

**FusionDC1000A Prefabricated All-in-One Data
Center
V100R021C10**

Maintenance Guide (ICT Scenario)

Issue 01
Date 2021-07-21



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About This Document

Purpose

This document describes the operation methods and precautions for the FusionDC1000A prefabricated all-in-one data center (FusionDC1000 for short) in terms of routine maintenance and parts replacement. It provides you a quick grasp of the operation and maintenance (O&M) methods of the FusionDC1000.

Intended Audience

This document is intended for:

- Maintenance engineers
- Technical support engineers
- System engineers
- Hardware installation engineers
- Commissioning engineers
- Data configuration engineers

Symbol Conventions

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

Symbol	Description
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

Change History

Changes between document issues are cumulative. The latest document issue contains all updates made in previous issues.

Issue 01 (2021-07-21)

This issue is the first official release.

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1 Safety Information

1.1 General Safety

Statement

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "CAUTION", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Huawei will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting equipment malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

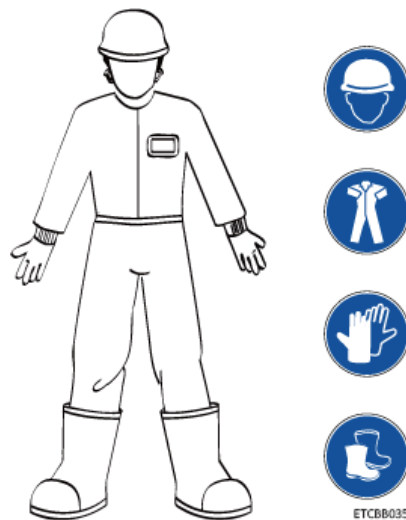
Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

Huawei will not be liable for any consequences of the following circumstances:

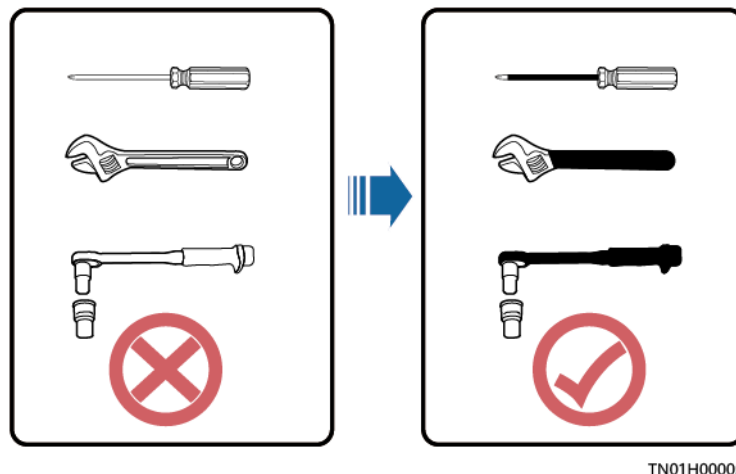
- Operation beyond the conditions specified in this document
- Installation or use in environments which are not specified in relevant international or national standards
- Unauthorized modifications to the product or software code or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, and storms
- Damage caused during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document

General Requirements

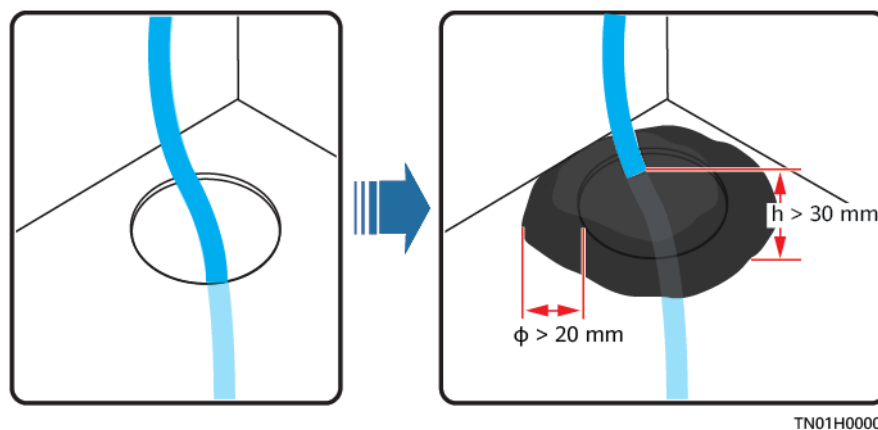
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear personal protective equipment such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.



- Follow the specified procedures for installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.
- Do not stop using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.
- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- Use insulated tools or tools with insulated handles, as shown in the following figure.



- All cable holes should be sealed. Seal the used cable holes with firestop putty. Seal the unused cable holes with the caps delivered with the cabinet. The following figure shows the criteria for correct sealing with firestop putty.



- Do not scrawl, damage, or block any warning label on the equipment.
- When installing devices, use a torque wrench with a proper measurement range to tighten bolts. Ensure that the wrench is not skewed and the torque error does not exceed 10%.
- Do not work with power on during installation.
- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed to an outdoor environment for a long period of time.
- Before operations, ensure that the equipment is firmly secured to the floor or other solid objects, such as a wall or an installation rack.
- Do not use water to clean electrical components inside or outside of a cabinet.
- Do not change the structure or installation sequence of equipment without permission.
- Do not touch a running fan with your fingers, components, screws, tools, or boards before the fan is powered off or stops running.

Personal Safety

- If there is a probability of personal injury or equipment damage during operations on the equipment, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Do not power on the equipment before it is installed or confirmed by professionals.

1.2 Personnel Requirements

- Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- 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 operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
- Trained personnel: personnel who are technically trained, 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
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

1.3 Electrical Safety

Grounding

- 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.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- 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.

General Requirements

Use dedicated insulated tools when performing high-voltage operations.

AC and DC Power

DANGER

Do not connect or disconnect power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- If a "high electricity leakage" tag is attached on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the AC power supply; otherwise, electric shock as a result of electricity leakage may occur.
- Before installing or removing a power cable, turn off the power switch.
- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- A circuit breaker equipped with a residual current device (RCD) is not recommended.
- A damaged power cable must be replaced by the manufacturer, service agent, or professionals to avoid risks.
- High voltage operations and installation of AC-powered facilities must be performed by qualified personnel.

Cabling

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables behind the air intake and exhaust vents of the equipment.
- Ensure that cables meet the VW-1 or ZB and higher flame spread rating requirements.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- If an AC input power cable is connected to the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- 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.
- When selecting, connecting, and routing cables, follow local safety regulations and rules.

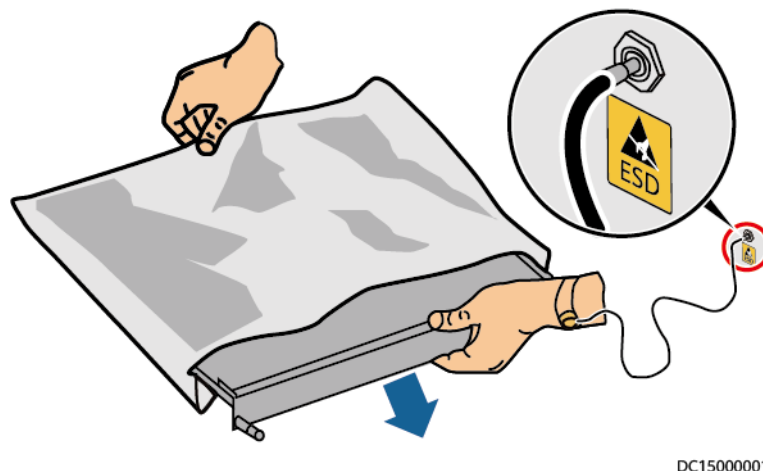
ESD

NOTICE

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

- Wear ESD gloves or a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).
- When holding a board, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package boards with ESD packaging materials before storing or transporting them.

Figure 1-1 Wearing an ESD wrist strap



DC15000001

Neutral-Ground Voltage

It is recommended that the three-phase loads be equalized and the neutral-ground voltage be kept at less than 2 V to meet power distribution requirements.

1.4 Installation Environment Requirements

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- 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.

- If any liquid is detected inside the equipment, immediately disconnect the power supply and contact the administrator.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- Ensure that the equipment room provides good heat insulation, and the walls and floor are dampproof.
- Install a rat guard at the door of the equipment room.

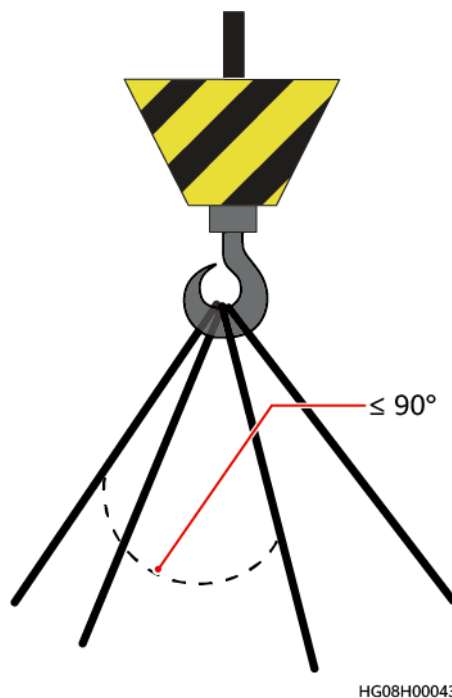
Installation at Heights

- Working at heights refers to operations that are performed at least 2 meters above the ground.
- Do not work at heights if the steel pipes are wet or other potential danger exists. After the preceding conditions no longer exist, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.
- When working at heights, comply with local relevant laws and regulations.
- Only trained and qualified personnel are allowed to work at heights.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.
- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.

1.5 Mechanical Safety

Hoisting Devices

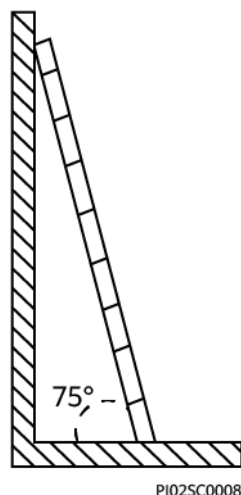
- Do not walk under hoisted objects.
- Only trained and qualified personnel should perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables is no more than 90 degrees, as shown in the following figure.



- Do not drag steel ropes and hoisting tools or bump hoisted objects against hard objects during hoisting.

Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- 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. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle rule can be used to measure the angle. Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.



- When climbing a ladder, take the following precautions to reduce risks and ensure safety:
 - Keep your body steady.
 - Do not climb higher than the fourth rung of the ladder from the top.
 - Ensure that your body's center of gravity does not shift outside the legs of the ladder.

Drilling Holes

When drilling holes into a wall or floor, observe the following safety precautions:

NOTICE

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

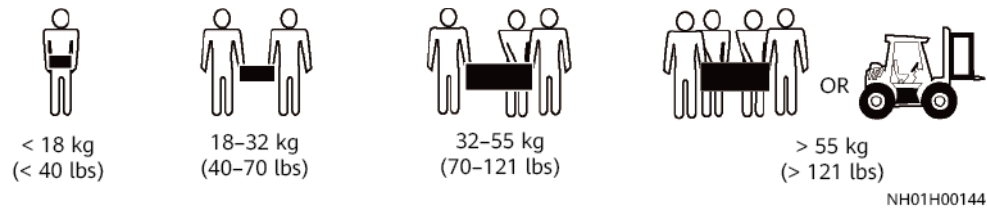
- Obtain the consent from the customer and subcontractor before drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

Moving Heavy Objects

DANGER

When removing a heavy or unstable component from a cabinet, be aware of unstable or heavy objects on the cabinet.

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules (such as power supply units, fans, and boards) that are installed in the equipment because they cannot support the weight of the equipment.
- Avoid scratching the cabinet surface or damaging cabinet components and cables during equipment transportation.
- When transporting the equipment using a forklift truck, ensure that the forks are properly positioned to ensure that the equipment does not topple. Before moving the equipment, secure it to the forklift truck using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Choose railways, sea, or a road with good condition for transportation to ensure equipment safety. Avoid tilt or jolt during transportation.
- Move a cabinet with caution. Any bumping or falling may damage the equipment.

1.6 Cooling System Safety

Storage and Recycling

- Do not store devices near a heat source or under direct sunshine.
- Keep devices away from fire or high-temperature objects, especially devices injected with pressurized nitrogen or refrigerant; otherwise, explosion or refrigerant leakage may occur, causing personal injury.



-  The sign indicates that the product cannot be disposed of with other wastes that have a shell in European Union (EU) areas. To avoid environment pollution and harm to human health, wastes must be classified and recycled. This also promotes resource reuse. When recycling a device, fill in the device information in the recycling collection system or contact your dealer for help. The dealer can help you recycle devices in a safe and environment-friendly way.

1.7 Pre-fab. Module Safety

- Ensure that the installation environment meets the following requirements:
 - The ground must be solid without spongy or soft soil, and is not prone to subsidence.
 - The site must be clean and far away from dust, oil fume, and harmful gas.

- The site must be far away from corrosive, flammable, and explosive materials.
- The site must be far away from sources of strong variation, loud noises, and strong electromagnetic interference.
- The site must not be located in a low-lying land or an area prone to water accumulation. It must be above the highest water level of the local area.
- Do not install other equipment on the top of a pre-fab. module without evaluation by Huawei.
- When performing operations (such as installing an awning or outdoor unit) over the top of a pre-fab. module, take measures to protect the top of the pre-fab. module against damage. Do not perform operations such as arc welding, drilling, and cutting on the top of a pre-fab. module.
- Do not smoke or use open flame inside a pre-fab. module.
- Before performing fire operations inside a pre-fab. module, obtain the customer's approval and the required work permit and fully evaluate risks.

1.8 Battery Safety

Basic Requirements

Before operating batteries, carefully read the safety precautions for battery handling and master the correct battery connection methods.

 DANGER

- Do not expose batteries at high temperatures or around heat-generating devices, such as sunlight, fire sources, transformers, and heaters. Overheating may cause the batteries to explode.
 - Do not burn batteries. Otherwise, the batteries may explode.
 - To avoid leakage, overheating, fire, or explosions, do not disassemble, alter, or damage batteries, for example, insert sundries into batteries or immerse batteries in water or other liquids.
-
- Wear goggles, rubber gloves, and protective clothes.
 - Move batteries in the required direction. Do not place a battery upside down or tilt it.
 - Keep the battery loop disconnected during installation and maintenance.
 - Use batteries of specified models. Using batteries of other models may damage the batteries.
 - Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
 - The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and powder fire extinguishers.

NOTICE

To ensure battery safety and battery management accuracy, use batteries provided with the DC power system by Huawei. Huawei is not responsible for any battery faults caused by batteries not provided by Huawei.

Battery Installation

Before installing batteries, observe the following safety precautions:

- Install batteries in a well-ventilated, dry, and cool environment that is far away from heat sources, flammable materials, moisture, extensive infrared radiation, organic solvents, and corrosive gases. Take fire prevention measures.
- Place and secure batteries horizontally.
- Note the polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, the battery may be short-circuited.
- Check battery connections periodically, ensuring that all screws are securely tightened.
- When installing batteries, do not place installation tools on the batteries.

Battery Short Circuit

** DANGER**

Battery short circuits can generate high instantaneous current and release a great amount of energy, which may cause equipment damage or personal injury.

To avoid battery short circuit, do not maintain batteries with power on.

Lithium Battery

The safety precautions for lithium batteries are similar to those for lead-acid batteries except that you also need to observe the following precautions.

** WARNING**

There is a risk of explosion if a battery is replaced with an incorrect model.

- A battery can be replaced only with a battery of the same or similar model recommended by the manufacturer.
- When handling a lithium battery, do not place it upside down, tilt it, or bump it with other objects.
- Keep the lithium battery loop disconnected during installation and maintenance.

- Do not charge a battery when the ambient temperature is below the lower limit of the operating temperature (charging is forbidden at 0°C). Low-temperature charging may cause crystallization, which will result in a short circuit inside the battery.
- Use batteries within the allowed temperature range; otherwise, the battery performance and safety will be compromised.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

1.9 Others

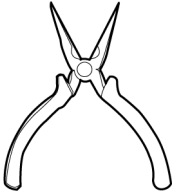
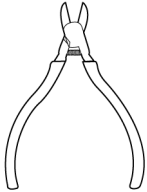
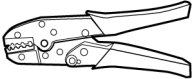
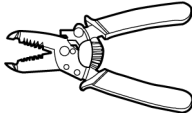
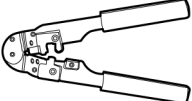
- Exercise caution when shutting down the smart cooling product. Doing so may cause equipment and room overheating, which will damage the equipment.
- Exercise caution when setting battery parameters. Incorrect settings will affect the power supply and battery lifespan.

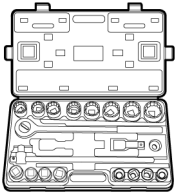
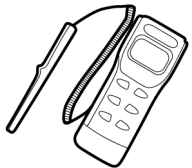
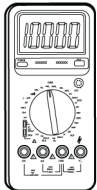
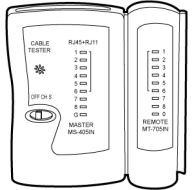
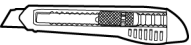
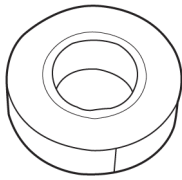
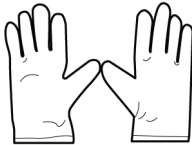
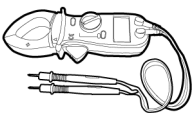
2

Operation and Maintenance Preparations

2.1 Tools

Table 2-1 Tools

Tools		
Phillips screwdriver	Flat-head screwdriver	Adjustable wrench
		
Electrician's knife	Needle-nose pliers	Diagonal pliers
		
Crimping tool	Wire stripper	RJ45 crimping tool
		

Tools		
Cable cutter 	Hex key 	Socket wrench 
Hand-held thermohygrograph 	Multimeter 	Electroprobe 
Network cable tester 	Heat gun 	Utility knife 
Step ladder (2 m) 	Cable tie 	Insulation tape 
ESD wrist strap 	ESD gloves 	Protective gloves 
Clamp meter 	Vacuum cleaner 	-

 NOTE

The listed tools are for routine maintenance only. Prepare other tools as required.

2.2 Reference Documentation

NOTICE

The documents provided in the solution only include the special maintenance items, maintenance methods, and precautions of the components. For other maintenance items of the components, see the documents delivered with the components.

Table 2-2 Maintenance documents to be prepared

Component	Document
AC/DC power system	<i>MTS9000A V100R002C20 Telecom Power User Manual (MTS9606B, 36 kW)</i>
ECC800-Pro	<i>ECC800 Data Center Controller V100R003C00 User Manual (for ECC800-Pro)</i>
NetEco	<i>iMaster NetEco V600R021C10 Device Installation and Commissioning Guide (Data Center)</i>

 NOTE

- The ECC800-Pro/NetEco version depends on the version in use. Click  on the ECC800-Pro/NetEco WebUI to obtain the current version.
- For NetEco maintenance, see the NetEco documents.

2.3 Pre-fab. Module Entry and Working Requirements

The following table describes the requirements for working in the FusionDC1000.

Item	Requirement
Before entry	• Obtain the entry permit. • Perform detailed operations based on the requirements specified by the manager of the FusionDC1000.

Item	Requirement
Entry preparations	• Obtain ESD clothes and shoes. • Remove dust from tools and materials that need to be taken into the data center, and make a record. • Do not bring in forbidden items, such as storage devices, cameras, or portable hard disks into the FusionDC1000.
Working in the data center	• Only professional personnel are allowed to work in the data center and only in the presence of designated personnel. • Obtain permission from designated personnel and take necessary precautions and preventive measures before entering the FusionDC1000 and performing any operation which may affect the normal running of the FusionDC1000. • Do not perform any unauthorized operations.
After all work is finished	• Pack up the tools and surplus materials. • Clean up and organize the equipment room environment according to environment requirements. • Accept the operations and make records about any operations performed.
Check before leaving	• Check the items to be taken out. • Sign out.
Follow-up procedure	• Return the ESD clothes and shoes. • If any faulty component is replaced, dispose of the removed faulty component.

NOTICE

Replace, maintain, and troubleshoot components of the FusionDC1000 only in the presence of qualified engineers.

2.4 O&M Personnel Skill Requirements

Power supply and distribution system	Familiar with the power supply and distribution system configurations and the operations for each core device in the FusionDC1000 With power distribution system engineer qualifications
Cooling system	Familiar with the cooling system configurations and the operations for each core device in the FusionDC1000 With cooling engineer qualifications

Managem nt system	With knowledge in the hardware and software of the prefabricated data center, familiar with basic communications protocols, familiar with equipment interfaces in extra low voltage (ELV) systems, and proficient in operating the NetEco management system With ELV engineer qualifications
Fire extinguishi ng system	Familiar with the fire extinguishing system configurations and the operations for each core device in the FusionDC1000 With fire engineer qualifications
Lighting and structural systems	Familiar with the overall configurations and layout of the FusionDC1000 Experienced in maintaining the FusionDC1000

3 Routine Maintenance

3.1 Pre-fab. Module Repainting

Prerequisites

- Before repainting, communicate with the customer and inform the customer that the front, left, and right surfaces of the data center exterior are level A surfaces, and rear, bottom, and top surfaces are level B surfaces.
 - The color may be slightly different when level A surfaces are repainted. Reach an agreement with the customer before repainting.
 - Acceptance criteria for repainting of level B surfaces: The repainted area should have the same color as surrounding areas. The color difference ΔE is not greater than 3. (Use a colorimeter to measure the color difference. If a colorimeter is not available, check that no obvious edge exists between the repainted area and its surrounding.) The paint should also be free from bulges, scratches, flake-off, or cracks.
- The outdoor area without shelters is not subject to bad weather conditions such as raining, sandstorm, strong wind, or snowing during paint repair.
- You have prepared the required paint that matches the color palette delivered with equipment.

Context

The FusionDC1000 pre-fab. module exterior should be intact. If the pre-fab. module surface is bumped, scratched, or rusted, the paint should be repaired.

NOTE

Check the damage to the pre-fab. module paint and prepare appropriate tools and materials. The number of materials depends on site requirements.

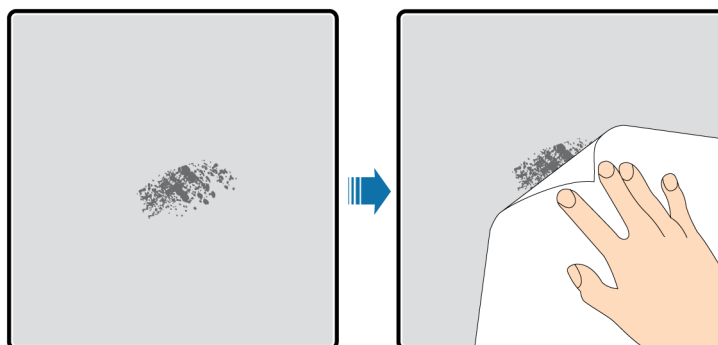
Table 3-1 Paint repair

Paint Damage	Tools and Materials	Procedure	Description
Slight scratch (steel base material not exposed)	Spray paint or paint, brush (required for repainting a small area), fine sandpaper, anhydrous alcohol, cotton cloth, painting gun (required for repainting a large area)	Steps 1, 2, and 4	1. For the color of the finish coat (polyurethane paint), see the delivered color palette and pantone No. specified on it. 2. For a few smudges, scratches or rusts, Huawei recommends manual paint spraying or paint brushing.
Smudges and rust that cannot be wiped off			
Deep scratch (primer damaged, steel base material exposed)	Spray paint or paint, zinc-rich primer, brush (required for repainting a small area), fine sandpaper, anhydrous alcohol, cotton cloth, painting gun (required for repainting a large area)	Steps 1, 2, 3, and 4	3. For many scratches or large-area smudges and rusts, use a painting gun to spray paint. 4. The paint coating should be thin and even. Paint drops are prohibited on the coating. The surface should be smooth. 5. Leave the repainted area for about 60 minutes before performing any further operation.
LOGO and pattern damage	Seek help from Huawei headquarters for a detailed painting solution. Frontline personnel can turn to local advertisement coating suppliers.		
Dent	1. If a dent is less than 100 mm² in area and less than 3 mm in depth, fill the dent with Poly-Putty base and then perform the same operations as those for processing deep scratches. 2. If a dent is greater than 100 mm² in area or greater than 3 mm in depth, ask the local supplier for an appropriate repainting solution.		

Procedure

Step 1 Gently polish damaged areas using fine sandpaper to remove smudges or rust.

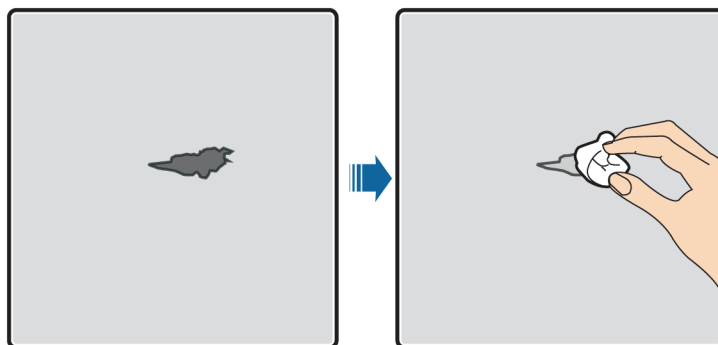
Figure 3-1 Polishing a damaged area using sandpaper



DM97000001

Step 2 Dip a piece of cotton cloth into anhydrous alcohol and wipe the polished or damaged area to remove the dirt and dust. Then wipe off the alcohol with a clean and dry cotton cloth.

Figure 3-2 Wiping a polished or damaged area using anhydrous alcohol



DD00000012

Step 3 Paint one layer of zinc-rich primer on the damaged coat using a brush or painting gun.

Figure 3-3 Zinc-rich primer



DC02H00024

- Step 4** Apply two layers of paint on the damaged finish coat based on the damage degree of the paint using a spray bottle, brush, or painting gun.

