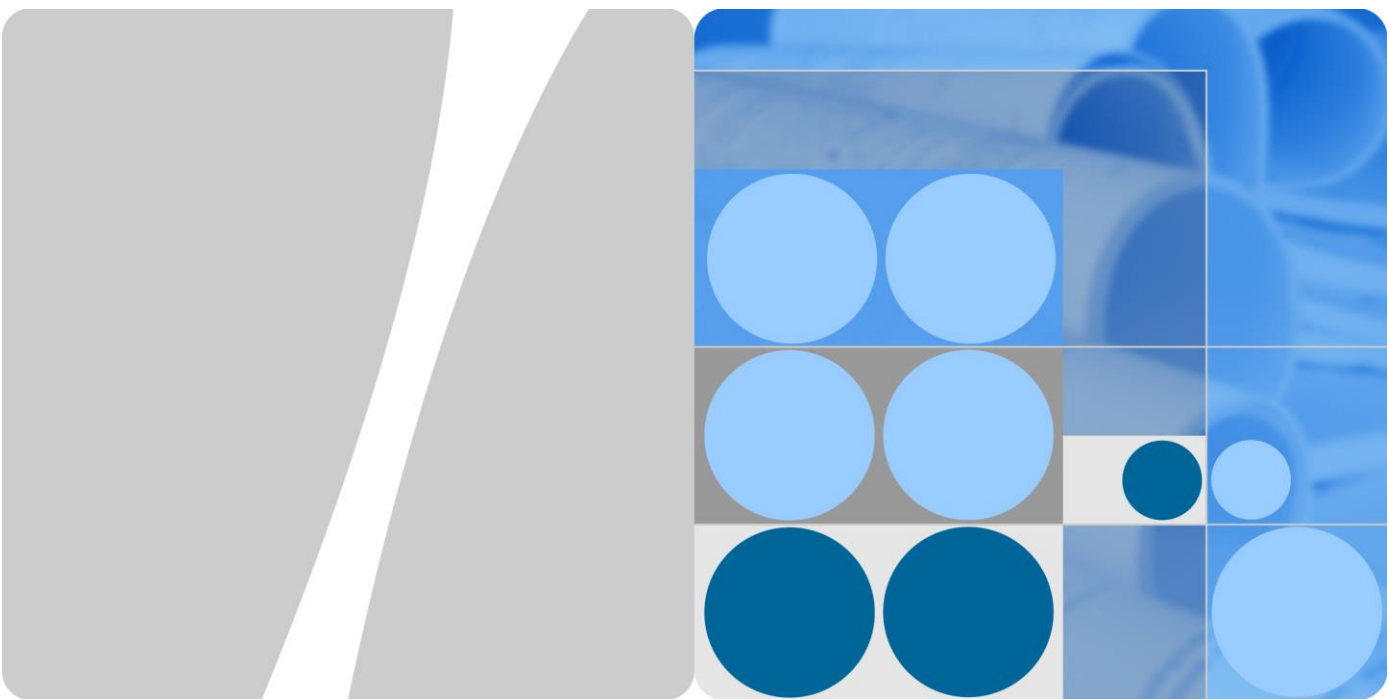




PowerCube 500 (ICC30)
V200R001C00

User Manual

Issue **05**
Date **2019-10-25**

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About This Document

Purpose

This document describes the ICC30 in terms of its overview, components, routine maintenance, troubleshooting, and parts replacement.

The figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Hardware installation engineers
- Installation and commissioning engineers
- Field maintenance engineers
- System maintenance engineers
- Sales 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.
	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.

Symbol	Description
 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 the changes made in earlier issues.

Issue 05 (2019-10-25)

Modified contents about the rectifier and the SSU.

Issue 04 (2019-09-12)

Deleted contents about the app.

Issue 03 (2019-01-31)

Added LIVE APP.

Issue 02 (2016-07-06)

Updated the tool list.

Issue 01 (2016-06-14)

Added the configurations of ICC30T-NA, ICC30-NT, and ICC30T-NT.

Issue Draft A (2016-01-30)

This issue is the first official release.

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1 Safety Precautions

1.1 General Safety

1.1.1 Disclaimer

- Before installing, operating, or maintaining Huawei equipment, read through this manual and follow all the instructions.
- To ensure safety of humans and the equipment, pay attention to the safety symbols on the equipment and all the safety instructions in this document.
- The "CAUTION", "WARNING", and "DANGER" statements in this document do not represent all the safety instructions. They are only supplements to the safety instructions.
- 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.

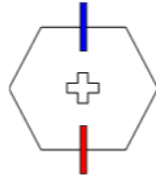
Huawei will not be liable for any consequences of the following circumstances:

- Running in conditions not specified in this manual
- Installation or use in environments which are not specified in related international standards
- Unauthorized modifications to the product or software code
- Failure to follow the operation instructions and safety precautions in this document
- Device damage due to force majeure

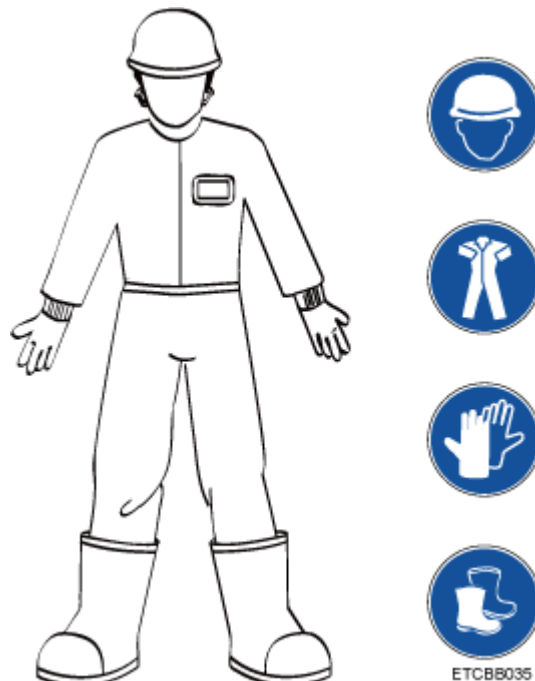
1.1.2 General Requirements

- Ensure that the product is used in an environment that meets the product design specifications (such as the grid power, input voltage, temperature, and humidity) to avoid causing malfunctions, damaging components, or voiding the warranty.
- Personnel who plan to install, operate, or maintain Huawei equipment need to receive thorough training, obtain required job qualifications, understand all necessary safety precautions, and be able to correctly perform all operations.
- 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.

- Bolts should be tightened with a torque wrench and marked using red or blue color. After the installation personnel confirm that the screws are tightened, mark the screws using blue color. After the inspector confirms that the screws are tightened, mark the screws using red color. (The marks should cross the edges of the screws, as shown in the following figure.)

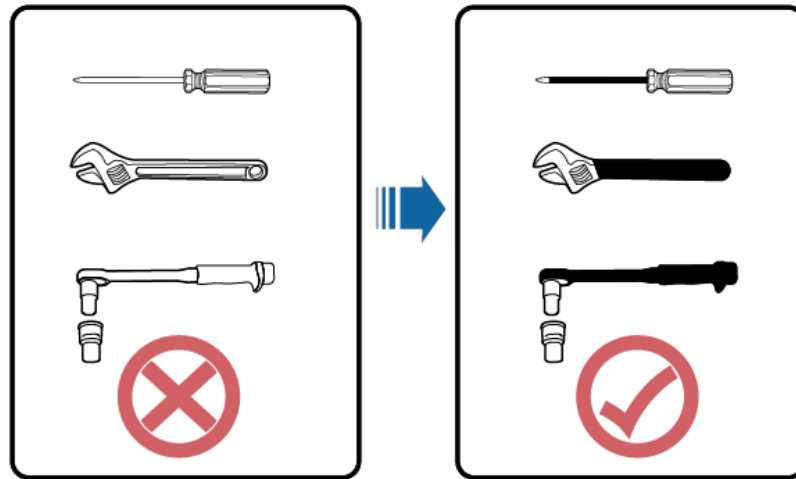


- If there is a probability of personal injury or equipment damage during installation, immediately stop operations on the equipment, report the case to the project owner, and take feasible protective measures.
- Before installing, operating, or maintaining a cabinet, clean up the water, ice, or other sundries on the top of the cabinet. Then, open the cabinet door to prevent sundries from falling into the cabinet.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, installing cabinets, installing power cables, inserting and removing signal connectors connected to outdoor ports, working at heights, and outdoor installation) in severe weather conditions such as lightning, rain, snow, and wind of level 6.
- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, safety clothing, safety helmet, and safety shoes, as shown in the following figure.



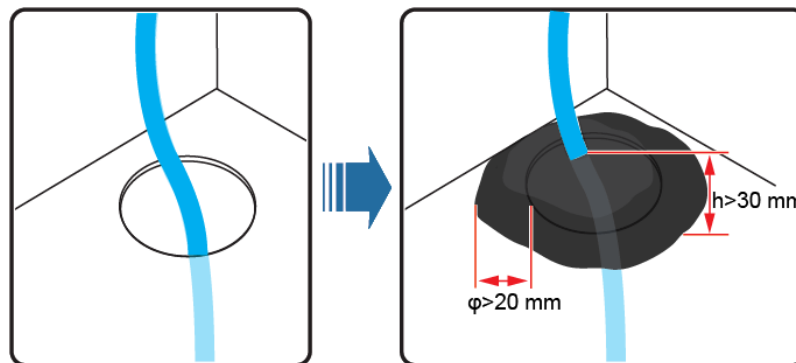
- Follow the procedures of installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage with a multimeter and ensure that there is no risk of electric shock.

- Ensure that all slots are installed with boards or filler panels. Avoid hazards caused by hazardous voltages or energy on boards. Ensure that the air channel is normal, control electromagnetic interference, and prevent dust and other sundries on the backplane, baseplate, and boards.
- 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 protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the nameplates. Promptly replace warning labels that have worn out.
- Keep irrelevant people far away from the equipment.
- Use wooden or fiberglass ladders when you need to perform live working at heights.
- Use insulated tools or tools with insulated handles, as shown in the following figure.



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- All cable holes should be sealed. Seal the 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.

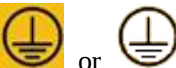


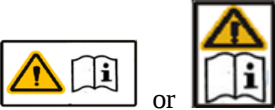
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1.1.3 Symbol Conventions

To ensure safety of humans and the equipment, pay attention to the safety symbols on the equipment and all the safety instructions in this document. The "NOTICE", "CAUTION",

"WARNING", and "DANGER" statements in this document do not represent all the safety instructions. They are only supplements to the safety instructions.

Symbol	Description
	Indicates exposed high-voltage devices. This symbol warns trained operation personnel that direct contact with the power grid supply voltage or indirect contact with the power grid voltage through damp objects or damp air will be fatal. This symbol is attached to a position with dangerous voltages or a power protective cover which may be removed during maintenance.
	Warns users of overheating. This symbol is attached to a device surface that may overheat and cause scalding. It warns users not to touch the surface during operation or maintenance. Users should wear heat insulation gloves before operation to prevent scalding.
	Indicates protective grounding. This symbol is attached near the protective ground terminal and is used beside a terminal through which a device is connected to an external grounding grid. A device ground cable is connected from the protective ground terminal to the external ground bar.
	Indicates equipotential bonding. This symbol is used for an equipotential bonding terminal. That is, this symbol is attached to each equipotential bonding terminal inside a device.
	Is an ESD symbol and attached to any areas with electrostatic sensitivity. If you see such a symbol, wear a pair of ESD gloves or an ESD wrist strap before operating a device.
	Indicates that the device can be safely used only in areas with an altitude lower than 2000 meters.
	Indicates that the device can be safely used only in a non-tropical climate.
	Is used on a fan box or moving parts. It is attached to the panel of the fan box to warn trained operation personnel not to touch the device. Do not touch the fan blade when it is rotating.
	Indicates that users should refer to the instruction. This symbol is used when the usage of a device port cannot be clearly described. For example, this symbol can be used in but not limited to the following scenarios: 1. For a multi-power device, use it near the power supply to replace the multi-power supply identifier. The symbol indicates that the device has multiple power inputs. Therefore, when powering off the device, you must

Symbol	Description
	disconnect all power inputs. 2. If there are multiple output ports, use the symbol near the output ports. Connect cables according to the rated power output and configuration parameter information in the instruction. 3. If there are multiple slots, use the symbol near the slot information. For details, see the description of slot information, restrictions on boards, and usage conditions in the instruction.

1.2 Personnel Requirements

- Personnel who plan to install, operate, or maintain Huawei equipment need to receive a thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals and 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.

NOTE

- 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, and 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
- Users or operators: operation personnel, except trained personnel and professionals, who may handle the equipment

1.3 Electrical Safety

1.3.1 Grounding Requirements

- The protective ground of the equipment should be reliably connected to the ground screw on the metal enclosure (grounding resistance $\leq 0.1 \text{ ohm}$).
- For a device that needs to be grounded, install the ground cable first when installing the device and remove the ground cable last when removing the device.
- Do not damage the ground conductor.
- Do not operate the device in the absence of a properly installed ground conductor.

- For a device that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protection ground.

1.3.2 AC and DC Power Operation Requirements



DANGER

- The power system is powered by high-voltage power sources. Direct or indirect contact (especially through damp objects) with the power sources may result in electric shock.
 - Non-standard and improper operations may result in fire or electric shocks.
 - Do not install or remove power cables with power on. Transient contact between the core of a power cable and a conductor may generate electric arcs or sparks, which may cause fire or hurt human eyes.
-
- If the power supply to the equipment is permanently connected, install an easily accessible disconnecter at the exterior of the equipment.
 - Before making electrical connections, switch off the disconnecter on the upstream device to cut the power supply if people may contact energized components.
 - If a "high electricity leakage" tag is attached on the power terminal of a device, you must ground the protective ground terminal on the device 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 circuit breaker.
 - Before connecting a power cable, check that the label on the power cable is correct.
 - Before connecting the power supply, ensure that electrical connections are correct.
 - If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.

1.3.3 Cabling Requirements

- When routing cables, ensure that a sufficient distance exists between the cables and heat-generating components such as power copper bars, shunts, and fuses. This prevents damage to the insulation layer of the cables.
- Separately bind signal cables and power cables.
- Ensure that all cables meet the VW-1 test requirements.
- Do not route cables behind the air exhaust vents of rectifiers in a cabinet.
- Securely bind all cables.
- If AC input power cables need to be routed from the top, bend the cables in the U shape outside the cabinet and then route them into the cabinet.
- Ensure that cables are more than 20 mm away from heat sources to prevent damage (melting, aging, or breakage) to the cable insulation layer.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- 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.
- Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- Route and bind ground cables and signal cables separately.

- Route and bind AC power cables, DC power cables, signal cables, and communications cables separately.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.

1.3.4 TNV Circuit

- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.

1.3.5 Environment Requirements and Tool Insulation

- Keep irrelevant people far away from the equipment.
- Before operating the equipment, wear insulation shoes and gloves, and take measures to protect your eyes. Remove conductive objects such as jewelry and watches to avoid electric shock or burns.
- Use insulated tools or tools with insulated handles.
- Use wooden or fiberglass ladders when you need to perform live working at heights.

1.4 Installation Environment Requirements

- Do not place the equipment in an environment that has inflammable and explosive gases or smoke. Do not perform any operation in such an environment.
- Ensure that there are no acid, alkaline, or other corrosive gases in the installation place.
- Do not place the equipment near heat sources or exposed fire sources, such as electric heaters, microwave ovens, roasters, water heaters, furnace fire, candles, or other places where high temperature may occur. Otherwise, the enclosure will melt or the equipment will heat up, which can cause a fire.
- Do not use flammable materials such as paper and cotton to shield or cover the equipment that is running. Otherwise, heat dissipation will fail and the enclosure will deform, which can cause a fire.
- Do not place the product in areas prone to water leakage, such as near air conditioner vents, ventilation vents, or feeder windows of the equipment room.

Installation Inside a Cabinet

Before installing the equipment into a cabinet, ensure that the cabinet is secured and will not tilt or fall down due to loss of balance, which can cause personal injury or equipment damage.

Installation at Heights

Working at heights refers to operations that are performed at least 2 meters above the ground.

Stop working at heights if the steel pipes are wet or other potential danger exists. After any of the preceding conditions no longer exists, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.



WARNING

- 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 forbidden 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.
- Do not perform operations on the upper and lower layers at the same time. If unavoidable, install a dedicated protective shelter between the upper and lower layers or take other protective measures. Do not pile up tools or properties on the upper layer.
- 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.
- Dismantle the scaffolding from top down after finishing the job. Do not dismantle the upper and lower layers at the same time. When removing a part, ensure that other parts will not collapse.
- Before climbing up a ladder, ensure that the ladder is secure and free of cracks. The angle between the ladder and the ground should be 75°. When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Do not loiter when working at heights. Do not sleep at heights.
- 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 may be forbidden from working and the suspension is considered as absenteeism.
- Operators who violate the safety regulations are responsible for accidents caused. The supervisor has to bear the responsibility accordingly.

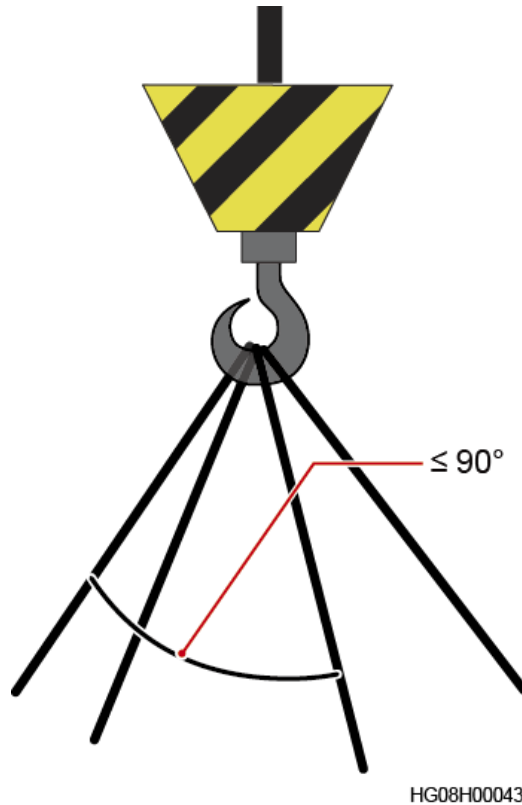
1.5 Mechanical Safety

1.5.1 Hoisting

⚠ DANGER

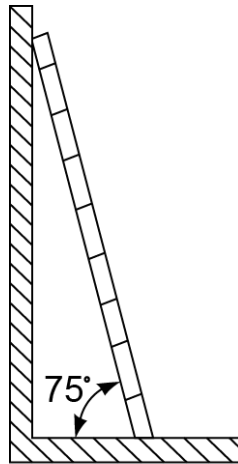
When heavy objects are being hoisted, do not walk under the cantilever or the objects.

- 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 fixed onto a weight-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.



1.5.2 Using Ladders

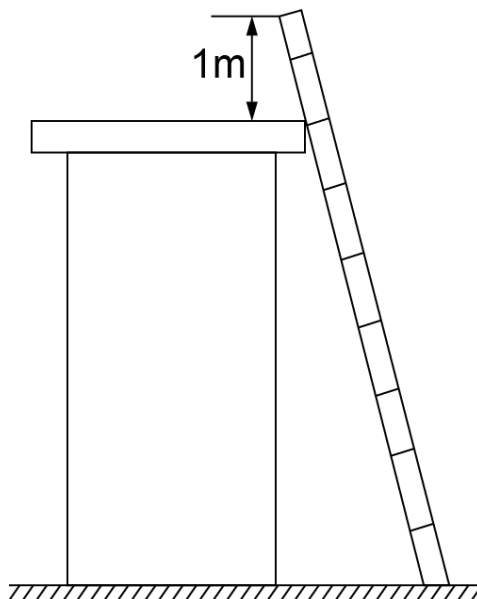
- Use only ladders that are in good condition. Do not exceed the maximum weight capacity of the ladders.
- The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle rule can be used to measure the angle. Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding, and that the ladder is securely positioned.



PI02SC0008

- When climbing a ladder:
 - Ensure that your body's center of gravity does not shift outside the legs of the ladder.
 - To minimize the risk of falling, steady your balance on the ladder before performing any operation.
 - Do not climb higher than the fourth rung of the ladder from the top.

To climb onto a roof, ensure that the ladder top is at least one meter higher than the roof line, as shown in the following figure.



PI02SC0009

1.5.3 Drilling Holes

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

NOTICE

Do not drill holes into the cabinet without permission. Incorrect drilling operations may affect the electromagnetic shielding of the cabinet and damage cables inside. Metal shavings from drilling may short-circuit boards inside the cabinet.

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

1.5.4 Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects. When lifting the chassis, keep your back straight and move smoothly to avoid injury.
- When moving equipment by hand, wear gloves to protect against sharp edges.
- Move or lift the chassis by holding its handles or lower edges. Do not hold the handles on certain modules such as power supply units, fans, and boards because they cannot support the weight of the equipment.

1.6 Battery Safety

1.6.1 Basic Requirements

Before installing, operating, or maintaining batteries, read the battery manufacturer's instructions. Observe the safety precautions provided in this document which are supplemental to the safety instructions provided by the battery manufacturer.

When installing and maintaining batteries, pay attention to the following:

- Do not wear conductive articles such as watches, bracelets, bangles, and rings.
- Use dedicated insulated tools.
- Do not expose batteries at high temperatures or around heat-generating devices, such as the sunshine, warmer, microwave oven, roaster, or water heater. Battery overheating may cause explosions.
- Batteries can work properly with the allowed charge and discharge parameters when the temperature is within the specified range. If the temperature is outside the specified range, the battery charge and discharge performance and safety are affected.
- To avoid leakage, overheating, fire, or explosions, do not disassemble or alter batteries, insert sundries, or immerse batteries in water or other liquid.
- Avoid skin contact with electrolyte overflow. Before installing or maintaining batteries, wear goggles, rubber gloves, and protective clothing. If a battery leaks, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.
- Move batteries in the required direction. Do not place a battery upside down or tilt it.
- Switch off the battery circuit breaker or remove the battery fuse before installation and maintenance.
- When replacing a battery, use a battery of the same or equivalent type. Improper replacement may cause the battery to explode.

