iSitePower Integrated Smart Site (ICC1000-A1-E1) V100R001C00

User Manual

Issue	04
Date	2022-10-15

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

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

Website: https://e.huawei.com

About This Document

Overview

This document describes the iSitePower integrated solution in terms of its products, components, and maintenance methods.

Figures provided in this document are for reference only.

Intended Audience

This document is intended for:

- Sales engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

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

Symbol	Description
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 04 (2022-10-15)

Updated **3.2.13 (Optional) DG Expansion Module GIM01C2**.

Updated **3.2.3 Monitoring Module SMU02C (02312MML-009)** and **4.3.1 Replacing an SMU02C**.

Issue 03 (2022-02-07)

Updated **3.2.26-DC Air Conditioner PC3000D-2**.

Issue 02 (2021-01-10)

Updated the device address description.

Issue 01 (2020-09-30)

This issue is the first official release.

Contents

1 Safety Precautions

1.1 General Safety

Statement

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

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

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

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

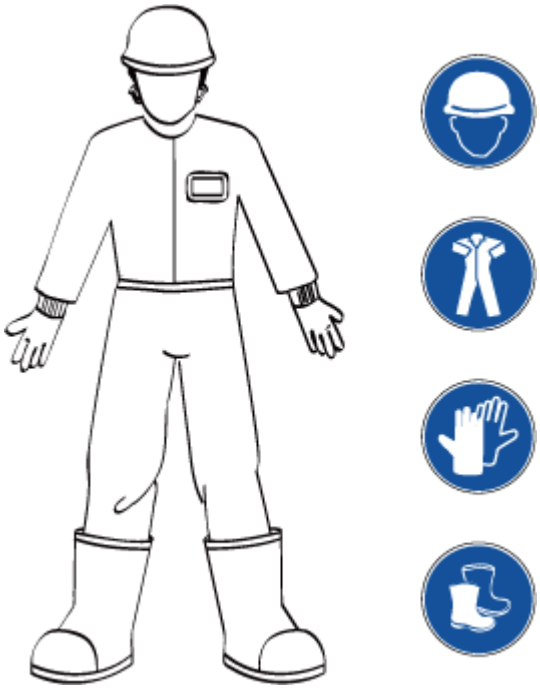
The Company will not be liable for any consequences of the following circumstances:

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

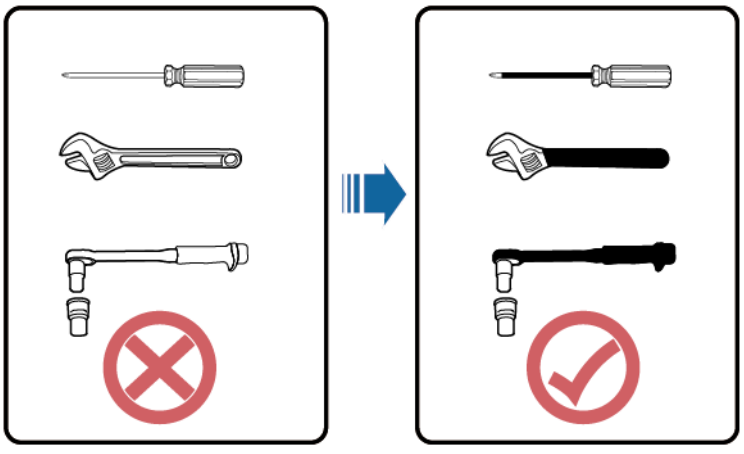
- Storage conditions that do not meet the requirements specified in this document

General Requirements

- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.

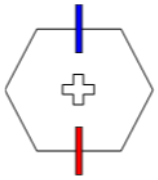


- Use insulated tools or tools with insulated handles, as shown in the following figure.

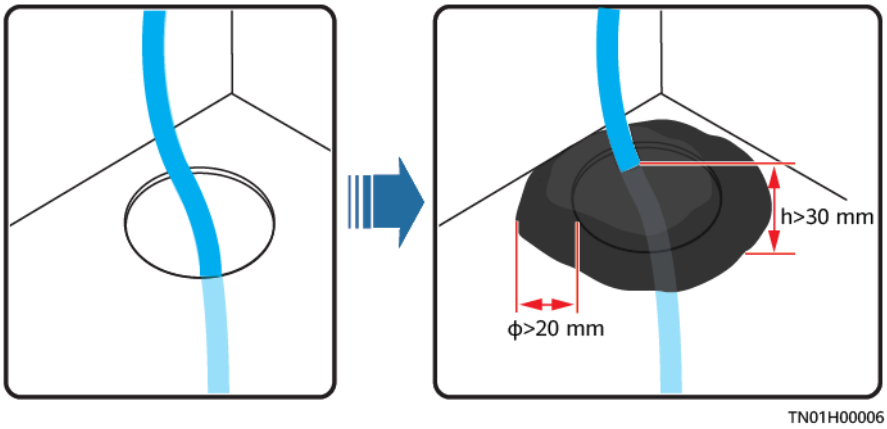


- Follow the specified procedures for installation, operation, and maintenance.
- Ensure that bolts are tightened with a torque wrench and marked using red or blue color. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm if the bolts are tightened and then mark them in

red. (The marks should cross the edges of the bolts, as shown in the following figure.)



- Before installing, operating, or maintaining a cabinet, clean up any water, ice, snow, or other sundries on the top of the cabinet to prevent sundries from falling into the cabinet when you open the cabinet door.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Before handling a conductor surface or terminal, measure the contact point voltage 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 using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.
- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- All cable holes should be sealed. Seal the used cable holes with firestop putty. Seal the unused cable holes with the caps delivered with the cabinet. The following figure shows the criteria for correct sealing with firestop putty.



- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of a cabinet.

Personal Safety

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

Symbol Conventions

To ensure personal and equipment safety, observe all the safety instructions marked on the equipment when installing, operating, and maintaining the equipment.

Symbol	Description
	Indicates a part exposed to high voltage. This symbol warns operators that both direct and indirect contact with the power grid voltage is 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 operations or maintenance. Users should wear heat insulation gloves before operations to prevent scalding.
 or 	Indicates protection earthing. This symbol is attached next to a protection ground terminal next to grounded equipment and an external ground system. An equipment ground cable is connected to an external ground bar through the protection ground terminal.
	Indicates equipotential bonding. This symbol is found with equipotential terminals inside equipment.
	Indicates electrostatic discharge (ESD). This symbol is used in all electrostatic sensitive areas. Before operating equipment in these areas, wear ESD gloves or an ESD wrist strap.
	Capacitors store hazardous energy. Open the chassis one minute after all power supplies are disconnected.
	Indicates that the equipment is safe to use at altitudes below 2000 m.

Symbol	Description
	Indicates that the equipment is not safe to use in tropical climates.
	Indicates a fan assembly or moving part. This symbol is silkscreened on or attached to the panel of a fan assembly, warning operators to keep away. Do not touch the blades when the fan is rotating.
	This symbol is used when the usage of a device port cannot be clearly described. It prompts users to refer to the instruction. 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 disconnect all power inputs. 2. If there are multiple output interfaces, use the symbol near the output interfaces. 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 or maintain the equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.

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, maintenance
- Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

1.3 Electrical Safety

Grounding

- The protective ground of the equipment should be reliably connected to the ground screw on the metal enclosure (grounding resistance ≤ 0.1 ohm).
- For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protection ground.

AC and DC Power

DANGER

- The power system is energized by power sources with hazardous voltage. Direct or indirect contact (through damp objects) with the power sources may result in electric shock.
- Non-standard and improper operations may result in fire or electric shock.
- Do not connect or disconnect power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- If the power supply to the equipment is permanently connected, install an easily accessible disconnector at the exterior of the device.
- Before making electrical connections, switch off the disconnector on the upstream device to cut off the power supply if people may contact energized components.
- If a "high electricity leakage" tag is attached on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the AC power supply; otherwise, electric shock as a result of electricity leakage may occur.
- Before installing or removing a power cable, turn off the power switch.

- Before connecting a power cable, check that the label on the power cable is correct.
- Before connecting the power supply, ensure that cable connections are correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.

Cabling

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Do not route cables behind the air intake and exhaust vents of the equipment.
- Ensure that cables meet the VW-1 flame spread rating requirements.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that all cables are securely bound. Route and bind cables so that they appear neat and tidy and their cable sheaths are intact.
- If an AC input power cable is connected to the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- Ensure that the bending radius of each cable is at least five times the diameter of the cable.
- 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.

ESD

- When installing, operating, and maintaining the equipment, comply with the ESD protection regulations and wear the ESD clothing, gloves, and wrist strap.
- When holding a board, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package boards with ESD packaging materials before storing or transporting them.

1.4 Installation Environment Requirements

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the equipment is running.
- 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.
- Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation

vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.

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

Installation at Heights

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

Do not at heights in any of the following situations:

- Rainwater remains on steel pipes or other risky conditions exist. After the preceding conditions no longer exist, the safety director and relevant technical personnel need to check the involved equipment. Operators can begin working only after obtaining consent.
- When working at heights, comply with local relevant laws and regulations.
- Only trained and qualified personnel are allowed to work at heights.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

DANGER

- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- 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 materials 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.
- 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 will be forbidden from working.
- Operators who violate the safety regulations are responsible for accidents caused. The supervisor has to bear the responsibility accordingly.

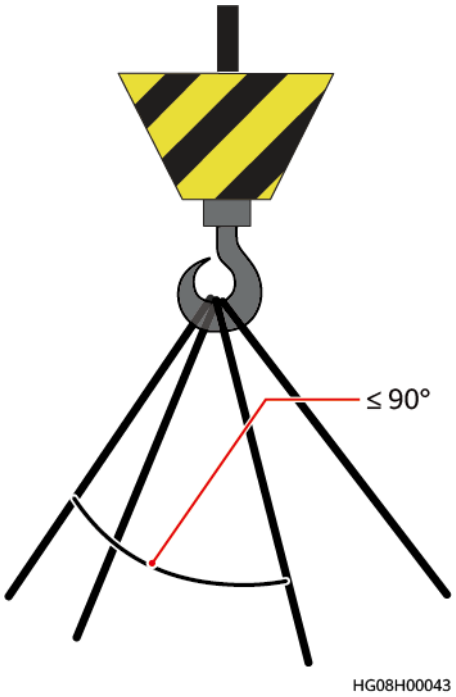
1.5 Mechanical Safety

Hoisting Devices

DANGER

Do not walk under hoisted objects.

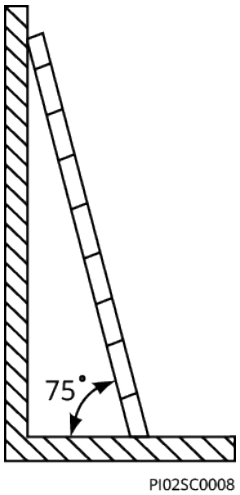
- Only trained and qualified personnel are allowed to perform hoisting operations.
- Check that hoisting tools are available and in good condition.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a load-bearing object or wall.
- Ensure that the angle formed by two hoisting cables is no more than 90 degrees, as shown in the following figure.



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

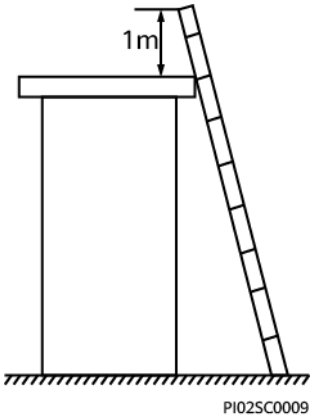
Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.
- Ensure that the ladder is securely positioned. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle ruler can be used to measure the angle.



When climbing a ladder, take the following precautions to reduce risks and ensure safety:

- Keep your body steady.
- Do not climb higher than the fourth rung of the ladder from the top.
- 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.



- Ensure that your body's center of gravity does not shift outside the legs of the ladder.

Drilling Holes

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

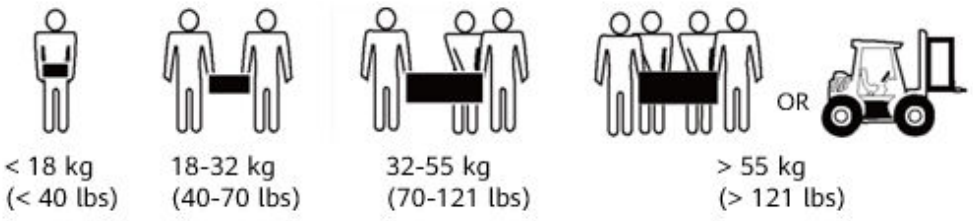
NOTICE

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

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

Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.

- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules (such as power supply units, fans, and boards) that are installed in the equipment because they cannot support the weight of the equipment.

1.6 Battery Safety

If no battery is involved, skip this section.

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.

Basic Requirements

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

DANGER

- Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. Overheating may cause battery explosion.
- Do not burn batteries. Otherwise, the batteries may explode.
- To avoid leakage, overheating, fire, or explosions, do not disassemble, alter, or damage batteries, for example, insert sundries into batteries or immerse batteries in water or other liquids.
- When replacing a battery, use a battery of the same model or 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.

To ensure safety during battery installation, operation, and maintenance, pay attention to the following:

- Do not wear conductive articles such as watches, bracelets, bangles, and rings.
- Wear goggles, rubber gloves, and protective clothing to avoid damage caused by electrolyte in the case of electrolyte overflow. If a battery overflows, 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.
- Use dedicated insulated tools.
- Move batteries in the required direction. Do not place a battery upside down or tilt it.
- Keep the battery loop disconnected during installation and maintenance.
- Do not drop, squeeze, or puncture a battery. Protect batteries from external high pressure to prevent internal short circuits and overheating.

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
- Do not use a damaged battery.
- To prevent injuries 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.
- 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.

Battery Installation

Before installing batteries, observe the following safety precautions:

- 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.
- Place and secure batteries horizontally.
- Note the polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, the battery may be short-circuited.
- 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.
- 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.
- Secure battery cables or copper bars by tightening bolts to the required torque. Loose connections will result in excessive voltage drop or cause batteries to burn out in the case of excessive current.
- Check battery connections periodically, ensuring that all screws are securely tightened.

Battery Short Circuit

DANGER

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

- If permitted, disconnect the batteries in use before performing any other operations on them.
- To avoid battery short circuit, do not maintain batteries with power on.

Flammable Gas

NOTICE

- Do not use unsealed lead-acid batteries.
- To prevent fire or corrosion, ensure that flammable gas (such as hydrogen) is properly exhausted for lead-acid batteries.

Lead-acid batteries emit flammable gas when used. Ensure that batteries are kept in a well-ventilated area and take preventive measures against fire.

Battery Leakage

NOTICE

Battery overheating causes deformation, 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.

Electrolyte overflow may damage the equipment. It will corrode metal parts and boards, and ultimately damage the boards.

⚠ 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 cause damage.

If the electrolyte overflows, follow the instructions of the battery manufacturer or neutralize the electrolyte by using sodium bicarbonate ($NaHCO_3$) or sodium carbonate (Na_2CO_3).

Lithium Battery

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

⚠ WARNING

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

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

- Keep the lithium battery loop disconnected during installation and maintenance.
- When the ambient temperature is lower than the lower limit of the operating temperature (charge is forbidden at 0°C), do not charge the lithium battery. Otherwise, a short circuit would occur 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

If no photovoltaic (PV) module is involved, skip this section.

Before installing, operating, and maintaining PV modules, read the instructions provided by the PV module manufacturer. 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 manufacturer.

DANGER

- Before installation and maintenance, put on a safety helmet, goggles, insulation gloves, and protective clothing to avoid personal injury.
- Before installation and maintenance, cover all PV modules totally using opaque materials to avoid electric shocks caused by generated currents.
- Do not 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.
- 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 case of strong wind, do not install PV modules at heights.
- To install or maintain a high support, set up a support platform and wear a safety helmet or belt.
- Do not drill holes into, step on, or place heavy objects on PV modules, because these actions will damage PV modules.
- At least two persons are required to move and install PV modules. Forces can be applied only to the aluminum frame of the PV modules. 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.

1.8 DG Safety

If no diesel generator (DG) is involved, skip this section.

Before installing, operating, and maintaining a diesel generator (DG), read the instructions provided by the DG 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 DG vendor.

Basic Requirements

- Wear a safety helmet, safety shoes, and union suit. Do not wear a wet union suit.
- The DG is used only for purposes specified by the manufacturer. When the DG is used for other purposes, obtain prior approval from the manufacturer even if the operation does not violate safety regulations.
- Ground the DG properly. Lock all electric control panels. Use insulated tools to check and repair energized devices. Avoid electric shock in wet environments.
- Follow all electrical regulations. Only qualified personnel are allowed to install, check, and repair electric parts of equipment.

DANGER

- Take off your ID card and jewelry before installation and maintenance. Tie your hair and put them in your hat to protect them from being twisted into high-speed moving components (such as a fan or drive bearing), avoiding personal injury or death.
- During installation and maintenance, strictly follow the instructions provided by the DG manufacturer to avoid burns, explosions, and fire.
- Keep sparks, open flame, and any other flammable objects away from the DG.
- Do not change original components with permission. Using non-original components may endanger safety.

- Maintain equipment only after checking that the mains supply is disconnected. If you are not sure whether the mains supply is disconnected, contact professionals.
- Wear protective gloves and goggles when performing the following operations:
  - Add fuel.
  - Add or replace engine oil and coolant. Contact with hot engine oil and coolant may cause serious scalds. Therefore, replace engine oil and coolant after their temperatures drop below 60°C.
  - Use compressed air. (The maximum air pressure for cleaning is 2 kg/cm²).

Fire Prevention

- Conductive objects such as metal can result in short circuits in power cables, which may cause fire.
- Keep the engine clean because excessive oil stains may cause engine overheat, which leads to fire and damage to equipment.
- Place multiple dry powder or CO_2 fire extinguishers besides the DG. Check the fire extinguishers periodically and replace them if necessary.

Transportation Precautions

Before transportation:

- Survey the site and design a transportation scheme to ensure smooth transportation.
- Check that all required tools and lifting devices are available and functional. Overloading is forbidden.
- Check for sharp objects such as nails and remove or trim them if necessary to avoid personal injury.
- Clean and repair the passages for transportation.
- Determine the manpower and work division if multiple people need to operate together.
- Take protective measures such as wearing the protective gloves, shoes, goggles, and safety helmet.

During transportation:

- Strictly follow the transportation scheme. If the scheme cannot be followed during actual operations, promptly communicate with the scheme designers.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- If multiple people work together to lift a heavy object, ensure that the weight is equally distributed and borne by shoulders (preferably with a tool). Keep a distance of one arm between people and ensure that people of different heights are properly arranged.
- Transport a heavy object stably with balanced force, move at a low and even speed, and put down the object stably and slowly to avoid damaging the object.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- If two persons or more move a heavy object together, ensure that the object is moved at a uniform pace and is lifted and landed simultaneously under the supervision of one person.
- For other requirements, see the requirements for moving heavy objects and hoisting safety.

Operational Safety

- Do not use the DG in places with explosives.
- Do not allow non-professional personnel to approach close to a DG in operation. Loose clothing, hair, and falling tools may cause serious personal injury and damage to equipment.

- For a DG in operation, its exposed pipes and components are at high temperatures. Avoid touching them to prevent burns.

2 Product Overview

2.1 Overview

The iSitePower integrated smart site solution provides an integrated power supply solution for the enterprises (transportation and buildings). It integrates outdoor cabinets, temperature control equipment, AC and DC power distribution, and surge protection, and reserves sufficient installation space for customers. It is a simple, reliable, and smart power system.

Product features:

- Simple
  - One-stop deployment
  - Seamless evolution
- Reliable
  - Reliable power supply
  - Multiple outdoor protection measures
- Smart
  - Unified network management system (NMS); sites are visible and controllable online.

Table 2-1 Key functions

No.	Item	Description
1	Mains management	• Wide operating voltage range – Supports 85–300 V mains input. • Mains protection – Supports mains overvoltage protection. The overvoltage protection threshold is 300 V. – Supports mains undervoltage protection. The undervoltage protection threshold is 84 V. • Mains alarm management – Reports alarms for mains overvoltage, undervoltage, and mains absence.
2	Solar power management	• Wide operating voltage range – Works properly at 24–140 V. • High-precision tracking – The tracking precision of the MPPT function reaches up to 99.8%. • High efficiency – MTTP's efficiency reaches up to 98%.
3	Multi-energy collaboration management	• Solar-mains collaboration – Based on the status of the solar energy and mains supply, the solar energy is preferentially used to ensure that the system works in the most economical way.
4	M48500N1 output management	• 12 V DC – Provides 12 V DC output and supports remote reset. • 24 V DC – Provides 24 V DC output and supports remote reset. • 24V AC – Provides 24 V AC output and supports remote reset.
5	Signal port management	• One alarm output port • One dry contact input port
6	Local wired maintenance	Supports local wired maintenance.
7	Battery state of health (SOH) management	Supports battery state of charge (SOC) and SOH management.

