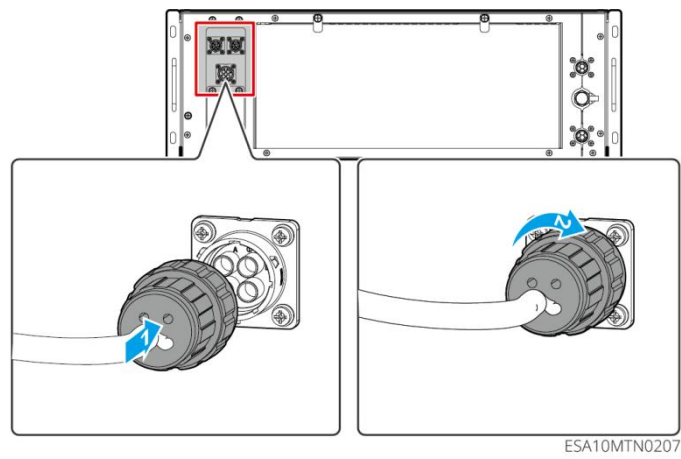


- **Installing the New Liquid Cooling Unit**

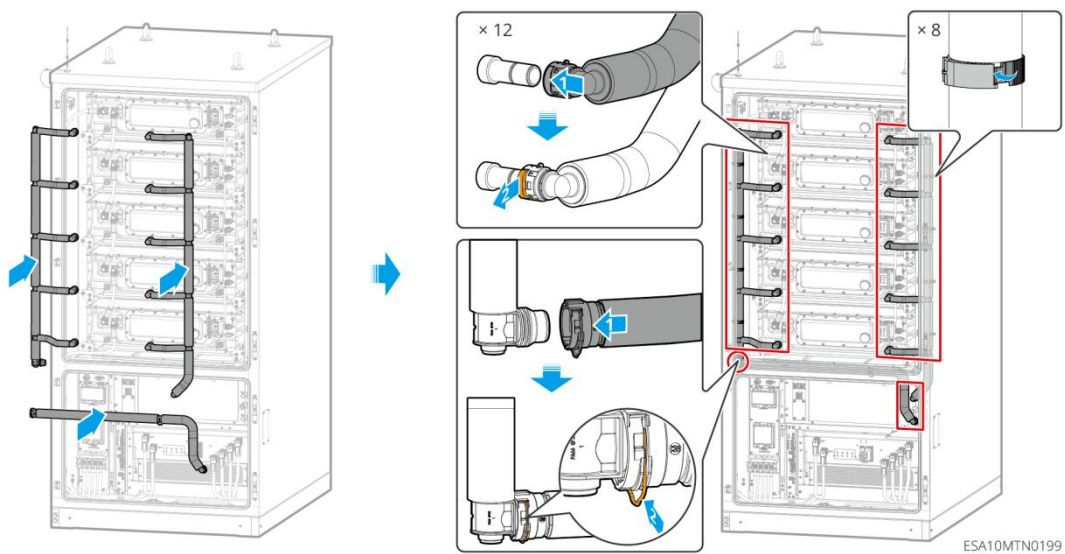
**Step 1:** Place the new liquid cooling unit back to its original position and tighten the fixing screws.



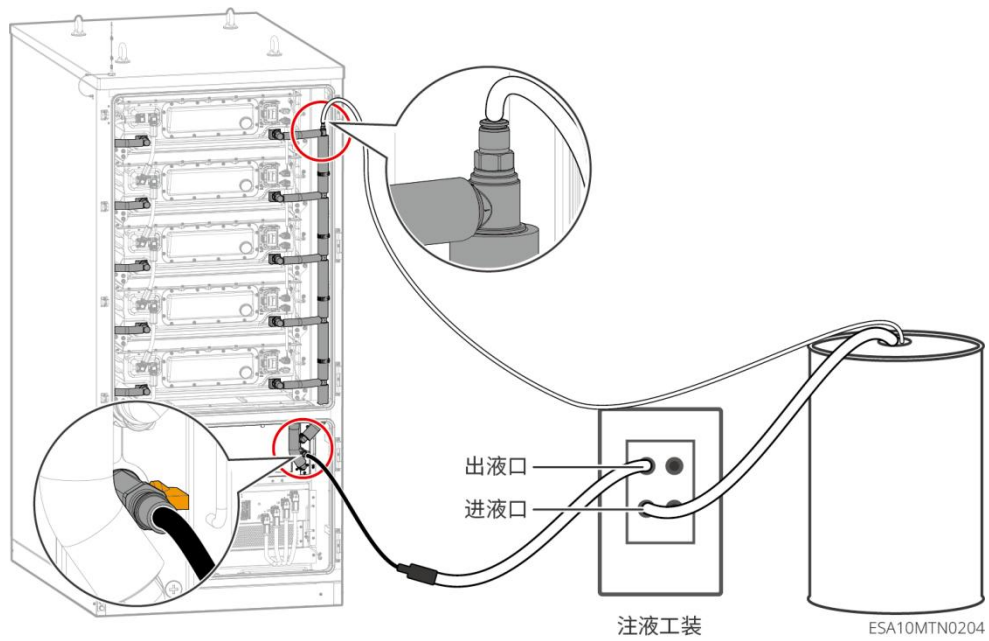
**Step 2:** Connect the cables on the liquid cooling unit.



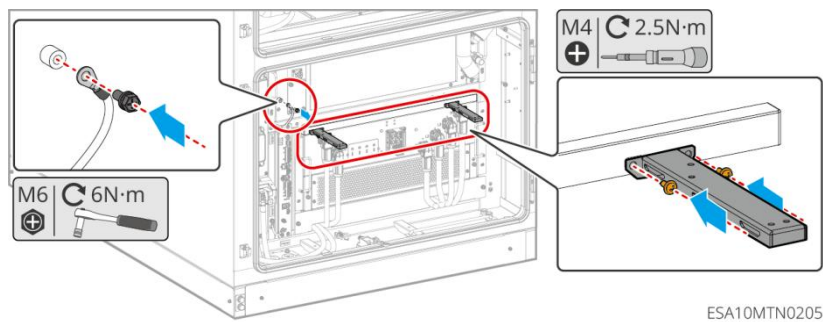
**Step 3:** Install the liquid cooling pipes.



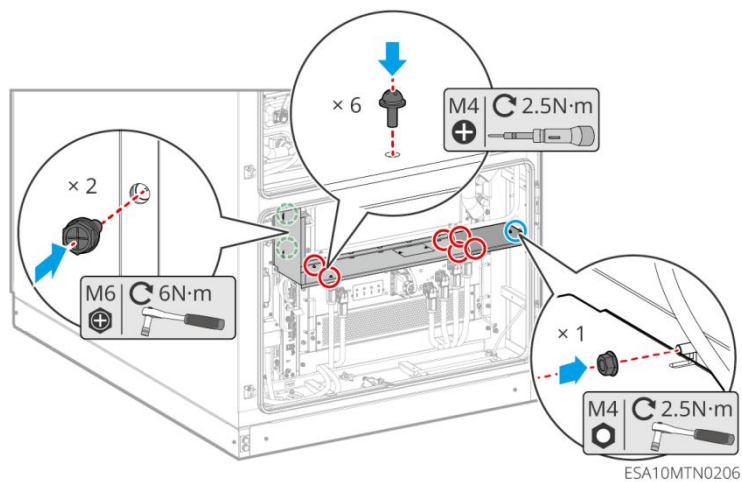
**Step 4:** Inject the cooling liquid.



**Step 5:** Install the front wind deflector bracket and connect the ground wire.



**Step 6:** Install the front wind deflector.



**Step 7:** Contact GoodWe after-sales service to set the operation mode of the liquid cooling unit.

## 6.2 Replacement of Internal Components of Liquid Cooling Units

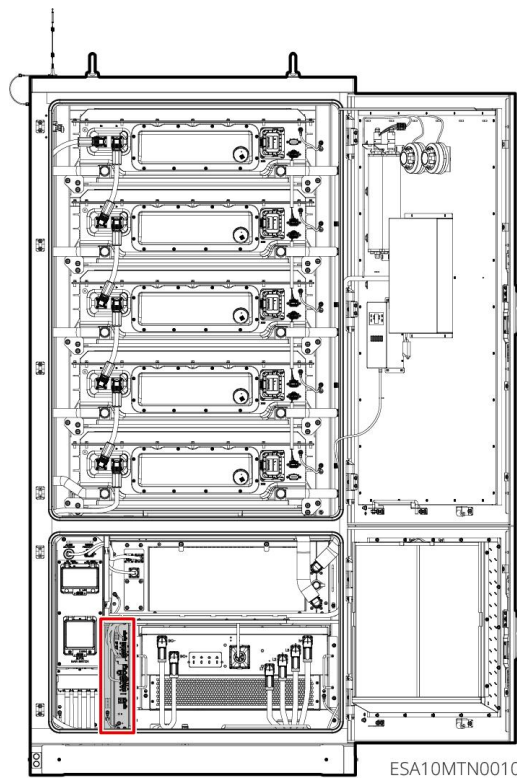
Please refer to the user manual of the corresponding liquid cooling unit:

- User Manual for Vertiv Liquid Cooling Units: EMW30&50 Drawer-Type Air-Cooled Chillers
- User Manual for Tonfei Liquid Cooling Units: LCI-50CR-21A4Z3-1227 Instruction Manual

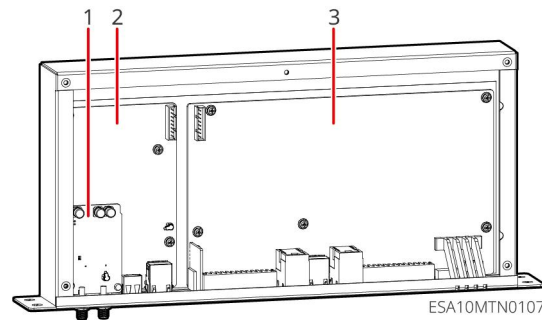
# 7 Replacement of EMS Main Control Box and Its Internal Components

## Background Information

- Location of the EMS Main Control Box:



- Introduction to Internal Components of the EMS Main Control Box:



No.	Description
1	4G Board (Domestic Use Only)
2	Cloud Board
3	LC Board

## Prerequisites

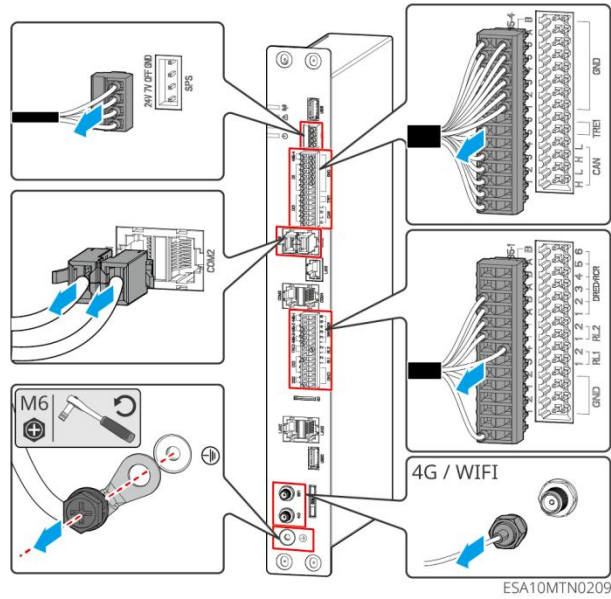
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing components of the EMS Main Control Box.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Phillips Insulated Torque Screwdriver	M4	Prepared by the user
Insulated Torque Socket Wrench	Size 10 (M6)	Prepared by the user
SIM Eject Tool	-	Prepared by the user