- Do not connect a metal conductor to the battery poles or touch the battery terminals. Otherwise, the battery may be short-circuited and heat up, which can cause injuries such as burning.
- Dispose of 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.
- Do not drop, squeeze, or puncture a battery. Protect batteries from external high pressure to prevent internal short circuits and overheating.
- Do not use damaged batteries.
- To prevent injury or explosion, do not allow children or pets to swallow or bite a battery.
- If batteries experience discoloration, deformation, abnormal heating, or other abnormalities during working, charging, or storage, stop using the batteries and replace them with new ones.
- Secure battery cables or copper bars to the torque specified in battery documentation. Loose connections will result in excessive voltage drops or cause batteries to burn out when the current increases.



DANGER

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

1.6.2 Battery Installation Regulations

Before installing batteries, observe the following safety precautions:

- Lead-acid batteries emit flammable gas when used. Install batteries in a dry and cool environment with good ventilation, which is away from high temperature and flammable materials, and take precautions against fire. High battery temperature may result in battery distortion, damage, and electrolyte overflow.
- Switch off the power supply before installing batteries.
- Note the positive and negative polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, a great amount of energy is released, causing personal injury and damage to equipment.
- When installing a battery string, retain at least one breakpoint to prevent a loop being formed. After checking that the installation is correct, close the breakpoints to finish the installation.
- Before powering on a battery string, ensure that all bolts connecting batteries are tightened to the required torque.
- Do not use unsealed lead-acid batteries. Place and secure lead-acid batteries horizontally to prevent device inflammation or corrosion due to flammable gas emitted from batteries.
- During the installation, insulate the terminals of cables connecting batteries. Ensure that the terminals do not come into contact with metal components such as the cabinet.
- When handling a battery, ensure that its electrodes are upward. Do not tilt or overturn batteries.

1.6.3 Protection Against Battery Short Circuits

 DANGER

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

If permitted, disconnect the batteries in use before performing any other operations.

1.6.4 Protection Against Flammable Gas

NOTICE

- Do not use unsealed lead-acid batteries.
 - Place and secure lead-acid batteries horizontally and ensure that hydrogen discharge measures are normal to prevent inflammation or device corrosion due to flammable gas emitted from batteries.
-

Lead-acid batteries emit flammable gas if they work abnormally. Store lead-acid batteries in a place with good ventilation, and take fire safety precautions.

1.6.5 Battery Leakage Handling Regulations

NOTICE

High battery temperature may result in battery distortion, damage, and electrolyte overflow.

If the battery temperature is higher than 60°C, check the battery for electrolyte overflow. If the electrolyte overflows, handle the leakage immediately.

 WARNING

When the electrolyte overflows, absorb and neutralize the electrolyte immediately.

When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may hurt human bodies. Neutralize and absorb the electrolyte with sodium bicarbonate (NaHCO_3) or sodium carbonate (Na_2CO_3) before moving the batteries.

1.6.6 Lithium Battery Scenarios

The precautions for lithium battery operations are similar to the precautions for lead-acid battery operations except that you also need to note the precautions described in this section.

 CAUTION

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 supplier.

- When handling lithium batteries, do not place them upside down, tilt them, or bump them against the ground.
- Keep the battery loop disconnected during installation and maintenance.
- When the ambient temperature is lower than the lower limit of the operating temperature, do not charge the battery (0°C Charging is not allowed). Otherwise, a short circuit occurs inside the battery.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

1.7 PV Module Safety

Before installing, operating, and maintaining photovoltaic (PV) modules, read the instructions provided by the PV module vendor. The safety precautions specified in this document are highly important precautions that require special attention. For additional safety precautions, see the instructions provided by the PV module vendor.



DANGER

- Before installation and maintenance, put on a safety helmet, goggles, insulation gloves, and protective clothing to avoid personal injury.
 - Before installing and maintaining PV modules, cover all PV modules totally using opaque materials to avoid electric shocks caused by generated currents.
 - Never focus sunlight on PV modules using a mirror or lens, because this may damage PV modules and cause personal injury.
-
- When moving PV modules, do not hold connection boxes or power cables, because they are not designed to support the weight of PV modules.
 - Exercise caution when moving PV modules to avoid collision. Improper movement and placement may cause the glass plates on PV modules to break and lose electrical performance, which renders the PV modules useless.
 - In strong wind, do not install PV modules at heights.
 - To install or maintain a high support, you must set up a support platform and use a safety helmet or safety belt.
 - Do not drill holes in, step on, or place heavy objects on PV modules, because these actions may damage PV modules.
 - At least two persons are required to move and install PV modules. Only the aluminum frame of the PV modules can be raised. Exerting force on the front or rear surface of the PV modules using your head is prohibited. This may cause hidden cracks in the PV modules.

2 Solution Overview

2.1 Positioning

Huawei PowerCube 500 hybrid power supply solution applies to safe and smart city projects. It provides power and support for cameras in video surveillance systems, and provides power and space for data backhaul devices. Meanwhile, it can also provide power and support for devices such as solar street lamps and hot spot coverage.

The PowerCube 500 supports mains and solar power supplies. It includes the solar power supply solution, grid power supply solution, and solar-grid power supply solution, applicable to diverse scenarios with or without mains power supply.

The PowerCube 500 supports multiple output voltage modes at the same time, including 12 V DC, 24 V AC, 48 V DC, and 220 V AC. It can provide power for cameras and transmission equipment such as the small-sized router, passive optical network (PON), customer premises equipment (CPE), and access point (AP).

2.2 Features

Huawei PowerCube 500 hybrid power supply solution is simple, reliable, and intelligent.

- Simple: The MIMO technology supports multiple energy input and multiple output voltage modes.
- Reliable: It features integrated design, carrier-class reliability, and dual-antitheft design.
- Intelligent: You can access a power supply using the mobile phone app, facilitating site deployment. You can also manage sites using a remote NMS.

2.3 Solutions

Grid Power Supply Solution

The grid power supply solution works circularly as follows. The power source preference sequence is mains > battery.

1. If the mains is normal, the mains supplies power to loads and batteries.
2. If the mains is abnormal, batteries supply power to loads.

Figure 2-1 Network diagram of a grid power supply solution

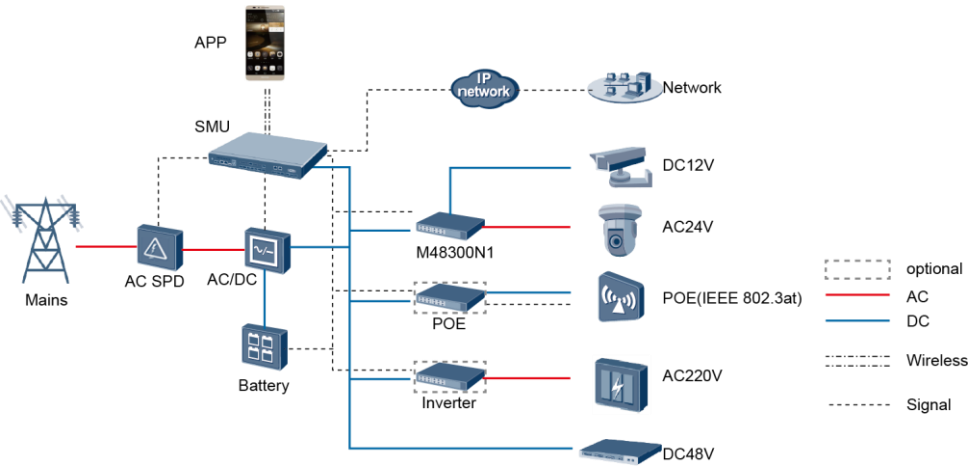
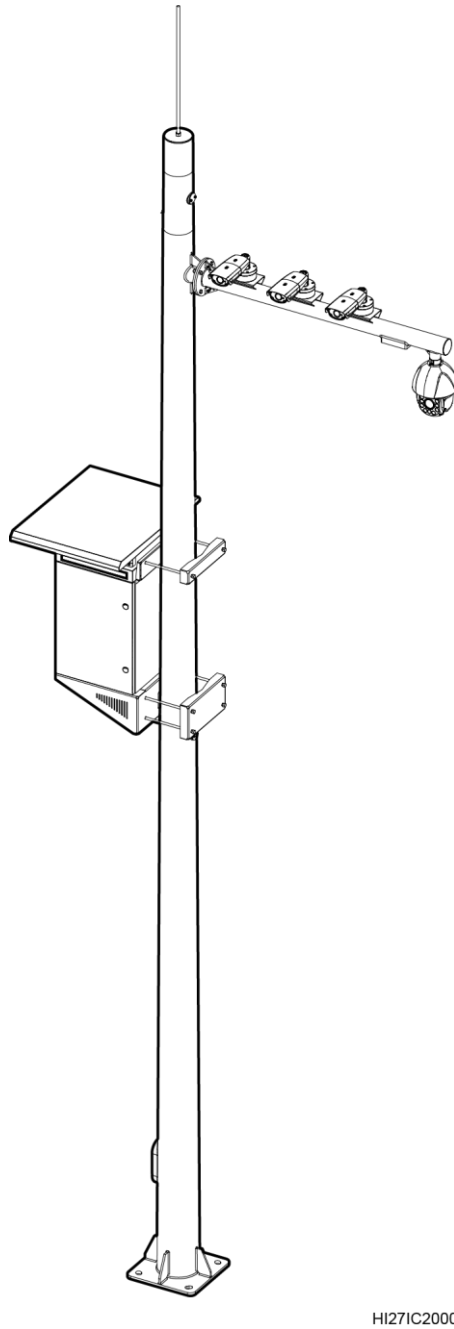


Figure 2-2 Site with mains power supply



Solar-Grid Power Supply Solution

The solar-grid power supply solution works circularly as follows. The power source preference sequence is PV module > mains > battery.

1. If sunshine is sufficient, PV modules supply power to loads and batteries.
2. If sunshine is insufficient, PV modules and the mains supply power to loads and batteries.
3. If there is no sunshine, the mains supplies power to loads and batteries.

4. If there is no sunshine and the mains is not available, batteries supply power to loads.

Figure 2-3 Network diagram of a solar-grid power supply solution

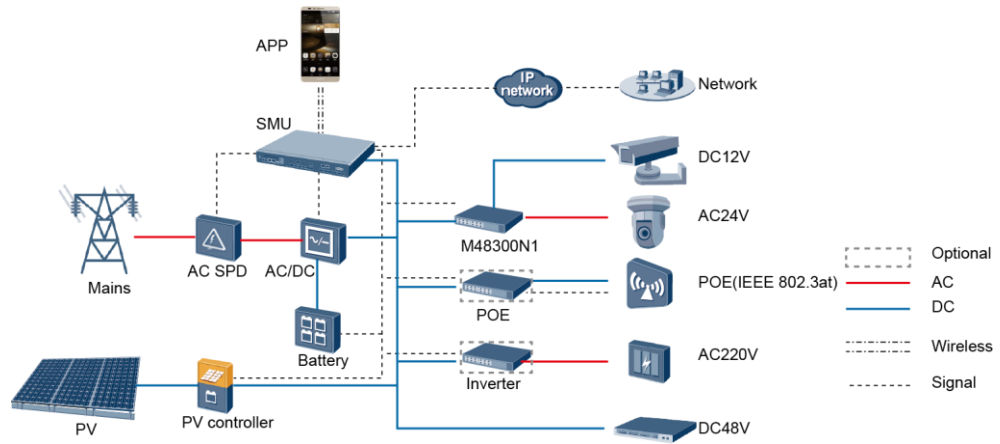
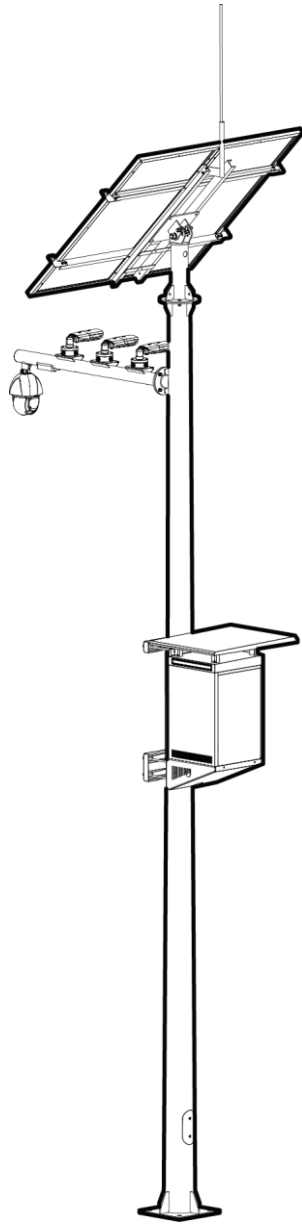


Figure 2-4 Site with solar and mains power supplies



2.4 Configurations

Table 2-1 Configurations for the grid power supply solution

Item	ICC30-NA	ICC30T-NA	ICC30-NT	ICC30T-NT
PDU	DCDU-80A1			
SMU	SMU02B			
UIM	UIM05D			

Item	ICC30-NA	ICC30T-NA	ICC30-NT	ICC30T-NT
PSU	A maximum of one R4850G2, one R4850N6, or two R4830G2s			
Energy storage unit (ESU)	One string of ESM-A02		One group of TCB-30C	
Sensor	Smoke sensor and temperature and humidity sensor			
Component	Inverter (optional), PoE module (optional), and M48300N1 module	PoE module (optional), M48300N1 module, and HAU	Inverter (optional), PoE module (optional), and M48300N1 module	PoE module (optional), M48300N1 module, and HAU
Pole	Mains pole			
Transmission equipment	AR531 (optional), AR550 (optional), AR550C (optional), MA5671 (optional), MA5621 (optional), NE05E-SK (optional), GPX147-FSM1101-12			

Table 2-2 Configurations for the solar-grid power supply solution

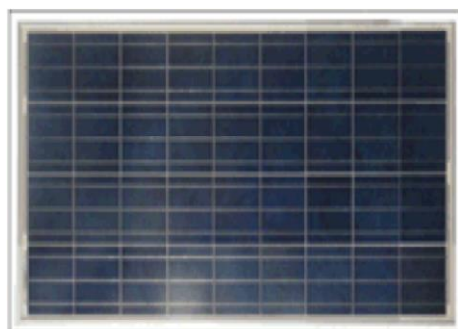
Item	ICC30-NA	ICC30T-NA	ICC30-NT	ICC30T-NT
PDU	DCDU-80A1			
SMU	SMU02B			
UIM	UIM05D			
PSU	A maximum of one R4850G2, one R4850N6, or two R4830G2s			
Solar supply unit (SSU)	S4820G1			
Energy storage unit (ESU)	One string of ESM-A02		One group of TCB-30C	
Sensor	Smoke sensor and temperature and humidity sensor			
Component	Inverter (optional), PoE module (optional), and M48300N1 module	PoE module (optional), M48300N1 module, and HAU	Inverter (optional), PoE module (optional), and M48300N1 module	PoE module (optional), M48300N1 module, and HAU
Pole	Solar pole			
PV module	150 W, or 200 W PV module			
Transmission equipment	AR531 (optional), AR550 (optional), AR550C (optional), MA5671 (optional), MA5621 (optional), NE05E-SK (optional), GPX147-FSM1101-12			

3 Component Description

3.1 PV Module

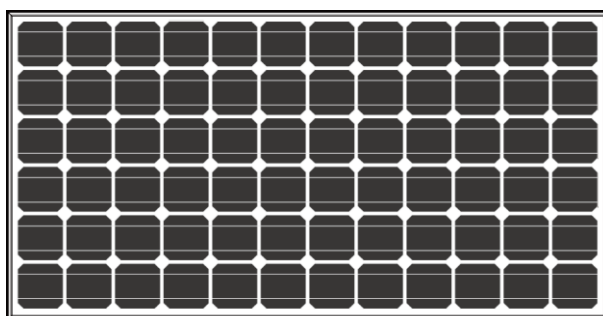
Exterior

Figure 3-1 150 W PV module



HV01WC0000

Figure 3-2 200 W PV module



HV01WC0006

Specifications

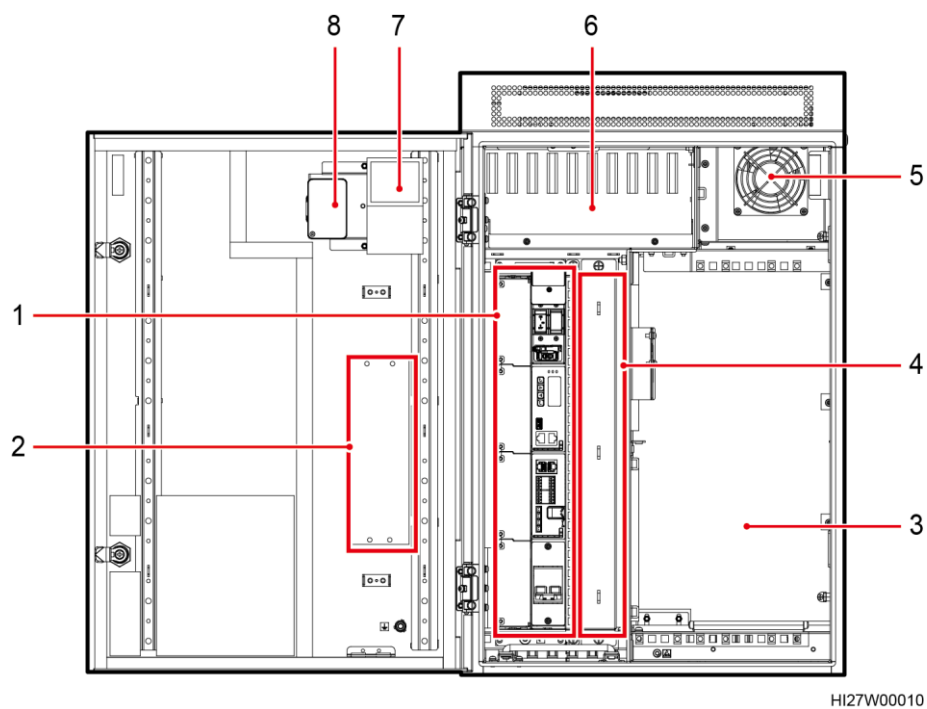
Table 3-1 PV module specifications

Item	150 W PV Module	200 W PV Module
Peak power	150 W	200 W
Solar cell	Polycrystalline silicon	Monocrystalline silicon
Dimensions (L x W x H)	1482 mm x 676 mm x 35 mm	1580 mm x 808 mm x 46 mm
Weight	About 12 kg	About 16 kg
Optimal operating voltage	About 18.5 V	About 37 V

3.2 ICC30-NA

Interior

Figure 3-3 Interior



HI27W00010

(1) DCDU-80A1

(2) Space for a PoE adapter

(3) Space for batteries

(4) Space for customer equipment

(5) Fan

(6) Space for transmission equipment

- (7) Temperature and humidity sensor (8) Smoke sensor

Specifications

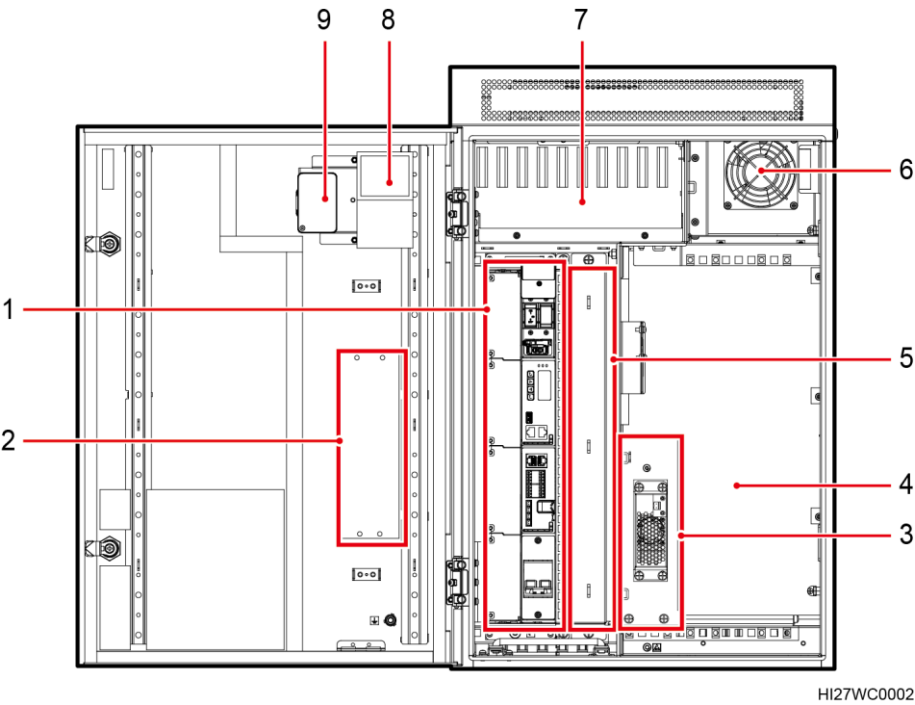
Table 3-2 ICC30-NA specifications

Item	Specifications
Dimensions (H x W x D)	750 mm x 480 mm x 480 mm
Weight	About 55 kg
Cooling	Free cooling
Operating temperature	0–45°C (When the ambient temperature is above 40°C, an awning is required.)
Cabling mode	Routed in and out from the bottom
Maintenance mode	Operated and maintained from the front
Installation mode	Mounted on a pole or wall
Space for customer equipment	1 U
Battery	One string of ESM-A02 can be installed.
Operating environment	Class C