No.	Item	Description
8	Remote NMS	• NetEco with out-of-band IP networking – Communicates with the NetEco through the IP out-of-band channel to implement monitoring functions such as real-time data collection, parameter configuration, device control, alarm reporting, performance statistics, board manufacturing information uploading, log downloading, and remote upgrade. • eSight monitoring through network devices – Users can monitor energy devices, view alarms and real-time performance, and manage configurations on the eSight.
9	Inventory management	The electronic label information of all communicable devices is reported and managed on the NetEco.

2.2 Cabinet Description

Figure 2-1 Cabinet appearance

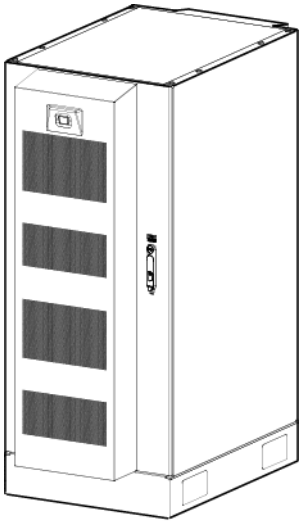
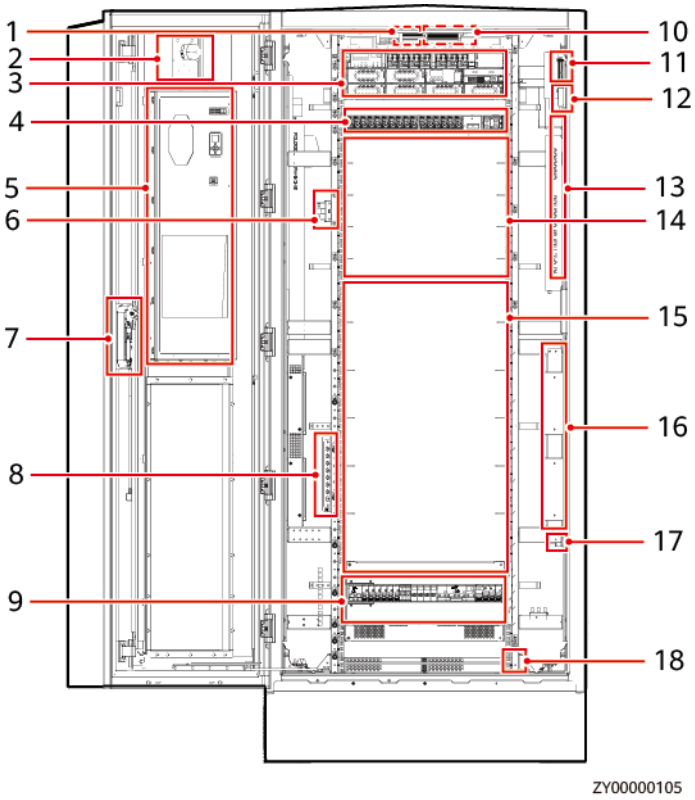


Table 2-2 Cabinet description

Item	Description
External dimensions (H x W x D)	• Cabinet: 2100 mm x 900 mm x 1200 mm (including the base) • Base: 200 mm x 900 mm x 1200 mm

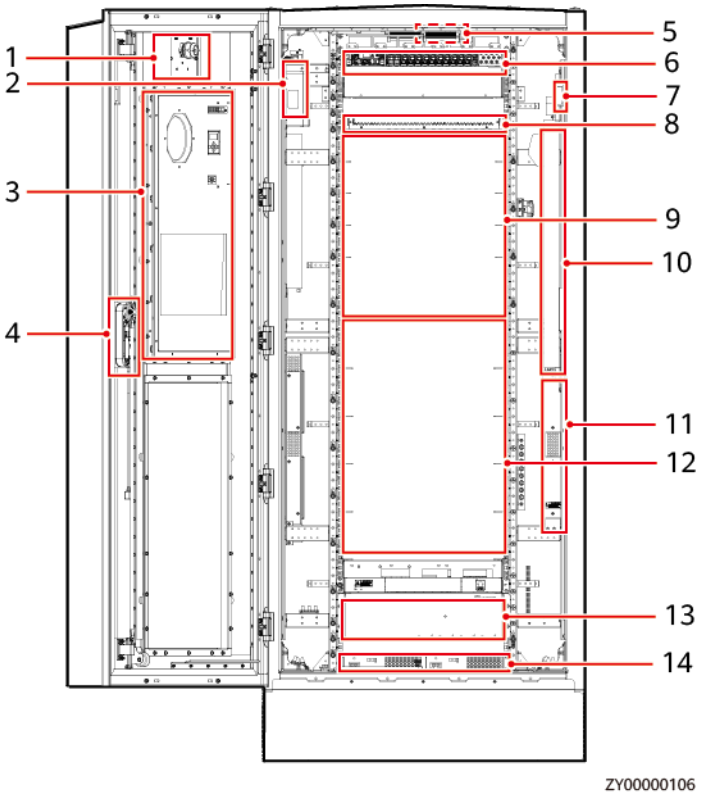
Item	Description
Space for lithium batteries	30 U
Space for customer equipment	• 12 U (supports a depth of 980 mm) • 24 U (supports a depth of 480 mm)
Cabinet weight	< 520 kg (excluding PSUs and batteries)
Temperature control mode	• ICC1000-A1-C1 (01075363): DC air conditioner PC1500D-1 (4 PCS at most) + DC heater • ICC1000-A1-C1 (01075363-001/01075363-002): DC air conditioner PC3000D-2 (4 PCS at most) + DC heater
Cabling mode	Routed in and out from the bottom
IP rating	IP55
Installation mode	Floor-mounted
Power Subrack	• ICC1000-A1-C1 (01075363): ETP48400-C3B3 • ICC1000-A1-C1 (01075363-001/01075363-002): ETP48400-C3B1
Monitoring unit	SMU02C
Application environment	Class C environments **NOTE** During device installation or maintenance, ensure that the cabinet is in a class A environment. If the cable holes are not properly sealed or the cabinet door is opened for maintenance, corrosive gases such as vehicle exhaust may enter the cabinet, which may cause device function exceptions or application risks. Huawei will not be liable for the losses caused by these problems.

Figure 2-2 Internal structure (front door)



(1) Smoke sensor	(2) Front door camera (optional)	(3) ETP48400-C3B3/ETP48400-C3B1
(4) DCDB48-200-16B	(5) Space for the DC air conditioner	(6) Digital temperature and humidity sensor
(7) Electronic Lock	(8) Ground bar	(9) ACDB380-63-2B/ATS-63A2 (optional)
(10) Light	(11) Smart ETH gateway (optional)	(12) Door status sensor
(13) PDU2000-16-1PH-7 (optional)	(14) Space for customer equipment	(15) Space for lithium batteries
(16) Lithium battery busbar	(17) Vibration sensor	(18) Water sensor

Figure 2-3 Internal structure (rear door)



(1) Rear door camera (optional)	(2) ACDB220-40-1B (optional)	(3) Space for the DC air conditioner
(4) Electronic Lock	(5) Light	(6) ACDB220-63-12B (optional)
(7) Door status sensor	(8) ETP23006-C1A1 (optional)	(9) Space for customer equipment
(10) PDU2000-32-1PH-9 (optional)	(11) Lithium battery busbar	(12) Space for lithium batteries
(13) Air purifier (optional)	(14) HAU03D-01 (optional)	

NOTE

The figures showing the components installed on the front and rear doors of the cabinet are for reference only. You can install the components based on site requirements.

3 Components

3.1 EPS

3.1.1 (Optional) PV Module

3.1.1.1 335 W PV Module

Figure 3-1 PV module

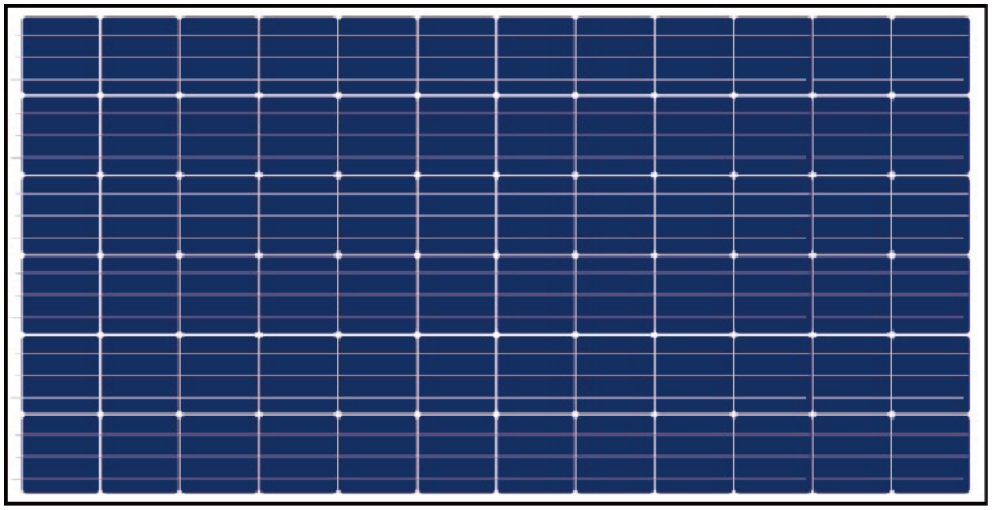


Table 3-1 PV module technical specifications

Item	Technical Specifications
Maximum power	335 W
Solar cell	Polycrystalline silicon
Dimensions	1960 mm x 992 mm x 40 mm

Item	Technical Specifications
Weight	About 22.1 kg
Open-circuit voltage	46.5 V

3.1.1.2 375 W PV Module

Figure 3-2 375 W PV module

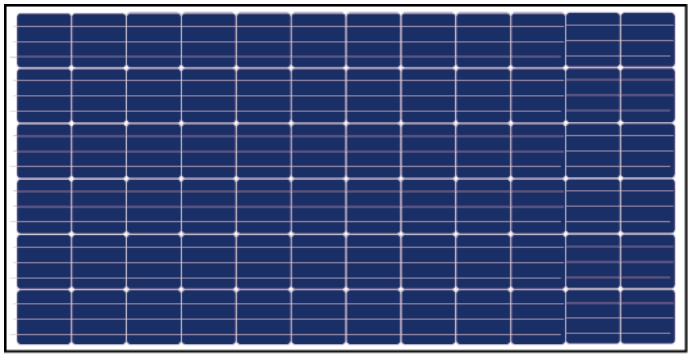


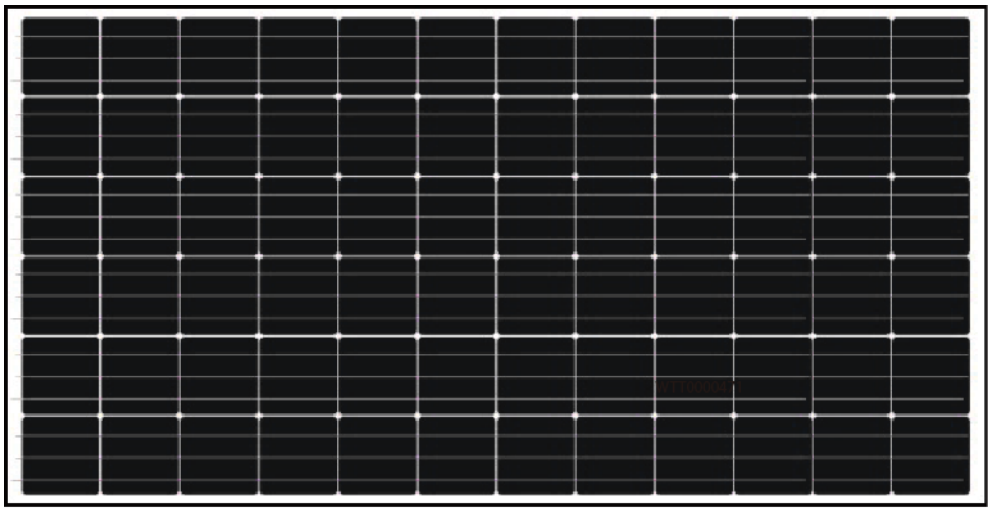
Table 3-2 PV module technical specifications

Item	375 W PV Module
Maximum power	375 W
Solar cell	Monocrystalline silicon
Dimensions	1960 mm x 992 mm x 40 mm
Operating voltage	39.9 V

3.1.1.3 iPV375-M1A

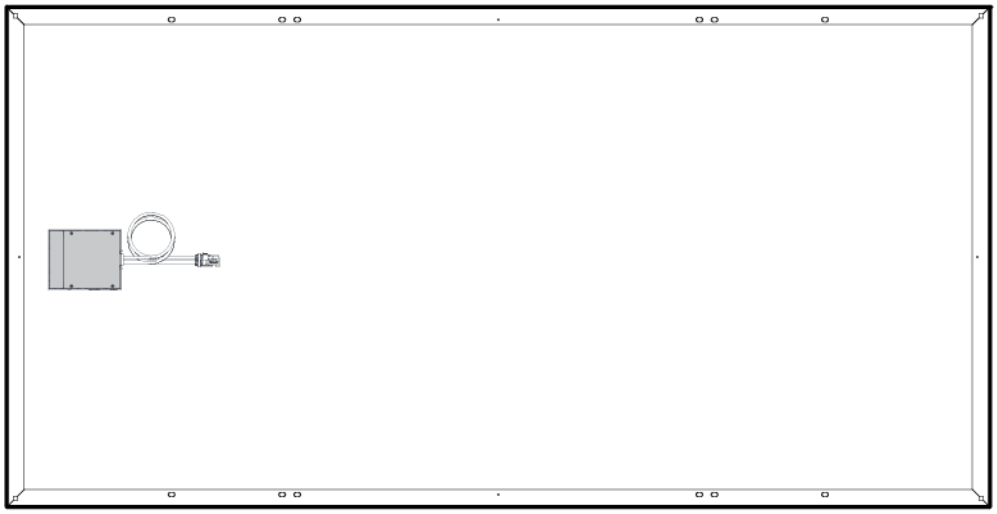
The iPV375-M1A consists of PV modules and the PVA-425E1 PV adapter. It provides functions such as MPPT tracking, module-level shutdown, and module-level monitoring.

Figure 3-3 iPV375-M1A front view



WTT0000473

Figure 3-4 iPV375-M1A rear view



ZSH0000014

Table 3-3 PV module technical specifications

Item	Technical Specifications
Solar cell	Monocrystalline silicon
Dimensions	1960 mm x 992 mm x 40 mm
Weight	About 22.1 kg
Maximum power	375 W
Operation efficiency	19.3%
Optimal operating voltage	39.9 V
Optimal operating current	9.4 A

Item	Technical Specifications
Open-circuit voltage	48.3 V
Short-circuit current	9.85 A
Maximum system Voltage	1000 V

Table 3-4 PVA-425E1 technical specifications

Item		Technical Specifications
Input	Input voltage	10–65 V DC
	Maximum input current	14 A
	Input power	425 W
Output	Peak efficiency	99.3%
	MPPT Tracking Precision	• Up to 99.9%@Static • Up to 99.5%@Dynamic
	Output voltage	4–65 V DC, rated voltage: 26.7 V DC/ 53.5 V DC
	Maximum output current	16 A
Others	Dimension (L x W x H)	118 mm x 118 mm x 24.7 mm
	Weight	< 700 g
	Cooling	Natural cooling
	Output connector	MC4
	Output wire length	1.2 m
IP rating		IP67

3.1.2 (Optional) PV Module Support

PV module supports are available in four angles: 15°, 25°, 35°, and 45°.

Figure 3-5 Single-pole support

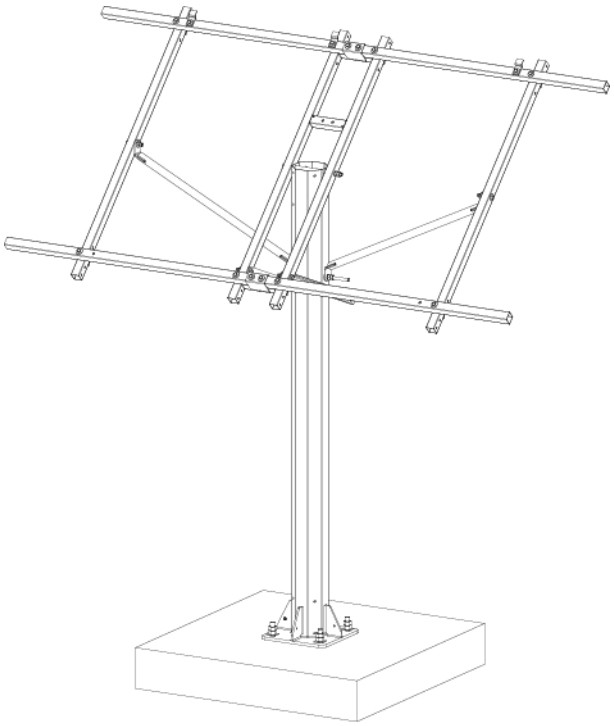


Figure 3-6 A-shaped low support

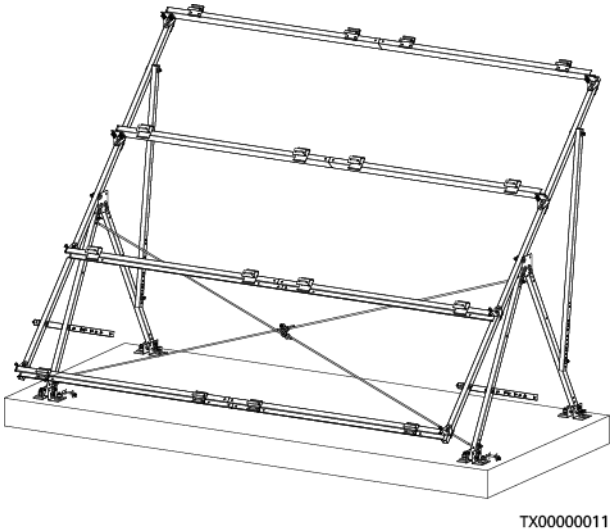
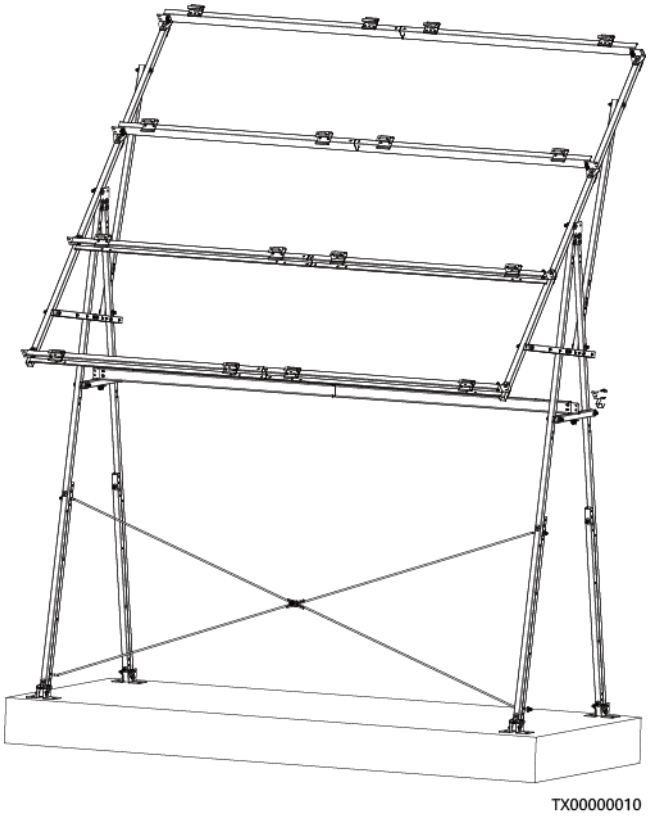