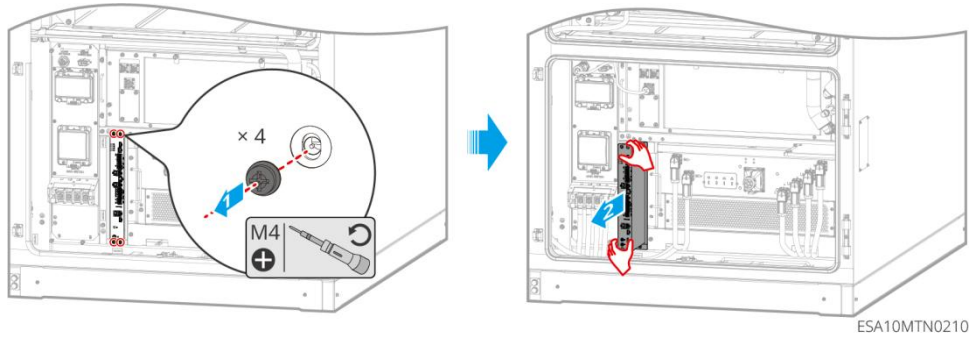
## 7.1 Replacement of the EMS Control Box

- **Dismantling the Old EMS Control Box**

**Step 1:** Disconnect all cable connections on the EMS Control Box and keep proper records.

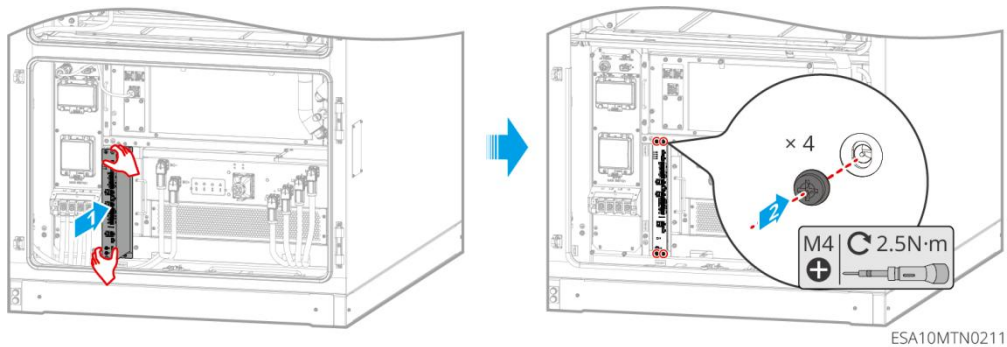


**Step 2:** Unscrew the fixing screws of the EMS Control Box and take out the box.



● **Installing the New EMS Control Box**

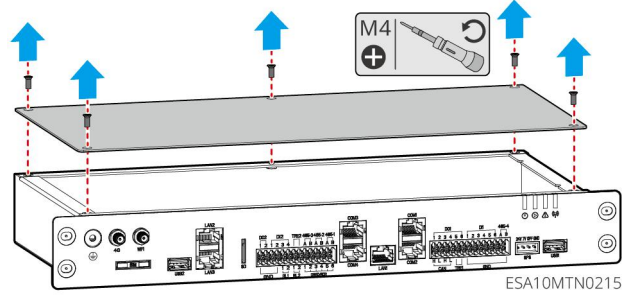
**Step 1:** Place the EMS Control Box back to its original position and tighten its fixing screws.



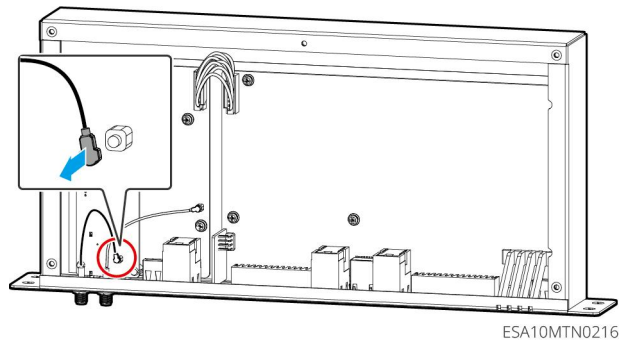
**Step 2:** Connect the cables on the EMS Control Box.



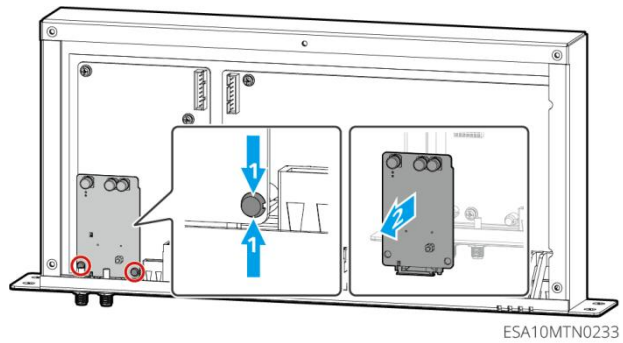
**Step 2:** Unscrew the fixing screws on the upper cover of the EMS control box.



**Step 3:** Disconnect the 4G antenna.

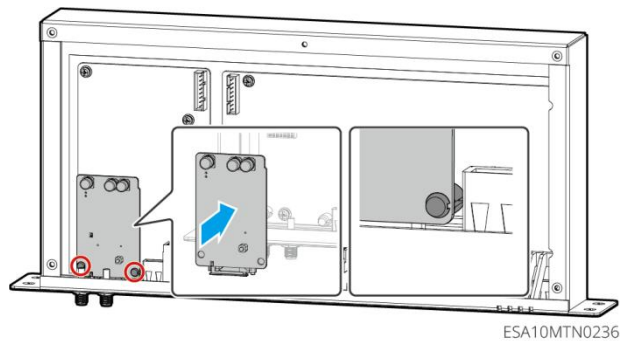


**Step 4:** Remove the old 4G Board.

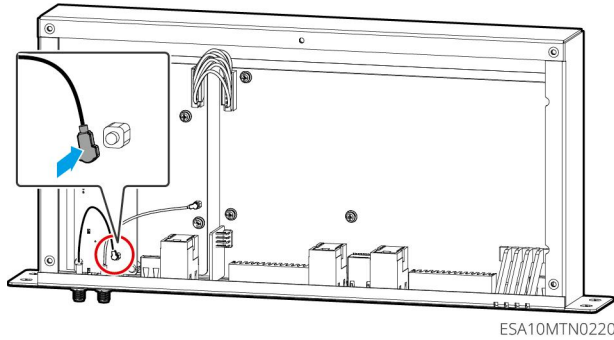


- Installing the New 4G Board

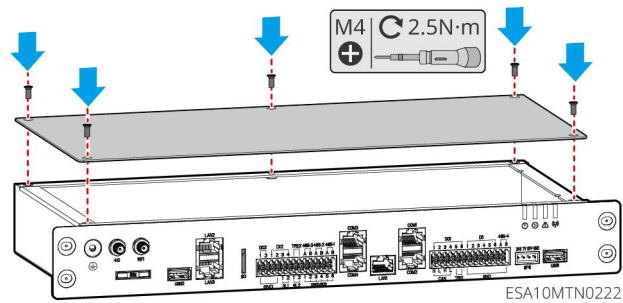
**Step 1:** Install the new 4G Board.



**Step 2:** Connect the 4G antenna.



**Step 3:** Tighten the fixing screws on the upper cover plate of the EMS Control Box.



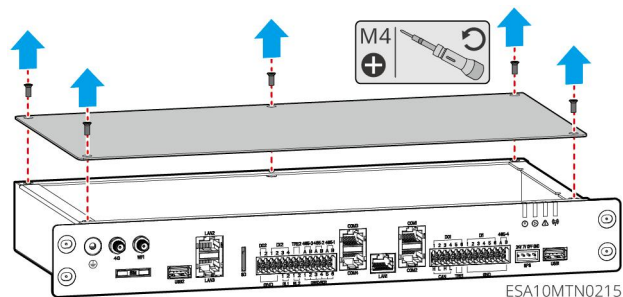
**Step 4:** Install the EMS Control Box. For specific operations, refer to the [7.1 Replacement of the EMS Control Box](#).

## 7.4 Replacement of the Cloud Board

- Removing the Old Cloud Board

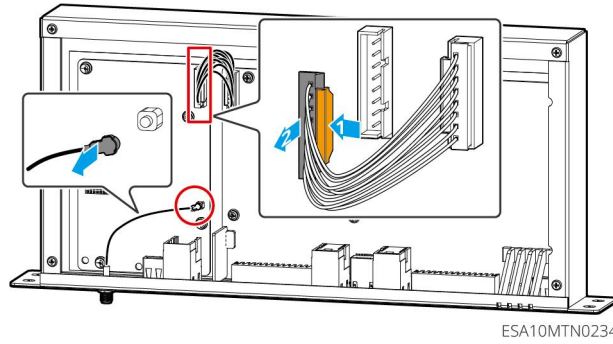
**Step 1:** Remove the EMS Control Box. For specific operations, refer to [7.1 Replacement of the EMS Control Box](#).

**Step 2:** Unscrew the fixing screws on the upper cover plate of the EMS Control Box.

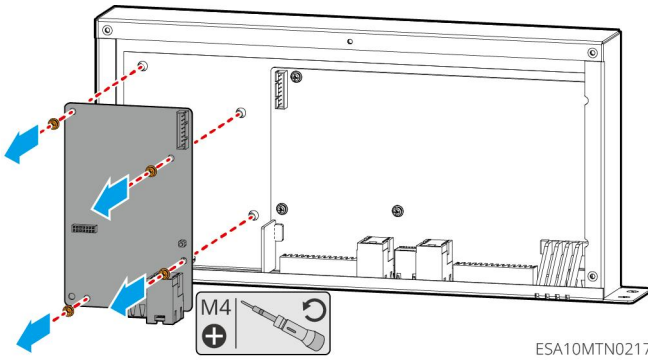


**Step 3:** (Optional) Remove the 4G Board. For specific operations, refer to the relevant steps in [7.3 Replacement of the 4G Board](#).

**Step 4:** Disconnect the antenna and cable connections on the Cloud Board.

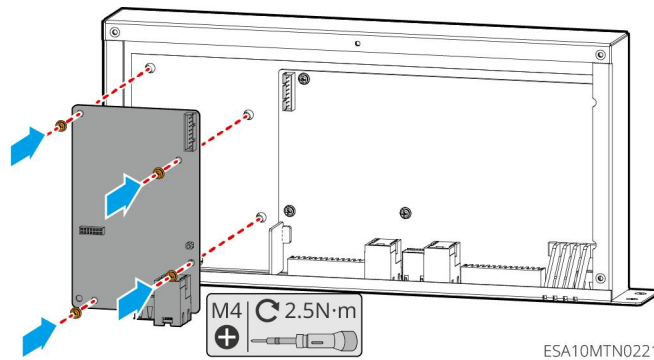


**Step 5:** Remove the fixing screws of the Cloud Board and take down the board.

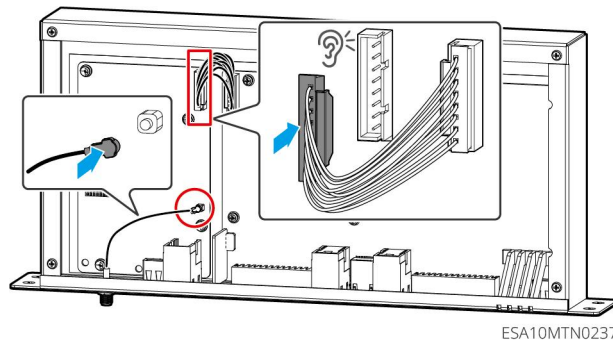


● Installing the New Cloud Board

**Step 1:** Place the new Cloud Board back to its original position and tighten its fixing screws.

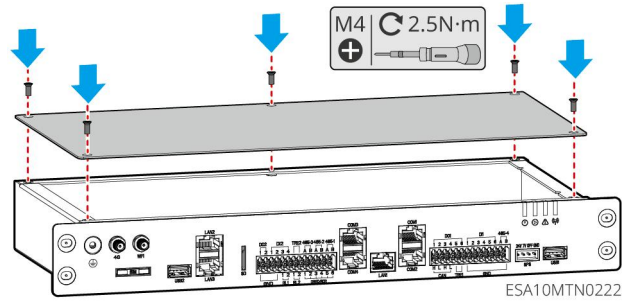


**Step 2:** Connect the antennas and cables on the Cloud Board.



**Step 3:** (Optional) Install the 4G Board. For specific operations, refer to the relevant steps in [7.3 Replacement of the 4G Board](#).

