SmartACU2000D Smart Array Controller

User Manual (With PID Modules)

Issue 04

Date 2023-05-17



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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: https://e.huawei.com

About This Document

Purpose

This document describes the SmartACU2000D Smart Array Controller (SACU for short), which is an outdoor cabinet, in terms of its installation, electrical connections, commissioning, and maintenance. Before installing and operating an SACU, read this manual carefully to get familiar with the functions and features of the device as well as the precautions.

Figures used in this document are for reference only.

Intended Audience

This document is intended for photovoltaic (PV) plant operators and qualified electricians.

Symbol Conventions

The symbols that may be found in this manual are defined as follows.

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

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Symbol	Description
NOTE	Supplements important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, or environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 04 (2023-05-17)

Updated **5 Electrical Connections**.

Added **6.2 Powering On the System**.

Updated **7.1 Routine Maintenance**.

Issue 03 (2023-05-09)

Updated **1 Safety Information**.

Added **4.2 Unpacking and Acceptance**.

Updated **4.3 Preparing Tools**.

Issue 02 (2020-08-18)

Added **A Scenario Where a Longitudinal Encryption Device Is Used**.

Issue 01 (2020-02-14)

This issue is used for first office application (FOA).

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1 Safety Information

Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The **Danger**, **Warning**, **Caution**, and **Notice** statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.**

The equipment should be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- The equipment is damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- The equipment is operated beyond the conditions specified in this document.

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- The equipment is installed or used in environments that do not comply with international, national, or regional standards.
- The equipment is installed or used by unqualified personnel.
- You fail to follow the operation instructions and safety precautions on the product and in the document.
- You remove or modify the product or modify the software code without authorization.
- You or a third party authorized by you cause the equipment damage during transportation.
- The equipment is damaged due to storage conditions that do not meet the requirements specified in the product document.
- You fail to prepare materials and tools that comply with local laws, regulations, and related standards.
- The equipment is damaged due to your or a third party's negligence, intentional breach, gross negligence, or improper operations, or other reasons not related to the Company.

1.1 Personal Safety

DANGER

Ensure that power is off during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will generate electric arcs or sparks, which may cause a fire or personal injury.

DANGER

Non-standard and improper operations on the energized equipment may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death.

DANGER

Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

DANGER

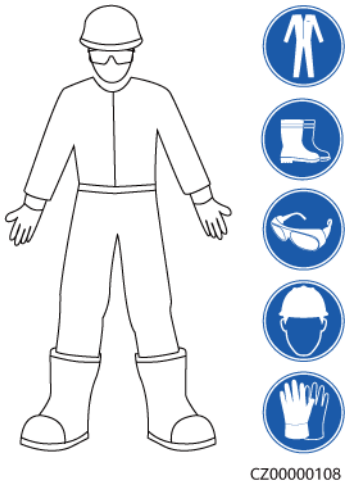
During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards, and specifications.

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WARNING

During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

Figure 1-1 Personal protective equipment



General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- Do not touch the power supply equipment directly or with conductors such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock.
- Do not touch operating equipment because the enclosure is hot.
- Do not touch a running fan with your hands, components, screws, tools, or boards. Otherwise, personal injury or equipment damage may occur.
- In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

Personnel Requirements

- Only professionals and trained personnel are allowed to operate the equipment.
  - Professionals: personnel who are familiar with the working principles and structure of the equipment, trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance

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  - Trained personnel: personnel who are trained in technology and safety, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Mechanical Safety

⚠ WARNING

Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

⚠ WARNING

Before installing equipment in a cabinet, ensure that the cabinet is securely fastened with a balanced center of gravity. Otherwise, tipping or falling cabinets may cause bodily injury and equipment damage.

⚠ WARNING

When pulling equipment out of a cabinet, be aware of unstable or heavy objects in the cabinet to prevent injury.

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WARNING

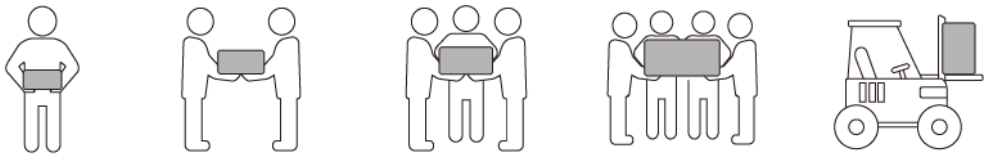
Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

General Requirements

- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed for an extended period of time.
- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.
- When performing operations over the top of the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.

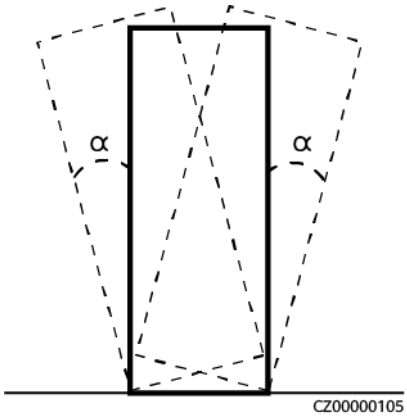


- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from

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scratching the surface of the equipment or damaging the components and cables.

- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- When transporting the equipment using a pallet truck or forklift, ensure that the tynes are properly positioned so that the equipment does not topple. Before moving the equipment, secure it to the pallet truck or forklift using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Choose sea or roads in good conditions for transportation as transportation by railway or air is not supported. Avoid tilt or jolt during transportation.
- Ensure that tilt angle of the cabinet meets the requirements shown in the figure. The tilt angle α of a cabinet with packaging must be less than or equal to 15°. After the cabinet is unpacked, its tilt angle α must be less than or equal to 10°.



Using Ladders

- Use wooden or insulated ladders when you need to perform live-line working at heights.
- Platform ladders with protective rails are preferred. Do not use single ladders.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned and held firm.

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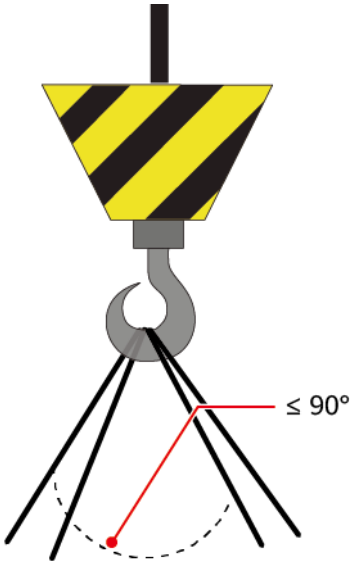


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- When climbing up the ladder, keep your body stable and your center of gravity between the side rails, and do not overreach to the sides.
- When a step ladder is used, ensure that the pull ropes are secured.

Hoisting

- Only trained and qualified personnel are allowed to perform hoisting operations.
- Install temporary warning signs or fences to isolate the hoisting area.
- Ensure that the foundation where hoisting is performed on meets the load-bearing requirements.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a fixed object or wall that meets the load-bearing requirements.
- During hoisting, do not stand or walk under the crane or the hoisted objects.
- Do not drag steel ropes and hoisting tools or bump the hoisted objects against hard objects during hoisting.
- Ensure that the angle between two hoisting ropes is no more than 90 degrees, as shown in the following figure.



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Drilling Holes

- Obtain consent from the customer and contractor before drilling holes.
- Wear protective equipment such as safety goggles and protective gloves when drilling holes.
- To avoid short circuits or other risks, do not drill holes into buried pipes or cables.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings.

1.3 Electrical Safety

DANGER

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

DANGER

Non-standard and improper operations may result in fire or electric shocks.

DANGER

Prevent foreign matter from entering the equipment during operations. Otherwise, equipment damage, load power derating, power failure, or personal injury may occur.

WARNING

For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.

CAUTION

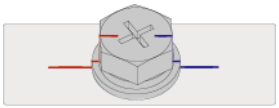
Do not route cables near the air intake or exhaust vents of the equipment.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.

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- Obtain approval from the national or local electric utility company before connecting the equipment to the grid.
- Observe the power plant safety regulations, such as the operation and work ticket mechanisms.
- Install temporary fences or warning ropes and hang "No Entry" signs around the operation area to keep unauthorized personnel away from the area.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.
- Ensure that bolts are tightened with a torque tool and marked in red and blue after double-check. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm that the bolts are tightened and then mark them in red. (The marks should cross the edges of the bolts.)



- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- Before maintaining a downstream electrical or power distribution device, turn off the output switch on the power supply equipment.
- During equipment maintenance, attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers as well as warning signs to prevent accidental connection. The equipment can be powered on only after troubleshooting is complete.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.

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- Do not work on the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protective ground point.

Cabling Requirements

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated, and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.
- When cable connection is completed or paused for a short period of time, seal the cable holes with sealing putty immediately to prevent small animals or moisture from entering.
- Secure buried cables using cable supports and cable clips. Ensure that the cables in the backfill area are in close contact with the ground to prevent cable deformation or damage during backfilling.
- If the external conditions (such as the cable layout or ambient temperature) change, verify the cable usage in accordance with the IEC-60364-5-52 or local laws and regulations. For example, check that the current-carrying capacity meets requirements.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
  - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
  - Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle. Otherwise, the cable performance may deteriorate due to cable damage, which affects the current-carrying capacity and temperature rise.

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1.4 Environment Requirements

DANGER

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

DANGER

Do not store any flammable or explosive materials in the equipment area.

DANGER

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

WARNING

Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.

WARNING

To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

General Requirements

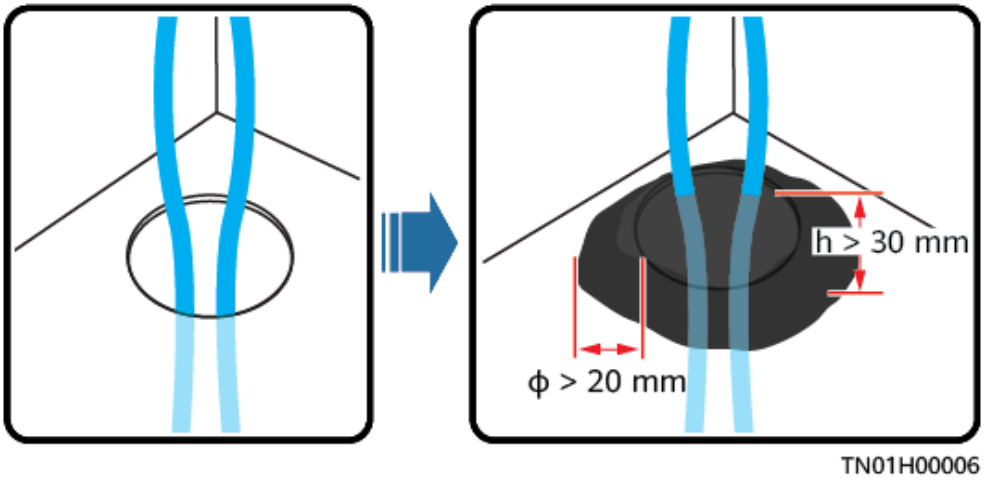
- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, performing outdoor installation, and opening

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doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.

- Do not install the equipment in an environment with dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must be above the highest water level of that area in history.
- Do not install the equipment in a position that may be submerged in water.
- If the equipment is installed in a place with abundant vegetation, in addition to routine weeding, harden the ground underneath the equipment using cement or gravel.
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).
- Before opening doors during the installation, operation, and maintenance of the equipment, clean up any water, ice, snow, or other foreign objects on the top of the equipment to prevent foreign objects from falling into the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- Ensure that the equipment room provides good heat insulation, and that the walls and floor are dampproof.
- Install rodent guards at the door of the equipment room to prevent rodents and insects from entering the room.
- All cable holes should be sealed. Seal the used cable holes with sealing putty. Seal the unused cable holes with the caps delivered with the equipment. The following figure shows the criteria for correct sealing with sealing putty.

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- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

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2 Overview

2.1 Model

Model Description

This document covers the following product models:

- SmartACU2000D-D-01
- SmartACU2000D-D-03

Figure 2-1 Model identification



Table 2-1 Model description

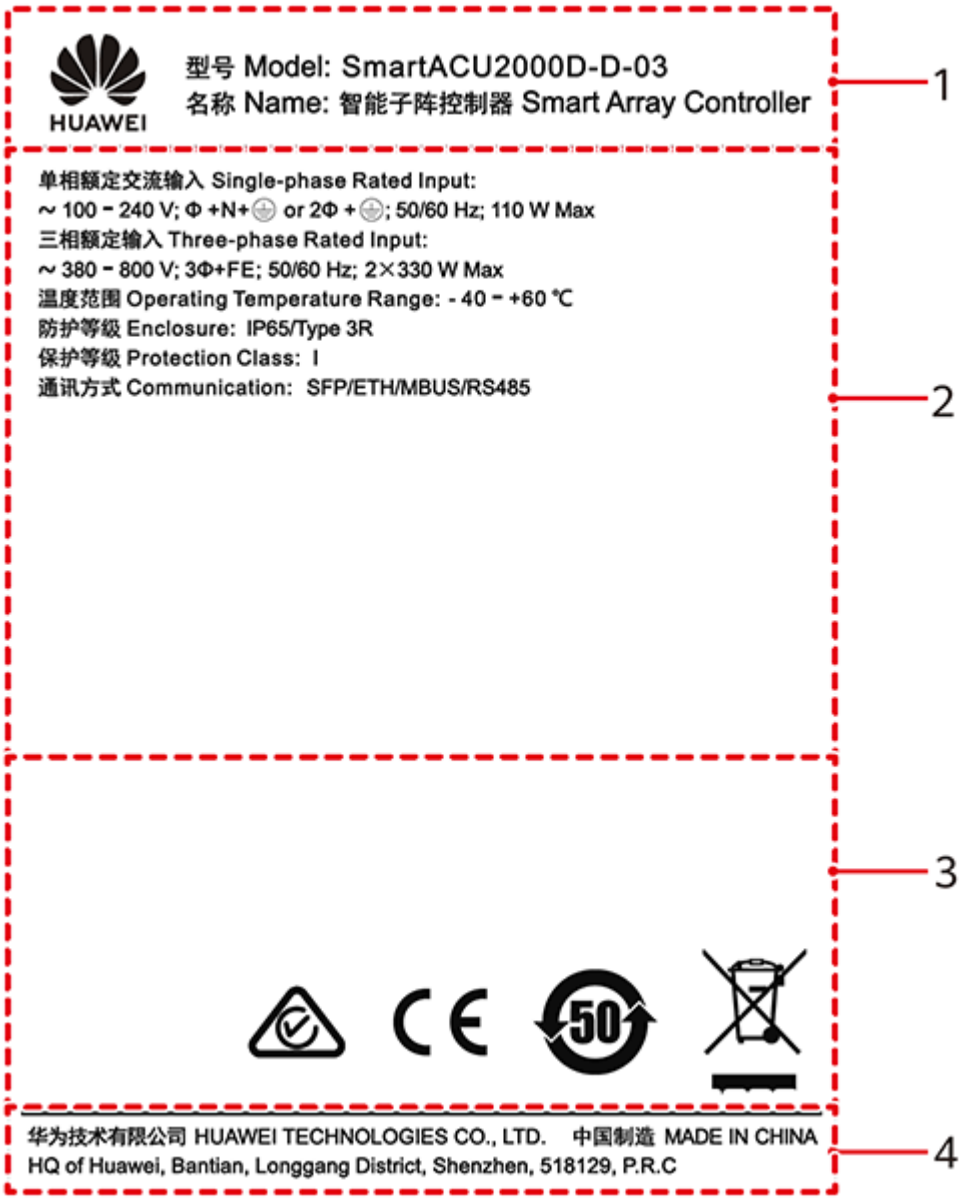
No.	Meaning	Description
1	Series	SmartACU2000: Smart Array Controller
2	Hardware	D: version D
3	Voltage level	D: ≤ 800 V three-phase AC input
4	Configuration	• 01: one MBUS route and one SmartPID2000 (referred to as PID module hereinafter) • 03: two MBUS routes and two PID modules

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Model Identification

You can view the SACU model on its nameplate.

Figure 2-2 Nameplate (SmartACU2000D-D-03 as an example)



(1) Trademark and model

(2) Key technical specifications

(3) Compliance symbols

(4) Company name and country of origin

NOTE

The nameplate figure is for reference only.

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2.2 Product Introduction

Functions

The SACU is an outdoor cabinet that houses the SmartLogger3000 (SmartLogger for short), SmartModule1000 (SmartModule for short), PID module, SmartMBUS CCO module, Ethernet switch, access terminal box (ATB), and power over Ethernet (PoE) module.

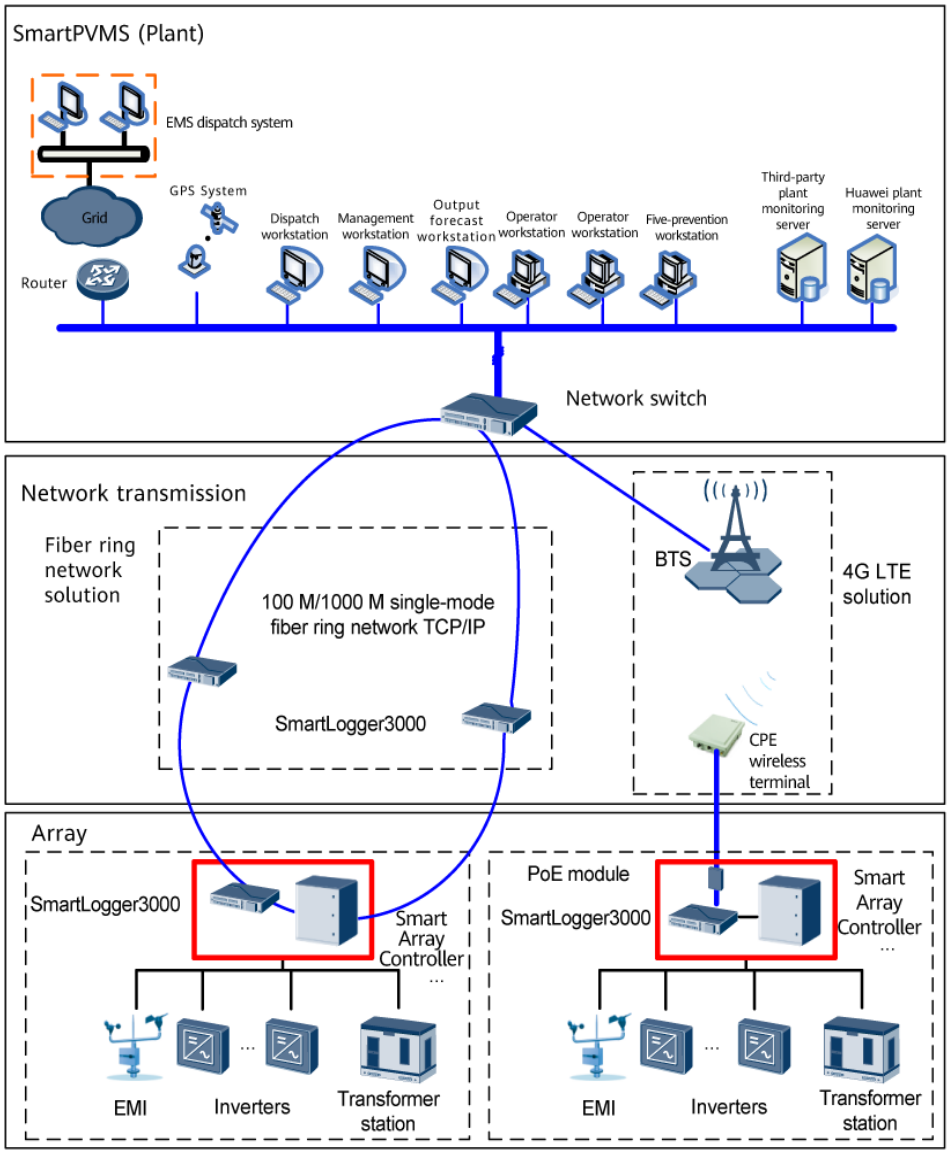
- The SmartLogger monitors and manages PV power systems. It converges ports, converts protocols, and centrally monitors and maintains the devices in PV power systems.
- The SmartModule monitors and manages PV power systems. It converges ports, and converts protocols for devices in PV power systems. It extends ports for the SmartLogger.
- The PID module effectively prevents the potential induced degradation (PID) effect of PV modules, thereby increasing the energy yield and revenue of the PV plant.
- The SmartMBUS CCO module connects to the SUN2000 inverters that support the MBUS function to transmit data over power cables, implementing MBUS networking.

Features

- Intelligent and flexible: Connects to a maximum of 150 inverters and supports one-click commissioning.
- Easy to use: Supports wizard-based settings, facilitating parameter settings and device connection.
- Stable and reliable: Has a built-in surge protection module for safe and reliable industrial applications.

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Networking



- Wired network: fiber ring network solution

  NOTE

  - A maximum of 15 SmartLoggers can be connected to form a fiber ring network. Each SmartLogger can connect to devices such as inverters, EMIs, and power meters.
  - Multiple fiber ring networks can be connected to the management system over Ethernet switches.

- Wireless network: 4G LTE solution

  NOTE

  The IP address of the SmartLogger and that of the customer-premises equipment (CPE) must be on the same network segment.

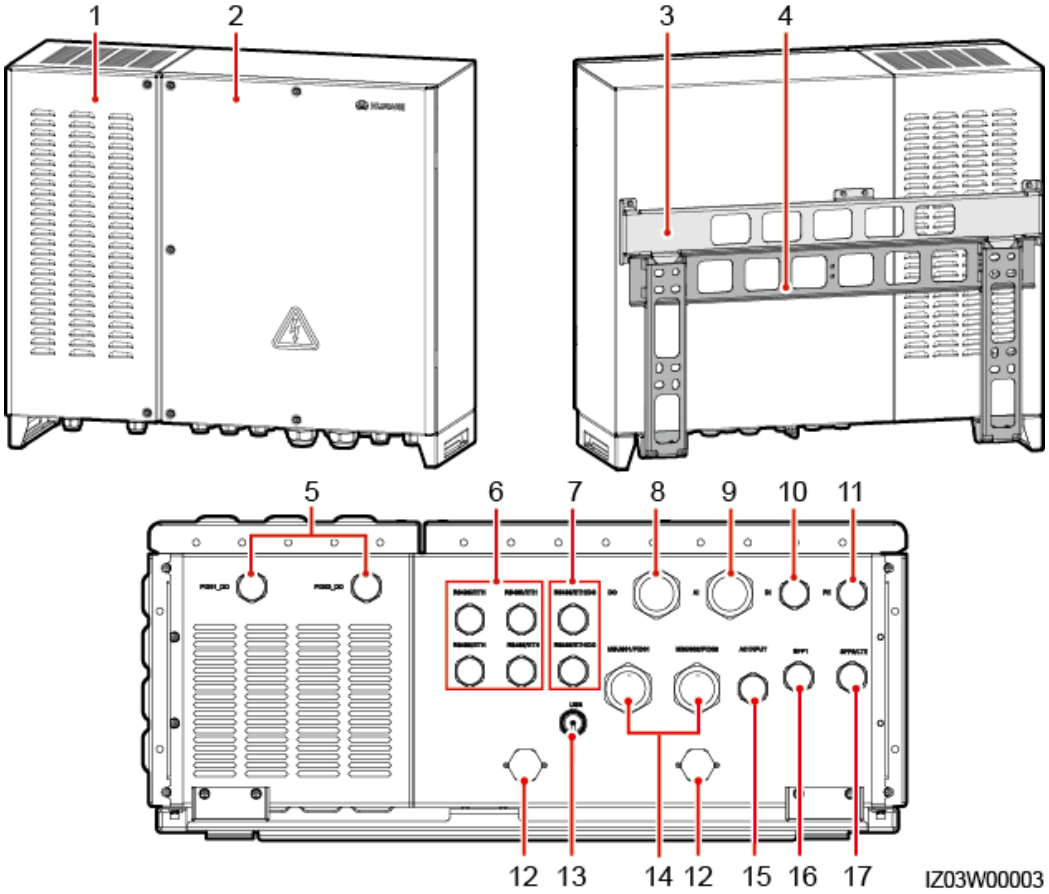
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2.3 Appearance

2.3.1 Product Appearance

Appearance

Figure 2-3 Appearance of the product



No.	Component	Description
1	PID cabinet door	The PID cabinet is only for PID modules. Do not install third-party devices in the cabinet.
2	Main cabinet door	-
3	Hanging kit	-
4	Mounting bracket	-

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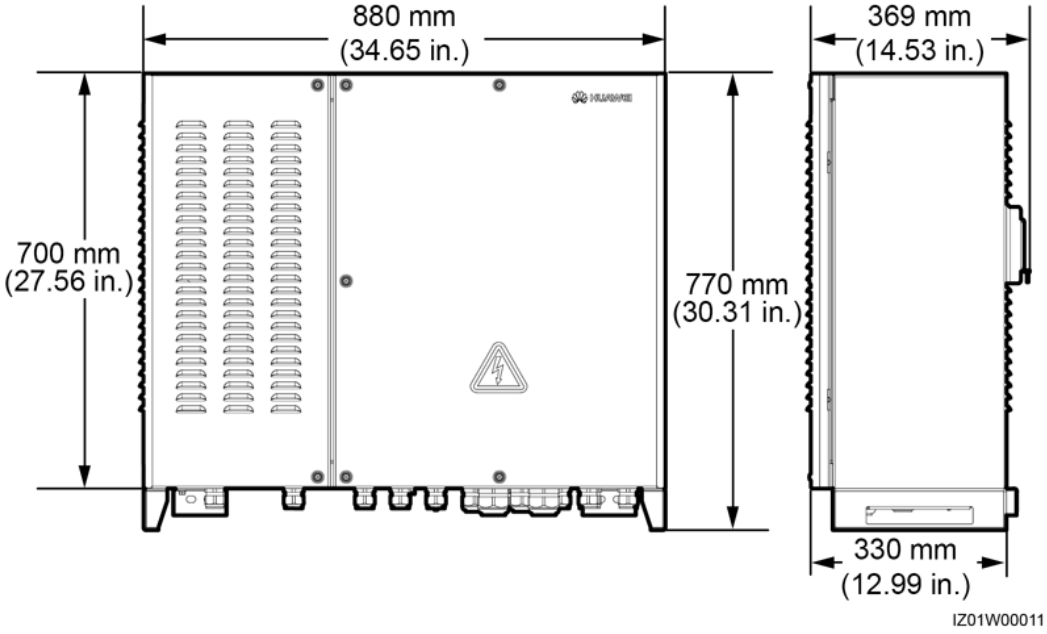
No.	Component	Description
5	Waterproof connectors for the PID DO signal cable (PID01_DO, PID02_DO)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
6	Waterproof connectors for the RS485 communications cable or network cable (RS485/ETH)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
7	Waterproof connectors for the RS485 communications cable, network cable, or DC input and output power cables (RS485/ETH/DC)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
8	Waterproof connector for the DO signal cable (DO)	Specifications: 5/4 in. Inner diameter: 20–32 mm (0.79–1.26 in.)
9	Waterproof connector for the AI signal cable (AI)	Specifications: 5/4 in. Inner diameter: 20–32 mm (0.79–1.26 in.)
10	Waterproof connector for the DI signal cable (DI)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
11	Waterproof connector for the protective earthing cable (PE)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
12	Ventilation valve	-
13	USB port (USB)	The USB port is used only for maintenance (such as upgrade and data export). Ensure that the USB cover is tightened when the port is not used.
14	Waterproof connectors for the three-phase AC power cable (including the functional earthing wire) (MBUS01/PID01, MBUS02/PID02)	• Specifications: 1 in. • Inner diameter: 18–25 mm (0.71–0.98 in.)
15	Waterproof connector for the single-phase AC power cable (AC INPUT)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)

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No.	Component	Description
16	Waterproof connector for the optical cable (SFP1)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)
17	Waterproof connector for the optical cable or network cable (SFP2/LTE)	• Specifications: 3/4 in. • Inner diameter: 13–18 mm (0.51–0.71 in.)

Dimensions

Figure 2-4 Cabinet dimensions



2.3.2 Enclosure Signs

Symbol	Name	Meaning
	Warning symbol for electric shocks	High voltage exists after the device is powered on. Only qualified and trained electrical technicians are allowed to install and operate the device.
	Warning label for multiple power inputs	This device has more than one power input. Before maintenance, ensure that the upstream switch is OFF.