Figure 3-7 A-shaped high support



3.1.3 (Optional) SJB-0601A

Figure 3-8 SJB-0601A exterior

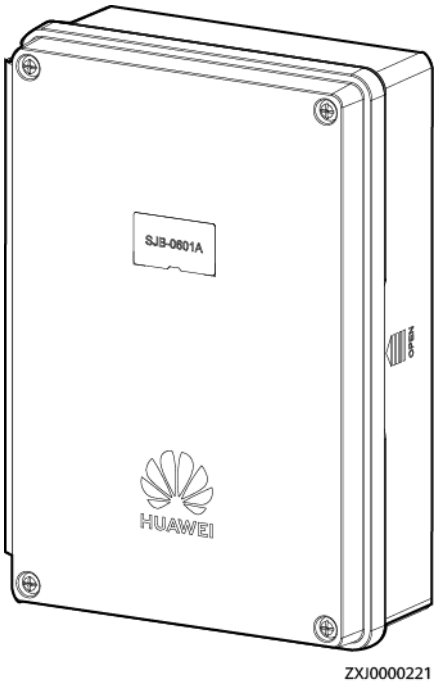
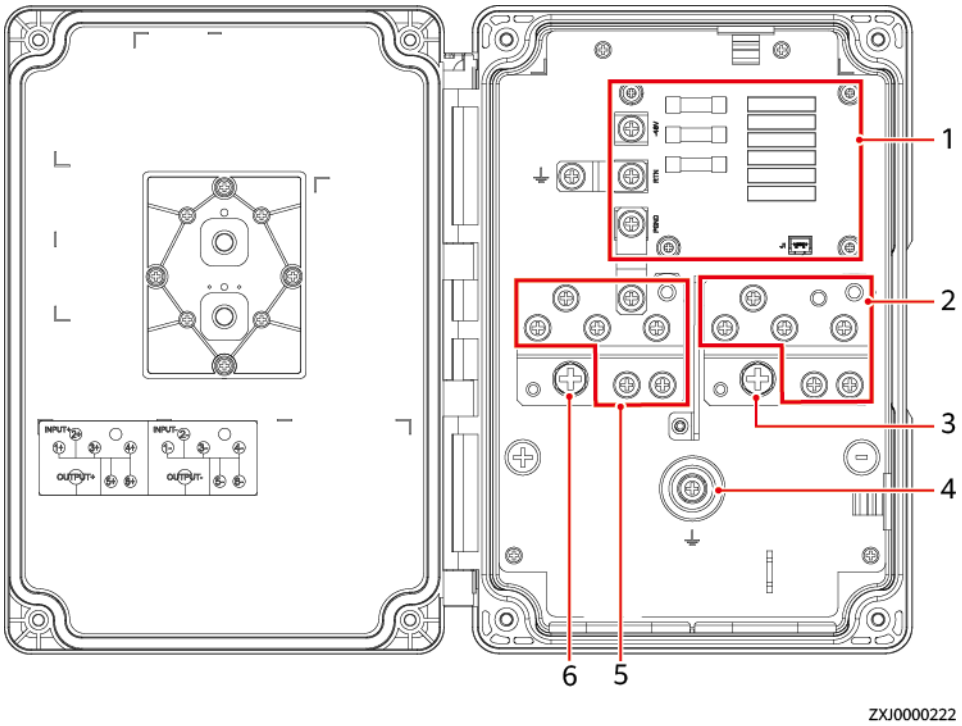


Figure 3-9 SJB-0601A interior



(1) Surge protection board (2) Input– (3) Output–

(4) Ground screw (5) Input+ (6) Output+

Table 3-5 SJB-0601A technical specifications

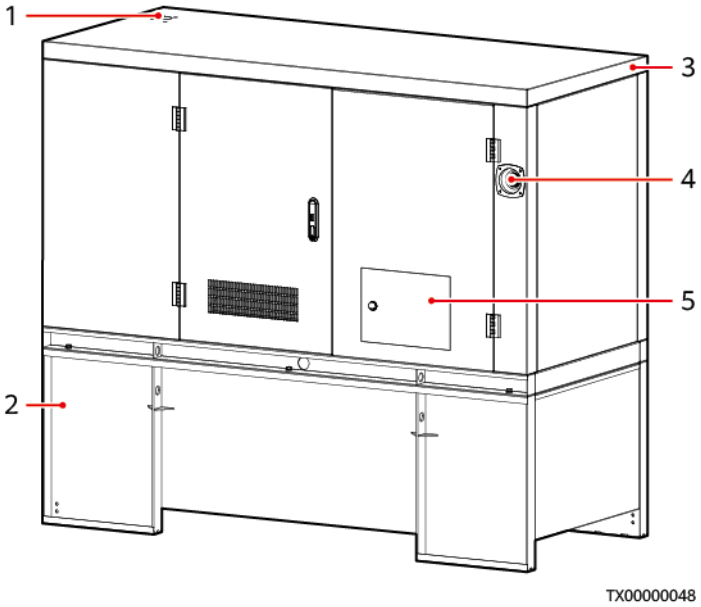
Item	Specifications
Dimensions (H x W x D)	220 mm x 158 mm x 65 mm
Ports	Six inputs converge into one output.
Operating voltage	SJB-0601A (02312VQH): 43.2–58 V DC
IP rating	IP55
Installation mode	Mounted on a pole or wall
Cabling mode	Routed in and out from the bottom

3.1.4 (Optional) DG

3.1.4.1 EPM180-M2B

A DG converts chemical energy into electricity. In a DG, the engine converts thermal energy into mechanical energy, and then the generator converts mechanical energy into electricity.

Figure 3-10 EPM180-M2B exterior



(1) Smoke exhaust vent
(2) Fuel tank
(3) Soundproof canopy
(4) EMERGENCY STOP button
(5) Fuel filler port (behind the door)

Table 3-6 DG technical specifications

Item	EPM180-M2B
Dimensions (H x W x D)	1825 mm x 950 mm x 1800 mm
Weight (excluding fuel)	About 950 kg
Engine model	Weichai WP2.3D25E200
Generator model	Xingnuo XN184E
Rated output power	18 kW/22.5 kVA
Output voltage	230 V AC/400 V AC, three-phase four-wire, 50 Hz
Fuel tank capacity	800 L
Maintenance interval	1250 operating hours
Noise	≤ 75 dB (1 m, 75% of rated load)

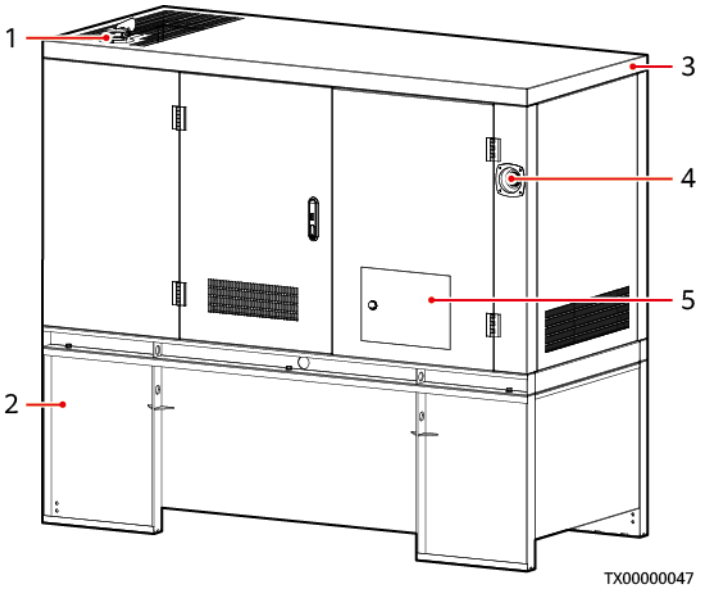
NOTE

For details about a DG, see the DG user manual.

3.1.4.2 EPM240-M2C

A DG converts chemical energy into electricity. In a DG, the engine converts thermal energy into mechanical energy, and then the generator converts mechanical energy into electricity.

Figure 3-11 EPM240-M2C exterior



(1) Waterproof cap
(2) Fuel tank
(3) Soundproof canopy
(4) EMERGENCY STOP button
(5) Fuel filler port (behind the door)

Table 3-7 DG technical specifications

Item	EPM240-M2C
Dimensions (H x W x D)	1925 mm x 950 mm x 2200 mm
Weight (excluding fuel)	About 1000 kg
Engine model	Weichai WP2.3D33E200
Generator model	Xingnuo XN184G
Rated output power	24 kW/30 kVA
Output voltage	230 V AC/400 V AC, three-phase four-wire, 50 Hz
Fuel tank capacity	1000 L
Maintenance interval	1250 operating hours
Noise	≤ 75 dB (1 m, 75% of rated load)

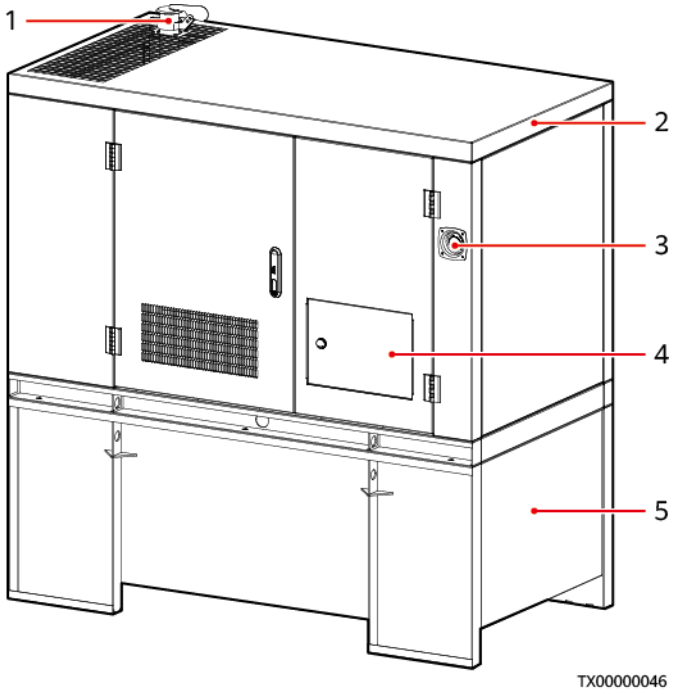
NOTE

For details about a DG, see the DG user manual.

3.1.4.3 EPM100-M2E

A DG converts chemical energy into electricity. In a DG, the engine converts thermal energy into mechanical energy, and then the generator converts mechanical energy into electricity.

Figure 3-12 EPM100-M2E exterior



(1) Waterproof cap
(2) Soundproof canopy
(3) EMERGENCY STOP button
(4) Fuel filler port (behind the door)
(5) Fuel tank

Table 3-8 DG technical specifications

Item	EPM100-M2E
Dimensions (H x W x D)	1825 mm x 950 mm x 1800 mm
Weight (excluding fuel)	About 846 kg
Engine model	Yanmar 3TNV88-GGE
Generator model	Xingnuo XN164D
Rated output power	10 kW/12 kVA
Output voltage	230 V AC/400 V AC, three-phase four-wire, 50 Hz

Item	EPM100-M2E
Fuel tank capacity	800 L
Maintenance interval	1250 operating hours
Noise	≤ 75 dB (1 m, 75% of rated load)

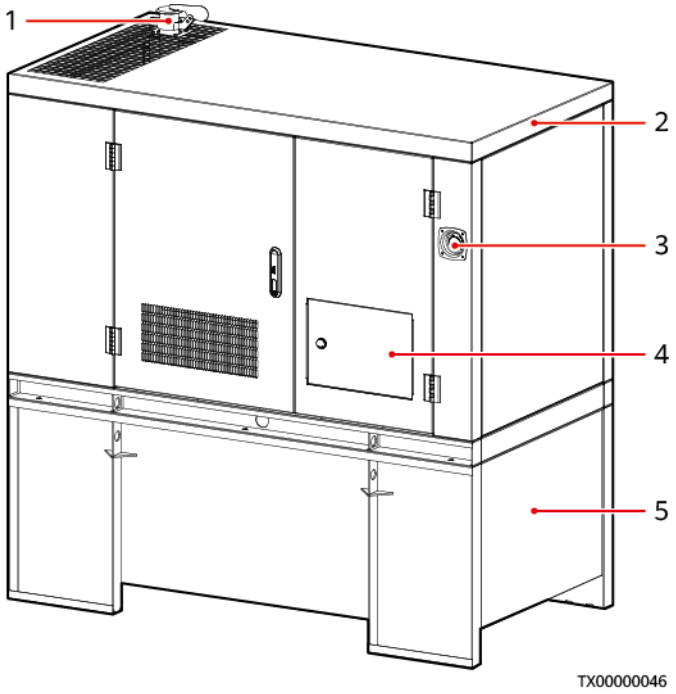
NOTE

For details about a DG, see the DG user manual.

3.1.4.4 EPM140-M2D

A DG converts chemical energy into electricity. In a DG, the engine converts thermal energy into mechanical energy, and then the generator converts mechanical energy into electricity.

Figure 3-13 EPM140-M2D exterior



(1) Waterproof cap
(2) Soundproof canopy
(3) EMERGENCY STOP button
(4) Fuel filler port (behind the door)
(5) Fuel tank

Table 3-9 DG technical specifications

Item	EPM140-M2D
Dimensions (H x W x D)	1825 mm x 950 mm x 1800 mm

Item	EPM140-M2D
Weight (excluding fuel)	About 900 kg
Engine model	Yanmar 4TNV88
Generator model	Xingnuo XN184E
Rated output power	14 kW/17.5 kVA
Output voltage	230 V AC/400 V AC, three-phase four-wire, 50 Hz
Fuel tank capacity	800 L
Maintenance interval	1250 operating hours
Noise	≤ 75 dB (1 m, 75% of rated load)

NOTE

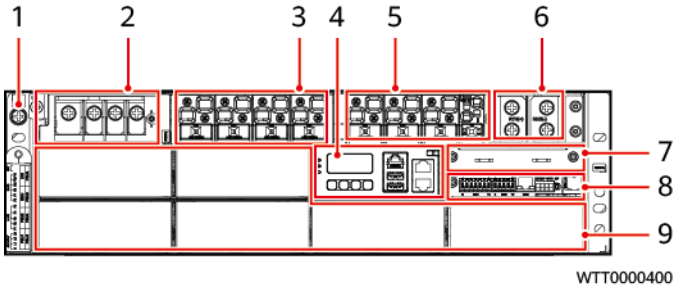
For details about a DG, see the DG user manual.

3.2 ICC

3.2.1 Power Subrack ETP48400-C3B3

The ETP48400-C3B3 power system converts AC power into DC power and supplies –48 V and –57 V constant voltage to communications equipment. The maximum capacity of the power system is 24 kW.

Figure 3-14 ETP48400-C3B3 exterior



(1) Ground screw
(2) AC input module
(3) LLVD power distribution
(4) SMU02C
(5) BLVD power distribution
(6) Battery wiring ports
(7) Reserved slot for CIM02C/ NIM01C3/GIM01C
(8) UIM05B1
(9) Space for rectifiers, M48500N1, S4875G1 and PCU-01A

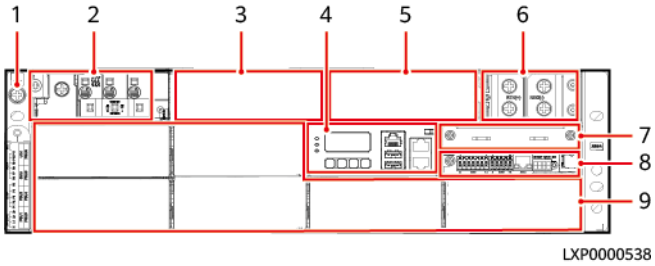
Table 3-10 System specifications

Item	Technical Specifications
AC input	220/380 V AC three-phase four-wire
DC power configuration	• LLVD: four 125 A circuit breakers • BLVD: one 63 A and three 125 A circuit breakers **NOTE** When the circuit breaker is switched off, the –48 V (–) loop is disconnected, but the RTN (+) loop is not disconnected.
Cabling mode	Routed in and out from the front
Dimensions (H x W x D)	132 mm x 442 mm x 330 mm

3.2.2 Power Subrack ETP48400-C3B1

The ETP48400-C3B1 is embedded power systems that convert AC power into DC power. They supply –48 V or –57 V constant voltage to telecommunications equipment. The maximum capacity of the ETP48400-C3B1 is 24 kW.

Figure 3-15 ETP48400-C3B1 appearance



(1) Ground screw
(2) AC input module
(3) Space for LLVD power distribution
(4) SMU02C
(5) Space for BLVD power distribution
(6) Battery wiring ports
(7) Reserved slot for CIM02C/ NIM01C3/GIM01C
(8) UIM05B1
(9) Space for rectifiers, M48500N1, S4875G1 and PCU-01A

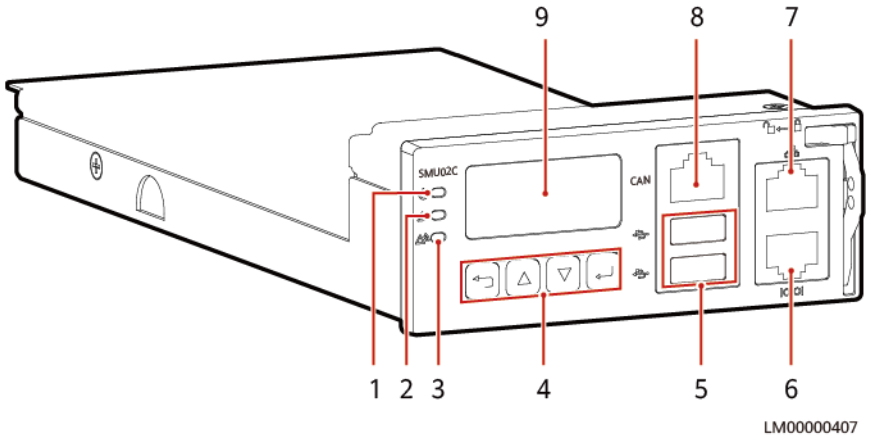
Table 3-11 System specifications

Item	Description
AC input system	220/380 V AC three-phase four-wire, compatible with 220 V AC single-phase

Item	Description
DC power distribution	• LLVD: four 125 A circuit breakers • BLVD: one 63 A and three 125 A circuit breakers **NOTE** When the circuit breaker is switched off, the –48 V (–) loop is disconnected, but the RTN (+) loop is not disconnected.
Dimensions (H x W x D)	130 mm x 482 mm x 330 mm

3.2.3 Monitoring Module SMU02C (02312MML-009)

Figure 3-16 SMU02C



(1) Running indicator (2) Minor alarm indicator (3) Major alarm indicator

(4) Buttons (5) USB ports (protected by a security protection mechanism) (6) RS485/RS232 communications port

(7) FE port (8) CAN communications port (9) LCD

Indicators

Table 3-12 Indicator description

Item	Color	Status	Description
Running 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.

Item	Color	Status	Description
		Blinking fast (4 Hz)	The SMU is running properly but fails to communicate with the host.
Minor alarm indicator	Yellow	Off	No minor alarm or warning is generated.
		Steady on	A minor alarm or warning 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 3-13 Button description

Button	Name	Description
	Up	Scrolls menu items and sets parameters.
	Down	
	Back	Returns to the previous menu without saving the settings.
	OK	• Enters the main menu from the standby screen. • Enters a submenu from the main menu. • Saves the submenu settings.
Note: • The LCD screen becomes dark if no button is pressed within 30s. • You need to log in again if no button is pressed within 1 minute. • Press and hold  or  to increase or decrease a parameter value quickly. • Hold down  and  for 10s to restart the SMU. • Hold down  and  (or ) for 2s to increase (or decrease) the LCD contrast.		

USB Port

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

After installing a dedicated WiFi module on the USB port, you can access the WebUI locally.

NOTICE

Using a WiFi module not provided by the Company may cause function abnormalities or data loss. The Company will not be liable for any loss caused thereby.

Communications Ports

Table 3-14 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
FE	10M/100M autonegotiation	SNMP protocol	Connects to a third-party NMS.
		BIN protocol	Connects to a Huawei NMS.
		HTTPS protocol	Connects to a PC and manages the SMU over the WebUI.
		TCP-Modbus protocol	Adapts to Huawei TCP-Modbus and connects to a third-party NMS.
RS485/RS232	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	Master/Slave protocol	Connects to a Huawei NMS.
		YDN protocol	Connects to a third-party NMS.
CAN	Baud rate: 125 kbit/s	CAN protocol	Connects to Huawei southbound devices.
NOTE All the preceding ports are protected by security mechanisms.			