**Step 4:** Tighten the fixing screws on the upper cover plate of the EMS Control Box.



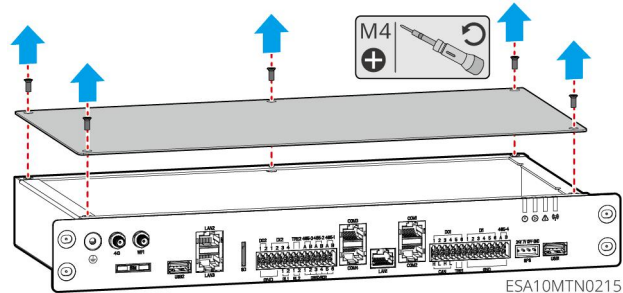
**Step 5:** Install the EMS Control Box. For specific operations, refer to [7.1 Replacement of the EMS Control Box](#).

## 7.5 Replacement of the LC Board

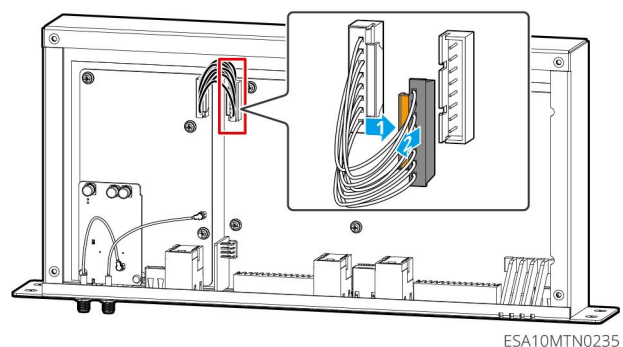
- **Removing the Old LC Board**

**Step 1:** Remove the EMS Control Box. For specific operations, refer to the [7.1 Replacement of the EMS Control Box](#).

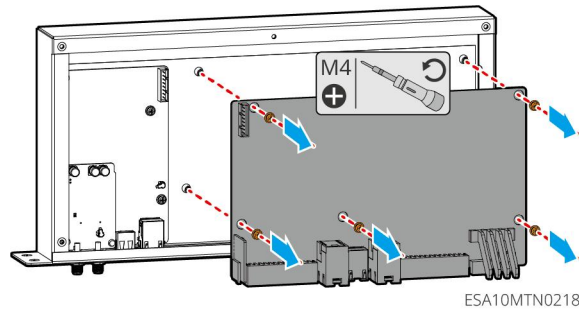
**Step 2:** Unscrew the fixing screws on the upper cover plate of the EMS Control Box.



**Step 3:** Disconnect the cable connections on the LC Board.

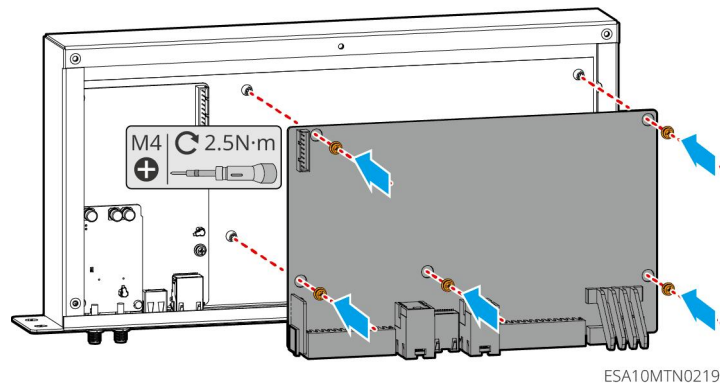


**Step 4:** Unscrew the fixing screws of the LC Board and take out the board.

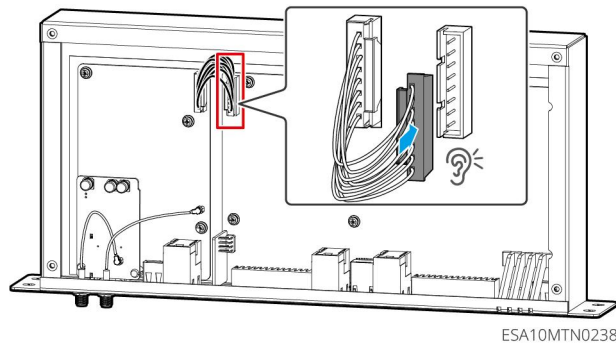


- **Installing the New LC Board**

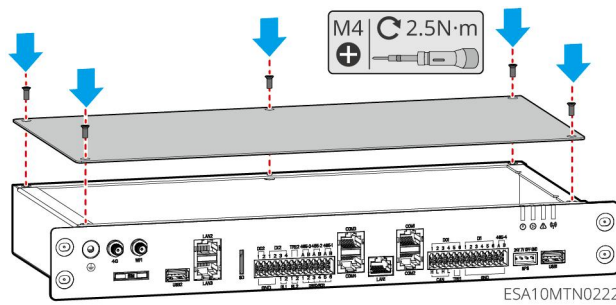
**Step 1:** Place the new LC Board in position and tighten its fixing screws.



**Step 2:** Connect the cables on the new LC Board.



**Step 3:** Tighten the fixing screws on the upper cover plate of the EMS Control Box.



**Step 4:** Install the EMS Control Box. For specific operations, refer to the [7.1 Replacement of the EMS Control Box](#).

## 7.6 Post-Replacement Handling

**Step 1:** Power on the system. For specific operations, refer to Chapter 7 in the [User Manual for ESA261 Series Industrial and Commercial Energy Storage Systems](#).

**Step 2:** Configure the corresponding SN. The following two methods can be referenced:

- Locate the corresponding register via Modbus and write the SN (Serial Number).
- Via the IOT Management Platform → Device Debugging → Transparent Transmission Control → Enter the SN of the EMS Control Box → Write to the corresponding EMS Control Box register → Write the SN.

**Step 3:** Query firmware information. The following three methods can be referenced:

- Via SolarGo → Bluetooth Devices → Settings → Query firmware information.
- Via the IOT Management Platform → Query the corresponding register → Query firmware information.
- Via the WE 3.0 / SEMS+ Platform → Energy Storage Monitoring → PCS Monitoring → Query firmware information.

**Step 4:** Burn the program. The following two methods can be referenced:

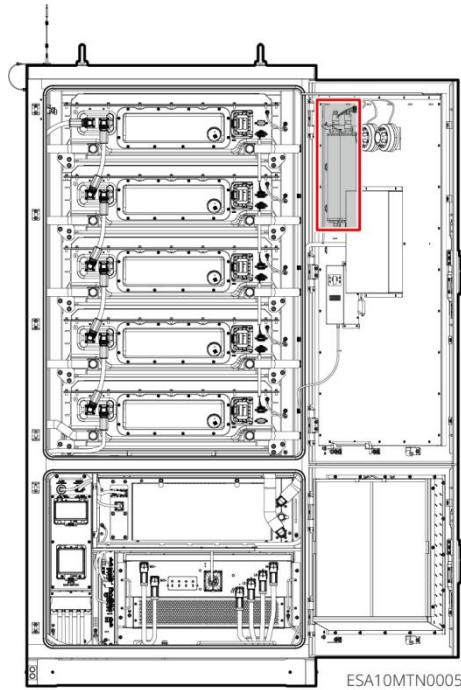
- Insert a USB flash drive into the USB port of the local EMS Control Box.
- Burn via IOT.

# 8 Replacement of Fire Protection System

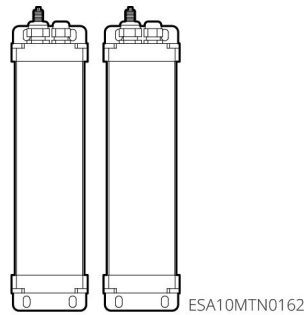
## 8.1 Replacement of Fire Extinguisher Cylinders

### Background Information

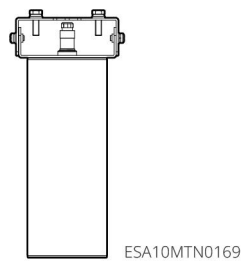
- Location of Fire Extinguisher Cylinders:



- Type I of Fire Extinguisher Cylinders:



- Type II of Fire Extinguisher Cylinders:



## Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#) .
- One person is required for replacing aerosol components.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
-----------	--------------------	--------------------

Insulated Torque Socket Wrench	Size 10 (M6)	Prepared by the user
Phillips Insulated Torque Screwdriver	M5	Prepared by the user
Wire Cutters	-	Prepared by the user

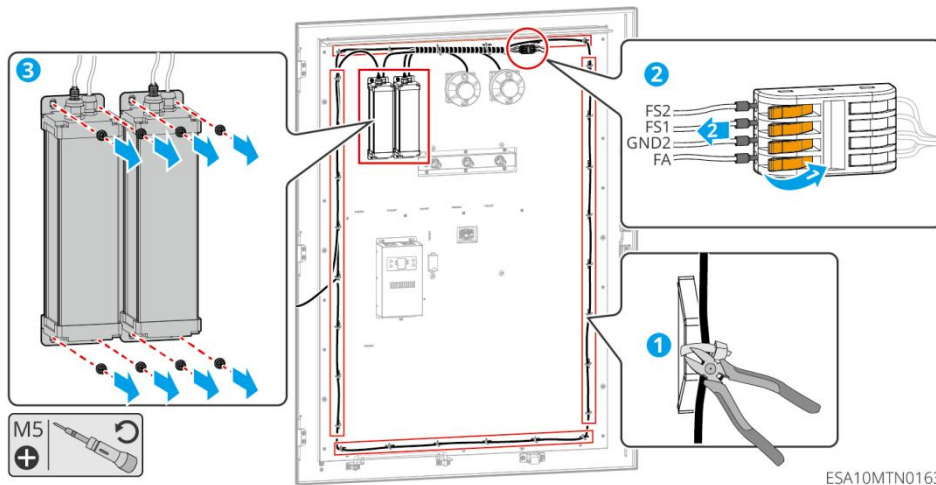
## 8.1.1 Replacement of Fire Extinguisher Cylinder (Type I)