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Symbol	Name	Meaning
	Warning label for cable connection	Do not connect a three-phase input power cable to a single-phase input switch. Do not connect a single-phase input power cable to a three-phase input switch. Otherwise, the device will be damaged.
	Warning label for PID functional earthing (FE)	Do not connect a PE cable to the PID FE bar.
	Warning label for surge protection module operation	Do not remove or install an energized surge protection module.
	Weight label	The SACU is heavy and needs to be moved with auxiliary tools or by more than one person.

2.4 Product Composition

NOTE

For simplicity purposes, the following figure shows only the components that you need to operate and reserved installation positions.

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Figure 2-5 SmartACU2000D-D-03 components

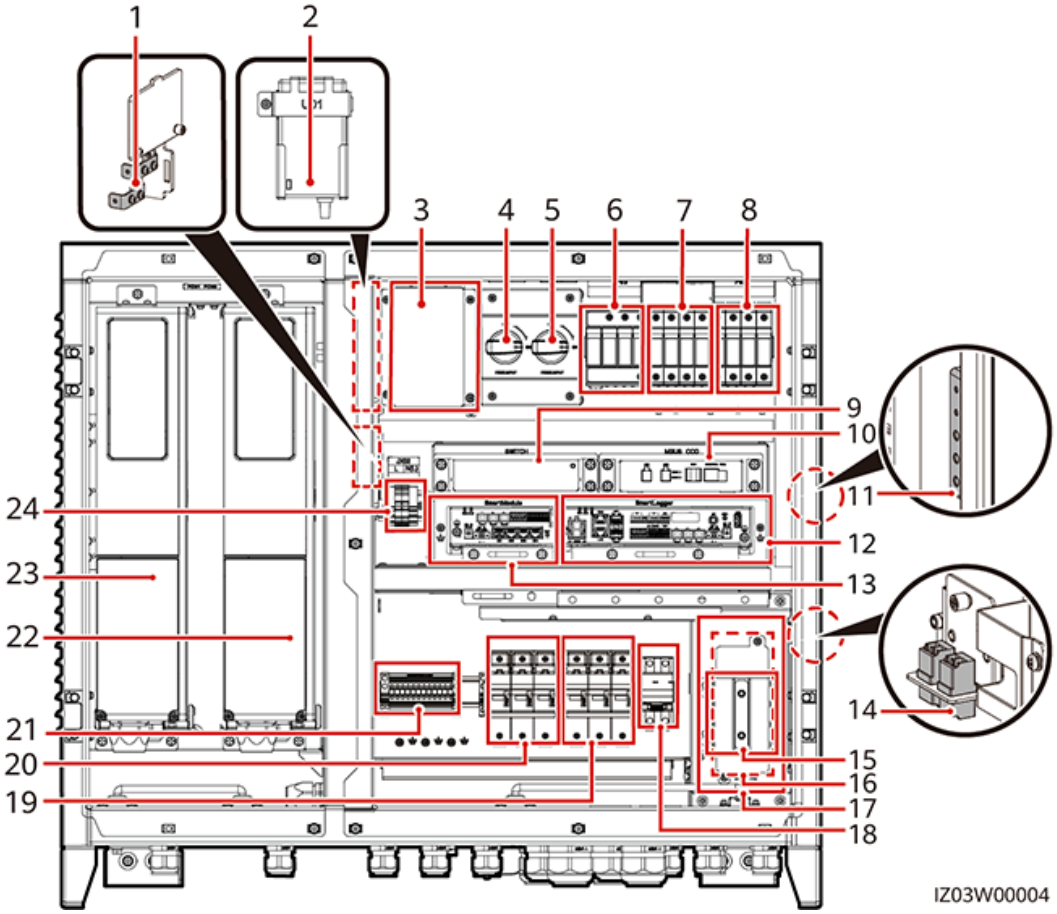


Table 2-2 Components and reserved installation positions

No.	Name	Specifications	Quantity
1	PID FE bar (FE01, FE02)	-	1
2	SmartLogger power adapter (U01)	• AC input: 100–240 V, 50 Hz/60 Hz • DC output: 12 V/2 A	1
3	Position for the 24 V DC power module (U02)	• AC input: 100–240 V, 50 Hz/60 Hz • DC output: 12 V DC, 60 W (maximum); 24 V DC, 30 W (maximum) **NOTE** • If an external 24–28 V DC input is used, the DC output voltage ranges from 21.5 V to 25.2 V. • The 24 V DC power module is optional. Its installation position is reserved in the cabinet.	1
4	PID01 input switch (QF01)	AC: 1 A/3P	1
5	PID02 input switch (QF02)	AC: 1 A/3P	1

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No.	Name	Specifications	Quantity
6	Single-phase surge protective device (SPD) (F03)	U_c = 385 V AC; 20 kA/40 kA; 8/20 μs; 4P	1
7	Three-phase SPD 1 (F01)	U_c = 680 V AC; 20 kA/40 kA; 8/20 μs; 1P	4
8	Three-phase SPD 2 (F02)	U_c = 680 V AC; 20 kA/40 kA; 8/20 μs; 1P	4
9	Position for the Ethernet switch (SWITCH)	-	1
10	SmartMBUS CCO (MBUS CCO)	SmartMBUS CCO01A	1
11	Protective earthing (PE) bar	-	1
12	SmartLogger3000 (SmartLogger)	SmartLogger3000	1
13	SmartModule1000A01 (SmartModule)	SmartModule1000A01	1
14	Fiber adapter (OFA01: TX1 RX1; OFA02: TX2 RX2)	2LC/PC-2LC/PC-4	2
15	Position for the SPD of the power over Ethernet (PoE) module	-	1
16	Position for the PoE module (POE)	-	1
17	ATB	-	1
18	Single-phase input switch (QF03)	32 A/2P	1
19	Three-phase input switch 2 (FU02)	25 A/3P	1
20	Three-phase input switch 1 (FU01)	25 A/3P	1
21	RS485 communications terminal (JX01)	12P; supports the wires with a cross-sectional area of 1–2.5 mm^2 (or 18–14 AWG).	1
22	SmartPID module (PID02)	SmartPID2000	1
23	SmartPID module (PID01)	SmartPID2000	1

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No.	Name	Specifications	Quantity
24	AC input terminal of the 24 V power module (JX02)	220 V/2P; supports the wires with a cross-sectional area of 0.2–10 mm^2 (or 24–8 AWG).	1

Figure 2-6 SmartACU2000D-D-01 components

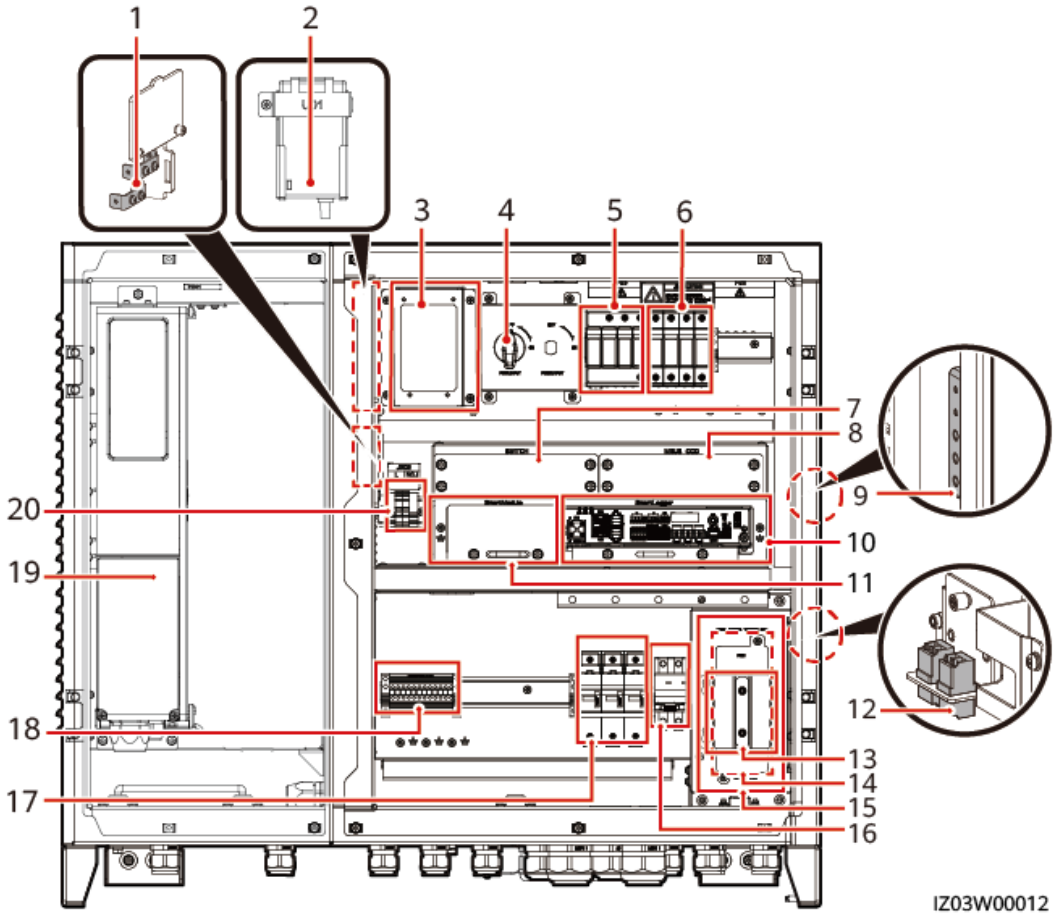


Table 2-3 Components and reserved installation positions

No.	Name	Specifications	Quantity
1	PID FE bar (FE01, FE02)	-	1
2	SmartLogger power adapter (U01)	• AC input: 100–240 V, 50 Hz/60 Hz • DC output: 12 V/2 A	1

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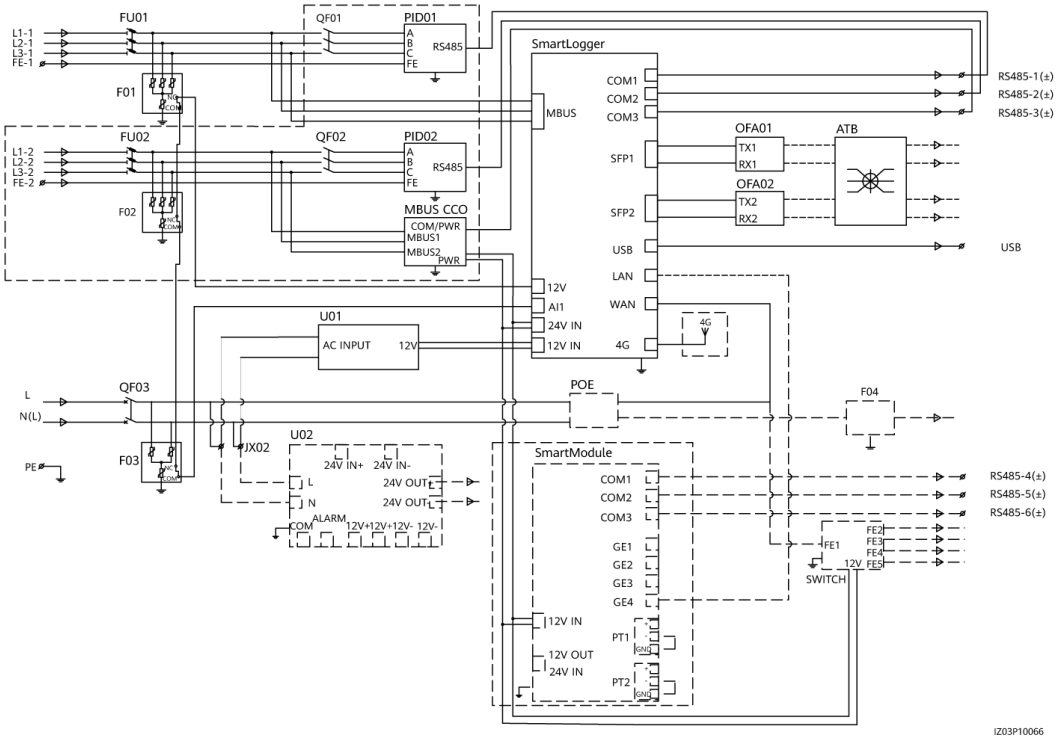
No.	Name	Specifications	Quantity
3	Position for the 24 V DC power module (U02)	• AC input: 100–240 V, 50 Hz/60 Hz • DC output: 12 V DC, 60 W (maximum); 24 V DC, 30 W (maximum) **NOTE** • If an external 24–28 V DC input is used, the DC output voltage ranges from 21.5 V to 25.2 V. • The 24 V DC power module is optional. Its installation position is reserved in the cabinet.	1
4	PID01 input switch (QF01)	AC: 1 A/3P	1
5	Single-phase surge protective device (SPD) (F03)	U_c = 385 V AC; 20 kA/40 kA; 8/20 μs; 4P	1
6	Three-phase SPD (F01)	U_c = 680 V AC; 20 kA/40 kA; 8/20 μs; 1P	4
7	Position for the Ethernet switch (SWITCH)	-	1
8	Position for the SmartMBUS CCO (MBUS CCO)	-	-
9	Protective earthing (PE) bar	-	1
10	SmartLogger3000 (SmartLogger)	SmartLogger3000	1
11	SmartModule1000A01 (SmartModule)	-	1
12	Fiber adapter (OFA01: TX1 RX1; OFA02: TX2 RX2)	2LC/PC-2LC/PC-4	2
13	Position for the SPD of the power over Ethernet (PoE) module	-	1
14	Position for the PoE module (POE)	-	1
15	ATB	-	1
16	Single-phase input switch (QF03)	32A/2P	1
17	Three-phase input switch (FU01)	25A/3P	1

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No.	Name	Specifications	Quantity
18	RS485 communications terminal (JX01)	12P; supports the wires with a cross-sectional area of 1–2.5 mm^2 (or 18–14 AWG).	1
19	SmartPID module (PID01)	SmartPID2000	1
20	AC input terminal of the 24 V power module (JX02)	220 V/2P; supports the wires with a cross-sectional area of 0.2–10 mm^2 (or 24–8 AWG).	1

2.5 Working Principles

Figure 2-7 Schematic diagram (The components in dotted boxes are optional. Either a PoE module or a switch can be configured.)



The SACU communicates with devices in a PV array over RS485, MBUS, or Ethernet.

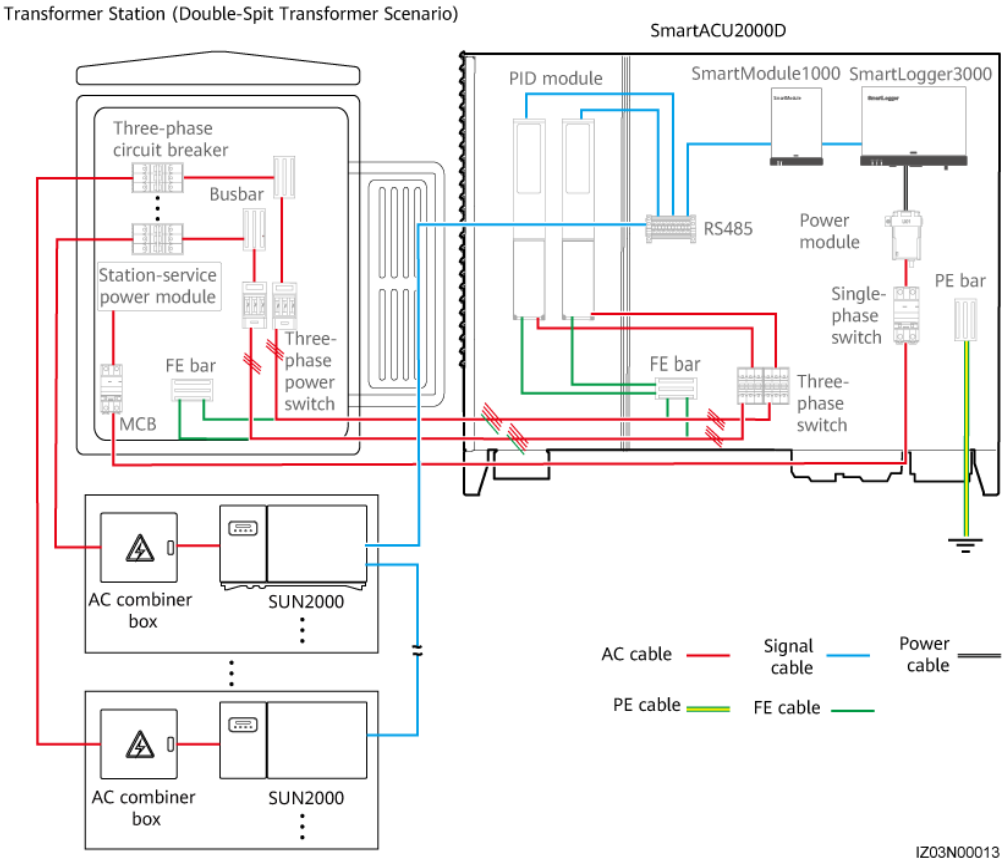
NOTE

When the SACU communicates with the inverter over MBUS, log in to the embedded WebUI of the SmartLogger3000, choose **Monitoring** > **MBUS** > **Network Settings**, and set **Networking** to **Enable** (default value). When the SACU communicates with the inverters over RS485, set **Networking** to **Disable**. For details, see the *SmartLogger3000 User Manual*.

- RS485 communication mode

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Figure 2-8 RS485 communication mode



- All SACU models support the RS485 communication mode.
- The SmartLogger connects to the transformer station, power meter, inverter, PID module, MBUS CCO module, and other devices that support RS485 communication over COM ports.

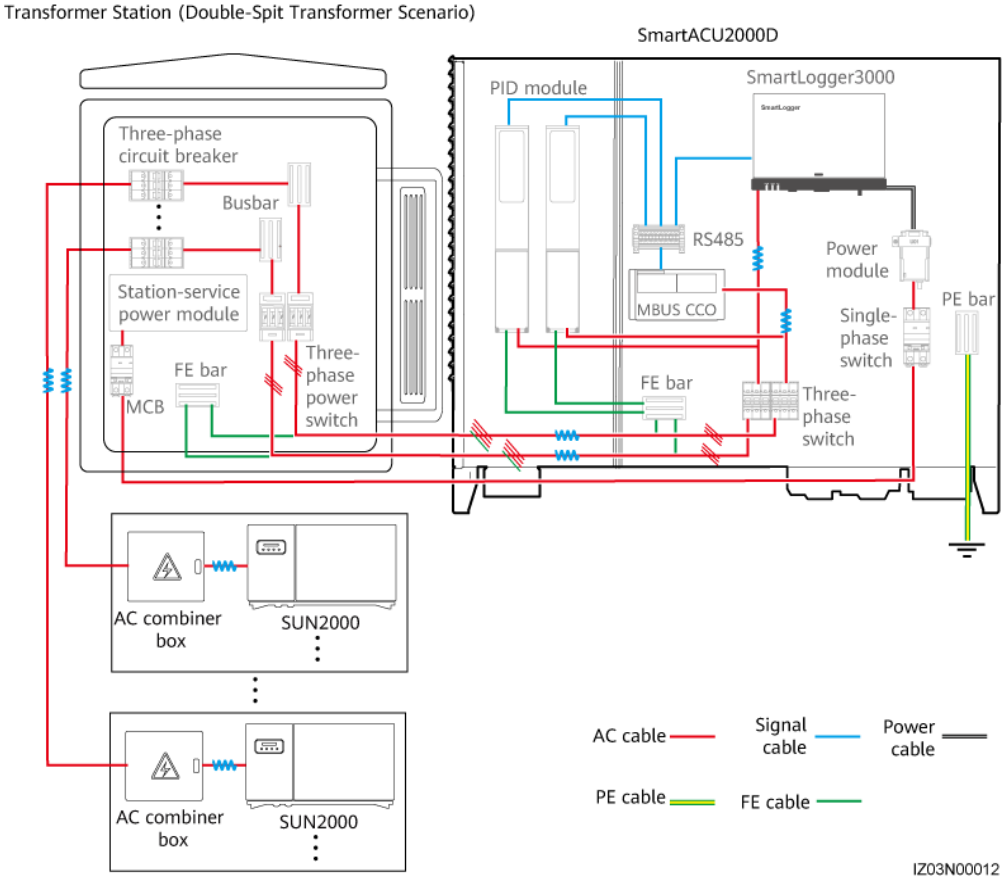
  NOTE

  - The SmartModule is installed before delivery only for the SmartACU2000D-D-03.
  - The figure displays only major components and cables, and is for reference only.

- MBUS communication mode

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Figure 2-9 MBUS communication mode



- If a double-winding transformer is used, use the SACU that supports the access of one MBUS route.
- If a double-split transformer is used, use the SACU that supports the access of two MBUS routes.
- The SmartLogger has embedded MBUS. It connects to the inverters that support MBUS communication over the three-phase AC power cable.
- In the SACU that supports the access of two MBUS routes, the MBUS CCO module connects to the inverters that support MBUS communication over the three-phase AC power cable.

  NOTE

  - The MBUS CCO is installed before delivery only for the SmartACU2000D-D-03.
  - The figure displays only major components and cables, and is for reference only.

- Ethernet communication mode
  - All SACU models support the Ethernet communication mode. The cabinet reserves a position for installing an Ethernet switch.
  - The SmartLogger has one 10/100/1000 Mbit/s Ethernet electrical port (WAN), and the SmartLogger connecting to an Ethernet switch has five 10/100/1000 Mbit/s Ethernet electrical ports.

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The SACU communicates with the plant monitoring system over a fiber ring network or 4G LTE network.

- Over a fiber ring network
  - All SACU models support a fiber ring network.
  - The SmartLogger connects to the plant monitoring system by optical fibers through an ATB.
- Over a 4G LTE network
  - All SACU models support the 4G LTE communication mode. The cabinet reserves positions for installing the PoE module and PoE SPD.
  - The SmartLogger connects to the plant monitoring system by 4G LTE through CPE.

The PID module factory-installed in the SACU can change the voltage between the neutral point on the AC side and the ground to change the voltage between the positive or negative electrode of PV modules and the ground, so as to prevent PID effect on PV modules.

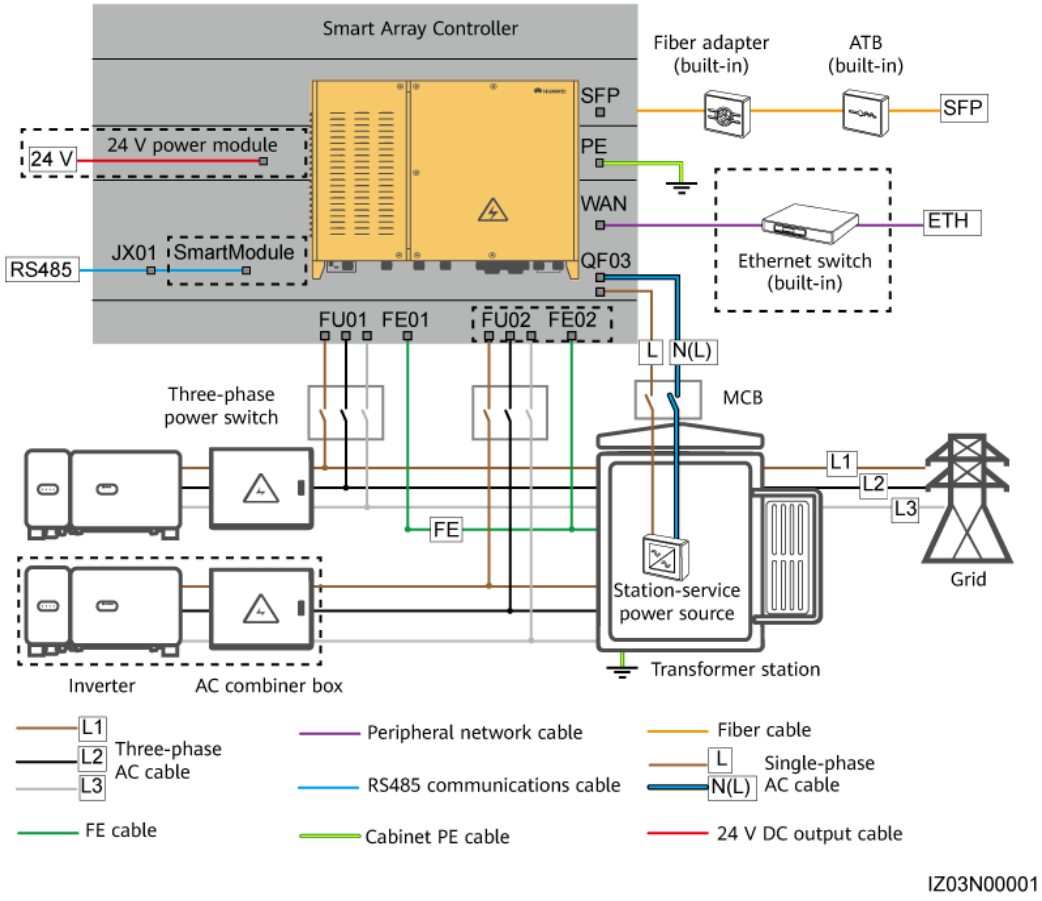
- If a double-winding transformer is used, use the SACU with one PID module.
- If a double-split transformer is used, use the SACU with two PID modules.

2.6 Configuration in Different Scenarios

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2.6.1 Fiber Ring Network

Figure 2-10 Networking diagram



NOTE

- Components in dashed-line boxes are optional. To highlight the key points, the figure does not show all factory-installed components and cables.
- The SmartModule is installed on the SmartACU2000D-D-03 before delivery, and you do not need to perform any operations on the SmartModule. If the SmartACU2000D-D-01 needs to provide more RS485 ports, the SmartModule can be installed.

Table 2-4 Components required in the fiber ring network scenario

Position	Component	Recommended Model or Specifications	Component Source	Quantity
SACU	(Optional) SmartModule	SmartModule1000A01	Purchased from Huawei	1
	(Optional) Ethernet switch	UT-H605 or ES1000		1
	(Optional) 24 V power supply	-		1

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Position	Component		Recommended Model or Specifications	Component Source	Quantity
	Fitting bag for fiber ring switching[a]	Optical module	-		2
		Optical jumper	-		8
Transformer station	Miniature circuit breaker (MCB)		Recommended rated current: 32 A; number of poles: 2	Prepared by the customer	1
	Three-phase power switch	Knife fuse switch	• When the rated AC voltage on the low-voltage (LV) side of the transformer station is less than or equal to 500 V, the rated voltage of the knife fuse switch should be greater than or equal to 600 V. • When the rated AC voltage on the LV side of the transformer station is greater than 500 V and less than or equal to 800 V, the rated voltage of the knife fuse switch should be greater than or equal to 800 V. • Recommended rated current of the fuse: 32 A; rated current of the knife fuse switch box: ≥ 32 A; number of poles: 3 (three fuses for each knife fuse switch box)		• Scenario with a double-winding transformer: 1 • Scenario with a double-split transformer: 2
Note a: There are two types of fitting bags for fiber ring switching: with 100 M optical modules or with 1000 M optical modules. You can purchase a fitting bag based on the specifications of the optical modules used on the fiber channel (FC) switch.					

NOTE

- Components listed in the table need to be installed onsite.
- Models of the components inside the transformer station are specified by the transformer station vendor.