Figure 3-17 Communications port pin definitions

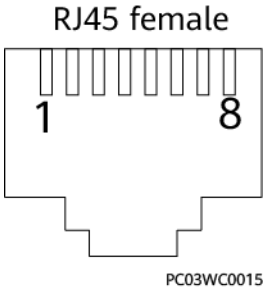


Table 3-15 Pin definitions for the FE port

Pin	Signal	Description
1	TX+	Transmit data over FE.
2	TX-	
3	RX+	Receive data over FE.
6	RX-	
4, 5, 7, 8	Null	-

Table 3-16 RS485/RS232 port pin definitions

Pin	Signal	Description
1	TX+	Transmit data over RS485.
2	TX-	
4	RX+	Receive data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Transmits data over RS232.
6	PGND	Protective earthing (PE)
8	Null	-

Table 3-17 Pin definitions for the CAN port

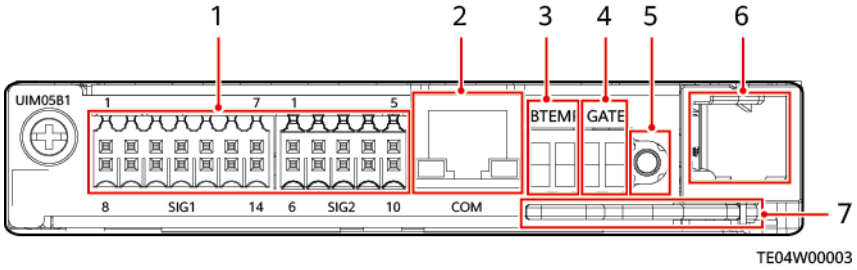
Pin	Signal	Description
1	RX+	Receive data over RS485.
2	RX-	
3	Null	-

Pin	Signal	Description
4	TX+	Transmit data over RS485.
5	TX-	
6	Null	-
7	CANH	CAN bus high level
8	CANL	CAN bus low level

3.2.4 User Interface Module UIM05B1

The user interface module UIM05B1 provides sensor ports, RS485 ports, and dry contact input and output ports to manage the cabinet interior environment of the power system and to report alarms.

Figure 3-18 Panel



(1) Dry contact and sensor ports
(2) COM communications port
(3) Battery temperature sensor port
(4) Door status sensor port
(5) Battery switch port
(6) Cable hole for fan cables
(7) Handle

NOTE

The battery switch is used only when the mains supply is unavailable.

Figure 3-19 Dry contacts

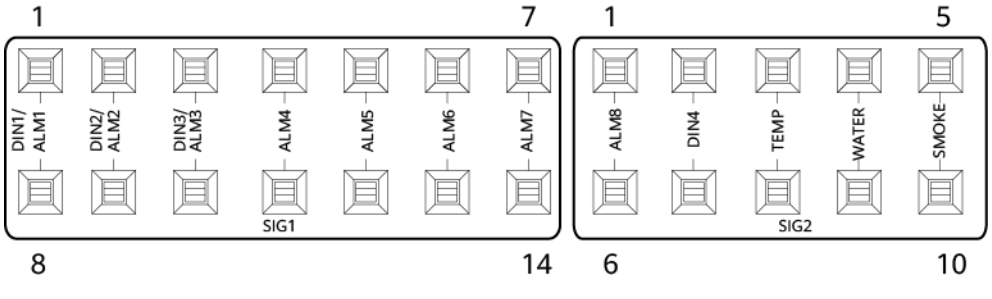


Figure 3-20 COM port pin definitions

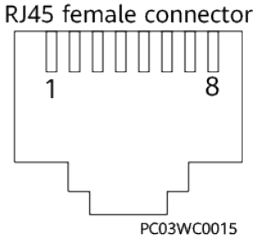


Table 3-18 COM port pin definitions

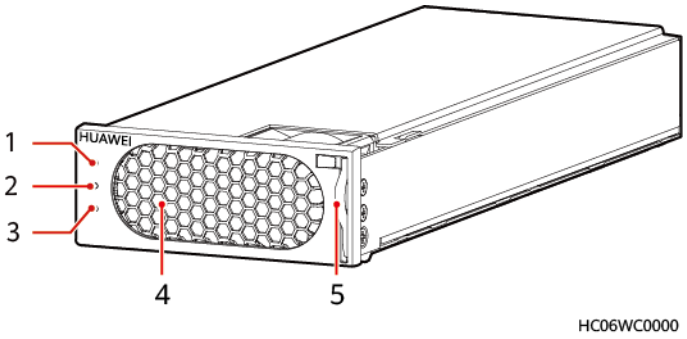
Pin	Signal	Description
1	RS485_RX+	RS485 data, positive
2	RS485_RX-	RS485 data, negative
3	12 V	Power supply
4	RS485_TX+	RS485 data, positive
5	RS485_TX-	RS485 data, negative
6	GND	Ground
7	Reserved	–
8	GND	Ground

3.2.5 PSU (R4875G5/R4850G5)

The R4875G5 or R4850G5 is an efficient rectifier that converts AC power into DC power.

Appearance

Figure 3-21 PSU



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) Air intake vent (5) Handle

Functions

- Converts AC power into 48 V DC power.
- Works reliably and efficiently.

Table 3-19 PSU function description

Item	Function
Hot swap	Hot swappable
Input protection	• Input overvoltage and undervoltage protection • Input overcurrent protection
Output protection	• Output overvoltage protection • Output short-circuit protection • Output current limiting protection
Overtemperature protection	Overtemperature protection

Indicators

Table 3-20 PSU indicator description

Indicator	Color	Status	Description
Power indicator	Green	Steady on	The PSU has an AC input.
		Off	The PSU has no AC input.
			The PSU is faulty.
		Blinking at 0.5 Hz	The PSU is being queried.
		Blinking at 4 Hz	The PSU is loading an application program.
Alarm indicator	Yellow	Off	No alarm is generated.
		Steady on	• The PSU has generated a pre-warning indicating that power will be limited due to ambient overtemperature. • The PSU has generated a protection shutdown alarm due to ambient overtemperature or undertemperature.
			AC input overvoltage or undervoltage protection has been triggered.

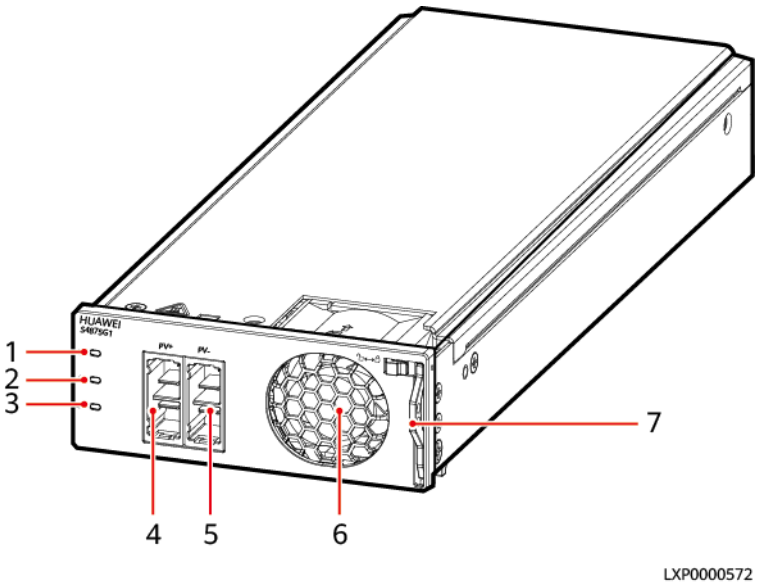
Indicator	Color	Status	Description
			The PSU is in hibernation state.
		Blinking at 0.5 Hz	The communication between the PSU and the external device is interrupted.
Fault indicator	Red	Off	The PSU is proper.
		Steady on	The PSU locks out due to output overvoltage.
			The PSU has no output due to an internal fault.

3.2.6 (Optional) S4875G1

The S4875G1 is a DC-DC converter that supports the maximum power point track (MPPT) function and provides 48 V DC output. It automatically enables solar cells to work at the maximum power point of the output power curves, fully utilizing solar energy.

Panel

Figure 3-22 panel



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) PV positive input port (5) PV negative input port (6) Air intake vent

(7) Handle

Indicators

Table 3-21 Indicators on the S4875G1

Indicator	Color	State	Description	Suggestion
Power indicator	Green	Steady on	The SSU has PV input.	Normal status
		Off	The SSU has no PV input.	Check that the PV input voltage is normal.
			The SSU is faulty.	Replace the SSU.
		Blinking (0.5 Hz)	The PV input is available, and the SSU is being queried.	The SSU automatically recovers after the loading is finished, and no action is required.
		Blinking (4 Hz)	The PV input is available, and the SSU is loading software.	
Alarm indicator	Yellow	Off	The SSU has no protection alarms.	Normal status
		Steady on	An SSU overtemperature warning occurs.	Ensure that the ventilation vent is unblocked and the ambient temperature is within the normal range.
			An input overvoltage or undervoltage alarm occurs.	Check whether the overvoltage or undervoltage is caused by external faults.
			The SSU is hibernating.	Restart the SSU.
		Blinking (0.5 Hz)	The SSU fails to communicate.	Clean the edge connectors of the SSU. If the indicator is still blinking, check whether the external communication module is faulty.
Fault indicator	Red	Off	The SSU is normal.	Normal status
		Steady on	The SSU locks out due to output overvoltage.	Hot-swap the SSU. If the fault persists, replace the SSU.
			The SSU has no output due to internal faults.	Replace an SSU.
			The SSU is not in position.	Check that the SSU is properly installed.

3.2.7 (Optional) DG Battery Charger BC-1206A

Figure 3-23 BC-1206A exterior

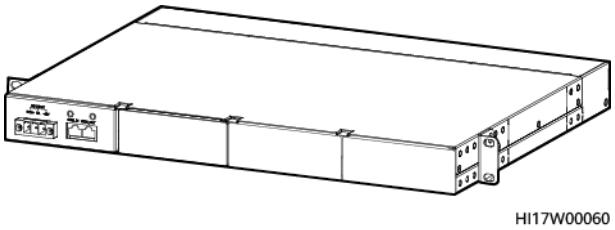
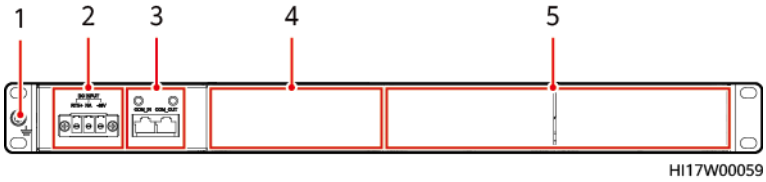


Figure 3-24 BC-1206A interior



(1) Ground screw
(2) DC input
(3) Network ports
(4) Surge protection board (behind the baffle plate)
(5) Slots for the BCU-1203A

Description

Table 3-22 BC-1206A function description

Function	Description
DC module	The BC-1206A can integrate two BCU-1203A modules, each with one –48 V DC input and one 13.50 V DC/3 A output.
Input protection	• Protects against input undervoltage. • Protects against input overcurrent. • Protects against input reverse connection.
Output protection	• Protects against output overvoltage. • Protects against output current limiting. • Protects against output short circuits. • Protects against output reverse connection. • Protects against output overtemperature. • Isolates output faults.

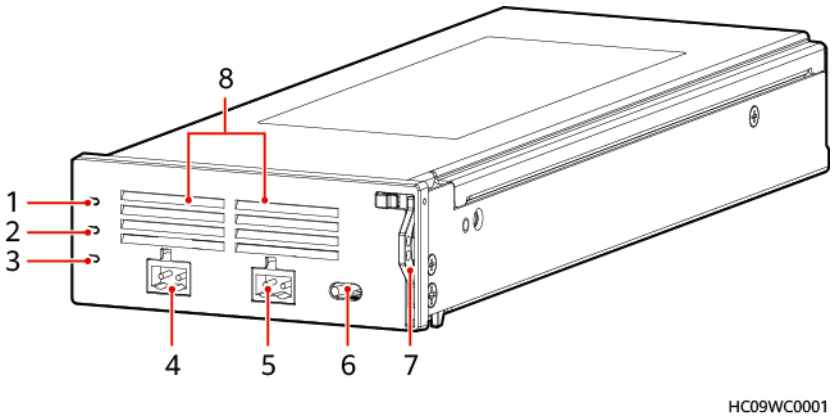
Technical Specifications

Table 3-23 BC-1206A technical specifications

Item	Specifications
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 330 mm (including mounting ears)
Weight	≤ 10 kg
Input operating voltage	–40 V DC to –60 V DC
Output voltage	13.5 V; max. 6 A (max. 3 A for a single BCU)
Output power	81 W

3.2.8 (Optional) DG Battery Charger Module BCU-1203A

Figure 3-25 BCU-1203A exterior



(1) Power indicator

(2) Indicator of CAN bus communication exception and output current limiting

(3) Fault indicator

(4) DC output port for supplying power to the DG battery

(5) Auxiliary DC output port

(6) Power switch

(7) Handle

(8) Air intake vent

Function

Table 3-24 BCU-1203A function description

Function	Description
DC-DC conversion	Converts –48 V DC into 12 V DC to charge the DG battery.

Function	Description
Input protection	• Protects against input undervoltage. • Protects against input reverse connection.
Output protection	• Protects against output current limiting. • Protects against output short circuits. • Protects against output reverse connection.
Alarm protection	Indicates alarms by indicators.

Technical Specifications

Table 3-25 BCU-1203A technical specifications

Item	Specifications
Dimensions (H x W x D)	44.5 mm x 105 mm x 268.5 mm
Weight	≤ 2 kg
Input operating voltage	–36 V DC to –60 V DC
Output voltage	Rated voltage: 13.5 V DC
Number of outputs	2 (BAT_OUT_A max. output 3 A, DG battery connection supported; AUX_OUT_C max. output 1 A)
Total output power	81 W

Indicators

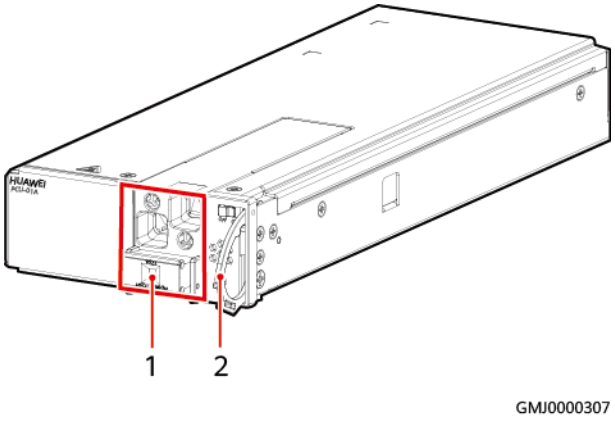
Table 3-26 Indicator definition

Indicator	Color	Normal State	Abnormal State	Reason
Power indicator	Green	On	Off	The green indicator is steady on when the charger is working properly.
Indicator of CAN bus communication exception and output current limiting	Yellow	Off	On Blinking	The yellow indicator is on when the output current is limited. The yellow indicator is blinking if the CAN bus communication is abnormal.

Indicator	Color	Normal State	Abnormal State	Reason
Fault indicator	Red	Off	On	The red indicator is on if the output is abnormal due to input overvoltage, input undervoltage, output short circuit, output reverse connection, overtemperature protection, or any other internal fault.

3.2.9 (Optional) Protocol Converter Unit PCU-01A

Figure 3-26 PCU-01A exterior



(1) Circuit breaker (2) Handle

Function

The PCU-01A converts MBUS signals into CAN signals. Supports hot swap.

Technical Specifications

Table 3-27 PCU-01A technical specifications

Item		Specifications
DC input	Input voltage	43.2–58 V DC
	Input current	Max. 80 A
	Input circuit breaker	1×100 A

Item		Specifications
DC output	Output voltage	43.2–58 V DC
	Output current	Max. 80 A
Structure	Dimensions (H x W x D)	40.8 mm × 105 mm × 284 mm
Surge Protection	Input port	Differential mode, common mode: 2 kV/4 kV
	Edge connector port	Differential mode, common mode: 2 kV/4 kV
	CAN communications port	Differential mode, common mode: 2 kV/4 kV

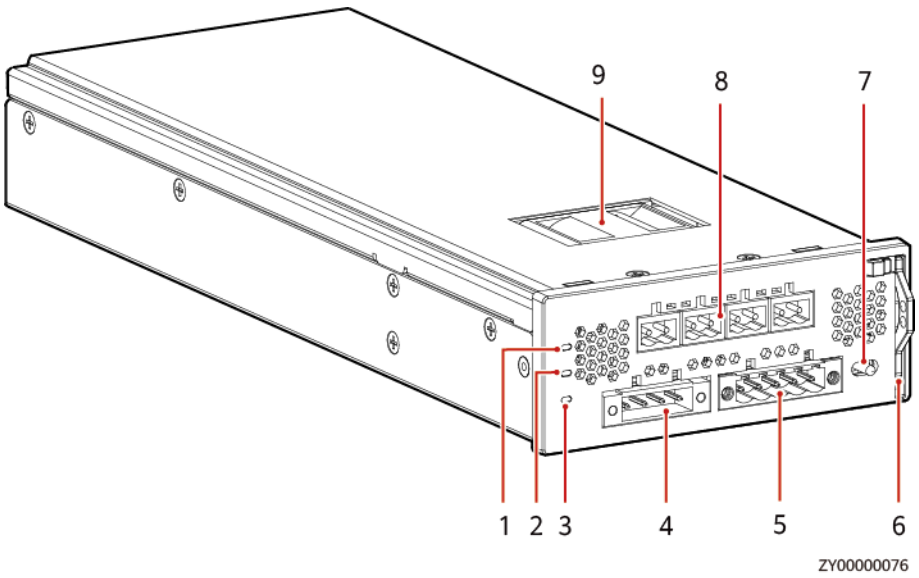
3.2.10 (Optional) Power Module M48500N1

CAUTION

Do not connect multiple M48500N1 modules in parallel. Otherwise, the modules may be damaged.

The power module M48500N1 is a DC-to-DC or DC-to-AC converter that operates over an input from 40 V DC to 60 V DC. The power module supports three output voltages: 12 V DC (output power: 100 W), 24 V DC (output 200 W), and 24 V AC (output power: 200 W).

Figure 3-27 Appearance



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) Two 12 V DC outputs (5) Two 24 V DC outputs (6) Handle

(7) ON/OFF switch (used to turn on/turn off the output) (8) Four 24 V AC outputs (9) Fan

Indicator

Table 3-28 Description of the indicators

Item	Color	Status	Description
Power indicator	Green	Off	• The power module is faulty. • There is no DC input.
		Steady on	The DC input is available and the power system is working properly.
		Blinking slowly (0.5 Hz)	The DC input is available and the module is being queried.
		Blinking fast (4 Hz)	The DC input is available and the module is loading software.
Alarm indicator	Yellow	Steady on	• An ambient overtemperature alarm is generated. • Overtemperature protection is triggered. • Undertemperature protection is triggered. • The 12 V DC, 24 V DC, or 24 V AC output is turned off. • The power module is hibernating. (In this mode, only the protection indicator is on and no alarm is reported.) • A DC input overvoltage or undervoltage alarm is generated. • The 12 V DC, 24 V DC, or 24 V AC output experiences overcurrent, short circuit, or over power.
		Off	The power module is normal.
		Blinking slowly (0.5 Hz)	The power module fails to communicate.
Fault indicator	Red	Off	The power module is normal.

Item	Color	Status	Description
		Steady on	• Internal communication fails. • The fan is faulty. • The power module shuts down due to output overvoltage. • The power module shuts down due to internal overtemperature. • No output or emergency shutdown due to internal causes. • A 12 V DC, 24 V DC, or 24 V AC output undervoltage alarm is generated. • The switch on the panel of the module is OFF.