 NOTE

In the case that a pre-fab. module pattern has different colors, to prevent undamaged areas and those with different colors as the damaged area from being polluted during repainting, cover such areas using white paper and adhesive tape before repairing paint.

Figure 3-4 Manual paint spray



DC02H00025

Figure 3-5 Repainting using a brush



DC01H00029

Figure 3-6 Repainting using a painting gun



DC02H00023

----End

Follow-up Procedure

Check whether the surface meets the requirement after repainting.

3.2 Routine Maintenance

Table 3-2 Routine maintenance checklist

Category	Maintenance Item	Method	Check Standard	Troubleshooting
ECC800-Pro WebUI	FusionDC1000A alarms	On the ECC800-Pro WebUI, choose Home > Active Alarms or Query > Historical Alarms .	No alarm is displayed in the alarm information area.	Clear alarms by referring to the ECC800-Pro documents.
			Alarm short message service (SMS) messages can be received.	Check whether the SIM card is properly installed. Replace the SIM card if it is faulty.

Category	Maintenance Item	Method	Check Standard	Troubleshooting
	Camera images and angles	On the ECC800 WebUI, choose System > Video Settings > Video Information . Click Access Link to display the linked video page.	The video images are properly displayed.	If no video image is displayed: 1. Connect the camera cable again. 2. If the cable is properly connected, replace the camera.
			The coverage of the camera is optimal.	If camera angles do not meet the monitoring requirement, adjust them by following the instructions in the commissioning guide.
(Optional) ASD	ASD and its power supply	Check the working status of the ASD and its power supply.	The ASD and its power supply are normal.	If the ASD or its power supply is abnormal, troubleshoot by following instructions in documents delivered with the ASD.

3.3 Monthly Maintenance

3.3.1 Power Supply and Distribution System

Table 3-3 Monthly maintenance checklist for the power supply and distribution system

Maintenance Item	Method	Check Standard	Troubleshooting
PDF	Check the luminance of the indicators.	The three-phase power indicators are bright.	Replace the indicator.
	Check the SPD indicator and SPD	The SPD indicator is green.	If the SPD indicator is red, replace the SPD.

Maintenance Item	Method	Check Standard	Troubleshooting
	circuit breaker status.	The SPD circuit breaker is switched to ON.	Switch on the circuit breaker.
MTS9606B	Check the status of the green indicator on the rectifier.	The green indicator is steady on.	1. Check the rectifier AC input. 2. Replace the rectifier if it is faulty.
	Check the status of the yellow indicator on the rectifier.	The yellow indicator is off.	1. If there is a warning of ambient overtemperature, check the ambient temperature and clean the air channel of the cabinet. 2. If the ambient temperature is too high or too low and the rectifier shuts down for protection, troubleshoot the indoor cooling system. 3. If AC input overvoltage or undervoltage protection is triggered. Check the AC input voltage. 4. If the rectifier is in hibernation state, no action is required.
	Check the status of the red indicator on the rectifier.	The red indicator is off.	1. If the rectifier locks out due to output overvoltage, check whether the cabinet is connected to an external DC power supply with an excessively high voltage (greater than 58.5 V DC). 2. If the rectifier locks out due to output overvoltage, check whether the output voltage of the rectifier exceeds the upper limit of 58.5 V DC. 3. Replace the rectifier if it is faulty.
	Check the status of the green indicator on the SMU.	The green indicator is steady on.	1. Check the connection of the DC input power cable. 2. Check the connection of the communications cable. 3. Replace the SMU if it is faulty.
	Check the status of the red indicator on the SMU.	The red indicator is off.	1. If a critical or major alarm is generated, check related components based on the alarm information. 2. Replace the SMU if it is faulty.

Maintenance Item	Method	Check Standard	Troubleshooting
	Check the LCD display of the SMU.	The display is normal.	1. Check the LCD cable connection. 2. Replace the SMU if it is faulty.
	Check whether the SMU can communicate with the network management system (NMS).	The SMU can communicate with the NMS.	1. Check the connection of the communications cable. 2. Check the network parameter settings. Correct the settings if necessary.

3.3.2 Surveillance system

Table 3-4 Monthly maintenance checklist for the surveillance system

Check Item	Content	Check Standard	Troubleshooting
Access actuator	Power input	Input voltage: 36–60 V DC	Check the input power cables if the input voltage is abnormal.
	PWR indicator	Steady on: The power supply is normal. Off: No power supply is available.	Check the input power cables.
	ALM indicator	Steady on: A fault alarm is raised. Off: No fault alarm is raised.	Clear alarms by referring to the ECC800-Pro documents.
	RUN indicator	Off: The power supply is abnormal. Blinking at long intervals: The device successfully registers with the ECC800-Pro and the software runs properly (the indicator blinks at 0.5 Hz, on for 1s and then off for 1s). Blinking at short intervals: The communication is disconnected or the device fails to register with the ECC800-Pro (the indicator blinks at 4 Hz, on for 0.125s and then off for 0.125s). Blinking: The indicator blinks at super short intervals for 0.5s (blinking at 10 Hz, on for 0.05s and then off for 0.05s) and then turns off for 0.5s. The cycle lasts for 10s.	Check the power supply. If the RUN indicator blinks fast, check whether the communications cable is normal. If not, replace the cable.

Check Item	Content	Check Standard	Troubleshooting
	RF_Z indicator	On: There are no network parameters. A network is waiting to be created. Blinking slowly: A network is set up, and node access is not allowed (the indicator blinks at 0.5 Hz, on for 1s and then off for 1s). Blinking at super short intervals: A network is set up, and node access is allowed (the indicator blinks at 10 Hz, on for 0.05s and then off for 0.05s). Blinking at super short intervals intermittently: The device is searching for a network (the indicator blinks at 2 Hz, on for 0.5s and then off for 0.5s).	See the ECC800-Pro documents.
(Optional) PAD	Appearance	The exterior is intact and the touchscreen is working properly.	Replace the PAD.
Exit button	Function	The function is normal.	Replace the exit button.

3.3.3 Fire Extinguishing System (CE)

Table 3-5 Monthly maintenance checklist for the fire extinguishing system

Device	Method	Check Standard	Maintenance Guide
Extinguishant control panel	Check indicators on the extinguishant control panel.	The power indicator turns on, and the alarm indicator turns off.	Replace the extinguishant control panel.
Batteries of the fire alarm control panel and ASD	Check the battery terminals.	The wiring terminals are in good condition without corrosion.	Clean the contaminated and corroded terminals. Replace batteries whose terminals are severely corroded.
Fire extinguisher	Check the appearance of the fire cylinder, electrical actuator, pneumatic switch, fire extinguishing pipeline, and nozzle.	All devices of the fire extinguisher are intact, free from deformation and mechanical damage.	Replace the fire cylinder. For details about how to replace other devices, contact Huawei technical support.

Device	Method	Check Standard	Maintenance Guide
		All devices of the fire extinguisher are free from rust on the exterior, and the coating is intact.	Repaint.
		The lead seal and safety signs on hand-operated devices of the fire cylinder are intact.	Replace the electrical actuator.
	Check the pressure pointer of the fire cylinder.	The pressure pointer is in the green zone.	Ask a fire engineer to check whether the fire cylinder leaks extinguishant. If leakage occurs, the fire engineer charges the extinguishant in the local charging station.
Emergency light	Disconnect the power plug of the emergency light.	The emergency light turns on.	Replace the emergency light.
Smoke detector	Check the smoke detector indicator.	The indicator blinks once every 6s.	Replace the smoke detector.
Heat detector	Check the heat detector indicator.	The indicator blinks once every 6s.	Replace the heat detector.

3.3.4 Other Systems

Table 3-6 Monthly maintenance checklist for other systems

Maintenance Item	Method	Check Standard	Troubleshooting
Pre-fab. Module repainting	Check the exterior of the prefab. module for damage or corrosion.	The prefab. module and bases are free from paint flake-off, rust, and corrosion.	Maintain or replace the rusty, corroded, or damaged part.
Pre-fab. module external environment	Check whether there are potential hazards or pollutants around the prefab. modules.	There are no potential hazards or pollutants around the prefab. modules.	Take measures to handle potential hazards.
	Check whether there is noticeable rubbish around the prefab. modules.	There is no noticeable rubbish around the prefab. modules.	Clean the rubbish.

Maintenance Item	Method	Check Standard	Troubleshooting
	Check whether the ambient temperature, humidity, and solar radiation outside the prefab. module meet requirements.	The external temperature, humidity, and solar radiation requirements of the FusionDC1000 are as follows: • Temperature: -20°C to +55°C • Relative humidity: 5%–95% RH • Solar radiation: $\leq 1120 \text{ W/m}^2$	Contact Huawei technical support.

3.4 Quarterly Maintenance

3.4.1 Power Supply and Distribution System

Table 3-7 Monthly maintenance checklist for the power supply and distribution system

Maintenance Item	Method	Check Standard	Troubleshooting
PDF	Check the luminance of the indicators.	The three-phase power indicators are bright.	Replace the indicator that generates no or dim light.
	Check the SPD indicator and SPD circuit breaker status.	The SPD indicator is green.	If the SPD indicator is red, replace the SPD.
		The SPD circuit breaker is switched to ON.	Switch on the circuit breaker.
	Tap any button on the PD510 electricity meter panel. (Optional)	The PD510 electricity meter LCD lights up and displays information properly.	1. If the LCD does not display information properly (no display or fuzzy), check whether the power cable is properly connected. 2. If the power cable is properly connected, replace the PD510.

Maintenance Item	Method	Check Standard	Troubleshooting
MTS9606B	Check whether AC input undervoltage occurs.	The AC input voltage is normal.	1. If the AC input power cable has a large voltage drop, use a shorter or thicker power cable. 2. If the AC input power cable is poorly connected, secure the cable connection. 3. If the mains voltage is low, report the voltage status to the power supply department.
	Check whether AC input overvoltage occurs.	The AC input voltage is normal.	If the mains voltage is high, report the voltage status to the power supply department.
	Check whether an AC input phase is open.	No AC input phase is open.	1. If the AC input power cable is poorly connected, open-circuited, or damaged, check the cable status and rectify the fault. 2. If the mains supply is faulty, provide the open-phase data to the power supplier.
	Check whether the DC output circuit breaker is OFF.	If the circuit breaker is OFF, the indicator in the middle of the panel is red. If the circuit breaker is ON, the indicator is green.	If the circuit breaker is ON but the downstream load cannot be powered on, check the cable connection and upstream power-on status. If the fault persists, replace the circuit breaker.

3.4.2 Surveillance system

Table 3-8 Quarterly maintenance checklist for the monitoring system

Check Item	Content	Check Standard	Troubleshooting
Temperature and humidity (T/H) sensor	Use a hand-held hygrothermograph to measure the temperature and humidity in the current aisle, and compare the measured values with the values displayed on the ECC800-Pro.	The measured values are consistent with those displayed on the ECC800-Pro. The temperature error is within -2°C to $+2^{\circ}\text{C}$, and the humidity error is within -5% RH to $+5\%$ RH.	If the differences exceed the allowed range, replace the T/H sensor.
Access actuator	Power input	Input voltage: 36–60 V DC	Check the input power cables if the input voltage is abnormal.
	PWR indicator	Steady on: The power supply is normal. Off: No power supply is available.	Check the input power cables.
	ALM indicator	Steady on: A fault alarm is raised. Off: No fault alarm is raised.	Clear alarms by referring to the ECC800-Pro documents.

Check Item	Content	Check Standard	Troubleshooting
	RUN indicator	Off: The power supply is abnormal. Blinking at long intervals: The device successfully registers with the ECC800-Pro and the software runs properly (the indicator blinks at 0.5 Hz, on for 1s and then off for 1s). Blinking at short intervals: The communication is disconnected or the device fails to register with the ECC800-Pro (the indicator blinks at 4 Hz, on for 0.125s and then off for 0.125s). Blinking: The indicator blinks at super short intervals for 0.5s (blinking at 10 Hz, on for 0.05s and then off for 0.05s) and then turns off for 0.5s. The cycle lasts for 10s.	Check the power supply. Check the power supply. If the RUN indicator blinks fast, check whether the communications cable is normal. If not, replace the cable.
	RF_Z indicator	On: There are no network parameters. A network is waiting to be created. Blinking slowly: A network is set up, and node access is not allowed (the indicator blinks at 0.5 Hz, on for 1s and then off for 1s). Blinking at super short intervals: A network is set up, and node access is allowed (the indicator blinks at 10 Hz, on for 0.05s and then off for 0.05s). Blinking at super short intervals intermittently: The device is searching for a network (the indicator blinks at 2 Hz, on for 0.5s and then off for 0.5s).	See the ECC800-Pro documents.

3.4.3 Fire Extinguishing System (CE)

Table 3-9 Quarterly maintenance checklist for the fire extinguishing system

Device	Method	Check Standard	Maintenance Guide
Extinguishant control panel batteries	- Switch off the power input circuit breaker of the Extinguishant control panel so that the batteries power the panel. - Measure the battery voltage using a multimeter.	- The extinguishant control panel reports a power supply fault. - The battery voltage is 24 ± 1 V DC.	Replace the extinguishant control panel batteries.

3.4.4 Other Systems

Table 3-10 Quarterly maintenance checklist for other systems

Item	Method	Check Standard	Troubleshooting
Ventilation vent air filter	Check whether the filter is blocked.	The air filter is not blocked.	If an air filter is slightly blocked, clean the air filter and reinstall it. If more than 50% of the meshes are blocked, replace the air filter.
Pre-fab. module body	Check the pre-fab. module.	The pre-fab. module is clean.	- Clean the pre-fab. module using a long-handled soft brush and alkaline or neutral detergent. - Wash the pre-fab. module with clean water.
Pre-fab. module repainting	Check the pre-fab. module exterior for damage or corrosion.	The pre-fab. module and bases are free from paint flake-off, rust, or corrosion.	Maintain or replace the rusty or damaged part of the pre-fab. modules. Repaint areas with paint flake-off or rust.

3.5 Semi-annual Maintenance

3.5.1 Power Supply and Distribution System

Table 3-11 Semi-annual maintenance checklist for the power supply and distribution system

Maintenance Item	Method	Check Standard	Troubleshooting
PDF	Check the luminance of the indicators.	The three-phase power indicators are bright.	Replace the indicator that generates no or dim light.
	Check the SPD indicator and SPD circuit breaker status.	The SPD indicator is green.	If the SPD indicator is red, replace the SPD.
		The SPD circuit breaker is switched to ON.	Switch on the circuit breaker.
MTS9606B	Check whether DC busbar overvoltage occurs.	The DC busbar voltage is normal.	Replace the rectifier if it is faulty.
	Check whether DC busbar undervoltage occurs.	The DC busbar voltage is normal.	1. Restore the AC power supply if it has failed. 2. Check the load status and rectify faults you found. 3. Replace the rectifier if it is faulty.
	Check whether the DC busbar temperature exceeds 95°C at the room temperature.	The DC busbar temperature is within 95°C.	1. Secure the DC busbar if it is loose or poorly connected. 2. Check the load status and rectify faults you found.
	Check that the battery capacity and number of battery strings displayed on the SMU are the same as the actual data.	The battery capacity and number of battery strings displayed on the SMU are the same as the actual data.	If the parameter settings are incorrect or batteries are changed, reset the battery parameters.
	Check Charge Limit Coef. The value is typically 0.15C10 and adjustable.	The Charge Limit Coef setting is correct.	Change the value as required. If there is no special requirement, retain 0.15C10 .

Maintenance Item	Method	Check Standard	Troubleshooting
	Check that the battery temperature displayed on the SMU is the same as the actual temperature.	The battery temperature displayed on the SMU is the same as the actual temperature.	1. Replace the battery temperature sensor if it is faulty. 2. Replace the SMU if it is faulty.
	Check whether the total load current displayed on the SMU is the same as the actual current measured by a clamp meter.	The total load current displayed on the SMU is the same as the actual current measured by a clamp meter.	1. Reconnect the current detection cable or lithium battery communications cable if it is loose. 2. Replace the SMU if it is faulty.
	Check whether the battery charge current displayed on the SMU is the same as the actual current measured by a clamp meter.	The battery charge current displayed on the SMU is the same as the actual current measured by a clamp meter.	1. Reconnect the current detection cable or lithium battery communications cable if it is loose. 2. Replace the SMU if it is faulty.
	Check whether the difference between the DC output voltage displayed on the SMU and the measured DC busbar voltage is less than 0.5 V DC.	The difference between the DC output voltage displayed on the SMU and the measured DC busbar voltage is less than 0.5 V DC.	1. Secure the cabinet busbars and cables if they are loose or poorly connected. 2. Replace the SMU if it is faulty.

3.5.2 Cooling System

Table 3-12 Semi-annual maintenance checklist for the cooling system

Item	Maintenance Item	Description	Troubleshooting
13.5 kW integrated air cond	Appearance	The unit is clean and free from dust and dirt.	Use a brush or cotton cloth to clean up dust and dirt on the unit.
	Condensate water	The condensate drain port is not blocked.	Use a high-pressure water gun to clean the condensate drain outlet.

Item	Maintenance Item	Description	Troubleshooting
Condenser	Condenser	The condenser is not dirty or blocked.	Use a washing tool to clean the condenser until the drainage becomes clear.

3.5.3 Surveillance System

Table 3-13 Semi-annual maintenance checklist for the monitoring system

Check Item	Description	Criteria	Troubleshooting
Smart ETH gateway	Power input	Input voltage: 45–55 V DC	Check the input power cables if the input voltage is abnormal.
	Power output	Output voltage: 45–55 V DC	Contact Huawei technical support.
	PWR indicator	Steady on: The power supply is normal. Off: No power supply is available.	Check the input power cables.

Check Item	Description	Criteria	Troubleshooting
	RUN indicator	Off: The power supply is abnormal. Blinking at long intervals: The device successfully registers with the ECC800-Pro and the software runs properly (the indicator blinks at 0.5 Hz, on for 1s and then off for 1s). Blinking at short intervals: The communication is disconnected or the device fails to register with the ECC800-Pro (the indicator blinks at 4 Hz, on for 0.125s and then off for 0.125s). Blinking: The indicator blinks at super short intervals for 0.5s (blinking at 10 Hz, on for 0.05s and then off for 0.05s) and then turns off for 0.5s. The cycle lasts for 10s.	Check the power supply. For details, see the <i>ECC800 Data Center Controller V100R003C00 User Manual (for ECC800-Pro)</i>, or contact Huawei technical support.
	ALM indicator	Steady on: A fault alarm is raised. Off: No fault alarm is raised.	For details, see the <i>ECC800 Data Center Controller V100R003C00 User Manual (for ECC800-Pro)</i>, or contact Huawei technical support.
Water sensor (rope type)	Sprinkle a proper amount of water on the water detection cable.	An alarm is generated on the ECC800 WebUI.	If no alarm is generated, replace the water sensor. NOTE During normal monitoring, the power indicator of the water sensor is steady green. If the power indicator is off, replace the water sensor.

3.5.4 Fire Extinguishing System (CE)

NOTICE

- Semi-annual maintenance of the fire extinguishing system involves system commissioning. Before the maintenance, inform the related administrative departments that the fire extinguishing system will be maintained and stop working.
- Before maintaining the fire extinguishing system, remove the electrical actuator from the container valve of the fire cylinder. This prevents the extinguishant release due to misoperations, and prevents accidental damage.
- After the maintenance, reconnect the electrical actuator, and inform the administrative departments that the fire extinguishing system has become operational.

Table 3-14 Semi-annual maintenance checklist for the fire extinguishing system

Device	Operation	Check Standard	Maintenance Guide
Fire extinguishing system commissioning	Commission the fire extinguishing system by following the instructions in the Fire Extinguishing System Commissioning (CE) section in the commissioning guide for the solution in use.	Devices work properly, and the management system displays related alarms.	Replace the corresponding component.
Fire alarm bell	Flip the key to Enable Control on the extinguishant control panel rightward. Press Silence/Sound Alarm to start or abort the fire alarm bell. Reset the key to Enable Control by flipping it leftward.	The alarm bell rings normally. The alarm bell rings loud and clear when it is started.	1. Check and reconnect cables to the fire alarm bell. 2. If the fault persists, replace the fire alarm bell.
Warning sign	Pull up the reset button on the pneumatic switch.	The warning sign indicator is on.	Replace the warning sign.

Device	Operation	Check Standard	Maintenance Guide
Heat detector	Heat the heat detector using a heating device.	The temperature alarm threshold is 50°C to 65°C. 1. If the temperature is below the alarm threshold, the alarm indicator blinks once every 6s. 2. If the temperature is above the alarm threshold, the indicator turns on. The extinguishant control panel generates an alarm and triggers the fire alarm bell.	Replace the heat detector.
Smoke detector	Release smoke onto the smoke detector using a smoke pistol.	The indicator is steady on and the extinguishant control panel raises a corresponding alarm and triggers the fire alarm bell.	Replace the smoke detector.
Extinguishant abort button	1. After the manual gas release button is pressed on the extinguishant control panel, the gas release countdown starts. Then, press the extinguishant abort button. 2. Reset the extinguishant abort button by rotating it counterclockwise.	1. After the extinguishant abort button is pressed, the gas release countdown stops. 2. After the extinguishant abort button is reset, the gas release countdown starts from zero again.	Replace the extinguishant abort button.
Horn strobe	Press the manual gas release button on the extinguishant control panel.	The horn strobe generates shrill alarm sound and flashing signals after the countdown ends.	Replace the horn strobe.
ASD	Check the ASD sampling pipes.	The supports and connectors of the sampling pipes are securely connected.	Replace damaged sampling pipes, and apply glue where pipes are not well sealed.
	Remove or block a sampling pipe.	An alarm is generated.	See documents delivered with the ASD.
	Release smoke to the furthest end of an ASD sampling pipe.	The ASD generates an alarm in 120s.	See documents delivered with the ASD.

Device	Operation	Check Standard	Maintenance Guide
		The ASD panel displays an alarm.	See documents delivered with the ASD.
	Check the ASD operation panel.	All indicators are normal.	See documents delivered with the ASD.
	Check whether the backup power is working properly, and whether the ASD restarts normally after the mains powered is disconnected.	The backup power is working properly, and the ASD restarts normally after the mains power is disconnected.	See documents delivered with the ASD.
ASD power supply	Check the power indicator.	The power indicator turns on.	1. Check the power cables. 2. Replace the ASD power supply.

3.5.5 Other Systems

Table 3-15 Semi-annual maintenance checklist for other systems

Item	Method	Check Standard	Troubleshooting
Lights	Check whether the lights can be switched on normally.	The lights turn on normally.	1. If a light cannot be switched on, check whether the light is securely installed and in good contact with the light base. 2. If a light is securely installed and in good contact with the light base but fails to turn on, replace the light.
Ventilation vent air filter	Check whether the filter is blocked.	The air filter is not blocked.	If an air filter is slightly blocked, clean the air filter and reinstall it. If more than 50% of the meshes are blocked, replace the air filter.
Cable trays inside pre-fab. modules	Check whether the cable trays are securely connected without damage or misshapen.	Cable trays are properly installed, and fasteners are secure.	Secure cable trays that have become loose.

Item	Method	Check Standard	Troubleshooting
		Cable trays, screws, and nuts are free from rust or corrosion.	Repaint corroded cable trays, or replace damaged and seriously corroded parts. For details, see the installation guide for the corresponding solution.
Cables	Check cable connections.	Cables are securely connected without bare terminals.	Secure terminal connections, and replace terminals that do not meet requirements. For details, see the installation guide for the corresponding solution.
	Check whether cables are intact.	• Cable jackets are free from damage or cracks. • No cable overheats due to overload and the loads are within the rated capacity of the cables (the cables works only a very short time under overload situations). • The bend radius of cables meets requirements. • The cable armor is intact.	Replace parts that do not meet requirements.

4 Troubleshooting

4.1 Troubleshooting the Meter

Table 4-1 Troubleshooting the meter

Symptom	Alarm	Possible Causes	Troubleshooting
Screen off	None	The power supply is abnormal, and the meter voltage is lower than 85 V.	1. Check whether the upstream power supply is normal. 2. Check whether the power fuse is blown. If yes, replace the fuse. 3. Check whether the wiring terminals are loose. If they are loose, reconnect and secure the wiring terminals.
		The power supply is abnormal, and the meter voltage is higher than 265 V.	If overvoltage occurs, rectify the overvoltage and overload, and power on the meter again. If the screen is still off, the meter is damaged due to overvoltage and needs to be replaced.
		The meter is damaged.	Replace the meter.
Open phase	Open phase alarm	The power supply is abnormal.	1. Check whether the wiring terminals are loose. 2. Check whether the upstream power supply is normal.
		The fuse is broken.	Replace the fuse.
No current displayed	None	Cables are loose.	Check whether cables are securely connected to the current terminal block.

Symptom	Alarm	Possible Causes	Troubleshooting
Communication failure	Communication failure alarm	The network cable is abnormal.	1. Check whether the sequence of the network cable is correct based on the meter connection diagram provided by the manufacturer. 2. Connect the network cable of a meter that can properly communicate to the meter that cannot properly communicate. If the communication is restored, the original network cable is faulty. Replace the network cable.
		The communications parameters of the meter are incorrectly set.	The communications address, baud rate, and verification code of the meter are inconsistent with those in the initial meter configuration table.

4.2 Troubleshooting the 13.5 kW Integrated Air Conditioner

Table 4-2 Troubleshooting the 13.5 kW integrated air conditioner

Symptom	Alarm	Possible Causes	Troubleshooting
A blank screen is displayed and the system cannot be started.	None	The DC power supply is abnormal.	• If a group of integrated air conditioners fails to start, the upstream power supply may be abnormal. Check the cable connections between the upstream CO power cabinet and the fresh air integrated unit. • If a single integrated air conditioner fails to start, check whether the corresponding circuit breaker in the CO power cabinet trips. If the circuit breaker does not trip, check whether the CO power cabinet works properly. If the circuit breaker does not trip and the CO power cabinet works properly, check the cable connection to the fresh air integrated unit. • If the power supply is normal, the mainboard may be burnt. If so, replace the mainboard.
		The mainboard is faulty.	1. Check whether the cables are securely connected. 2. Replace the mainboard.