3.3 ICC30T-NA

Interior

Figure 3-4 Interior



- | | | |
|--------------------------------------|-------------------------------------|------------------|
| (1) DCDU-80A1 | (2) Space for a PoE adapter | (3) Heater |
| (4) Space for batteries | (5) Space for customer equipment | (6) Fan |
| (7) Space for transmission equipment | (8) Temperature and humidity sensor | (9) Smoke sensor |

Specifications

Table 3-3 ICC30T-NA specifications

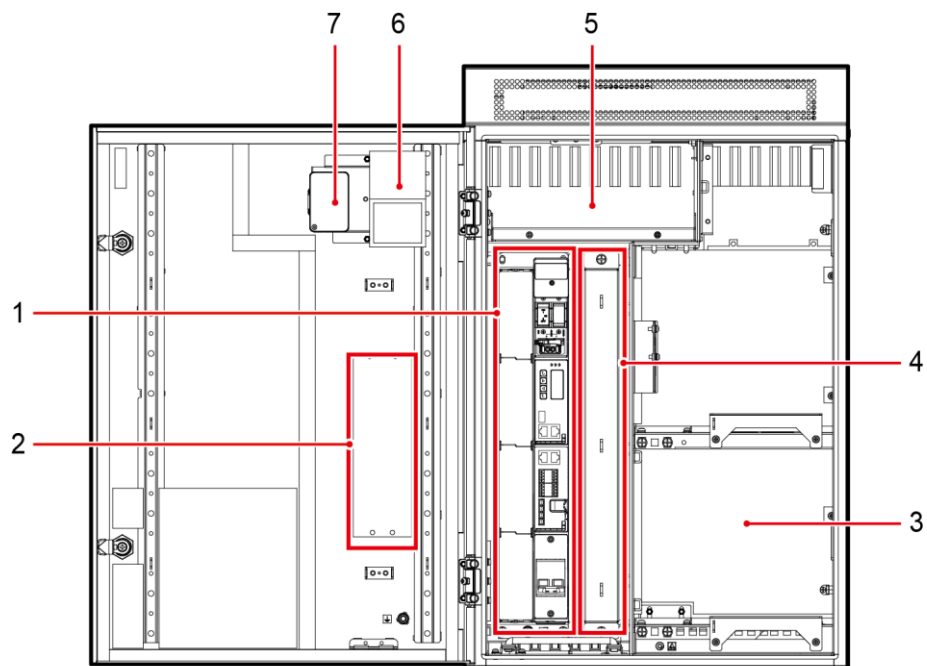
Item	Specifications
Dimensions (H x W x D)	750 mm x 480 mm x 480 mm
Weight	About 55 kg
Cooling	Free cooling
Operating temperature	–30°C to +45°C (When the ambient temperature is above 40°C, an awning is required.)
Cabling mode	Routed in and out from the bottom

Item	Specifications
Maintenance mode	Operated and maintained from the front
Installation mode	Mounted on a pole or wall
Space for customer equipment	1 U
Battery	One string of ESM-A02 can be installed.
Operating environment	Class C

3.4 ICC30-NT

Interior

Figure 3-5 Interior



HI27WC0003

- | | | |
|----------------------------------|--------------------------------------|-------------------------------------|
| (1) DCDU-80A1 | (2) Space for a PoE adapter | (3) Space for batteries |
| (4) Space for customer equipment | (5) Space for transmission equipment | (6) Temperature and humidity sensor |
| (7) Smoke sensor | | |

Specifications

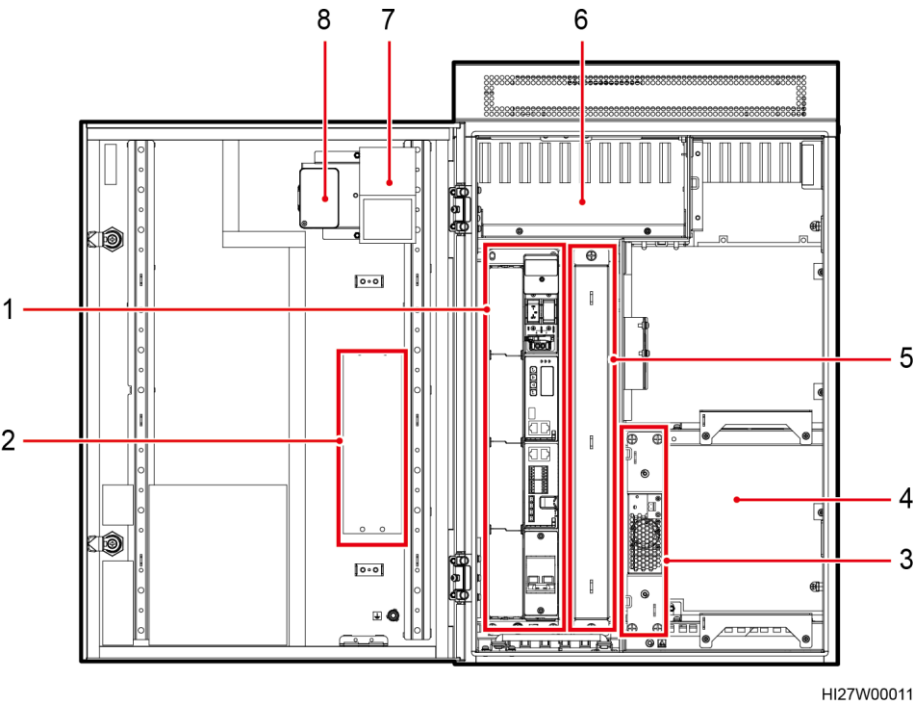
Table 3-4 ICC30-NT specifications

Item	Specifications
Dimensions (H x W x D)	750 mm x 480 mm x 480 mm
Weight	About 55 kg
Cooling	Free cooling
Operating temperature	–5°C to +45°C (When the ambient temperature is above 40°C, an awning is required.)
Cabling mode	Routed in and out from the bottom
Maintenance mode	Operated and maintained from the front
Installation mode	Mounted on a pole or wall
Space for customer equipment	1 U
Battery	One string of TCB-30C
Operating environment	Class C

3.5 ICC30T-NT

Interior

Figure 3-6 Interior



- (1) DCDU-80A1
- (2) Space for a PoE adapter
- (3) Heater
- (4) Space for batteries
- (5) Space for customer equipment
- (6) Space for transmission equipment
- (7) Temperature and humidity sensor
- (8) Smoke sensor

Specifications

Table 3-5 ICC30T-NT specifications

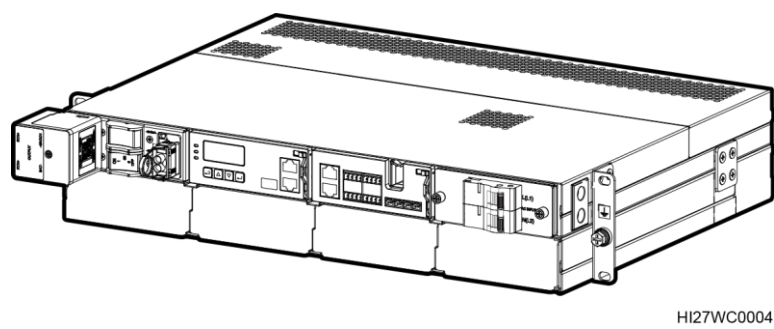
Item	Specifications
Dimensions (H x W x D)	750 mm x 480 mm x 480 mm
Weight	About 55 kg
Cooling	Free cooling
Operating temperature	–30°C to +45°C (When the ambient temperature is above 40°C, an awning is required.)
Cabling mode	Routed in and out from the bottom

Item	Specifications
Maintenance mode	Operated and maintained from the front
Installation mode	Mounted on a pole or wall
Space for customer equipment	1 U
Battery	One string of TCB-30C
Operating environment	Class C

3.6 DCDU-80A1

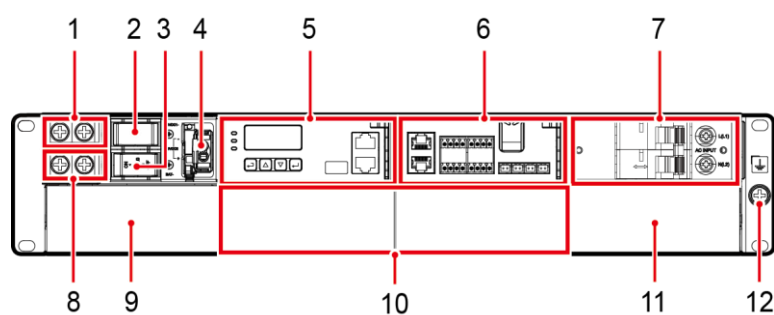
Exterior and Interior

Figure 3-7 Exterior



HI27WC0004

Figure 3-8 Interior



HI27WC0005

- | | | |
|---|---------------------------------------|-----------------------------|
| (1) -48 V DC output 1 wiring terminal | (2) -48 V DC output 1 circuit breaker | (3) Battery circuit breaker |
| (4) -48 V DC output 2 wiring terminal | (5) SMU02B | (6) UIM05D |
| (7) AC input circuit breakers and terminals | (8) Battery wiring terminal | (9) M48300N1 module slot |
| (10) PSU slot | (11) SSU slot | (12) Ground screw |

 NOTE

The AC SPD is installed inside the UIM05D.

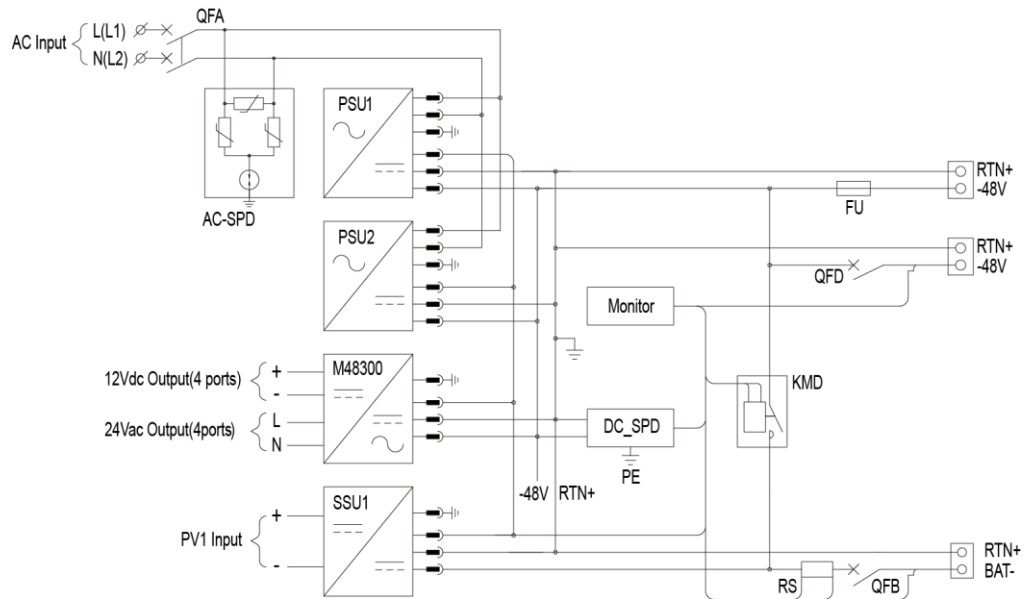
Specifications

Table 3-6 DCDU-80A1 specifications

Item		Specifications
Frame	Dimensions (H x W x D)	87.9 mm x 442 mm x 330 mm
	Weight	About 10 kg
	Cabling mode	Routed in and out from the left and right, routed in and out from the front
	Maintenance mode	Operated and maintained from the front
	Installation mode	Mounted on a 19-inch rack
Configuration	DC output	One 80 A battery wiring terminal, one 40 A load wiring terminal, and one 30 A load quick-connect terminal
	SMU	SMU02B
	UIM	UIM05D
	AC input	One 2-pole 32A circuit breaker supporting 220 V AC single-phase or 110 V AC dual-live-wire AC input
	M48300N1 module	An M48300N1 module can be installed in the M48300N1 module slot
	PSU (optional)	A PSU can only be installed in the PSU slot A maximum of one R4850G2, one R4850N2, or two R4830G2s
	SSU (optional)	An SSU can be installed in the SSU slot

Conceptual Diagram

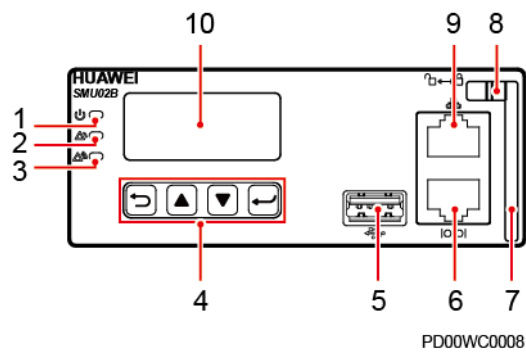
Figure 3-9 Conceptual diagram



3.6.1 SMU02B

Panel

Figure 3-10 SMU02B panel



- | | | |
|-------------------|--|-----------------------------|
| (1) Run indicator | (2) Minor alarm indicator | (3) Major alarm indicator |
| (4) Buttons | (5) USB port (protected by a security mechanism) | (6) RS485/RS232 port |
| (7) Handle | (8) Locking latch | (9) Fast Ethernet (FE) port |
| (10) LCD | | |

Indicators

Table 3-7 Indicator description

Name	Color	Status	Description
Run indicator	Green	Off	The SMU is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The SMU is running properly and communicating with the host properly.
		Blinking fast (4 Hz)	The SMU is running properly but fails to communicate with the host properly.
Minor alarm indicator	Yellow	Off	No minor or warning alarm is generated.
		Steady on	A minor or warning alarm is generated.
Major alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

Buttons

Table 3-8 Button description

Button	Name	Description
	Up	Press Up and Down to scroll through the menus or to change the value of a parameter.
	Down	
	Cancel	Returns to the previous menu without saving the settings.
	Enter	- Enters the main menu from the standby screen. - Enters a submenu from the main menu. - Saves menu settings on a submenu.
NOTE - The LCD screen becomes dark if no button is pressed within 30 seconds. - You need to log in again if no button is pressed within 1 minute. - To increase or decrease a parameter value quickly, hold down  or . - To restart the SMU, hold down  and  for 10 seconds. - To increase (or decrease) the LCD contrast ratio, hold down  and  (or ) for 2 seconds.		

USB Ports

You can quickly deploy a site, import and export configuration files, export running logs, and upgrade software by inserting the USB flash drive that is specially used for site deployment into the USB port.

After installing the specific WiFi module using the USB port, you can access the WebUI locally, which facilitates operations.

NOTICE

Using WiFi modules provided by another vendor may cause data loss or function exception. Consequences arising from this will not be borne by Huawei.

Communications Ports

Table 3-9 Communication port description

Communications Port	Communications Parameter	Communications Protocol
FE	10/100M autonegotiation	HTTPS, NetEco protocol, SNMP and TCP-Modbus protocol
RS485/RS232	Baud rate: 1200bit/s, 2400bit/s, 4800bit/s, 9600bit/s, 14400bit/s, 19200bit/s, 115200bit/s	Master/slave protocol, YDN protocol, and Modbus protocol
NOTE All these ports are protected by a security mechanism.		

Figure 3-11 FE/RS485/RS232 port pins

RJ45 female connector

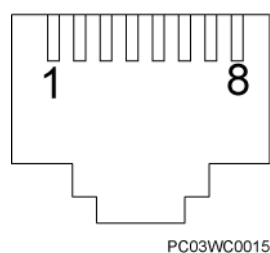


Table 3-10 Pin definitions for the FE port

Pin	Signal	Description
1	TX+	Transmits data over FE.
2	TX-	
3	RX+	Receives data over FE.
6	RX-	
4, 5, 7, 8	NA	-

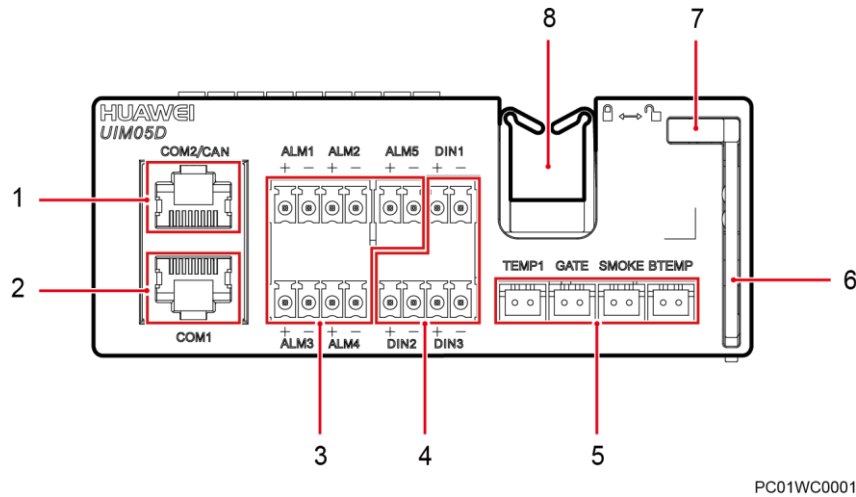
Table 3-11 Pin definitions for the RS485/RS232 port

Pin	Signal	Description
1	TX+	Transmits data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Transmits data over RS232.
6	PGND	Connects to the ground.
8	NA	—

3.6.2 UIM05D

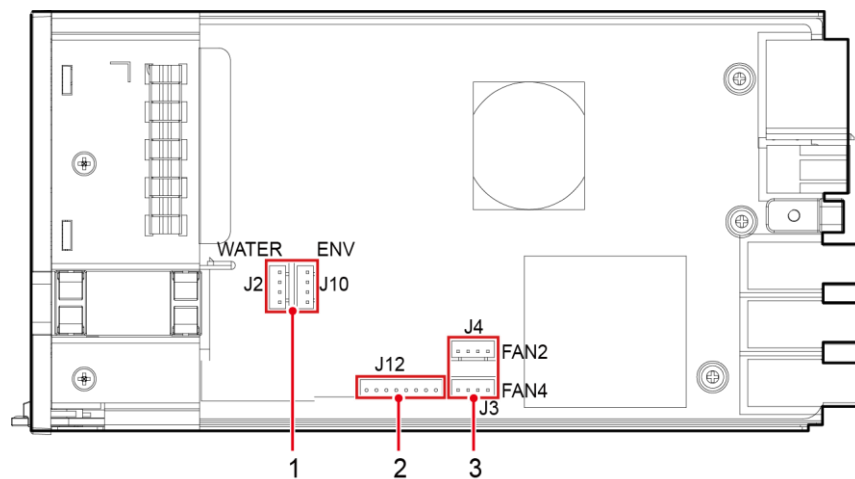
Interior

Figure 3-12 UIM05D interior (front view)



- | | | |
|-----------------------------|------------------|------------------------------|
| (1) COM2/CAN port | (2) COM1 port | (3) Dry contact output ports |
| (4) Dry contact input ports | (5) Sensor ports | (6) Handle |
| (7) Locking latch | (8) Cable outlet | |

Figure 3-13 UIM05D interior (top view)



- | | | |
|------------------|-----------------------------------|------------------------------------|
| (1) Sensor ports | (2) Internal circulation fan port | (3) External circulating fan ports |
|------------------|-----------------------------------|------------------------------------|

Ports

Table 3-12 UIM05Dports

Port Type	Silk Screen	Description
Communications port	COM1	RS485 port
	COM2/CAN	RS485 and CAN ports
Dry contact output ports	ALM1	Dry contact output 1
	ALM2	Dry contact output 2
	ALM3	Dry contact output 3
	ALM4	Dry contact output 4
	ALM5	Dry contact output 5
Dry contact input ports	DIN1	Dry contact input 1
	DIN2	Dry contact input 2
	DIN3	Dry contact input 3
Sensor ports	TEMP1	Ambient temperature sensor 1
	GATE	Door status sensor
	SMOKE	Smoke sensor
	BTEMP	Battery temperature sensor
	WATER	Water sensor
	ENV	Ambient temperature and humidity sensor
	J12	Internal circulation fan
	FAN2 (J4)	External circulating fan 1
	FAN4 (J3)	External circulating fan 2

Communication Port

Figure 3-14 Pins in the communication port

RJ45 female connector

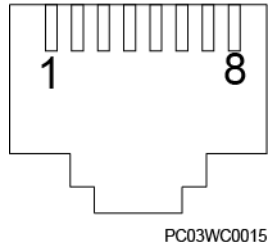


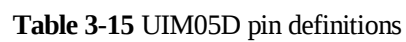
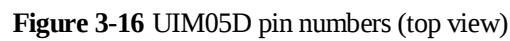
Table 3-13 Pin definitions for the COM1 port

Pin	Signal	Description
1	RX+	Receives data over RS485
2	RX-	
3	12V	Power supply
4	TX+	Sends data over RS485
5	TX-	
6	GND	Connects to the ground
7	None	-
8	GND	Connects to the ground

Table 3-14 Pin definitions for the COM2/CAN port

Pin	Signal	Description
1	RS485+	RS485 date+
2	RS485-	RS485 date-
3	None	-
4	RS485+	RS485 date+
5	RS485-	RS485 date-
6	GND	Connects to the ground
7	CANH	CAN bus high level
8	CANL	CAN bus low level

Figure 3-15 UIM05D pin numbers (front view)



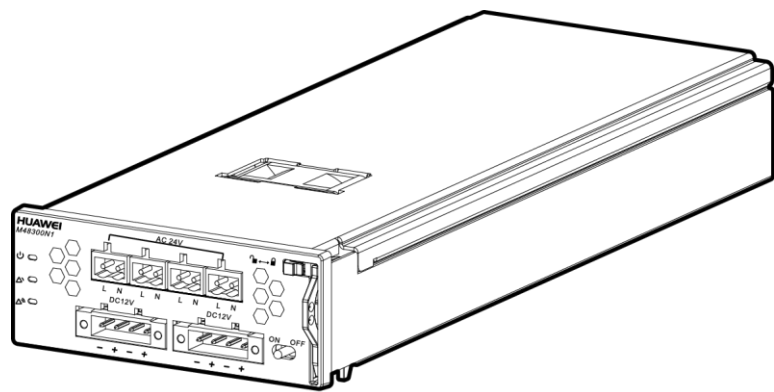
Silkscreen	No.	Pin Definitions
TEMP1	1	TEMP1
	2	GND
GATE	1	GATE+
	2	GATE-
SMOKE	1	12V
	2	SMOKE
BTEMP	1	BTEMP1

Silkscreen	No.	Pin Definitions
	2	GND
WATER (J2)	1	12V_USER
	2	WATER
	3	GND
	4	None
ENV (J10)	1	12V_USER
	2	ENV_TEMP
	3	12V_USER
	4	ENV_HUM
J12	1	RTN_FAN
	2	PWM_FAN1
	3	SPEED_FAN1
	4	-48V_FAN_OUT
	5	RTN_FAN
	6	PWM_FAN3
	7	SPEED_FAN3
	8	-48V_FAN_OUT
FAN2 (J4)	1	RTN_FAN
	2	PWM_FAN2
	3	SPEED_FAN2
	4	-48V_FAN_OUT
FAN4 (J3)	1	RTN_FAN
	2	PWM_FAN4
	3	SPEED_FAN4
	4	-48V_FAN_OUT

3.6.3 M48300N1

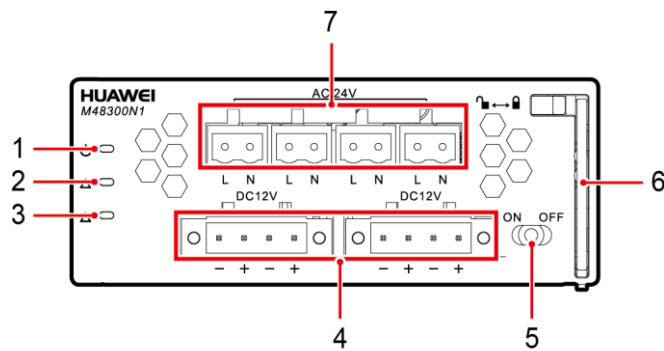
Exterior and Panel

Figure 3-17 Exterior



HI27WC0006

Figure 3-18 Panel



HI27WC0007

- (1) Power indicator
- (2) Alarm indicator
- (3) Fault indicator
- (4) 12 V DC output wiring terminal
- (5) Control switch
- (6) Handle
- (7) 24 V AC output wiring terminal

Specifications

Table 3-16 Specifications

Item	Description
Dimensions (L x W x H)	281 mm x 105 mm x 40.8 mm
Weight	≤ 1.5 kg

Item	Description
Operating voltage	40–60 V DC
Max. input current	13A
Output voltage	- Four 12 V DC outputs - Four 24 V AC outputs
Max. output power	100W (12 V DC) 200W (24 V AC)
Surge protection	12 V DC output port: differential mode ± 3 kA, common mode ± 5 kA 24 V AC output port: differential mode ± 2 kV/2 ohm, common mode ± 6 kV/12 ohm
The ON/OFF switch on the panel	The ON/OFF switch on the panel can be used to control the M48300N1 output.