Technical Specifications

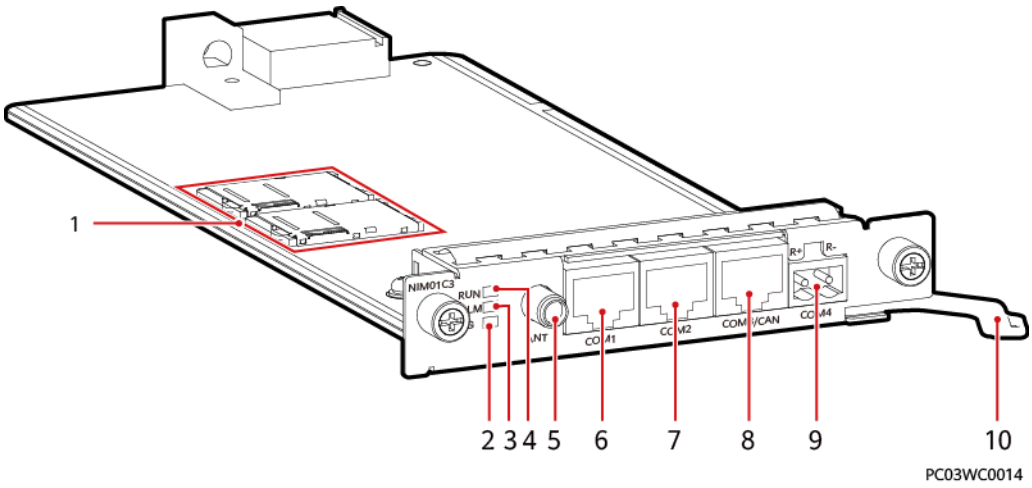
Table 3-29 Technical specifications

Item	Specifications
Input voltage range	40–60 V DC
Maximum input current	16.3 A (Rated value: 12.5 A)
Output voltage	DC output voltage range: 12–13.2 V DC
	DC output voltage range: 24–28.2 V DC
	AC output voltage range: 24–26.4 V AC (rated output frequency: 50 Hz)
Dimensions (H x W x D)	40.8 mm x 105 mm x 281 mm
Weight	< 2 kg
Surge protection	DC output port: ±3 kA in differential mode, ±5 kA in common mode

3.2.11 (Optional) Communications Expansion Module NIM01C3

It is mainly used for 4G communication. It can also extend the RS485/CAN port of the main control board or extend the southbound communication equipment.

Figure 3-28 Panel



(1) SIM card slots (2 PCS)
(2) 4G indicator
(3) Alarm indicator
(4) Run indicator
(5) ANT antenna port
(6) COM1 port
(7) COM2 port
(8) COM3/CAN port
(9) COM4 port
(10) Handle

Indicators

Table 3-30 Indicator description

Item	Color	Status	Description
4G indicator	Green	Steady on	The dial-up connection is in the data service state.
		Blinking for a period of 2s (on for 0.1s and then off for 1.9s)	A network has been registered.
		Blinking for a period of 2s (on for 0.1s, off for 0.1s, on for 0.1s, and then off for 1.7s)	Network search is in progress, or no available network is connected.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm is generated.
Run indicator	Green	Off	The NIM01C3 is not running because it is faulty or has no DC input.
		Blinking slowly (0.5 Hz)	The NIM01C3 is running and communicating with the host properly.

Item	Color	Status	Description
		Blinking fast (4 Hz)	The NIM01C3 is running properly, but fails to communicate with the host.

Communications Ports

Table 3-31 Communications port description

Communications Port	Communications Parameter	Description
COM1 port	Baud rate: 9600 bits/s, 19200 bits/s, or 115200 bit/s	Supports master/slave protocols and Modbus. Supplies 12 V power.
COM2 port	Baud rate: 9600 bits/s, 19200 bits/s, or 115200 bit/s	Supports master/slave protocols and Modbus. Supplies 12 V power.
COM3/CAN port	Baud rate: 9600 bit/s	COM3: Supports master/slave protocols and Modbus. CAN: Supports the CAN protocol.
COM4 port	Baud rate: 9600 bits/s, 19200 bits/s, or 115200 bit/s	Supports Modbus.

Figure 3-29 Pins in the COM1, COM2, and COM3 ports

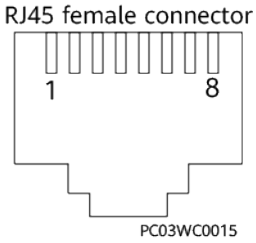


Table 3-32 Pin definitions for the COM1 and COM2 ports

Pin	Signal	Description
1	RS485+	RS485 data+
2	RS485-	RS485 data–

Pin	Signal	Description
3	12 V	Power supply
4	RS485+	RS485 data+
5	RS485-	RS485 data–
6	Reserved	-
7	Reserved	-
8	GND	Ground

Table 3-33 Pin definitions for the COM3/CAN port

Pin	Signal	Description
1	RS485_RX+	Receives data over RS485.
2	RS485_RX-	
3	Reserved	-
4	RS485_TX+	Transmits data over RS485.
5	RS485_TX-	
6	GND	Ground
7	CANH	CAN bus high level
8	CANL	CAN bus low level

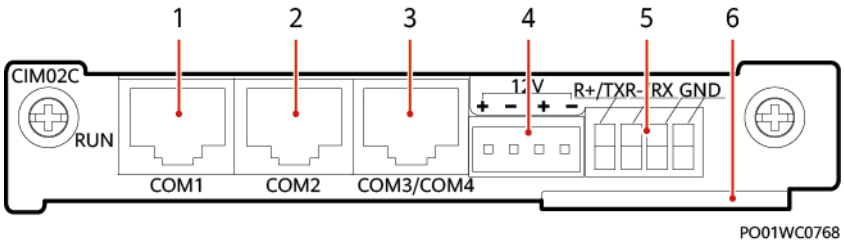
Table 3-34 Pin definitions for the COM4 port

Silk Screen	Signal	Description
R+	RS485+	RS485 data+
R-	RS485-	RS485 data–

3.2.12 (Optional) Communications Expansion Module CIM02C

It is used to extend the RS485/CAN port of the main control board and provides 12 V power supply for the southbound equipment.

Figure 3-30 Panel



(1) COM1 port (2) COM2 port (3) COM3/COM4 port

(4) 12 V power port (5) COM5 port (6) Handle

Table 3-35 Communications port description

Communications Port	Description	Communications Parameter
COM1 port	Supports RS485. Supplies 12 V power. Connects to a smart device, such as a digital temperature and humidity sensor or an electricity meter.	Baud rate: Default value: 9600 bit/s Options: 9600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s
COM2 port	Supports RS485. Supplies 12 V power. Connects to a smart device.	
COM3/COM4 port	COM3 supports RS485. COM4 supports RS232 and CAN. RS232 is used by default, which can be changed to CAN by using a jumper. For the operation method, see appendix. Connects to the power system.	
COM5 port	Supports RS232 and RS485. RS485 is used by default, which can be changed to RS232 by using a jumper. For the operation method, see appendix. Connects to an air conditioner.	

Figure 3-31 Pins in the COM1/COM2/COM3/COM4 ports

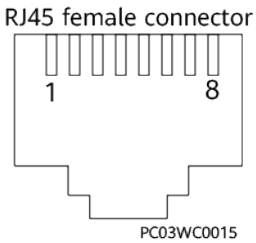


Table 3-36 Pin definitions for the COM1 and COM2 ports

Pin	Signal	Description
1	RS485_RX+	Receives data over RS485.
2	RS485_RX-	
3	12 V	Power supply
4	RS485_TX+	Transmits data over RS485.
5	RS485_TX-	
6	Reserved	-
7	Reserved	-
8	GND	Ground

Table 3-37 Pin definitions for the COM3/4 port

Pin	Signal	Description
1	RS485_RX+	Receives data over RS485.
2	RS485_RX-	
3	RS232_RXD	Receives data over RS232.
4	RS485_TX+	Transmits data over RS485.
5	RS485_TX-	
6	GND	Ground
7	CANH/ RS232_TXD	CAN data +/Transmits data over RS232.
8	CANL	CAN data –

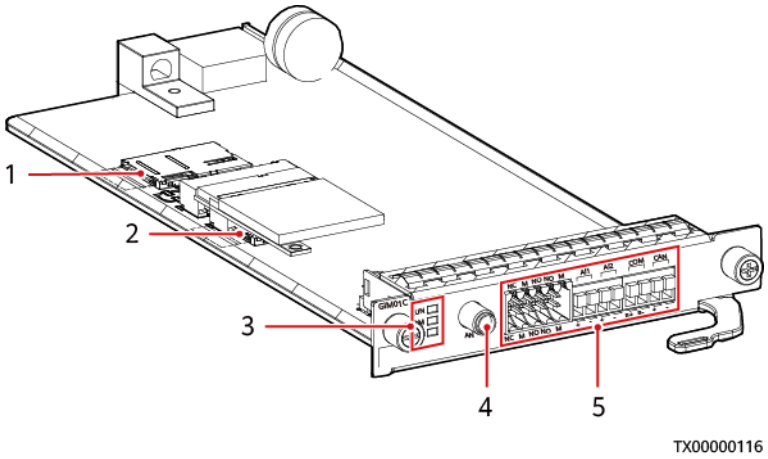
Table 3-38 Pin definitions for the COM5 port

Silk Screen	Signal	Description
R+/TX	RS485+/ RS232_TXD	RS485 data + or transmits data over RS232.
R-/RX	RS485-/ RS232_RXD	RS485 data – or receives data over RS232.
GND	GND	Ground

3.2.13 (Optional) DG Expansion Module GIM01C2

The GIM01C2 starts or shuts down a genset and supports northbound wireless communication.

Figure 3-32 GIM01C2 interior



(1) SIM card slot 2 (2) SIM card slot 1 (3) Indicators

(4) ANT antenna port (5) Ports

Indicators

Figure 3-33 GIM01C2 indicators

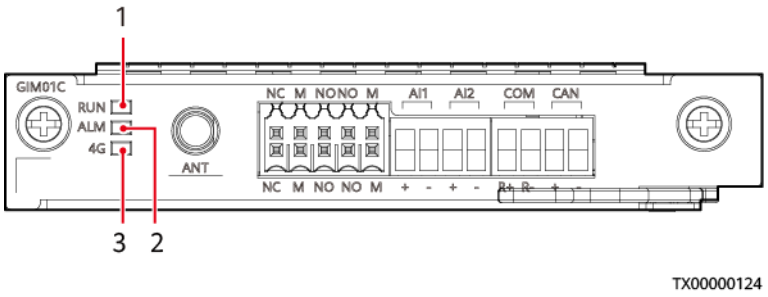


Table 3-39 Indicator description

No.	Item	Color	Status	Description
1	Running indicator (RUN)	Green	Off	The module is faulty or has no DC input.
			Blinking slowly (0.5 Hz)	The module is running and communicating with the host properly.
			Blinking fast (4 Hz)	The module is running but fails to communicate with the host.

No.	Item	Color	Status	Description
2	Alarm indicator (ALM)	Red	Reserved	
3	4G indicator (4G)	Green	Steady on	The dial-up connection is in the data service state.
			Blinking at intervals of 2s (on for 0.1s and then off for 1.9s)	A network has been registered.
			Blinking at intervals of 2s (on for 0.1s, off for 0.1s, on for 0.1s, and then off for 1.7s)	Network search is in progress or no available network is found.

Ports

Figure 3-34 Ports on the GIM01C2

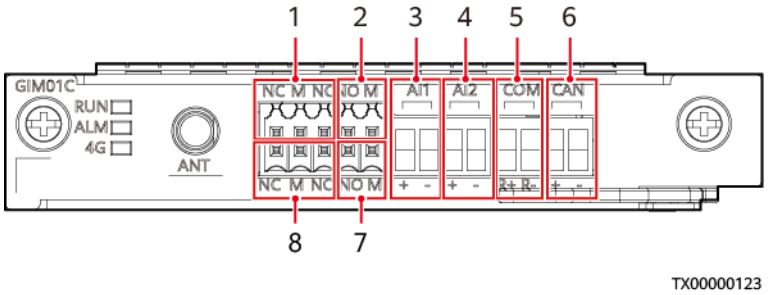


Table 3-40 Port description

No.	Port Type	Silk Screen	Port Description	Description
1 and 8	Genset control port	NC	DO normally closed port	Control genset startup and shutdown.
		M	Common port	
		NO	DO normally open port	
2 and 7	Genset reset port	M	Common port	The genset resets if the ports are closed.
		NO	DO normally open port	

No.	Port Type	Silk Screen		Port Description	Description
3	Fuel level detection port	AI1	+	+12 V power supply	Detect the fuel level.
			-	Analog signal	
4		AI2	+	+12 V power supply	
			-	Analog signal	
5	Communications port	COM	R+	RS485 data, positive	Used for RS485 communication.
			R-	RS485 data, negative	
6		CAN	+	CAN data, positive	Used for CAN communication.
			-	CAN data, negative	

3.2.14 (Optional) PVDU-80A1

The PVDU-80A1 is a photovoltaic distribution unit (PVDU) that converts solar energy input into stable –48 V DC output to power telecommunications equipment. It applies to solar access scenarios.

Figure 3-35 PVDU exterior

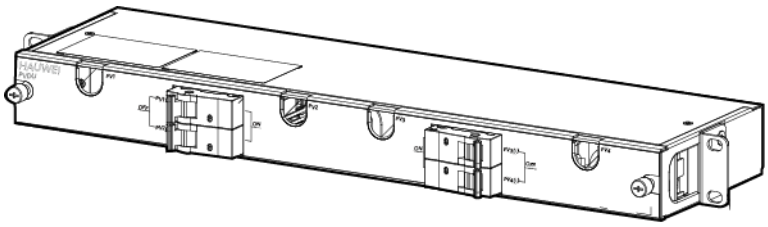
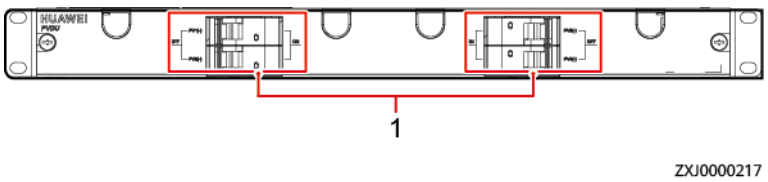


Figure 3-36 PVDU interior



(1) PV input circuit breakers

Table 3-41 PVDU-80A1 technical specifications

Item	Specifications
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 122 mm (including mounting ears)
Weight	2.6 kg
Input	70–150 V DC; max. 4x60 A
Output	70–150 V DC; max. 4x60 A
Installation mode	Installed in a 19-inch rack
Cabling mode	Routed in from the left and right
Maintenance mode	Maintained from the front
Operating temperature	–20°C to +65°C
Storage temperature	–40°C to +70°C
Operating humidity	5%–95% RH (non-condensing)
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)
Protection level	IP20

3.2.15 (Optional) PVDU-150A1

Figure 3-37 PVDU-150A1 exterior

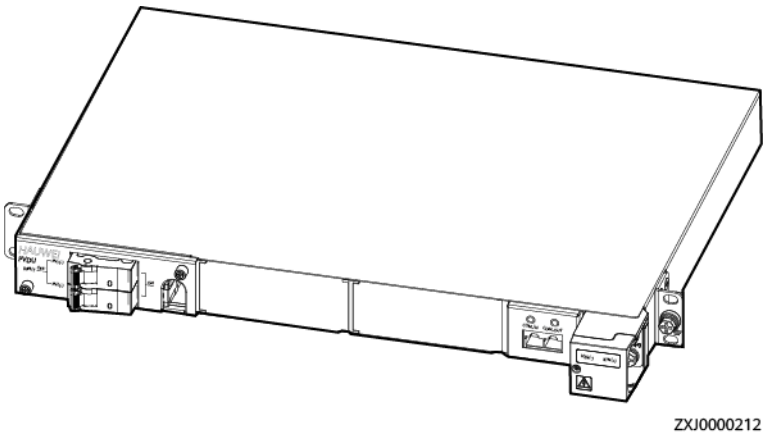
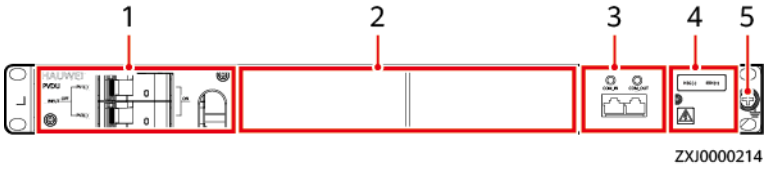


Figure 3-38 PVDU-150A1 interior



(1) Solar input circuit breakers (2) Space for SSUs (3) Network ports

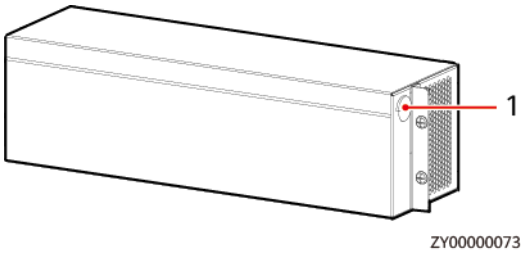
(4) DC output wiring terminal (5) Ground screw

Table 3-42 PVDU-150A1 technical specifications

Item	Specifications
Dimensions (H x W x D)	43.6 mm x 482.6 mm x 330 mm (including mounting ears)
Weight	2.9 kg
Input	60–150 V DC; 2×58A max.
Output	43.2–58V DC; rated value: 48 V DC; 150A max.
Installation mode	Installed in a 19-inch rack
Cabling mode	Routed in from the left and right and routed out from the front
Maintenance mode	Maintained from the front
Operating temperature	–20°C to +65°C
Storage temperature	–40°C to +70°C
Operating humidity	5%–95% RH (non-condensing)
Altitude	0–4000 m. (When the altitude ranges from 2000 m to 4000 m, high temperature derating applies and the operating temperature decreases by 1°C for each additional 200 m.)
IP rating	IP20

3.2.16 (Optional) Air Purifier

Figure 3-39 Appearance



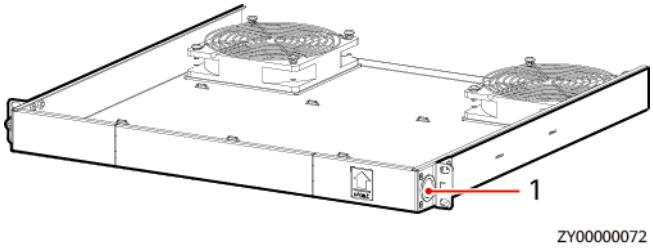
(1) Wiring port

NOTE

In the system, the air purifier fan is fan 2.

3.2.17 (Optional) Fan Assembly (FAN-S04)

Figure 3-40 Appearance



(1) Wiring port

NOTE

The two fans in the fan assembly are fan 1 and fan 3, and they are flow fans.

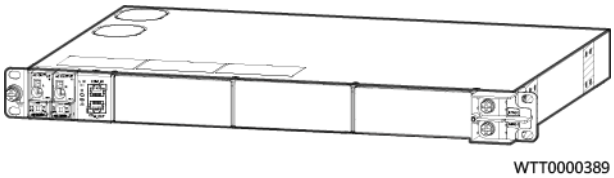
3.2.18 (Optional) Inverter

The ETP23006-C1A1 converts –48 V DC power into 220 V AC/230 V AC power and supplies high-performance power to AC devices.

3.2.18.1 Inverter ETP23006-C1A1

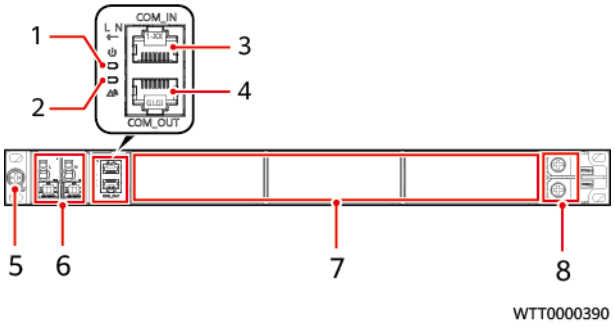
Appearance

Figure 3-41 ETP23006-C1A1 appearance



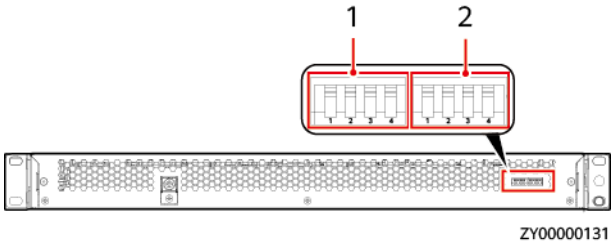
Interior

Figure 3-42 ETP23006-C1A1 interior (front view)



(1) Power indicator
(2) Fault indicator
(3) COM_IN port
(4) COM_OUT port
(5) Ground screw
(6) AC output circuit breakers
(7) Inverter modules (I23002G1)
(8) -48 V DC input terminals

Figure 3-43 ETP23006-C1A1 interior (rear view)



(1) First group of DIP switches
(2) Second group of DIP switches

Technical Specifications

Table 3-43 Technical specifications

Item		ETP23006-C1A1
Dimensions (H x W x D)		43.6 mm x 442.6 mm x 330 mm
Weight		5 kg
Cabling		Routed in and out from the front
Rated output capacity		3*2000VA/3*1600W
DC input	Rated voltage	53.5 V DC
	Rated current	120 A
AC output	Output voltage	230 V AC±3%
	Output frequency	50Hz±1%
	Number of outputs	One 63 A AC output (circuit breaker: 63 A/1P x 2)

DIP Switch

The DIP switches are on the rear of the embedded power subrack and horizontally placed and divided into two groups. Each group has four DIP switches, which are DIP1, DIP2, DIP3, and DIP4 from left to right. A DIP switch is set to OFF when it is flipped upward and to ON when it is flipped downward, as shown in **Figure 3-44**. The digit 0 indicates OFF, and 1 indicates ON.