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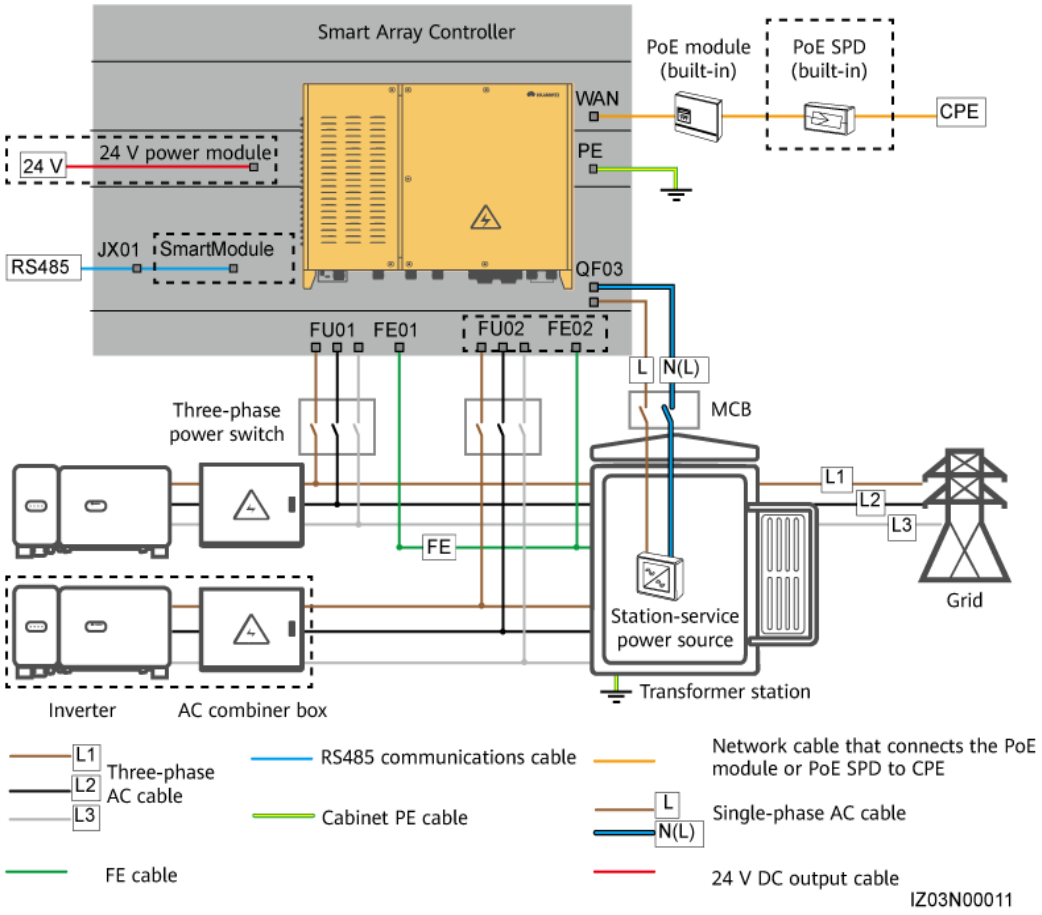
Table 2-5 Cables to be prepared by the customer in the fiber ring network scenario

No.	Cable	Recommended Model or Specifications	Recommended Cross-sectional Area Range
1	Three-phase AC power cable	• Four-core (L1, L2, L3, and FE) outdoor armored copper cable and OT-M4 terminals (FE) • When the rated AC voltage on the LV side of the transformer station is less than or equal to 500 V, the operating voltage between the three-phase AC power cable and the ground should be greater than or equal to 600 V. • When the rated AC voltage on the LV side of the transformer station is greater than 500 V and less than or equal to 800 V, the operating voltage between the three-phase AC power cable and the ground should be greater than or equal to 1000 V.	• 8–10 mm^2 (10 mm^2) • 8 AWG
2	(Optional) Peripheral network cable	Cat 5e outdoor shielded network cable with an outer diameter of less than 9 mm (0.35 in.) and internal resistance of less than or equal to 1.5 ohms/10 m (1.5 ohms/32.81 ft), as well as shielded RJ45 connectors	-
3	Peripheral RS485 communications cable	Computer cable (DJYP2VP2-22 2x2x1) or armored shielded twisted pair that can be used outdoors, as well as OT-M4 terminals	• 0.5–1 mm^2 (1 mm^2) • 20–18 AWG (18 AWG)
4	Cabinet PE cable	Outdoor copper cable and OT-M6 terminals	• 6–16 mm^2 (16 mm^2) • 10–6 AWG (6 AWG)
5	Optical cable	Four-core or eight-core single-mode armored optical cable with a transmission wavelength of 1310 nm and an outer diameter of less than or equal to 18 mm (0.71 in.)	-
6	Single-phase AC power cable	• Standard connection: two-core outdoor armored copper cable • Connection through a pipe: single-core outdoor copper cable • Operating voltage to the ground ≥ 300 V	• 4–6 mm^2 (4 mm^2) • 12–10 AWG (12 AWG)
7	(Optional) 24 V DC output power cable	• Standard connection: two-core outdoor armored copper cable • Connection through a pipe: single-core outdoor copper cable • Operating voltage to the ground ≥ 300 V	• 2.5–4 mm^2 (2.5 mm^2) • 14–12 AWG (14 AWG)

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2.6.2 4G LTE

Figure 2-11 Networking diagram



NOTE

- Components in dashed-line boxes are optional. To highlight the key points, the figure does not show all factory-installed components and cables.
- The SmartModule is installed on the SmartACU2000D-D-03 before delivery, and you do not need to perform any operations on the SmartModule. If the SmartACU2000D-D-01 needs to provide more RS485 ports, the SmartModule can be installed.

Table 2-6 Components required in the 4G LTE network scenario

Position	Component	Recommended Model or Specifications	Component Source	Quantity
SACU	(Optional) SmartModule	SmartModule1000A01	Purchased from Huawei	1
	(Optional) 24 V power supply	-		1

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Position	Component		Recommended Model or Specifications	Component Source	Quantity
	Fitting bags for the PoE module and CPE	PoE module	-		1
		PoE SPD[a]	-		1
Outside the SACU and transformer station		CPE	-		1
Transformer station	MCB		Recommended rated current: 32 A; number of poles: 2	Prepared by the customer	1
	Three-phase power switch	Knife fuse switch	When the rated AC voltage on the LV side of the transformer station is less than or equal to 500 V, the rated voltage of the knife fuse switch should be greater than or equal to 600 V. When the rated AC voltage on the LV side of the transformer station is greater than 500 V and less than or equal to 800 V, the rated voltage of the knife fuse switch should be greater than or equal to 800 V. Recommended rated current of the fuse: 32 A; rated current of the knife fuse switch box: ≥ 32 A; number of poles: 3 (three fuses for each knife fuse switch box)		• Scenario with a double-winding transformer: 1 • Scenario with a double-split transformer: 2
Note a: If the CPE model is EG860, a PoE SPD is required.					

NOTE

- Components listed in the table need to be installed onsite.
- Models of the components inside the transformer station are specified by the transformer station vendor.

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Table 2-7 Cables to be prepared by the customer in the 4G LTE network scenario

No.	Cable	Recommended Model or Specifications	Cross-sectional Area Range of the Cable (Recommended Value)
1	Three-phase AC power cable	• Four-core (L1, L2, L3, and FE) outdoor armored copper cable and OT-M4 terminals (FE) • When the rated AC voltage on the LV side of the transformer station is less than or equal to 500 V, the operating voltage between the three-phase AC power cable and the ground should be greater than or equal to 600 V. • When the rated AC voltage on the LV side of the transformer station is greater than 500 V and less than or equal to 800 V, the operating voltage between the three-phase AC power cable and the ground should be greater than or equal to 1000 V.	• 8–10 mm^2 (10 mm^2) • 8 AWG
3	Peripheral RS485 communications cable	Computer cable (DJYP2VP2-22 2x2x1) or armored shielded twisted pair that can be used outdoors, as well as OT-M4 terminals	• 0.5–1 mm^2 (1 mm^2) • 20–18 AWG (18 AWG)
4	Cabinet PE cable	Outdoor copper cable and OT-M6 terminals	• 6–16 mm^2 (16 mm^2) • 10–6 AWG (6 AWG)
5	Network cable from the PoE module or PoE SPD to the CPE	20 m (65.62 ft) long network cable delivered with the Huawei CPE. If the cable is not long enough, prepare a Cat 5e outdoor shielded network cable with an outer diameter of less than 9 mm (0.35 in.) and internal resistance of less than or equal to 1.5 ohms/10 m (1.5 ohms/32.81 ft), as well as shielded RJ45 connectors.	-
6	Single-phase AC power cable	• Standard connection: two-core outdoor armored copper cable • Connection through a pipe: single-core outdoor copper cable • Operating voltage to the ground ≥ 300 V	• 4–6 mm^2 (4 mm^2) • 12–10 AWG (12 AWG)

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No.	Cable	Recommended Model or Specifications	Cross-sectional Area Range of the Cable (Recommended Value)
7	(Optional) 24 V DC output power cable	• Standard connection: two-core outdoor armored copper cable • Connection through a pipe: single-core outdoor copper cable • Operating voltage to the ground ≥ 300 V	• 2.5–4 mm^2 (2.5 mm^2) • 14–12 AWG (14 AWG)

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3 Storage Requirements

The following requirements should be met when the SACU needs to be stored prior to installation:

- Do not unpack the SACU. Check the packing materials periodically. If any rodent bites are found, replace the packing materials immediately.
- Store the SACU in a place with appropriate temperature and humidity to protect the SACU from dust and water vapor corrosion.
- To avoid personal injury or device damage, stack SACUs neatly so that they will not fall over.
- If the SACU has been stored for a long time, it needs to be inspected by professionals before it is put into use.

The Company shall not be liable for any consequence caused by violation of the storage requirements specified in this document.

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4 System Installation

4.1 Checking Before Installation

Item	Acceptance Criteria
Outer package	The outer package is intact and tidy. If it is damaged or abnormal, do not unpack it, and contact your dealer.
Exterior	The exterior is intact. If any damage is found, do not use the device, and contact your dealer as soon as possible.
Deliverables	Check the number of deliverables against the packing list in the packing case. If any deliverables are missing or damaged, contact your dealer.

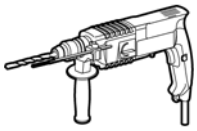
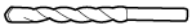
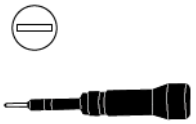
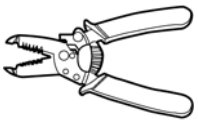
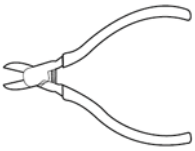
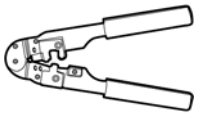
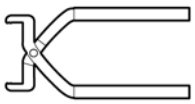
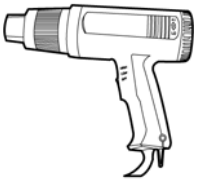
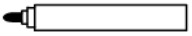
4.2 Unpacking and Acceptance

NOTICE

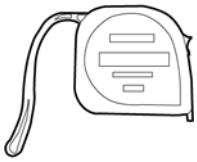
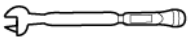
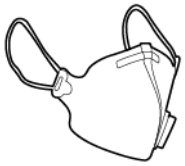
- To prevent the equipment from falling over, secure it to a pallet truck or forklift using ropes before moving it. Move the equipment with caution to avoid bumping or falling, which may damage the equipment.
- After placing the equipment in the installation position, unpack it with care to prevent scratches. Keep the equipment stable during unpacking.

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4.3 Preparing Tools

Category	Tool			
Installation	 Hammer drill	 Drill bit (Φ14 mm/Φ16 mm)	 Flat-head insulated torque screwdriver (M3)	 Phillips insulated torque screwdriver (M3/M4/M5/M6)
	 Adjustable wrench Open end: 32 mm	 Insulated torque socket wrench	 Wire stripper	 Diagonal pliers
	 Rubber mallet	 Crimping tool	 Cable cutter	 Utility knife
	 RJ45 crimping tool	 Network cable tester	 Multimeter	 SPD extracting tool
	 Heat shrink tubing	 Heat gun	 Vacuum cleaner	 Marker

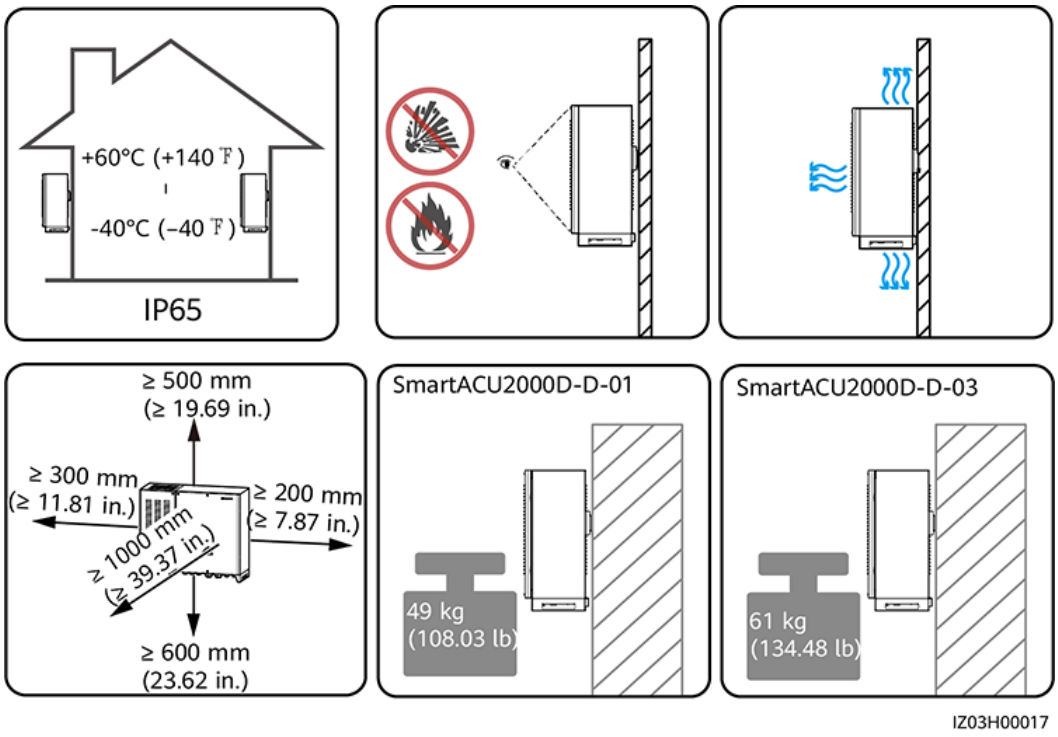
Copyright © Huawei Technologies Co., Ltd.

Category	Tool			
	 Steel measuring tape	 Level	 Cable tie	 Adjustable torque wrench
Personal protective equipment (PPE)	 Insulated gloves	 Protective gloves	 Goggles	 Dust mask
	 Safety helmet	 Reflective vest	 Insulated shoes	-

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4.4 Installation Requirements

Figure 4-1 Installation requirements



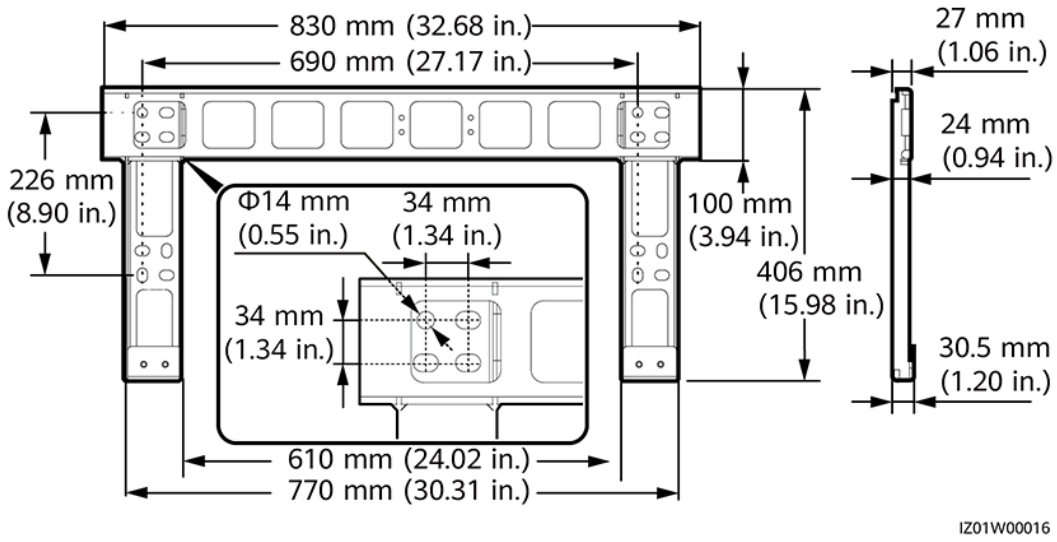
4.5 Installing the Cabinet

4.5.1 Installing the Mounting Bracket

A mounting bracket has four groups of tapped holes, each group containing four tapped holes. Mark any hole in each group based on site requirements and mark four holes in total. Two round holes are preferred to secure the mounting bracket.

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Figure 4-2 Mounting bracket dimensions



Wall-mounted Installation

WARNING

Avoid drilling holes into the water pipes and power cables buried in the wall.

NOTICE

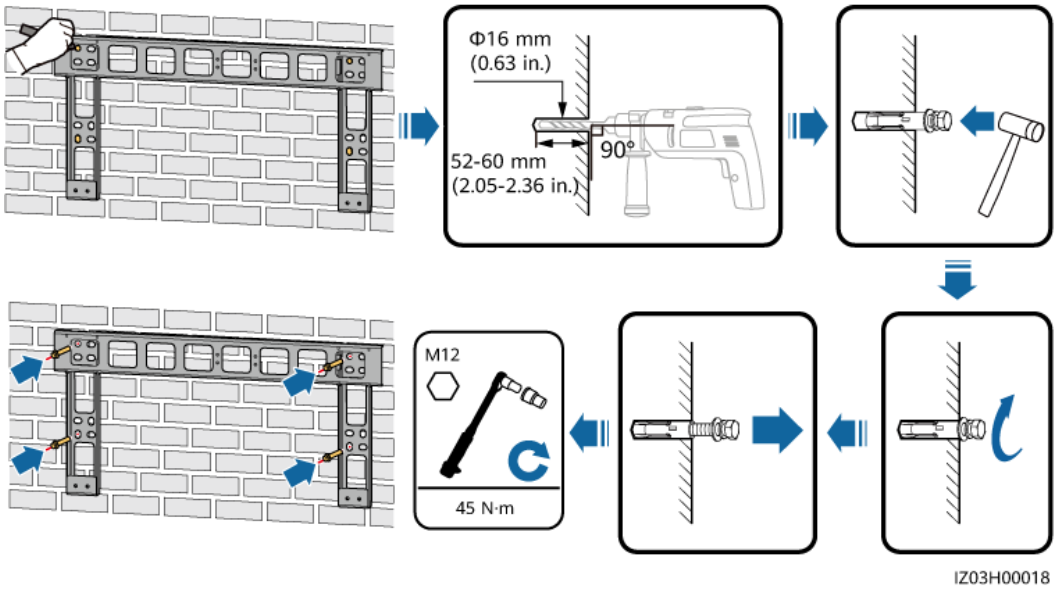
- To prevent dust inhalation or contact with eyes, wear safety goggles and an anti-dust respirator when drilling holes.
- Wipe away any dust in or around the holes and measure the hole distances. If the holes are inaccurately positioned, drill holes again.
- Level the head of the expansion sleeve with the concrete wall after removing the bolt, spring washer, and flat washer. Otherwise, the mounting bracket will not be securely installed on the wall.

Step 1 Prepare expansion bolts (M12x60 stainless steel expansion bolts are recommended).

Step 2 Install a mounting bracket.

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Figure 4-3 Installing a mounting bracket



NOTE

When determining the positions for drilling holes, level the hole positions using a level, and mark the positions using a marker.

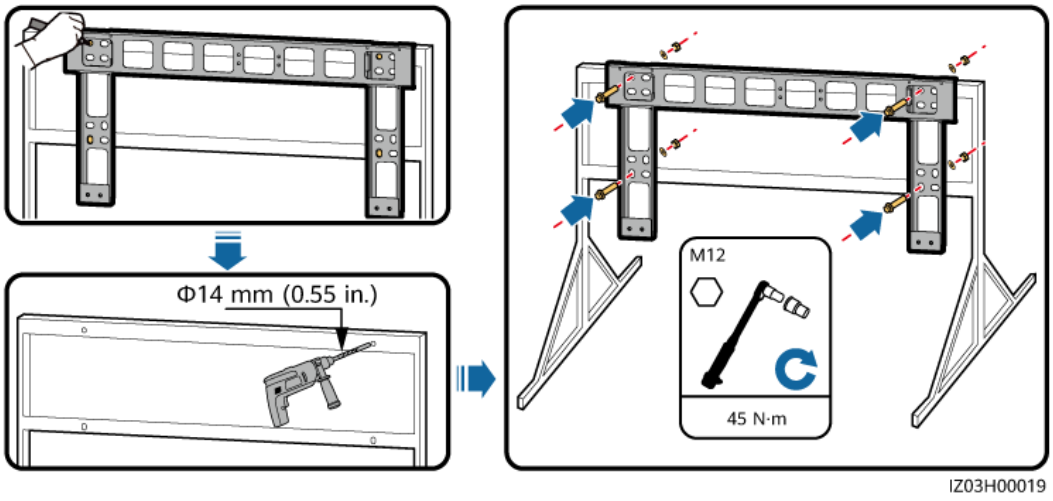
----End

Support-mounted Installation

Step 1 Obtain the M12x40 bolt assemblies from the packing case. (If the length does not meet the installation requirements, prepare M12 bolt assemblies by yourself and use them together with the supplied M12 nuts.)

Step 2 Install a mounting bracket.

Figure 4-4 Installing a mounting bracket



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NOTE

When determining the positions for drilling holes, level the hole positions using a level, and mark the positions using a marker.

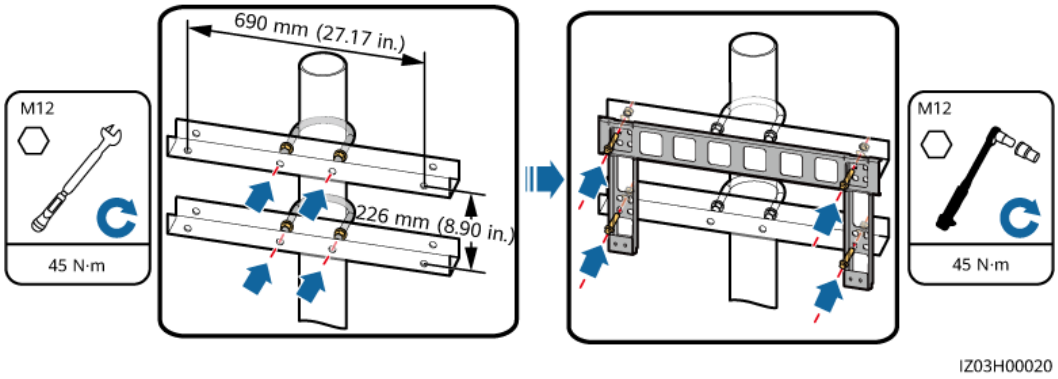
----End

Pole-mounted Installation

Step 1 Prepare a pole-mounting bracket by yourself. You are advised to use M12 U-shaped bolts to secure the pole-mounting bracket.

Step 2 Install a mounting bracket.

Figure 4-5 Installing a mounting bracket



NOTE

Figures provided in this section are for reference only. The actual poles and pole-mounting brackets may vary.

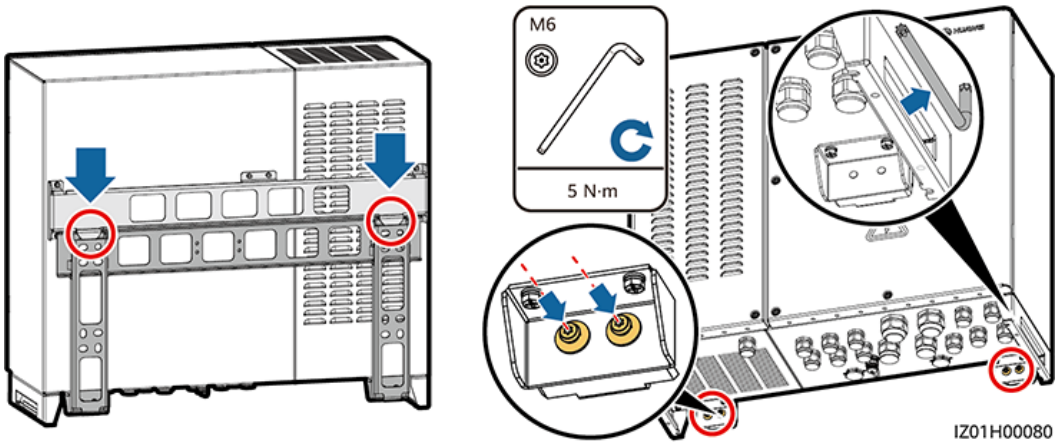
----End

4.5.2 Mounting the Cabinet

Step 1 Lift the cabinet, mount it onto the mounting bracket, and secure it using security Torx screws.

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Figure 4-6 Mounting a cabinet



----End

4.6 Installing the Components

Install the components based on **2.6 Configuration in Different Scenarios**.

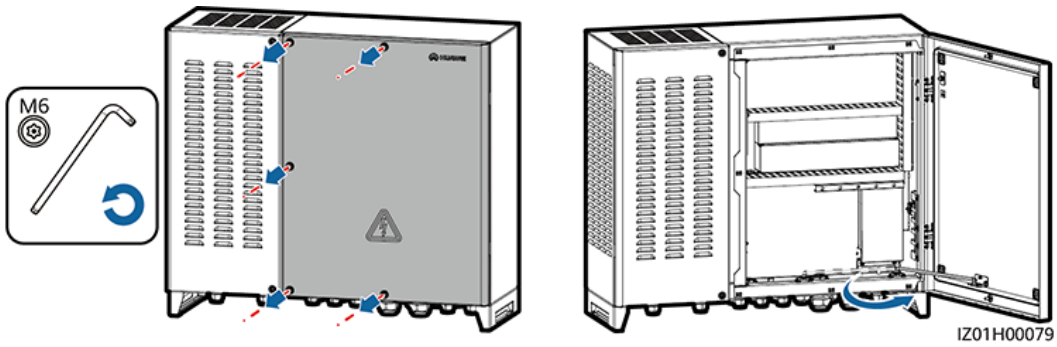
4.6.1 Opening the Main Cabinet Door

NOTICE

- Before opening the main cabinet door, turn off all upstream switches for the SACU to power off the SACU. After that, wait at least three minutes and then operate the SACU. If you have to operate the SACU with power-on, wear insulation gloves and take protective measures.
- If you need to open the main cabinet door on rainy or snowy days, take protective measures to prevent rain or snow from entering the cabinet. If it is impossible to take protective measures, do not open the main cabinet door on rainy or snowy days.
- Do not leave unused screws in the cabinet.

Loosen the screws on the main cabinet door, open the cabinet door, and adjust the support bar.

Figure 4-7 Opening a cabinet door



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NOTE

To highlight the involved area, the figure does not show certain components. This is applicable to all other similar figures.

4.6.2 (Optional) Installing the SmartModule

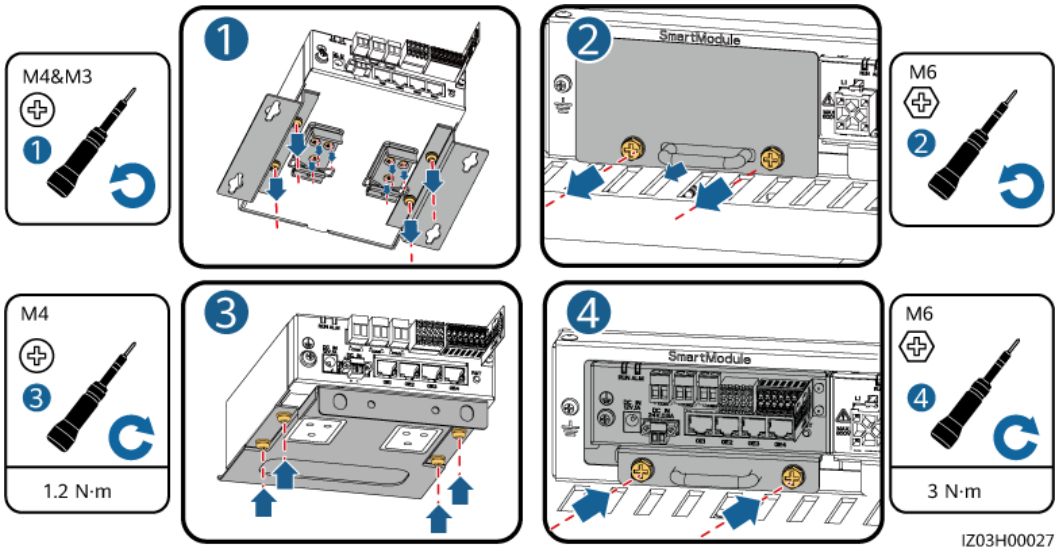
Step 1 Remove the mounting ears and guide rail–mounting bracket from the SmartModule.