- Removing the Old Fire Extinguisher Cylinder

**Step 1:** Cut off all cable ties securing the thermal wire.

**Step 2:** Disconnect the cable connections on the quick terminal block.

**Step 3:** Unscrew the fixing screws of the fire extinguisher cylinder and remove the cylinder.

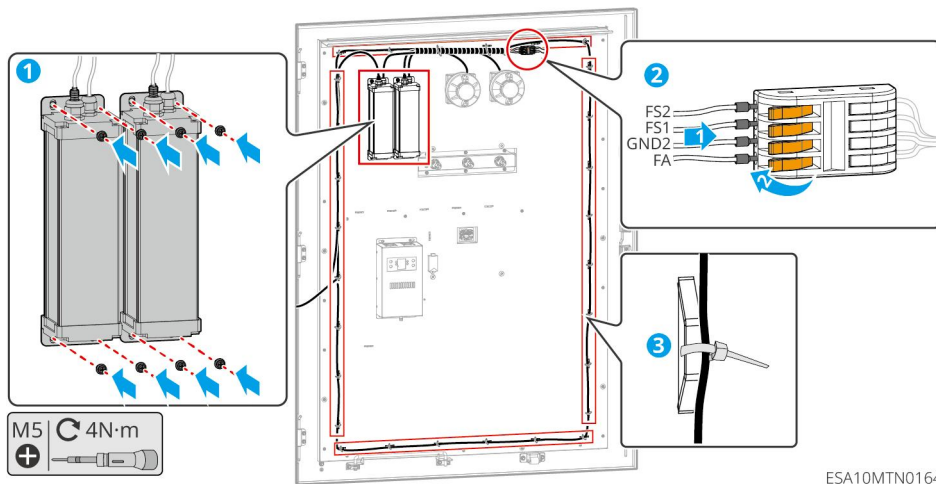


- Installing the New Fire Extinguisher Cylinder

**Step 1:** Tighten the fixing screws of the new fire extinguisher cylinder.

**Step 2:** Connect the cables to the quick terminal block.

**Step 3:** Secure the thermal wire with cable ties.



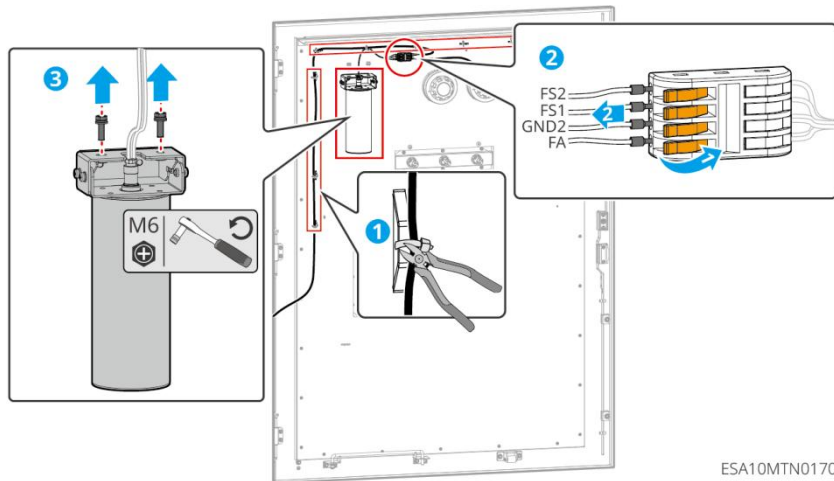
## 8.1.2 Replacement of Fire Extinguisher Cylinder (Type II)

- Removing the Old Fire Extinguisher Cylinder

**Step 1:** Cut off all cable ties securing the signal wires.

**Step 2:** Disconnect the cable connections on the quick terminal block.

**Step 3:** Unscrew the fixing screws of the fire extinguisher cylinder and take out the cylinder.

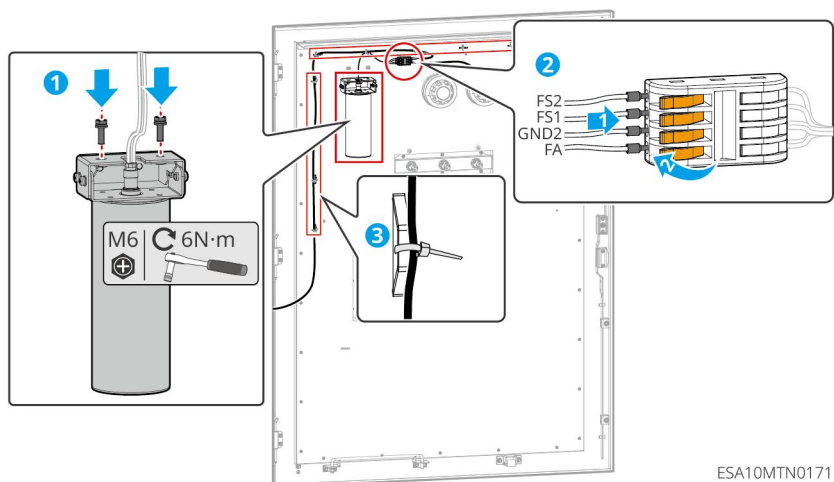


- Installing the New Fire Extinguisher Cylinder

**Step 1:** Tighten the fixing screws of the new fire extinguisher cylinder.

**Step 2:** Connect the cables to the quick terminal block.

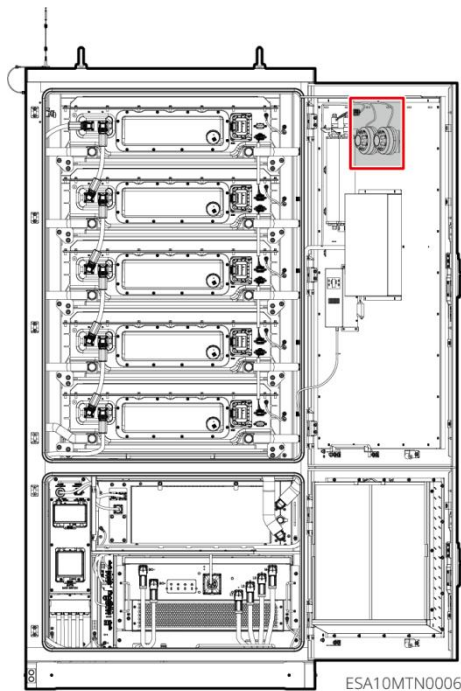
**Step 3:** Secure the signal wires with cable ties.



## 8.2 Replacement of Smoke Detectors and Temperature Detectors

### Background Information

Location of Smoke Detectors and Temperature Detectors:



### Prerequisites

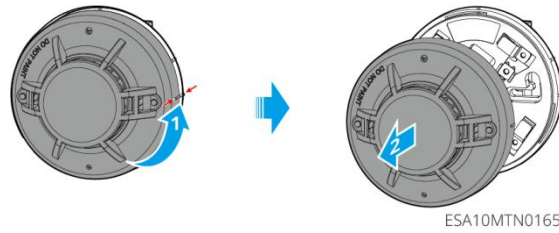
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing smoke detector and temperature detector components.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	Size 10 (M6)	Prepared by the user
Phillips Insulated Torque Screwdriver	M5	Prepared by the user
Utility Knife	-	Prepared by the user

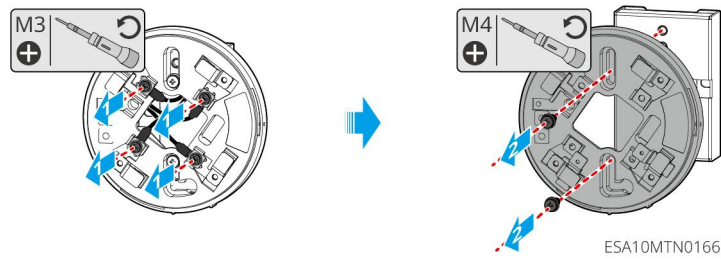
## 8.2.1 Replacement of Smoke Detectors and Temperature Detectors (Type I)

- **Removing the Old Smoke Detectors and Temperature Detectors**

**Step 1:** Rotate the housing of the smoke/temperature detector counterclockwise and remove the housing.

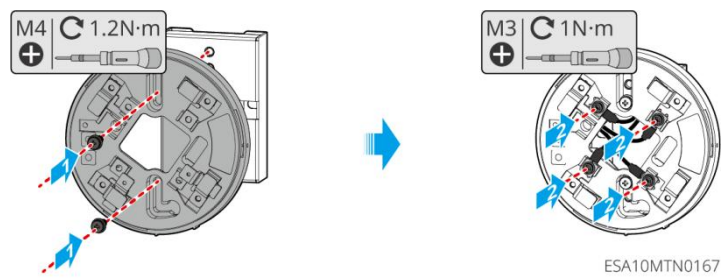


**Step 2:** Disconnect the cables connected to the base, then remove the fixing screws of the base and take down the base.



- **Installing the New Smoke Detectors and Temperature Detectors**

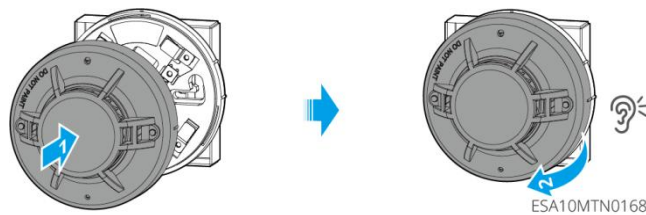
**Step 1:** Tighten the fixing screws of the base and connect the cables to the base.



- **Installing the New Smoke Detectors and Temperature Detectors**

**Step 1:** Tighten the fixing screws of the base and connect the cables to the base.

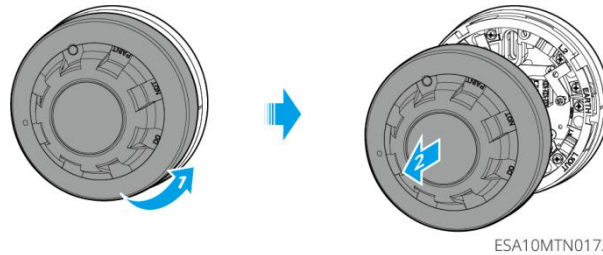
◦



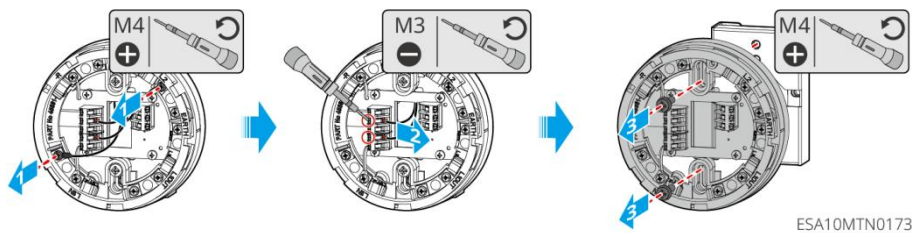
## 8.2.2 Replacement of Smoke Detectors and Temperature Detectors (Type II)

- **Removing the Old Smoke Detectors and Temperature Detectors**

**Step 1:** Rotate the housing of the smoke/temperature detector counterclockwise and remove the housing.

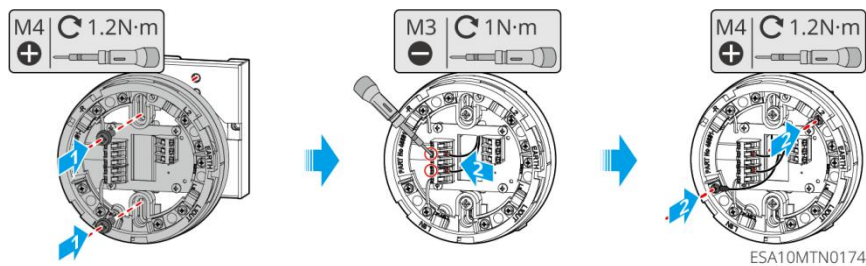


**Step 2:** Disconnect the cable connections on the base in sequence, then unscrew the fixing screws of the base and take down the base.

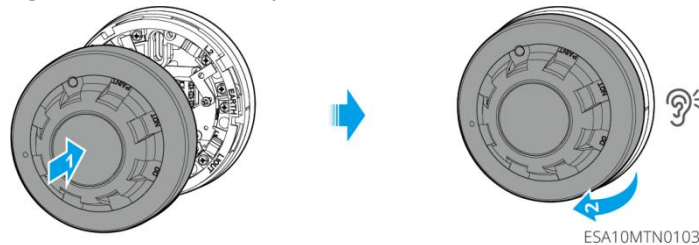


- **Installing the New Smoke Detectors and Temperature Detectors**

**Step 1:** Tighten the fixing screws of the base, then connect the cables on the base in sequence.



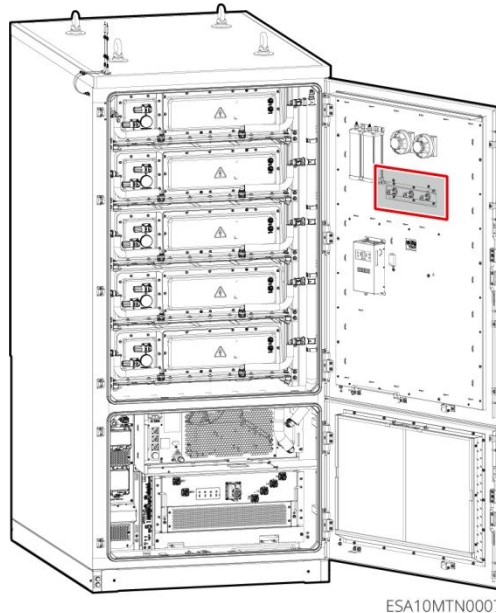
**Step 2:** Cover the housing of the smoke/temperature detector and rotate it clockwise to fasten it.