Indicators

Table 3-17 Indicator description

Indicator	Status	Description
Power indicator (green)	Off	- The M48300N1 has no DC input - The M48300N1 is faulty
	Steady on	The M48300N1 has DC input
	Blinking (at a frequency of 0.5 Hz)	The M48300N1 is being queried
	Blinking (at a frequency of 4 Hz)	Program loading is in progress
Alarm indicator (yellow)	Off	No alarm is generated
	Steady on	- The M48300N1 has generated a power limiting alarm due to ambient overtemperature - The M48300N1 has generated a shutdown alarm for protection due to ambient overtemperature - The M48300N1 is protected against input over/undervoltage - The M48300N1 is hibernating
	Blinking (at a frequency of 0.5 Hz)	The communication between the M48300N1 and the monitoring module is interrupted

Indicator	Status	Description
Fault indicator (red)	Off	The M48300N1 is running properly
	Steady on	- The M48300N1 locks out due to output overvoltage - The module has no output due to an internal fault

3.6.4 Rectifier

A rectifier converts AC input power into stable DC power.

Figure 3-19 Appearance

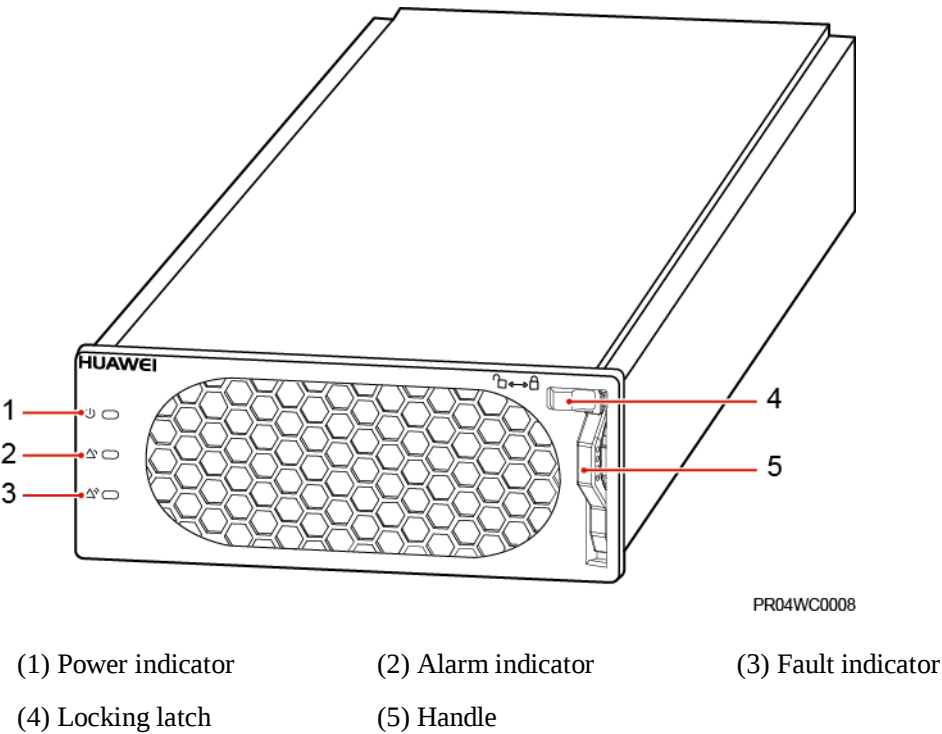


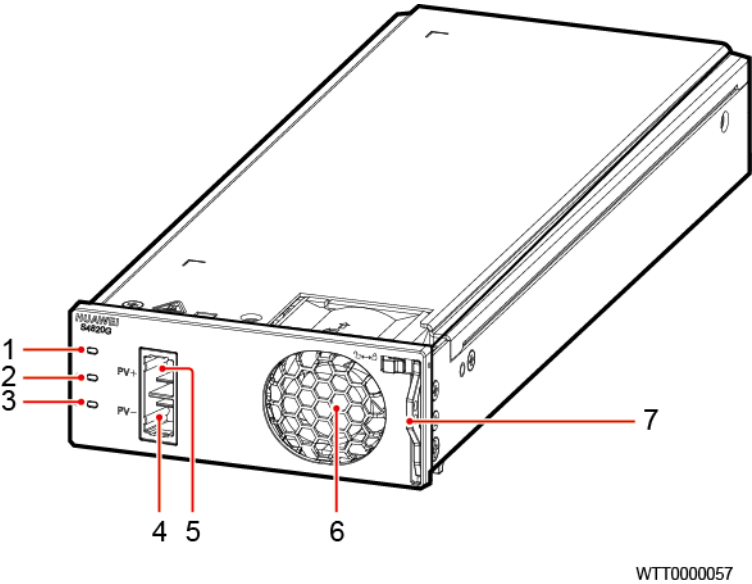
Table 3-18 Indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The rectifier has an AC input.
		Off	The rectifier has no AC input.
			The rectifier is faulty.
		Blinking at 0.5 Hz	The rectifier is being queried.
		Blinking at 4	The rectifier is loading an application

Indicator	Color	Status	Description
		Hz	program.
Alarm indicator	Yellow	Off	No alarm is generated.
		Steady on	- A warning is generated due to ambient overtemperature. - The rectifier has generated a protection shutdown alarm due to ambient overtemperature or undertemperature.
			AC input overvoltage or undervoltage protection has been triggered.
			The rectifier is in hibernation state.
		Blinking at 0.5 Hz	The communication between the rectifier and the external device is interrupted.
Fault indicator	Red	Off	The rectifier is normal.
		Steady on	The rectifier locks out due to output overvoltage.
			The rectifier has no output due to an internal fault.

3.6.5 S4820G1

Figure 3-20 Appearance



- (1) Power indicator
- (2) Alarm indicator
- (3) Fault indicator
- (4) PV negative input port
- (5) PV positive input port
- (6) Air intake vent

(7) Handle

Indicators

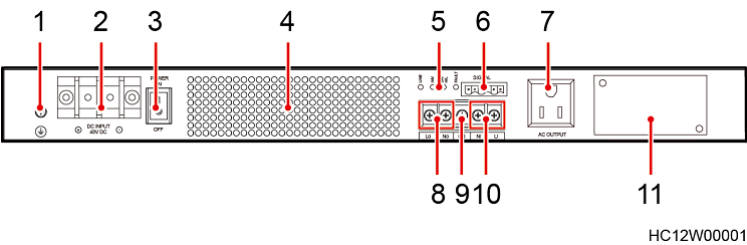
Table 3-19 Indicator description

Indicator	Status	Description
Power indicator (green)	Off	• The SSU has no DC input • The SSU is faulty
	Steady on	The SSU has DC input
	Blinking (at a frequency of 0.5 Hz)	The SSU is being queried
	Blinking (at a frequency of 4 Hz)	The SSU is loading an application program
Alarm indicator (yellow)	Off	The SSU has no protection alarm
	Steady on	• The SSU has generated a power limiting alarm due to ambient overtemperature • The SSU has generated a shutdown alarm for protection due to ambient overtemperature • The SSU is protected against input over/undervoltage • The SSU is hibernating
	Blinking (at a frequency of 0.5 Hz)	The communication between the SSU and the monitoring module is interrupted
Fault indicator (red)	Off	The SSU is running properly
	Steady on	• The SSU latches off due to output overvoltage • The SSU has no output due to an internal fault

3.7 Inverter (DJN1000-S)

Interior

Figure 3-21 DJN1000-S interior



- | | | |
|------------------------|------------------------|---------------------------|
| (1) Ground screw | (2) DC input terminal | (3) Switch |
| (4) Air intake vent | (5) Indicators | (6) Dry contact terminals |
| (7) AC output socket | (8) AC output terminal | (9) AC PE terminal |
| (10) AC input terminal | (11) SPD | |

Technical Specifications

Table 3-20 Inverter technical specifications

Item		Specifications
Dimensions (H x W x D)		43.5 mm x 482.6 mm x 286 mm (including mounting ears)
Rated output capacity		1000 VA/700 W
DC input	Rated voltage	48 V DC
	Rated current	17 A
AC input	Rated voltage	220 V AC
	Rated frequency	50 Hz
AC output	Rated output voltage	220 V AC±3%
	Output frequency	50±1% Hz
	Output mode	One wiring terminal AC output + one universal socket AC output

Indicators

Table 3-21 Inverter indicator description

Silk Screen	Color	Description
LINE	Green	The indicator is on when there is mains power input. The indicator is off when there is no mains power input.
INV.	Green	The indicator is on when the inverter is normal. The indicator is off when the inverter is abnormal. The indicator blinks when the inverter is in energy saving mode in which mains power is preferred.
BAT.H/L	Yellow	The indicator blinks when there is a DC input under/overvoltage alarm. The indicator is on when there is protection against DC input under/overvoltage.
FAULT	Yellow	The indicator is off when the inverter is normal. The indicator is on when the inverter is abnormal.

Dry Contact Terminals

Figure 3-22 Inverter dry contact terminals

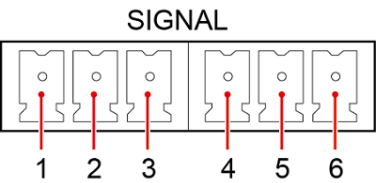


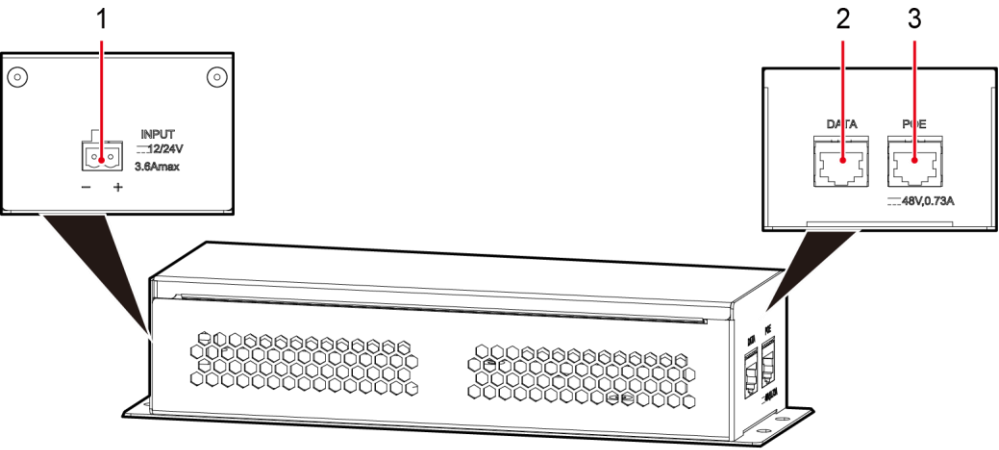
Table 3-22 Definition of inverter dry contact terminals

Pin	Description
1, 2	Dry contact signal for a DC input abnormality alarm, open when DC input is normal, closed when DC input is abnormal
1, 3	Dry contact signal for a DC input abnormality alarm, closed when DC input is normal, open when DC input is abnormal
4, 5	Dry contact signal for an inverter abnormality alarm, open when the inverter is normal, closed when the inverter is abnormal
4, 6	Dry contact signal for an inverter abnormality alarm, closed when the inverter is normal, open when the inverter is abnormal

3.8 (Optional) PoE Adapter

The PoE adapter converts 12 V or 24 V DC input. It provides one PoE port and one DATA port.

Figure 3-23 PoE adapter



- (1) Power port
- (2) DATA port.
- (3) PoE port

Technical Specifications

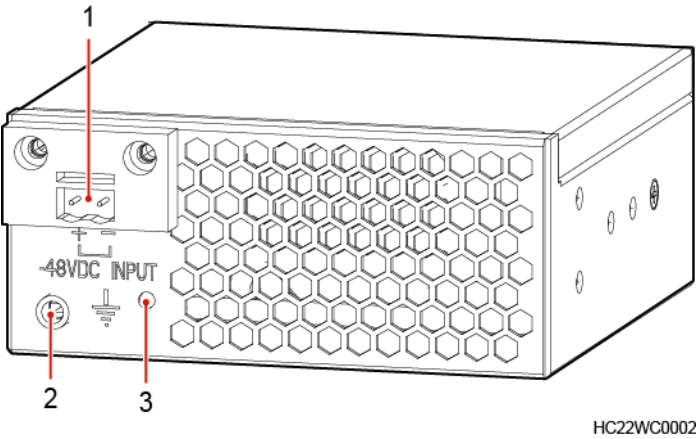
Table 3-23 PoE adapter technical specifications

Item	Specifications
DC input voltage range	10 V DC-30 V DC
DC output voltage range	47 V DC-52 V DC
Rated output power	35 W
Efficiency (with full load)	> 80%
Dimensions (H x W x D)	50 mm x 72 mm x 230 mm

3.9 DC Heater HAU02D

Exterior

Figure 3-24 DC heater exterior



- (1) Power port
- (2) Ground terminal
- (3) Indicators

Specifications

Table 3-24 DC heater specifications

Item	Specifications
Dimensions (H x W x D)	43.6 mm x 100 mm x 100 mm
Weight	≤ 1 kg
Operating voltage range	36–75 V DC
Rated operating voltage	48 V DC
Rated power	300 W
Operating temperature range	–40°C to +65°C
Start temperature	5±3°C
Shutdown temperature	15±3°C
Operating humidity	5%–95% RH
Altitude	0–4000 m. When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1°C for each additional 200 m.

3.10 ESU

3.10.1 ESM-A02

Panel

Figure 3-25 ESM panel

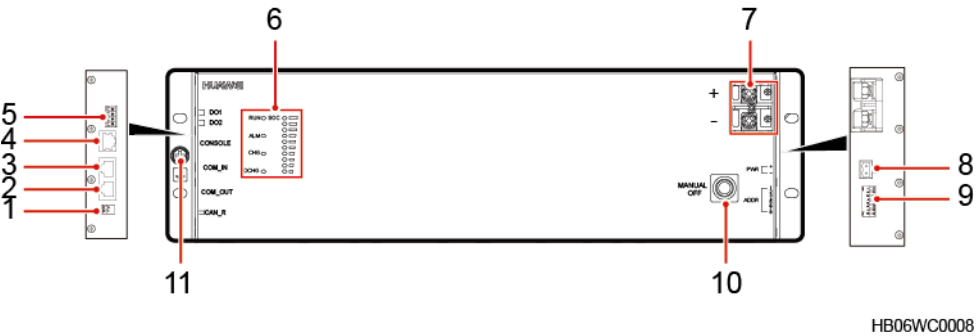


Table 3-25 Panel port description

No.	Silk Screen	Name	Function
1	CAN_R	Communications dual in-line package (DIP) switch	Ensures the signal transmission reliability.
2	COM_OUT	Communication ports	One is used for information reporting and the other for CAN cascading. The two ports are internally connected.
3	COM_IN	Communication port	
4	CONSOLE	Communication port	Used for commissioning.
5	DO1 DO2	ESM alarm dry contact output	Delivers alarms.
6	RUN	Communication indicator	For the function details, see Indicators .
	ALM	Alarm indicator	
	CHG	Charge indicator	
	DCHG	Discharge indicator	
	SOC	State of charge (SOC) indicator	
7	+	Positive battery terminal	The terminal to which positively charged ions migrate.
	-	Negative battery terminal	The terminal to which negatively charged ions migrate.

No.	Silk Screen	Name	Function
8	PWR	Power port	Supplies power to the energy storage management unit (ESMU).
9	ADDR	Address DIP switch	Indicates a CAN communication address.
10	MANUAL OFF	Battery switch	If no external power source is connected to the PWR port, hold down MANUAL OFF for more than 5 seconds to disconnect the ESM.
11		Protective grounding	-

COM_IN and COM_OUT Communication Ports

CAN communication ports COM_IN and COM_OUT apply to RJ45 terminals and protect against 250 A surge current.

Figure 3-26 Pins in an RJ45 terminal

RJ45 female connector

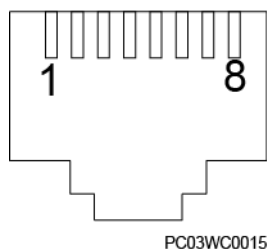


Table 3-26 Pin definition

Pin	Signal	Description
1, 2, 3, 4, 5, 6	Reserved	-
7	CAN_H	CAN high level signal
8	CAN_L	CAN low level signal

CONSOLE Port

CONSOLE is an RJ45 commissioning port.