Step 2 Remove the panel at the position where the SmartModule is to be installed from the cabinet and take out the mounting bracket.

Step 3 Secure the mounting bracket to the SmartModule.

Step 4 Install the SmartModule.

Figure 4-8 Installing a SmartModule



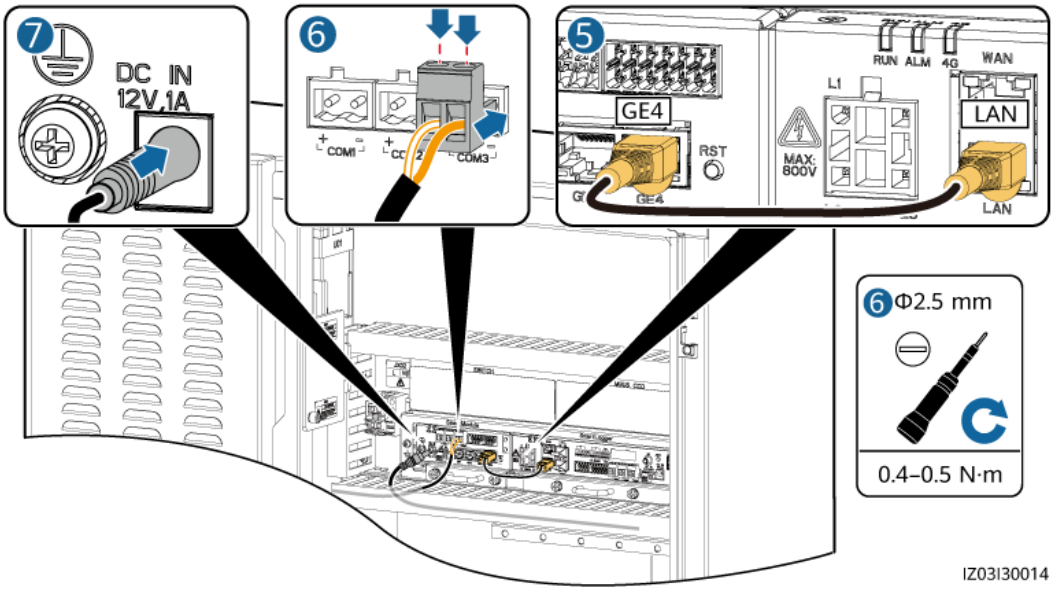
Step 5 Connect the **GE4** port on the SmartModule to the **LAN** port on the SmartLogger using the network cable delivered with the SmartModule.

Step 6 Connect the preinstalled RS485 cable to the COM port on the SmartModule based on the label.

Step 7 Connect the preinstalled power cable to the **12V 1A** port on the SmartModule based on the cable label.

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Figure 4-9 Connecting cables



----End

4.6.3 (Optional) Installing the Ethernet Switch

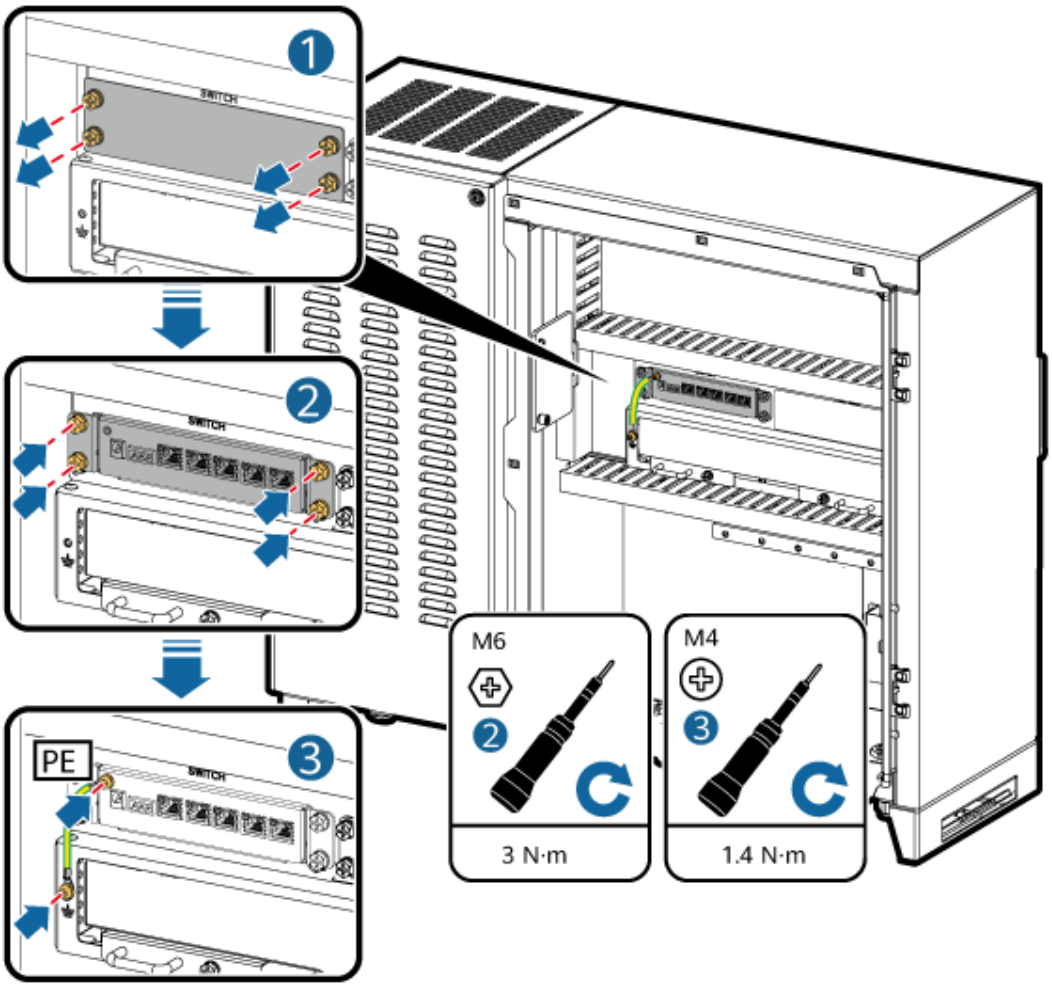
Step 1 Remove the panel behind which an Ethernet switch will be installed.

Step 2 Secure the Ethernet switch.

Step 3 Connect a PE cable to the Ethernet switch.

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Figure 4-10 Installing an Ethernet switch

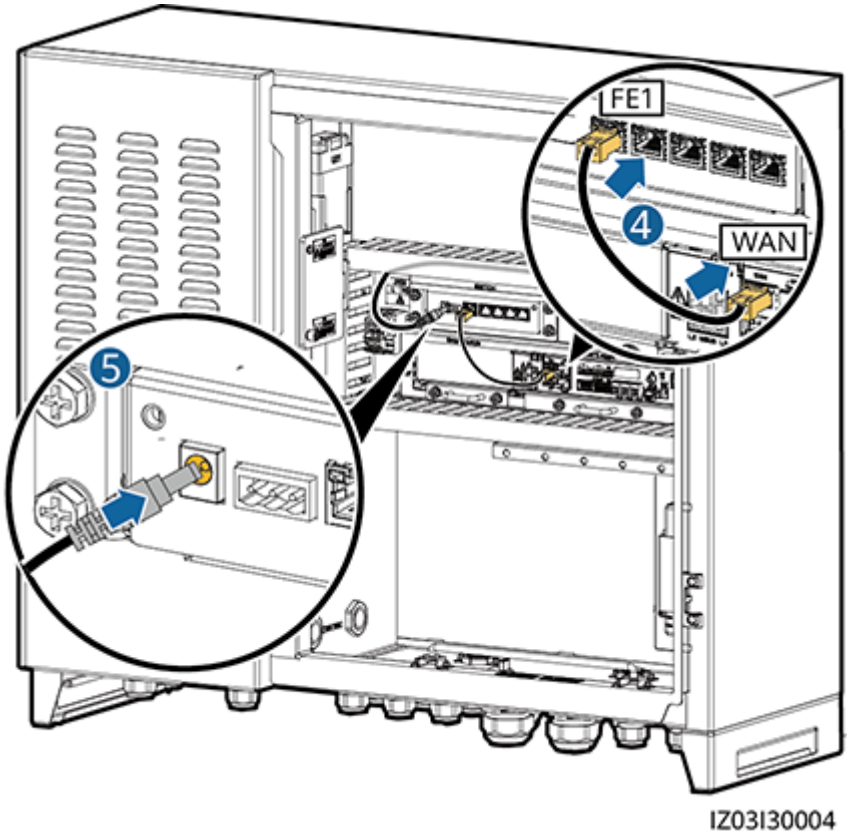


Step 4 Connect the **FE1** port on the Ethernet switch to the **WAN** port on the SmartLogger using the network cable delivered with the Ethernet switch.

Step 5 Connect the preinstalled power cable to the power port on the Ethernet switch based on the label.

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Figure 4-11 Connecting cables to an Ethernet switch



----End

4.6.4 (Optional) Installing the 24 V Power Module

Step 1 Remove the mounting bracket of the 24 V power module from the cabinet.

Step 2 Install the 24 V power module in the mounting bracket.

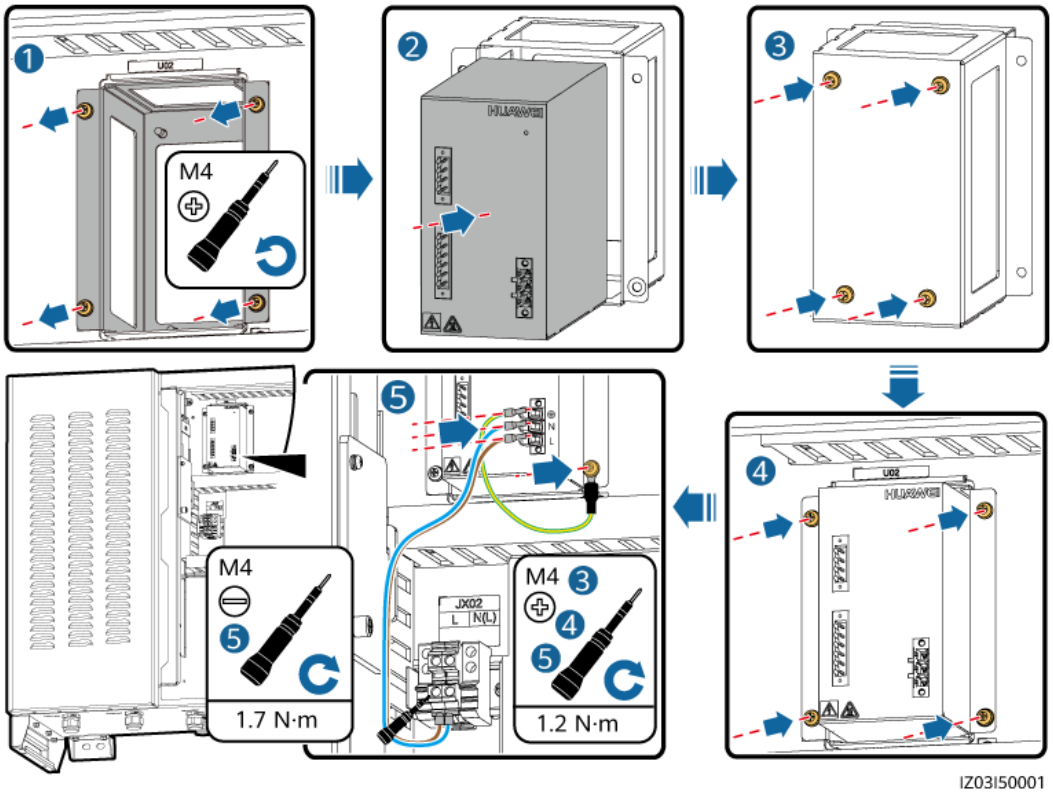
Step 3 Secure the 24 V power module to the mounting bracket using the screws (delivered with the 24 V power module).

Step 4 Install the 24 V power module in the cabinet.

Step 5 Connect the AC input power cables (delivered with the SACU) to the 24 V power module based on the cable label.

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Figure 4-12 Installing a 24 V power module



----End

4.6.5 Installing the PoE Module

Step 1 Loosen screws (do not remove the screws) and remove the mounting board.

Step 2 Remove screws from the PoE module installation position.

Step 3 Place the PoE module at the installation position and align the mounting holes. Then secure the PoE module.

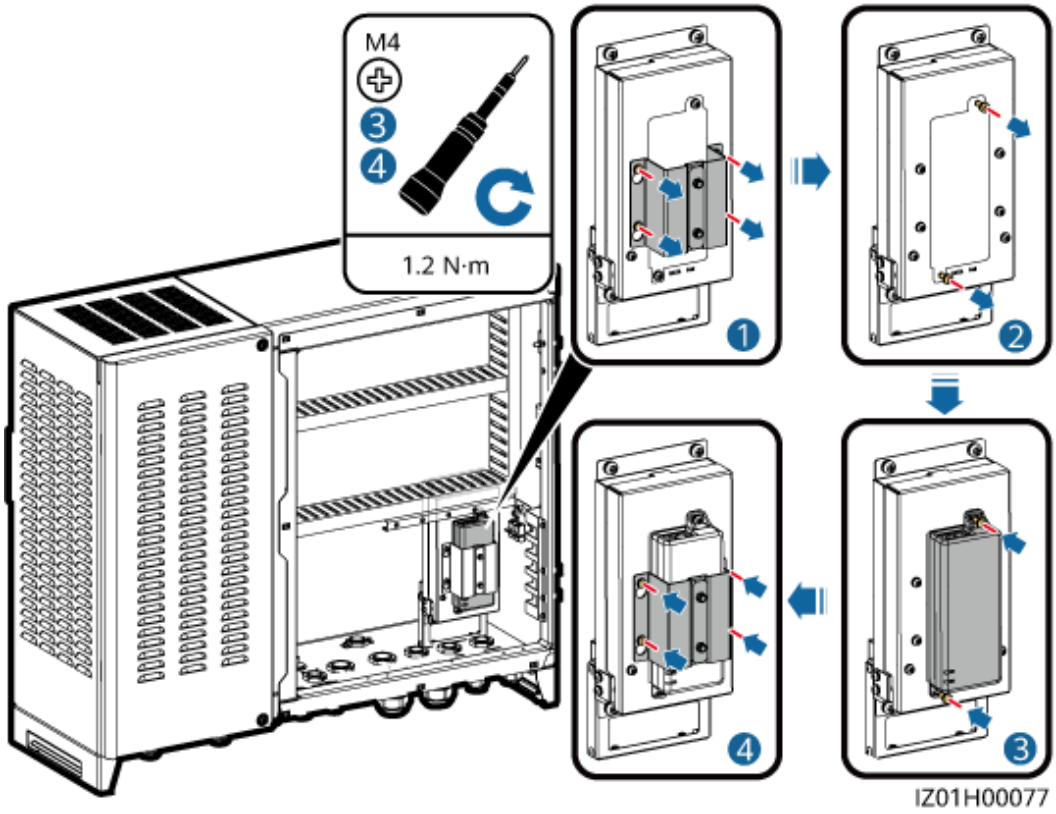
NOTE

Indicators should be in the lower left corner.

Step 4 Secure the mounting board.

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Figure 4-13 Installing a PoE module



----End

4.6.6 (Optional) Installing the PoE SPD

Step 1 Loosen the nuts (do not remove the nuts) on the PoE SPD mounting board.

Step 2 Replace and secure the PoE SPD mounting bracket.

Step 3 Connect one end of the ground cable to the PE point on the PoE SPD, and secure the ground nut.

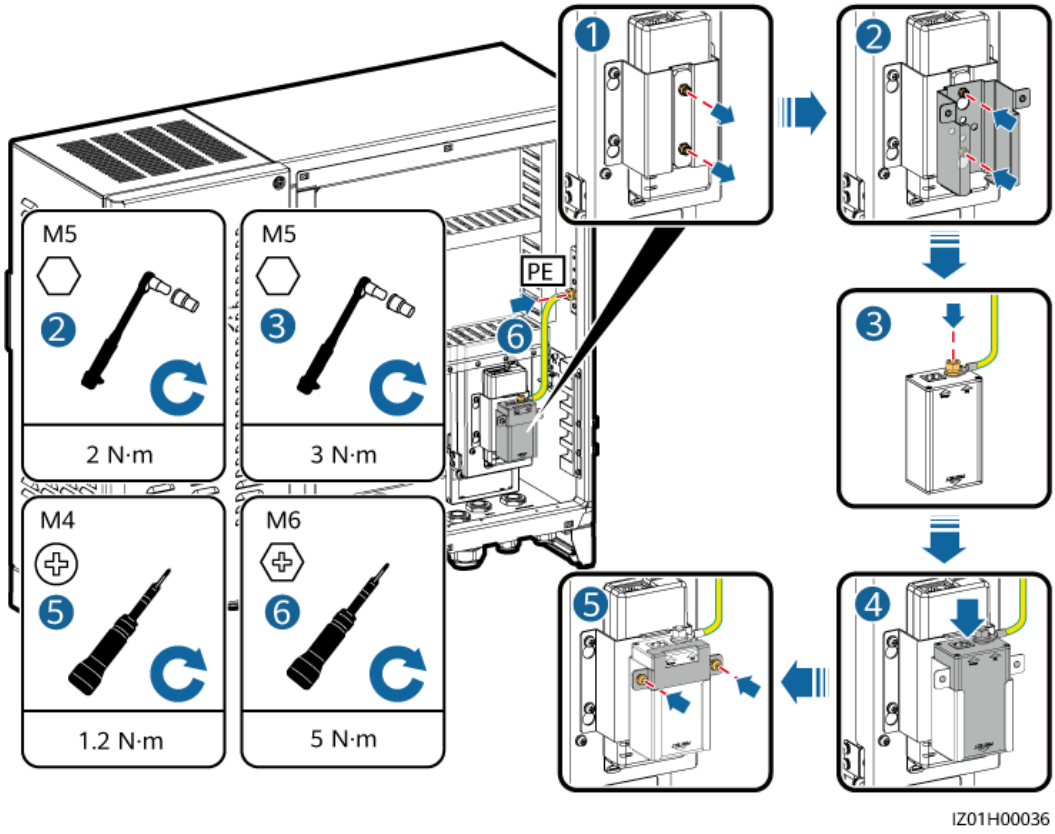
Step 4 Place the PoE SPD in the mounting bracket. Ensure that the PE point faces upwards and the surface marked **PE** faces outwards.

Step 5 Secure the PoE SPD fastener.

Step 6 Connect the other end of the ground cable to the PE bar.

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Figure 4-14 Installing a PoE SPD



----End

5 Electrical Connections

DANGER

- The site must be equipped with qualified fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

CAUTION

- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

NOTICE

- Only certified electricians are allowed to connect cables.
- Before connecting cables to ports, leave enough slack to reduce the tension on the cables and prevent poor cable connections.
- Connect cables in strict accordance with the operation description and precautions provided in the document. Do not connect signal cables, single-phase AC power cables, and three-phase AC power cables reversely or mix them up. Otherwise, the caused equipment damage is not covered under any warranty or service agreement.
- For simplicity purposes, cables described in this chapter are those to be connected onsite, rather than factory-installed cables. The cabling routes are for reference only.
- The cable colors shown in the electrical connection diagrams provided in this chapter are for reference only. Select cables in accordance with local cable specifications (green-and-yellow cables are only used for protective earthing).

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5.1 Selecting a Connection Mode

You can connect a peripheral cable to the SACU in common mode or through a tube based on site requirements.

NOTICE

- To prevent poor cable connection due to overstress caused by ground subsidence, you are advised to bend the cable inside the cabinet for a slack of 20–30 mm (0.79–1.18 in.) before connecting the cable to the appropriate port.
- If a cable has a jacket, ensure that the jacket is in the cabinet.
- This section describes how to connect a peripheral cable to the RS485/ETH/DC waterproof connector in common mode and through a tube, and provides a reference for connecting peripheral cables to other waterproof connectors.

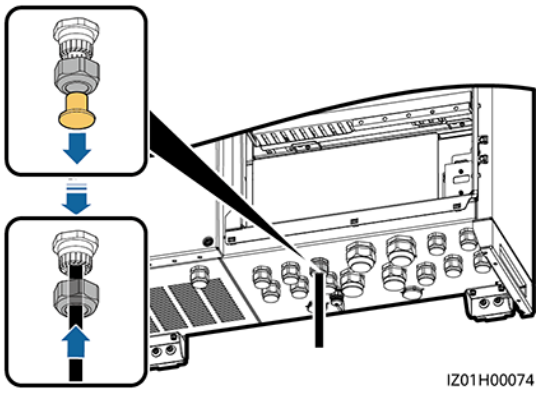
5.1.1 Common Connection

If you choose common connection, ensure that an appropriate cable is available.

Step 1 Remove the locking cap and plug from the waterproof connector.

Step 2 Route the cable through the locking cap and then the waterproof connector.

Figure 5-1 Routing a cable



Step 3 Connect the cable and tighten the locking cap.

Step 4 Check that the cable is connected correctly and securely. Seal the waterproof connector and cable hole using the supplied firestop putty.

Step 5 Clear foreign matter from the cabinet.

----End

5.1.2 Connection Through a Pipe

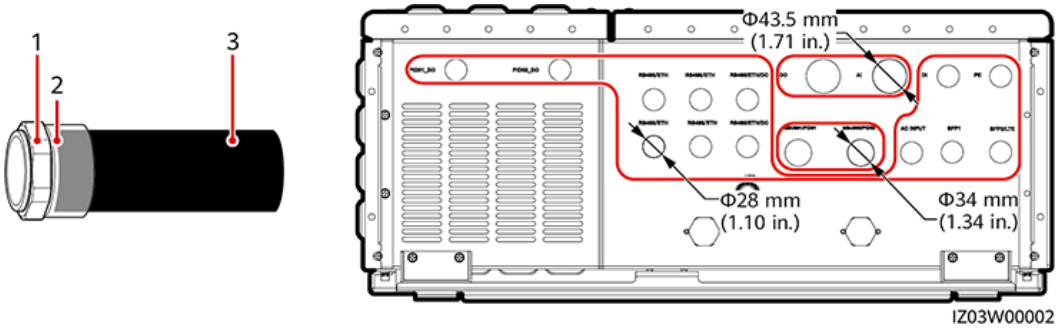
If you choose connection through a pipe, ensure that an appropriate cable and a pipe are available.

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NOTE

- Prepare an appropriate pipe based on the diameter of the cable holes at the bottom. It is recommended that the pipe specifications comply with the waterproof connector specifications. For example, for a 3/4 in. waterproof connector, a 3/4 in. pipe is recommended.
- The pipe appearance is for reference only. The actual pipe may vary. This is applicable to all other similar figures.

Figure 5-2 Pipe and diameter of cable holes at the bottom

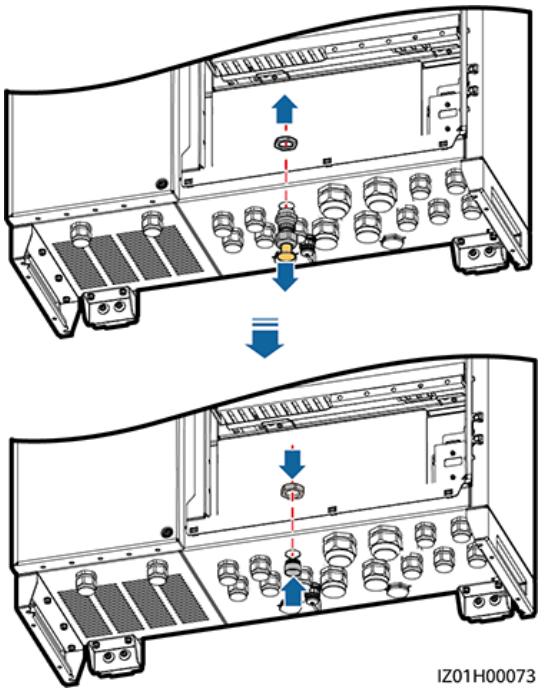


(1) Nut (2) Fitting (3) Conduit

Step 1 Remove the locking cap and plug from the waterproof connector, and remove the waterproof connector.

Step 2 Secure the pipe fitting using the nut delivered with the pipe.

Figure 5-3 Installing a pipe fitting



Step 3 Route the cable through the pipe conduit and then the fitting, and connect the cable.

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Step 4 Secure the pipe fitting to the conduit.

Step 5 Check that the cable is connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fitting are secured reliably, and seal the cable hole using supplied firestop putty.

Step 6 Clear foreign matter from the cabinet.

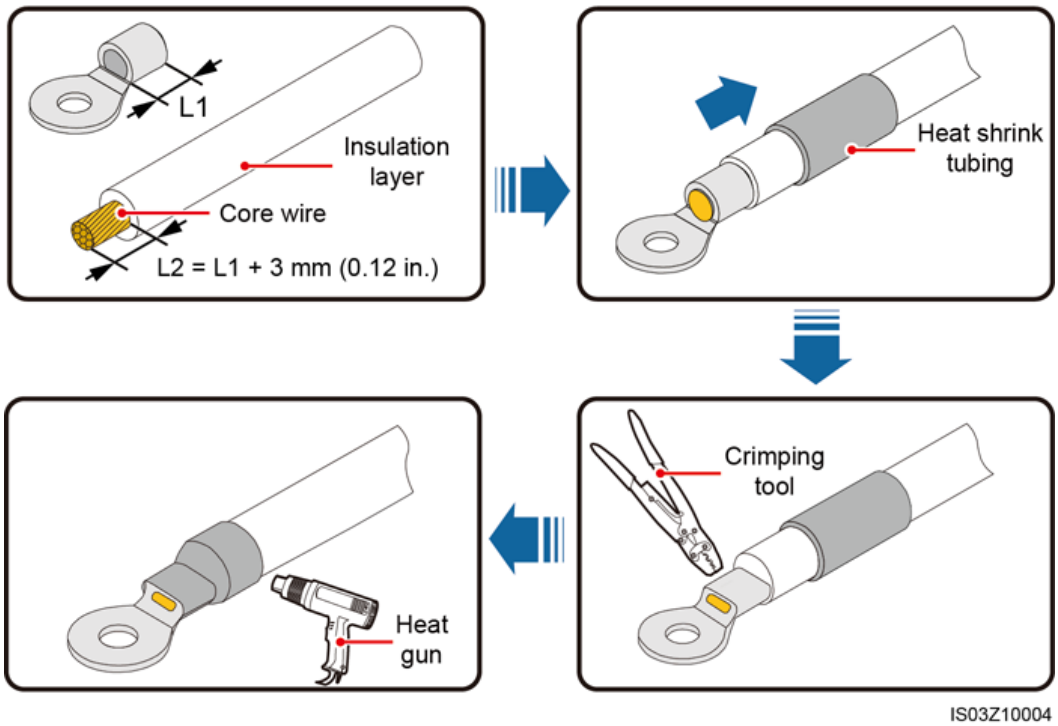
----End

5.2 Crimping the OT Terminal

NOTICE

- Avoid scratching the core wire when stripping a cable.
- The cavity formed after the conductor crimp strip of the OT terminal is crimped must wrap the core wire completely. The core wire must make close contact with the OT terminal.
- Wrap the wire crimping area with heat shrink tubing or insulation tape. The heat shrink tubing is used as an example.
- Use a heat gun carefully to avoid heat damage to the equipment.

Figure 5-4 Crimping an OT terminal



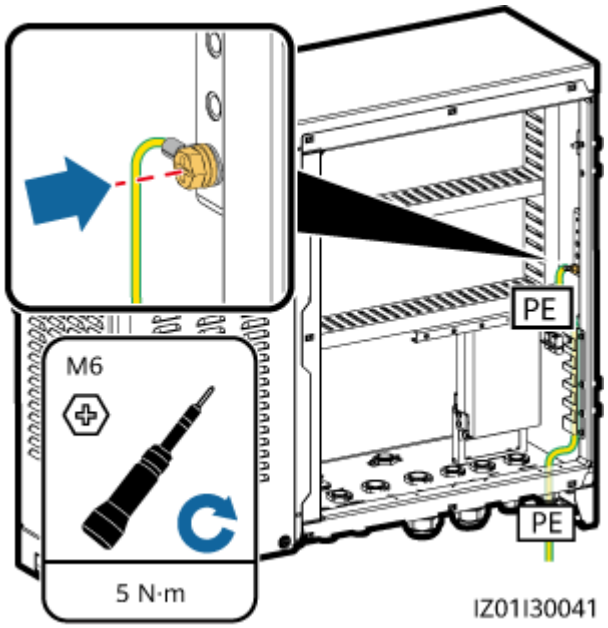
 Copyright © Huawei Technologies Co., Ltd.