# 9 Replacement of Indicator Lights

## Background Information

Location of Indicator Lights:



## Prerequisites

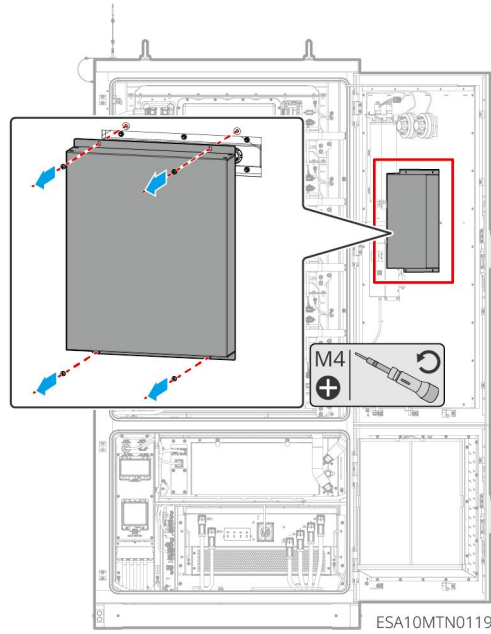
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing the light board.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	M4	Prepared by the user
Phillips Insulated Torque Screwdriver	M3、 M4	Prepared by the user
Utility Knife	-	Prepared by the user

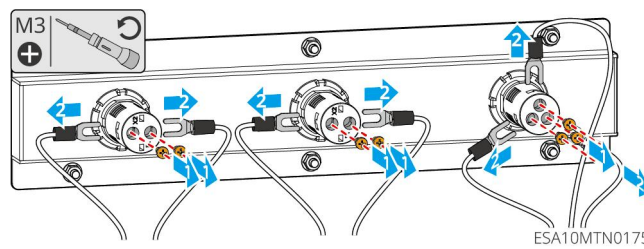
## Operation Steps

- **Removing the Old Indicator Lights**

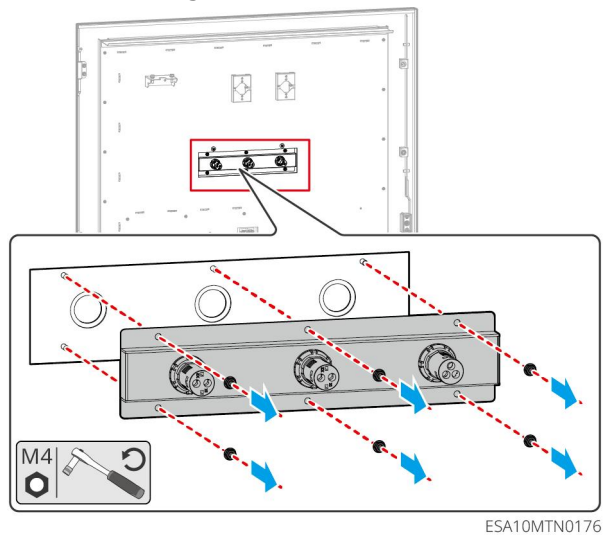
Step 1: Remove the shield cover.



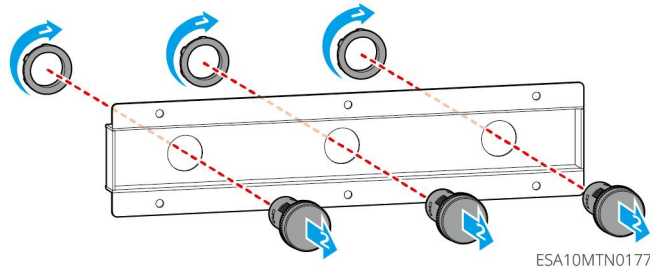
**Step 2:** Disconnect all cable connections on the light board.



**Step 3:** Unscrew the fixing screws of the light board.

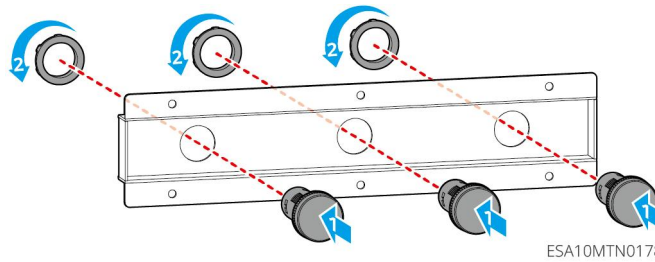


**Step 4:** Unscrew the fastening ring counterclockwise, then take out the indicator light to be replaced.

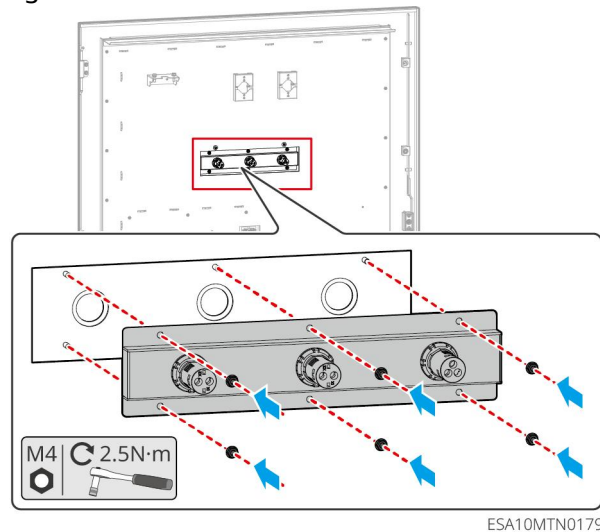


● **Installing the New Indicator Lights**

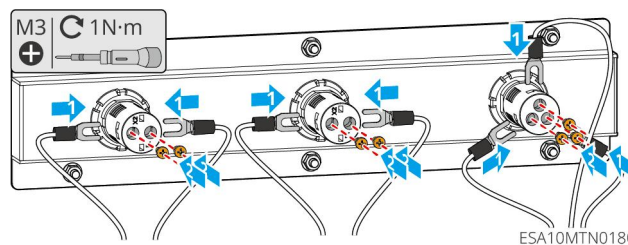
**Step 1:** Place the new indicator light back to its original position and tighten the fastening ring clockwise.



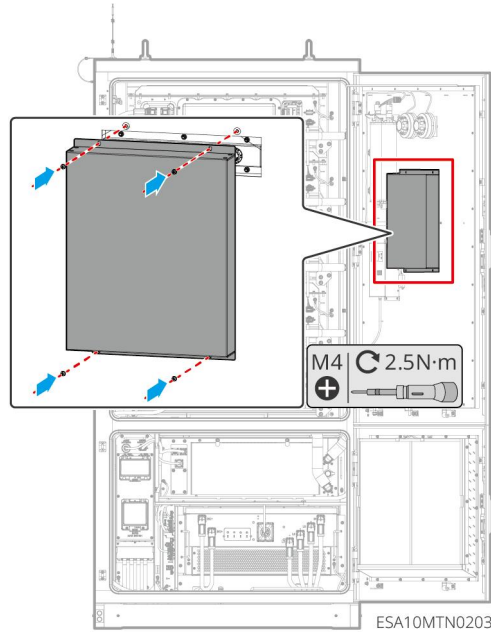
**Step 2:** Tighten the fixing screws of the light board.



**Step 3:** Connect the cables on the light board.



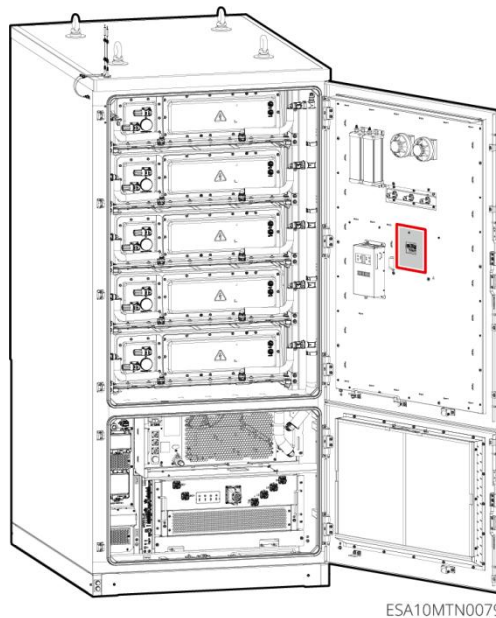
**Step 4:** Install the shield cover.



## 10 Replacement of Emergency Stop Switch

### Background Information

Location of Emergency Stop Switch:



### Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).

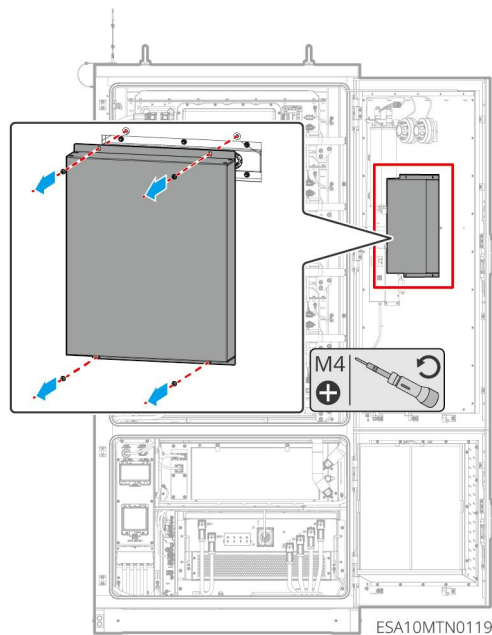
- One person is required for replacing the emergency stop switch component.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Slotted Insulated Torque Screwdriver	M6	Prepared by the user
Phillips Insulated Torque Screwdriver	M4 、 M6	Prepared by the user
Utility Knife	-	Prepared by the user

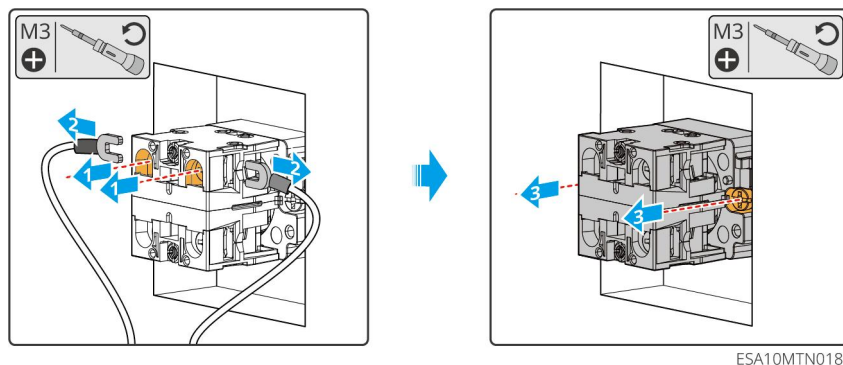
## Operation Steps

Removing the Old Emergency Stop Switch

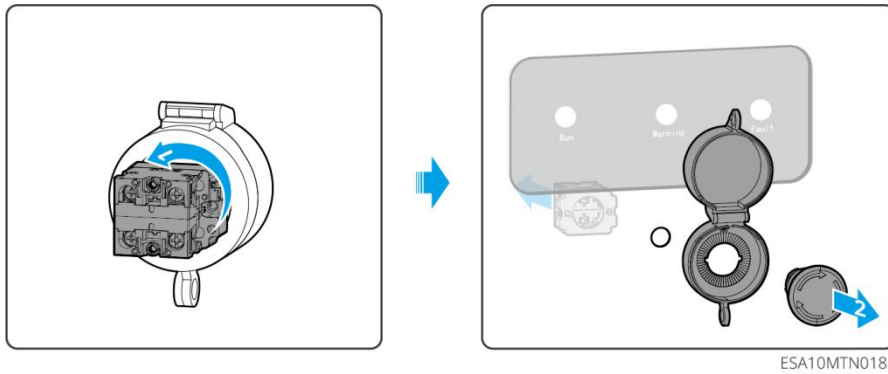
**Step 1:** Remove the shield cover.