Symptom	Alarm	Possible Causes	Troubleshooting
		The power supply and cable connections are normal, but the LCD turns blank.	Replace the LCD.
The air conditioner is started but has no cooling output.	1# internal fan fault	The internal fan is faulty.	- The power terminal of the internal fan is loose: Check the connection cables and terminals of the internal fan power cable, feedback signal cable, and control cable based on the air conditioner electrical conceptual diagram. - The internal fan is faulty: Replace the internal fan.
	1# system high pressure 1# external fan fault	The external fan is faulty (high system pressure).	- The power terminal of the external fan is loose: Check the connection cables and terminals of the external fan power cable, feedback signal cable, and control cable based on the air conditioner electrical conceptual diagram. - The external fan is faulty (determined according to high system pressure): Replace the external fan.
	1# cooling system abnormal 1# converter overcurrent 1# converter overtemperature	The compressor is faulty.	Replace the compressor.

Symptom	Alarm	Possible Causes	Troubleshooting
	- Indoor unit overvoltage - Indoor unit undervoltage - DC overvoltage - DC undervoltage	The AC or DC power supply is abnormal.	- Check whether the input power cable is correctly connected. - Choose System Status > Environment Status, and check the supplied DC and AC voltages. - Use a multimeter to measure the upstream power supply voltage (380 V±10%) of the integrated air conditioner. If the measured voltage exceeds the threshold, the power grid voltage is abnormal. - Check whether the corresponding circuit breaker in the upstream PDF has tripped. If not, check whether the PDF works properly.
	None	The control temperature is set too high.	Check whether the indoor temperature parameters of the fresh air integrated unit are correctly set.
The air conditioner is started but has insufficient cooling output.	1# cooling system abnormal 1# converter overcurrent 1# converter overtemperature	The compressor is faulty.	Replace the compressor.
	1# system high pressure	The condenser is blocked or the circulation air channel is blocked.	Check whether the condenser is blocked. Use a washing tool to clean the condenser until the drainage becomes clear.
	1# system low pressure	Refrigerant leaks.	Locate the leaking point on the refrigerant circulation pipe and weld the leaking point. Drain the refrigerant, and weld the leaking point. Then, charge nitrogen into the pipeline, preserve the pressure to verify the air tightness, vacuumize the pipeline, and then fill refrigerant.

Symptom	Alarm	Possible Causes	Troubleshooting
		The evaporator is blocked or the circulation air channel is blocked.	- Check whether the evaporator is blocked. Use a dry cotton cloth to clean the blockage. - Check whether the indoor air supply or return vent is blocked: Remove the blockage.

4.3 Troubleshooting the Dehumidifier

Table 4-3 Troubleshooting the dehumidifier

Symptom	Alarm	Possible Causes	Troubleshooting
The dehumidifier fails to start.	None	The power supply is unavailable.	Restore the power supply.
	E4: Water full	The drainage pump is damaged and cannot drain water automatically.	Symptom: When the water in the pump reaches the alarm threshold, the buzzer beeps twice. After that, the buzzer beeps twice every 5 minutes until the water in the pump is drained and the device stops working. Measure: Replace the drainage pump.
	E3: Humidity sensor fault	The humidity sensor is faulty.	Symptom: If the output voltage of the humidity sensor is less than or equal to 0.5 V or greater than or equal to 4 V, and the output voltage does not change for three consecutive hours, the humidity sensor is faulty. Measure: Replace the T/H sensor.
	E5: Coil pipe probe fault	The coil pipe sensor is faulty.	Symptom: If the temperature of the coil pipe sensor is greater than or equal to 50°C or less than or equal to -30°C, the coil pipe sensor is faulty. Measure: Replace the coil pipe sensor.

Symptom	Alarm	Possible Causes	Troubleshooting
The dehumidifier shuts down.	E1: Overvoltage protection	The power supply voltage exceeds the upper threshold.	Symptom: When the voltage is greater than 265 V for 1 minute, the fan and compressor automatically shut down. The fault code E1 is displayed on the screen. Measure: Power on the device again.
	E7: Undervoltage protection	The power supply voltage is below the lower threshold.	Symptom: When the voltage is less than 190 V for 1 minute, the fan and compressor automatically shut down. The fault code E7 is displayed on the screen. Measure: Adjust the upstream power distribution system to ensure that the voltage is normal if the voltage is greater than 190 V for 5 minutes and the device automatically recovers to the status before shutdown. Then the E7 code is cleared.
The dehumidification effect is poor.	Air filter scale	The air filter has scale.	Clean the filter.
	None	The air intake and exhaust vents of the dehumidifier are blocked.	Remove the obstacles.
		The room is not sealed.	Close the doors and windows of the room.
		The temperature and humidity inside the room are low.	When the temperature and humidity are low, the dehumidification capacity decreases greatly.
The noise is abnormal.	None	The floor where the device is placed is uneven.	Place the device on an even floor.

Symptom	Alarm	Possible Causes	Troubleshooting
		The air exhaust vent is blocked.	Remove the obstacles at the air exhaust vent.

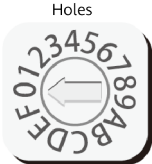
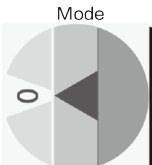
4.4 Troubleshooting the ASD

Table 4-4 Troubleshooting the 531-ASD

Symptom	Alarm	Possible Causes	Troubleshooting
The fault indicator is on.	The ASD fault dry contact signal is generated on the ECC collector or NMS.	- The pipe is broken. - Dust has accumulated in the sampling hole and filter box.	- Check and replace the broken pipe, and reset the ASD. - Check and clean the sampling hole and filter box. If they are seriously polluted, replace them with spare parts, and then reset the ASD.
The fault indicator and detector pollution indicator are on.	The ASD fault dry contact signal is generated on the ECC collector or NMS.	Dust has accumulation in the detection cavity.	Check and clean the detection cavity. If the detection cavity is seriously polluted, replace it with a spare one, and then reset the ASD.

Table 4-5 Troubleshooting the 531-ASD

Check Item	Check Content	Expected Result	Troubleshooting
Check whether the sampling pipe is broken.	Sampling pipe	The pipe is not broken.	Replace the pipe.
Check whether the sampling pipe is blocked.	Sampling holes in the middle and at the end of the pipe	The pipe is not blocked.	Clean the sampling pipe.
Check whether dust accumulates in the filter box.	Filter box	There is no dust accumulation.	Clean or replace the filter.

Check Item	Check Content	Expected Result	Troubleshooting
Check whether the Holes DIP switch setting is correct. Figure 4-1 Holes DIP switch setting 	Holes DIP switch setting and the actual number of sampling holes	The DIP switch setting is the same as the actual number of sampling holes.	Set the DIP switch on the control board to a correct value and reset the board.
Check whether the Class DIP switch setting is correct. Figure 4-2 Class DIP switch setting 	Class DIP switch setting	The DIP switch setting is 2, that is, the sensitivity class is 2.	Set the DIP switch on the control board to a correct value and reset the board.
Check whether the Mode DIP switch setting is correct. Figure 4-3 Mode DIP switch setting 	Mode DIP switch setting	The DIP switch setting is 1, indicating that the device is running properly.	Set the DIP switch on the control board to a correct value and reset the board.

4.5 Troubleshooting the ASD Power Box

Table 4-6 ASD power box

Symptom	Possible Causes	Troubleshooting
The ASD power box is started, but the ASD is not working, and the output fault indicator is on.	The ASD power box has no output, cables are not properly connected, or components are faulty.	Check whether the LN cable is correctly grounded. Check whether the main electrical fuse is in good contact with the safety seat. Check whether the load is short-circuited. Check whether the AC switch is in good contact.
The backup power fault indicator is on.	Cables are not properly connected or components are faulty.	If the backup power unit cannot work independently, shut down the main backup power unit for 10 seconds. If the backup power unit still cannot work properly after power-on, the backup power unit is faulty. Check whether the battery is aging. If so, replace the battery. Check whether the output power cable is correctly connected, whether the contact is good, and whether the power switch is turned on.
The output fault indicator is on.	Overcurrent or undervoltage occurs.	Use a multimeter to check whether the DC output voltage is less than or equal to 24 V. Use a multimeter to check whether the output current is greater than or equal to 5 A. Check whether the battery terminal voltage is less than 21 V DC.
The main power supply is faulty.	The main power fuse is broken.	Check whether the upstream input voltage is 220 V.

4.6 Troubleshooting the Extinguishant Control Panel

Symptom	Possible Causes	Troubleshooting
The Power Fault, General Fault, Main Fail, Batt Fail, or Batt Low indicator lights up.	The active and standby power supplies are faulty or the voltage is too low.	1. When the Batt Low indicator is on, check whether the battery string voltage is lower than 24 ± 1 V DC. If the battery is faulty, replace the battery. 2. If the Batt Fail indicator is on, check whether the battery wiring terminals are intact and not eroded. Check whether an open circuit occurs and reconnect the cables. 3. If the Main Fail indicator is on, check whether the mains is disconnected, whether the L-phase fuse is broken, and whether the mains voltage is abnormal. If so, rectify the fault. After rectifying the preceding causes, the Power Fault, General Fault, Main Fail, Batt Fail, or Batt Low indicator on the panel is off.
The General Fault, Zone Fault, Test, Disablement 1, or Disablement 2 indicator lights up.	Zone1, Zone2, and Zone3 are short-circuited or open-circuited.	1. Check whether the sensor fault indicator is steady on and whether the loop is short-circuited or open-circuited. 2. Check whether the terminal resistor is connected or faulty.
The Sounder Fault, Disablement, General Fault, or S1 Fault indicator lights up.	/	1. Check whether the alarm bell loop is short-circuited or open-circuited. 2. Check whether the alarm terminal resistor is connected or faulty.
The General Fault, Flooding Zone Fault, or S3 Fault indicator lights up.	/	1. Check whether the horn strobe loop is short-circuited or open-circuited. 2. Check whether the horn strobe terminal resistor is disconnected or faulty.
The General Fault, Flooding Zone Fault, or Exiting Fault indicator lights up.	/	1. Check whether the electrical actuator loop is short-circuited or open-circuited. 2. Adjust the resistance of the matched resistor for the host. (Turn the knob leftwards or rightwards until the Exiting Fault indicator turns off. Before turning the knob, turn the key inserted in the Enable Control slot and the Write Enable DIP switch to the right. After the adjustment, reset the key and the DIP switch.)
The General Fault and Comms Fault indicators light up.	/	1. Turn off the power supply and check the circuit board address and jumper connection.

Symptom	Possible Causes	Troubleshooting
The General Fault, Hold Activated, Flooding Zone Fault, and Hold Fault indicators light up.	/	Check whether the abort switch is short-circuited or open-circuited.
The General Fault, Flooding Zone Fault, and Release Fault indicators light up.	/	Check whether the pneumatic switch loop is short-circuited or open-circuited, whether the cable connection is correct, and whether the resistor is correctly used.
The General Fault and Releasing Trouble indicators light up.	The extinguishant control panel is not reset.	1. Turn the Enable Control key rightwards. 2. Push the Write Enable DIP switch rightwards. 3. When Fu1 is displayed, press Enter. 4. Press the Reset button.
The Tell Table indicator lights up.	/	The fault is caused by pressing the emergency start button on the host or on the automatic/manual switch, which can be automatically rectified by powering on the device.

NOTE

Measure the resistance with a multimeter. (When the resistance is infinite, the open-circuit state occurs.) When the resistance is 0, the short-circuited state occurs. Visually check whether the terminal resistor is disconnected or short-circuited.

- Remove the resistor from the device. Turn on the multimeter and set it to an appropriate resistance level (usually 20 kΩ for the fire extinguishing system). Connect the red and black probes to both ends of the resistor and check the corresponding values.
- Turn on the multimeter and set it to a proper voltage level (usually 200 kV DC). Connect the red and black probes to both ends of the component and check the corresponding values. (+ and -).

4.7 Troubleshooting the Access Actuator

Table 4-7 Access actuator

Symptom	Possible Causes	Troubleshooting
The power indicator is off.	The input voltage is not within the range of 36–60 V DC, the cable connection is incorrect, or the PoE power supply is faulty.	Check whether the upstream ETH gateway and the small busway connector box work properly, whether the network cable sequence is correct, and whether the input and output ports are correct.

Symptom	Possible Causes	Troubleshooting
The PoE port cannot communicate properly. The green indicator on the network port does not turn on or the yellow indicator does not blink.	Cables are not properly connected or components are faulty.	Check whether the network cable sequence is correct and whether any component is damaged.
The access actuator cannot be registered, and the running indicator is off.	Components are faulty.	Replace the faulty component with a new one.
The RS485 communication is faulty.	Cables are not properly connected.	Check whether the cable connection is correct or whether the cable is reversely connected, and whether the baud rates of the upstream and downstream devices are consistent.
The card reader cannot work properly.	Cables are not properly connected or components are faulty.	Check whether the network cable sequence is correct or replace the card reader.
The door cannot be unlocked properly.	The user does not have the access permission or the lock fails.	Check whether the user has the permission to open the door or whether the lock cable is connected properly.

4.8 Troubleshooting the Non-Location-Type Water Sensor

Table 4-8 Cable-type water sensor

Symptom	Possible Causes	Troubleshooting
The LED indicator is on and an alarm is generated.	Water leakage or a false alarm occurs.	Check all the leaking points on the cable and rectify the fault.

4.9 Troubleshooting the Three-in-One Card Reader

Table 4-9 Three-in-one card reader

Symptom	Possible Causes	Troubleshooting
The component fails to communicate.	The cable is not connected properly or the terminal is not crimped correctly.	Check whether the power supply is normal.

5 Parts Replacement

5.1 Replacing Structural Parts

5.1.1 Replacing the Lock Cylinder or External Handle

Prerequisites

- The replacement does not affect the normal operation of the indoor equipment.
- For an outdoor door, it is recommended that the replacement be performed in non-rainy days. In rainy days, set up a temporary awning above the door.

Context

Tools: M4–M6 electric screwdriver or Phillips screwdriver For an outdoor door, white sealant and a glue gun are needed.

Materials: lock cylinder and external handle of the appropriate model

Operating personnel: 1–2

Procedure

- Step 1** Disconnect the power supply from the access actuator to release the door closer.
- Step 2** Use the electric screwdriver or Phillips screwdriver to remove the four screws from the lock covers on the right, top, and bottom side of the bar in sequence, and then remove the lock covers. Pull out the pin at the upper or lower end of the rods.

Figure 5-1 Lock covers on the bar



DC03L00001

Figure 5-2 Pulling out the pin



DC03L00002

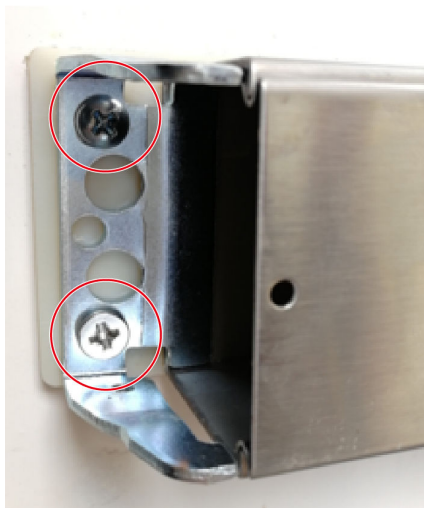
- Step 3** Rotate the lock rods to remove the upper and lower rods.
- Step 4** Use the electric screwdriver or Phillips screwdriver to remove the covers at the end of the bar and the screws on the fastener at the end of the bar.

Figure 5-3 Removing the covers at the end of the bar



DC03L00003

Figure 5-4 Removing the fastener at the end of the bar



DC03L00004

Step 5 Use the electric screwdriver or Phillips screwdriver to remove the screws that secure the lock cylinder to the door.

Figure 5-5 Removing the lock cylinder



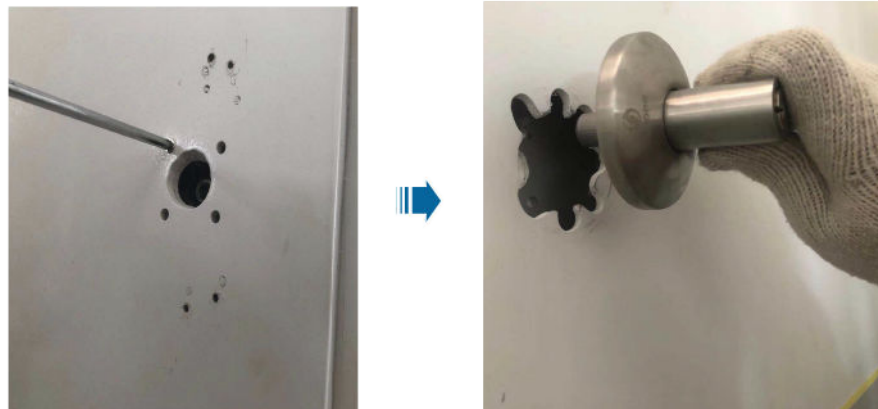
DC03L00005

Step 6 Remove the lock cylinder and bar together.

Step 7 (Optional) Replace the external handle.

1. Remove the screws from the external handle, clear the white sealant, and take out the external handle.

Figure 5-6 Removing the external handle



DC03L00006

2. Install a new external handle.

Step 8 (Optional) Replace the lock cylinder.

1. Use the electric screwdriver or Phillips screwdriver to remove the four screws that secure the lock cylinder to the bar, and separate the lock cylinder from the bar.

Figure 5-7 Separating the lock cylinder from the bar



DC03L00007

2. Assemble the new lock cylinder and bar.

Step 9 Reinstall the lock cylinder and bar together.

Step 10 Reinstall the fastener and covers at the end of the bar.

Step 11 Install the upper and lower rods.

- Insert the upper rod into the upper lock base or lock cylinder, rotate and tighten the upper rod, and then reinstall the pin.
- Insert the lower rod into the lower lock base or lock cylinder, rotate and tighten the lower rod, and then reinstall the pin.

Step 12 Reinstall the lock covers. Reinstall the lock cover, upper lock cover, and lower lock cover on the lock cylinder.

Step 13 (Optional) For an outdoor door, apply white sealant on the joint between the external handle and the door panel.

----End

Follow-up Procedure

Open and close the door for 20 times, and check whether the bar lock and external handle can work properly.



CAUTION

After the lock is installed, restore the connection between the door and the door closer.



NOTE

After the installation is complete, clear the marks and dust generated during the installation and removal.

5.1.2 Troubleshooting the Falling Door Panel

The door panel has falling pieces. As a result, the gap between the single-swing door panel and the door frame is uneven, or the left and right door panels of the double-swing door are not aligned, and the door panels cannot be closed properly. This section describes how to troubleshoot the door panels with falling pieces.



NOTE

- The outdoor fireproof door uses hinges which are installed outside. The indoor fireproof door uses hinges which are installed inside.
- The methods for handling a single-swing door and a double-swing door are the same.

5.1.2.1 Troubleshooting the Falling Door Panel with External Hinges

Prerequisites

- The maintenance does not affect the normal operation of the indoor equipment.
- For an outdoor door, it is recommended that the maintenance be performed in non-rainy days. In rainy days, set up a temporary awning above the door.

Context

Tools: electric screwdriver (torx screwdriver bit/torx screwdriver), or hex key (one set), Phillips screwdriver, steel measuring tape, step ladder, plastic paper (used for placing hardware and other accessories)

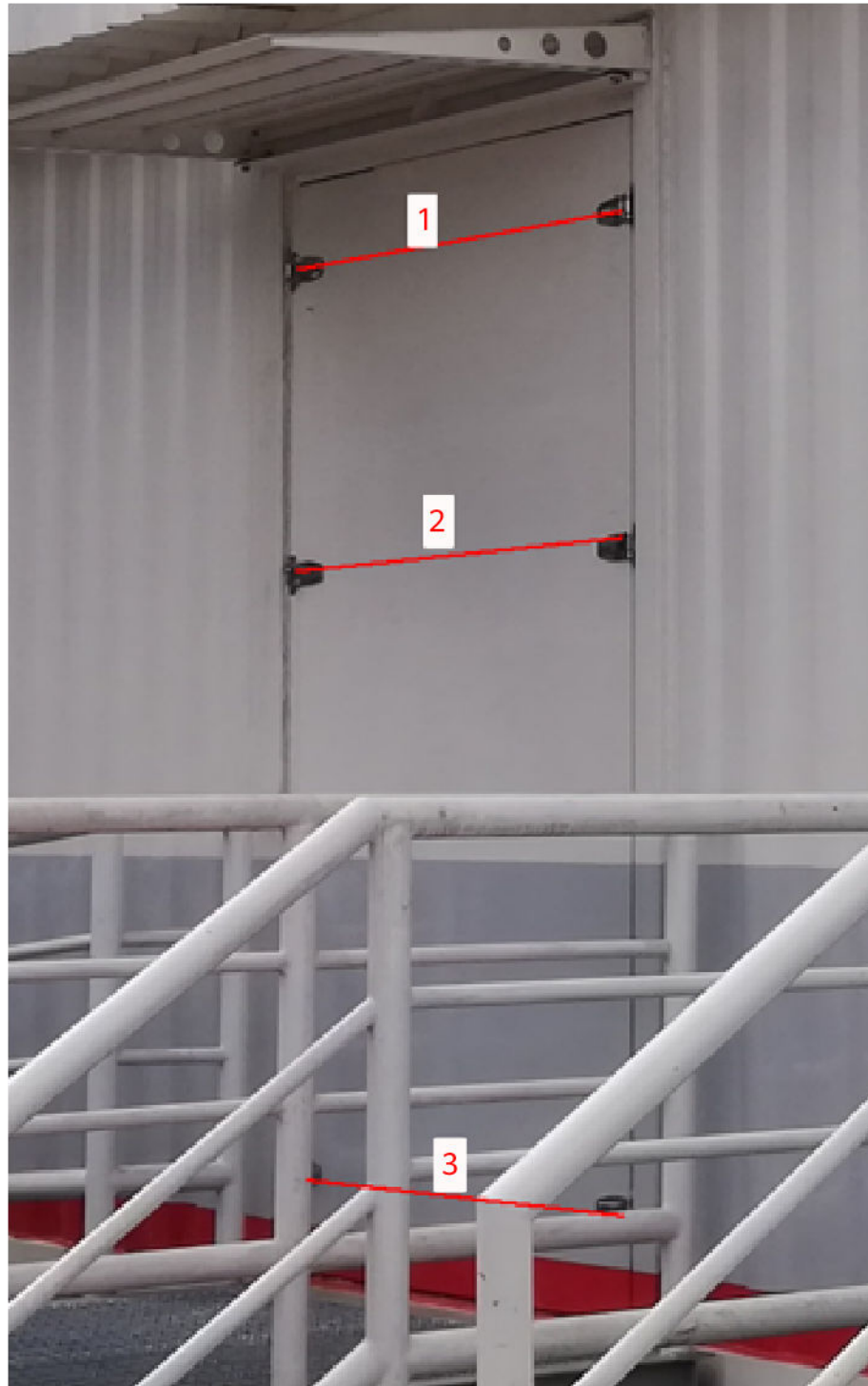
Operating personnel: 3

Procedure

Step 1 Check whether the door frame of the fireproof door is deformed.

1. Measure the widths of positions 1, 2, and 3 in the door frame shown in the following figure and compare them to determine whether the door frame of the fireproof door is deformed.

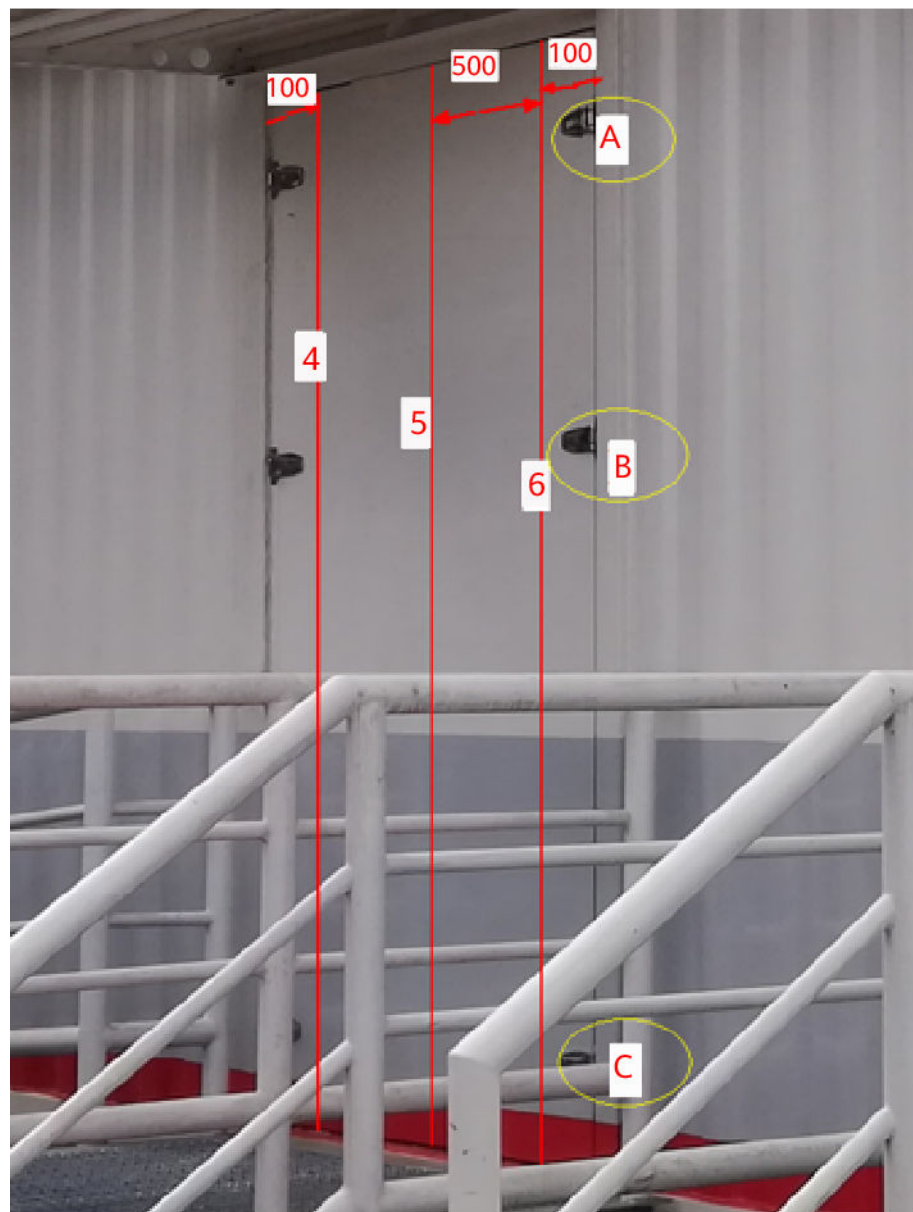
Figure 5-8 Measuring the widths of the door frame



DC03L00009

2. Measure the heights of positions 4, 5, and 6 in the door frame shown in the following figure and compare them to determine whether the door frame of the fireproof door is deformed.