Figure 3-27 Commissioning cable

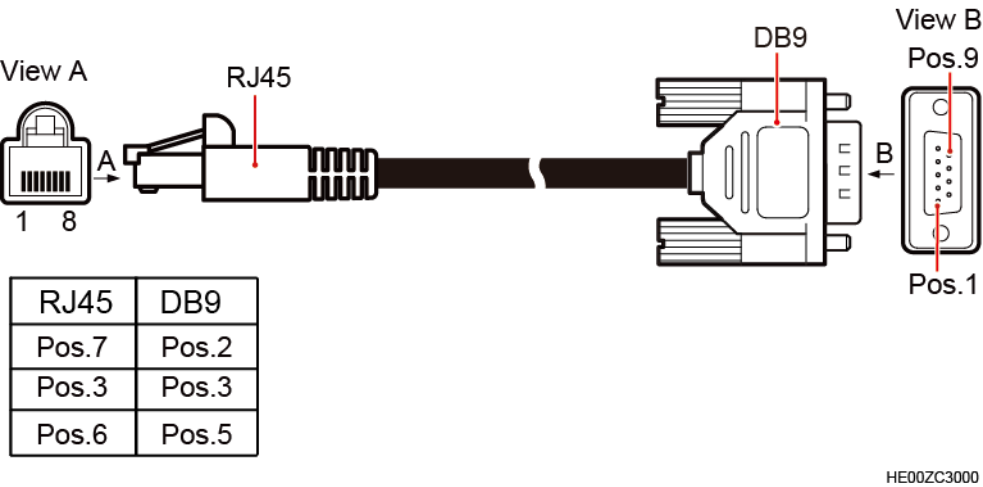


Table 3-27 Pin definition

RJ45 Male Connector Pin	Signal	DB9 Female Connector Pin	Signal
7	TX	2	RX
3	RX	3	TX
6	GND	5	GND

DO1 and DO2 Ports

Table 3-28 DO1 and DO2 port definition

Silk Screen	Definition	Alarm	Valid Status
DO1	Reports faults and major alarms.	Board Hardware Fault, Cell Fault, Overvoltage Protection, Undervoltage Protection, Charge Overcurrent Protection, Discharge Overcurrent Protection, High Temperature Protection, and Low Temperature Protection	Closed: alarm
DO2	Reports the low battery string voltage alarm.	Battery Undervoltage	Closed: alarm

Indicators

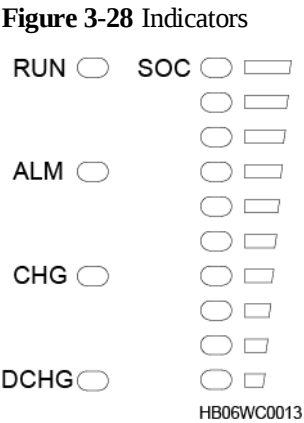


Table 3-29 Indicator definition

Silk Screen	Definition	Color	Description
RUN	Communication indicator	Green	Blinks at long intervals: Communication is normal. Blinks at short intervals: Communication is disconnected. Off: The ESM is shut down or hibernating.
ALM	Fault indicator	Red	Steady on: A major alarm is generated. Off: No major alarm is generated.
CHG	Charge indicator	Green	Off: The ESM is being open-circuited or discharging. Steady on: The ESM is being charged.
DCH	Discharge indicator	Green	Off: The ESM is being open-circuited or charged. Steady on: The ESM is discharging.
SOC	Battery SOC indicator NOTE Each indicator displays 10% SOC.	Green	Charging: The maximum capacity indicator blinks at long intervals, while the indicators that indicate lower capacity are steady on. Discharging: The maximum capacity indicator blinks at short intervals, while the indicators that indicate lower capacity are steady on. Fully charged: All capacity indicators are steady on. Standby: The capacity indicator that reflects the remaining battery capacity is steady on. For example, if the ESM

Silk Screen	Definition	Color	Description
			is fully charged, 10 capacity indicators are steady on. If the ESM capacity is greater than or equal to 90% but less than 100%, nine capacity indicators are steady on. Shutdown: All capacity indicators are off.
Note: - Major alarm: The ESM needs to be maintained immediately. - Minor alarm: The ESM does not require maintenance, but sends a reminder to remote maintenance personnel. - Blinking at long intervals: on for 1s and then off for 1s - Blinking at short intervals: on for 0.125s and then off for 0.125s			

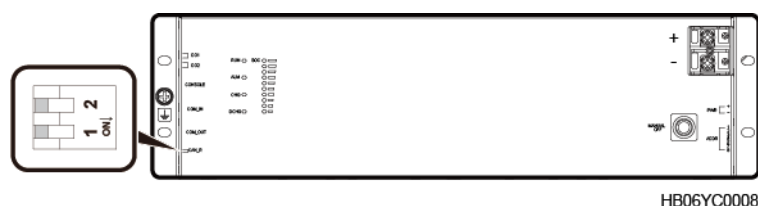
CAN R Communications DIP Switch

NOTICE

When the ESM serves as the start node and end node on the CAN communications circuit, switch toggle switches 1 and 2 of the DIP switch corresponding to the CAN_R port both to ON. Otherwise, signal transmission may be unreliable.

The side panel provides a 2-bit DIP switch to control whether to allow the resistance for the CAN port to be connected. The DIP switch is OFF by default.

Figure 3-29 CAN_R communications DIP switch



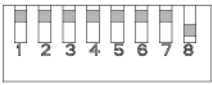
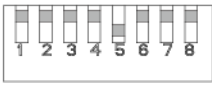
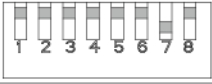
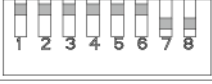
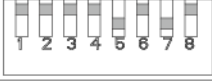
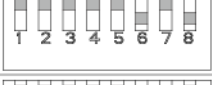
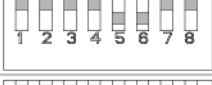
Resistance DIP switch corresponding to the CAN port

- When both toggle switches 1 and 2 are ON, the resistance for the CAN port is connected.
- When both toggle switches 1 and 2 are OFF, the resistance for the CAN port is disconnected.

ADDR Address DIP Switch

Set the six most significant bits of an 8-bit DIP switch on the side panel in binary mode. ON is 1 and OFF is 0. You are advised to use addresses from 1.

Figure 3-30 Mapping between DIP switch settings and ESM addresses

DIP Switch	Value	Address	DIP Switch	Value	Address
 0 1	00000001	1	 0 1	00001000	8
 0 1	00000010	2	 0 1	00001001	9
 0 1	00000011	3	 0 1	00001010	10
 0 1	00000100	4	 0 1	00001011	11
 0 1	00000101	5	 0 1	00001100	12
 0 1	00000110	6	 0 1	00001101	13
 0 1	00000111	7	 0 1	00001110	14

HE00DC0001

Specifications

Table 3-30 ESM specifications

Item	ESM-A02
Dimensions (H x W x D)	130 mm x 442 mm x 390 mm
Weight	About 24 kg
Rated capacity	25 Ah
Nominal voltage	48 V

3.10.2 TCB-C

Exterior



HI27WC0009

Specifications

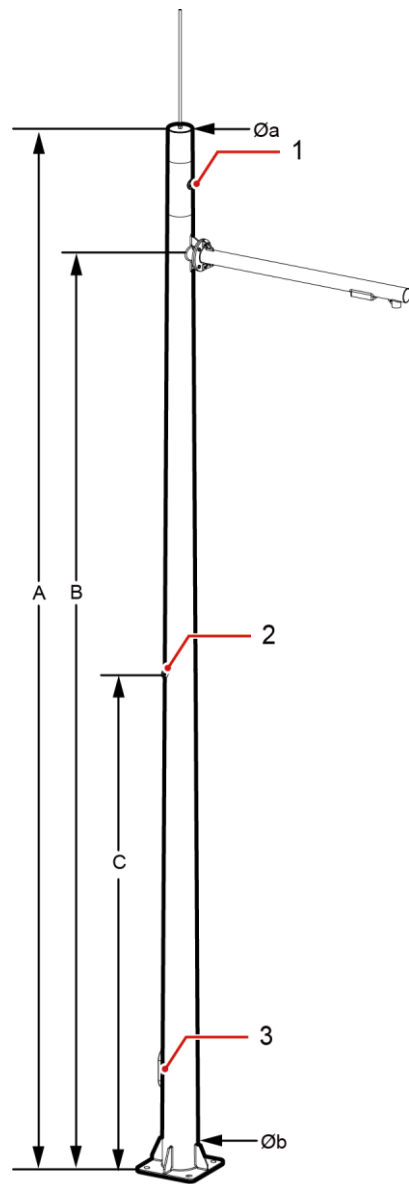
Table 3-31 TCB-C specifications

Item	TCB-30C
Dimensions (H x W x D)	180 mm x 165 mm x 197 mm
Weight	13.2 kg
Rated voltage	12 V
Rated capacity	30 Ah
Maximum charge current	9 A
Operating temperature	−20°C to +50°C
Cycle life	800 cycles at 45°C when the depth of discharge (DOD) is 50%

3.11 Pole

Exterior

Figure 3-31 Mains pole



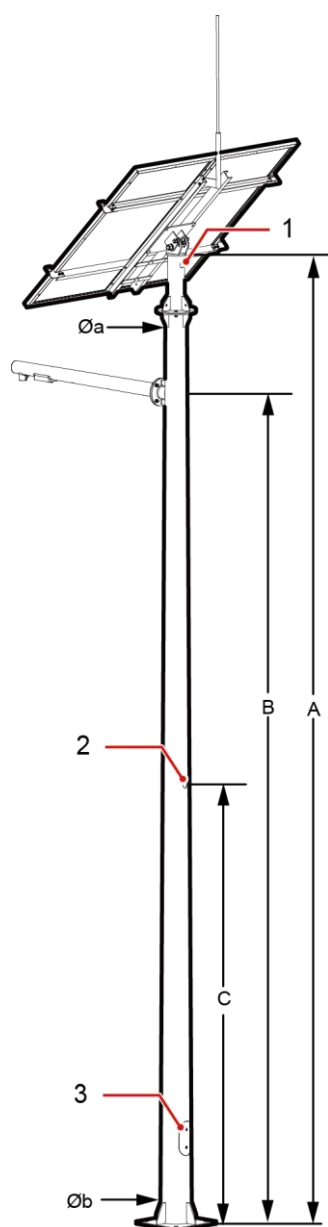
HI27WC0011

(1) Top cable hole

(2) Middle cable hole

(3) Maintenance window

Figure 3-32 Solar pole



(1) Top cable hole

(2) Middle cable hole

(3) Maintenance window

NOTE

The cabinet should be installed above the middle cable hole.

Specifications

Table 3-32 Pole specifications

Item	Mains Pole 1	Mains Pole 2	Solar Pole 1	Solar Pole 2
Code	21540161/21540155	21540285	21540068/21540078	21540069
Dimensions	• Pole length A = 6.8 m • Cantilever height B = 6 m • Middle cable hole height C = 3.2 m • Upper diameter Øa = 90 mm • Lower diameter Øb = 150 mm	• Pole length A = 6.8 m • Cantilever height B = 6 m • Middle cable hole height C = 3.2 m • Upper diameter Øa = 150 mm • Lower diameter Øb = 220 mm	• Pole length A = 7.2 m • Cantilever height B = 6 m • Middle cable hole height C = 3.2 m • Upper diameter Øa = 150 mm • Lower diameter Øb = 220 mm	• Pole length A = 10 m • Cantilever height B = 9.5 m • Middle cable hole height C = 3.2 m • Upper diameter Øa = 120 mm • Lower diameter Øb = 240 mm
Weight	About 115 kg	About 150 kg	About 177 kg	About 245 kg
Middle cable hole diameter	125 mm	186 mm	186 mm	200 mm
Weight of an ICC on a pole	< 100 kg	< 220 kg	< 100 kg	< 100 kg
Installed with loads	• The CPE and antenna can be installed by using a clamp. • Three box cameras and one dome camera can be installed. • The equipment container can be installed by using a clamp.			
Application scenarios	Mains scenario		Mains and solar scenario, solar scenario	
Windbreak capability	Wind speed 40 m/s (U.S.-standard)			
Anticorrosi on property	Class C environment			

3.12 Video Surveillance

A video surveillance system consists of dome cameras, box cameras, transmission devices, and signal processors. For details, see the related documentation that can be downloaded from <http://support.huawei.com/enterprise/>.

4 Routine Maintenance

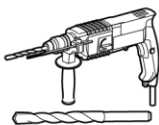
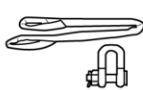
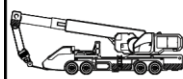
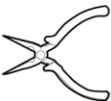
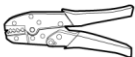
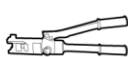
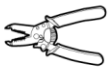
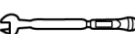
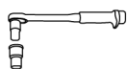
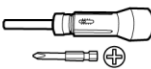
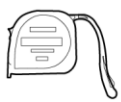
4.1 Maintenance Preparations

Getting Familiar with the Site

Before maintaining the PowerCube 500, maintenance engineers need to get familiar with the site environment, solution composition, component connection modes, drawings, and installation procedure.

Preparing Tools

Figure 4-1 Tools

				
Hammer drill and drillbit (φ16)	Protective gloves	Insulation gloves	Protective shoes	Hoist clamp and lifting rope (7 m)
				
Crane (with a capacity of greater than 2 t)	Ladder (2 m)	Needle-nose pliers	Diagonal pliers	COAX crimping tool
				
Pliers	Hydraulic pliers	Cable cutter	Wire stripper	Adjustable torque wrench
				
Socket wrench (M4~M12)	Torque wrench	Torque screwdriver (M3-M6)	Flathead screwdriver (M3-M6)	Hex key
				
Level	Measuring tape (5 m)	Marker	Heat shrink tubing	Polyvinyl chloride (PVC) insulation tape
				
Brush	Labels	Multimeter	Network cable tester	Compass
				
Rubber hammer	Cable tie	Heat gun		

HTool050

4.2 PV Modules Routine Maintenance

Maintain PV modules periodically based on site requirements. The recommended maintenance period is six months.

 NOTE

- Do not clean a damaged PV module, but replace it immediately.
- Clean PV modules at dawn, at dusk, or on a day without sunshine. Do not use cool water to clean sun-warmed PV modules as it will break the glass cover on the PV modules.

Table 4-1 Routine maintenance checklist for PV modules

Maintenance Item	Check Whether	Check Method	Repair When	Measures
Appearance	PV modules are damaged.	By observing	PV modules are damaged.	Replace damaged PV modules.
	There are oil stains, dust, or snow on the PV module surface.	By observing	There are oil stains, dust, or snow on the PV module surface.	Use a soft cotton cloth to wipe the PV module surface. For the stains hard to remove, use moderate detergent without abrasives to remove them.
	PV module supports corrode or rust.	By observing	PV module supports corrode or rust.	Remove the rust and repaint that part.
	The pole is deformed or tilted.	By observing	The pole is deformed or tilted.	• Replace the deformed pole. • Adjust the base if the pole is tilted.
	PV module supports are stable.	Shaking the support slightly	The bolts are loose and the support is not stable.	Tighten the loose bolts and nuts.
Conducting wire	Conducting wires are damaged or broken.	By observing	Conducting wires are damaged or broken.	Replace broken conducting wires. Wrap damaged parts with PVC insulation tape.
Wiring terminal	Wiring terminals are connected securely.	-	Wiring terminals are loose.	Secure wiring terminals.
Electrical	The	Using a	Under normal	Replace the PV

Maintenance Item	Check Whether	Check Method	Repair When	Measures
properties	open-circuit voltage of a PV module is normal. For a 150 W PV module, the nominal value is 22 V. For a 200 W PV module, the nominal value is 45 V.	multimeter	sun exposure (800 W/M ² illumination intensity recommended), the open-circuit voltage is more than 30% lower than the nominal value.	module.

4.3 Cabinet Routine Maintenance

Maintain the cabinet periodically based on site requirements. The recommended maintenance interval is six months.

Table 4-2 Cabinet routine maintenance list

Maintenance Item	Check Whether	Check Method	Repair When	Measures
Door lock	Check whether the door lock is damaged.	Visual inspection	The door lock is damaged.	Replace the door lock.
Ground cable	Check whether the ground cable is loose.	Observing, shaking the cable, or using a wrench	The ground cable is loose or disconnected.	Tighten the wiring terminals on the ground bar using a wrench to ensure that the ground cable is connected properly.
Exterior	Check whether the electroplated coating flakes off or is scratched.	Visual inspection	The ICC is damaged or distorted.	Repaint and repair the cabinet shell.

4.4 ICC Routine Maintenance

Routine maintenance for the integrated controller and converter (ICC) is required periodically based on site requirements. The recommended maintenance interval is six months. If any faults occur, rectify the faults in time.

Table 4-3 Routine maintenance checklist

Maintenance Item	Check Whether	Check Method	Repair When	Measures
Electricity	The output voltage is normal	Multimeter	The battery or load voltage exceeds the threshold	For details, see the SMU02B User Manual
Preventive maintenance	Indicators are normal	By observing	An alarm is generated	
Power cable	Insulation layers and wiring terminals	By observing	- The insulation layer cracks and deteriorates - The wiring terminal has rust or drops	- Replace power cables - Replace wiring terminals

4.5 Routine Maintenance for Poles

Maintain poles periodically based on site requirements. The recommended maintenance interval is six months.

Table 4-4 Routine maintenance items for poles

Maintenance Item	Check Whether	Check Method	Repair When	Measures
Appearance	The pole is deformed or tilted.	By observing	The pole is deformed or tilted.	- Replace the deformed pole. - Adjust the base if the pole is tilted.
	The pole is corroded or rusty.	By observing	The pole is corroded or rusty.	Remove the rust and paint the pole again.

4.6 PoE Adapter Routine Maintenance

Maintain the PoE adapter periodically based on site requirements. The recommended maintenance interval is six months.

Table 4-5 PoE adapter routine maintenance items

Maintenance Item	Check Whether	Check Method	Repair When	Measures
Presence	The PoE adapter is detected.	By observing	The PoE adapter is stolen.	Install a new PoE adapter.
Cable connections	The input and output cables securely connect to the PoE adapter.	By observing or manual checking	The cables are loose.	Reconnect cables.

4.7 TCB-C Routine Maintenance

To maximize the battery lifespan, maintain batteries periodically based on site requirements.

Table 4-6 TCB-C routine maintenance checklist

Check Frequency	Check Whether	Expected Result	Measures
Monthly	Charge current	The charge current is lower than or equal to the preset charge current limit.	Find the cause of an alarm based on the alarm information.
	Battery string charge voltage	After being charged in float mode for 12 hours, the battery charge voltage should be higher than or equal to 13.00 V. At the end of equalized charging, the battery charge voltage should be higher than or equal to 13.50 V.	• Check whether the voltage setting on the power system is within the specified range. If it is not, rectify the fault immediately. • Mark and record the batteries whose voltages are beyond the specified range. • Forcibly charge the battery string in equalized mode. • Replace the batteries with very low voltages.
	Battery	The battery open-circuit	Replace abnormal

Check Frequency	Check Whether	Expected Result	Measures
	voltage	voltage should be higher than or equal to 12.60 V.	batteries.
	Battery appearance	The battery shell is intact, without acid leaks, deformation, or bulges.	Replace abnormal batteries.
	Battery management alarm	No battery management alarm is generated.	Find the cause of an alarm based on the alarm information.
	Battery ambient temperature	The battery ambient temperature is below 50°C.	Find the cause of an abnormal temperature.
	Battery surface temperature	The battery surface temperature is below 50°C.	Replace the battery.
	Environment around batteries and the battery cabinet	Environment around batteries and the battery cabinet is clean, free from surplus tools and cables.	Clean up foreign objects.
Quarterly	Repeat all monthly check items.	The criteria are the same as those for monthly check items.	The criteria are the same as those for monthly check items.
	Battery management parameter setting	Set battery management parameters by referring to the SMU02B User Manual.	Modify battery management parameters.
	Temperature sensor	Use an infrared thermodetector to measure the temperature at the probe of the temperature sensor, and compare the reading with the displayed temperature. The deviation should be less than or equal to 3°C. Hang the battery temperature sensor between any two batteries at the topmost layer.	Replace the temperature sensor if it is faulty. Install the temperature sensor in the correct position.
	Battery screws are tightened.	The torque should meet manufacturer's requirements.	Tighten screws to the torque specified by the manufacturer.
	Cables between batteries	The cables are deteriorating, the insulation layer cracks, or the cable surface feels hot.	Replace the cables.
	PVC air	There are foreign objects in the	Clear blockages.

Check Frequency	Check Whether	Expected Result	Measures
	conduit	PVC air conduit.	
Yearly	Repeat all quarterly check items.	The criteria are the same as those for quarterly check items.	The criteria are the same as those for quarterly check items.
	Tighten all the screws for connecting batteries to the torque specified by the manufacturer to prevent fire disasters.	N/A	N/A

4.8 Battery Routine Maintenance

To ensure the optimal operating status of ESMs, check and maintain ESMs regularly. When maintaining ESMs, record related information for checking ESM management parameters in the future.

Table 4-7 Routine maintenance checklist

Maintenance Interval	Maintenance Item	Measure
Monthly	Operating environment	Keep the ESMs far away from heat sources and direct exposure to sunlight.
	Appearance	If an ESM experiences damage, leakage, or deformity, disconnect the faulty ESM, take pictures, and then replace it.
Quarterly	Cleanliness	Clean the ESM exterior using dry cotton cloth. Exercise caution when cleaning ESMs because the ESM voltage is high.
	Connection	Check and tighten every screw. If a cable temperature exceeds 40°C (feels hot), rectify the fault.
Semi-annually	Voltage	Measure and record the busbar voltage and the positive and negative voltages of ESMs when charging is about to complete. Ensure that the voltages are the same. If the voltages are different, check for cable faults.

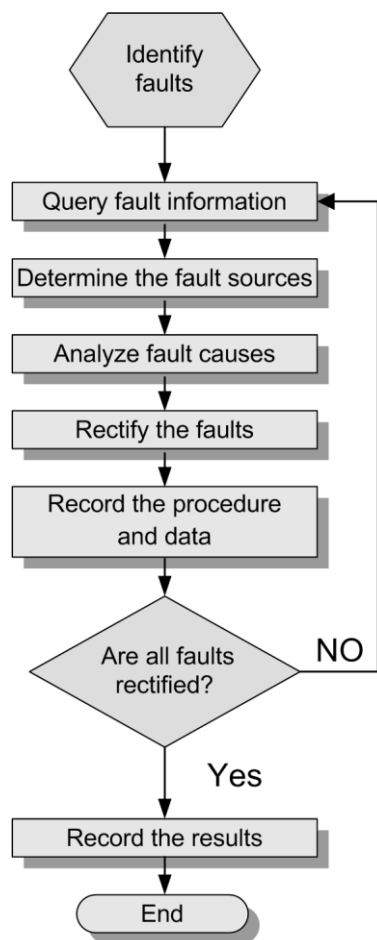
Maintenance Interval	Maintenance Item	Measure
		• In the first year, collect real-time data when discharging is about to complete at least once every six months. • From the second year, check the battery capacity every three months. If a historical alarm indicates that an electrochemical cell is frequently overcharged or overdischarged, the voltage of the electrochemical cell is always near the charge or discharge protection threshold. This causes insufficient backup time. Therefore you need to replace the ESM as soon as possible.
Note: The SOC indicator indicates that charging or discharging is about to complete. For details, see the SOC indicator description.		

5 Troubleshooting

5.1 General Troubleshooting Procedure

The following figure shows the general troubleshooting procedure.

Figure 5-1 General troubleshooting procedure



Step 1 Observe the indicator of each module to identify faults.

- Step 2** Query fault information by accessing each monitoring module.
- Step 3** Determine the fault sources: DC, AC, component, battery, or controller.
- Step 4** Analyze fault causes based on fault sources by referring to maintenance cases or checklists.
- Step 5** Rectify the faults.
- Step 6** Record the troubleshooting procedure and obtained data.
- Step 7** Query the information again to ensure that all faults are rectified.
- Step 8** Record the troubleshooting results.
- Step 9** If the troubleshooting exists, repeat the steps.