Figure 3-44 DIP switches

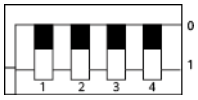
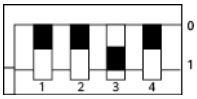


Table 3-44 Default settings

Item	DIP Switch Setting	Factory Default Value
First group of DIP switches		0000
Second group of DIP switches		0010

NOTE

The two groups of DIP switches of the embedded power system are set by default before delivery.

Indicator

Table 3-45 Indicator description

Indicator	Status	Description
Power indicator	Steady on (Green)	There is DC input and the power system is working properly.
	Off	There is no DC input.
	Blinking (green, 4 Hz)	There is DC input and the power system is loading software.
Fault indicator	Steady on (red)	SPD fault, industrial-frequency synchronization exception, carrier synchronization exception, INV_BPS exception, parallel CAN exception, hardware address exception, phase address exception, or multi-host conflict

Indicator	Status	Description
	Off	Normal

Communications Port

Table 3-46 Communications port description

Communications Port	Communications Parameter	Communications Protocol	Function
COM_IN port	Baud rate: 125 kbit/s	CAN protocol	Connects to an upper-level device, such as a Huawei SMU02C.
COM_OUT port			Connects to a lower-level device, such as a lithium battery.
NOTE All these ports are protected by a security mechanism.			

Figure 3-45 Pin definitions for communications ports

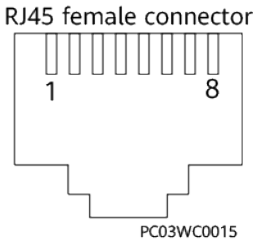


Table 3-47 Pin definitions for the COM_IN port

Pin	Signal	Description
1, 2, 3, 4, 5, and 6	None	-
7	CANH	CAN bus high level
8	CANL	CAN bus low level

Table 3-48 Pin definitions for the COM_OUT port

Pin	Signal	Description
1, 2, and 3	None	-

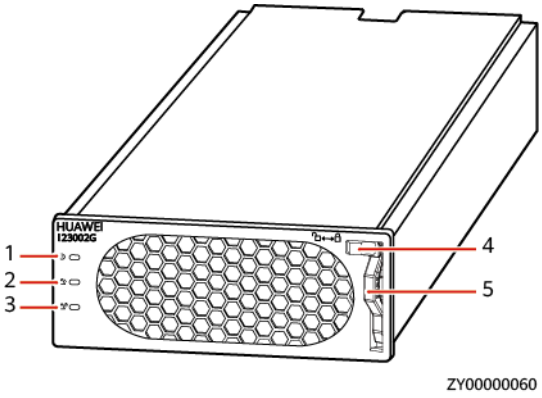
Pin	Signal	Description
4	NO	Pins 4 and 6 are normally open (NO), and pins 5 and 6 are normally closed (NC).
5	NC	
6	COM	
7	CANH	CAN bus high level
8	CANL	CAN bus low level

3.2.18.2 Inverter Module I23002G1

The I23002G1 is an inverter module that supports DC/AC conversion. The input voltage ranges from 42 V DC to 58 V DC, and the rated output voltage is 220 V AC/230 V AC.

Appearance and Panel

Figure 3-46 Appearance



(1) Power indicator (2) Alarm indicator (3) Fault indicator

(4) Locking latch (5) Handle

Features

Table 3-49 Inverter module features

Item	Features
Hot swapping	Supports hot swapping
Cooling mode	Built-in fan (fan speed adjustable)

Indicator

Table 3-50 Indicator description of an inverter module

Indicator	Status	Description	Troubleshooting
Power indicator	Steady on (Green)	The inverter module has DC input.	Normal status
	Off	The inverter module has no DC input.	Check that the DC voltage input is normal.
		The inverter module is faulty.	Replace the inverter module.
	Blinking (Green, 0.5 Hz)	The DC input is available, and the inverter module is being queried.	The indicator is steady on when the query is exited or the software is being loaded.
	Blinking (Green, 4 Hz)	The DC input is available, and the inverter module is loading software.	
Alarm indicator	Off	The inverter module has no protection alarms.	Normal status
	Steady on (Yellow)	An inverter module overtemperature warning occurs.	Ensure that the ventilation vent is unblocked and the ambient temperature is within the normal range.
		A DC input overvoltage or undervoltage alarm occurs. An AC output overvoltage or undervoltage alarm occurs.	Check whether the overvoltage or undervoltage is caused by the external input
		An output short circuit, overload timeout protection.	Rectify the load fault.
		The level-2 phase lock fails.	Remove and reinstall the inverter module.
		The inverter module is hibernating.	Restart the inverter module.
	Blinking (Yellow, 0.5 Hz)	The inverter module fails to communicate.	Clean the edge connectors of the inverter module, if the indicator is still blinking, check whether the external communication module is faulty.
Fault indicator	Off	The inverter module is normal.	Normal status
	Steady on (Red)	The inverter module has no output due to internal faults.	Replace the inverter module.

Indicator	Status	Description	Troubleshooting
		The inverter module is not in position.	Check that the inverter module is properly installed.

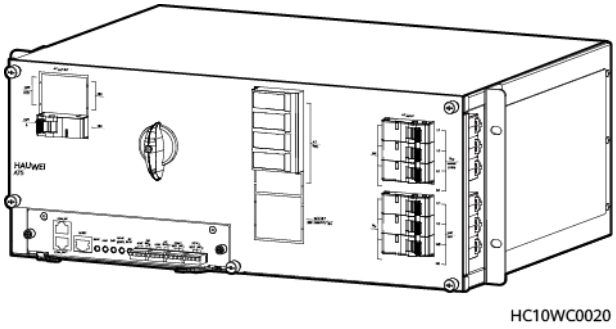
NOTE

1. Rectify a fault by referring to the preceding troubleshooting methods.
2. If the fault persists, replace the inverter module.
3. Return the faulty inverter module to Huawei for repair.

3.2.19 (Optional) AC Transfer Switch ATS-63A2

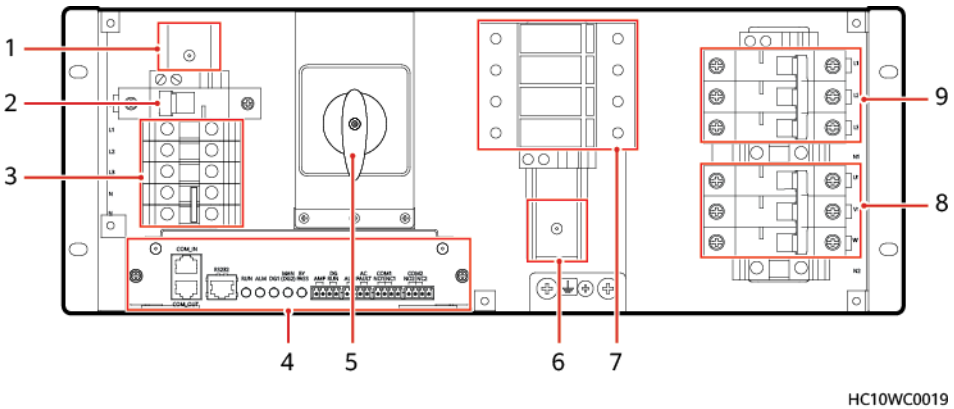
Exterior

Figure 3-47 ATS exterior



Interior

Figure 3-48 ATS interior



(1) Space for a residual current device (RCD)

(2) 10 A AC output circuit breaker

(3) Three-phase AC output terminals

(4) ATS main control box

(5) Transfer switch

(6) Space for a maintenance socket

(7) SPD (8) DG 1 input circuit breakers (9) Mains/DG 2 input circuit breakers

Functions

The ATS is an automatic switch system integrating control and power distribution. It supports and detects the three-phase inputs from two power sources (DG 1 and mains or DG 1 and DG 2) and switches between the two power inputs. The power source can switch to DG 1 by turning the bypass switch. The following table describes the ATS functions.

Table 3-51 ATS function description

Function	Description
Rated input power	200 V–240 V/346 V–415 V; three-phase; 50 Hz/60 Hz; max. 63 A
Rated output power	200 V–240 V/346 V–415 V; three-phase; 50 Hz/60 Hz; max. 63 A
AC power distribution	Provides one route of three-phase AC power distribution for downstream loads, one 10 A AC output, and one reserved maintenance socket output.
Power source switching	Provides a bypass switch that allows the power source to switch to DG 1.
Monitoring	Monitors the voltage, current, frequency, and power factor of three-phase outputs.
Protection	Protects against mains overvoltage, mains undervoltage, DG overvoltage, and DG undervoltage.
Alarming	Generates alarms for mains open phase and DG open phase.
AC surge protection	Nominal discharge current In: 20 kA (8/20 μs); maximum discharge current Imax: 40 kA (8/20 μs)
Port surge protection	Alarm port: 5 kA, 8/20 μs; in-cabinet CAN port: 250 A, 8/20 μs

Technical Specifications

Table 3-52 ATS technical specifications

Item	Specifications
Dimensions (H x W x D)	175 mm x 482.6 mm x 310 mm (including mounting ears)
Weight	20 kg

Working Mode

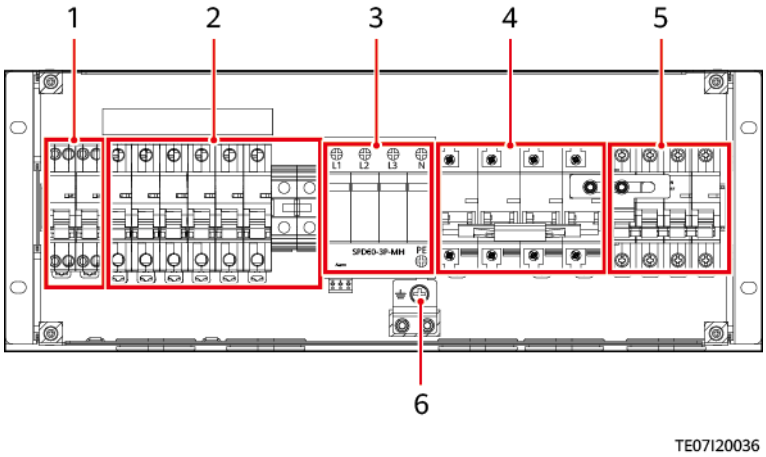
The ATS can work in automatic mode (AUTO) or manual mode (BYPASS).

3.2.20 (Optional) AC Distribution Unit ACDB380-63-2B

The ACDB380-63-2B is used to connect to the mains and DG input. It supports three-phase four-wire AC output and single-phase AC output.

Panel

Figure 3-49 Panel



(1) Single-phase AC output circuit breakers	(2) Three-phase four-wire AC output circuits breaker and N terminal	(3) SPD
(4) Mains AC input circuit breakers	(5) DG AC input circuit breakers	(6) Ground screw

Technical Specifications

Table 3-53 Technical Specifications

Item	Specifications
Operating temperature	–20°C to +50°C
Dimensions (H x W x D)	72.7 mm x 482.6 mm x 175 mm
Weight	6 kg
Operating voltage	220 V three-phase four-wire input, 50/60 Hz
AC power distribution	• AC input circuit breaker: Mains: 1 x 125 A/4P; DG: 1 x 63 A/4P; mechanical interlock • AC output circuit breaker: Three-phase four-wire: 2 x 63 A/3P; single-phase: 2 x 16 A/P

Item	Specifications
Surge protection level	Nominal lightning strike discharge current: 30 kA (8/20 μs); maximum lightning strike discharge current: 60 kA (8/20 μs)
IP rating	IP20

3.2.21 (Optional) Power Distribution Unit PDU2000-16-1PH-7

Appearance and Panel

Figure 3-50 Appearance of the PDU2000-16-1PH-7

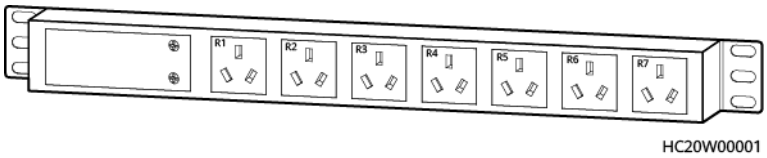
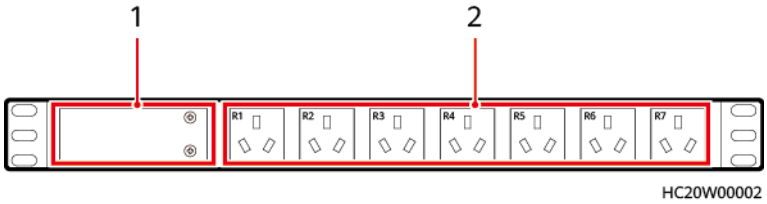


Figure 3-51 PDU panel



(1) Input terminal (behind the cover)

(2) Output sockets

Technical Specifications

Table 3-54 PDU2000-16-1PH-7 technical specifications

Item	Specifications
Dimensions (H x W x D)	44.5 mm x 44.5 mm x 484 mm
Weight	About 2.4 kg
Operating voltage	220–240 V AC
Output voltage	220–240 V AC
Output current	10 A for each route; maximum system output: 32 A

3.2.22 (Optional) Power Distribution Unit PDU2000-32-1PH-9

Appearance and Panel

Figure 3-52 Appearance of the PDU2000-32-1PH-9

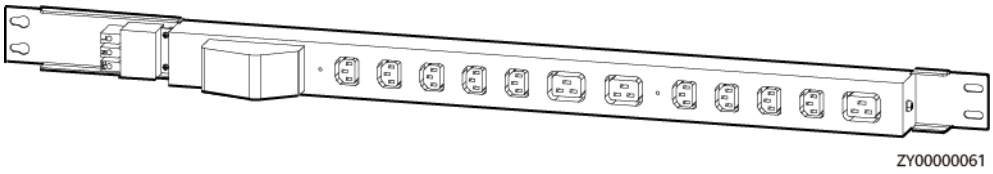
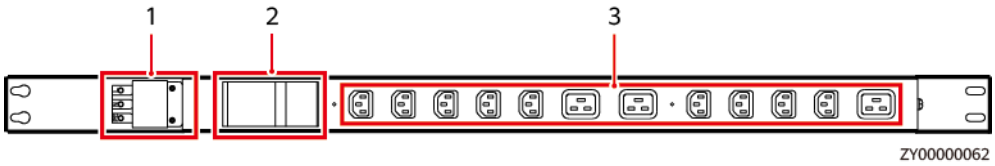


Figure 3-53 PDU panel



(1) Input wiring terminal

(2) Switch of the power distribution bar

(3) AC output socket

Technical Specifications

Table 3-55 PDU2000-32-1PH-9 technical specifications

Item	Specifications
Dimensions (H x W x D)	44.4 mm x 55 mm x 921 mm
Weight	About 10 kg
Operating voltage	220–240 V AC
Output voltage	220–240 V AC
Output current	Nine 10 A outputs and three 16 A outputs

3.2.23 (Optional) AC Distribution Unit ACDB220-63-12B

The ACDB220-63-12B distributes AC power for the power system and provides twelve 16 A AC outputs. It can be installed on a 19-inch rack and has good surge protection capability.

Appearance and Panel

Figure 3-54 Appearance

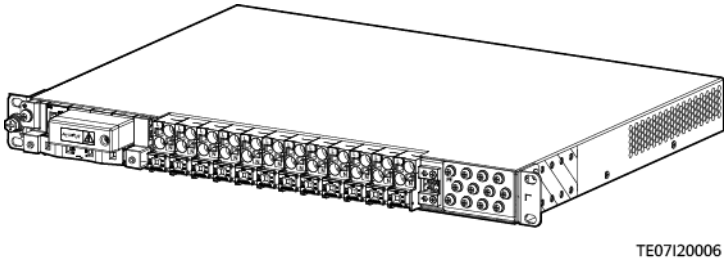
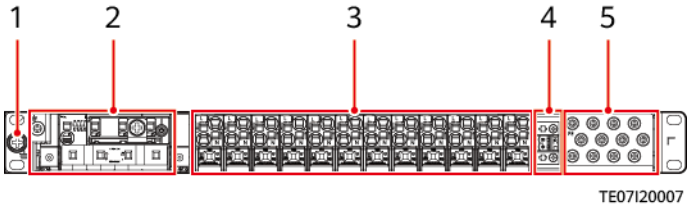


Figure 3-55 Panel



(1) Ground screw

(2) AC input terminals and circuit breaker

(3) AC output power distribution

(4) Surge protection alarm dry contact

(5) PE cable busbar

Technical Specifications

Table 3-56 Technical Specifications

Item	Specifications
Operating temperature	–40°C to +45°C
Dimensions (H x W x D)	43.6 mm x 442 mm x 330 mm
Weight	5 kg
Operating voltage	220 V single-phase input, 50/60 Hz
AC power distribution	• AC input circuit breaker: 1 x 63 A • AC output circuit breaker: 2 x 32 A, 10 x 16 A **NOTE** When the circuit breaker is switched off, the circuit of the live wire is disconnected, but the circuit of the neutral wire is not disconnected.
Surge protection level	Nominal lightning strike discharge current: 30 kA (8/20 µs); maximum lightning strike discharge current: 60 kA (8/20 µs)
IP rating	IP20

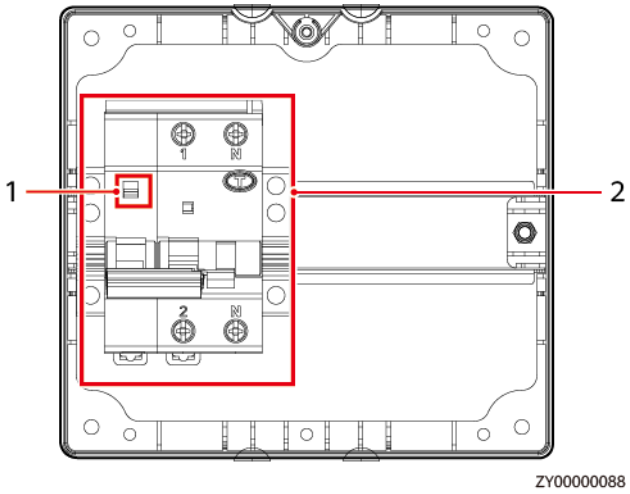
3.2.24 (Optional) Leakage Protection Box ACDB220-40-1B

NOTICE

The RCD supports automatic switch reclosing. If you need to manually power off an RCD, you need to first switch to the manual mode. Otherwise, delayed automatic switch-on will occur in automatic mode.

Panel

Figure 3-56 Panel



(1) Automatic/Manual switch (2) Automatic reclosing RCD

Technical specifications

Table 3-57 Technical specifications

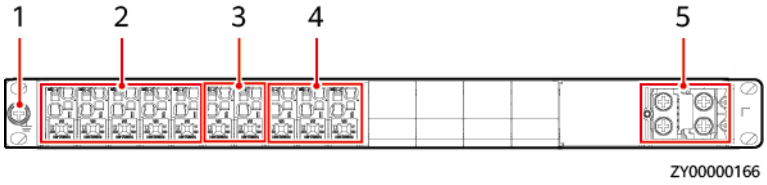
Item	Specifications
Dimensions (H x W x D)	153 mm x 167 mm x 65 mm (excluding the protruding part of the circuit breaker)
Weight	2 kg
Operating temperature	-20°C to +55°C
Transportation temperature	–40°C to +70°C
Storage temperature	–40°C to +70°C

Item	Specifications
Operating humidity	5%~95% (RH)
Storage humidity	5%~95% (RH)
Altitude	0 m~5000 m (When the altitude ranges from 2000 m to 5000 m, high temperature derating applies and the operating temperature decreases by 1°C for each additional 200 m.)