Figure 5-9 Measuring the heights of the door frame



DC03L00010

- Step 2** Disable the door closer. Remove the bolts connecting the rocker arm of the door closer and the T-shaped panel using a Phillips screwdriver, and reinstall the bolts on the T-shaped panel.

Figure 5-10 Removing a door closer



DC03L00011

- Step 3** Place flat washers in the gaps between the door panel (door handle side) and the door frame.

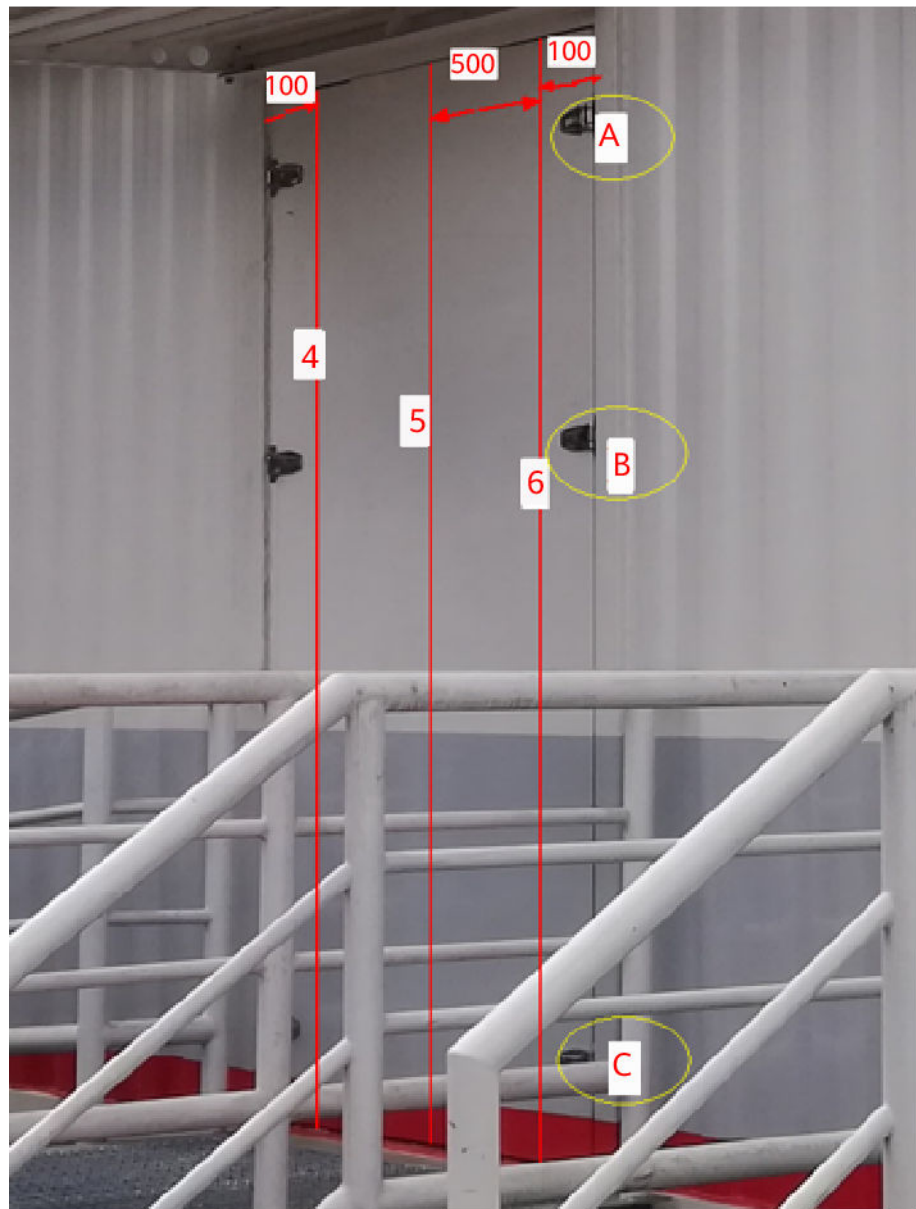
Figure 5-11 Placing flat washers at the top and bottom of the door frame



DC03L00012

- Step 4** Loosen the screws on hinges A and C and adjust the door panel. Then loosen the screws on hinge B and adjust the door panel.

Figure 5-12 Adjusting the hinges



DC03L00010

- Step 5** Adjust the thickness of the upper and lower flat washers to ensure that the upper edge of the adjusted door panel is flush with the upper edge of the other door panel and the door gap is even. Then tighten the screws on the hinges and remove the upper and lower flat washers.

NOTICE

Ensure that two persons hold the door panel from the outside to prevent it from falling down.

- Step 6** After the fault is rectified, use a Phillips screwdriver to connect the rocker arm of the door closer to the bolts on the T-shaped panel.

----End

Follow-up Procedure

After the door panel is normal, check the rubber strip at the bottom of the door frame. If the rubber strip is damaged, replace it. For details, see section "Replacing the Rubber Strips at the Bottom of the Door Panel."

5.1.2.2 Troubleshooting the Falling Door Panel with Internal Hinges

Prerequisites

- The maintenance does not affect the normal operation of the indoor equipment.
- For an outdoor door, it is recommended that the maintenance be performed in non-rainy days. In rainy days, set up a temporary awning above the door.

Context

Tools: electric screwdriver (torx screwdriver bit/torx screwdriver), or hex key (one set), Phillips screwdriver, plastic paper (used for placing hardware and screws)

Material: flat washer

Operating personnel: 2

Procedure

- Step 1** Disable the door closer. Remove the bolts connecting the rocker arm of the door closer and the T-shaped panel using a Phillips screwdriver, and reinstall the bolts on the T-shaped panel.

Figure 5-13 Removing a door closer



- Step 2** Open the door panel to a proper angle, and hold the door panel by one person to keep it still. Use the electric screwdriver or torx screwdriver (or hex key) to remove the screws connecting the door frame and the hinge at the bottom.

Figure 5-14 Removing the bottom hinge



DC03L00013

Step 3 At the joint of the bottom hinge and door frame, place a 2 mm or 3 mm thick flat washer at the end of each screw based on the falling of the door panel.

Figure 5-15 Placing a flat washer on the bottom hinge



- Step 4** Secure the bottom hinge to the door frame again, use the electric screwdriver (torx screwdriver or torx screwdriver) or hex key to partially tighten the screws that secure the hinge.

NOTICE

Prevent the flat washer at the end of the screws from falling off during the installation.

- Step 5** (Optional) Check whether the door frame under the hinge is closer to the floor. If yes, add a 2 mm or 3 mm thick flat washer in the gap between the door frame and the floor below the hinge.

To add a spacer, use a hammer to knock a flat chisel or crowbar into the gap between the door frame and the container, and then insert a flat washer with a thickness of 2–3 mm into the gap.

Figure 5-16 Adjusting the door frame edge



DC03L00015

Step 6 Check the functions.

1. The lower end of the door panel must not scratch the lower door frame.
2. The width of the vertical gap between the left and right door panels must be even, and the door panels can be properly closed. For a door with only one door panel, the width of the vertical gap between the door panel and the door frame must be even.

Step 7 After checking that all functions are normal, tighten all screws of the hinge. Connect the rocker arm of the door closer to the bolts on the T-shaped panel using a Phillips screwdriver.

----End

Follow-up Procedure

After the door panel is normal, check the rubber strip at the bottom of the door frame. If the rubber strip is damaged, replace it. For details, see section "Replacing the Rubber Strips at the Bottom of the Door Panel."

5.1.2.3 Replacing the Rubber Strips at the Bottom of the Door Panel

Context

Tools: utility knife, measuring tape

Material: sealant

Procedure

- Step 1** Remove the V-shaped rubber strips at the bottom of the door frame and clear the residual adhesive.

Figure 5-17 Removing the V-shaped rubber strips



DC03L00008

- Step 2** Cut the V-shaped rubber strips to an appropriate length based on site requirements. Apply sealant to the bottom of the door frame and attach new V-shaped rubber strips.

NOTICE

When attaching rubber strips, ensure that the V-shaped rubber strips at the bottom of the door frame are seamlessly connected to the V-shaped rubber strips on both sides.

----End

5.2 Replacing Components for the Power Supply and Distribution System

5.2.1 Replacing Input PDF Components

5.2.1.1 Replacing an ATS Controller

Prerequisites

A spare ATS controller of the same model is available and functional.

Impact on the System

Certain services of the FusionDC1000 are interrupted.

Preparations

Tools: Phillips screwdriver, flat-head screwdriver, key to the PDF door, step ladder

Materials: spare ATS controller

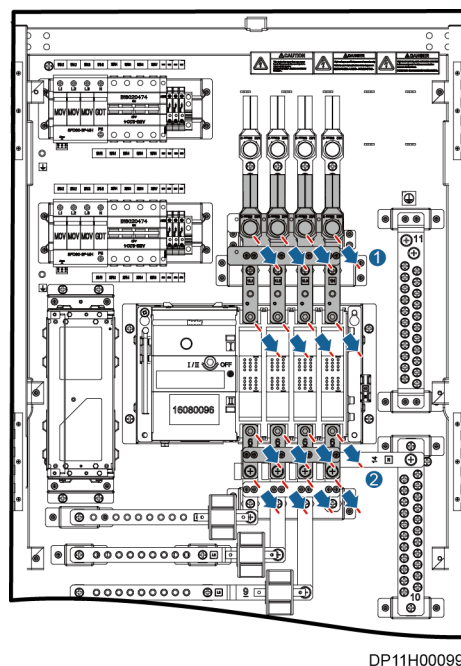
Documents: documents delivered with the PDF

Skill requirement: power distribution engineers

Procedure

- Step 1** Open the front door of the PDF, turn off the output switches in the PDF, and turn off the upstream and downstream switches.
- Step 2** Remove the protective panel of the PDF.
- Step 3** Remove the cables at the ATS controller top and label them.
- Step 4** Remove the screws that secure the copper bars above and below the ATS controller, and remove the copper bars.

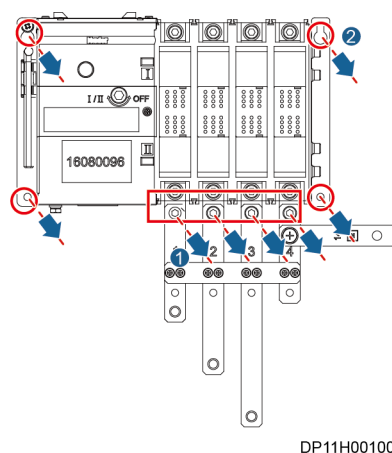
Figure 5-18 Removing copper bars



Step 5 Remove the screws from the inner layer of the copper bar below the ATS controller.

Step 6 Remove the four screws that secure the ATS controller to the base and take out the input switch.

Figure 5-19 Removing an input switch



Step 7 Install the new ATS controller and secure it using screws.

Step 8 Reinstall the copper bars and cables.

Step 9 Reinstall the protective panel of the PDF.

Step 10 Turn on the upstream and output switches of the PDF.

Step 11 Check that the new ATS controller is working properly.

 NOTE

After power-on, the Power indicator of the controller lights up.

Step 12 Turn on downstream switches of the PDF.

----End

Follow-up Procedure

Dispose of the removed ATS controller that is confirmed faulty.

5.2.1.2 Replacing an MCB

Prerequisites

A spare MCB of the same model is available and functional.

 NOTE

The PDF must be powered off. Ensure that the power input is disconnected during replacement.

Impact on the System

None

Preparations

Tools: electroprobe, insulation gloves, flat-head screwdriver, Phillips screwdriver, multimeter

Material: spare MCB

Documents: none

Skill requirement: electrician's work permit

Procedure

- Step 1** Determine the position of the faulty MCB, and open the corresponding cabinet door.
- Step 2** Remove the front panel of the PDF using a Phillips screwdriver.
- Step 3** Switch a multimeter to the DC voltage mode to measure the voltage between positive and negative copper bars at the upper part of the MCB. If the voltage is lower than 36 V DC for 1 minute, replace the MCB.
- Step 4** Remove the input and output power cables from the MCB.

NOTICE

- When removing cables, remove the cable below the MCB first.
 - After removing cables, insulate the cable terminals.
 - While removing cables, label them with the corresponding terminal ports for later connection.
-

Step 5 Push the buckle at the MCB outwards using a flat-head screwdriver, and remove the faulty MCB.

Step 6 Install the new MCB by referring to the preceding method, connect cables, and tighten screws.

Step 7 Reinstall the removed components, and close the corresponding cabinet door.

----End

Follow-up Procedure

Dispose of the removed MCB that is confirmed faulty.

5.2.1.3 Replacing an SPD

Prerequisites



DANGER

Do not replace an SPD during a thunderstorm.

- An SPD is faulty.
- A spare SPD of the same model is available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, flat-head screwdriver, electroprobe

Material: spare SPD

Documents: PDF user manual

Skill requirement: electrician's work permit

Procedure

Step 1 Remove the protective panel of the SPD.

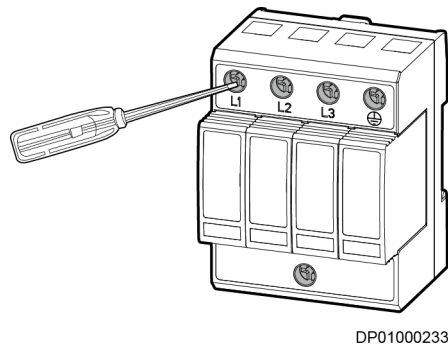
CAUTION

Avoid touching any charged body when removing the panel.

Step 2 Switch off the SPD circuit breaker.

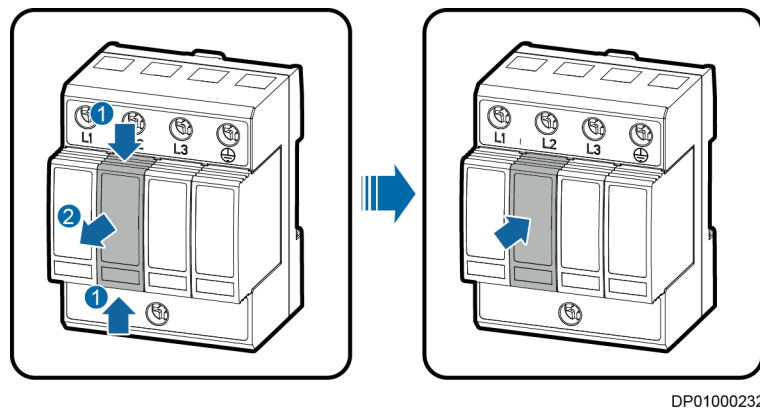
Step 3 Detect the L1, L2, L3, and N voltages to the PE using an electrical tester pen, and verify that the faulty SPD has no voltage before replacing the faulty SPD. **Figure 5-20** shows how to detect the voltages.

Figure 5-20 Detecting the voltages



Step 4 Hold down the faulty SPD module and pull it out.

Figure 5-21 Replacing the module



NOTE

- If one SPD module is damaged by lightning strike, it is recommended that all SPD modules be replaced.
- If the SPD module cannot be pulled out, use a tool such as a flat-head screwdriver to lever it out.

Step 5 Install the spare SPD module, and switch on the SPD circuit breaker.

Step 6 Reinstall the protective panel.

----End

Follow-up Procedure

Dispose of the removed SPD module that is confirmed faulty.

5.2.1.4 Replacing an Indicator

Prerequisites

- An indicator is dim or faulty.
- A spare indicator of the same model is available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, multimeter

Material: spare indicator

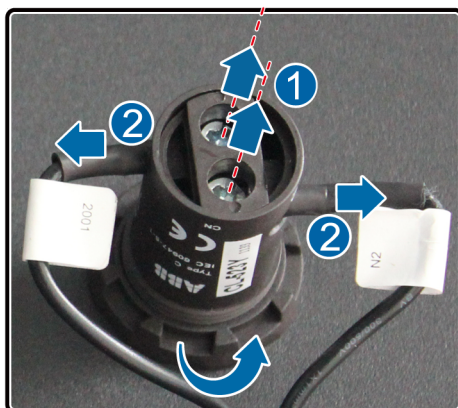
Documents: none

Skill requirement: electrician's work permit

Procedure

- Step 1** Switch off the MCB or fuse for protecting the indicator.
- Step 2** Replace the indicator after confirming that no voltage is detected by using a multimeter.
- Step 3** Loosen the screws at the back of the indicator and remove the cables.

Figure 5-22 Removing an indicator



DJ03000004

NOTE

While removing cables, label them with the corresponding terminal ports for later connection.

- Step 4** Remove the retaining ring from the indicator and remove the indicator from the mounting hole.

- Step 5** Install the new indicator in the mounting hole, install the retaining ring, connect the cables, and switch on the MCB.

----End

Follow-up Procedure

Dispose of the removed indicator that is confirmed faulty.

5.2.2 Replacing MTS9606B Components

5.2.2.1 Replacing a DMU02C1

Prerequisites

- The protective gloves and cabinet door key are available.
- The new DMU02C1 is intact.

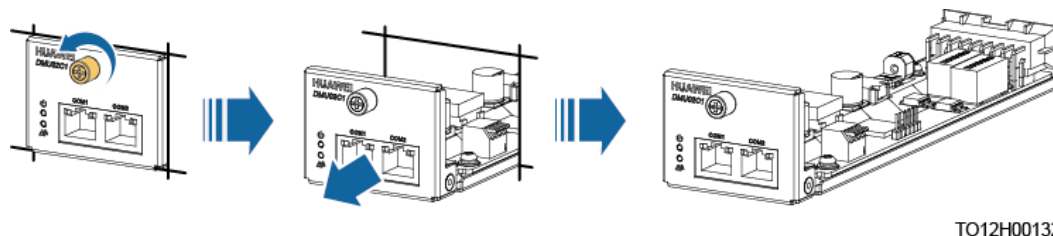
Procedure

- Step 1** Put on the protective gloves.

- Step 2** Note where cables are connected to the DMU02C1 panel. Record these positions and disconnect the cables.

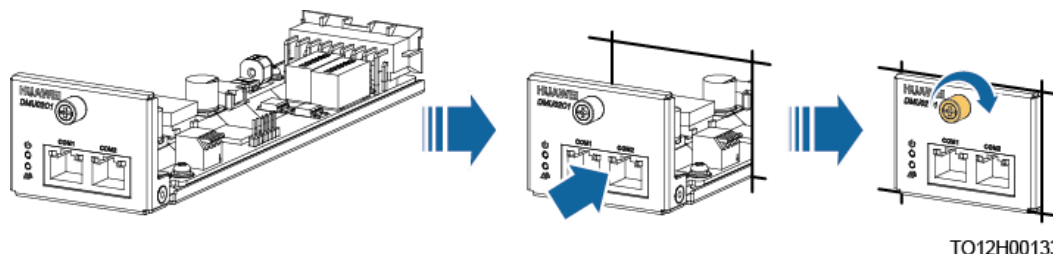
- Step 3** Remove the old DMU02C1.

Figure 5-23 Removing the old DMU02C1



- Step 4** Install the new DMU02C1.

Figure 5-24 Installing the new DMU02C1



- Step 5** Reconnect the cables based on the information you recorded.

- Step 6** Remove the protective gloves.

----End

Follow-up Procedure

Pack the removed component and have it sent to the local Huawei warehouse.

5.2.2.2 Replacing a Rectifier

Prerequisites

- You have obtained a pair of protective gloves and the cabinet door key.
- The new rectifier is intact.

CAUTION

Protect yourself from being burnt when moving the rectifier because the rectifier has a high temperature.

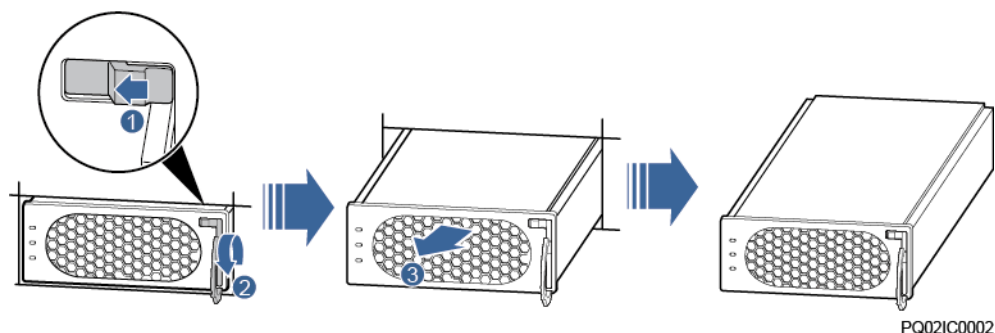
Procedure

Step 1 Put on protective gloves.

Step 2 Push the locking latch at the right side of the panel towards the left.

Step 3 Gently draw the handle outwards, and then remove the rectifier from the subrack.

Figure 5-25 Removing a rectifier

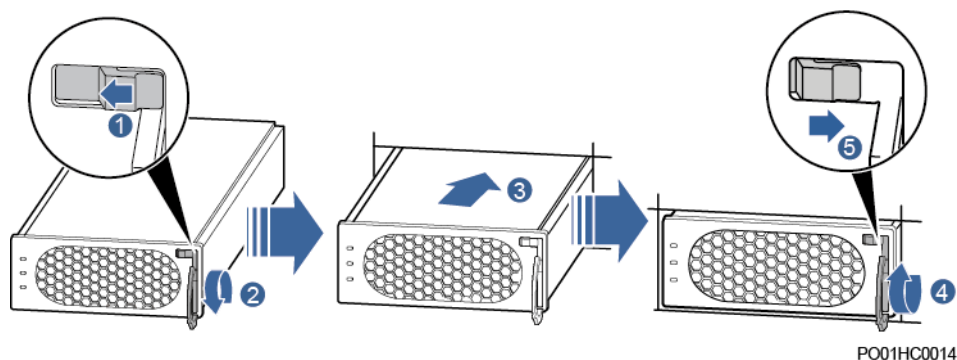


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

Step 5 Place the new rectifier at the entry to the correct slot.

Step 6 Gently slide the converter into the slot along guide rails until it is engaged. Close the handle, and push the locking latch towards the right to lock the handle.

Figure 5-26 Installing a rectifier



Step 7 Take off protective gloves.

----End

Follow-up Procedure

Pack the removed component, and return it to Huawei local warehouse.

5.2.2.3 Replacing a UIM03F1 Board

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new UIM03F1 board is intact.

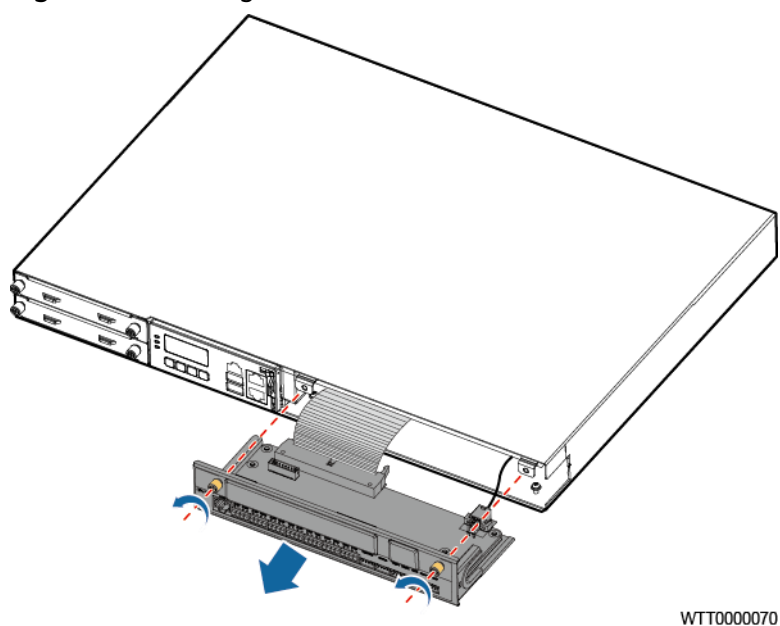
Procedure

Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

Step 2 Record the position of signal cables connected to the UIM03F1 panel, and then disconnect the signal cables.

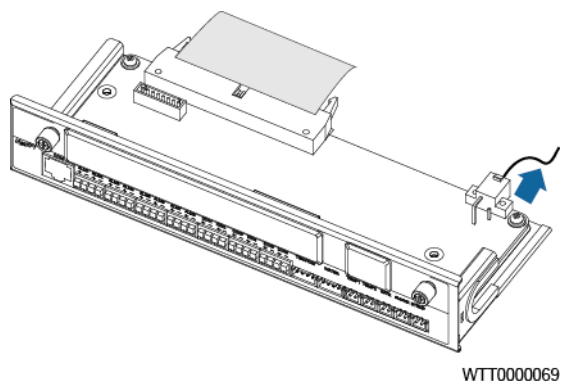
Step 3 Unscrew and take out the UIM03F1.