5.3 Connecting the PE Cable

NOTICE

- Connect the PE cable to the nearest ground point or the ground bar in the transformer station.
- To enhance the corrosion resistance of a ground terminal, you are advised to apply silicone grease or paint on it after connecting the PE cable.

Figure 5-5 Connecting a PE cable



5.4 Connecting the Communications Cables for the Fiber Ring Network

Connecting Optical Jumpers

Step 1 Obtain optical modules from the fitting bag for fiber ring switching.

Step 2 Insert optical modules into the SFP1 and SFP2 ports of the SmartLogger.

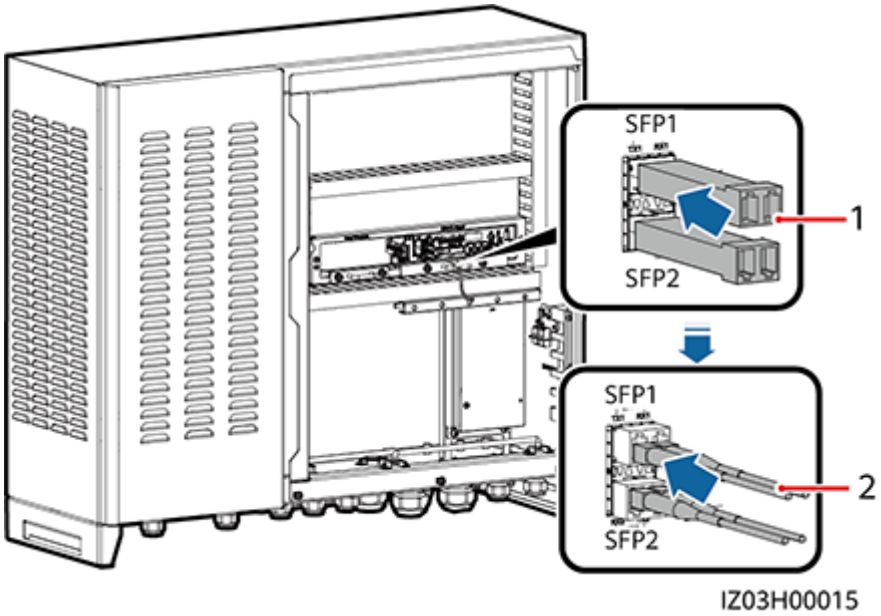
NOTICE

- Pay attention to the directions of the optical modules. The label of the optical module on the SFP1 port faces upwards, whereas the label of the optical module on the SFP2 port faces downwards.
- If you hear a **click** when inserting the optical module, the optical module snaps into place. Then pull it back to ensure that it is secure.

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Step 3 Connect the optical jumpers delivered with the optical modules to the ports on the optical modules.

Figure 5-6 Connecting optical jumpers



(1) Optical module (2) Optical jumper

----End

Connecting the Cables to the ATB

NOTICE

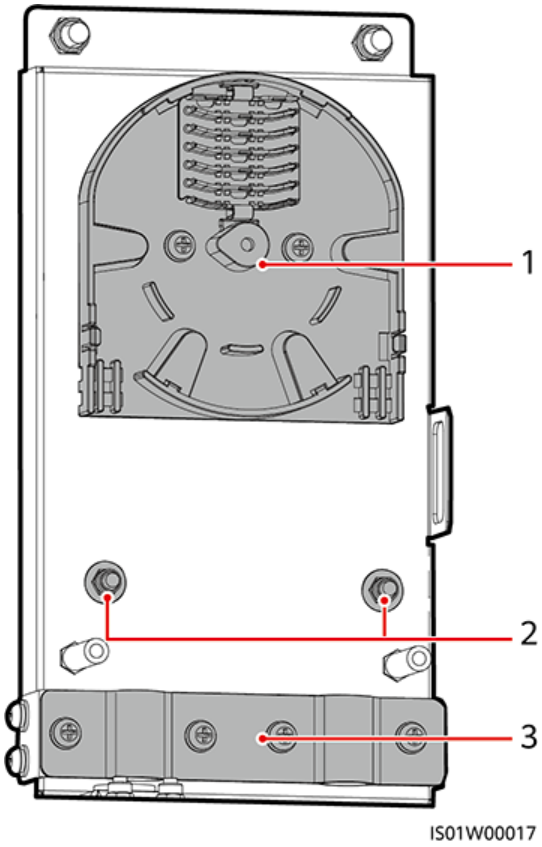
- The hardness of the optical cables is high. Therefore, you need to route the optical cables into the cabinet after the optical cables are prepared.
- Only professionals are allowed to connect and splice optical cables.

NOTE

Connect two optical cables in a fiber ring network, and connect one optical cable in a star optical network.

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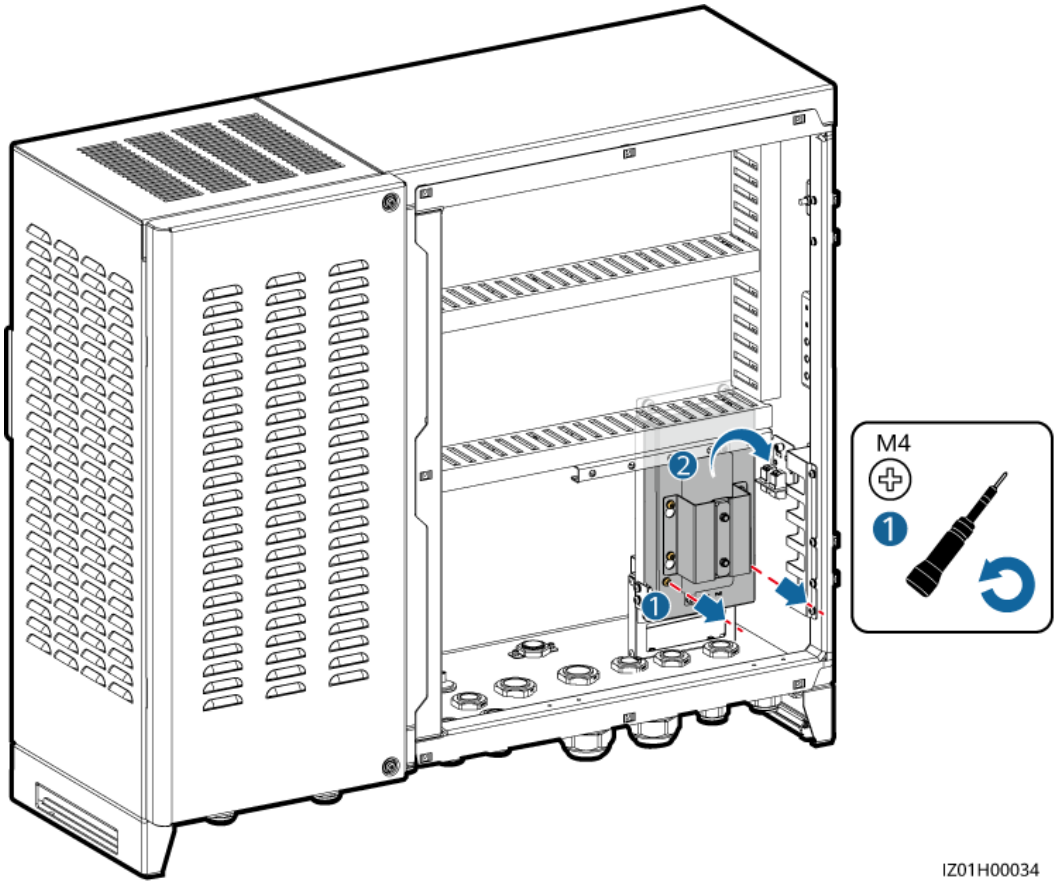
Figure 5-7 ATB interior



(1) Fiber spool (2) Fixing points for internal steel wires of optical cables (3) Cable clip

Step 1 Remove the external mechanical parts from the ATB.

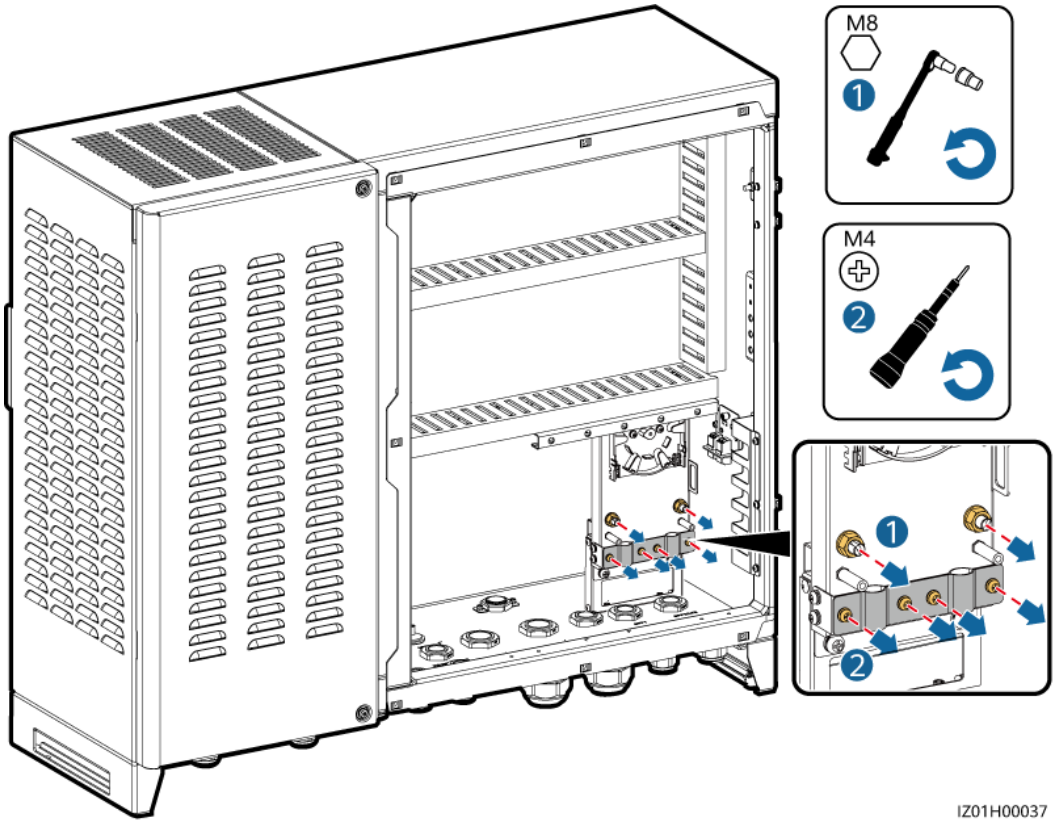
Figure 5-8 Removing external mechanical parts



Step 2 Remove the optical cable fastener.

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Figure 5-9 Removing a fastener



Step 3 Connect one end of the optical jumper to the fiber adapter.

Step 4 Route the other end of the optical jumper through the cable hole on the side of the ATB, and connect the cable to the ATB.

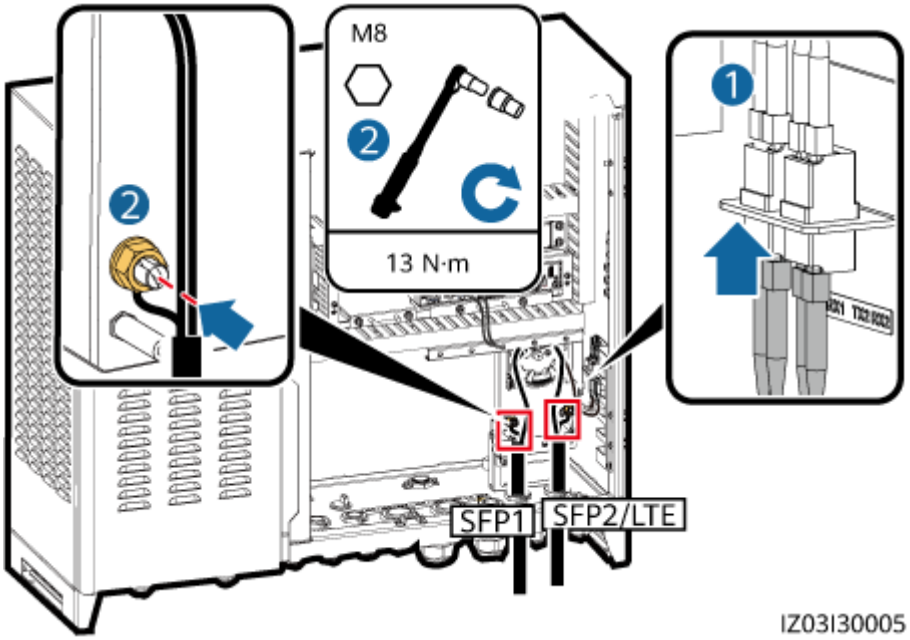
Step 5 Connect the peripheral optical cable to the ATB, splice the optical cable and the optical jumper, and then wind the spliced cable around the fiber spool on the ATB.

NOTICE

Only professionals are allowed to splice fibers.

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Figure 5-10 Connecting optical cables



Step 6 Check that the cables are connected correctly and securely. Then reinstall the optical cable fastener and external mechanical parts.

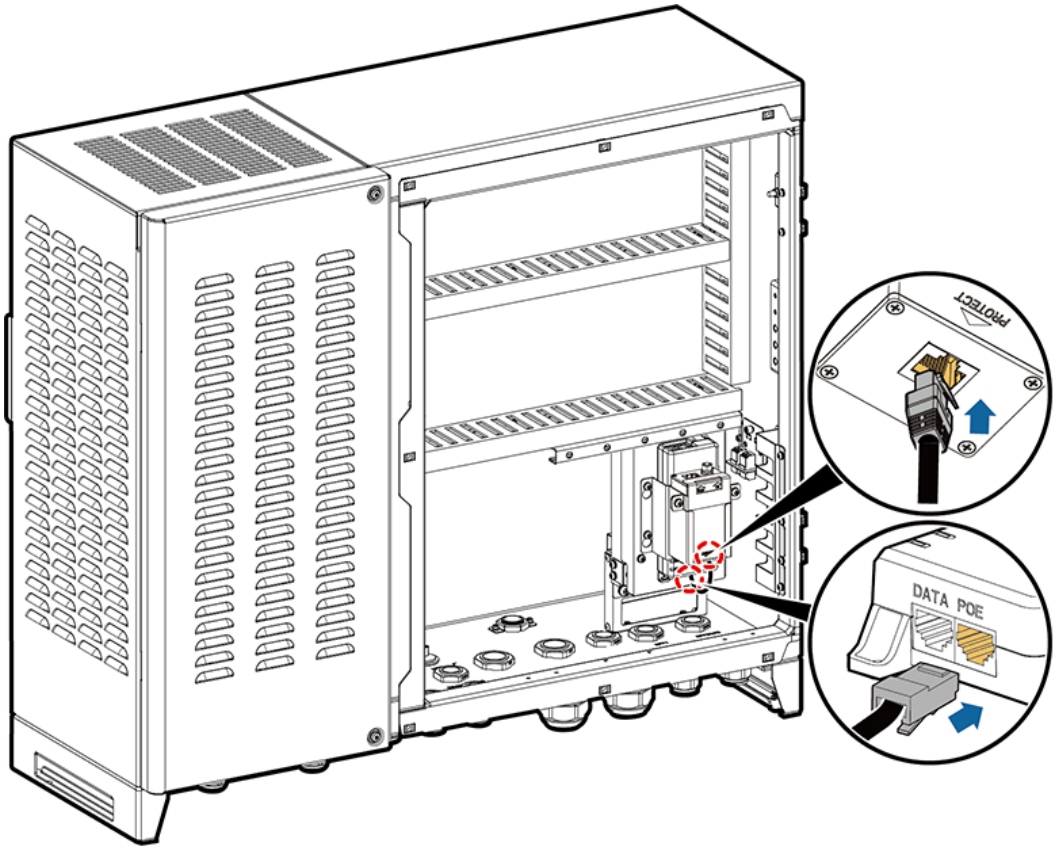
----End

5.5 Connecting the 4G LTE Cable (With a PoE SPD)

Step 1 Connect the **POE** port on the PoE module to the **PROTECT** port on the PoE SPD using the network cable delivered with the PoE SPD.

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Figure 5-11 Connecting a PoE module to a PoE SPD

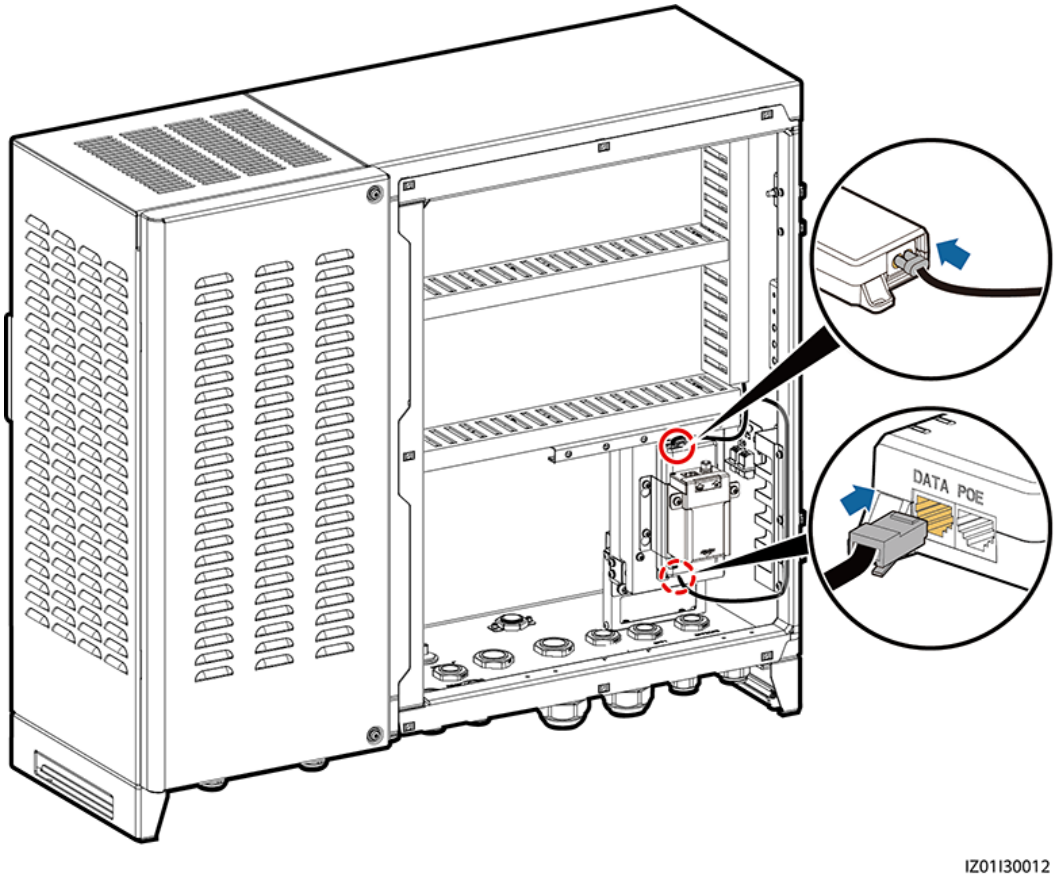


Step 2 Connect the factory-installed network cable on the SmartLogger to the **DATA** port on the PoE module.

Step 3 Connect the factory-installed power cable on the SmartLogger to the PoE module.

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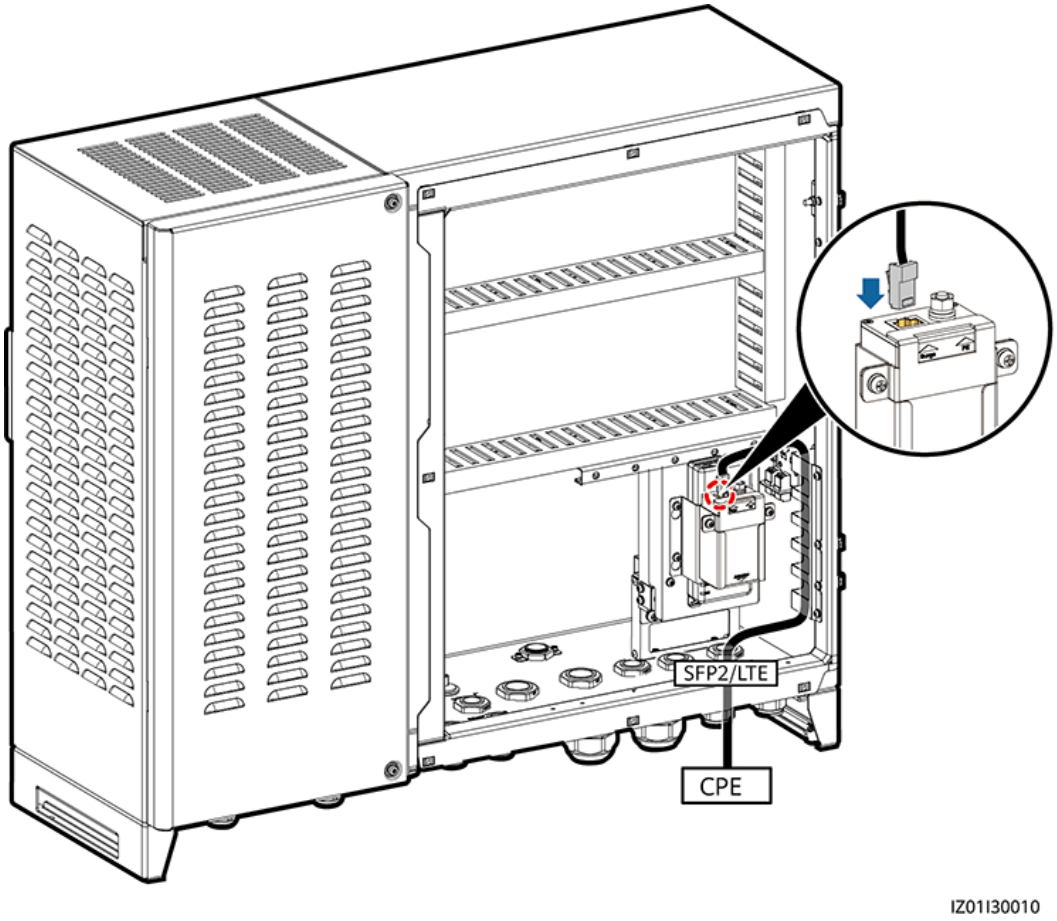
Figure 5-12 Connecting cables to a PoE module



Step 4 Connect the network cable delivered with the CPE to the **Surge** port on the PoE SPD.

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Figure 5-13 Connecting a CPE network cable



----End

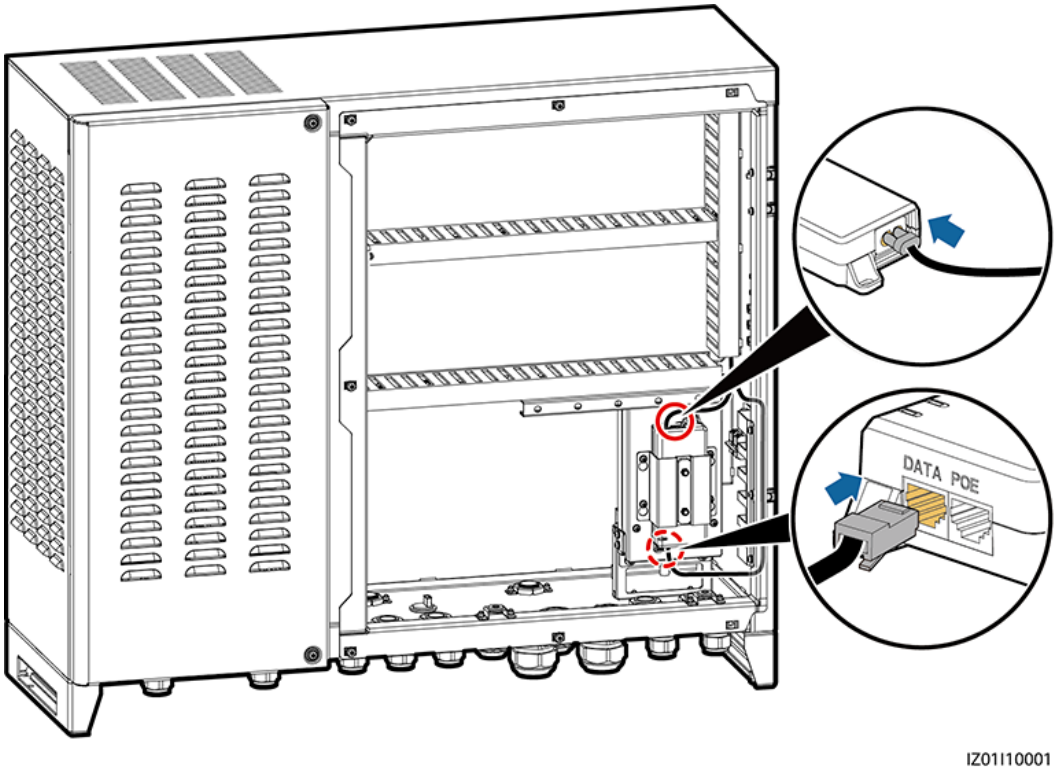
5.6 Connecting the 4G LTE Cable (Without a PoE SPD)

Step 1 Connect the factory-installed network cable on the SmartLogger to the **DATA** port on the PoE module.

Step 2 Connect the factory-installed power cables on the SmartLogger to the PoE module.

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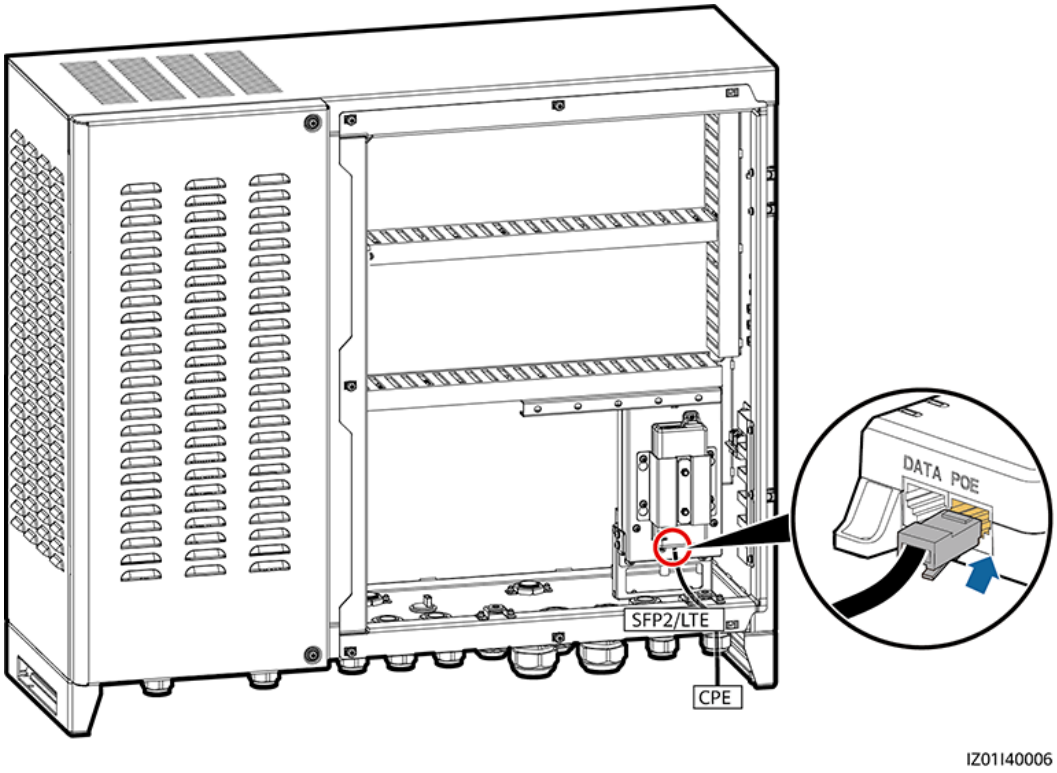
Figure 5-14 Connecting cables to a PoE module



Step 3 Connect the network cable delivered with the CPE to the **POE** port on the PoE module.