**Step 2:** Disconnect all cable connections on the emergency stop switch base and unscrew the fixing screws of the base.

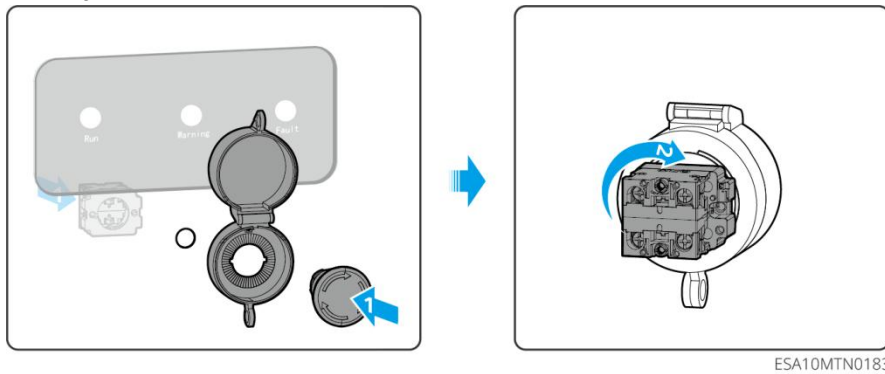


**Step 3:** Hold both the base and the button of the emergency stop switch simultaneously, rotate the base counterclockwise until the two are unlatched, then remove them together.

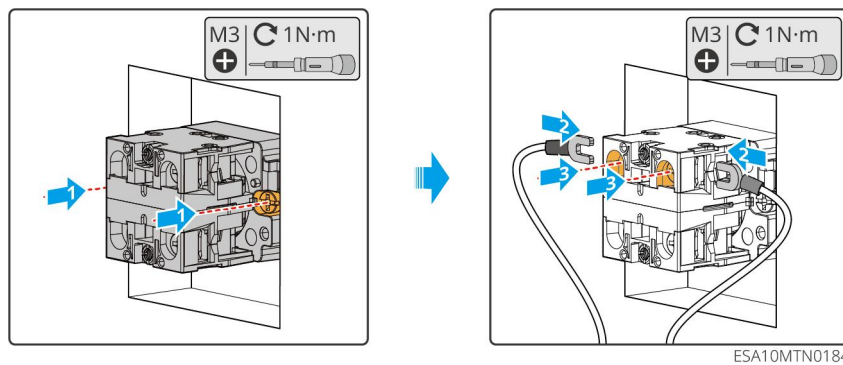


● **Installing the New Emergency Stop Switch**

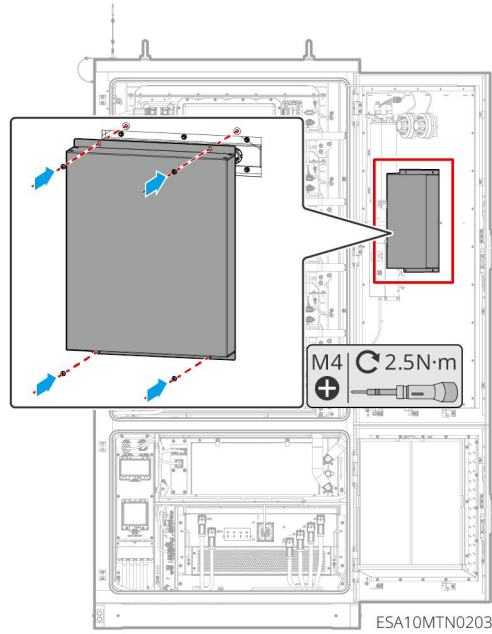
**Step 1:** Align the button of the emergency stop switch with its base, press and rotate the base clockwise until it is fully latched.



**Step 2:** Tighten the fixing screws of the emergency stop switch and connect all cables to the switch.



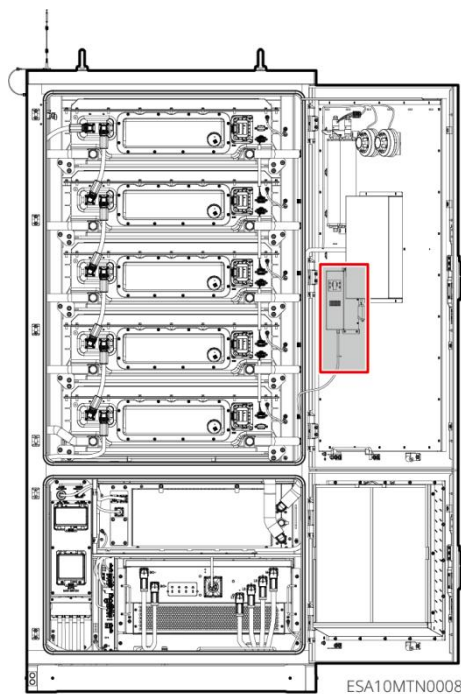
**Step 3:** Install the shield cover.



# 11 Replacement of Dehumidification Device

## Background Information

Location of the Dehumidification Device:



## Prerequisites

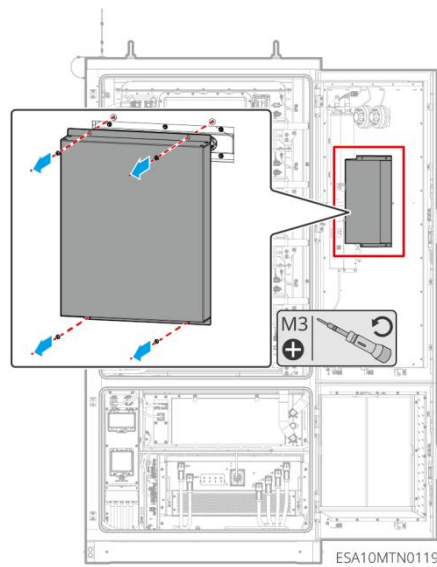
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing the dehumidification device component.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Slotted Insulated Torque Screwdriver	M3	Prepared by the user
Phillips Insulated Torque Screwdriver	Prepared by the user	Prepared by the user

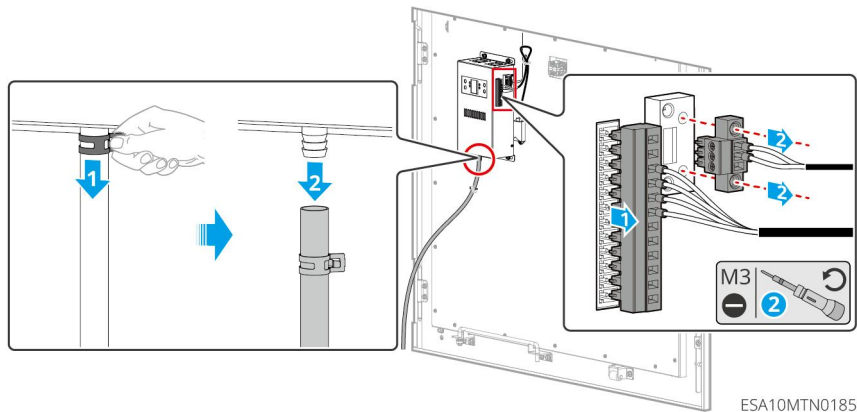
## Operation Steps

- **Removing the Old Dehumidification Device**

**Step 1:** Remove the shield cover.

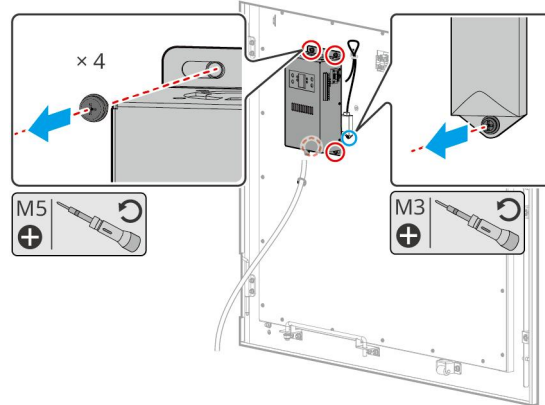


**Step 2:** Disconnect all cables and the drain pipe from the dehumidification device.



**Step 3:** Remove the dehumidification device:

1. Unscrew the fixing screws of the dehumidification device.
2. Unscrew the fixing screws of the temperature and humidity sensor.

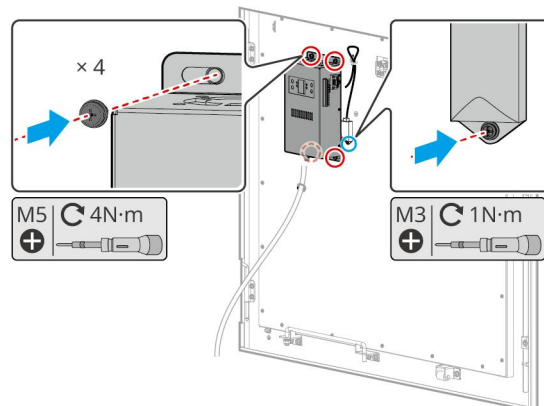


ESA10MTN0186

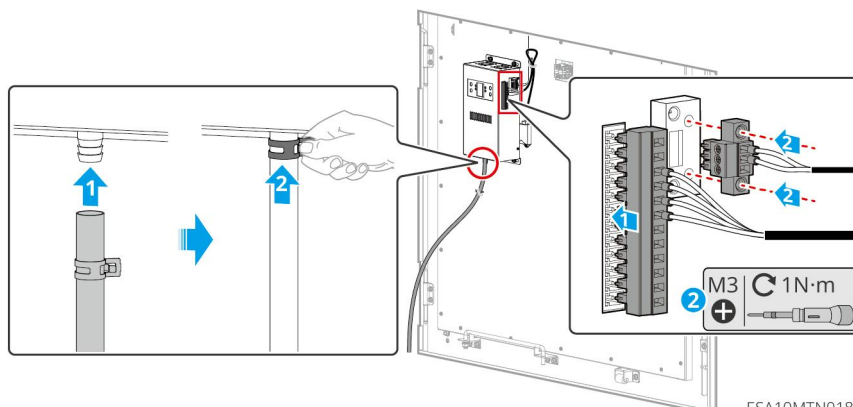
- **Installing the New Dehumidification Device**

**Step 1:** Install the dehumidification device:

1. Tighten the fixing screws of the dehumidification device.
2. Tighten the fixing screws of the temperature and humidity sensor.

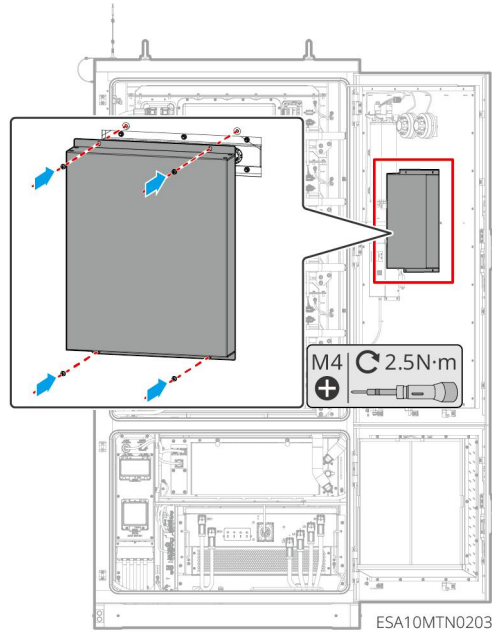


ESA10MTN0187

**Step 2:** Connect all cables and the drain pipe to the dehumidification device.

ESA10MTN0188

**Step 3:** Contact GoodWe after-sales service to set the parameters of the dehumidification device.**Step 4:** Install the shield cover.