3.2.25 Power Distribution Unit DCDB48-200-16B

The DCDB48-200-16B is a DC power distribution expansion unit that can be installed in a 19-inch rack. It is 1 U high . It is applicable to DC power distribution capacity expansion scenarios.

Figure 3-57 DCDB48-200-16B appearance



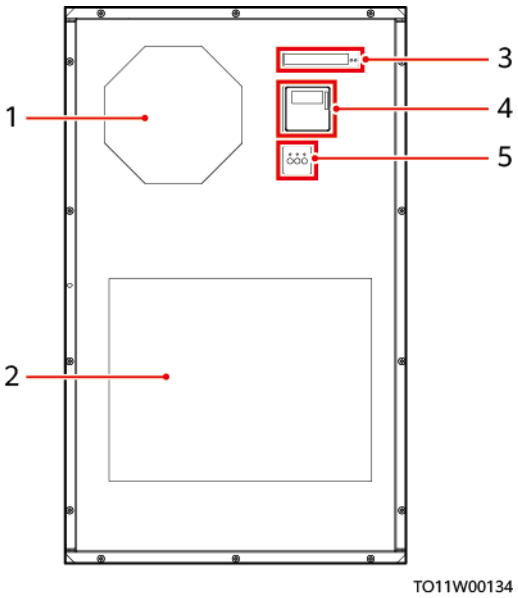
(1) Ground screw
(2) 32 A circuit breaker
(3) 16 A circuit breaker
(4) 10 A circuit breaker
(5) DC input ports

Table 3-58 DCDB specifications

Item	DCDB48-200-16B
Input voltage	40–60 V DC
Total input current	Maximum: 200 A
DC power distribution	five 1-pole 32 A, two 1-pole 16 A, and three 1-pole 10 A circuit breakers
Dimensions (H x W x D)	45 mm x 442 mm x 255 mm
Weight	≤ 5 kg
Installation mode	Installed in a 19-inch rack
Cabling mode	Routed in and out from the front
Maintenance mode	Maintained from the front

3.2.26 DC Air Conditioner PC3000D-2

Figure 3-58 Appearance



(1) Air return vent (2) Air exhaust vent (3) Communications port

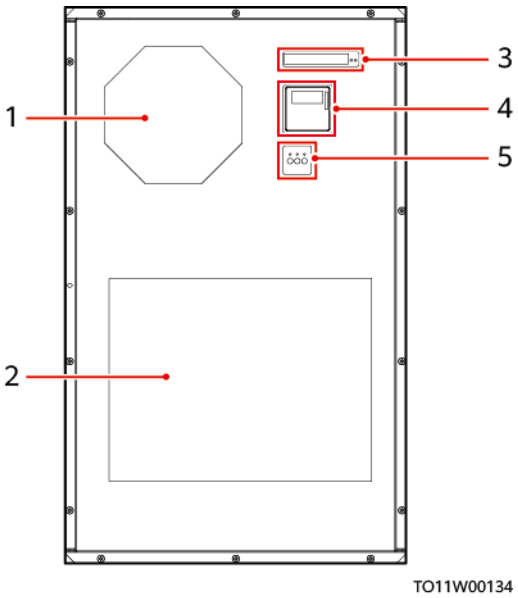
(4) Display panel (5) Power port

Table 3-59 Specifications

Item	Specifications
Rated power (L35/L35)	≤ 950 W
Rated cooling capacity (L35/L35)	≥ 3000 W x 92.5%
Input voltage	–48 V DC
Ambient temperature	–15°C to +55°C
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.)
Relative humidity	5%–95% RH
Noise	GR487, maximum acoustic pressure level: ≤ 65 dB(A) at 1.5 m

3.2.27 DC Air Conditioner PC1500D-1

Figure 3-59 PC1500D-1 appearance



(1) Air intake vent
(2) Air return vent
(3) Communications cable port
(4) LCD
(5) Power cable port

Table 3-60 PC1500D-1 specifications

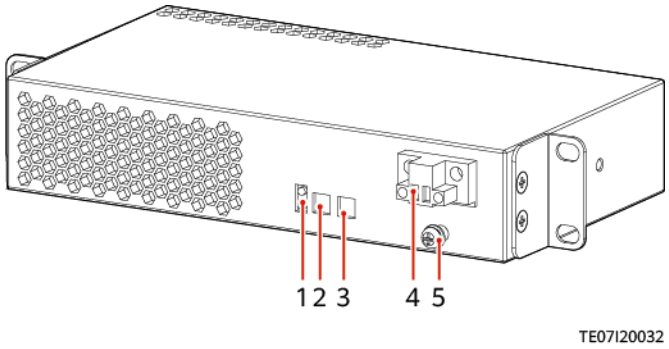
Item	Specifications
Rated power/ current (L35/ L35)	≤ 500 W
Rated cooling capacity (L35/ L35)	≥ 1600 W at a return air temperature of 35°C and an ambient temperature of 35°C
Input voltage	–48 V DC (–44 V DC to –57 V DC)
Ambient temperature	–15°C to +55°C
Alarm reporting	Reports alarms over dry contacts. Normal: closed; faulty: open
Altitude	≤ 4000 m When the altitude ranges from 2000 m to 4000 m, the operating temperature decreases by 1°C for each additional 200 m.
Relative humidity	5%–95% RH

Item	Specifications
Noise	Meets GR 487 standard; acoustic pressure level ≤ 65 dBA at 1.5 m

3.2.28 (Optional) DC Heater HAU03D-01

Appearance

Figure 3-60 Appearance



(1) Indicator
(2) Alarm dry contact
(3) Control dry contact
(4) DC input port
(5) Ground screw

Technical Specifications

Table 3-61 DC heater specifications

Item	Specifications
Dimensions (H x W x D)	43.0 mm x 216 mm x 120 mm
Weight	2.5 kg
Operating voltage range	36–75 V DC
Rated operating voltage	48 V DC
Rated power	500 W
Operating temperature	–40°C to +65°C
Startup temperature	Heater 1:12°C by default, configurable Heater 2: 8°C by default, configurable

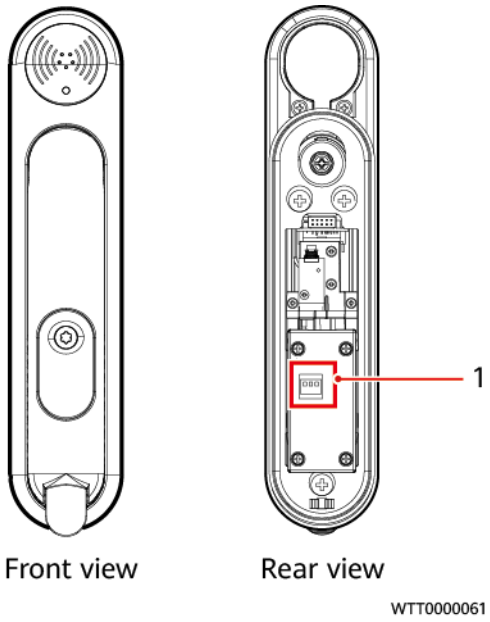
Item	Specifications
Shutdown temperature	Heater 1: 20°C by default, configurable Heater 2: 16°C by default, configurable
Humidity	5%–95% RH
Altitude	0–4000 m (When the altitude is between 2000 m and 4000 m, the operating temperature decreases by 1°C for each additional 200 meters.)

3.2.29 Electronic Lock

The electronic lock has the following functions:

- Allows you to open the door by using an IC card, mobile phone, NMS, and key.
- Supports remote management of IC card user rights.
- Generates alarms.
- Records logs of swiping cards at the site.

Figure 3-61 Electronic lock



(1) DIP switch

Table 3-62 DIP Switch Principles

Electronic Lock	DIP Switch 1	DIP Switch 2	DIP Switch 3	Address
1	OFF	OFF	OFF	91

Electronic Lock	DIP Switch 1	DIP Switch 2	DIP Switch 3	Address
2	ON	OFF	OFF	92
3	OFF	ON	OFF	93
4	ON	ON	OFF	94
5	OFF	OFF	ON	95
6	ON	OFF	ON	96
7	OFF	ON	ON	97
8	ON	ON	ON	98

Port Definitions

Figure 3-62 Ports on the electronic lock

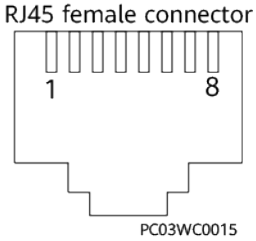


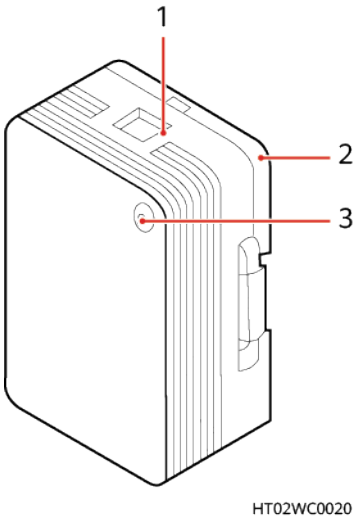
Table 3-63 Port definitions of the electronic lock

Pin	Definitions	Description
1	RS485_RX+	RS485 data +
2	RS485_RX-	RS485 data -
3	12V	Power supply
4	/	-
5	/	-
6	/	-
7	/	-
8	GND	Ground

3.2.30 Sensor

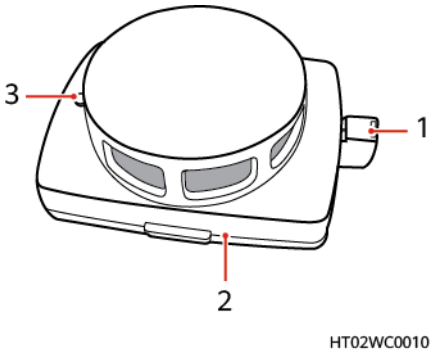
3.2.30.1 Smoke Sensor

Figure 3-63 Appearance



(1) Wiring port (2) Base (3) Indicator

Figure 3-64 Appearance 2



(1) Wiring port (2) Base (3) Indicator

3.2.30.2 Digital Temperature and Humidity Sensor

Figure 3-65 Appearance 1

Figure 3-66 Appearance 2

DIP Switch

The following figure shows the DIP switch on a digital T/H sensor. The following table describes the DIP switch settings.

Figure 3-67 DIP switch 1

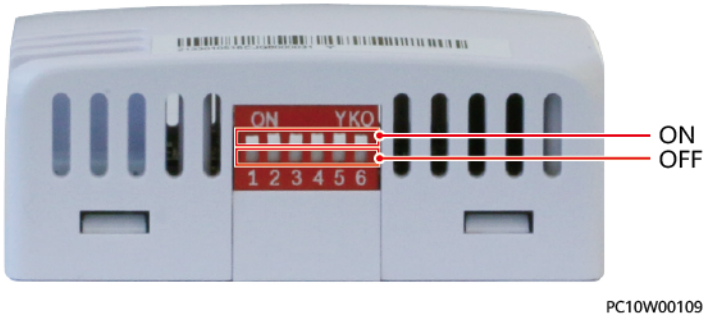


Figure 3-68 DIP switch 2

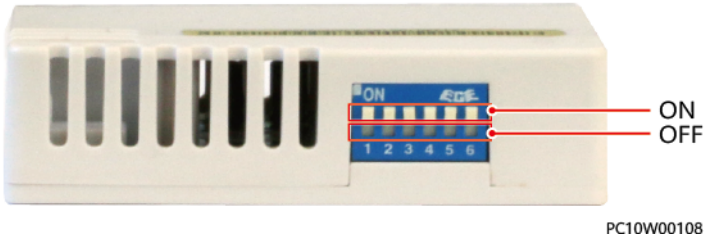


Table 3-64 DIP switch settings

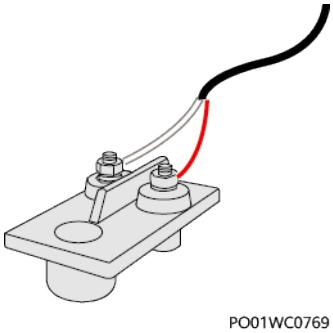
Toggle Switch 1	Toggle Switch 2	Toggle Switch 3	Toggle Switch 4	Toggle Switch 5	Toggle Switch 6	T/H Sensor Address
ON	ON	OFF	OFF	ON	ON	51
OFF	OFF	ON	OFF	ON	ON	52

3.2.30.3 Water Sensor

A water sensor detects water based on the resistance change between both electrodes.

When the electrodes detect water, they are short-circuited and the SMU reports an alarm.

Figure 3-69 Water sensor



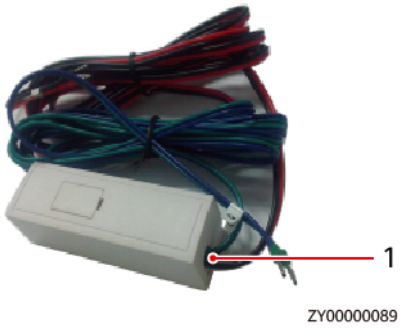
Technical Specifications

Table 3-65 Water sensor specifications

Category	Item	Specifications
Environment	Operating temperature	–40°C to +80°C
	Storage temperature	–40°C to +80°C
Structure	Dimensions (H x W x D)	• Indoor version: 26 mm x 50 mm x 95 mm • Outdoor version: 78.5 mm x 38.4 mm x 38.2 mm

3.2.30.4 Vibration Sensor

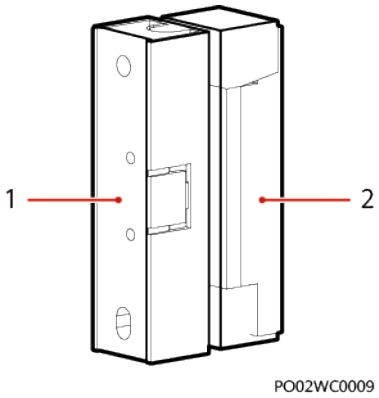
Figure 3-70 Appearance



(1) Wiring port

3.2.30.5 Door Status Sensor

Figure 3-71 Appearance



(1) Switch (2) Magnet

3.2.31 Light

Figure 3-72 Appearance

3.2.32 (Optional) Smart ETH Gateway

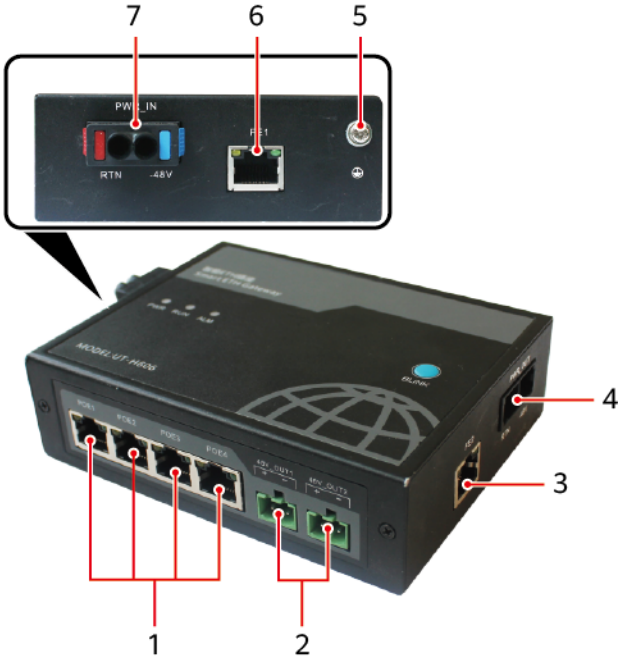
The smart ETH gateway provides two FE ports, four PoE ports, and three –48 V power ports, and can connect to multiple communications devices such as IP cameras.

Appearance

Figure 3-73 Appearance

Ports

Figure 3-74 Ports



(1) PoE ports
(2) 48V_OUT port
(3) FE2 port
(4) Power output port
(5) Ground terminal
(6) FE1 port
(7) Power input port

Indicators

Figure 3-75 Indicators

Table 3-66 Indicator description

Name	Color	Status	Description
Power indicator (PWR)	Green	Steady on	The power input is normal.
		Off	There is no power input.
Run indicator (RUN)	Green	Steady on	Power supply is normal or data is being transmitted or received.
		Off	The power supply is abnormal.
		Blinking slowly (0.5 Hz)	The software is running properly.
Alarm indicator (ALM)	Red	Steady on	An alarm is generated.
		Off	No alarm is generated.

Power Ports

Table 3-67 Power port description

Port Type	Silk Screen	Description
PWR_IN/PWR_OUT port	RTN	Power supply +
	-48 V	Power supply -
48V_OUT1/48V_OUT2 port	+	Power supply +
	-	Power supply -

Communication Ports

Figure 3-76 FE and PoE port pins

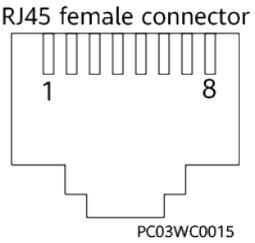
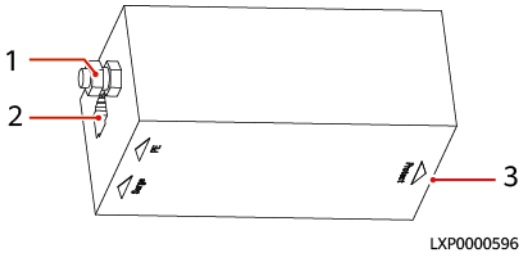


Table 3-68 FE and PoE port pin definitions

Port Type	Pin	Signal	Description
FE1/FE2 port	1	TX+	Transmits data.
	2	TX-	
	3	RX+	Receives data.
	6	RX-	
	4, 5, 7, 8	Reserved	-
PoE1–PoE4 ports	1	TX+	Transmits data.
	2	TX-	
	3	RX+	Receives data.
	6	RX-	
	4	PoE_48V	48 V power supply
	5	PoE_48V	
	7	PoE_GND	Ground
	8	PoE_GND	

3.2.33 (Optional) Signal SPD

Figure 3-77 Appearance



(1) Ground screw (2) Surge port (3) Protcet port

3.2.34 (Optional) Camera

Camera Outside the Cabinet

NOTE

The camera outside the cabinet is in the external environment. If the camera is blocked by dust, clean it periodically.