Figure 5-27 Taking out the UIM03F1



Step 4 Disconnect the -48 V power cable from the UIM03F1 board.

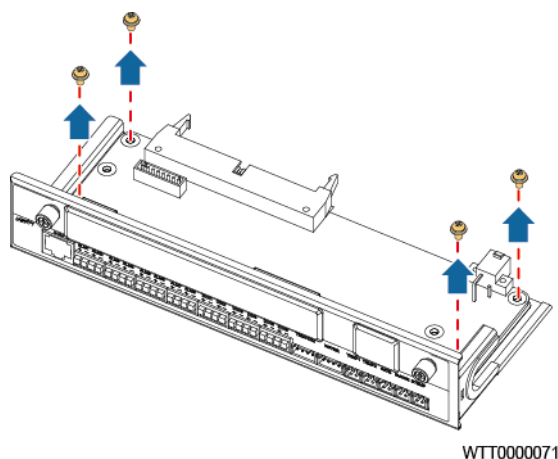
Figure 5-28 Disconnecting the -48 V power cable



Step 5 Record the connection positions of all cables including cables for internal and external circulation fans and flat cables on the UIM03F1 board, and then disconnect the cables.

Step 6 Remove the UIM03F1 board.

Figure 5-29 Removing the UIM03F1 board



- Step 7** Take out and install the new UIM03F1 board.
- Step 8** Connect all the cables on the UIM03F1 board to the new UIM03F1 based on the recorded information.
- Step 9** Reconnect the -48 V power cable to the UIM03F1 board.
- Step 10** Push the UIM03F1 in place and tighten the screws.
- Step 11** Reconnect signal cables to the new UIM03F1 panel based on the recorded information.
- Step 12** Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Pack the removed component and have it sent to the local Huawei warehouse.

5.2.2.4 Replacing a Circuit Breaker

Prerequisites

The new circuit breaker is intact.

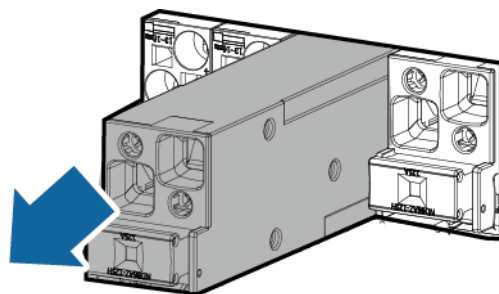
NOTICE

- Power off the system before replacing a circuit breaker. Do not operate with power on.
- Power-off will disconnect the power supply to loads. Obtain prior consent from customers before replacing a circuit breaker.

Procedure

- Step 1** Switch off the circuit breaker to be replaced.
- Step 2** Record the connection positions of cables, remove the cables, and insulate them.
- Step 3** Remove the faulty circuit breaker.

Figure 5-30 Removing a circuit breaker



TO12H00137

- Step 4** Install the new circuit breaker.
- Step 5** Connect cables to the circuit breaker based on the recorded cable information.
- Step 6** Switch on the circuit breaker.

----End

Follow-up Procedure

Pack the removed component and send it to the local Huawei warehouse.

5.2.2.5 Replacing an AC Input Module

Prerequisites

The required tools are available and the new AC input module is intact.

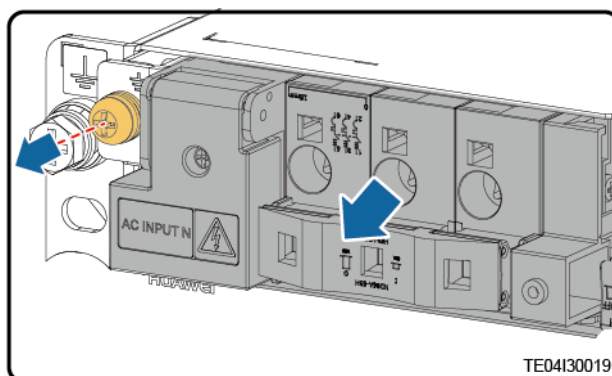
NOTICE

- Power off the AC input module before replacing it.
 - Power-off will cause load devices to be shut down. Before replacing the AC input module, obtain the customer's approval.
-

Procedure

- Step 1** Switch off the circuit breaker on the AC input module.
- Step 2** Record the installation positions of cables, remove the cables and insulate them.
- Step 3** Remove the AC input module.

Figure 5-31 Removing the AC input module



Step 4 Install the new AC input module.

Step 5 Install the AC input power cables based on the recorded information.

----End

Follow-up Procedure

Pack the removed parts and send it to the local Huawei warehouse.

5.2.2.6 Replacing an AC Output Module

Prerequisites

- You have obtained the toolbox.
- The new AC output module is intact.

NOTICE

- Power off the system before replacing an AC output module. Do not operate with power on.
 - Power-off will disconnect power supply to loads. Obtain prior consent from customers before replacing an AC output module.
-

Procedure

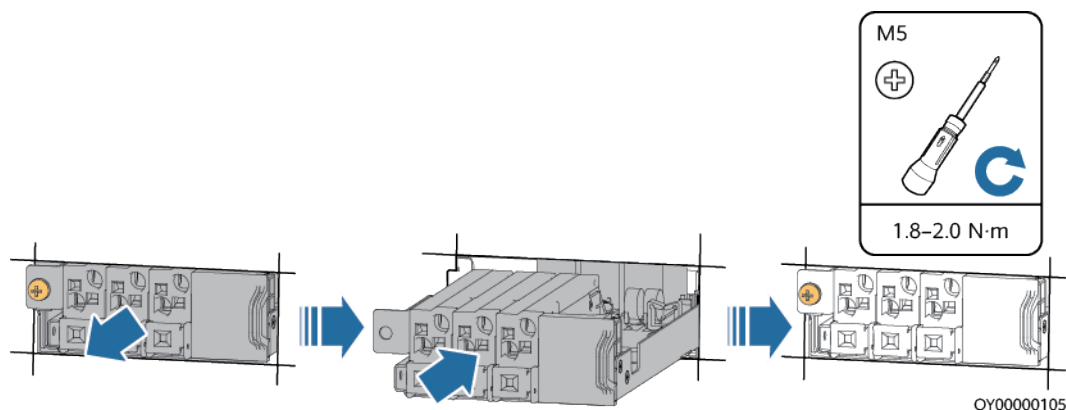
Step 1 Switch off the circuit breaker of the AC output module to be replaced.

Step 2 Record the connection positions of cables, remove the cables, and insulate them.

Step 3 Loosen the screws that secure the AC output module and remove the module.

Step 4 Install a new AC output module and connect cables based on the recorded information.

Figure 5-32 Replacing an AC output module



Step 5 Switch on the circuit breakers of the AC output module.

----End

5.2.2.7 Replacing a DCDU-12C

Prerequisites

- The protective gloves and door key are available.
- The new DCDU is intact.

Procedure

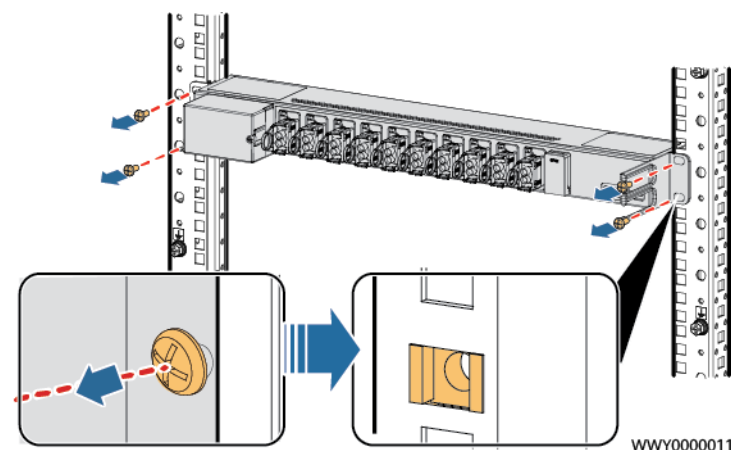
Step 1 Put on the protective gloves.

Step 2 Switch off the circuit breaker for the DCDU, and remove the input power cables from the DCDU.

Step 3 Remove the output power cables from the DCDU and mark the cables.

Step 4 Remove the DCDU.

Figure 5-33 Removing the DCDU



Step 5 Install a new DCDU.

Step 6 Install DCDU output power cables according to the recorded cable positions.

Step 7 Install DCDU input power cables.

Step 8 Switch on the circuit breaker for the DCDU.

Step 9 Take off the protective gloves.

----End

Follow-up Procedure

Pack the removed component and send it to the local Huawei warehouse.

5.2.2.8 Replacing an SMU02C

Prerequisites

- The ESD wrist strap, protective gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new SMU02C is intact.

Procedure

Step 1 Connect the ground cable for the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

NOTE

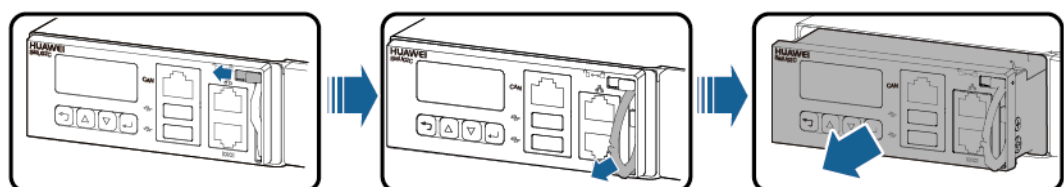
Record the software version of the old SMU. If the old SMU is damaged and cannot be viewed, send the barcodes of the old SMU and the cabinet to Huawei service personnel for query.

Step 2 Remove the communications cable from the SMU02C panel and record the cable information.

Step 3 Push the locking latch leftwards.

Step 4 Pull the handle outwards and remove the SMU02C.

Figure 5-34 Removing the SMU02C



PC03100000

Step 5 Take off the SD card from the side of the SMU02C.

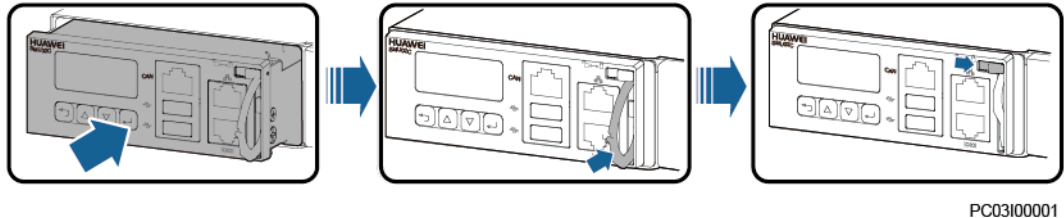
NOTE

If no SD is installed, go to [Step 7](#).

Step 6 Insert the SD card into the new SMU02C.

- Step 7** Place the new SMU02C in the slot, push the locking latch leftwards, and pull out the handle.
- Step 8** Gently push the SMU02C along guide rails until it is engaged. Close the handle, and push the locking latch rightwards.

Figure 5-35 Installing the SMU02C



- Step 9** Reset SMU02C parameters.

NOTE

After replacing the old SMU with a new spare part, power on the new SMU and check its software version. If the software version of the new SMU is earlier than that of the old SMU, upgrade the new SMU software.

- Step 10** Reconnect the communications cable to the SMU02C panel based on the recorded cable information.
- Step 11** Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Pack the removed component and have it sent to the local Huawei warehouse.

5.2.2.9 Replacing a UIM05B1

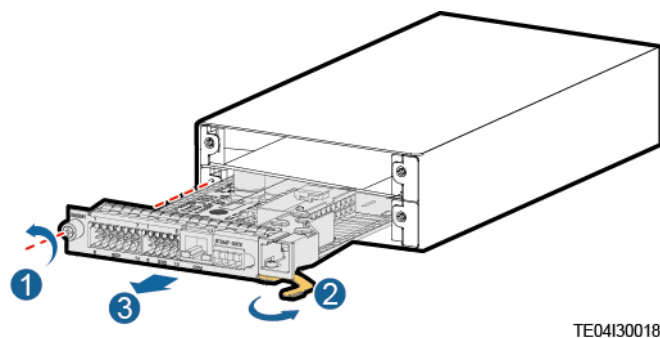
Prerequisites

- The ESD wrist strap, ESD gloves, ESD box or bag, and toolbox are available.
- The new UIM05B1 is intact.

Procedure

- Step 1** Connect the ESD wrist strap ground cable, and wear the ESD wrist strap and ESD gloves.
- Step 2** Record the connection positions of cables on the UIM05B1 panel and remove the cables.
- Step 3** Loosen the screws on the UIM05B1 panel, pull the handle until it is engaged, and take out the UIM05B1.

Figure 5-36 Removing the UIM05B1



Step 4 Install the new UIM05B1.

Step 5 Install the cables based on the recorded information.

Step 6 Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Pack the removed component and send it to the local Huawei warehouse.

5.2.2.10 Replacing a TCUC/TCUE Control Board

Prerequisites

- An ESD wrist strap, protective gloves, ESD box or bag, and the cabinet door key are available.
- The new TCUC/TCUE control board is intact.

Procedure

NOTE

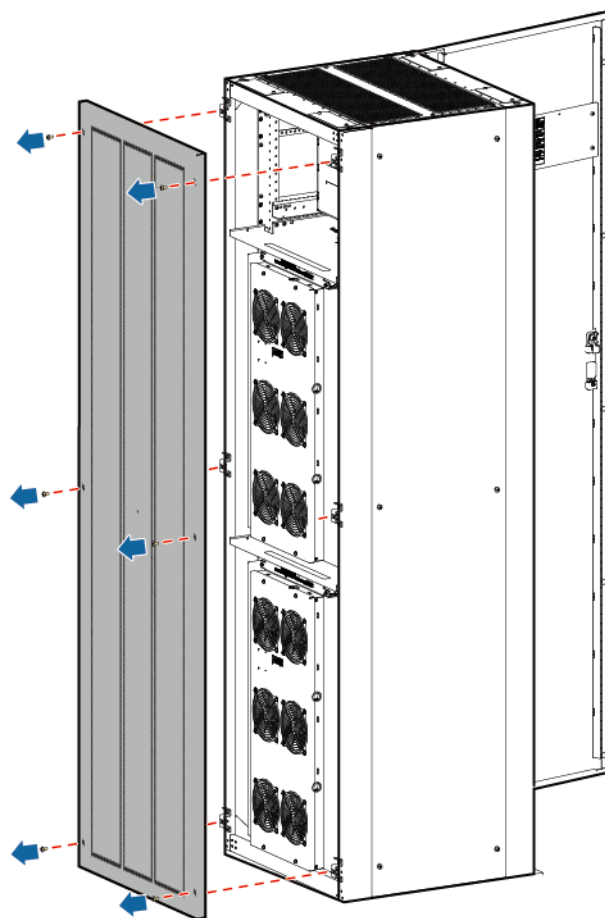
In this procedure, the TCUC is used as an example in the figures.

Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Power off the TCUC/TCUE on the DCPU/DCDB.

Step 3 Remove the cabinet rear door.

Figure 5-37 Removing the cabinet rear door



WTT0000281

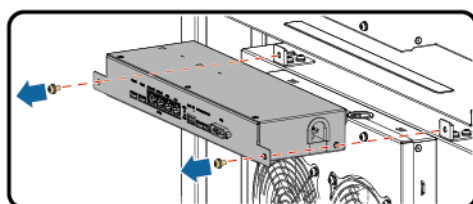
Step 4 Remove the TCUC/TCUE.

1. Record the cable connections on the TCUC/TCUE panel and disconnect the cables.
2. Unscrew and remove the TCUC/TCUE.

NOTE

When removing the TCUC/TCUE, if the cables are not long enough, cut off the cable ties or disconnect the fan extension cables.

Figure 5-38 Removing the TCUC/TCUE

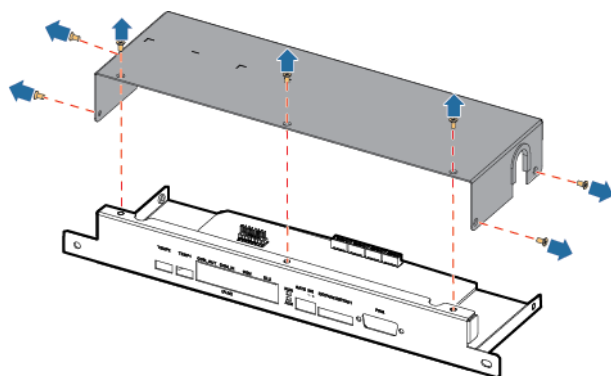


WTT0000286

Step 5 Remove the TCUC/TCUE control board.

1. Unscrew the top cover of the TCUC/TCUE.

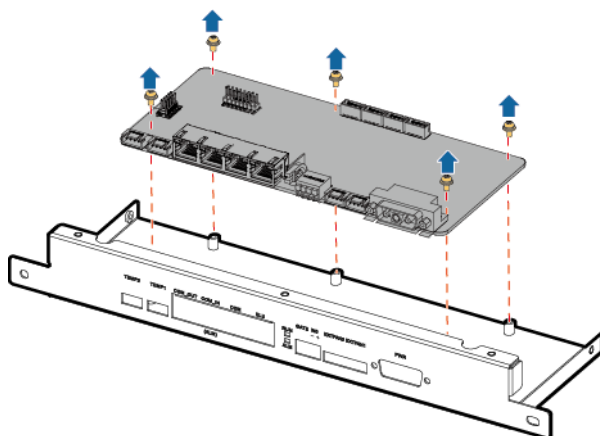
Figure 5-39 Removing the top cover of the TCUC/TCUE



WTT0000288

2. Record the cable connections on the TCUC/TCUE control board and disconnect the cables.
3. Unscrew the TCUC/TCUE control board and take out the control board.

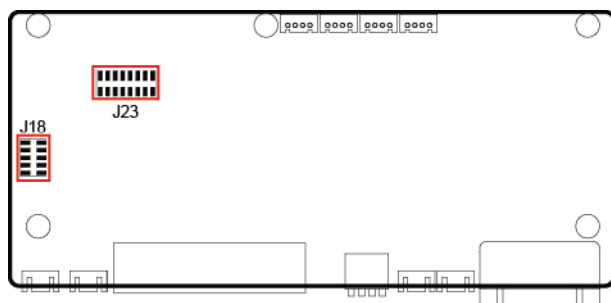
Figure 5-40 Removing the TCUC/TCUE control board



WTT0000287

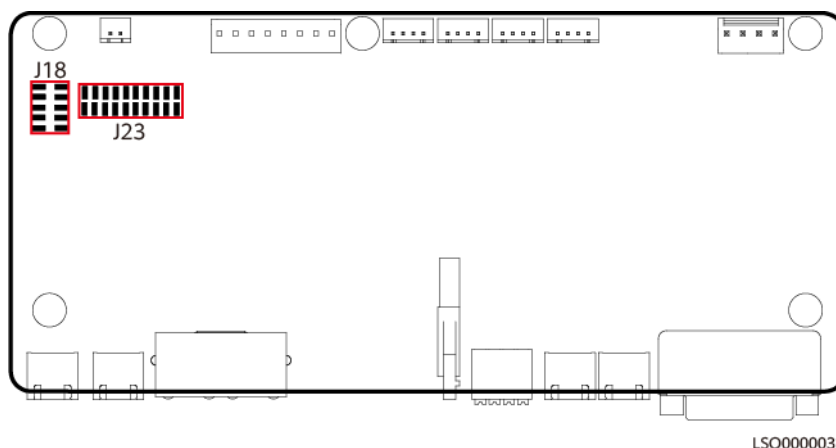
4. Record the positions of jumper caps on the TCUC/TCUE control board.

Figure 5-41 Jumper caps on the TCUC control board



WWY0000013

Figure 5-42 Jumper caps on the TCUE control board



Step 6 Install a new TCUC/TCUE control board.

1. Set jumper caps for the new TCUC/TCUE control board based on the recorded information.
2. Install a new TCUC/TCUE control board in the TCUC/TCUE.
3. Connect the four INFAN extension cables to the new TCUC/TCUE control board based on the labels on the cables.
4. Reinstall the top cover for the TCUC/TCUE and screws.

Step 7 Install the TCUC/TCUE.

1. Reinstall the TCUC/TCUE and tighten the screws.
2. Reconnect the removed cables to the TCUC/TCUE based on the recorded information.
3. Power on the new TCUC/TCUE on the DCDC/DCDB.

NOTE

Check that the TCUC/TCUE works properly.

Step 8 Reinstall the cabinet rear door.

Step 9 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Pack the removed component and send it to the local Huawei warehouse.

5.2.2.11 Replacing a FAN

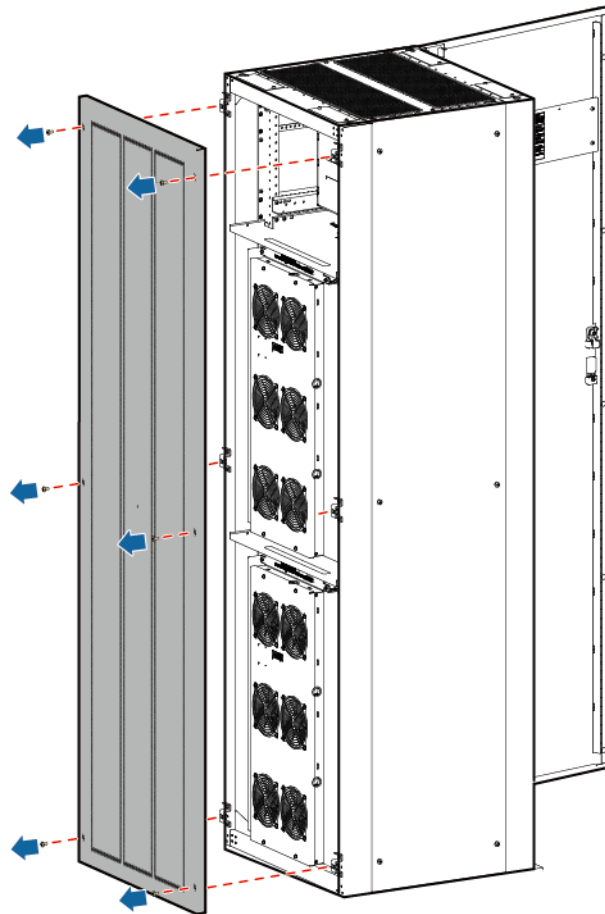
Prerequisites

- Tools and the key to the cabinet door are available.
- The new fan is intact.

Procedure

- Step 1** Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.
- Step 2** Power off the TCUC/TCUE whose fan needs to be replaced on the DCDU/DCDB.
- Step 3** Remove the cabinet rear door.

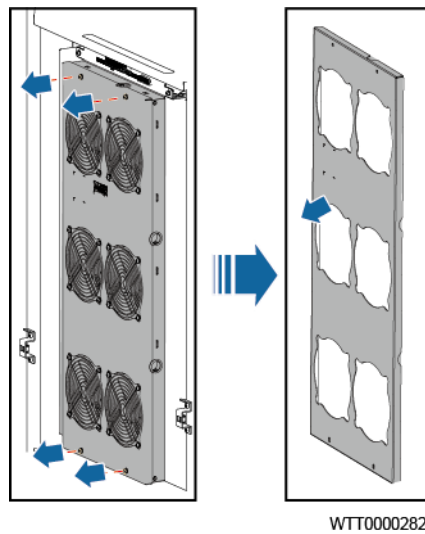
Figure 5-43 Removing the cabinet rear door



WTT0000281

- Step 4** Remove the frame of the fan assembly.

Figure 5-44 Removing the frame of the fan assembly

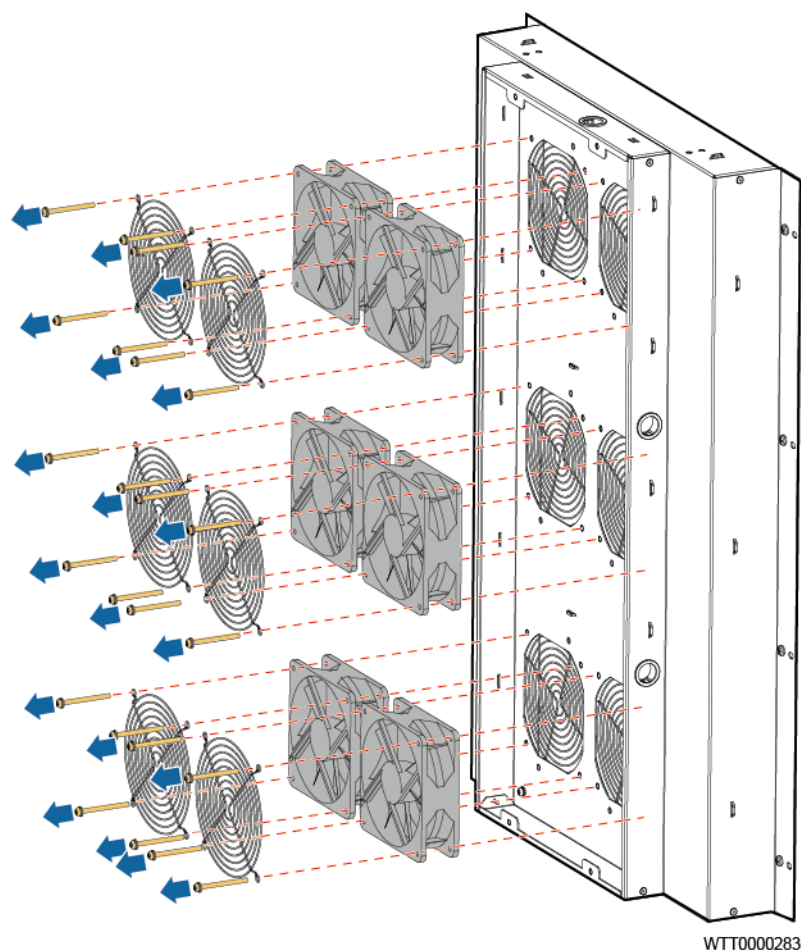


Step 5 Disconnect the cable between the fan and the TCUC/TCUE.

- When replacing the two upper fans, disconnect the connectors on the fans and the EXTFAN ports on the TCUC/TCUE.
- When replacing the lower four fans, disconnect the connectors on the fans and the extension cables of the fans based on the cable labels.