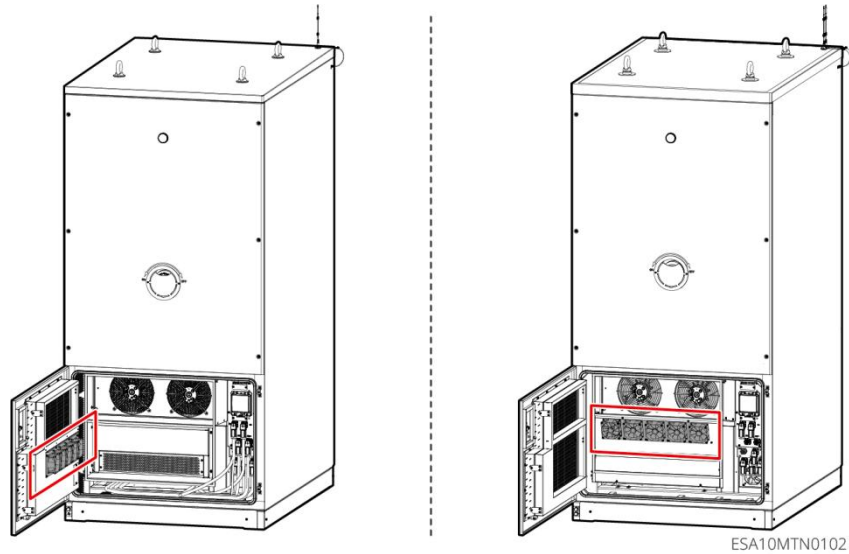
## 12 Replacement of Cabinet Cooling Fan

### NOTICE

The location of the cabinet cooling fan may vary across different machines, but the maintenance steps are similar. This chapter takes the replacement of the cooling fan on the rear door as an example; refer to this process for fans in other locations.

### Background Information

Location of the Fan:



## Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing the fan on the cabinet rear door.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Slotted Insulated Torque Screwdriver	M3	Prepared by the user
Phillips Insulated Torque Screwdriver	M4	Prepared by the user
Utility Knife / Wire Cutters	-	Prepared by the user

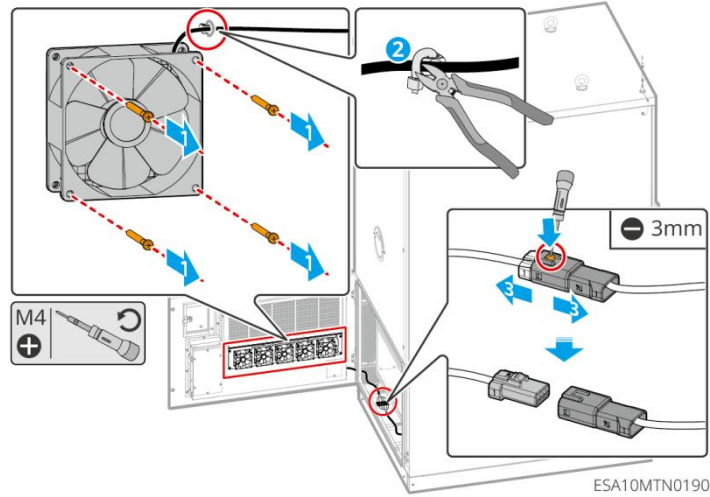
## Operation Steps

- **Removing the Old Fan**

**Step 1:** Unscrew the fan's fixing screws.

**Step 2:** Cut the cable ties that secure the fan's power cord.

**Step 3:** Disconnect the fan's power cord.

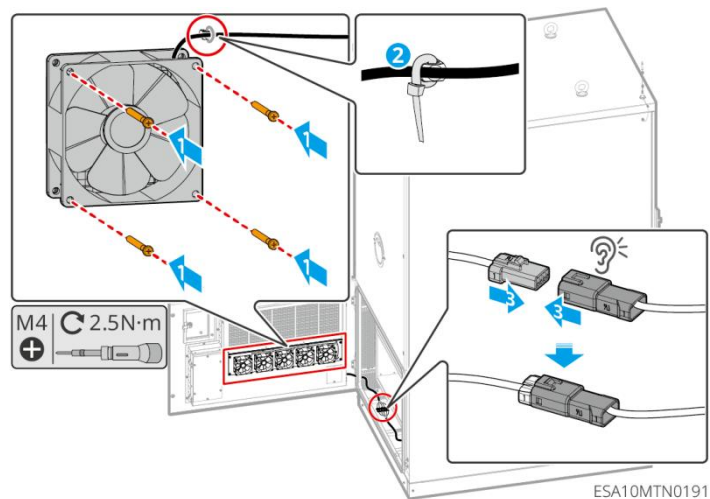


- **Installing the New Fan**

**Step 1:** Tighten the fan's fixing screws.

**Step 2:** Secure the fan's power cord with cable ties.

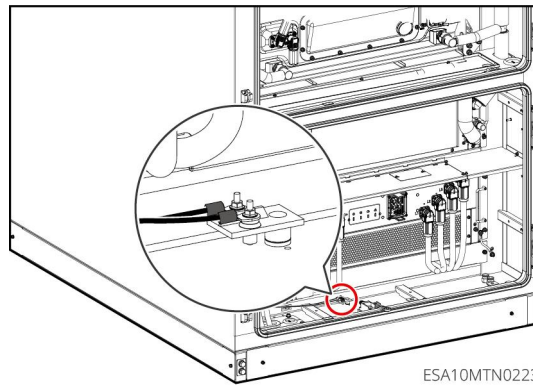
**Step 3:** Connect the fan's power cord.



## 13 Replacement of Water Leak Detector

### Background Information

Location of the Water Leak Detector:



ESA10MTN0223

## Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- Two people are required for replacing the water leak detection device.
- Prepare tools:

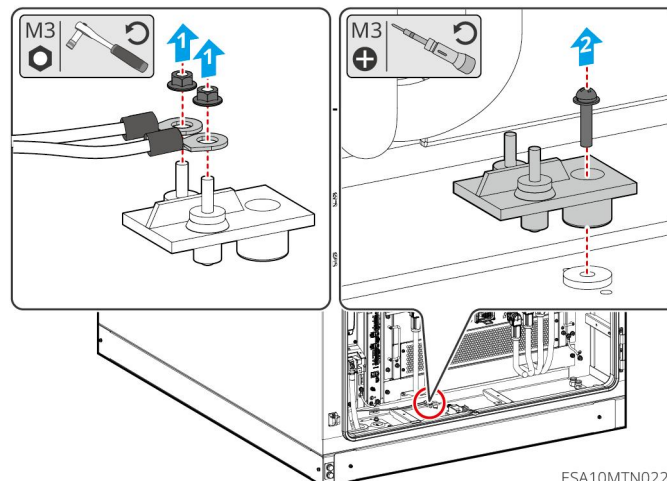
Tool Name	Tool Specification	Acquisition Method
Insulated Torque Socket Wrench	Size 5.5 (M3)	Prepared by the user
Phillips Insulated Torque Screwdriver	M3	Prepared by the user

## Operation Steps

- **Removing the Old Water Leak Detector**

**Step 1:** Disconnect the cable connections on the water leak detector.

**Step 2:** Unscrew the fixing screws of the water leak detector and take down the detector.

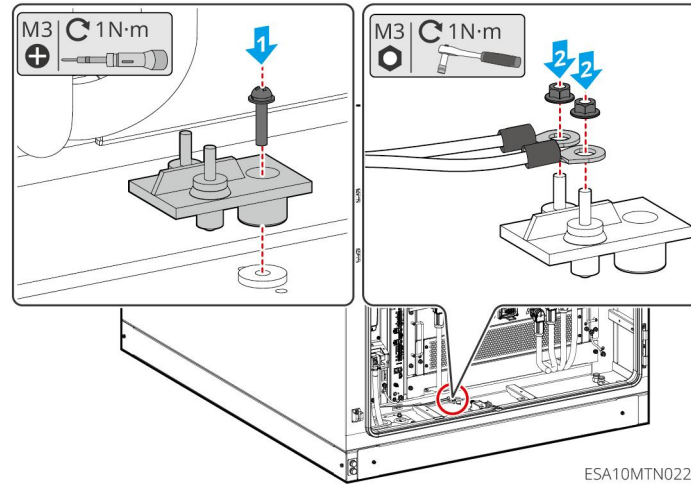


ESA10MTN0224

- **Installing the New Water Leak Detector**

**Step 1:** Place the new water leak detector back to its original position and tighten the fixing screws of the detector.

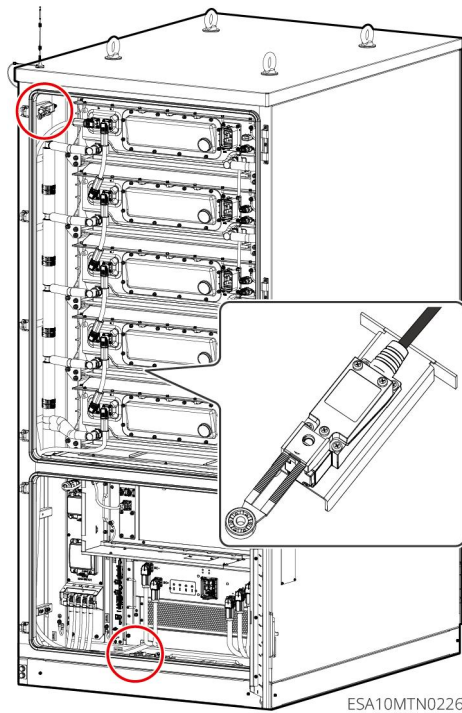
**Step 2:** Connect the cables to the water leak detector.



## 14 Replacement of Access Control Switch

### Background Information

Location of the Access Control Switch:



### Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing the access control switch.
- Prepare tools:

Tool Name	Tool Specification	Acquisition Method
Phillips Insulated Torque Screwdriver	M4	Prepared by the user

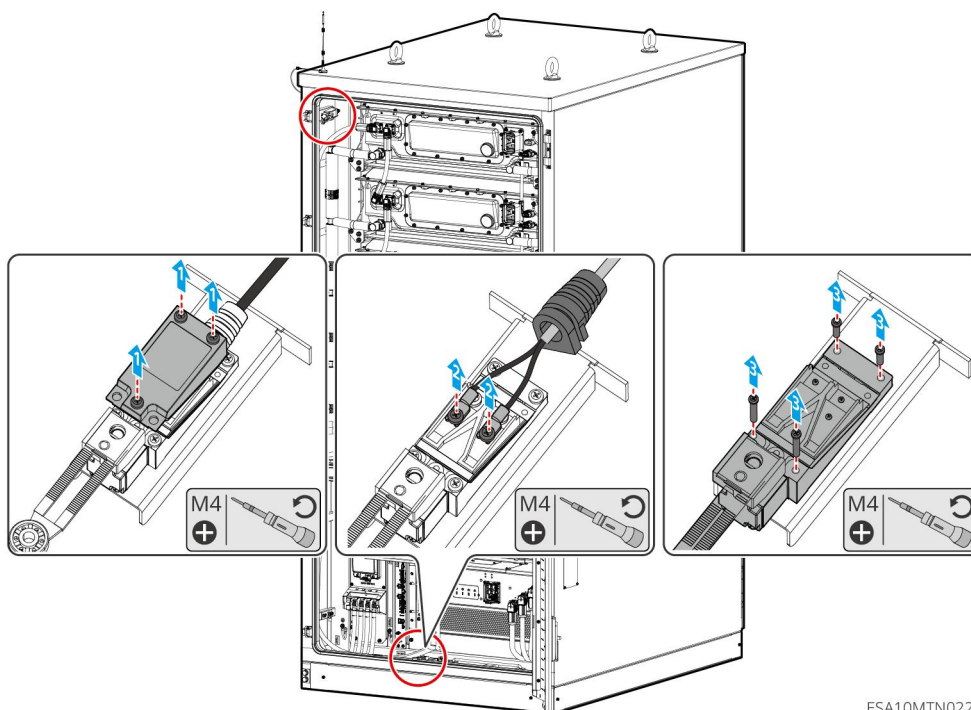
## Operation Steps

### ● Removing the Old Access Control Switch

**Step 1:** Unscrew the fixing screws of the access control switch's upper cover and remove the upper cover.

**Step 2:** Disconnect the cable connections of the access control switch: first loosen the screws, then pull out the Y-type terminals.