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Figure 5-15 Connecting a CPE network cable



----End

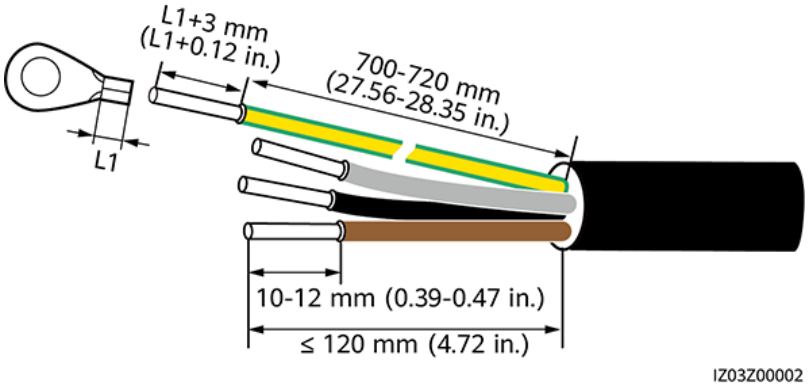
5.7 Connecting the Three-Phase AC Power Cable

- For the SACU that houses one PID module, connect the three-phase AC power cable to the **FU01** switch, and the FE cable to **FE01** on the FE bar.
- For the SACU that houses two PID modules, connect the three-phase AC power cable of the first route to the **FU01** switch, and the corresponding FE cable to the **FE01** port on the FE bar. Connect the three-phase AC power cable of the second route to the **FU02** switch, and the corresponding FE cable to the **FE02** port on the FE bar.
- This section describes how to connect three-phase AC power cables for the SACU with two PID modules. For details about the single PID module situation, refer to the way of connecting the first route of three-phase AC power cable.

Step 1 Prepare a cable.

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Figure 5-16 Length for cable stripping



Step 2 Crimp an OT terminal.

Step 3 Connect the L1, L2, and L3 cables to the three-phase input switch, and the FE cable to the FE bar.

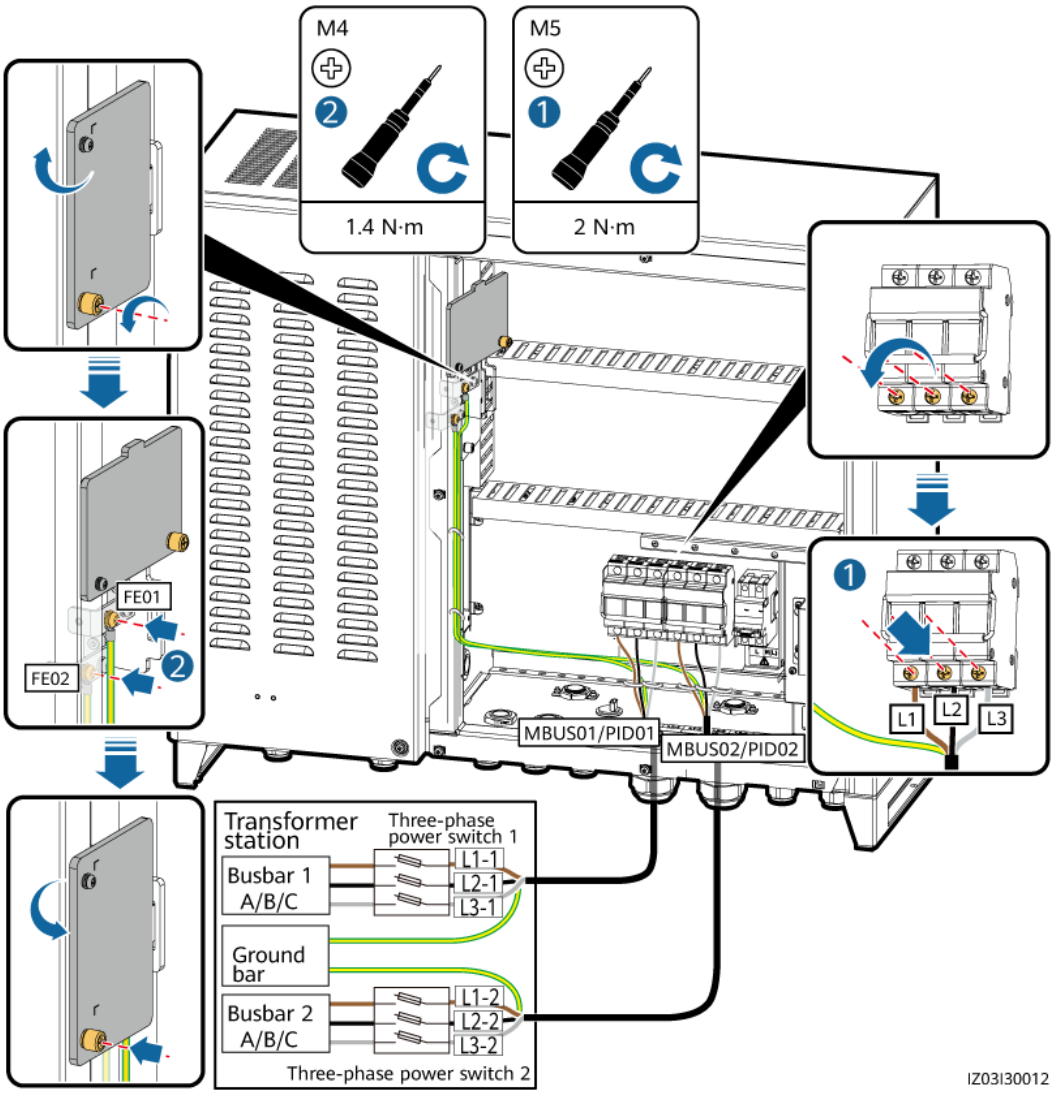
NOTICE

- Connect the L1-1, L2-1, and L3-1 cables from the **FU01** switch respectively to ports A, B, and C on the transformer station busbar 1 over a three-phase power switch.
- Connect the L1-2, L2-2, and L3-2 cables from the **FU02** switch respectively to ports A, B, and C on the transformer station busbar 2 over a three-phase power switch.
- Connect the FE cable for the PID module to the ground bar in the transformer station.
- Ensure that the L1, L2, and L3 cables are connected in correct phase sequence.
- Do not mix up the cables to the **FE01** port with the cables to the **FE02** port.

Step 4 Bind the cable.

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Figure 5-17 Connecting a cable



----End

5.8 Connecting the Peripheral RS485 Communications Cables

Connect peripheral RS485 communications cables to the JX01 terminal block. All RS485 communications cables are connected in the same way. This section describes how to connect two RS485 communications cables.

Table 5-1 Definition of the JX01 terminal block

No.	Port on the JX01 Terminal Block	Definition
1	RS485-1 (+)	RS485A, RS485 differential signal+
2	RS485-1 (–)	RS485B, RS485 differential signal–

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No.	Port on the JX01 Terminal Block	Definition
3	RS485-2 (+)	RS485A, RS485 differential signal+
4	RS485-2 (–)	RS485B, RS485 differential signal–
5	RS485-3 (+)	RS485A, RS485 differential signal+
6	RS485-3 (–)	RS485B, RS485 differential signal–
7	RS485-4 (+)	RS485A, RS485 differential signal+
8	RS485-4 (–)	RS485B, RS485 differential signal–
9	RS485-5 (+)	RS485A, RS485 differential signal+
10	RS485-5 (–)	RS485B, RS485 differential signal–
11	RS485-6 (+)	RS485A, RS485 differential signal+
12	RS485-6 (–)	RS485B, RS485 differential signal–

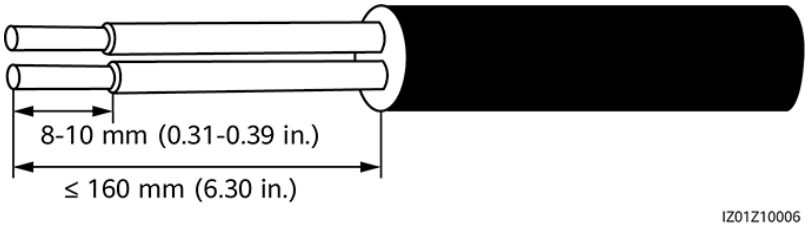
NOTICE

- For the SmartACU2000D-D-01, do not connect a peripheral RS485 communications cable to the RS485-1 port (ports 1 and 2 on the JX01 terminal block), because the PID01 communications cable has been connected to this port.
- For the SmartACU2000D-D-03, do not connect a peripheral RS485 communications cable to the RS485-1 and RS485-2 ports, because the PID01 communications cable has been connected to the RS485-1 port (ports 1 and 2 on the JX01 terminal block) and the PID02 communications cable has been connected to the RS485-2 port (ports 3 and 4 on the JX01 terminal block).
- For the SmartACU2000D-D-03, do not connect a peripheral RS485 communications cable to the RS485-3 port (ports 5 and 6 on the JX01 terminal block) because the communications cable of the MBUS CCO module has been connected to this port.
- JX01 ports 7, 8, 9, 10, 11, and 12 on the SmartACU2000D-D-03 can be connected to the RS485 cable.
- JX01 ports 7, 8, 9, 10, 11, and 12 on the SmartACU2000D-D-01 can be connected to the RS485 cable only after the SmartModule is installed.

Step 1 Prepare the communications cable.

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Figure 5-18 Length for cable stripping

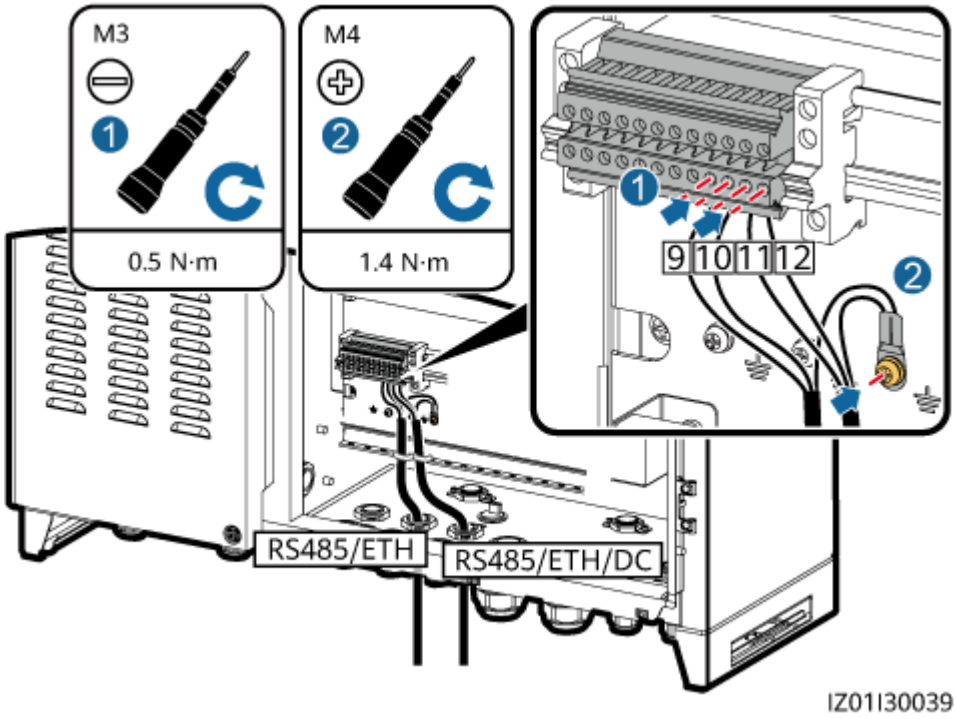


Step 2 Connect the communications cable to the JX01 terminal block.

Step 3 Crimp an OT terminal on the shield layer, and connect the shield layer to the cabinet ground point.

Step 4 Bind the communications cable.

Figure 5-19 Connecting RS485 communications cables



----End

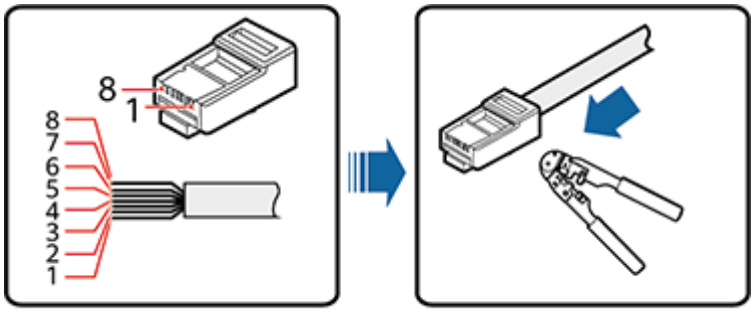
5.9 (Optional) Connecting the Peripheral Network Cable

Connect peripheral network cables to ports **FE2** to **FE5** on the switch. All network cables can be connected in the same way.

Step 1 Prepare a network cable.

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Figure 5-20 Wiring sequence of an RJ45 connector



(1) White-and-orange (2) Orange (3) White-and-green (4) Blue

(5) White-and-blue (6) Green (7) White-and-brown (8) Brown

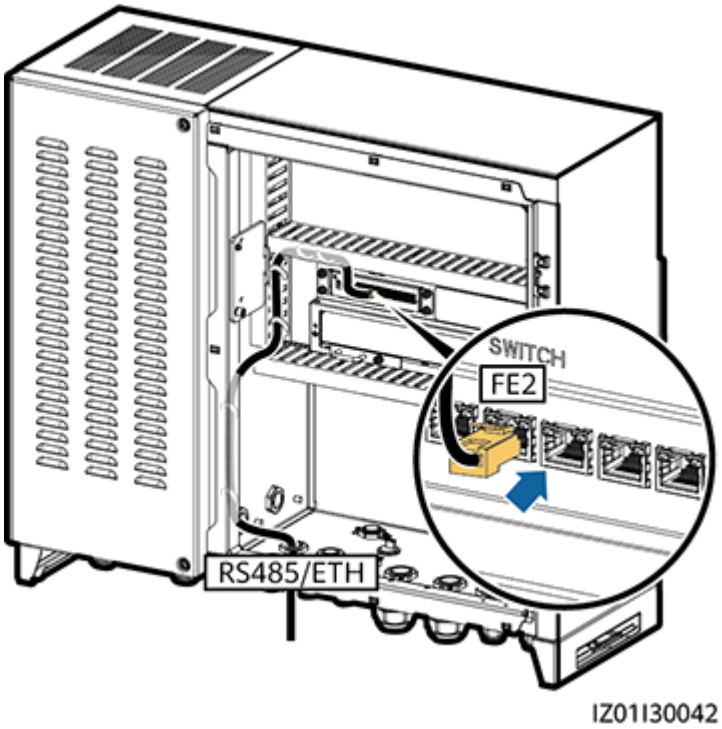
NOTE

Verify that the network cable functions properly using a network cable tester.

Step 2 Connect the peripheral network cable to the **FE2** port on the switch.

Step 3 Bind the network cable.

Figure 5-21 Connecting a network cable



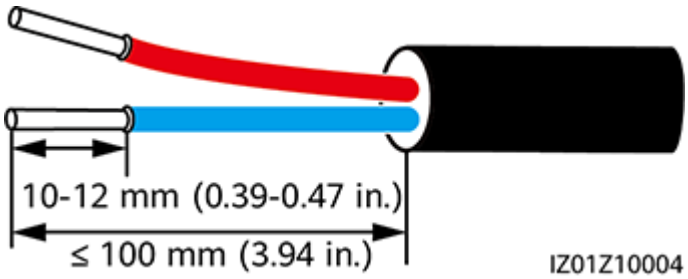
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5.10 (Optional) Connecting the DC Output Power Cable to the 24 V Power Module

Step 1 Prepare a cable.

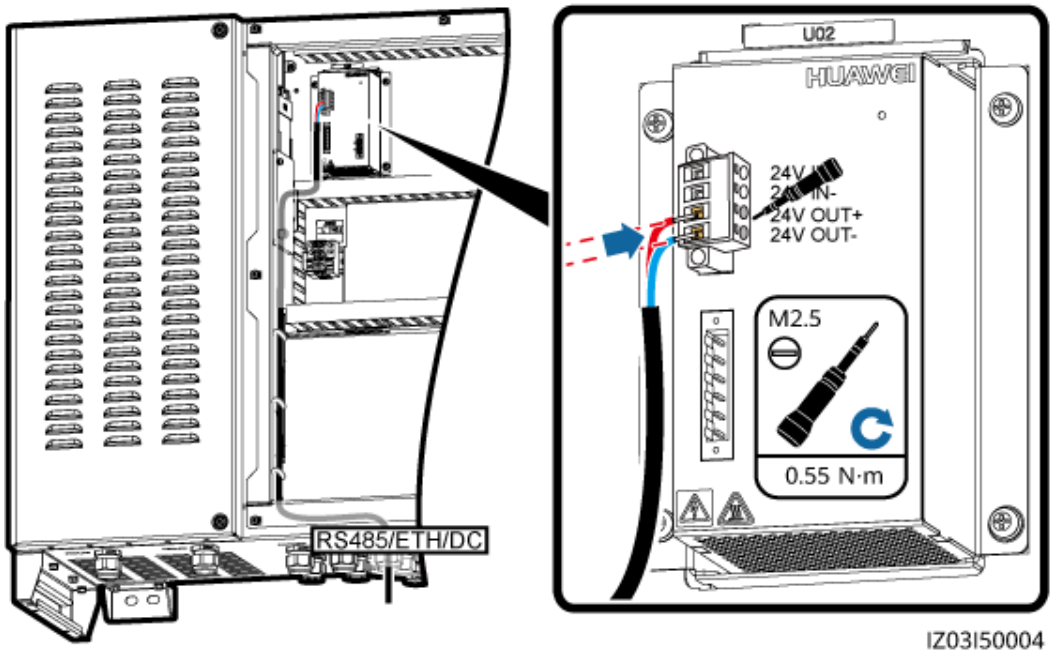
Figure 5-22 Length for cable stripping



Step 2 Connect the cable to the 24V OUT+ and 24V OUT- ports on the 24 V power module.

Step 3 Bind the cable.

Figure 5-23 Connecting a DC output power cable to the 24 V power module



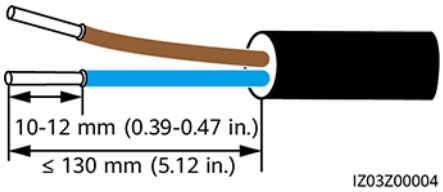
----End

5.11 Connecting the Single-Phase Power Cable

Step 1 Prepare a cable.

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Figure 5-24 Length for cable stripping



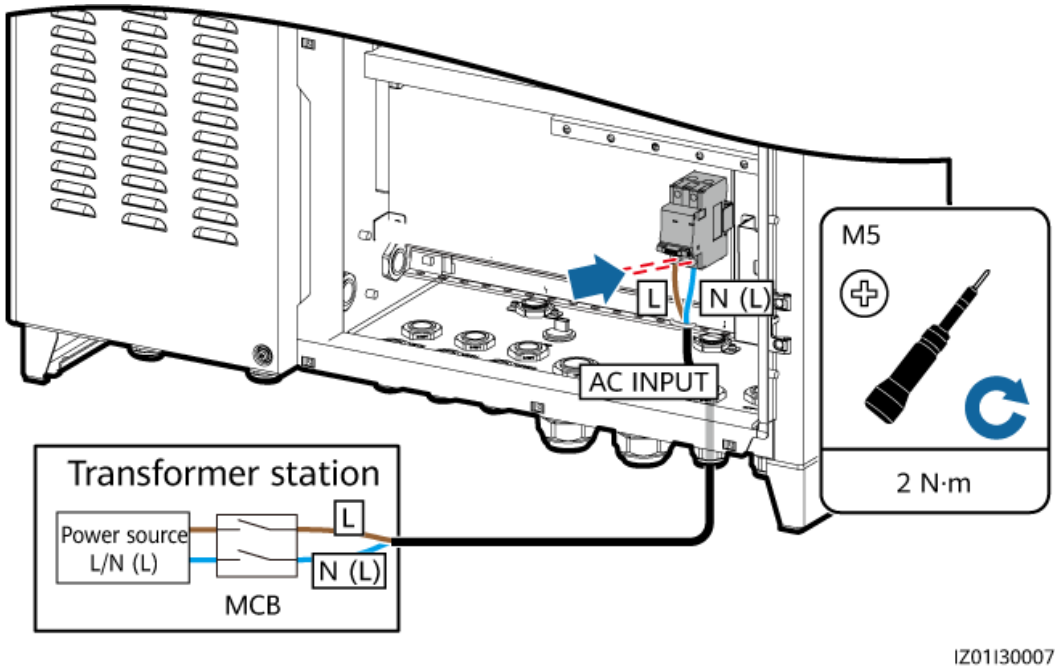
Step 2 Connect the cable to the single-phase input switch.

NOTICE

Connect the L and N (L) wires to the L and N (L) terminals of the station-service power source for the transformer station through an MCB.

Step 3 Bind the cable.

Figure 5-25 Connecting a cable



----End

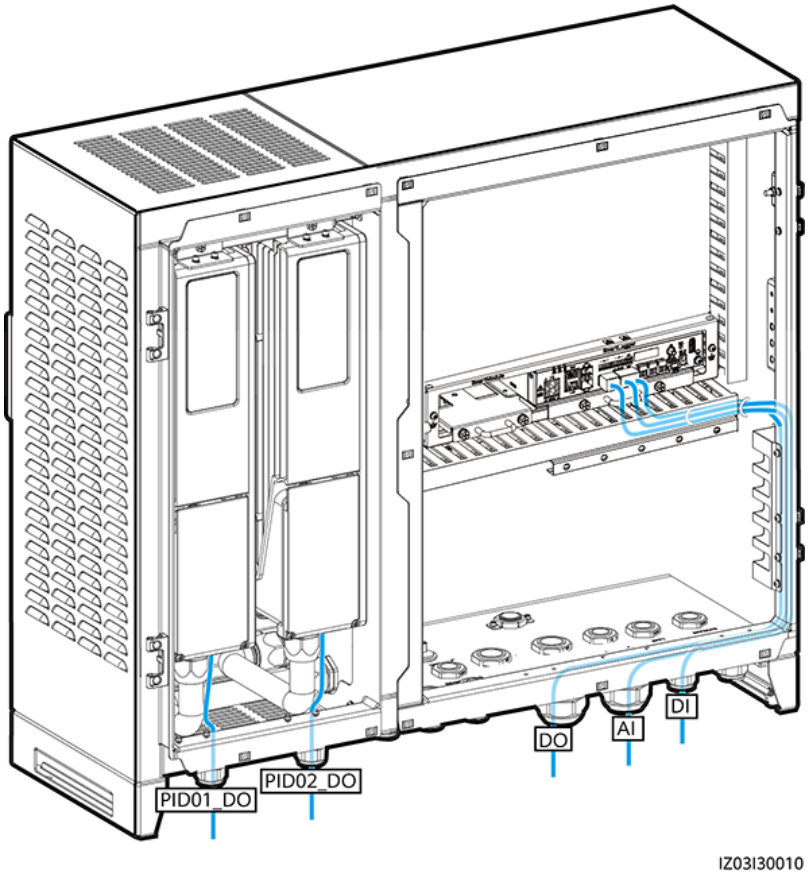
5.12 Connecting DO/DI/AI Cables

The SACU reserves the waterproof connectors for the PID01_DO, PID02_DO, DO, DI, and AI cables. Cabling routes are provided for the signal cables.

For details about how to prepare and connect the cables, see the *SmartPID2000 User Manual* and *SmartLogger3000 User Manual*.

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Figure 5-26 Cabling routes



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6 System Commissioning

6.1 Checking Before Power-On

No.	Acceptance Criteria
1	The cabinet and all components are installed properly.
2	All upstream switches for the cabinet and all switches inside the cabinet are OFF.
3	All cables are connected correctly and securely, without exposed metal.
4	Cables are bound neatly, and cable ties are secured evenly and properly in the same direction.
5	Routing for the power cables and signal cables meets the requirements for routing strong-current and weak-current cables and complies with the cable routing plan.
6	The locking caps of the used waterproof connectors are tightened and sealed. Idle waterproof connectors are plugged and the locking caps are tightened.
7	The cabinet interior is clean, without dust, dirt, or foreign matter.
8	The paint on the cabinet exterior is intact. If paint flakes off, repaint that area to prevent corrosion.

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6.2 Powering On the System

DANGER

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

- You have completed the power-on check.
- Ensure that the power voltage of the SACU is within the operating voltage range, and the three-phase input voltage is within the operating voltage range of the SmartMBUS and PID module.

Procedure

Step 1 Turn on the single-phase power switch that controls the power supply from the remote transformer station to the SACU.

Step 2 Turn on the three-phase power switch that controls the power supply from the remote transformer station to the SACU.

Step 3 Check that the input voltages of all switches of the SACU are within appropriate operating voltage ranges using a multimeter.

Step 4 Turn on the QF03 single-phase input switch in the SACU.

Step 5 Turn on the PID switch in the SACU.

- Turn on QF01 for the SmartACU2000D-D-01.
- Turn on QF01 and QF02 for the SmartACU2000D-D-03.

Step 6 Turn on the three-phase input switch in the SACU.

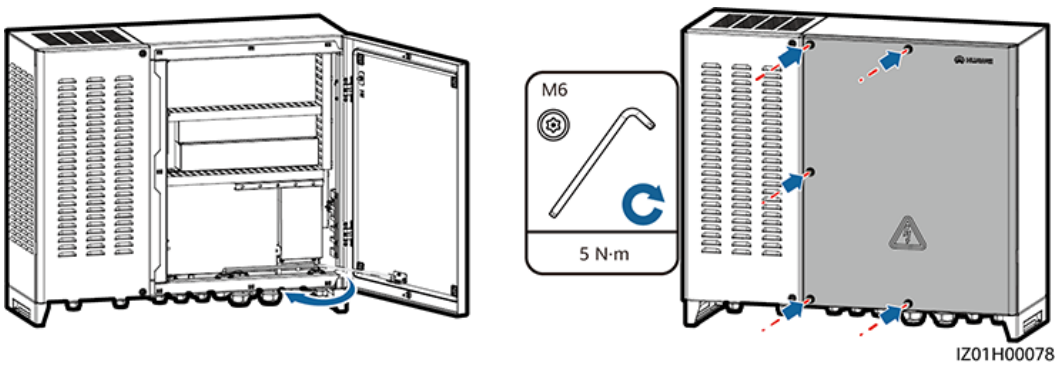
- Turn on FU01 for the SmartACU2000D-D-01.
- Turn on FU01 and FU02 for the SmartACU2000D-D-03.

----End

6.3 Closing the Cabinet Door

Retract the support bar, close the cabinet door, and tighten the screws.

Figure 6-1 Closing the main cabinet door



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6.4 Powering Off the System

Step 1 Turn off the single-phase power switch that controls the power supply from the remote transformer station to the SACU.

Step 2 Turn off the three-phase power switch that controls the power supply from the remote transformer station to the SACU.

Step 3 Turn off the QF03 single-phase input switch in the SACU.

Step 4 Turn off the three-phase input switch in the SACU.

- Turn off FU01 for the SmartACU2000D-D-01.
- Turn off FU01 and FU02 for the SmartACU2000D-D-03.

Step 5 Turn off the PID switch in the SACU.

- Turn off QF01 for the SmartACU2000D-D-01.
- Turn off QF01 and QF02 for the SmartACU2000D-D-03.

----End

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7 System Maintenance

7.1 Routine Maintenance

DANGER

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- If you need to open the cabinet door on rainy or snowy days, take protective measures to prevent rain or snow from entering the cabinet. If it is impossible to take protective measures, do not open the cabinet door on rainy or snowy days.

WARNING

- Prior to maintenance, power off the equipment.