----End

5.2 Troubleshooting Component

5.2.1 Troubleshooting PV modules

Table 5-1 Troubleshooting PV modules

Symptom	Possible Cause	Solution
No output	- The cables to PV modules are not connected properly. - PV modules are faulty.	- Check whether the cables are loose, disconnected, or broken. If yes, reconnect the cables properly or replace them. - Use a multimeter to check whether each PV input has an output voltage, and use a clamp meter to check whether each PV input has a current. If no voltage or current is detected, check the PV modules. - Use a multimeter to check whether each PV module has an output voltage. If a PV module has no output voltage, replace it. - On a sunny day, check the output voltage of each PV module. The voltage of 150 W PV modules should range from 20 V DC to 25 V DC, while that of 200 W PV modules should range from 40 V DC to 45 V DC. If the output voltage of a PV module is not within the range, replace it.

5.2.2 Troubleshooting Batteries

Table 5-2 Batteries faults and troubleshooting measures

Symptom	Possible Causes	Measures
In the initial operation period of a battery	The bolts for connecting battery	Tighten the bolts.

Symptom	Possible Causes	Measures
string, the voltage of a single battery or the total voltage of the battery string drops quickly when the battery string is discharging.	- terminals are loose. - The battery terminal or cable is dirty, which increases the connection voltage drop.	Clear the dirt and reinstall the bolts.
In the initial operation period of a battery string, the battery string can discharge properly but the power supply to the load is disconnected quickly.	The BLVD voltage is greater than the maximum value in the power system.	Adjust the BLVD voltage to a normal range based on site requirements.
- For a 2 V battery, the measured battery string voltage is about 4 V lower than the rated value. - For a 12 V battery, the measured battery string voltage is about 24 V lower than the rated value.	One battery is connected reversely.	Connect the battery correctly based on the polarity marks of battery terminals or the plus and minus signs on the battery cover.
In the initial operation period of a battery string, batteries have different voltages.	Batteries have a slight difference in the internal structure or in the storage and transportation conditions from each other.	After batteries are charged in float mode for three months, the voltages of all batteries become the same.

5.2.3 Troubleshooting a PSU

Table 5-3 PSU faults and troubleshooting measures

Symptom	Possible Causes	Measures
The green indicator is off.	No AC input exists.	Check that the AC input voltage is normal.
	The input fuse is damaged.	Replace the PSU.
The yellow indicator is steady on.	Overtemperature pre-alarm.	Ensure that the vent of the PSU is unblocked.
	AC input undervoltage or	Check that the AC input voltage is

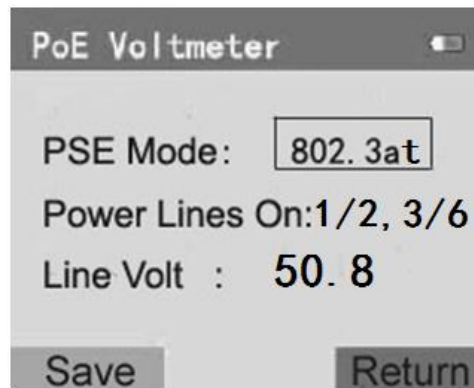
Symptom	Possible Causes	Measures
	overvoltage occurs.	normal.
	The PSU is hibernated. (only the yellow indicator is lit, and no alarm is generated)	In PowerCube, the PSU in hibernating is normal.
The red indicator is steady on.	Output overvoltage occurs.	Remove the PSU and then install it again. If there is still no output, replace the PSU.
	The fan is faulty.	Replace the PSU.
	Overtemperature occurs.	Ensure that the vent of the PSU is unblocked.
	No output exists because of a fault inside the PSU.	Replace the PSU.

5.2.4 Troubleshooting a PoE Adapter

Table 5-4 PoE adapter faults and troubleshooting measures

Symptom	Possible Cause	Measures
There is no output.	There is no input.	If the input power cable is loose, reconnect the cable.
	Input power cables are reversely connected.	Connect input power cables correctly.
The input is normal but the output is abnormal.	There is no output.	Connect the RJ45 port of the NL-820 network tester to the PoE output port on the PoE adapter. Enter the POE Voltmeter screen on the NL-820 network tester, as shown in Figure 5-2. Supply a 12/24 V DC voltage to the PoE adapter. Then use the NL-820 network tester to check whether the output voltage at the PoE port is between 47 V DC and 52 V DC. If the output voltage is beyond the range, replace the PoE adapter because it is damaged.

Figure 5-2 PoE Voltmeter



5.2.5 Inverter Troubleshooting

Table 5-5 Inverter faults and troubleshooting measures

Symptom	Possible Causes	Measures
No information is displayed after the inverter is powered on.	- The DC loop is not connected. - The DC input voltage is abnormal. - The DC input power cable is connected reversely.	- Connect the DC loop. - Adjust the DC voltage to the normal range of 46 V DC to 56 V DC with a tolerance of ± 1 V DC. - Connect the DC input power cable correctly.
Undervoltage protection is performed immediately after the inverter is powered on and loads are added.	- The DC input voltage is less than the minimum value. - The busbar impedance is greater than the maximum value. - The DC loop cable is loose.	- Adjust the DC voltage to the normal range of 47 V DC to 54 V DC with a tolerance of ± 1 V DC. - Increase the cable diameter or decrease the cable length to reduce the busbar impedance. - Check that the cable connections are secure.
Overload protection is performed immediately after the inverter is powered on.	- The load power is greater than the maximum value. - The load or output socket is short circuited.	- Decrease the load power to a proper range. - Rectify faults on the user side.
Adjacent equipment makes noises after the inverter is powered on.	The DC busbar impedance is greater than the maximum value.	Decrease the impedance.

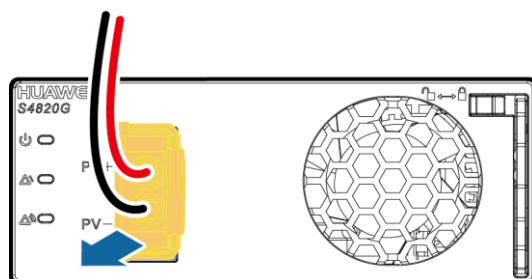
6 Parts Replacement

6.1 Replacing a PV Module

Procedure

Step 1 Remove the solar input cable from the SSU inside the cabinet.

Figure 6-1 Removing the solar input cable from the SSU inside the cabinet



Step 2 Transport maintenance personnel to the PV module installation position by using a crane.

Step 3 Disconnect the cable delivered with the damaged PV module from the extension cable.

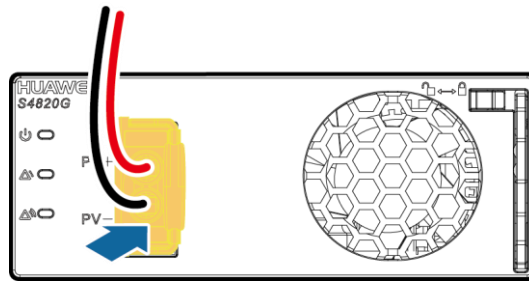
Step 4 Unscrew the PV module using a wrench and remove the PV module from the support.

Step 5 Install a new PV module and secure it to the support by tightening the screws using a wrench.

Step 6 Reconnect the cable delivered with the PV module and the extension cable.

Step 7 Reconnect the solar input cable to the SSU.

Figure 6-2 Reconnecting the solar input cable to the SSU



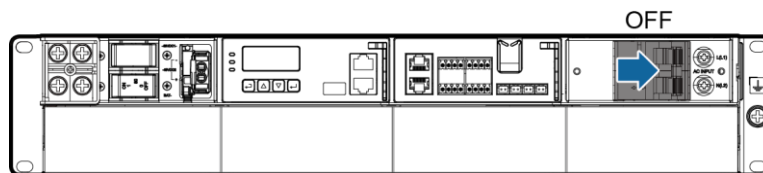
----End

6.2 Replacing a DCDU-80A1

Procedure

Step 1 Switch the AC input circuit breaker on the DCDU to OFF.

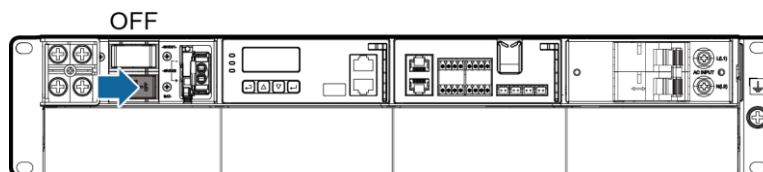
Figure 6-3 Switching the AC input circuit breaker on the DCDU to OFF



Step 2 Switch off the upstream AC input circuit breaker for the DCDU, and attach labels such as "No operations allowed."

Step 3 Switch the battery circuit breaker on the DCDU to OFF.

Figure 6-4 Switching the battery circuit breaker on the DCDU to OFF



NOTE

If the battery is ESM-A02, press and hold down the switch on the battery for 5 seconds to disconnect the battery.

Step 4 Record the cables connected to the DCDU and label the cables.

NOTICE

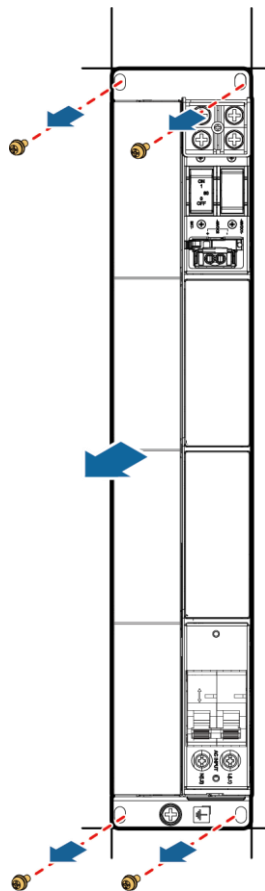
- When disconnecting the battery cables, disconnect the positive battery cable first, then disconnect the negative cable, and insulate the cables.
- Insulate all the removed power cables.

Step 5 Remove all the cables from the DCDU.

Step 6 Remove all the modules from the DCDU.

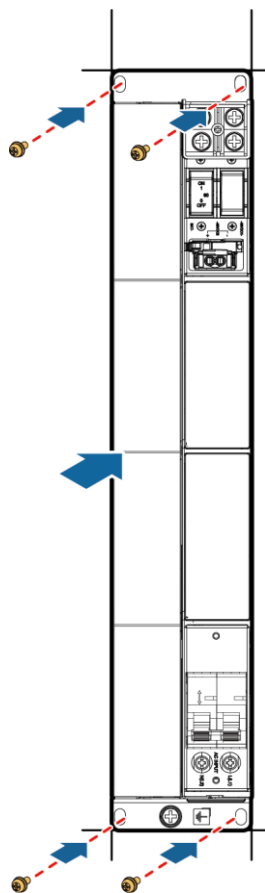
Step 7 Remove the DCDU.

Figure 6-5 Removing the DCDU



Step 8 Install the new DCDU.

Figure 6-6 Installing the new DCDU



Step 9 Install the modules in the new DCDU.

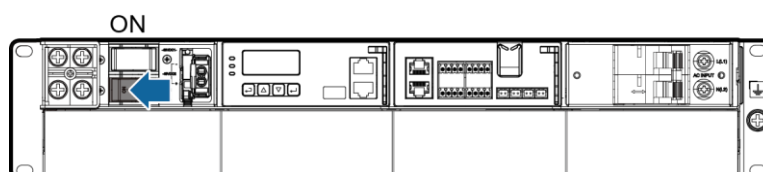
NOTICE

Before connecting the input power cable to the SSU, ensure that the battery cables have been connected and the positive and negative battery terminals are properly connected.

Step 10 Connect the cables to the DCDU based on the cable labels.

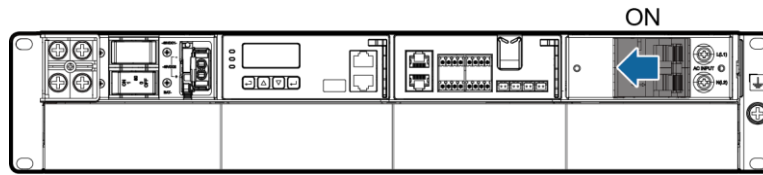
Step 11 Switch the battery circuit breaker on the DCDU to ON.

Figure 6-7 Switching the battery circuit breaker on the DCDU to ON



Step 12 Switch the AC input circuit breaker on the DCDU to ON.

Figure 6-8 Switching the AC input circuit breaker on the DCDU to ON



Step 13 Switch on the upstream AC input circuit breaker for the DCDU.

----End

6.2.1 Replacing an SMU02B

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new SMU02B is intact.

Procedure

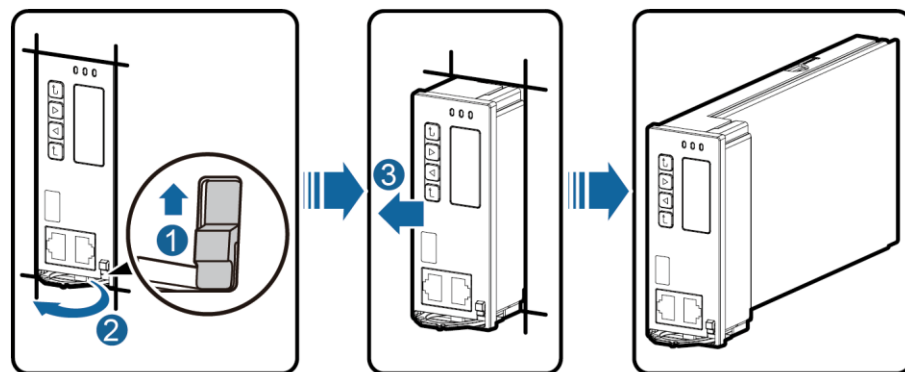
Step 1 Record the cable connection positions on the SMU02B and label the cables.

Step 2 Remove cables from the SMU02B.

Step 3 Push the locking latch upwards.

Step 4 Pull out the handle of the SMU02B to remove it from the subrack.

Figure 6-9 Removing the old SMU02B

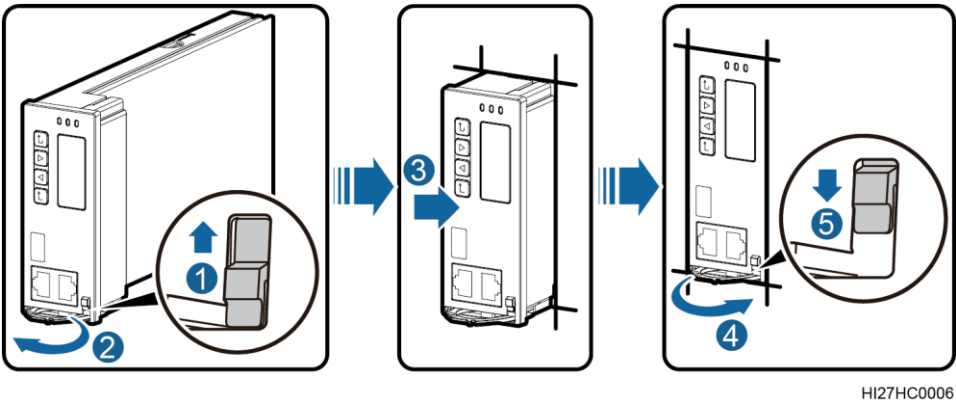


HI27HC0012

Step 5 Insert a new SMU02B into the slot, push the locking latch upwards, and pull out the handle.

Step 6 Gently push the SMU02B along the guide rails into the subrack. Close the handle, and push the locking latch downwards.

Figure 6-10 Installing a new SMU02B



Step 7 Connect the cables to the new SMU02B based on the cable labels.

Step 8 Set the cabinet model.

Table 6-1 Setting the cabinet model

Main Menu	Second-Level Menu	Third-Level Menu	Setting
Parameters Settings	Local Parameters	System Type	Corresponding cabinet model

Step 9 Set sensor parameters.

Table 6-2 Setting sensor parameters

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Setting
Parameters Settings	Power System	Sensor Config. Para.	Smoke Sensor	• Yes (configured with smoke sensors) • None (no smoke sensors)
			Ambient Temp. Sensor	• Yes (configured with temperature and humidity sensors) • None (no temperature and humidity sensors)
			Ambient Humi. Sensor	

Step 10 Set other SMU parameters based on the installation guide.

----End

Follow-up Procedure

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

6.2.2 Replacing a UIM05D

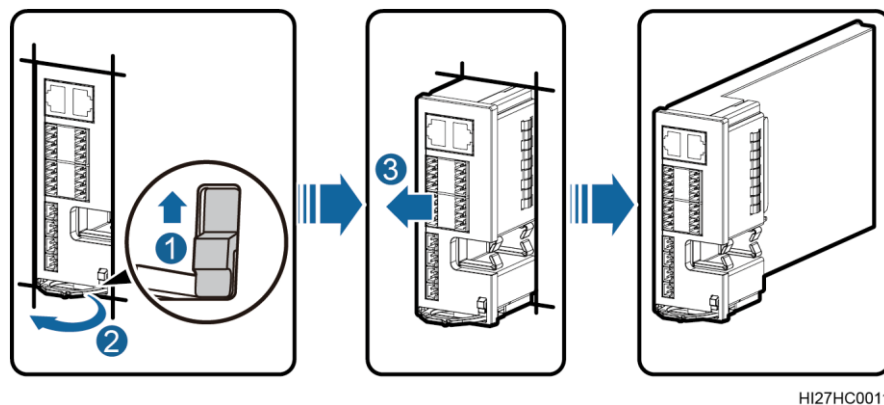
Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new UIM05D is intact.

Procedure

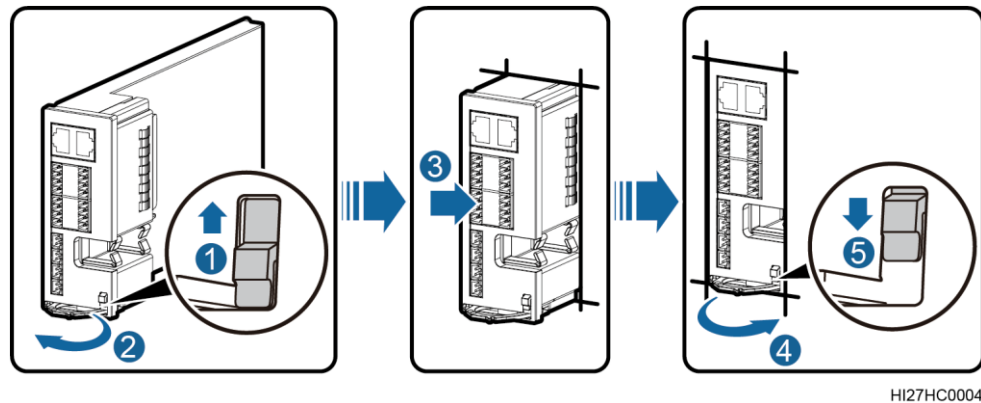
- Step 1** Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.
- Step 2** Record all the cable connection positions on the UIM05D, and remove the cables.
- Step 3** Push the locking latch upwards. Pull out the handle of the UIM05D to remove it from the subrack.

Figure 6-11 Removing the old UIM05D



- Step 4** Insert the new UIM05D into the slot, push the locking latch upwards, and pull out the handle. Gently push the UIM05D along the guide rails into the subrack. Close the handle, and push the locking latch downwards.

Figure 6-12 Installing a new UIM05D



Step 5 Connect the cables to the new UIM05D panel based on the recorded information.

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

----End

Follow-up Procedure

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

6.2.3 Replacing an AC SPD

The AC SPD is integrated in the UIM. For details about how to replace it, refer to the section about replacing an UIM.

6.2.4 Replacing an M48300N1

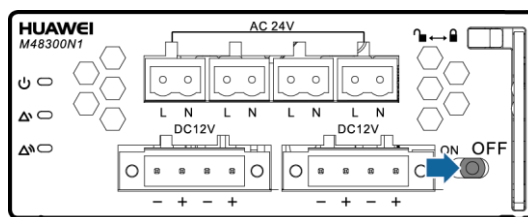
Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new M48300N1 module is intact.

Procedure

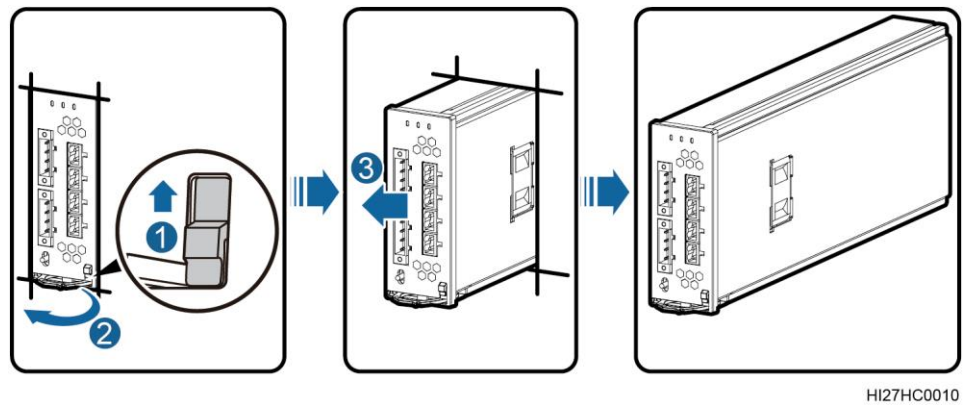
Step 1 Turn the switch on the M48300N1 module panel to OFF.