**Step 3:** Unscrew the fixing screws of the access control switch's base and remove the base.



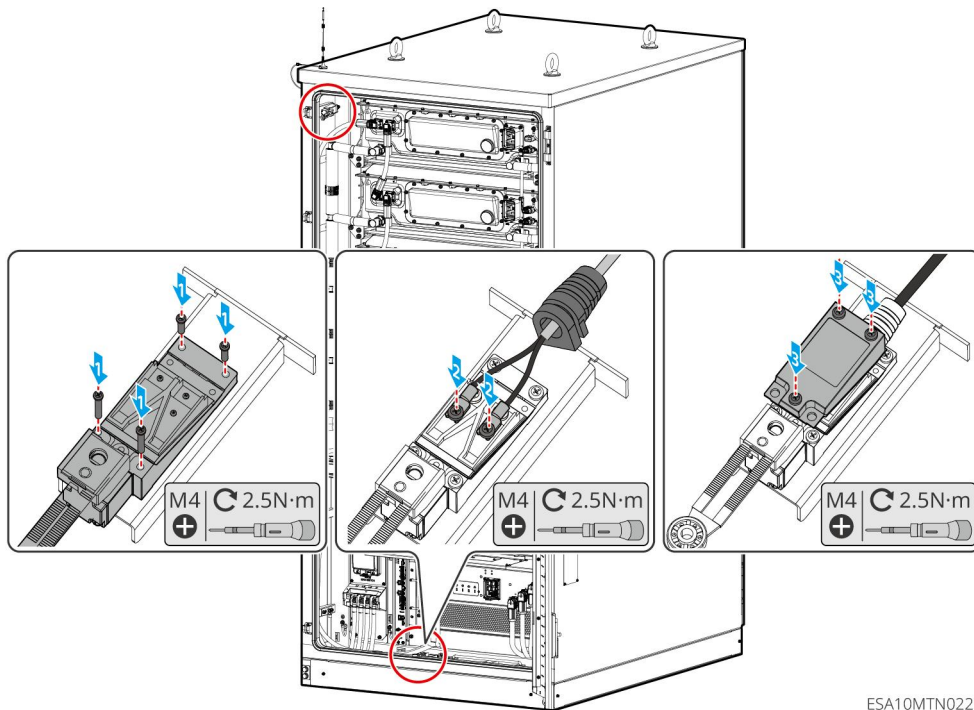
ESA10MTN0227

### ● Installing the New Access Control Switch

**Step 1:** Tighten the fixing screws of the access control switch's base.

**Step 2:** Connect the cables of the access control switch: first insert the Y-type terminals, then tighten the screws.

**Step 3:** Tighten the fixing screws of the access control switch's upper cover.

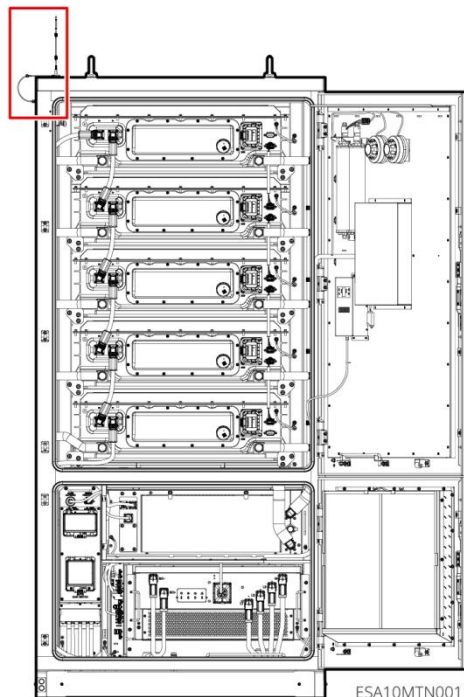


ESA10MTN0228

## 15 Replacement of Antenna

### Background Information

Location of the Antenna:



ESA10MTN0011

## Prerequisites

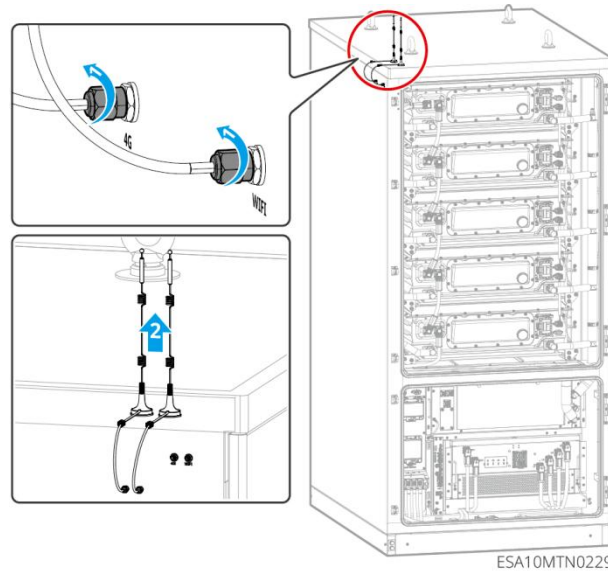
- The energy storage system has been powered off. For specific operations, refer to [2.2 System Power-Off](#).
- One person is required for replacing the antenna.

## Operation Steps

- **Removing the Old Antenna**

**Step 1:** Unscrew the antenna screws on the side of the cabinet.

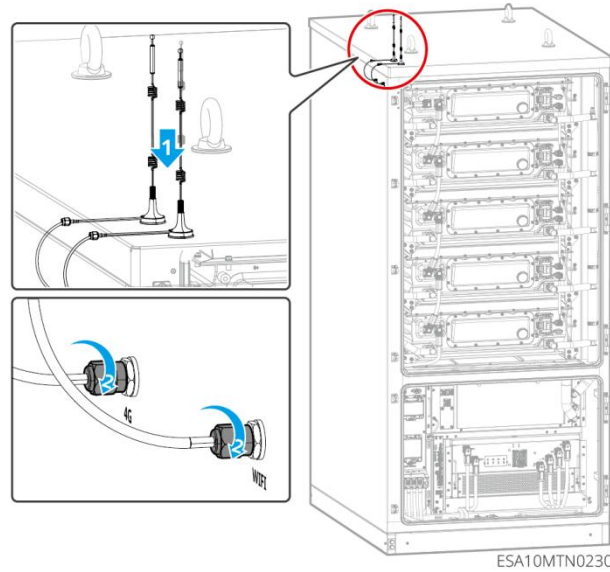
**Step 2:** Unplug the WiFi/4G suction cup antenna from the top of the cabinet (only the Chinese version is equipped with a 4G antenna).



- **Installing the New Antenna**

**Step 1:** Install the WiFi/4G suction cup antenna on the top of the cabinet.

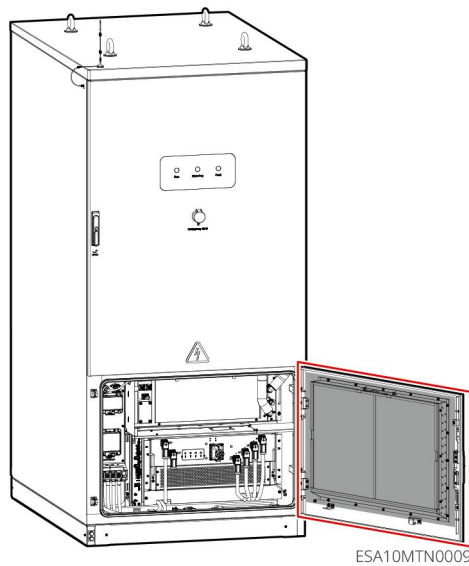
**Step 2:** Tighten the antenna screws on the side of the cabinet.



## 16 Replacement of Dust Filter

### Background Information

Location of the Dust Filter:



### Prerequisites

- The energy storage system has been powered off. For specific operations, refer to [2.2 System](#)

[Power-Off.](#)

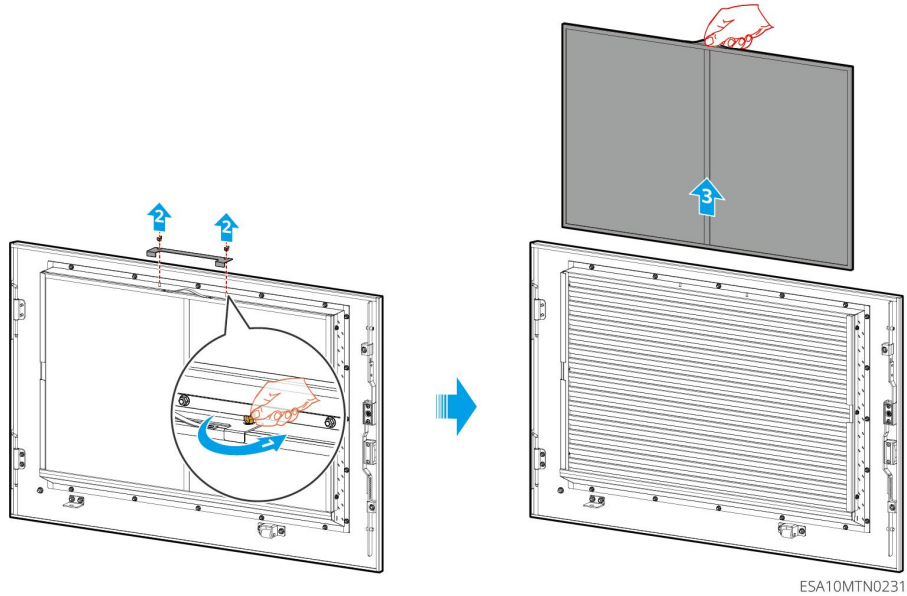
- One person is required for replacing the dust filter.

## Operation Steps

- **Removing the Dust Filter**

**Step 1:** Unscrew the wing nuts that secure the dust filter.

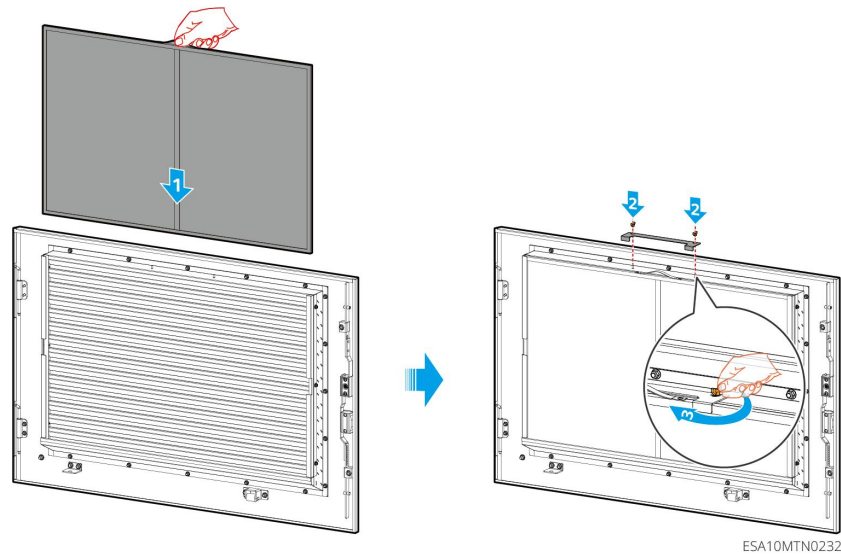
**Step 2:** Hold the dust filter handle and pull out the filter for replacement or cleaning.



- **Installing the Dust Filter**

**Step 1:** Place the replaced or cleaned dust filter back to its original position.

**Step 2:** Tighten the wing nuts.



# Contact Information

## **GoodWe Technologies Co., Ltd.**

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