Step 6 Remove the fan to be replaced and install a new fan.

Figure 5-45 Removing the fan



Step 7 Connect the cable between the new fan and the TCUC/TCUE. Ensure that the cable connection of the new fan is the same as that of the old fan.

Step 8 Install the frame of the fan assembly.

Step 9 Power on the new TCUC/TCUE on the DCDU/DCDB.

NOTE

After powering on the TCUC/TCUE, check that the fan works properly.

Step 10 Reinstall the cabinet rear door.

Step 11 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

5.2.2.12 Replacing an ESM

Prerequisites

- The protective gloves, Phillips screwdriver, and socket wrench are available.
- You have confirmed the model of the ESM to be replaced and a new ESM is available.

- You are authorized to enter the site with the key.
- (Optional) The intelligent displacement lock function has been disabled. For details, see [Intelligent Displacement Lock and IoT Module Installation Guide \(ESM\)](#).

Replacement Requirements

NOTICE

To keep power continuity during ESM replacement, ensure that other power sources, such as the mains, diesel generator, or a third-party DC power source, provide continuous power supply.

Conditions for the ESM to enter and exit the maintenance mode:

1. If the intelligent displacement lock antitheft function is disabled, hold down the MANUAL ON/OFF button for at least 15s to enter the maintenance mode.
2. Hold down the MANUAL ON/OFF button for at least 15s to exit the maintenance mode.

Before replacing an ESM in an actual maintenance scenario, hold down the MANUAL ON/OFF button for the ESM to power off. After the ESM is replaced, hold down the MANUAL ON/OFF button on the new ESM to exit the maintenance mode.

Removing an Old ESM

Step 1 Wear protective gloves.

Step 2 Switch the BAT- battery circuit breaker in the power system to OFF or remove the battery fuse.

Step 3 Press the MANUAL ON/OFF button on the battery to turn off the battery output.

Step 4 Disconnect the cables from the old ESM. Insulate each cable and label them immediately.

Step 5 Loosen the screws on the panel and remove the ESM.

----End

Installing an New ESM

Step 1 Install the new ESM and tighten the screws.

Step 2 Hold down the MANUAL ON/OFF button for 15s for the battery to enter the maintenance mode. In this mode, all indicators blink, the battery board is activated, but the battery is not charged or discharged.

Step 3 Connect the cables to the new ESM based on the cable labels.

Step 4 Switch the BAT- battery circuit breaker in the power system to ON or reinstall the battery fuse using a fuse extracting unit.

Step 5 Hold down the MANUAL ON/OFF button for 15s for the battery to exit the maintenance mode. The battery is automatically activated and connects to the power system.

Step 6 Remove the protective gloves and pack up all tools.

----End

Follow-up Procedure

- Put the removed component into the ESD box or bag and then place the ESD box or bag into the carton box with foams or the packing case of the new component.
- Fill in the fault card with the information about the removed component.
- Contact your local Huawei office to handle the faulty component.

5.2.3 Replacing a Light

Prerequisites

Spare LED lights of the same model are available and functional.

Impact on the System

None

Preparations

Tool: multimeter

Material: spare light

Skill requirement: electrician's work permit

Procedure

Step 1 Locate a failed light.

- If a light does not work but the cables to the light are intact, the light has failed and needs to be replaced.
- If all lights after a light do not work, the light adjacent to the working light has failed.

Step 2 Disconnect the power supply to the lights.

Step 3 Remove the faulty light.



During replacement, do not touch any end of the light with bare hands. You will get an electric shock if you touch bare electrodes.

Step 4 Install the new light in the original position.

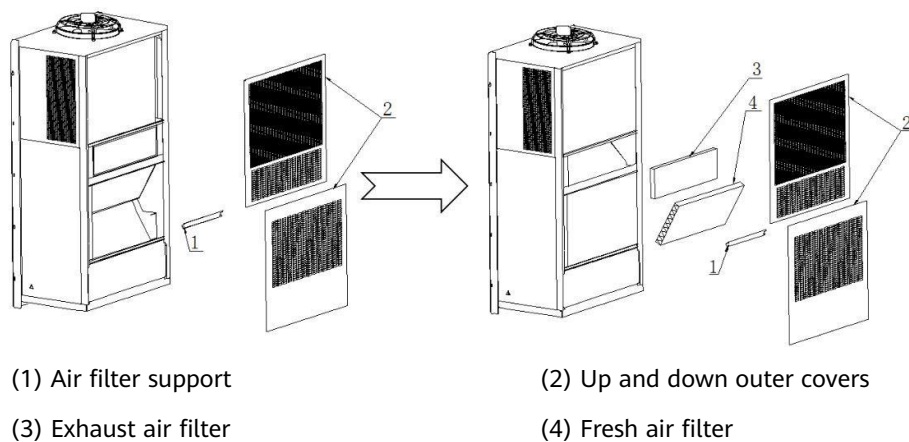
----End

5.3 Replacing Cooling System Components

5.3.1 Replacing the Air Filter

Remove the up and down covers. Loosen the two screws of fixing the air filter support, and remove the air filter support. Take the air filter out of the cooling product and clean it, as shown by the following figure.

Figure 5-46 Replacing the Air Filter



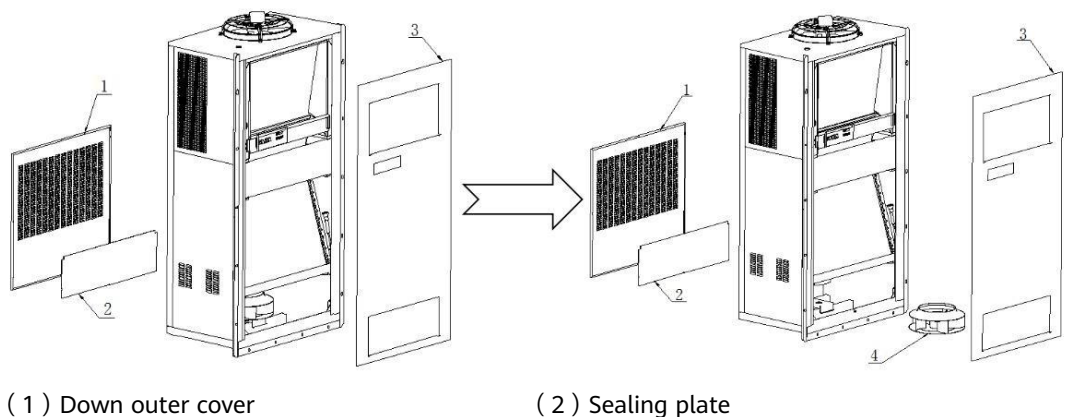
5.3.2 Replacing the Internal Cycle Fan

Step 1 Remove the front maintenance plate and the connecting terminal of internal cycle fan.

Step 2 Remove the mounting holder of internal cycle fan.

Step 3 Remove the fixing screws of the fan and take out of the fan.

Figure 5-47 Replacing the internal cycle fan



(3) Inner cover

(4) Internal cycle fan

Step 4 Follow the reverse steps to install the new fan.

----End

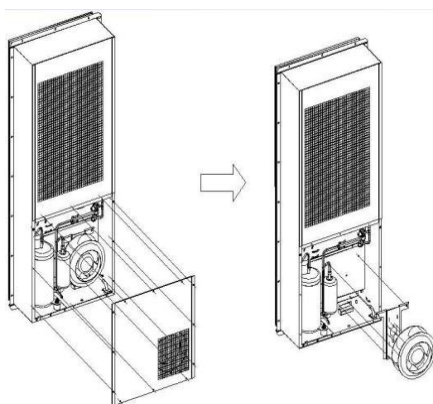
5.3.3 Replacing the External Cycle Fan

Step 1 Dismantle the unit's backside maintenance plate and the connecting terminal of external cycle fan.

Step 2 Dismantle the mounting holder of external cycle fan.

Step 3 Remove the fixing screws of the fan and take out of the fan.

Figure 5-48 Replacing the external cycle fan



(5) External cycle fan

Step 4 Follow the reverse steps to install the new fan.

----End

5.4 Replacing Monitoring System Components

5.4.1 Replacing an ECC800-Pro Main Control Module

Prerequisites

NOTICE

- The ECC800-Pro main control module is hot-swappable.
- Before disconnecting cables from the ECC800-Pro main control module, label the cables based on the corresponding ports.

- Tools: ESD wrist strap, ESD gloves, Phillips screwdriver, labels, marker
- Materials: a new undamaged and undeformed ECC800-Pro main control module of the appropriate model

Procedure

- Step 1** Use the **Back Up Current Settings** function to record the ECC800-Pro configuration information or manually record the information.

Path: **Maintenance > Configuration File > Back Up Current Settings**

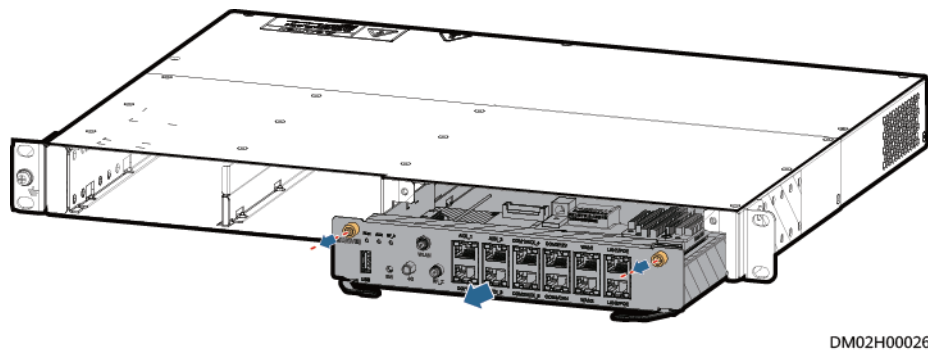
NOTE

If the main control module is damaged, you may fail to log in to the ECC800-Pro. In this case, you cannot back up the settings.

The following information cannot be backed up: monitoring module IP address parameters, smart module certificate, NetEco certificate, NetEco second-challenge password, time configuration parameters, access user management, access permission management, device access certificate, log, and user configuration information.

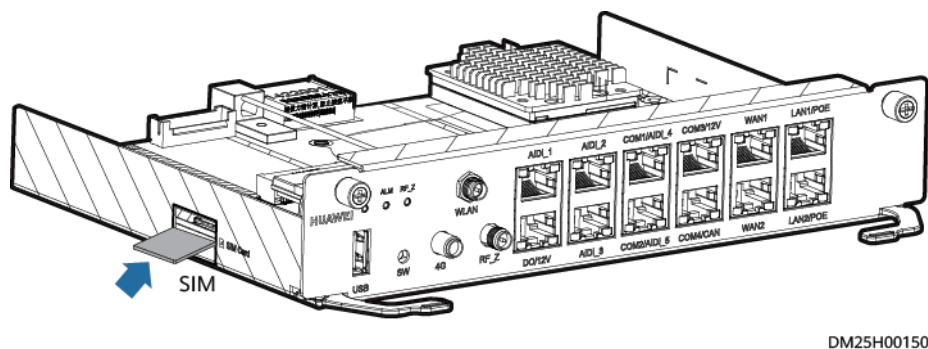
- Step 2** Label each cable and antenna based on the corresponding ports on the ECC800-Pro main control module.
- Step 3** Remove cables, USB flash drive, USB-to-WiFi module, and antennas from the ECC800-Pro main control module.
- Step 4** Loosen the screws on both sides of the ECC800-Pro main control module and pull the handles on both sides of the ECC800-Pro main control module to remove the main control module.

Figure 5-49 Removing the ECC800-Pro main control module



- Step 5** (Optional) Remove the SIM card from the corresponding slots of the ECC800-Pro main control module.
- Step 6** (Optional) Install the removed SIM card in the corresponding slot of the new ECC800-Pro main control module.

Figure 5-50 Installing a SIM card



- Step 7** Install the spare ECC800-Pro main control module in the ECC800-Pro subrack and tighten the screws on both sides of the ECC800-Pro main control module.
- Step 8** Connect the communications cables and antennas to the ECC800-Pro main control module.
- Step 9** Choose **Maintenance > Configuration File** and import the backup configuration file, or set parameters for the devices that connect to the ECC800-Pro to ensure normal communication.

----End

5.4.2 Replacing an ECC800-Pro PSU

Prerequisites

DANGER

Do not touch the terminals in the rear of a removed PSU to avoid electric shocks.

- Tool: insulation gloves
- Materials: a reserved undamaged and undeformed PSU of the appropriate model.

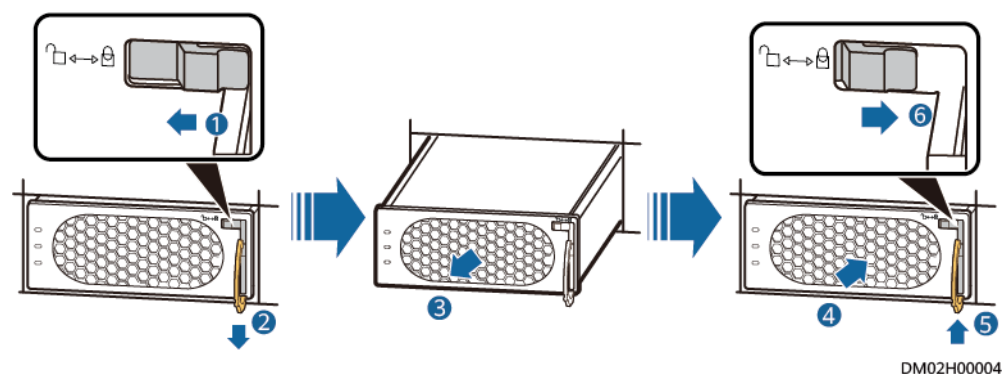
Context

The PSU is hot-swappable.

Procedure

- Step 1** Push the locking latch in the upper right corner of the PSU panel leftwards.
- Step 2** Pull out the handle of the PSU to remove the PSU from the subrack.
- Step 3** Gently push the reserved PSU into the subrack along guide rails, and push the locking latch rightwards to secure the handle.

Figure 5-51 Replacing a PSU



----End

5.4.3 Replacing ECC800-Pro Antennas

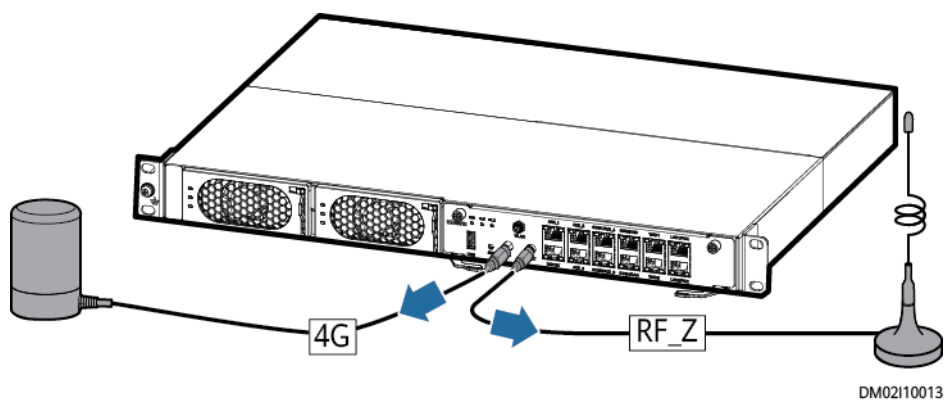
Prerequisites

- Tools: ESD wrist strap, ESD gloves
- Materials: Spare ECC800-Pro antennas of the same model are available and functional.

Procedure

- Step 1** Remove the 4G antenna cables and RF_Z antenna cables connected to the ports on the ECC800-Pro, as shown in [Figure 5-52](#).

Figure 5-52 Removing antennas



- Step 2** Install the spare 4G antenna cables and RF_Z antenna cables in the original positions and connect them to the ECC800-Pro.

----End

5.4.4 Replacing a SIM Card

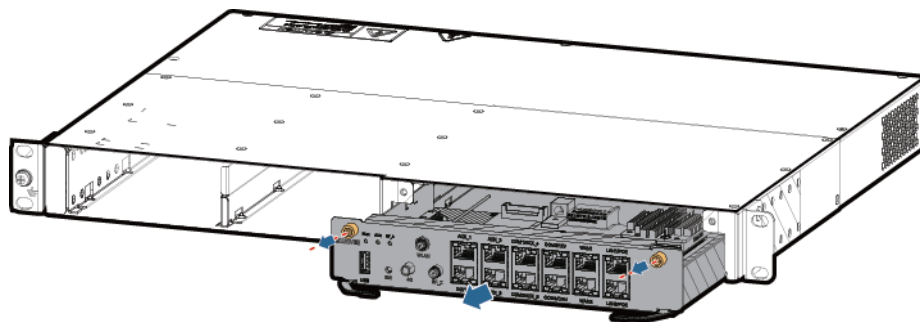
Prerequisites

- Tools: ESD wrist strap, ESD gloves
- Materials: A spare SIM card of the same model are available and functional.

Procedure

- Step 1** Record the position of the signal cable connected to the ECC800-Pro main control module panel, and then disconnect the signal cable.
- Step 2** Loosen the screws on both sides of the ECC800-Pro main control module.
- Step 3** Pull the handles on both sides of the ECC800-Pro main control module, and to remove the main control module.

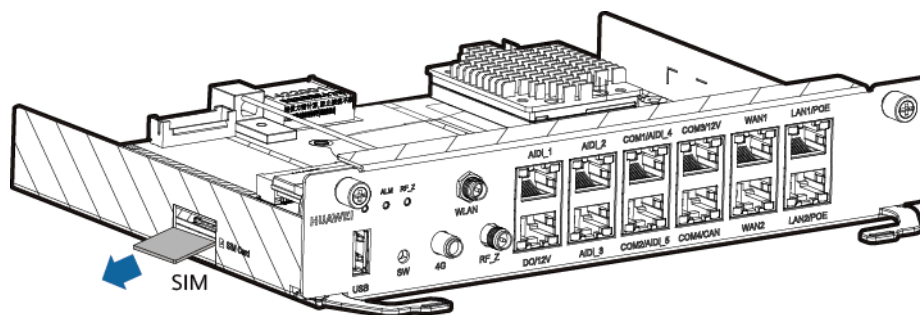
Figure 5-53 Removing the ECC800-Pro main control module



DM02H00026

Step 4 Remove the SIM card from the card slot.

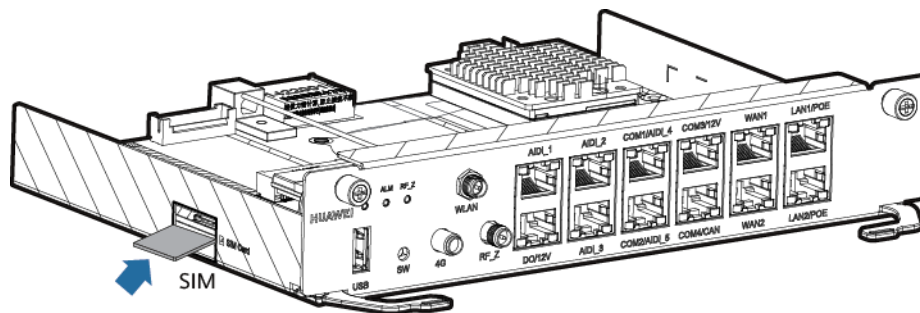
Figure 5-54 Removing a SIM card



DM25H00151

Step 5 Insert the spare SIM card into the card slot.

Figure 5-55 Installing a SIM card



DM25H00150

Step 6 Install the ECC800-Pro main control module in the card slot.

Step 7 Tighten the screws on both sides of the ECC800-Pro main control module.

Step 8 Reconnect signal cables to the ECC800-Pro main control module panel based on the recorded information.

----End

5.4.5 Replacing a Smart ETH Gateway

Prerequisites

A spare ETH gateway of the same model is available and functional.

Impact on the System

Devices connected to the ETH gateway will be disconnected.

Preparations

Tools: ESD wrist strap, ESD gloves, Phillips screwdriver, step ladder, label, marker

Material: spare ETH gateway

Skill requirement: ELV engineer

Procedure

- Step 1** Label each cable based on the corresponding ports on the smart ETH gateway.
 - Step 2** Disconnect cables from the smart ETH gateway.
 - Step 3** Remove the faulty smart ETH gateway from the guide rails of the cable trough.
 - Step 4** Install the spare smart ETH gateway in the original position and connect the cables.
- End

5.4.6 Replacing an ETH Converter

Prerequisites

A spare ETH converter of the same model is available and functional.

Impact on the System

The device at the rear of the ETH converter is disconnected.

Preparations

Tools: ESD wrist strap, ESD gloves, step ladder, label, marker

Material: spare ETH converter

Skill requirement: ELV engineer

Procedure

- Step 1** Label each cable based on the corresponding ports on the ETH actuator.
- Step 2** Disconnect the cables from the ETH converter.

Step 3 Remove the faulty ETH converter.

Step 4 Install a new ETH actuator in the original position and connect the cables.

----End

5.4.7 Replacing a Camera

Prerequisites

A spare camera of the same model is available and functional.

Impact on the System

Video surveillance stops.

Preparations

Tools: Phillips screwdriver, step ladder, protective gloves

Material: spare camera

Documents: documents delivered with the camera, monitoring drawings and parameters

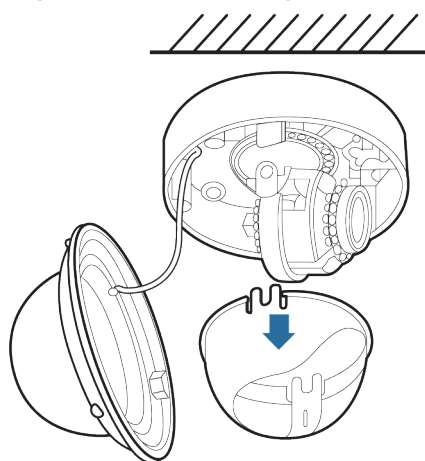
Skill requirement: ELV engineer

Procedure

Step 1 Remove the front cover of the camera and remove the screws from the front cover.

Step 2 Remove the inner cover.

Figure 5-56 Removing the inner cover



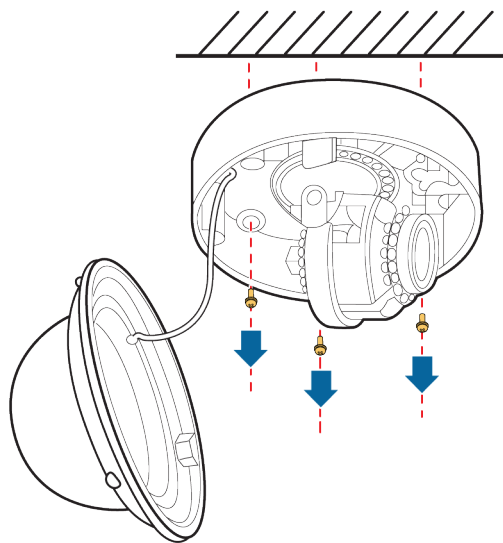
DS09000046

NOTE

In the scenario with an SD card, remove the SD card and install it in a new camera.

Step 3 Use a Phillips screwdriver to remove the screws that fasten the camera to its base.

Figure 5-57 Removing the camera base



DM08H00004

Step 4 Remove the network cable and take out the camera.

Step 5 Install the new camera by following instructions in documents delivered with the camera, tighten the screws to secure the camera to the base, and reconnect the network cable in the original way.

Step 6 Adjust the angle of the camera to cover the monitored area by following instructions in documents delivered with the camera.

Step 7 Configure the camera by referring to the management system initial configuration table.

NOTE

The original parameter settings can be used.

Step 8 Check that the new camera is working properly.

----End

5.4.8 Replacing a Region-type Water Sensor and Water Detection Cable

Prerequisites

- The water sensor needs to be replaced.
- A spare water sensor of the same model is available and functional.

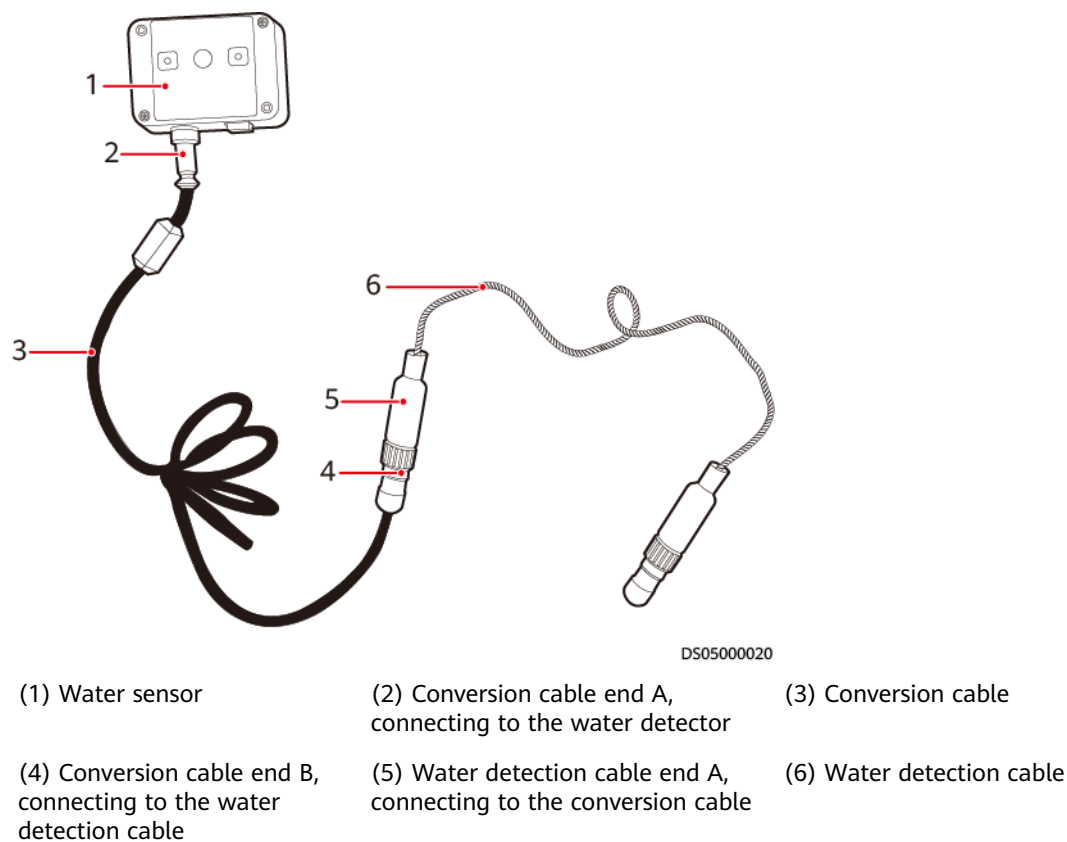
Context

Prepare a water sensor or water detection cable of the same model.