Figure 6-13 Turning the switch on the M48300N1 module panel to OFF



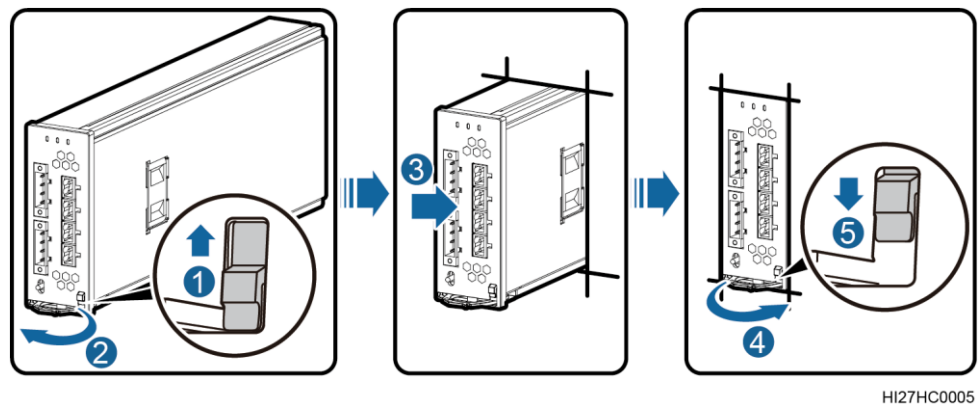
- Step 2** Record the cable connection positions on the M48300N1 module and label the cables.
- Step 3** Remove the cables from the M48300N1 module.
- Step 4** Push the locking latch upwards.
- Step 5** Pull out the handle of the M48300N1 module to remove it from the subrack.

Figure 6-14 Removing the old M48300N1



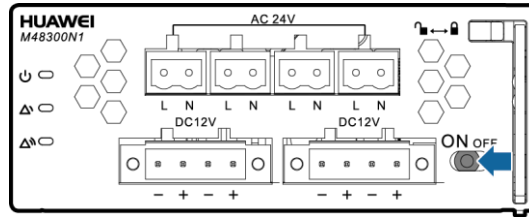
- Step 6** Insert the new M48300N1 module into the slot, push the locking latch upwards, and pull out the handle.
- Step 7** Gently push the M48300N1 module along the guide rails into the subrack. Close the handle, and push the locking latch downwards.

Figure 6-15 Installing a new M48300N1



- Step 8** Connect the cables to the new M48300N1 module based on the recorded information.
- Step 9** Turn the switch on the new M48300N1 module to ON.

Figure 6-16 Turning the switch on the new M48300N1 module to ON.



----End

Follow-up Procedure

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

6.2.5 Replacing a Rectifier

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new PSU is intact.

CAUTION

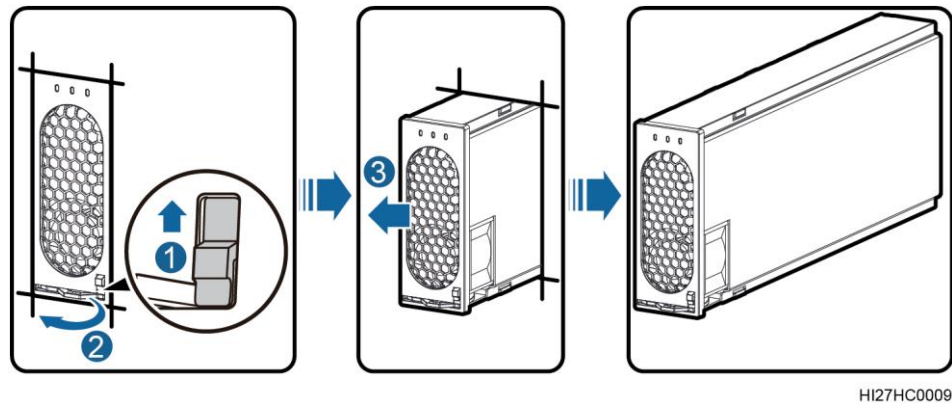
- To prevent burns, exercise caution when removing a PSU because the PSU may be hot as a result of continuous operation.
- In the scenario where the system is configured with ESU-As and is operating, replace or remove the PSU only when the system is powered by the mains. Otherwise, the stable power supply to the system will be affected.

Procedure

Step 1 Push the locking latch at the right side of the PSU panel upwards.

Step 2 Gently pull out the handle to separate the handle from the subrack, and remove the PSU from the subrack.

Figure 6-17 Removing the old PSU

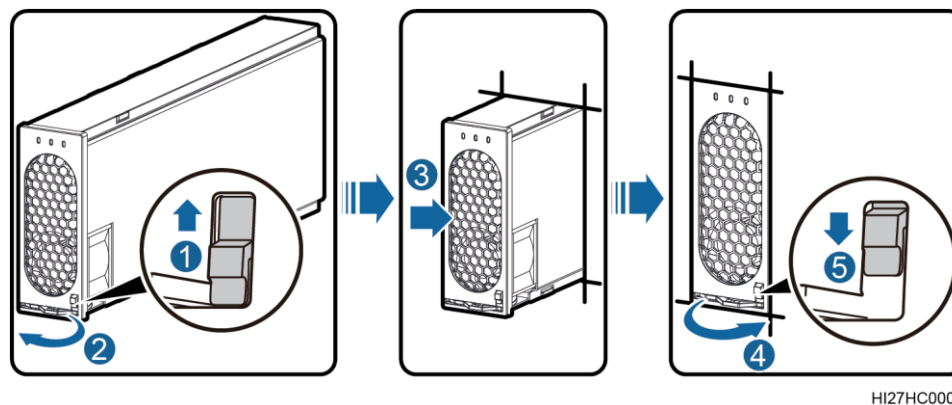


Step 3 Push the locking latch on the new PSU upwards, and pull out the handle.

Step 4 Place the new PSU in the correct slot.

Step 5 Gently slide the PSU along the guide rails, close the handle, and push the locking latch downwards to lock the handle.

Figure 6-18 Installing a new PSU



----End

Follow-up Procedure

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

6.2.6 Replacing an S4820G1

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new SSU is intact.

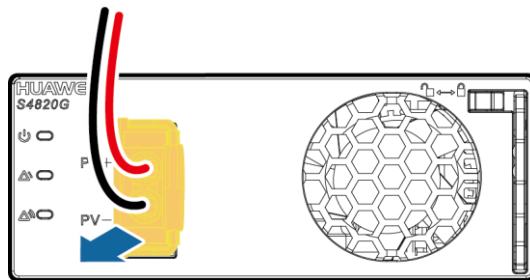
CAUTION

To prevent burns, exercise caution when removing an SSU because the SSU may be hot as a result of continuous operation.

Procedure

Step 1 Remove cables from the SSU panel and label the cables.

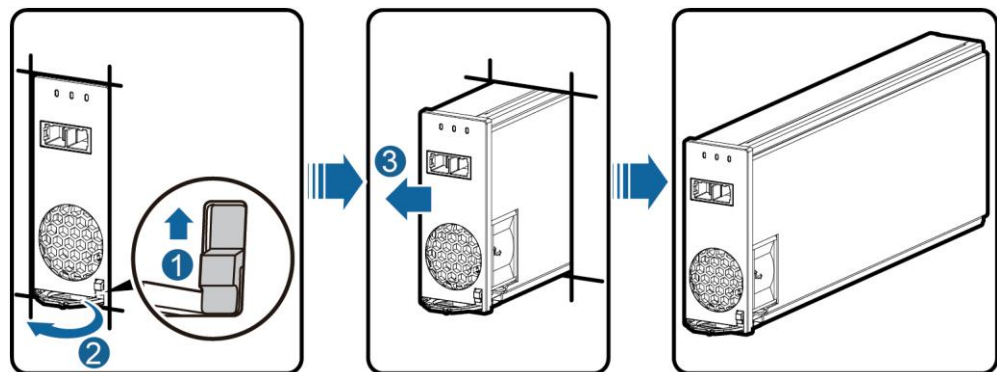
Figure 6-19 Removing cables from the SSU panel and label the cables



Step 2 Push the locking latch at the right side of the SSU panel upwards.

Step 3 Gently pull out the handle to separate the handle from the subrack, and remove the SSU from the subrack.

Figure 6-20 Removing the old S4820G1



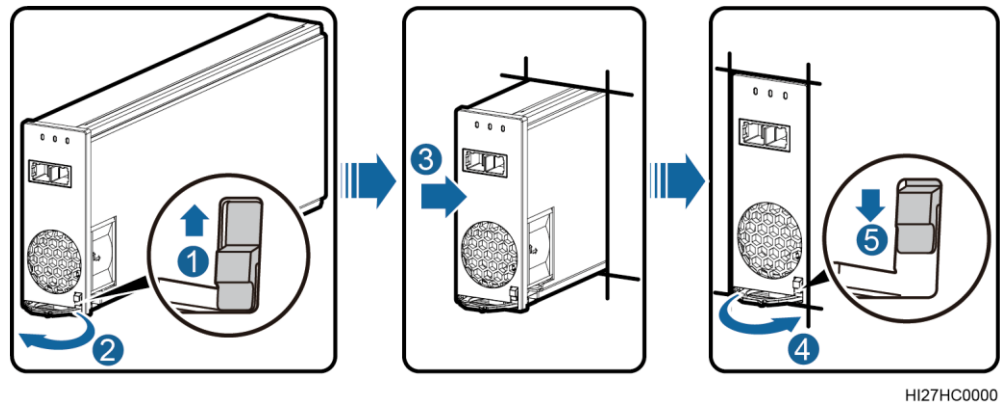
HI27HC0008

Step 4 Push the locking latch on the new SSU upwards, and pull out the handle.

Step 5 Place the new SSU in the correct slot.

Step 6 Gently slide the SSU along the guide rails, close the handle, and push the locking latch downwards to lock the handle.

Figure 6-21 Installing a new S4820G1



Step 7 Reconnect the solar input cable to the new SSU based on the recorded information.

Figure 6-22 Reconnecting the solar input cable to the new SSU



----End

Follow-up Procedure

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

6.3 Replacing a Temperature and Humidity Sensor

Prerequisites

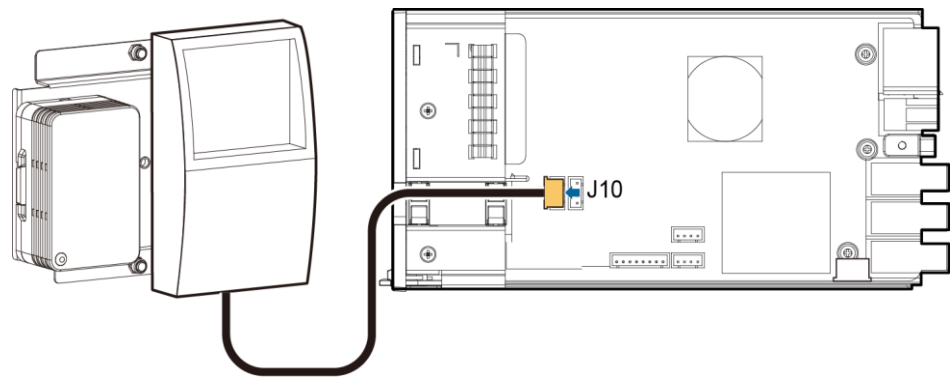
- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, flat-head screwdriver, and Phillips screwdriver are available.
- The new temperature and humidity sensor is intact.

Procedure

Step 1 Record and remove the cables on the UIM05D.

Step 2 Pull out the UIM05D and remove the temperature and humidity sensor cable.

Figure 6-23 Removing the temperature and humidity sensor cable from the UIM05D

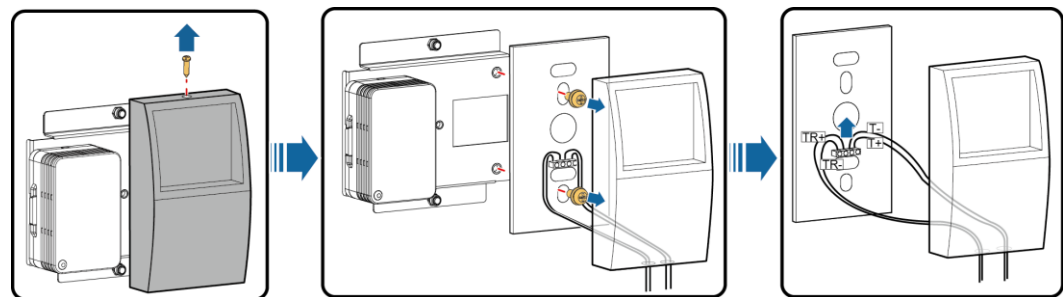


HT02H00010

Step 3 Remove the temperature and humidity sensor.

1. Remove the sensor enclosure.
2. Remove the sensor base.
3. Remove the sensor cable.

Figure 6-24 Removing a temperature and humidity sensor

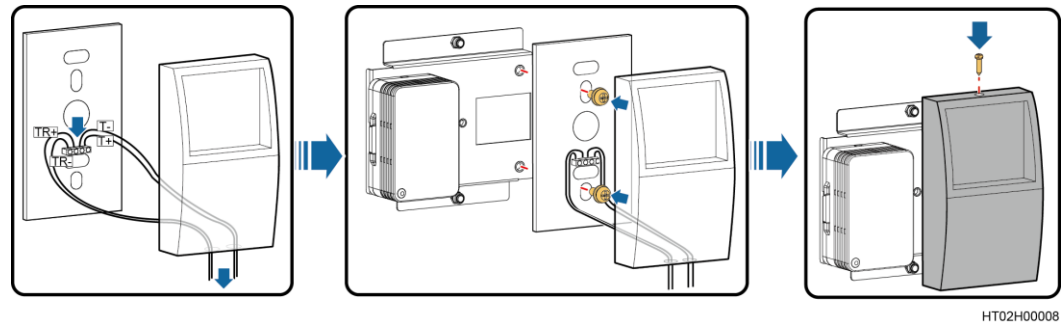


HT02H00009

Step 4 Install the new temperature and humidity sensor.

1. Install the sensor cable.
2. Install the sensor base in the cabinet.
3. Close the sensor cover.

Figure 6-25 Installing a new temperature and humidity sensor



Step 5 Connect the temperature and humidity sensor cable to the J10 terminal on the UIM05D.

Step 6 Reinstall the UIM05D and reconnect the cables to the UIM05D panel based on the recorded information.

----End

Follow-up Procedure

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

6.4 Replacing a Smoke Sensor

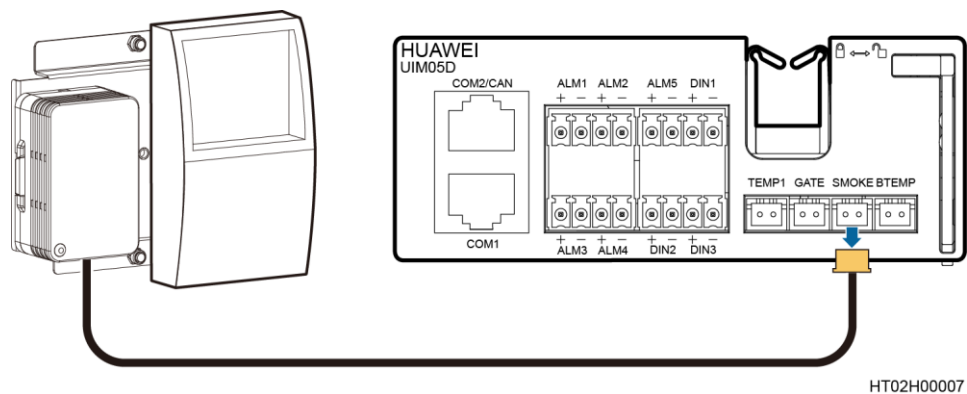
Context

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and Phillips screwdriver are available.
- The new smoke sensor is intact.

Procedure

Step 1 Remove the smoke sensor cable from the UIM05D panel.

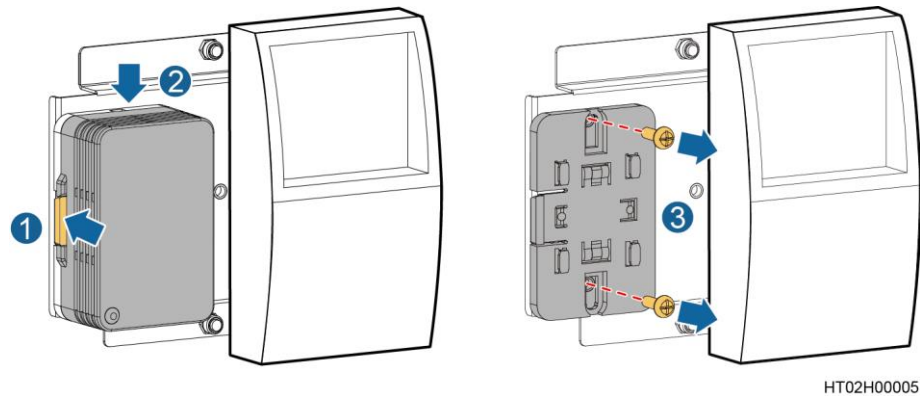
Figure 6-26 Removing the smoke sensor cable



Step 2 Remove the smoke sensor.

1. Hold down the buckle on the smoke sensor and push the smoke sensor in the OPEN direction.
2. Unscrew and remove the smoke sensor base.

Figure 6-27 Removing a smoke sensor



Step 3 Install the new smoke sensor.

1. Install the base of the new smoke sensor and tighten the screws.
2. Properly place the new smoke sensor and press and push it in the CLOSE direction.

Step 4 Connect one end of the smoke sensor cable to the smoke sensor and the other end to the SMOKE terminal on the UIM05D.

----End

Follow-up Procedure

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

6.5 Replacing a Cabinet Interior Fan

Context

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and Phillips screwdriver are available.
- The new fan is intact.

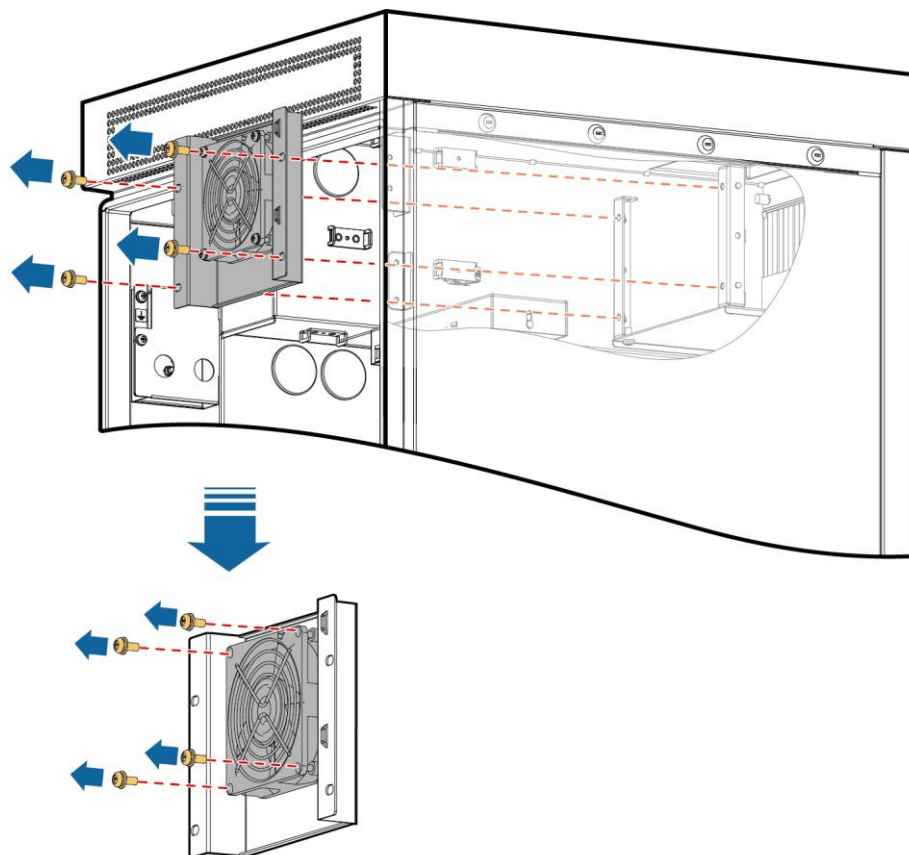
Procedure

Step 1 Record and disconnect the fan cable transfer terminal.

Step 2 Remove the fan.

1. Remove the fan fastener.
2. Separate the fan from the fastener.

Figure 6-28 Removing a fan



HI27H00021

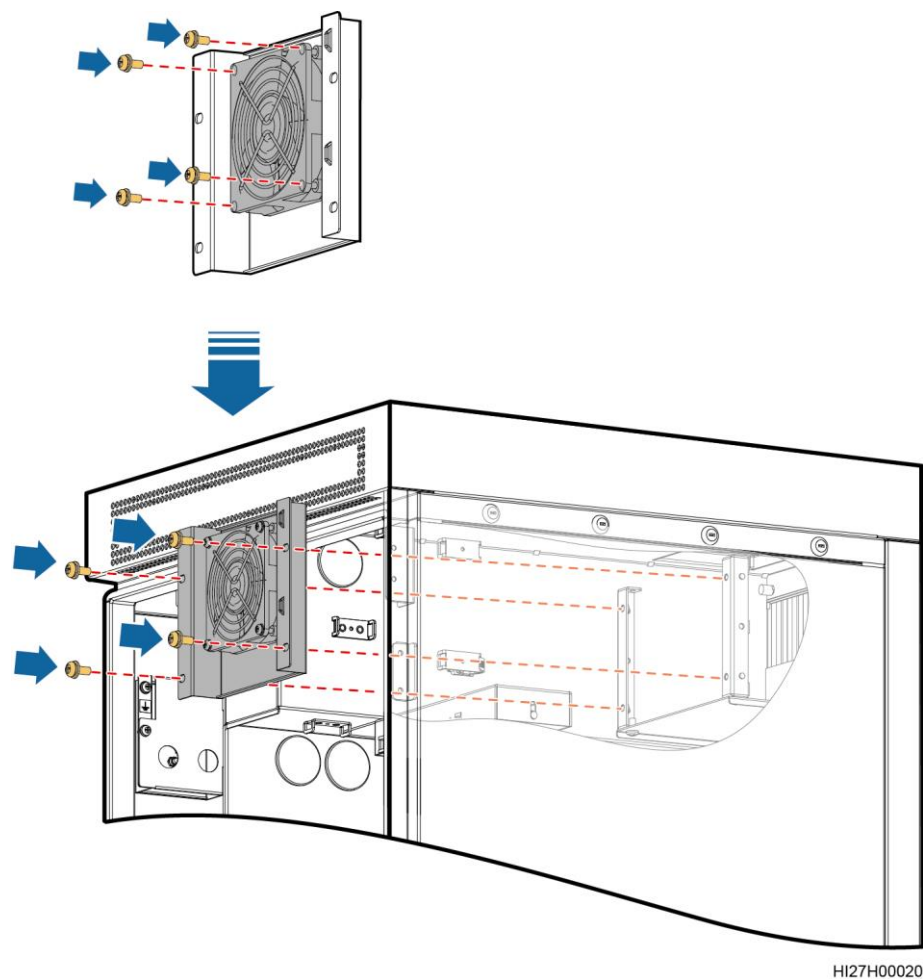
Step 3 Install the new fan.