Table 7-1 Maintenance checklist

Check Item	Check That	Maintenance Interval
Cabinet	• The SACU exterior is not damaged or deformed. • There is no dust or dirt in the SACU.	Once every twelve months
System running status	• All devices in the SACU operate properly. • The SPD works properly.	Once every six months

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Check Item	Check That	Maintenance Interval
Electrical connections	• Cables are secured. • Cables are intact and especially the parts touching the metallic surface are not scratched. • Idle waterproof connectors are plugged and the locking caps are tightened. • The cover on the USB port is tightened.	Once every twelve months
Grounding reliability	All ground cables are reliably connected.	Once every twelve months

7.2 Troubleshooting

Symptom	Cause	Troubleshooting
The three-phase input switch of the SACU is not powered on.	1. The power supply to the upstream transformer station of the three-phase input switch is abnormal. 2. The three-phase input switch is faulty.	1. Use a multimeter to check whether the power supply to the upstream transformer station of the three-phase input switch is normal. 2. Replace the three-phase input switch.
The input switch (QF01 or QF02) of the PID module is not powered on.	1. The input switch of the PID module is faulty. 2. The cable between the three-phase input switch and the input switch of the PID module is loose or disconnected.	1. Replace the input switch of the PID module. 2. Check the cable between the three-phase input switch and the input switch of the PID module. If the cable is loose or disconnected, secure it.
The PID module of the SACU is not powered on.	1. The grid three-phase input ports for the PID module are disconnected from cables or loosely connected to cables. 2. The power grid is disconnected from power. 3. The PID module is faulty.	1. If the cable is loose or disconnected, secure it. 2. Check whether power is available to the power grid. 3. Contact the dealer or Huawei technical support.

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Symptom	Cause	Troubleshooting
The single-phase input switch of the SACU is not powered on.	1. The power supply to the upstream transformer station of the single-phase input switch is abnormal. 2. The single-phase input switch is faulty.	1. Use a multimeter to check whether the power supply to the upstream transformer station of the single-phase input switch is normal. 2. Replace the single-phase input switch.
The PoE module is not powered on.	The power cable of the PoE module is loose or disconnected.	If the cable is loose or disconnected, secure it.
The power adapter or 24 V DC power module fails to supply power.	1. The input and output power cables of the 24 V DC power module are loose or disconnected. 2. The power adapter or 24 V DC power module is faulty.	1. If the cable is loose or disconnected, secure it. 2. Replace the power adapter or 24 V DC power module.
The SmartLogger in the SACU is not powered on.	1. The DC output power cable for the power adapter does not connect to the 12V IN port on the SmartLogger. 2. The power cable is not connected to the AC power receiving port on the power adapter. 3. The AC input power cable is not connected to the AC socket. 4. The power adapter is faulty. 5. The SmartLogger is faulty.	1. Check the power adapter and connect the DC output power cable for the power adapter to the 12V IN port on the SmartLogger. 2. Check whether the power cable is connected to the AC power receiving port on the power adapter. 3. Check whether the power cable is connected to the AC socket. 4. Replace the power adapter. 5. Contact the dealer or Huawei technical support.

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Symptom	Cause	Troubleshooting
No communication between the SmartLogger and the Ethernet switch.	1. The network cable between the SmartLogger and the Ethernet switch is not properly connected. 2. The IP address of the SmartLogger is not configured or is not in the LAN.	1. Check whether the network port indicators on the SmartLogger and Ethernet switch blink properly. If not, connect the network cable to another FE port on the Ethernet switch or replace the network cable and try again. 2. On the SUN2000 app, check whether the IP address of the SmartLogger is correctly set. If not, set the IP address again. 3. Log in to the SmartLogger WebUI over the LAN port (default IP address of the LAN port: 192.168.8.10) and check whether the IP address of the SmartLogger is correct. If not, set the IP address again. 4. Connect the PC to the Ethernet switch and ping the IP address of the SmartLogger. If the communication is abnormal, replace the network cable and try again.

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Symptom	Cause	Troubleshooting
No communication between the SmartLogger and the SmartModule.	1. The network cable between the SmartLogger and the SmartModule is not properly connected. 2. The communication certificate has expired.	1. Check whether the network port indicators on the SmartLogger and SmartModule blink properly. If not, connect the network cable to another GE port on the SmartModule or replace the network cable and try again. 2. Log in to the SmartLogger WebUI or SUN2000 app and check whether a communication certificate expiration alarm is generated. If yes, reload the certificate. 3. Contact the dealer or Huawei technical support.

7.3 Component Replacement

NOTICE

- Do not perform operations with power on because high voltage exists during the running of the device.
- Before replacing a component, ensure that a spare component of the same model is available and functional.
- Before replacing a component, power off the SACU. Wait at least 3 minutes after the power-off to ensure that the SACU is de-energized.
- After replacing a component, check the SACU before powering it on to ensure that the new component works properly.
- Dispose of faulty components in accordance with the local disposal act for waste electrical equipment.

7.3.1 Replacing the Single/Three-Phase SPD

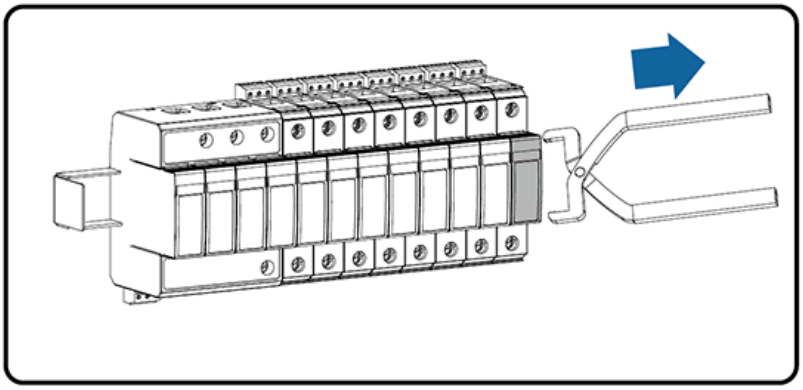
NOTE

- An SPD consists of a surge protection module and a base.
- If an SPD is damaged or its indication window is displayed in red, replace the SPD.
- A single-phase SPD is replaced in the same way as a three-phase SPD. This section describes how to replace a single-phase SPD.

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Step 1 Remove the faulty surge protection module from the SPD.

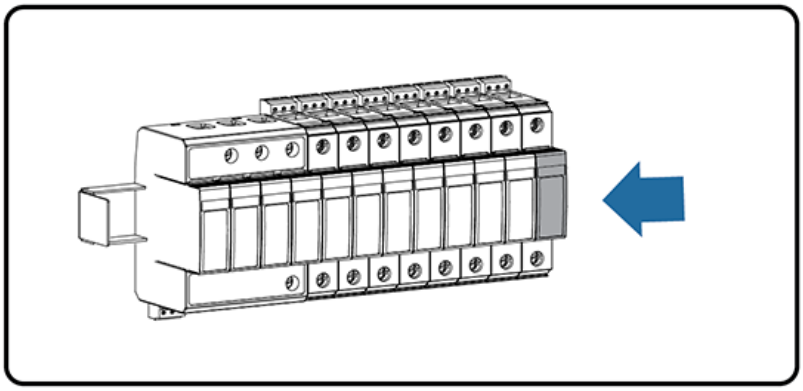
Figure 7-1 Removing a faulty surge protection module



IZ03H00009

Step 2 Install a new surge protection module.

Figure 7-2 Installing a new surge protection module



IZ03H00016

----End

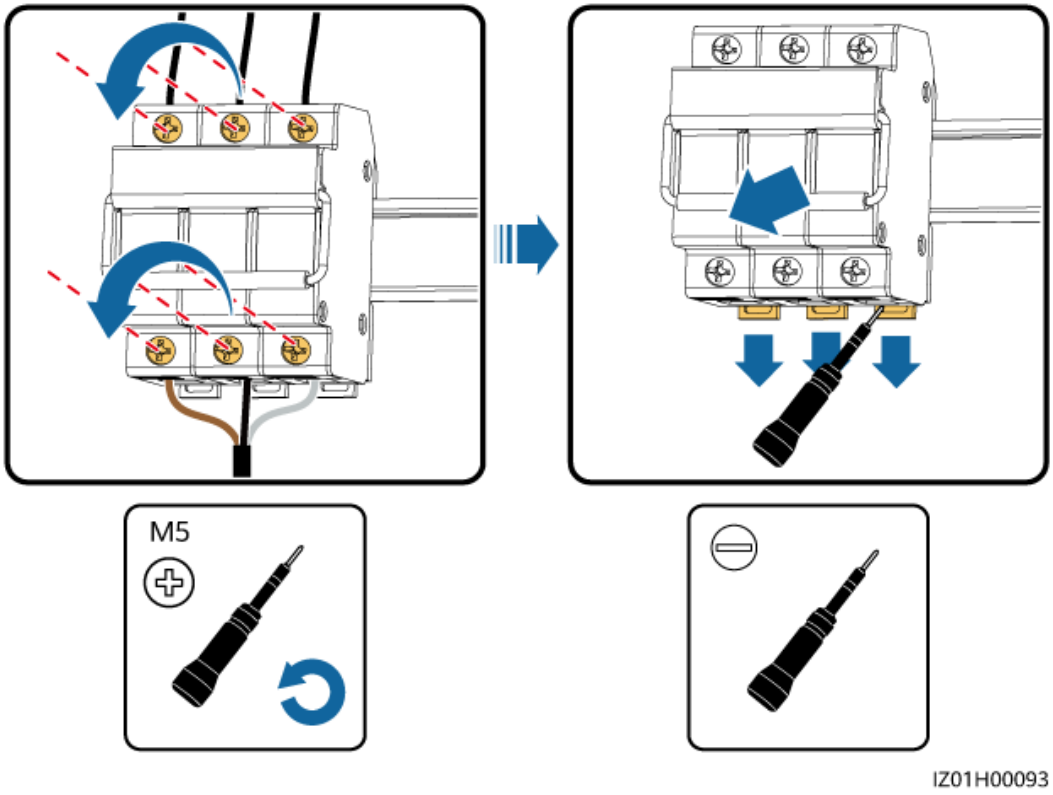
7.3.2 Replacing the Knife Fuse Switch

Step 1 Disconnect the cables from the knife fuse switch and label the cables.

Step 2 Remove the faulty knife fuse switch.

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Figure 7-3 Removing a faulty knife fuse switch



Step 3 Install a new knife fuse switch.

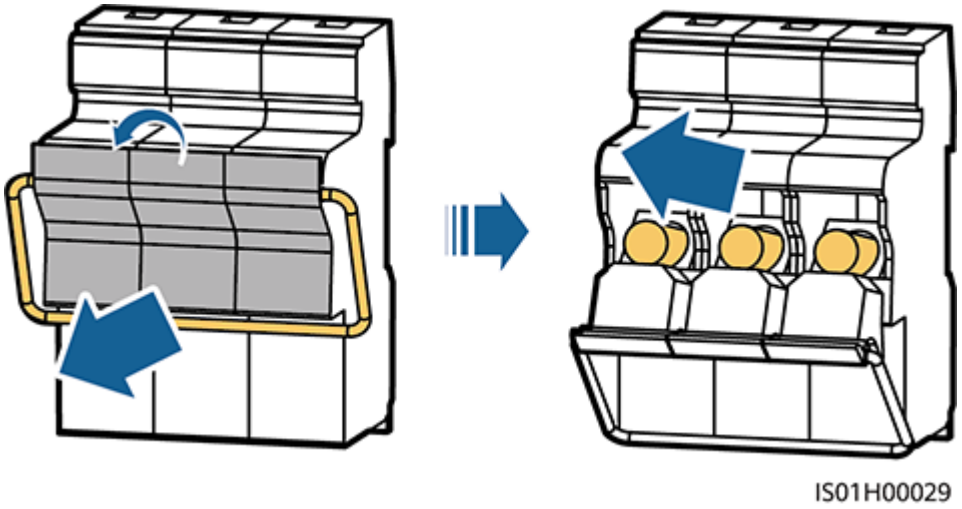
Step 4 Connect the cables based on their labels.

----End

7.3.3 Replacing the Fuse of a Knife Fuse Switch

Step 1 Open the knife fuse switch box and remove the faulty fuse.

Figure 7-4 Removing a faulty fuse



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Step 2 Install a new fuse and close the knife fuse switch box.

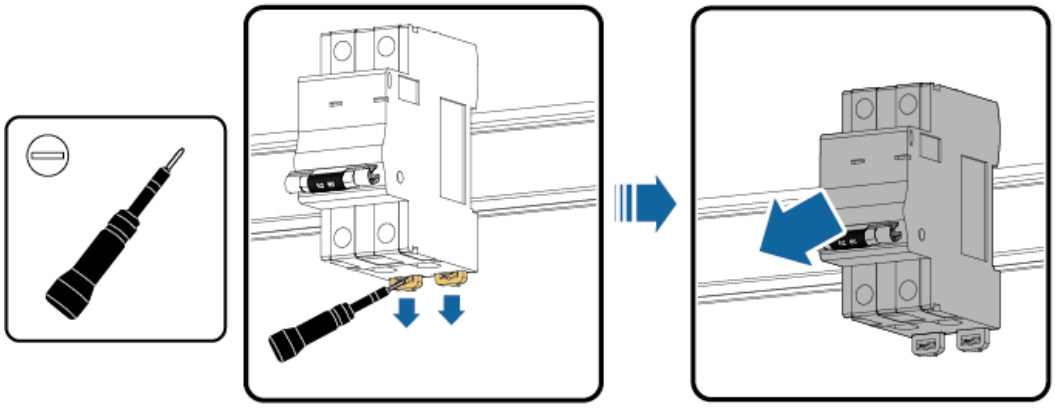
----End

7.3.4 Replacing the Single-Phase Input Switch

Step 1 Disconnect the cables from the single-phase input switch and label the cables.

Step 2 Remove the faulty single-phase input switch.

Figure 7-5 Removing a faulty single-phase input switch



Step 3 Install a new single-phase input switch.

Step 4 Connect the cables based on their labels.

----End

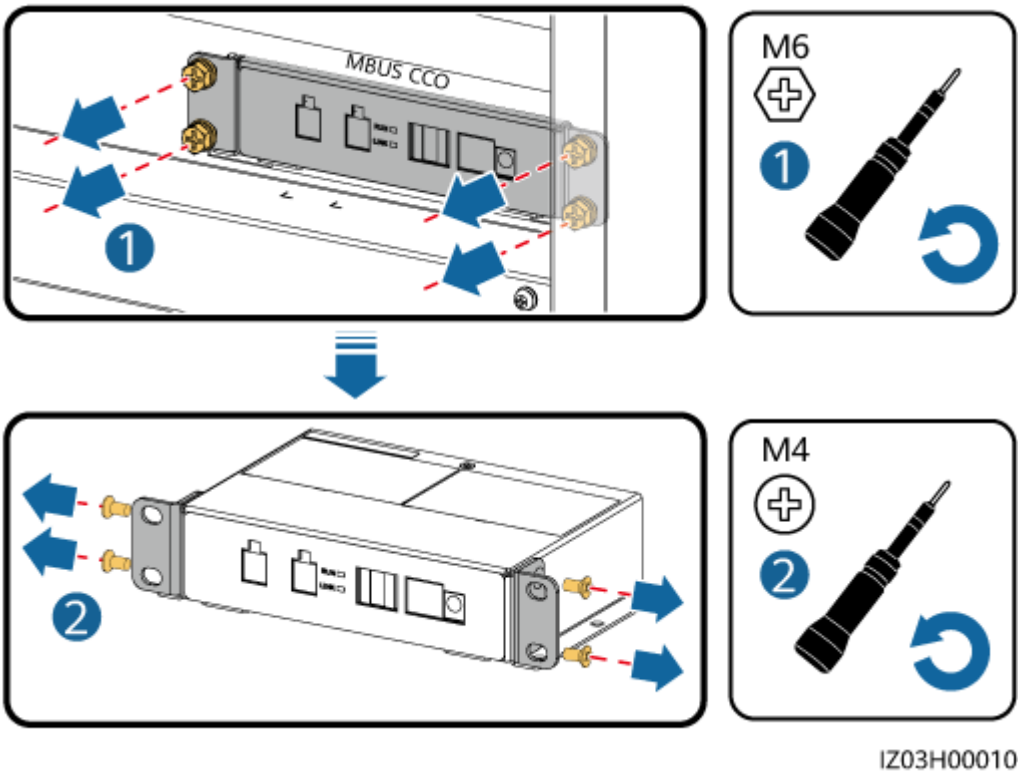
7.3.5 Replacing the SmartMBUS CCO Module

Step 1 Disconnect the cables from the SmartMBUS CCO module and label the cables.

Step 2 Remove the faulty SmartMBUS CCO module and its mounting ears.

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Figure 7-6 Removing a faulty SmartMBUS CCO module



Step 3 Install the mounting ears on a new SmartMBUS CCO module.

Step 4 Install the new SmartMBUS CCO module.

Step 5 Connect the cables based on their labels.

----End

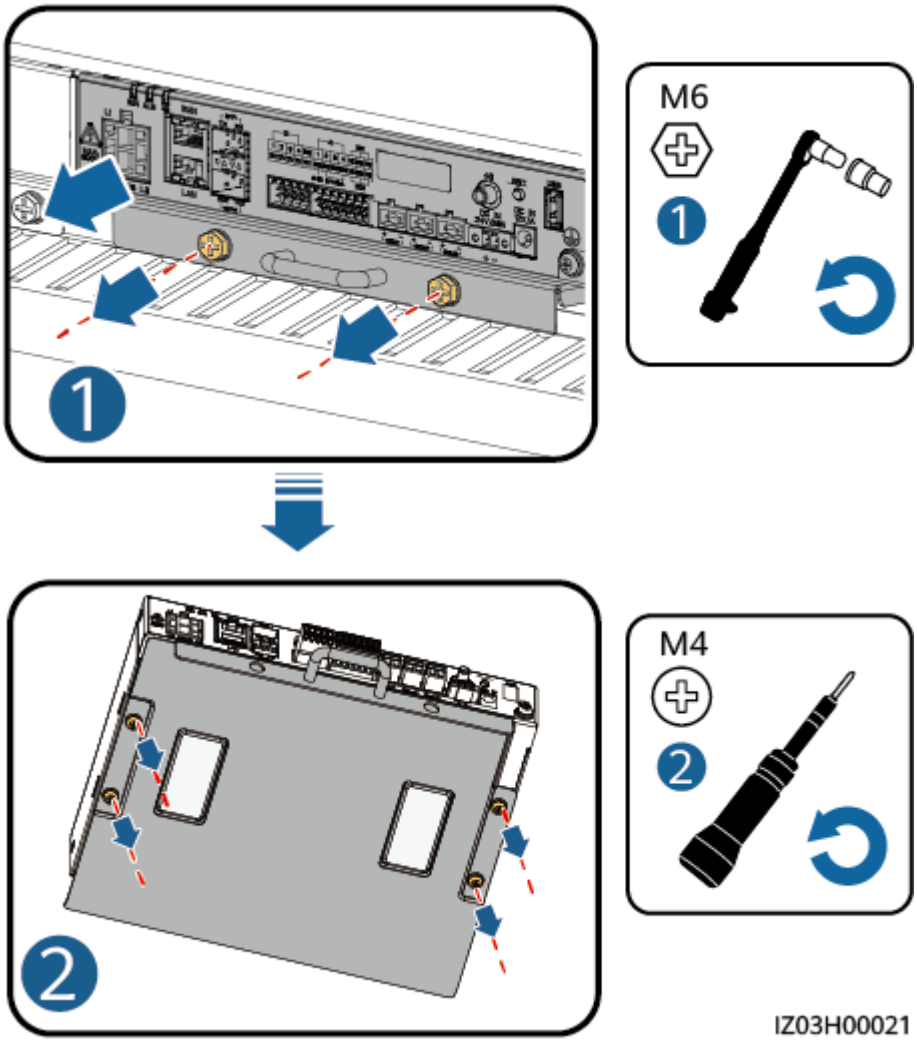
7.3.6 Replacing the SmartLogger

Step 1 Disconnect the cables from the SmartLogger and label the cables.

Step 2 Remove the faulty SmartLogger and its cabinet-mounting bracket.

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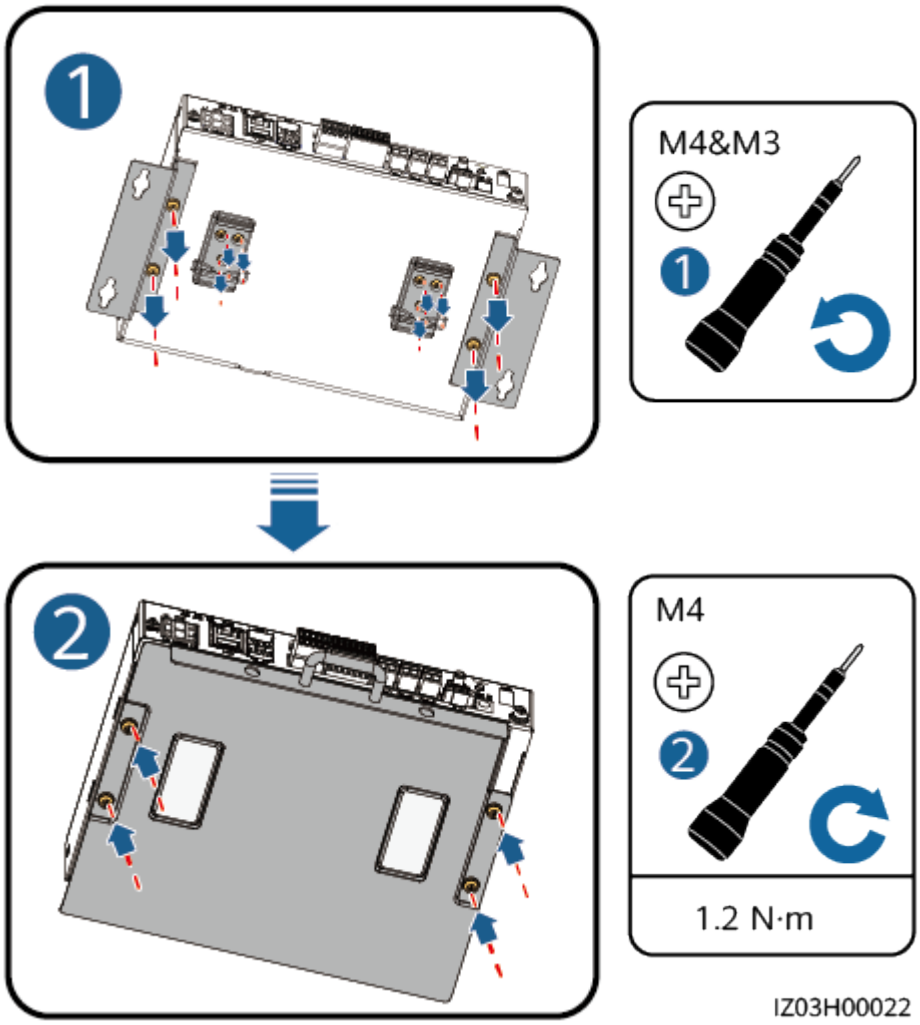
Figure 7-7 Removing a faulty SmartLogger



Step 3 Remove the mounting ears and guide rail–mounting bracket from a new SmartLogger, and install the cabinet-mounting bracket.

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Figure 7-8 Replacing a SmartLogger



Step 4 Install the new SmartLogger in the cabinet.

Step 5 Connect the cables based on their labels.

----End

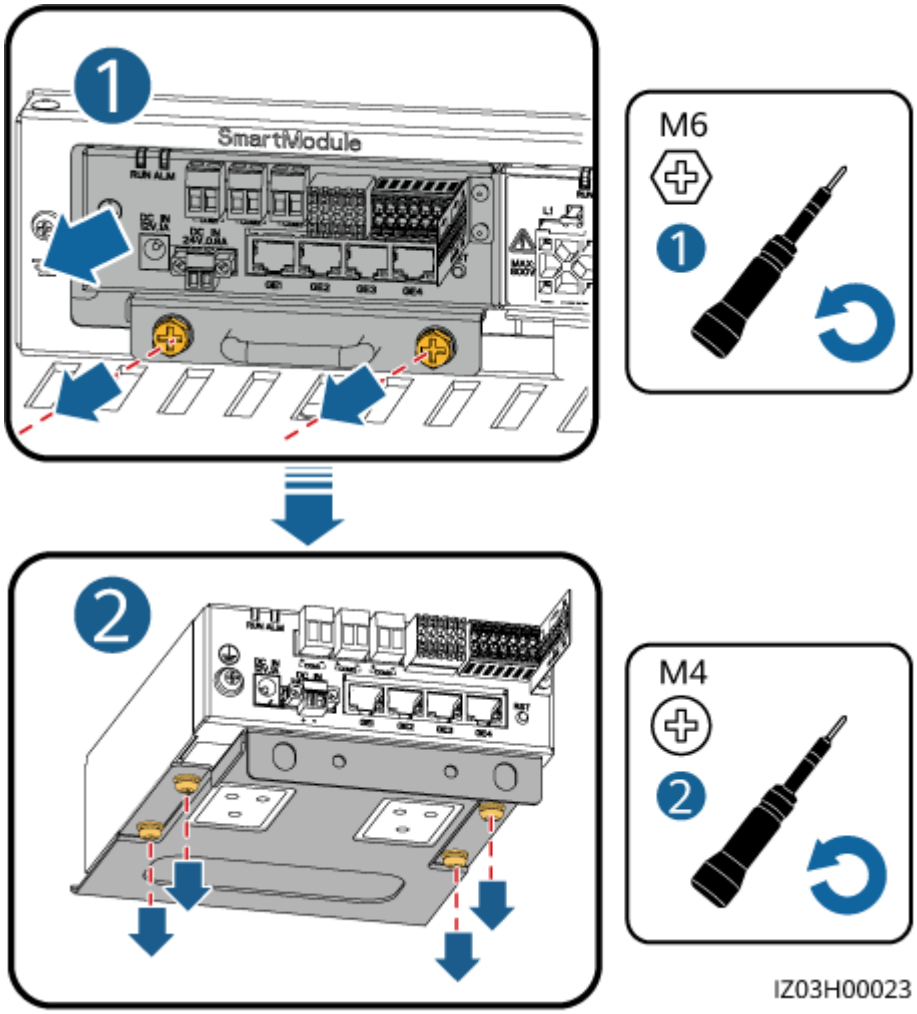
7.3.7 Replacing the SmartModule

Step 1 Disconnect the cables from the SmartModule and label the cables.

Step 2 Remove the faulty SmartModule and its cabinet-mounting bracket.

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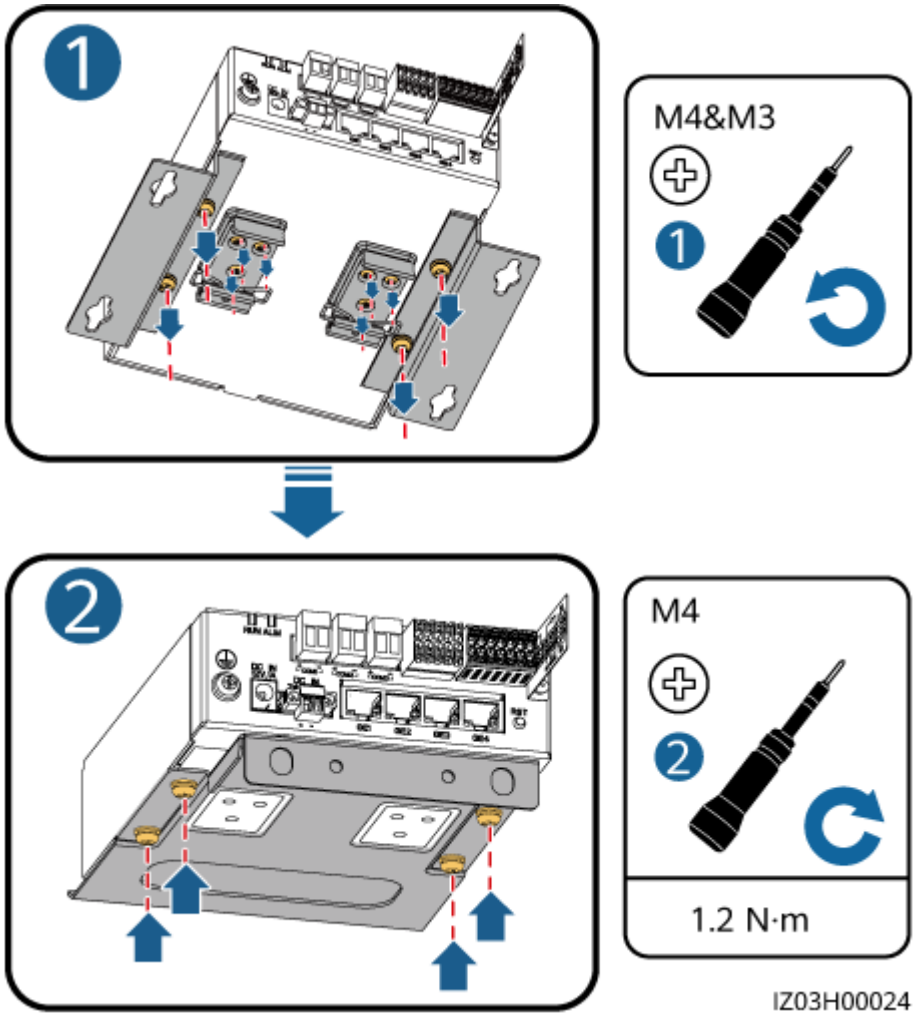
Figure 7-9 Removing a faulty SmartModule



Step 3 Remove the mounting ears and guide rail–mounting bracket from a new SmartModule, and install the cabinet-mounting bracket.