A water sensor consists of a water detection cable, water detector, and conversion cable. The water detection cable is laid out on the floor, connecting to the water

detector placed near the collector by the conversion cable. **Figure 5-58** shows the components.

Figure 5-58 Water sensor components



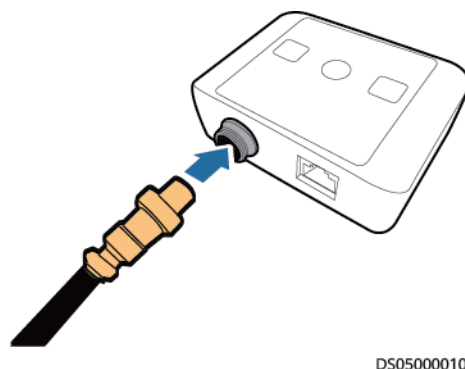
Recommended tool and material: crimping tool

Procedure

Step 1 Replace the water sensor.

1. Remove the conversion cable at the conversion port for the water sensor and conversion cable.
2. Connect a new water sensor to the conversion cable, as shown in **Figure 5-59**.
3. Secure the new water sensor.

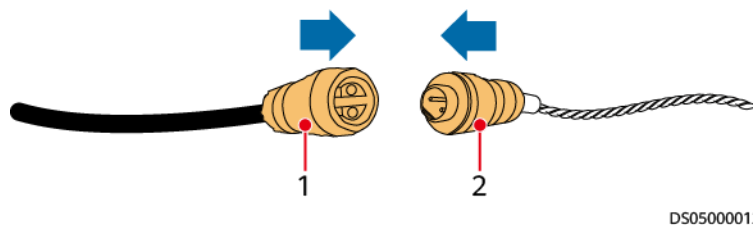
Figure 5-59 Connecting a conversion cable to a water sensor



Step 2 Replace a water detection cable.

1. Remove the faulty water detection cable from the port.
2. Install a new water detection cable, as shown in [Figure 5-60](#).

Figure 5-60 Connecting a new water detection cable



(1) Conversion cable end B, connecting to the water detection cable

(2) Water detection cable end A, connecting to the conversion cable

NOTE

The water detection cable and conversion cable are interconnected through the male and female connectors.

----End

Follow-up Procedure

Check whether the new water sensor works properly. Connect the network cable between the water detector and the ECC800-Pro, immerse the water detection cable in water, and check whether an alarm is generated. If an alarm is generated, the replacement is complete.

5.4.9 Replacing Access Control System Components

5.4.9.1 Replacing a Card Reader

Prerequisites

A spare IC card reader of the same model is available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, protective gloves

Materials: access card, spare IC card reader

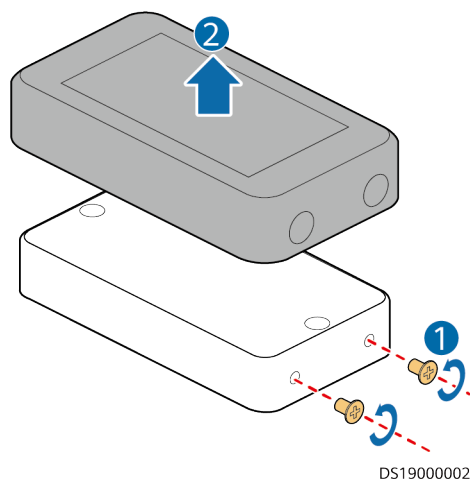
Skill requirement: ELV engineer

Procedure

Step 1 Open the door of the IC card reader box.

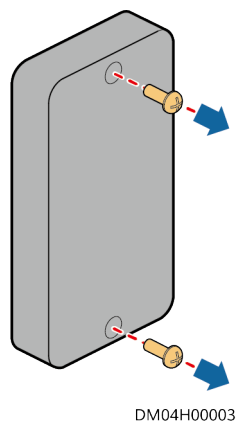
Step 2 Remove the two screws at the bottom of the IC card reader, and remove the front cover.

Figure 5-61 Removing the front cover



Step 3 Remove the two screws that secure the IC card reader body.

Figure 5-62 Removing screws



Step 4 Remove interconnection terminals from the IC card reader, and remove the IC card reader body.

- Step 5** Remove the two screws from the bottom of the new IC card reader, and remove the front cover.
- Step 6** Reconnect the interconnection terminals, and close the door of the IC card reader box.
- Step 7** Check that the new IC card reader is working properly.

 NOTE

The IC card reader is working properly if the pre-fab. module door can be opened from outside the pre-fab. module using an access card and door opening operations are logged in the monitoring system.

----End

5.4.9.2 Replacing an Exit Button

Prerequisites

A spare exit button of the same model is available and functional.

Impact on the System

None

Preparations

Tools: insulation tape, Phillips screwdriver, small flat-head screwdriver, protective gloves

Material: spare exit button

Skill requirement: ELV engineer

Procedure

- Step 1** Disassemble the faulty exit button, remove cables, and remove the faulty exit button.

Figure 5-63 Removing an exit button



Step 2 Install a new exit button and reconnect cables.

Step 3 Check whether the new exit button is working properly.

NOTE

If the pre-fab. module door can be opened using the exit button, and the door opening event is logged, the new exit button is working properly.

----End

5.4.9.3 Replacing a Magnetic Lock

Prerequisites

A spare magnetic lock of the same model is available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, 3 mm hex key, step ladder (2 m)

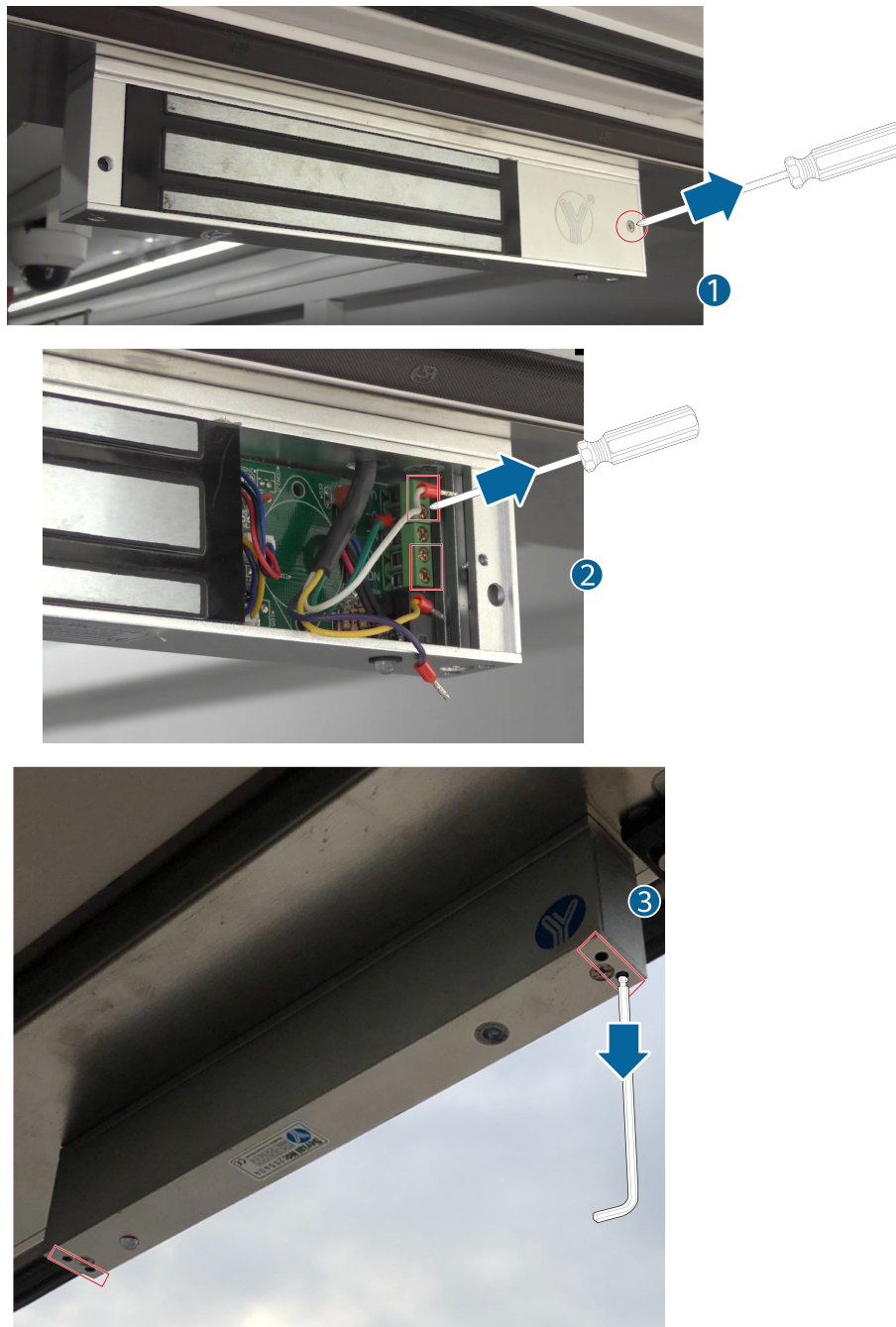
Material: spare magnetic lock

Skill requirement: ELV engineer

Procedure

- Step 1** Disconnect the power supply from the access actuator.
- Step 2** Remove the screws from the baffle plate of the magnetic lock using a Phillips screwdriver, as shown by (1) in the figure.

Figure 5-64 Removing screws

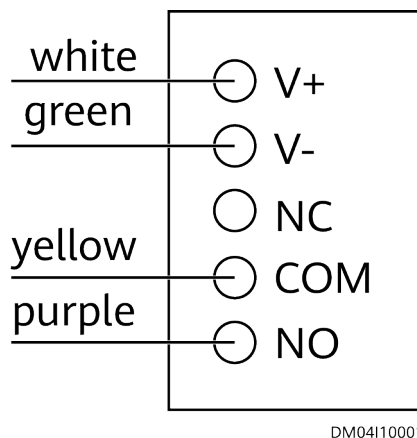


DM43000034

- Step 3** Remove the screws that secure the magnetic lock cables using a Phillips screwdriver, and remove the cables, as shown by (2) in the preceding figure.
- Step 4** Remove the screws from the shell of the magnetic lock using a 3 mm hex key, as shown by (3) in the preceding figure.

- Step 5** Replace the magnetic lock with a new one, and connect cables, as shown in the figure.

Figure 5-65 Connecting cables



- Step 6** Check that the new magnetic lock is working properly.

NOTE

If the magnetic lock indicator is green when the pre-fab. module door is closed and red when the door is open, the magnetic lock is working properly.

----End

5.4.9.4 Replacing an Emergency Door Release Button

Prerequisites

A spare emergency door release button of the same model is available and functional.

Impact on the System

None

Preparations

Tools: insulation tape, step ladder (2 m), Phillips screwdriver, protective gloves

Material: spare emergency door release button

Skill requirement: ELV engineer

Procedure

- Step 1** Remove the emergency door release button.
1. Remove the screws securing the emergency door release button, as shown by (1) in the figure.
 2. Remove the glass panel of the emergency door release button, as shown by (2) in the figure.

3. Remove the screws securing the base, as shown by (3) in the figure.
4. Disconnect cables and remove the emergency door release button.

Figure 5-66 Removing an emergency door release button



DM17H00003

Step 2 Install a new emergency door release button.

1. Connect the cables.
2. Tighten the screws on the base.
3. Install the glass panel.
4. Tighten the screws.

Step 3 Check that the new emergency door release button is working properly.

NOTE

Remove the cover of the emergency door release button using a screwdriver, press the button, and rotate the door handle clockwise to open the pre-fab. module door. If the door can be opened, the emergency door release button is working properly.

----End

5.4.9.5 Replacing an Access Actuator

Prerequisites

A spare access actuator of the same model is available and functional.

Impact on the System

None

Preparations

Tools: ESD wrist strap, ESD gloves, step ladder, label, marker

Material: spare access actuator

Skill requirement: ELV engineer

Procedure

- Step 1** Label each cable based on the corresponding ports on the access actuator.
- Step 2** Disconnect cables from the access actuator.
- Step 3** Remove the faulty access actuator from guide rails.
- Step 4** Install the spare access actuator in the original position and connect the cables.

----End

5.4.10 Replacing a T/H Sensor

Prerequisites

- A T/H sensor needs to be replaced.
- A spare T/H sensor of the same model is available and functional.

Context

A T/H sensor can be maintained only from the rear door.

Procedure

- Step 1** Tap **Shutdown** on the controller home screen.

NOTICE

Exercise caution because the equipment is still energized after it is shut down on the controller home screen.

- Step 2** Remove the cable terminal from the RS485 port on the T/H sensor.
- Step 3** Pull out the T/H sensor.

NOTE

- Before installing the new T/H sensor, check that its DIP switch settings are consistent with the DIP switch settings of the old T/H sensor.
- The dehumidifier humidity sensor and T/H sensor are located in different positions. When the humidity inside the room is the same, the relative humidity displayed on the dehumidifier humidity sensor and T/H sensor is different.

- Step 4** Connect the RS485 cable terminal and install the new T/H sensor in the correct position.
- Step 5** Set the DIP switch on the T/H sensor.

Table 5-1 DIP switch settings on T/H sensors

Location	Display Name	Address	DIP Switch No.					
			1	2	3	4	5	6
Return air side	Return air 2 temp/humid	1	ON	OFF	OFF	OFF	OFF	OFF
Cold aisle	Cold aisle 1 temp/humid	11	ON	ON	OFF	ON	OFF	OFF
	Cold aisle 2 temp/humid	12	OFF	OFF	ON	ON	OFF	OFF
	Cold aisle 3 temp/humid	13	ON	OFF	ON	ON	OFF	OFF
Hot aisle	Hot aisle 1 temp/humid	21	ON	OFF	ON	OFF	ON	OFF
	Hot aisle 2 temp/humid	22	OFF	ON	ON	OFF	ON	OFF
	Hot aisle 3 temp/humid	23	ON	ON	ON	OFF	ON	OFF

----End

5.4.11 Replacing the WiFi Module

Impact on the System

The app cannot be connected to the ECC800-Pro, and the smart module information cannot be properly displayed.

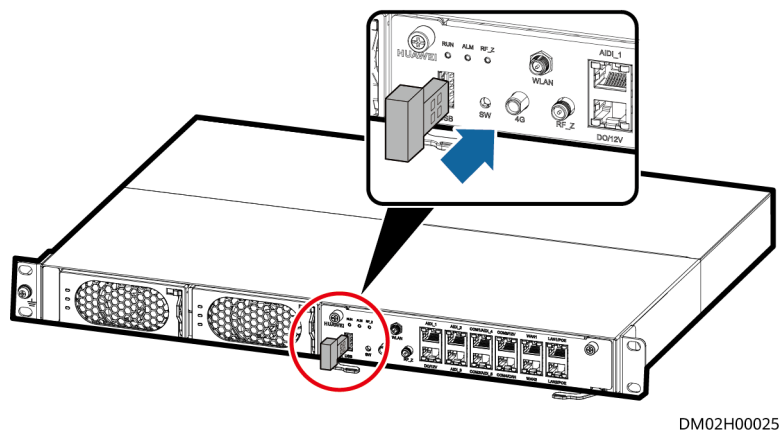
Preparations

Material: WiFi module

Procedure

- Step 1** Remove the old WiFi module from the USB port on the ECC800-Pro.
- Step 2** Install the spare WiFi module in the original position.
- Step 3** Log in to the ECC800-Pro WebUI.

Figure 5-67 Position of the WiFi module



----End

5.4.12 (Optional) Replacing a PAD

Prerequisites

A spare PAD of the same model is available and functional.

Impact on the System

None

Preparations

Tools: ESD wrist strap, ESD gloves, label, marker

Material: new PAD of the same model

Skill requirement: ELV engineer

Procedure

- Step 1** Install the app on the spare PAD and connect the PAD to the network over the WiFi hotspot of the data center.
- Step 2** Specify the user name and password for the app on the spare PAD and log in to check that the app works properly.
- Step 3** Remove the old PAD from the support and install the spare PAD on the support.

----End

5.5 Replacing Fire Extinguishing System Components (CE)

5.5.1 Replacing a Smoke Detector (CE)

Prerequisites

A spare smoke detector of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: protective gloves, step ladder, Phillips screwdriver

Materials: spare smoke detector

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the smoke detector, inform the related administration department of the temporary downtime of the fire control system. After the replacement, inform the administration department that the system has become operational.

Procedure

- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Hold the smoke detector, and rotate it counterclockwise to remove it from the base.

Figure 5-68 Removing a smoke sensor



DF01H00007

Step 3 Remove cables from the base using a Phillips screwdriver.

 NOTE

As a terminal resistor is connected to the last smoke detector in the loop in parallel, remove the terminal resistor from the faulty smoke detector, and connect the resistor to the new smoke detector when you replace the smoke detector.

Step 4 Remove the screws on the base using a Phillips screwdriver, and remove the base.

Step 5 Install the new base to the same position, and reconnect the cables.

Step 6 Insert the new smoke detector into the base, and rotate it clockwise until it locks in.

Step 7 Switch on the input circuit breaker of the extinguishant control panel, and connect the cables to the battery.

Step 8 Check whether the new smoke detector is working properly.

 NOTE

If the red indicator blinks once every 6s, the smoke detector is working properly.

----End

5.5.2 Replacing a Heat Detector (CE)

Prerequisites

A spare heat detector of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: protective gloves, step ladder, Phillips screwdriver

Materials: spare heat detector

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the heat detector, inform the related administration department of the temporary downtime of the fire control system. After the replacement, inform the administration department that the system has become operational.

Procedure

Step 1 Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.

Step 2 Hold the heat detector, and rotate it counterclockwise to remove it from the base.

Figure 5-69 Removing a heat detector



DF03H00004

Step 3 Remove cables from the base.

 NOTE

As a terminal resistor is connected to the last heat detector in the loop in parallel, remove the terminal resistor from the faulty heat detector, and connect the resistor to the new heat detector when you replace the heat detector.

Step 4 Remove the screws on the base using a Phillips screwdriver, and remove the base.

Step 5 Install the new base to the same position, and reconnect the cables.

Step 6 Insert the new heat detector into the base, and rotate it clockwise until it locks in.

Step 7 Switch on the input circuit breaker of the extinguishant control panel, and connect the cables to the battery.

Step 8 Check whether the new heat detector is working properly.

 NOTE

If the red indicator blinks once every 6s, the heat detector is working properly.

----End

5.5.3 Replacing Warning Signs (CE)

Prerequisites

A spare warning sign of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: Phillips screwdriver, protective gloves, step ladder

Materials: spare warning sign

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

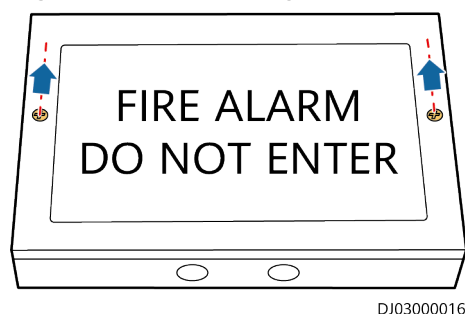
NOTICE

Before replacing the warning signs, inform the related administrative departments of the temporary downtime of the fire extinguishing system. After the replacement, inform the administration department that the system has become operational.

Procedure

- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Loosen the screws securing the warning sign and its base using a Phillips screwdriver, and remove the cover of the warning sign.

Figure 5-70 Removing screws



- Step 3** Remove the cables from the warning sign, and label the cables.
- Step 4** Remove the screws on the base using a Phillips screwdriver, and remove the base.
- Step 5** Install the new warning sign base in the same way, and connect the cables.
- Step 6** Install the warning sign cover.
- Step 7** Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.
- Step 8** Check whether the new warning sign is working properly.
1. Open the cover of the pneumatic switch. Press the test button on the pneumatic switch to short-circuit the cables inside to simulate an extinguishant release and trigger the warning sign.

NOTE

If the warning sign turns on, the warning sign is working properly.

2. Flip the key **Enable Control** rightward. Reset the extinguishant control panel by pressing **Reset** on it. Then, reset the key **Enable Control** leftward.

----End

5.5.4 Replacing an Internal Horn Strobe (CE)

Prerequisites

A spare horn strobe of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: Phillips screwdriver, step ladder

Materials: spare horn strobe

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the horn strobe, inform the related administrative department of the temporary downtime of the fire control system. After the replacement, inform the administration department that the system has become operational.

Procedure

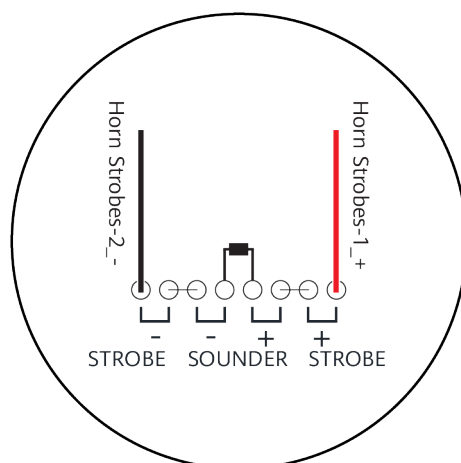
- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Rotate the horn strobe cover counterclockwise and remove it.
- Step 3** Remove cables from the horn strobe.

NOTICE

- While removing cables, label the cables with the corresponding terminal ports for later connection.
 - As a terminal resistor is connected to the last internal horn strobe in parallel, remove the terminal resistor from the faulty horn strobe, and connect the resistor to the new horn strobe when you replace the horn strobe.
-

- Step 4** Remove screws from the horn strobe base using a Phillips screwdriver, and remove the base.
- Step 5** Install the new horn strobe in the same way, connect the cables, and install the terminal resistor and cover.

Figure 5-71 Connecting cables



DC00S00303

Step 6 Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.

Step 7 Check that the new horn strobe is working properly.

1. Disconnect the wiring terminals from the electrical actuator on the fire cylinder.

NOTE

After the wiring terminals are disconnected from the electrical actuator, the extinguishant control panel generates an alarm, which is normal.

2. Press the manual gas release button on the extinguishant control panel.

NOTE

That the horn strobe is triggered indicates that the horn strobe works properly.

3. Reset the manual gas release button.
4. Flip the key to **Enable Control** counterclockwise (rightward). Reset the extinguishant control panel by pressing **Reset** on it. Then, reset key to **Enable Control** clockwise (leftward).

-----End

5.5.5 Replacing an External Horn Strobe (CE)

Prerequisites

A spare horn strobe is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: Phillips screwdriver, step ladder

Materials: spare horn strobe, key to the control box

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the horn strobe, inform the related administrative department of the temporary downtime of the fire control system. After the replacement, inform the administration department that the system has become operational.

Procedure

- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Rotate the horn strobe cover counterclockwise and remove it.

Figure 5-72 Removing the cover



DC00S00302

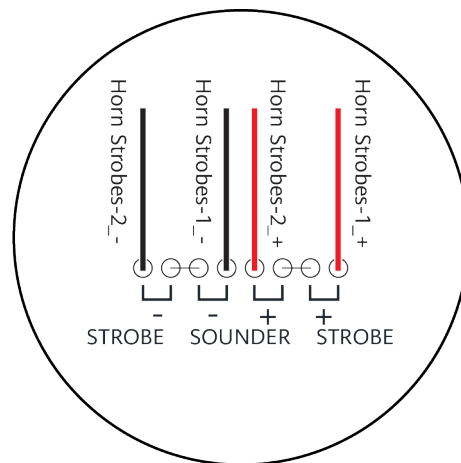
- Step 3** Remove the cables to the horn strobe.

NOTICE

While removing cables, label the cables with the corresponding terminal ports for later connection.

- Step 4** Remove screws from the horn strobe using a Phillips screwdriver, and remove the base.
- Step 5** Reconnect the cables. Install the new base and cover.

Figure 5-73 Connecting cables



DC00S00300

Step 6 Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.

Step 7 Check that the new horn strobe is working properly.

1. Disconnect the wiring terminals from the electrical actuator on the fire cylinder.

NOTE

After the wiring terminals are disconnected from the electrical actuator, the extinguishant control panel generates an alarm, which is normal.

2. Press the manual gas release button on the extinguishant control panel.

NOTE

That the horn strobe is triggered indicates that the horn strobe works properly.

3. Reset the manual gas release button.
4. Flip the key **Enable Control** counterclockwise (rightward). Reset the extinguishant control panel by pressing **Reset** on it. Then, reset key to **Enable Control** clockwise (leftward).

----End

5.5.6 Replacing a Fire Alarm Bell (CE)

Prerequisites

A spare fire alarm bell of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: hex key, Phillips screwdriver, protective gloves, step ladder

Materials: spare fire alarm bell

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the fire alarm bell, inform the related administrative departments of the temporary downtime of the fire extinguishing system. After the replacement, inform the administration department that the system has become operational.

Procedure

- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Remove screws securing the fire alarm bell using a hex key, and remove the cover.

Figure 5-74 Removing a fire alarm bell



DF04000007

- Step 3** Remove the cables from the fire alarm bell.

NOTE

As a terminal resistor is connected to the last fire alarm bell in the loop in parallel, remove the terminal resistor from the faulty fire alarm bell, and connect the resistor to the new fire alarm bell when you replace the fire alarm bell.