1. Install the fan on the fastener.
2. Install the fastener with the fan in the cabinet.

NOTICE

Ensure that the airflow direction arrow on the new fan points inwards.

Figure 6-29 Installing a new fan



Step 4 Connect the new fan cable to the transfer terminal.

----End

Follow-up Procedure

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

6.6 Replacing a Cabinet Top Fan

Context

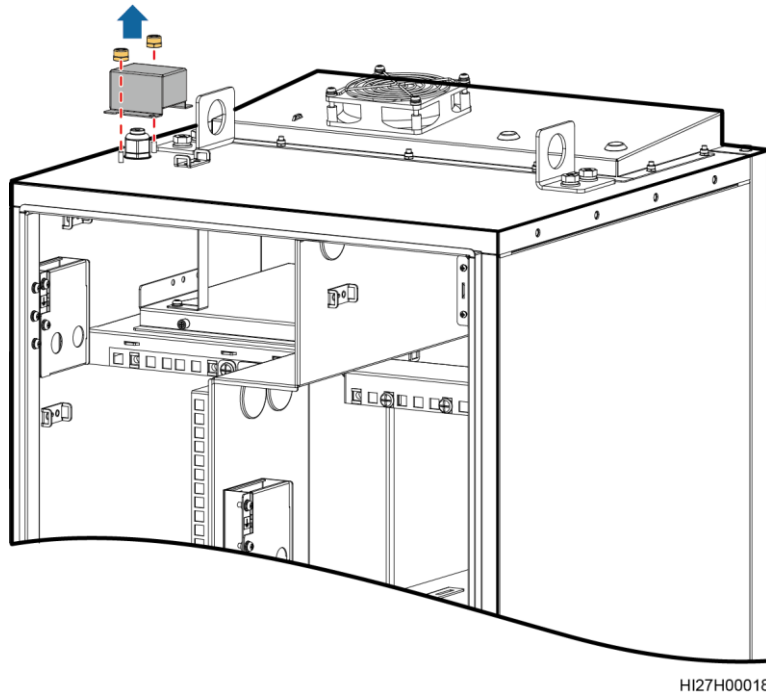
- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and Phillips screwdriver are available.
- The new fan is intact.

Procedure

Step 1 Remove the top cover from the cabinet.

Step 2 Remove the cable hole cover on the top of the cabinet.

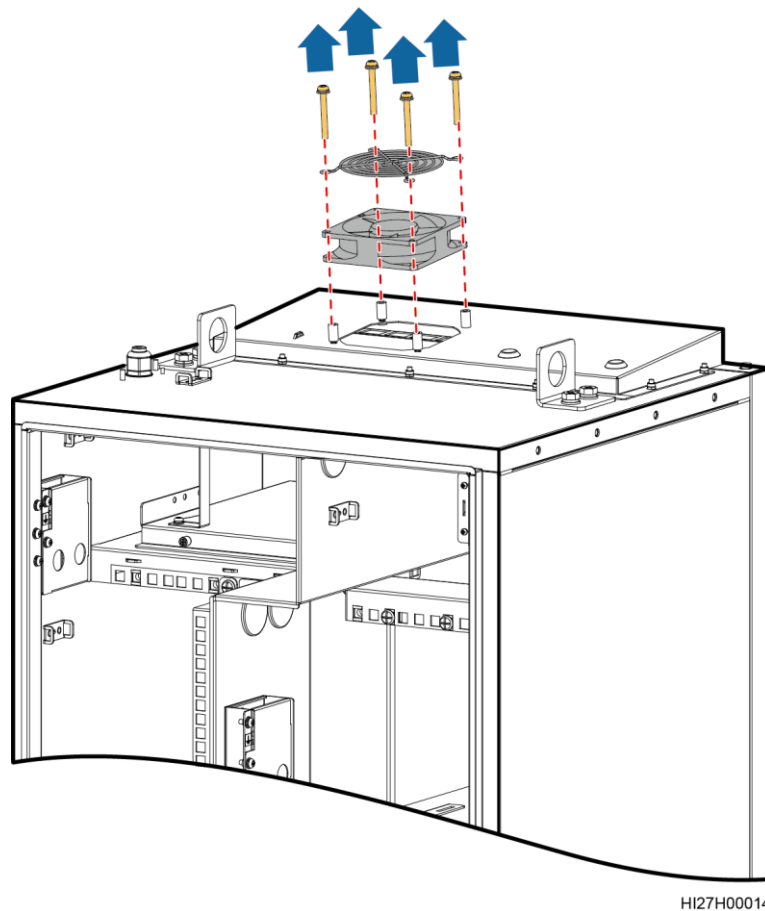
Figure 6-30 Removing the cable hole cover



Step 3 Disconnect the fan cable transfer terminal.

Step 4 Remove the fan.

Figure 6-31 Removing the fan



Step 5 Install the new fan.

NOTE

Ensure that the airflow direction arrow on the new fan points up.

Step 6 Connect the new fan cable to the transfer terminal.

Step 7 Reinstall the cable hole cover on the top of the cabinet.

Step 8 Reinstall the top cover on the cabinet.

----End

Follow-up Procedure

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

6.7 Replacing a Heater

Context

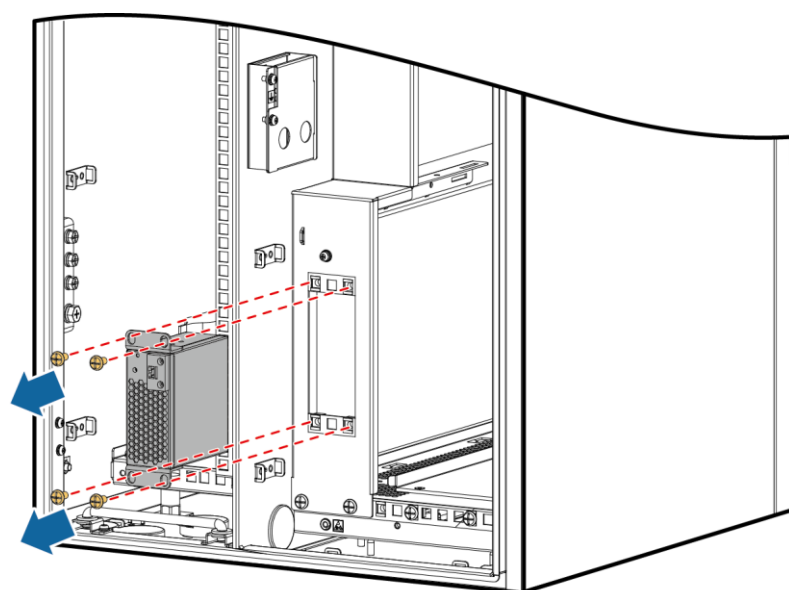
- A cabinet door key and Phillips screwdriver are available.
- The new heater is intact.

Procedure

Step 1 Remove the DC power cable from the heater.

Step 2 Remove the heater.

Figure 6-32 Removing the heater



HI27H00017

Step 3 Install the new heater.

Step 4 Install the DC power cable for the heater.

----End

Follow-up Procedure

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

6.8 Replacing an Inverter

Prerequisites

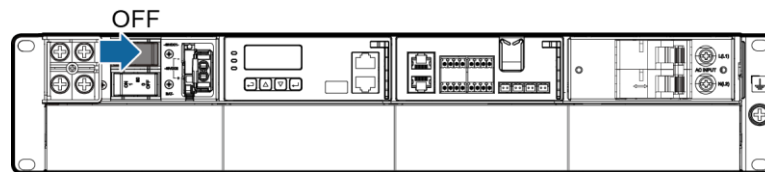
- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.

- The new inverter is intact.

Procedure

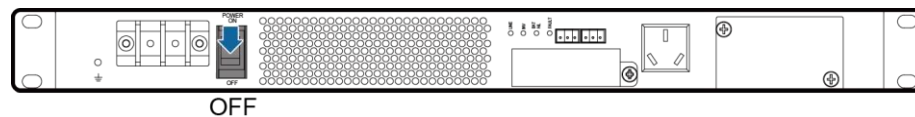
Step 1 Switch the circuit breaker connected to the inverter on the DCDU to OFF.

Figure 6-33 Switching the -48V DC output 1 circuit breaker on the DCDU to OFF



Step 2 Turn the switch on the inverter to OFF.

Figure 6-34 Turning the switch on the inverter to OFF



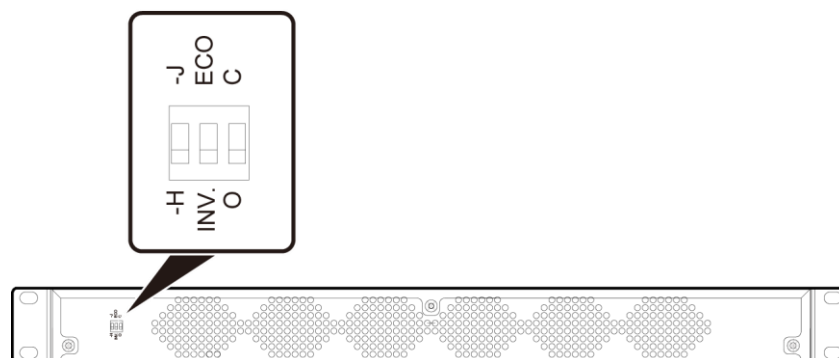
Step 3 Record the cables connected to the inverter and label the cables.

Step 4 Remove cables from the inverter and insulate the cables.

Step 5 Remove the inverter and record the DIP switch on the back of inverter.

Step 6 Set the DIP switch for the new inverter based on the recorded information.

Figure 6-35 Setting the DIP switch

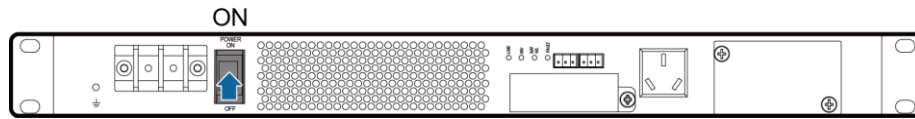


Step 7 Install the new inverter.

Step 8 Connect the cables to the new inverter based on the recorded information.

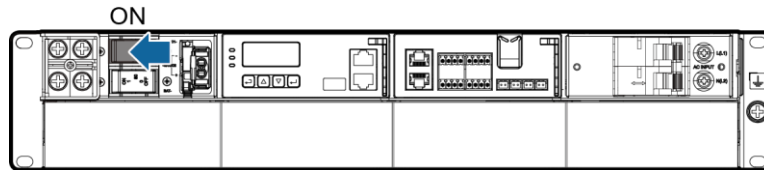
Step 9 Turn the switch on the inverter to ON.

Figure 6-36 Turning the switch on the inverter to ON



Step 10 Switch the circuit breaker connected to the inverter on the DCDU to ON.

Figure 6-37 Switching the circuit breaker connected to the inverter on the DCDU to ON



----End

Follow-up Procedure

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

6.9 Replacing a PoE Module

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new PoE module is intact.

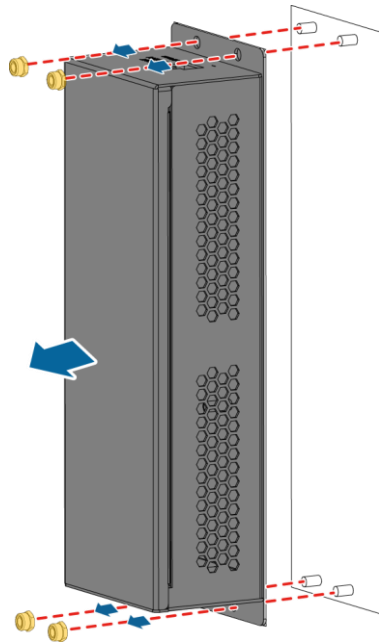
Procedure

Step 1 Record the cables connected to the PoE module and label the cables.

Step 2 Remove the cables from the PoE module.

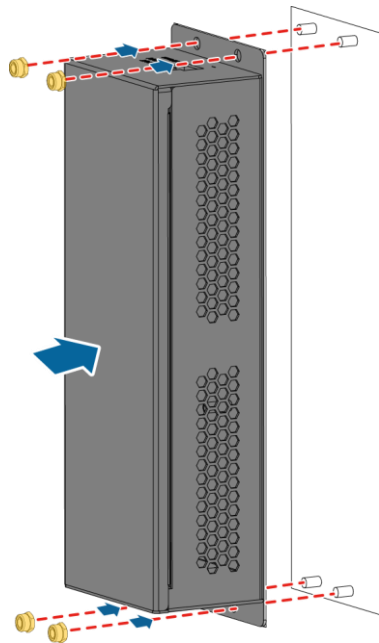
Step 3 Remove the old PoE module.

Figure 6-38 Removing the old PoE module



Step 4 Install the new PoE module.

Figure 6-39 Installing the new PoE module



Step 5 Connect the cables to the new PoE module based on the recorded information.

----End

Follow-up Procedure

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

6.10 Replacing an ESU

6.10.1 Replacing an ESM

Prerequisites

- An ESD wrist strap or ESD gloves, Phillips screwdriver, socket wrench, ESD box or bag, and cabinet door key are available.
- You have confirmed the model of the ESM to be replaced and prepared a new ESM.

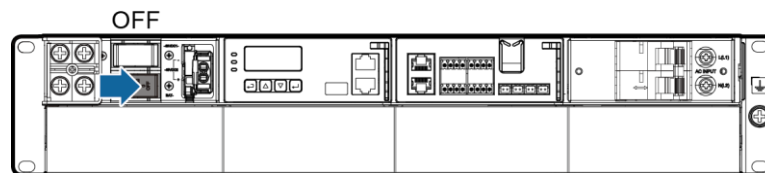
Context

ESM replacement may cause a system power failure. To prevent power failures, ensure that other power systems, such as the mains and solar power system, provide continuous power supply.

Procedure

Step 1 Switch the battery circuit breaker on the DCDU to OFF.

Figure 6-40 Switching the battery circuit breaker on the DCDU to OFF



Step 2 Remove the ESM power cable terminal.

Figure 6-41 Removing the ESM power cable terminal



Step 3 Press and hold down the switch on the ESM for 5 seconds to disconnect the battery.

Figure 6-42 Switch on the ESM



Step 4 Record the cable positions on the ESM and label the cables.

NOTICE

- When disconnecting the battery cables, disconnect the positive battery cable first, then disconnect the negative cable, and insulate the cables.
- Insulate all the removed power cables.

Step 5 Remove all the cables from the ESM.

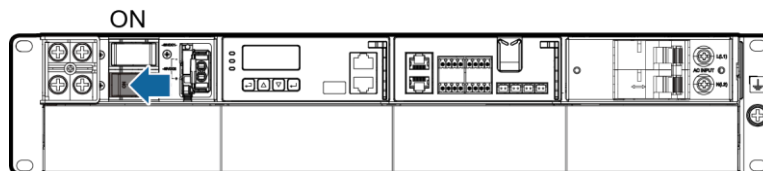
Step 6 Remove the old ESM.

Step 7 Install the new ESM.

Step 8 Reconnect all the cables to the ESM based on the recorded information.

Step 9 Switch the battery circuit breaker on the DCDU to ON.

Figure 6-43 Switching the battery circuit breaker on the DCDU to ON



----End

Follow-up Procedure

- Put the replaced component into the ESD box or bag and then place the ESD box or bag into the carton box with foams or the bag of the new component.
- Fill in the fault card with the information about the replaced component.

6.10.2 Replacing a TCB

Context

Battery replacement may cause a system power failure. To prevent power failures, ensure that other power systems, such as the mains and solar power system, provide continuous power supply.

NOTICE

- If the battery string is to be replaced partially, new batteries must be of the same type and from the same manufacturer as the replaced ones.
- If the battery string is to be replaced as a whole, new batteries must be of the same type and batch and from the same manufacturer as the replaced ones.

DANGER

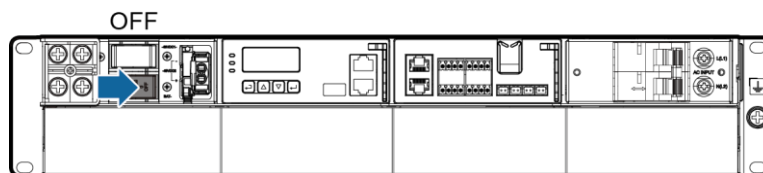
- Do not short-circuit or reversely connect the positive and negative battery terminals. Insulate tools such as wrenches and screwdrivers when handling the batteries to avoid personal injury and damage to the batteries.
- Exercise caution when taking or removing a battery to prevent it from falling off.

Procedure

Step 1 Put on the ESD wrist strap or ESD gloves.

Step 2 Switch the battery circuit breaker on the DCDU to OFF.

Figure 6-44 Switching the battery circuit breaker on the DCDU to OFF



NOTE

You are advised to fully charge the old battery string before replacing it to avoid voltage bias and current bias. This is because the new battery string has full capacity.

CAUTION

- If the DCDU is powered on, disconnect the positive battery terminal before replacing the negative battery cable.
- This requirement also applies to scenarios where other power systems are used or negative battery cables are involved.

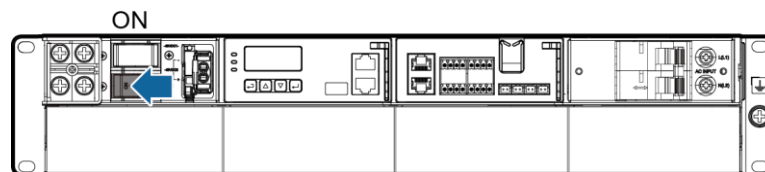
Step 3 Disconnect the cable between the positive battery string terminal and the positive transfer busbar.

Step 4 Disconnect the cable between the negative battery string terminal and the negative transfer busbar.

Step 5 Replace the faulty batteries with new ones.

- Step 6** Reconnect the cable between the negative battery string terminal and the negative transfer busbar.
- Step 7** Reconnect the cable between the positive battery string terminal and the positive transfer busbar.
- Step 8** After the battery string has been charged for 10 minutes, check the voltage of each battery using a multimeter. If the voltage of each battery is 12.6 V, the battery string is working properly.
- Step 9** Switch the battery circuit breaker on the DCDU to ON.

Figure 6-45 Switching the battery circuit breaker on the DCDU to ON



- Step 10** Take off the ESD wrist strap or gloves and put all the tools away.
- End

Follow-up Procedure

- Put the replaced component into the ESD box or bag and then place the ESD box or bag into the carton box with foams or the bag of the new component.
- Fill in the fault card with the information about the replaced component.

A Regulatory Compliance Statement

Regulatory Compliance Statement For regulatory compliance statements, see the file in the following URL:[PowerCube 500 V200R001 ICC30T&50T Regulatory Compliance Statement](#)

Regulatory Compliance Statement For regulatory compliance statements, see the file in the following URL:[PowerCube 500 V200R001 ICC30&50 Regulatory Compliance Statement](#)

Regulatory Compliance Statement For regulatory compliance statements, see the file in the following URL:[PowerCube 500 V200R001 ICC30T&50T Regulatory Compliance Statement](#)

Regulatory Compliance Statement For regulatory compliance statements, see the file in the following URL:[PowerCube 500 V200R001 ICC30&50 Regulatory Compliance Statement](#)

B Disconnecting the Battery Power Supply

When the battery voltage is less than 48 V, the battery power supply can be disconnected manually, and according to low battery voltage.

When the battery voltage is greater than or equal to 48 V, the battery power supply cannot be disconnected manually, and according to low battery voltage.

C Operating Environment Definitions

Table A-1 Operating environment definitions

Class	Environment Definition
Class A	Indoor environments where temperature and humidity are controllable, including rooms where human beings live.
Class B	Indoor environments where the ambient temperature and humidity are not controlled and outdoor environments (with simple shielding measures) where humidity can reach 100%.
Class C	Sea environments or outdoor land environments (with simple shielding measures) near pollution sources. If a site is near a pollution source, it is at most 3.7 km away from salt water such as the sea and salt lakes, 3 km away from heavy pollution sources such as smelteries, coal mines, and thermal power plants, 2 km away from medium pollution sources such as chemical, rubber, and galvanization industries, or 1 km away from light pollution sources such as packing houses, tanneries, and boiler rooms.
Class D	Environments within 500 m away from the seashore. Class D environments are special Class C environments.

D

Acronyms and Abbreviations

A

APP	application
AR	access router

C

CPE	customer premises equipment
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D

DCDU	direct current distribution unit
-------------	----------------------------------

E

ESMU	energy storage management unit
ESU	energy storage unit

H

HTTP	Hypertext Transfer Protocol
-------------	-----------------------------

I

ICC	integrated control cabinet
IVS	intelligent video surveillance

L

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

P

PMU	power monitoring unit
PSU	power supply unit
PON	passive optical network
PoE	power over Ethernet

S

SMU	site monitoring unit
SNMP	Simple Network Management Protocol
SSU	solar supply unit

T

TCB	Temperature cycle battery
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U

UIM	user interface module
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