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Figure 7-10 Replacing a SmartModule



Step 4 Install the new SmartModule in the cabinet.

Step 5 Connect the cables based on their labels.

----End

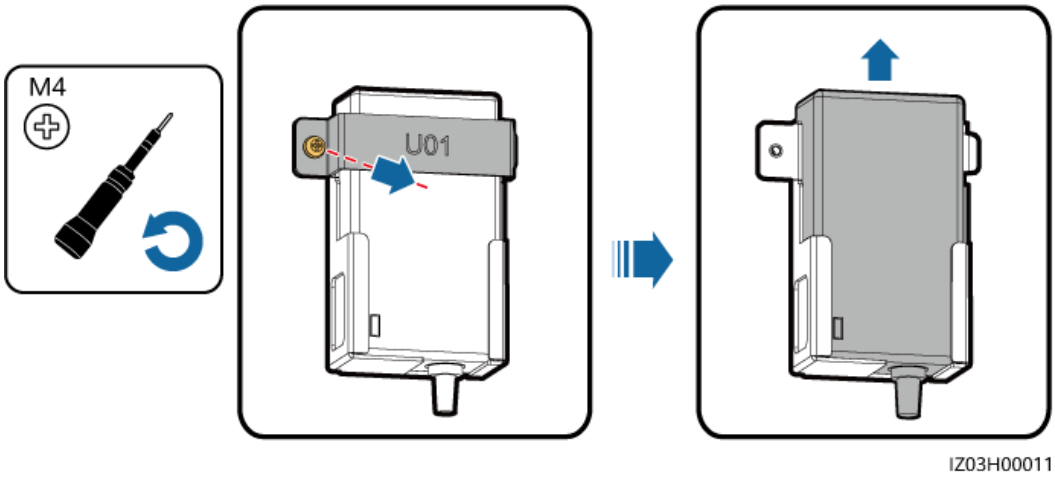
7.3.8 Replacing the Power Adapter

Step 1 Disconnect the cables from the power adapter and label the cables.

Step 2 Remove the faulty power adapter.

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Figure 7-11 Removing a faulty power adapter



Step 3 Install a new power adapter.

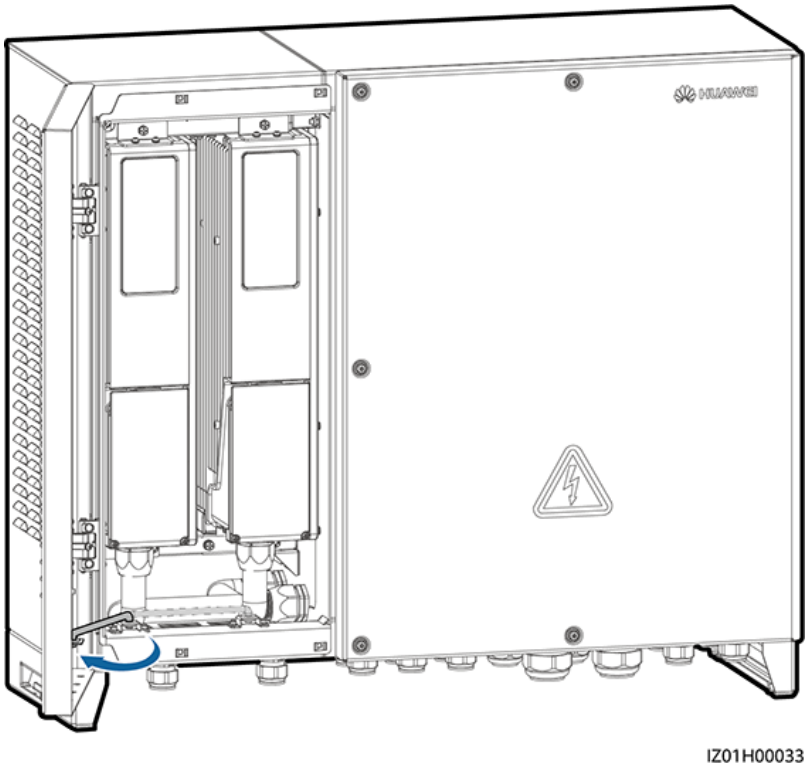
Step 4 Connect the cables based on their labels.

----End

7.3.9 Replacing the PID Module

Step 1 Open the PID cabinet door and adjust the support bar.

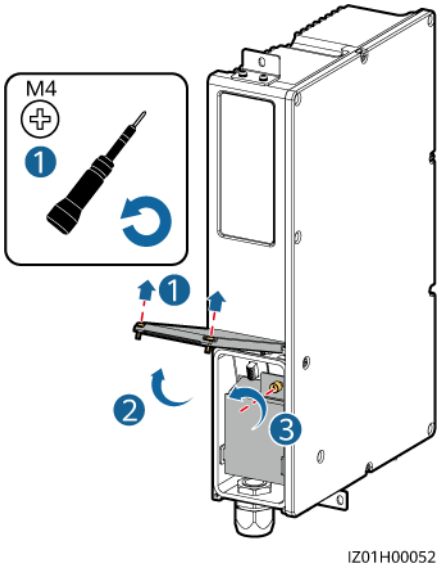
Figure 7-12 Adjusting a support bar



Step 2 Open the maintenance compartment door of the PID module, and remove the cover from the connection box.

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Figure 7-13 Removing the cover from a connection box



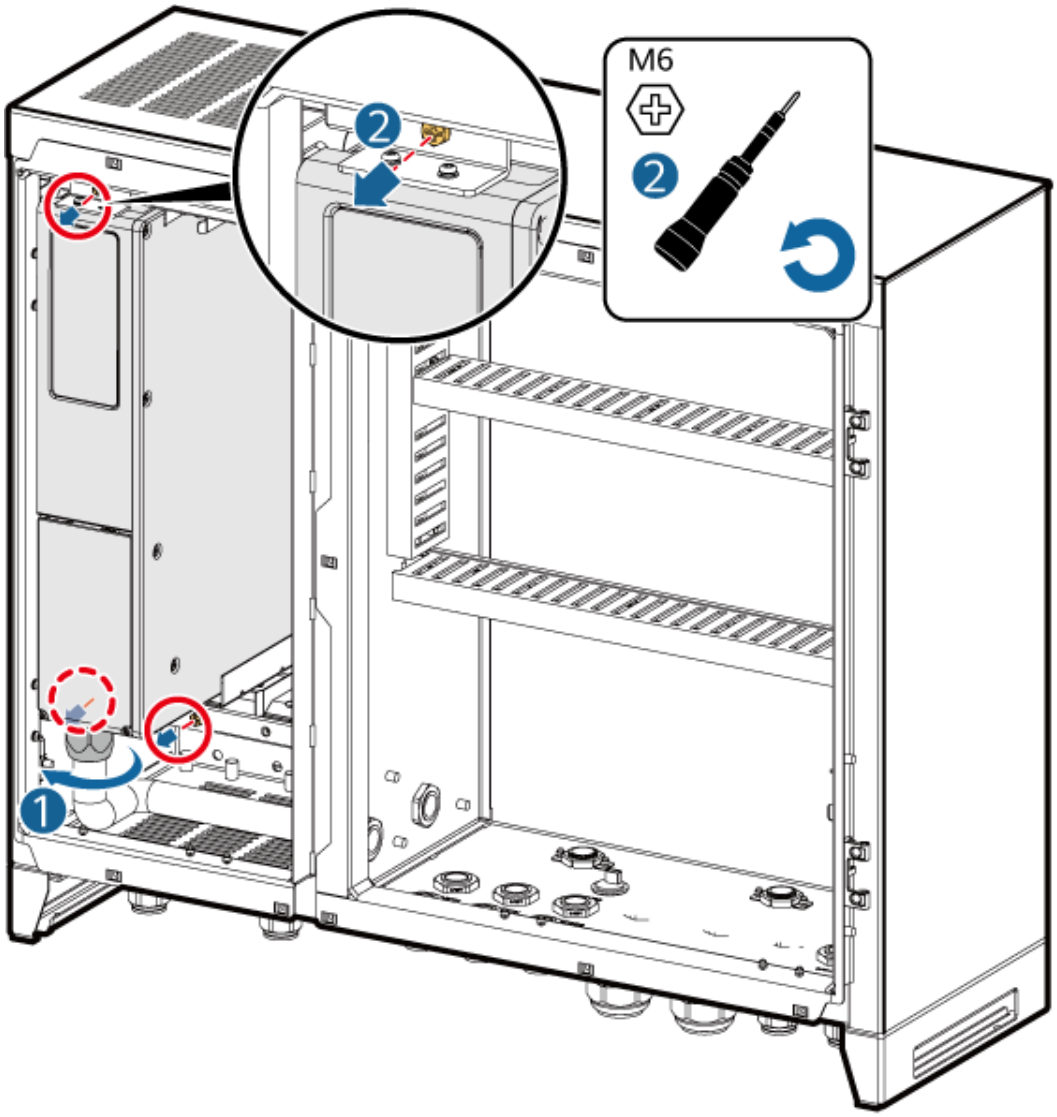
Step 3 Disconnect cables from the faulty PID module and label the cables.

Step 4 Remove the pipe connector from the faulty PID module.

Step 5 Remove the faulty PID module.

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Figure 7-14 Removing a faulty PID module



Step 6 Install a new PID module.

Step 7 Open the maintenance compartment door of the PID module, and remove the cover from the connection box.

Step 8 Connect the removed cables to the new PID module based on the cable labels.

Step 9 Secure the pipe connector to the PID module.

Step 10 Install the connection box cover and close the maintenance compartment door of the PID module.

Step 11 Install the support bar and close the PID module cabinet door.

NOTE

After ensuring that the PID module is powered on, set parameters by referring to the *SmartLogger3000 User Manual*.

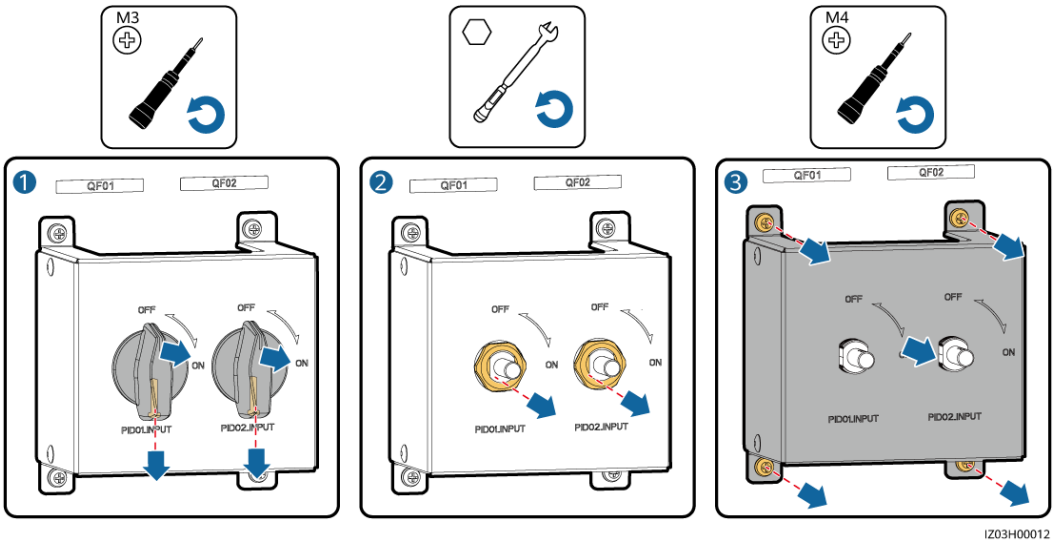
----End

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7.3.10 Replacing the PID Module Switch

Step 1 Remove the switch of the faulty PID module.

Figure 7-15 Removing the switch of the faulty PID module



Step 2 Disconnect cables from the switch of the faulty PID module, and label the cables.

Step 3 Connect the cables to a new PID module based on the cable labels.

Step 4 Install the new PID module switch.

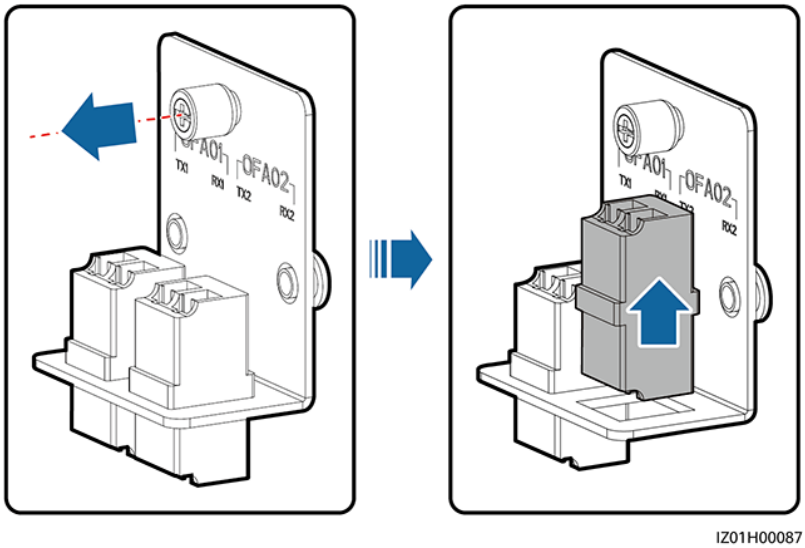
----End

7.3.11 Replacing the Fiber Adapter

Step 1 Disconnect the cables from the fiber adapter and label the cables.

Step 2 Remove the faulty fiber adapter.

Figure 7-16 Removing a fiber adapter



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Step 3 Install a new fiber adapter.

Step 4 Connect the cables based on their labels.

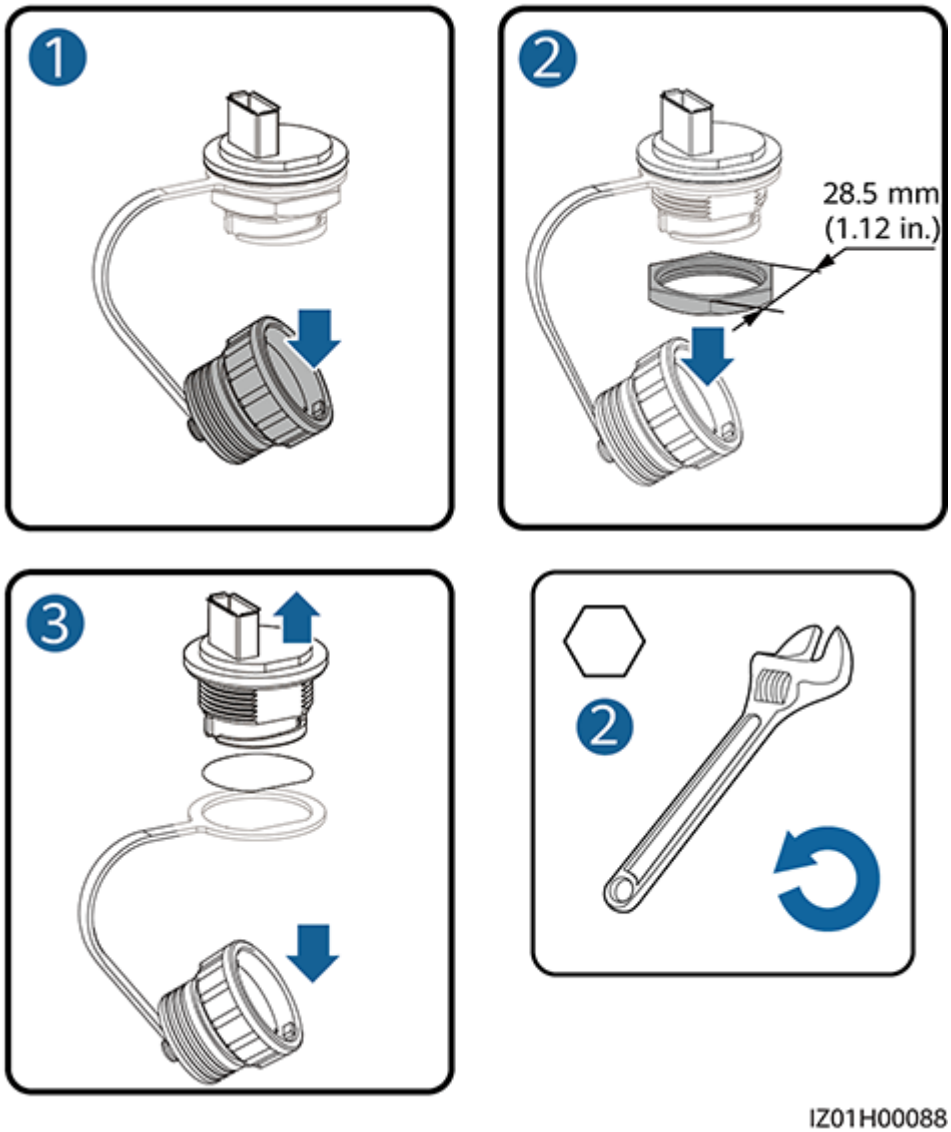
----End

7.3.12 Replacing the USB Port

Step 1 Disconnect the cable from the USB port and label the cable.

Step 2 Remove the faulty USB port.

Figure 7-17 Removing a USB port



Step 3 Install a new USB port. Ensure that the rubber ring is on the inner side of the cabinet.

Step 4 Connect the cables based on their labels.

----End

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8 Technical Specifications

Item	SmartACU2000D-D-01	SmartACU2000D-D-03
Communications mode	SFP/ETH/RS485/MBUS	
Number of MBUS routes	1	2
MBUS input (AC)	380–800 V; three-phase	
Number of PID routes	1	2
PID input (AC)	380–800 V; three-phase+FE	
Three-phase input power	480 W (maximum)	2 x 330 W (maximum)
Single-phase operating voltage[a]	AC input: 100–240 V	
Single-phase input power	110 W (maximum)	
Frequency	50 Hz/60 Hz	
Cable routing mode	Routed in and out from the bottom	
Operation and maintenance mode	Operated and maintained from the front	
Operating environment	Indoor and outdoor	
Maximum operating altitude	4000 m (13123.36 ft)	
Installation mode	Installed on a support, pole, or wall	

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Item	SmartACU2000D-D-01	SmartACU2000D-D-03
Dimensions (H x W x D, including the mounting plate)	770 mm x 880 mm x 369 mm (30.31 in. x 34.65 in. x 14.53 in.)	
Net weight (including firestop putty, screws, and the mounting plate)	About 49 kg (108.03 lb)	About 61 kg (134.48 lb)
Enclosure ingress protection (IP) rating	IP65/Type 3R	
Operating humidity	4%–100% RH	
Operating temperature	–40°C to +60°C (–40°F to +140°F)	
Storage temperature	–40°C to +70°C (–40°F to +158°F)	
Note a: Supports a 24 V power module. DC input and output: 24–28 V DC; 70 W (maximum)		

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A Scenario Where a Longitudinal Encryption Device Is Used

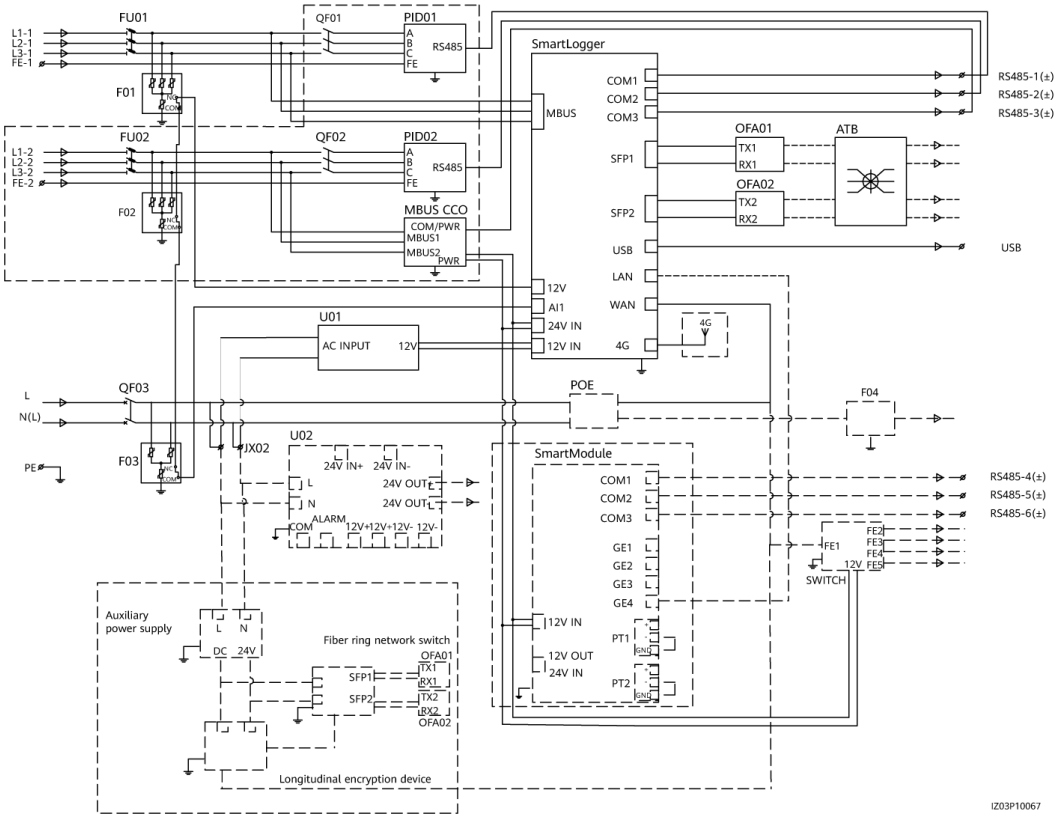
- The SmartACU2000D-D-01 provides only the installation positions for a longitudinal encryption device, fiber ring network switch, and auxiliary power supply, which can be installed on guide rails.
- The longitudinal encryption device, fiber ring network switch, and auxiliary power supply are prepared by the customer based on actual requirements. Huawei device faults caused by any of the three components are not covered by the warranty.
- For details about the installation method and cable specifications, see the installation guide of the components. You are advised to route cables through the cable trough or cable bridge in the SACU.
- The reserved installation dimensions (W x H x D) are 50 mm x 185 mm x 135 mm for the longitudinal encryption device, 65 mm x 185 mm x 135 mm for the fiber ring network switch, and 36 mm x 130 mm x 125 mm for the auxiliary power supply.

Schematic Diagram

The schematic diagram is as follows. The components in the dashed boxes are optional. They refer to the PoE module, longitudinal encryption device, and Ethernet switch. Configure one of them. The auxiliary power supply, longitudinal encryption device, and fiber ring network switch are prepared by the customer.

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Figure A-1 Schematic diagram (using a longitudinal encryption device)



Installation Position and Cable Routing

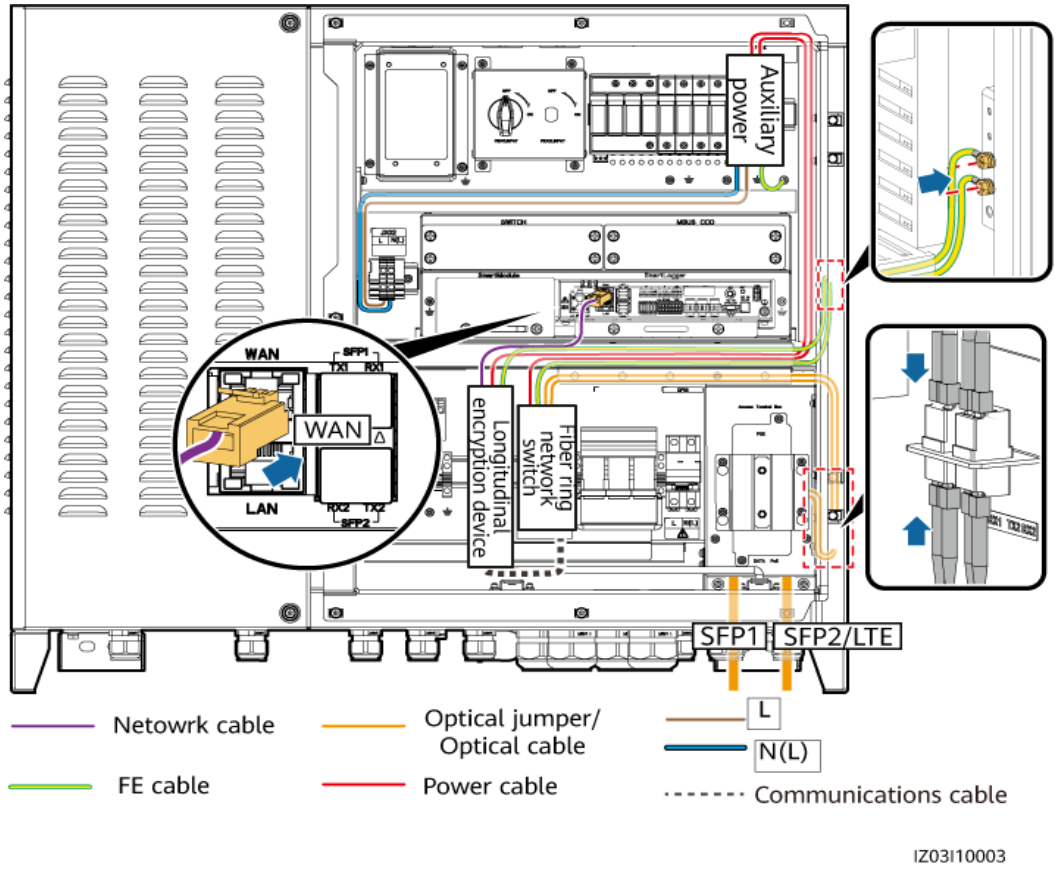
- The FE communications cable of the longitudinal encryption device can be connected to the WAN port of the SmartLogger3000 (SmartLogger).
- The optical jumper of the fiber ring network switch can be connected to the fiber adapter (OFA01 or OFA02). The adapter specification is 2LC/PC-2LC/PC-4. The optical cable can be connected to the ATB.
- The power cable of the auxiliary power supply can be connected to the 24 V AC input terminal (JX02). The JX02 is 220 V/2P and supports the connection of 0.2–10 mm^2 (or 24–8 AWG) cables. The ground cable can be connected to the nearest terminal using M4 screws.
- For details about the communications cable connection mode and cable specifications between the fiber ring network switch and the longitudinal encryption device, see the installation guide of the purchased components.

NOTE

This document provides only the recommended cable routing solution for the longitudinal encryption device, fiber ring network switch, and auxiliary power supply. For details about the cable specifications, see the installation guide of the purchased components.

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Figure A-2 Installation position and cable routing



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B Acronyms and Abbreviations

A	
AC	alternating current
AI	analog input
APP	application
ATB	access terminal box
C	
CAT 5E	Category 5 enhanced
CCO	central controller
CPE	customer-premises equipment
D	
DC	direct current
DI	digital input
DO	digital output
E	
EMI	environmental monitoring instrument
ETH	Ethernet
L	
LTE	Long Term Evolution
M	
MBUS	monitoring bus

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P	
PE	protective earthing
PID	potential induced degradation
PoE	power over Ethernet
R	
RH	relative humidity
S	
SFP	small form-factor pluggable
SPD	surge protective device
W	
WEEE	waste electrical and electronic equipment

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