- Step 4** Remove screws from the fire alarm bell base using a Phillips screwdriver, and remove the base.
- Step 5** Install the new base in the same way, connect the cables, and install the cover.
- Step 6** Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.
- Step 7** Check whether the new fire alarm bell is working properly.
1. Flip the key to **Enable Control** rightward, and set the access level of the extinguishant control panel to 2.

2. Press **Silence/Sound Alarm** to start or abort the fire alarm bell.

 NOTE

If the alarm bell starts and aborts normally, and rings loud and clear when it is started, the alarm bell is working properly.

3. Reset the key to **Enable Control** by flipping it leftward.

----End

5.5.7 Replacing an Extinguishant Abort Button (CE)

Prerequisites

A spare extinguishant abort button of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: Phillips screwdriver, protective gloves

Material: spare extinguishant abort button

Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

NOTICE

Before replacing the extinguishant abort button, inform the related administrative departments of the temporary downtime of the fire extinguishing system. After the replacement, inform the administration department that the system has become operational.

Procedure

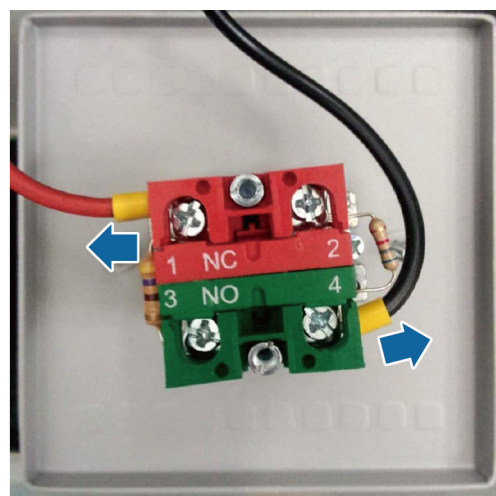
- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Remove the screws on the panel of the extinguishant abort button using a Phillips screwdriver.

Figure 5-75 Removing the extinguishant abort button



- Step 3** Disconnect the cables from the extinguishant abort button, and remove the panel of the extinguishant abort button.

Figure 5-76 Disconnecting cables from the extinguishant abort button

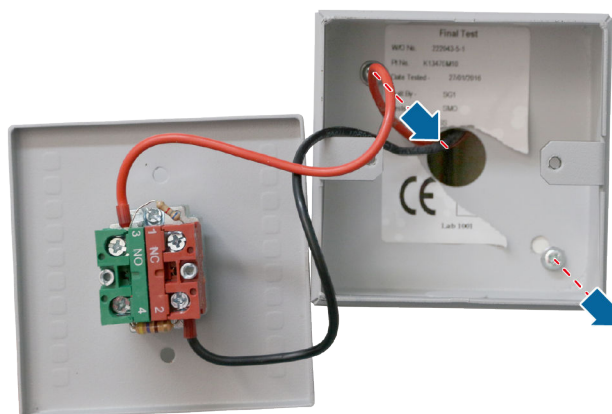


NOTE

As a resistor is installed on the loop of the extinguishant abort button, remove the resistor, and connect the resistor to the corresponding terminals of the new extinguishant abort button when you replace the extinguishant abort button.

- Step 4** Remove the screws on the extinguishant abort button base using a Phillips screwdriver, and remove the base.

Figure 5-77 Removing the base



DF10H00002

- Step 5** Install the new extinguishant abort button base in the same way.
- Step 6** Connect the cables to the panel of the new extinguishant abort button. Connect cables to the correct terminals.
- Step 7** Install the new extinguishant abort button panel in the same way.

Figure 5-78 Installing the extinguishant abort button



DF09000013

- Step 8** Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.
- Step 9** Check whether the new extinguishant abort button is working properly.
1. Disconnect the wiring terminals from the electrical actuator on the fire cylinder.
- NOTE**
- After the wiring terminals are disconnected from the electrical actuator, the extinguishant control panel generates an alarm, which is normal.
2. Press the manual gas release button on the extinguishant control panel.

3. Press the extinguishant abort button, and rotate it counterclockwise.

 NOTE

If you press the extinguishant abort button, the countdown stops. After you reset the extinguishant abort button, the countdown starts from zero again. This indicates that the extinguishant abort button is working properly.

4. Reset the manual gas release button.
5. Flip the key **Enable Control** counterclockwise (rightward). Reset the extinguishant control panel by pressing **Reset** on it. Then, reset the key **Enable Control** clockwise (leftward).

----End

5.5.8 Replacing Batteries for the Extinguishant Control Panel (CE)

Prerequisites

Spare extinguishant control panel batteries of the same model are available and functional.

Impact on the System

None

Preparations

Tools: protective gloves, step ladder

Materials: spare extinguishant control panel batteries

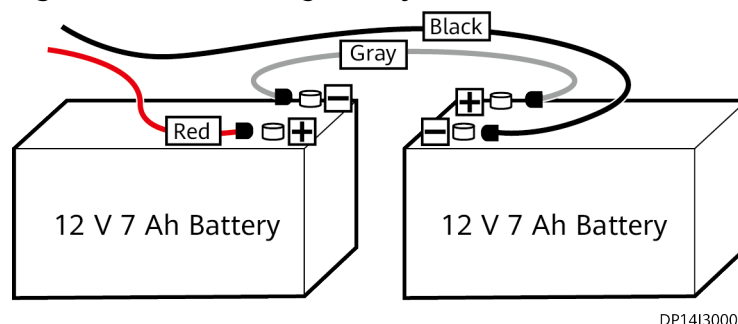
Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

Procedure

- Step 1** Remove the battery cables from the extinguishant control panel.
- Step 2** Remove the extinguishant control panel batteries.
- Step 3** Install the spare batteries to the proper position of the extinguishant control panel.
- Step 4** Connect battery cables to the extinguishant control panel in the same way.

Figure 5-79 Connecting battery cables



DP14I30003

NOTICE

Distinguish the positive and negative battery terminals when connecting battery cables.

----End

5.5.9 Replacing a Fire Cylinder (CE)

Prerequisites

A spare fire cylinder of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: pipe wrench, pallet truck, Phillips screwdriver, adjustable wrench, protective gloves

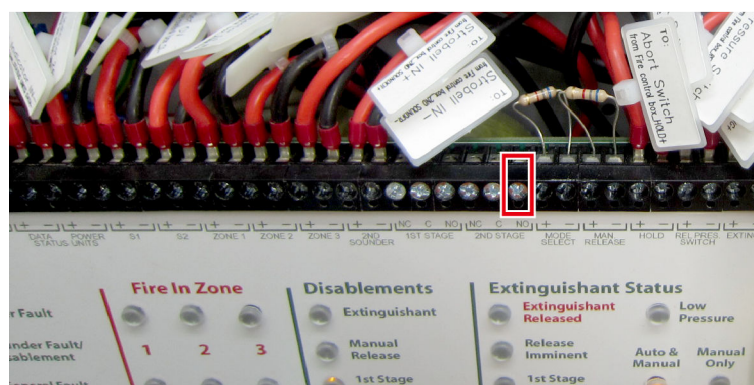
Materials: spare fire cylinder, sealing tape

Skill requirement: fire engineer

NOTICE

Before replacing the fire cylinder, inform the related administrative department of the temporary downtime of the fire extinguishing system. In addition, remove the cable connected to the 2ND STAGE NO terminal on the extinguishant control panel to disable the linkage control function. After the fire cylinder is replaced, reconnect the cable to the 2ND STAGE NO terminal on the extinguishant control panel to enable the linkage control function, and inform the administrative departments that the system has become operational.

Figure 5-80 Position of the 2ND STAGE NO terminal



DF11W00012

Procedure

- Step 1** Disconnect the battery cables, and switch off the input circuit breaker of the extinguishant control panel.
- Step 2** Move the new fire cylinder using a pallet truck to a position near the pre-fab. module door.

NOTICE

- Do not impact or strike the fire cylinder during transportation or installation.
 - Assign sufficient people for transportation and installation if no auxiliary tool is available.
-

- Step 3** Disconnect the interconnection terminals on the electrical actuator from the extinguishant control panel. Remove the electrical actuator by rotating it counterclockwise.
- Step 4** Remove the fire extinguishing pipe.
1. Remove the high-pressure hose.
 2. Remove the I-shaped connection pipe.
 3. Remove the threaded adapter from the container valve of the fire cylinder.
- Step 5** Remove the pneumatic switch.
- Step 6** Loosen the straps on the fire cylinder.
- Step 7** Remove the faulty fire cylinder from the installation position.
- Step 8** Move the new fire cylinder to the installation position, and tighten the straps.

NOTICE

Keep the pressure gauge panel outward so that people can view the reading.

- Step 9** Connect the fire cylinder to the fire extinguishing pipeline.

NOTICE

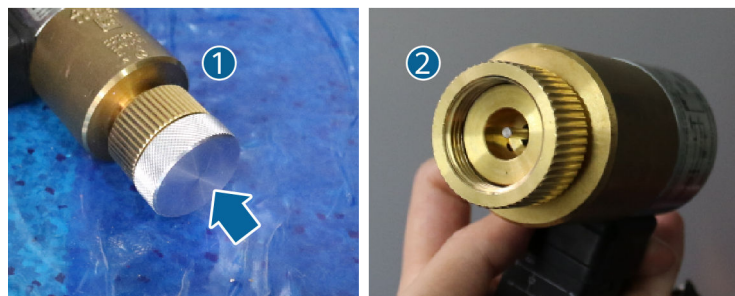
Wrap the threads with sealing tape to ensure air tightness.

1. Connect the threaded adapter to the fire cylinder.
 2. Connect the I-shaped connection pipe to the threaded adapter.
 3. Connect the high-pressure hose.
- Step 10** Reinstall the electrical actuator to the container valve of the fire cylinder.
1. Verify that the electrical actuator ejector is reset. If the ejector is not reset, press the ejector.

NOTICE

That the ejector is not reset may lead to extinguishant release.

Figure 5-81 Operating the electrical actuator ejector



DF11W00019

2. Align the electrical actuator and the container valve, and tighten the actuator clockwise.

Step 11 Connect the interconnection terminals on the electrical actuator to the extinguishant control panel.

Step 12 Switch on the input circuit breaker of the extinguishant control panel and connect the battery cables to power on the panel.

----End

Follow-up Procedure

Dispose of the removed fire cylinder that is confirmed faulty.

5.5.10 Replacing the Fire Cylinder of the Fire Detection and Extinguishing Equipment

Preparations

Before the replacement, ensure that the load services are not affected or obtain written consent from the customer.

Tools: insulated socket wrench, insulation gloves, Phillips screwdriver, key to the cabinet door, torque wrench, pipe cutter, pipe holder

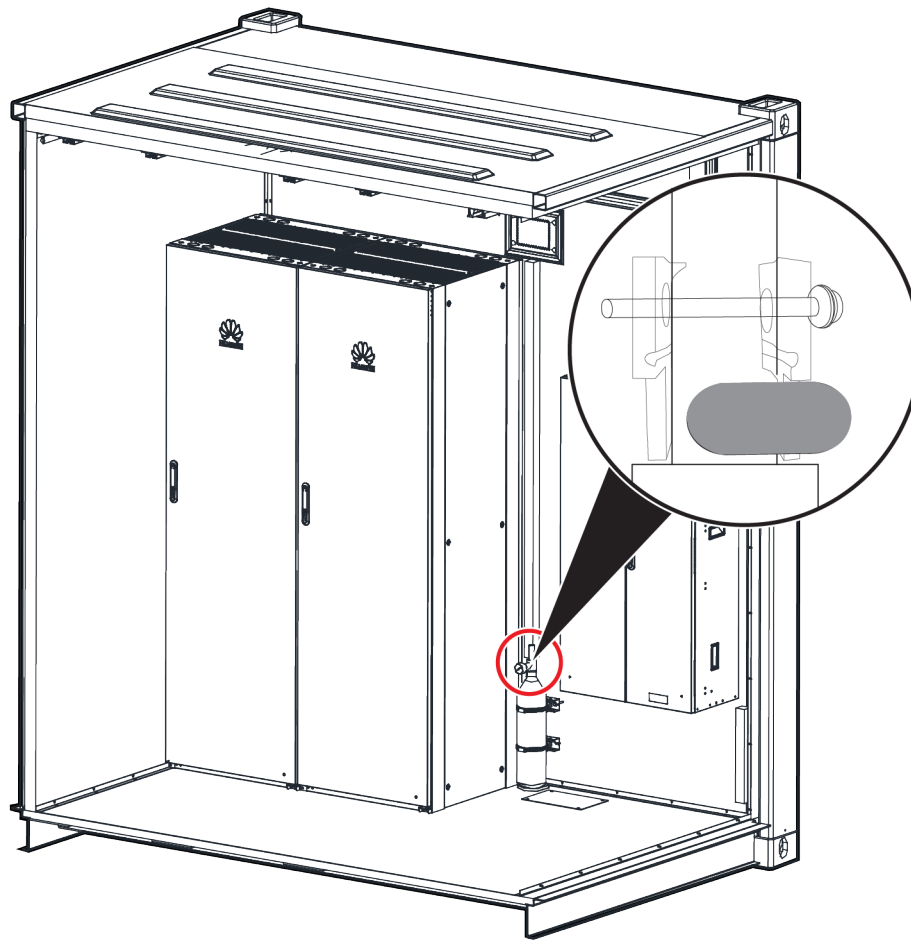
Materials:

- Check the fire cylinder and all components for any damage, abrasion, or corrosion. If there is any visible abrasion or corrosion, replace the damaged components and all corroded components.
- Check that the valve is closed (vertical to the cylinder).
- Fill the fire cylinder with extinguishant. The recommended extinguishant is heptafluoropropane.

Procedure

Step 1 Check that the fire cylinder valve is closed (vertical to the cylinder).

Figure 5-82 Checking the fire cylinder valve



DF04W00004

Step 2 Remove the fire cylinder.

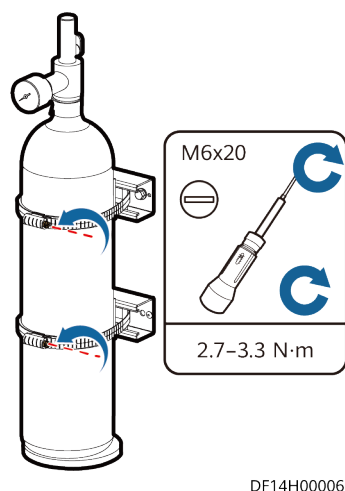
1. Remove the connection nut.

NOTICE

The fire-trace tube may contain high-pressure extinguishant. Loosen the connection nut slowly; otherwise, extinguishant may be released unexpectedly.

2. Remove the fire-trace tube.
3. Remove the fire cylinder fastener.
4. Take out the fire cylinder.

Figure 5-83 Removing the fire cylinder



Step 3 Install a new fire cylinder. Keep it upright.

Step 4 Install the fire-trace tube on the new fire cylinder.

NOTICE

Do not bend or twist the fire-trace tube. Otherwise, the fire cylinder may fail.

1. Cut off the end of the fire-trace tube evenly.

NOTICE

- Ensure that the wall thickness at the end of the fire-trace tube is consistent.
 - Ensure that the fire-trace tube, threaded nozzle, and end adapter are clean and free of dust.
-

Figure 5-84 Cutting off the end of the fire-trace tube

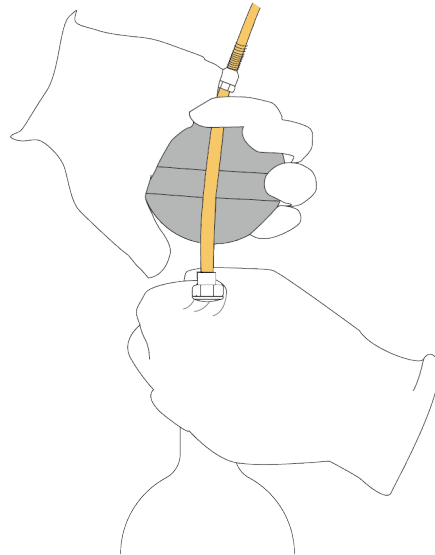


2. Clamp the end of the fire-trace tube to the threaded nozzle using a pipe holder.

NOTICE

Hold the pipe holder close to the end to avoid bending the tube during pipe insertion.

Figure 5-85 Installing the fire-trace tube



UB11H00023

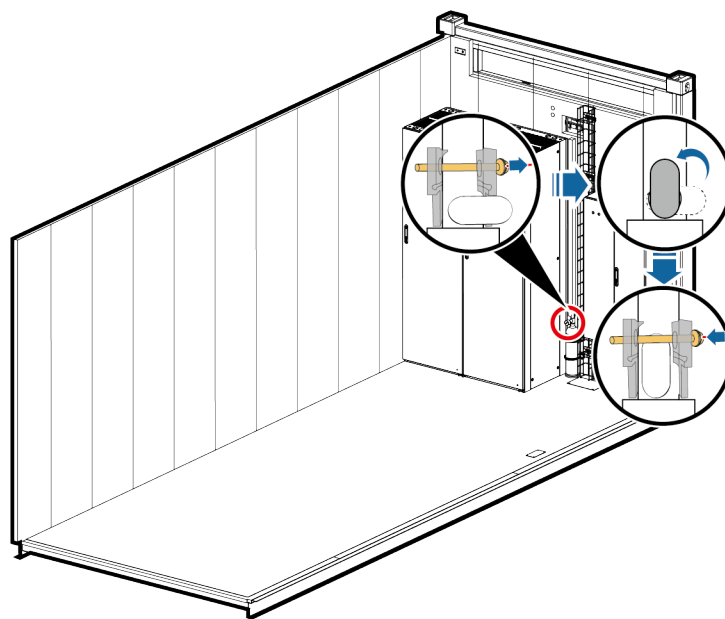
3. Tighten the connection nut to 7 N·m using an adjustable torque wrench.

Step 5 Remove the valve positioning kit, open the valve, reinstall the positioning kit, and secure it.

NOTICE

Slowly open the valve. To avoid unexpected blowout, do not quickly open the valve.

Figure 5-86 Opening the valve



DC13W00017

Step 6 Check the end pressure gauge on the front of the cabinet. The pointer should be in the green zone and the pressure reading should be greater than 1.6 MPa at 20°C. Record the reading of the pressure gauge. 8 hours later, observe the pressure gauge again. The pressure reading should remain unchanged.

-----End

5.5.11 Replacing an Extinguishant Control Panel (CE)

Prerequisites

A spare extinguishant control panel of the same model is available and functional.

Impact on the System

The fire extinguishing system stops working during the replacement.

Preparations

Tools: Phillips screwdriver, protective gloves

Materials: spare extinguishant control panel

Documents: delivered with the extinguishant control panel

Skill requirement: fire engineer

NOTICE

Before replacing the extinguishant control panel, inform the related administrative departments of the temporary downtime of the fire extinguishing system. After the replacement, inform the administration department that the system has become operational.

Procedure

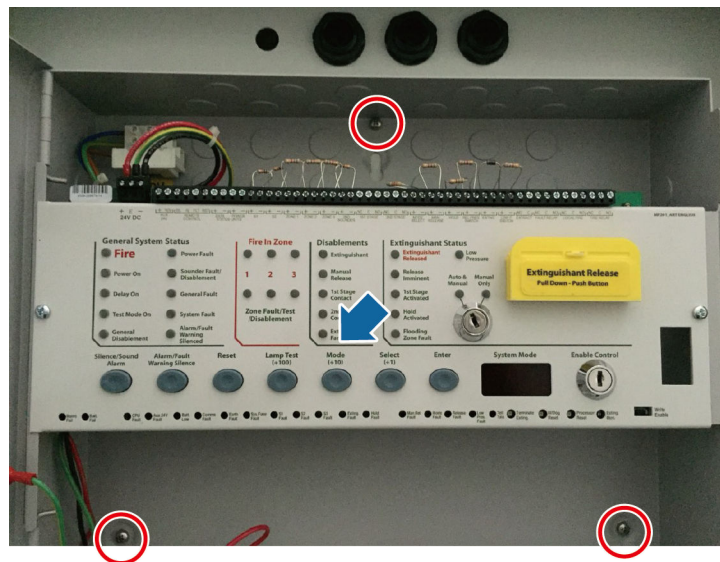
- Step 1** Switch off the input circuit breaker on the extinguishant control panel.
- Step 2** Remove the cables from the battery, and take out the battery.
- Step 3** Remove all cables connected to the terminals on the extinguishant control panel.

NOTE

While removing the cables, label the cables with their corresponding port numbers for later connection.

- Step 4** Remove the corrugated pipes and cables from the extinguishant box.
- Step 5** Remove the screws using a Phillips screwdriver, and take out the faulty extinguishant control panel.

Figure 5-87 Removing the extinguishant control panel



- Step 6** Install the new extinguishant control panel in the same position.
- Step 7** Put the corrugated pipes and cables back to the box, and reconnect the cables according to labels.
- Step 8** Put the batteries to the same position.
- Step 9** Switch on the input circuit breaker of the extinguishant control panel, and connect the battery cables.
- Step 10** Check whether the new extinguishant control panel is working properly.

NOTE

If the power indicator is on and the alarm indicator is off, the fire control panel is working properly.

----End

5.5.12 Replacing an Emergency Light Escape Sign (CE)

Prerequisites

A spare emergency light escape sign of the same model is available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, flat-head screwdriver, step ladder, protective gloves

Material: spare emergency light escape sign

Skill requirement: fire engineer

Procedure

- Step 1** Turn off the upstream switch for the power cable of the emergency light escape sign.

Figure 5-88 Emergency light escape sign



- Step 2** Remove the protective cover of the emergency light escape sign.
- Step 3** Pry the panel of the faulty emergency light escape sign using a screwdriver and remove the panel.
- Step 4** Install the new emergency light escape sign panel.
- Step 5** Reinstall the protective cover.
- Step 6** Turn on the upstream switch for the power cable of the emergency light escape sign.
- Step 7** Press the test button in the emergency light escape sign to check whether the new emergency light escape sign is working properly.

 NOTE

If the emergency light escape sign is on, it is working properly.

----End

5.5.13 Replacing Batteries for the ASD Power Box

Prerequisites

Spare ASD power box batteries of the same model are available and functional.

Impact on the System

None

Preparations

Tools: Phillips screwdriver, protective gloves

Materials: spare ASD power box batteries

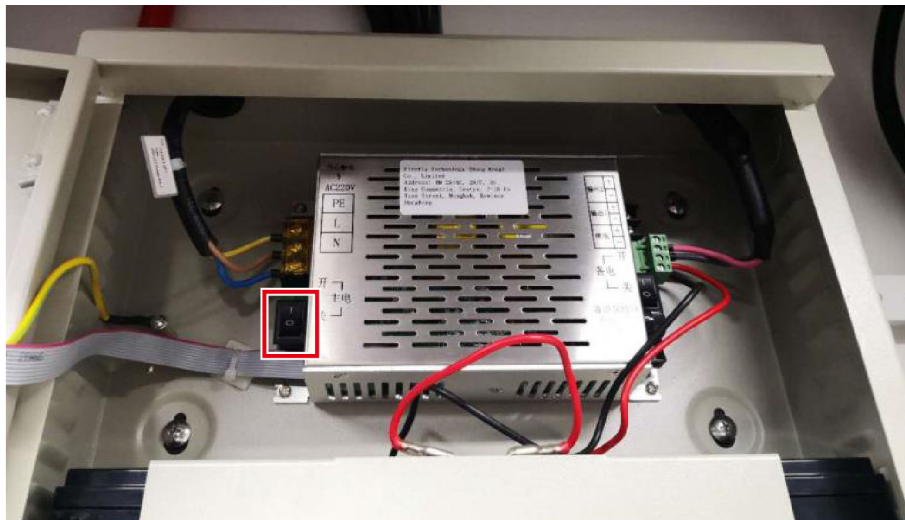
Documents: fire extinguishing drawings and parameters

Skill requirement: fire engineer

Procedure

- Step 1** Move the ASD power box batteries to the installation position indicated on the fire extinguishing device layout diagram.
- Step 2** Switch off the standby power supply for the ASD.

Figure 5-89 Switching off the standby power supply



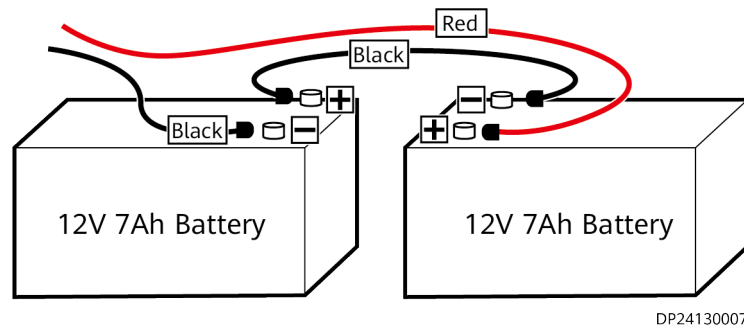
DC07H00048

- Step 3** Disconnect cables from the faulty ASD batteries.
- Step 4** Use a Phillips screwdriver to remove screws on the battery protective panel, and remove the protective panel.
- Step 5** Replace the batteries, and connect battery cables.

NOTICE

Distinguish the positive and negative battery terminals when connecting battery cables.

Figure 5-90 Connecting battery cables



Step 6 Reinstall the battery protective panel.

Step 7 Check whether the new ASD batteries are working properly.

NOTE

Turn on the standby power switch. If the power fault indicator is off, the batteries are working properly.

----End

6 Acronyms and Abbreviations

A

AC	alternating current
ASD	aspirating smoke detector
ATS	automatic transfer switch

C

CAN	control area network
CE	Conformite Europepe

E

ECC	energy control center
-----	-----------------------

L

LCD	liquid crystal display
-----	------------------------

M

MDU	monitoring display unit
-----	-------------------------

P

POE power over Ethernet

PDF power distribution frame

PDU power distribution unit

R

rPDU rack power distribution unit

S

SIM subscriber identity module

U

UPS uninterruptible power system

I

IVS intelligent video system