Figure 3-78 Appearance of the camera (C2120-I 2MP starlight infrared bullet camera)

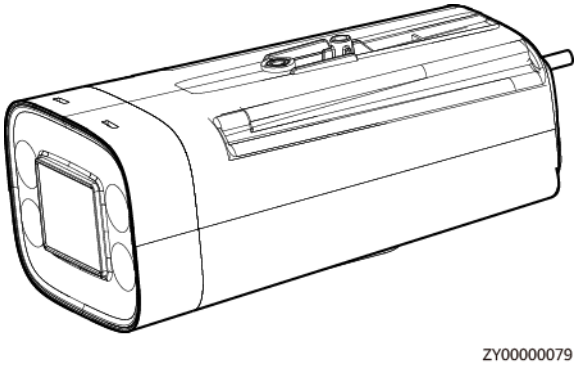
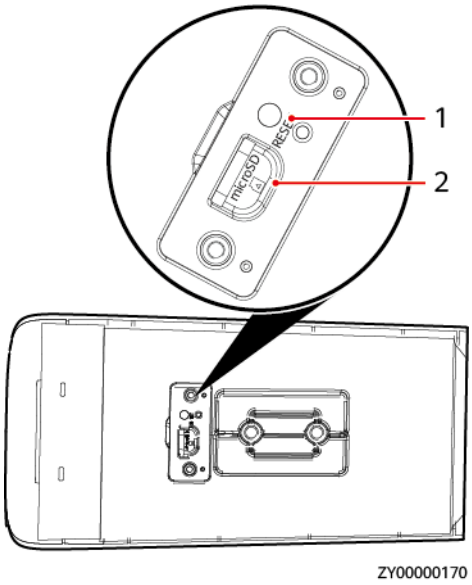
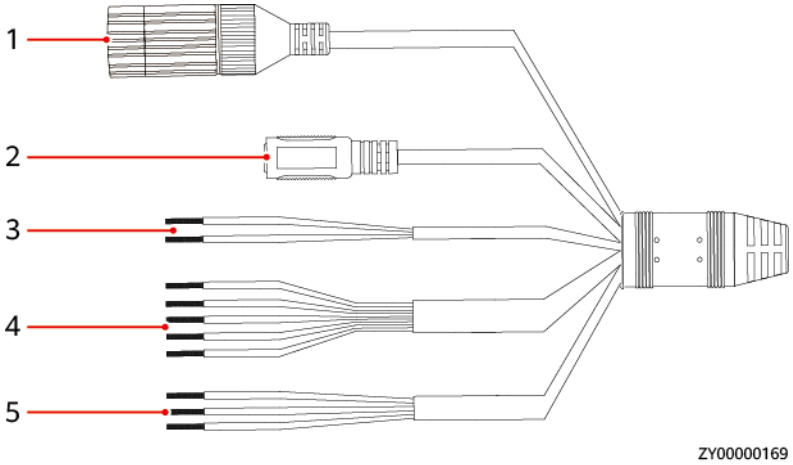


Figure 3-79 Interior



(1) Reset button (2) SD card slot

Figure 3-80 Port description



(1) Network port
(2) Power input port
(3) RS485 port
(4) Alarm port
(5) Audio port

Table 3-69 Technical specifications

Item	Specifications
Weight	0.7 kg
Dimensions (H x W x D)	90 mm x 109 mm x 210 mm

Camera Inside the Cabinet

Figure 3-81 Appearance of the camera

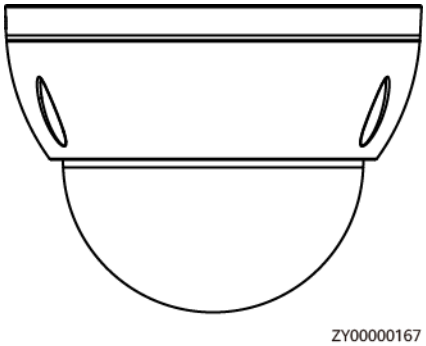
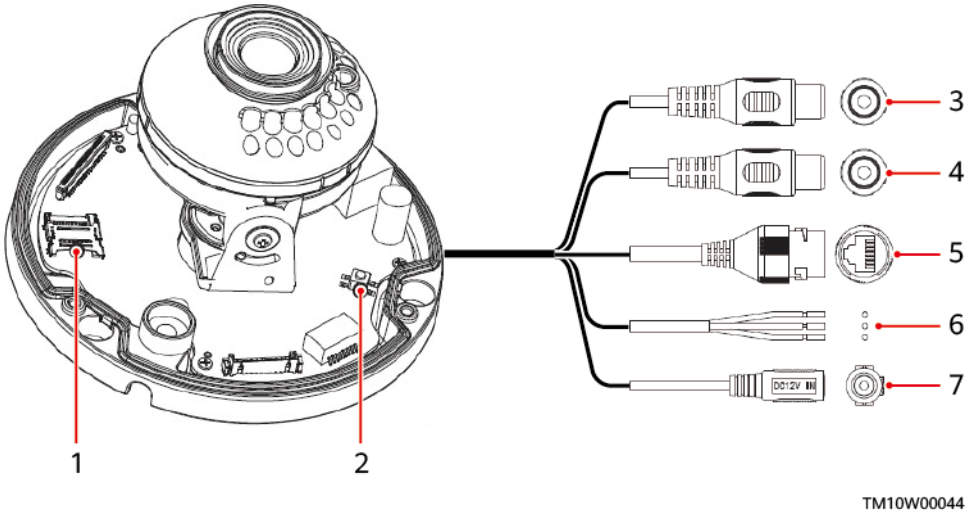


Figure 3-82 Interior and ports of camera



(1) SD card slot (2) Reset button (3) Audio output port

(4) Audio input port (5) Network port (6) Alarm port

(7) Power input port

Table 3-70 Indicator description

Color	Status	Description
Blue	Steady on	The camera is working properly.
Bluish red	Blinking	The SD card is faulty.
Red	Steady on	Other exceptions have occurred.

Table 3-71 Technical specifications

Item	Specifications
Weight	< 0.6 kg
Dimensions	Φ 109.9 mm x 81 mm

3.3 ESS

3.3.1 Lithium Battery ESM-48100B1

Appearance

Figure 3-83 ESM-48100B1

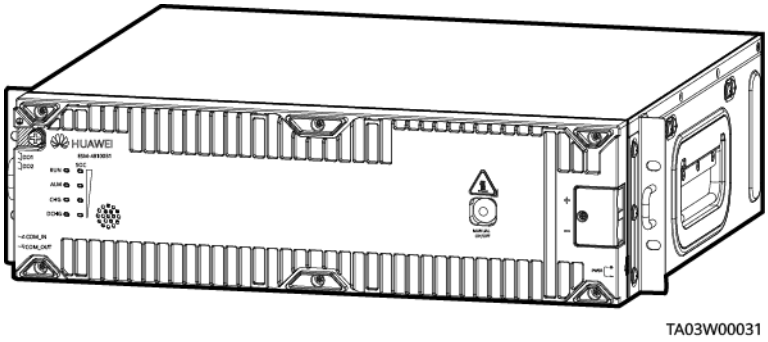


Figure 3-84 Panel and ports

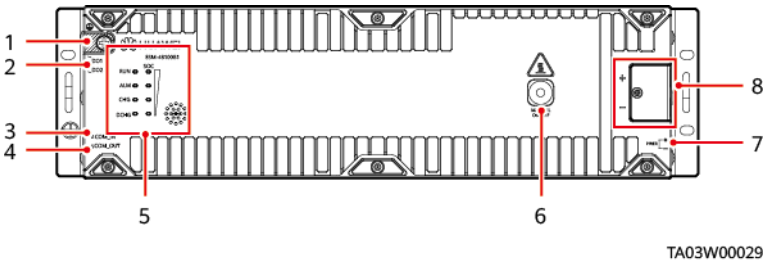


Table 3-72 Panel and ports description

No.	Silk Screen	Item	Description
1	GND	Protective ground	M6 screw
2	DO1	ESM dry contact output	Alarm output dry contact; configurable (if the dry contact is closed, an alarm is reported by default). For details, see **Table 3-75**.
	DO2		
3	COM_ IN	Communications port	1. Used for information reporting and communication cascading. 2. Use RJ45 terminals and provide the 1000 A surge protection capability. For details, see **Table 3-74**.
4	COM_ OUT	Communications port	
5	RUN	Run indicator	For the diagram, see **Figure 3-85**. For details about functions, see **Table 3-73**.
	ALM	Alarm indicator	
	CHG	Charge indicator	

No.	Silk Screen	Item	Description
	DCHG	Discharge indicator	
	SOC	SOC indicator	
6	MANUAL ON/OFF	Button for manual power-on/off	A contact button used for manual power-on/off and maintenance. For details, see **Activation and Startup**.
7	PWR	ESMU port for connecting to an external power source	The ESM can be activated if the PWR port is supplied with a voltage of 43.2–58 V. For details, see **Activation and Startup**.
8	+	ESM positive terminal	Positive and negative ports of the ESM. Secured by M6 screws. Appropriate OT terminals should be used. The required torque is 4 N·m and the recommended cable size is 25 mm^2. If the ESM is used at a temperature below 45°C, the cable size can be smaller but should be at least 16 mm^2.
	-	ESM negative terminal	

LED Indicator

Figure 3-85 LED indicator

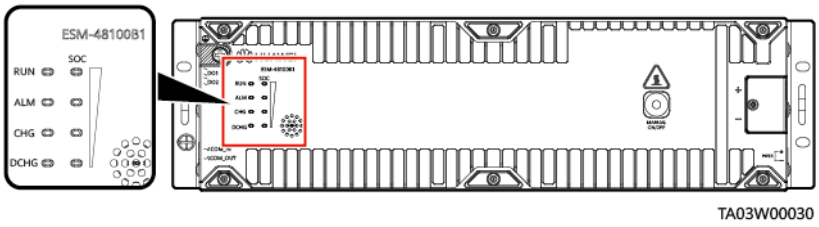


Table 3-73 LED indicator description

Silk Screen	Item	Color	Description
RUN	Run indicator	Green	Steady on: Communication is normal (including board startup, self-check, software loading, and board power-on when not loaded; excluding sleep when the power port or PWR port is energized). Off: The ESM is in sleep mode. Blinking at long intervals: The LUI is querying data. Blinking at short intervals: Communication is interrupted.
ALM	Fault indicator	Red	Steady on: There is a fault or major alarm. Off: There is no fault or major alarm. Blinking slowly: Anti-theft lock.
CHG	Charge indicator	Green	Steady on: The ESM is being charged. Off: The ESM is open-circuited or discharging.
DCHG	Discharge indicator	Green	Steady on: The ESM is discharging. Off: The ESM is open-circuited or being charged.

Silk Screen	Item	Color	Description
SOC	SOC indicators	Green	1. 0–24% capacity 25% indicator: blinking Other SOC indicators: off 2. 25%–49% capacity 25% indicator: steady on 50% indicator: blinking Other SOC indicators: off 3. 50%–74% capacity 25% indicator: steady on 50% indicator: steady on 75% indicator: blinking Other SOC indicators: off 4. 75%–99% capacity 25% indicator: steady on 50% indicator: steady on 75% indicator: steady on 100% indicator: blinking 5. 100% capacity The four SOC indicators are steady on.
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 • All indicators blinking: The ESM has entered the maintenance mode. • ESM in sleep mode: The fault indicator is off except for reverse-connection protection.			

Communications ports

Figure 3-86 RJ45 pins

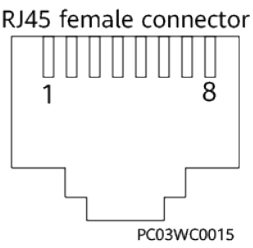


Table 3-74 Pin definitions of communications ports

RJ45 Pin	Signal	Description	Remark
1	RS485 T+	RS485 transmission +	Four-wire RS485 communications, complying with the Modbus protocol
2	RS485 T-	RS485 transmission –	
3	NC	Reserved	
4	RS485 R+	RS485 reception +	
5	RS485 R-	RS485 reception –	
6	NC	Reserved	-
7	CANH	Positive terminal for CAN communications	Used to report alarms to a monitoring unit and exchange data between ESMs connected in parallel.
8	CANL	Negative terminal for CAN communications	

DO1 and DO2 Ports

Table 3-75 DO1 and DO2 port definitions

Silk Screen	Definition	Description	Alarm Status
DO1	Fault, major alarm	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Cell voltage sampling fault, cell temperature sampling fault, charge converter output short circuit, relay coil short-circuit, charge low temperature protection, discharge low temperature protection, charge high temperature protection, discharge high temperature protection, power module internal overtemperature protection, discharge converter output short circuit, input reverse connection, BMU anti-theft lock, overload lockout due to component failure, serial number conflict, serial number conflict, input/output discharge overvoltage lockout, and discharge overcurrent lockout	Configurable (If the dry contact is closed, an alarm is reported by default.)

Silk Screen	Definition	Description	Alarm Status
DO2	Overload warning, overdischarge protection	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Discharge undervoltage alarm, discharge undervoltage protection, and discharge overcurrent warning	

Activation and Startup

An ESM can be activated in three modes. After being activated, the ESM switches from the sleep mode to disconnected mode.

- Activation through the PWR terminal: supply 43.2–58 V DC power to the PWR terminal on the ESM panel for at least 5s.
- Activation through the MANUAL ON/OFF button: hold down the MANUAL ON/OFF button on the ESM panel for at least 5s and less than 15s.
- Activation through the power port: supply a DC voltage of 43.2–58 V to the power terminal on the front panel for at least 5s.

  NOTE

  1. The MANUAL ON/OFF button is a contact button. The interval for pressing the button should be greater than 0.5s; otherwise, the operation is ineffective.
  2. If you have forcibly powered off the battery that is in charging, discharging, or disconnected mode by pressing the MANUAL ON/OFF button, the ESM can be only reactivated by pressing and holding this button.

Technical Specifications

Table 3-76 Technical specifications

Item	Specifications
Dimensions (W x D x H)	• 442 mm x 396 mm x 130 mm (excluding mounting ears) • 482 mm x 396 mm x 130 mm (including mounting ears)
Weight	44 kg
Installation mode	Installed in a 19-inch rack
Maintenance mode	Maintained from the front
Humidity	5%–95%
Altitude	0–4000 m (When the altitude ranges from 2000 m to 4000 m, the highest operating temperature decreases by 1°C for each additional 200 m.)

Item	Specifications
Ripple and noise	≤ 200 mV
IP rating	IP40
Other requirements	Indoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 3.1 requirements in ETSI EN 300 019-1-3 (V2.3.2 or a later version). Outdoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

3.3.2 Lithium Battery ESM-48100A8

Appearance

Figure 3-87 ESM-48100A8

Figure 3-88 Panel and ports

Table 3-77 Port pin definitions

No.	Silk Screen	Item	Description
1	GND	Protective ground	M6 screw
2	DO1 DO2	ESM dry contact output	Alarm output dry contact; configurable (if the dry contact is open, an alarm is reported by default). For details, see **Table 3-79**.
3	COM_ IN	Communications port	1. Used for information reporting and communication cascading. 2. Use RJ45 terminals and provide the 1000 A surge protection capability. For details, see **Table 3-78**.
4	COM_ OUT	Communications port	
5	RUN	Run indicator	For the diagram, see**Figure 3-90Figure 3-90** . For details about functions, see **Table 3-80**.
	ALM	Alarm indicator	
	CHG	Charge indicator	
	DCHG	Discharge indicator	
	SOC	SOC indicator	
6	MANUAL ON/OFF	Button for manual power-on/off	A contact button used for manual power-on/off and maintenance. For details, see**Activation and Startup** .
7	PWR	ESMU port for connecting to an external power source	The ESM can be activated if the PWR port is supplied with a voltage of 43.2–58 V. For details, see**Activation and Startup** .
8	+	ESM positive terminal	Positive and negative ports of the ESM. Secured by M6 screws. Appropriate OT terminals should be used. The required torque is 4.5-5.5 N·m and the recommended cable size is 25 mm^2. If the ESM is used at a temperature below 45°C, the cable size can be smaller but should be at least 16 mm^2.
	-	ESM negative terminal	

Figure 3-89 RJ45 pins

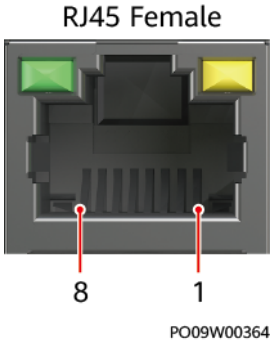


Table 3-78 Pin definitions of communications ports

RJ45 Pin	Signal	Description	Remark
1	RS485 T+	RS485 transmission +	• Four-wire RS485 communication, complying with the Modbus protocol and YDN1363 protocol • Baud rate: 9600 bit/s.
2	RS485 T-	RS485 transmission –	
3	NC	Reserved	
4	RS485 R+	RS485 reception +	
5	RS485 R-	RS485 reception –	
6	NC	Reserved	-
7	CANH	Positive terminal for CAN communications	Used to report alarms to a monitoring unit and exchange data between ESMs connected in parallel.
8	CANL	Negative terminal for CAN communications	

DO1 and DO2 Ports

Table 3-79 DO1 and DO2 port definitions

Silk Screen	Definition	Description	Alarm Status
DO1	Fault, major alarm	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Cell voltage sampling fault, straight-through short-circuit fault, straight-through open-circuit fault, cell fault, reverse-connection protection, internal temperature protection, cell temperature sampling fault, charge low temperature protection, charge high temperature protection, charge overcurrent protection, discharge low temperature protection, discharge high temperature protection, discharge overcurrent protection, serial number conflict, and discharge overcurrent lockout	Configurable (If the dry contact is open, an alarm is reported by default.)
DO2	Overload warning, overdischarge protection	If the ESM raises one of the following alarms, the dry contact supplies an alarm signal: Battery group discharge undervoltage protection, single cell discharge undervoltage protection, cell low voltage disconnection protection, battery group discharge undervoltage alarm, cell discharge undervoltage alarm, and discharge overcurrent alarm	

LED Indicator

Figure 3-90 LED indicator

Table 3-80 LED indicator description

Silk Screen	Item	Color	Description
RUN	Run indicator	Green	Steady on: Communication is normal (including board startup, self-check, software loading, and board power-on when not loaded; excluding sleep when the power port or PWR port is energized). Off: The ESM is shut down or hibernating. Blinking at long intervals: The LUI is querying data. Blinking at short intervals: Communication is interrupted.
ALM	Fault indicator	Red	Steady on: There is a fault or major alarm. Off: There is no fault or major alarm.
CHG	Charge indicator	Green	Steady on: The ESM is being charged. Off: The ESM is open-circuited or discharging.
DCHG	Discharge indicator	Green	Steady on: The ESM is discharging. Off: The ESM is open-circuited or being charged.

Silk Screen	Item	Color	Description
SOC	SOC indicators	Green	1. 0–24% capacity • 25% indicator: blinking • Other SOC indicators: off 2. 25%–49% capacity • 25% indicator: steady on • 50% indicator: blinking • Other SOC indicators: off 3. 50%–74% capacity • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: blinking Other SOC indicators: off 4. 75%–99% capacity • 25% indicator: steady on • 50% indicator: steady on • 75% indicator: steady on • 100% indicator: blinking 5. 100% capacity • The four SOC indicators are steady on.
Notes: • 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 – SOC indicator off and other indicators blinking: The ESM has entered the maintenance mode. – ESM in sleep mode: The fault indicator is off except for reverse-connection protection.			

Activation and Startup

An ESM can be activated in three modes. After being activated, the ESM switches from the sleep mode to disconnected mode.

- Activation through the PWR terminal: supply 43.2–58 V DC power to the PWR terminal on the ESM panel for at least 5s.
- Activation through the MANUAL ON/OFF button: hold down the MANUAL ON/OFF button on the ESM panel for at least 5s and less than 15s.

- Activation through the power port: supply a DC voltage of 43.2–58 V to the power terminal on the front panel for at least 5s.

  NOTE

  1. The MANUAL ON/OFF button is a contact button. The interval for pressing the button should be greater than 0.5s; otherwise, the operation is ineffective.
  2. If you have forcibly powered off the battery that is in charging, discharging, or disconnected mode by pressing the MANUAL ON/OFF button, the ESM can be only reactivated by pressing and holding this button.

Technical Specifications

Table 3-81 Technical specifications

Item	Specifications
Dimensions (W x D x H)	• 442 mm x 396 mm x 130 mm (excluding mounting ears) • 482 mm x 396 mm x 130 mm (including mounting ears)
Weight	≤ 48 kg
Installation mode	Installed in a 19-inch rack
Maintenance mode	Maintained from the front
Humidity	5%–95%
Altitude	0–4000 m (When the altitude ranges from 2000 m to 4000 m, the highest operating temperature decreases by 1°C for each additional 200 m.)
Ripple and noise	≤ 200 mV
IP rating	IP40
Other requirements	Indoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 3.1 requirements in ETSI EN 300 019-1-3 (V2.3.2 or a later version). Outdoor scenario: • There is no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

4 Maintenance

4.1 Routine Maintenance

Maintenance personnel perform routine maintenance periodically based on site requirements. The recommended interval is six months. If any fault is detected, rectify it in a timely manner. For details about the maintenance and troubleshooting of lithium batteries, see the corresponding lithium battery manuals. For details about how to maintain and troubleshoot AC / DC blade power supplies, see the blade manual.

NOTICE

- Do not maintain devices on raining days; otherwise, water may enter and damage devices.
- By default, the air conditioner is started when the door is open. If the air conditioner is set to stop when the door is open, you are advised to open the front and rear doors to prevent overheating on the side that is not open during device operation.

4.1.1 Cabinet

Table 4-1 Cabinet maintenance

No.	Maintenance Item	Possible Cause	Suggestion
1	Check whether the cabinet paint is flaking off or there are scratches on the cabinet surface.	The cabinet is scratched.	Repaint the cabinet.
2	Check whether the cabinet is rusty or corroded.	The environment quality of the equipment room is poor.	Evaluate the risk and improve the environment of the equipment room.

No.	Maintenance Item	Possible Cause	Suggestion
3	Check whether the cabinet door lock is damaged.	The door lock is rusty or has been tampered with.	Replace the door lock.
4	Check whether the front and rear of rectifiers are blocked or dusty.	The front or rear of rectifiers is blocked or dusty.	Remove the blockage or clean up the dust.
5	Whether there are traces of animals such as insects, mice, and snakes inside the cabinet	Animals entered the cabinet.	1. Clear the traces and take precautions during clearance to prevent secretions of animals from entering monitoring boards or energized components. 2. Seal the cable holes to prevent animals from entering the cabinet again.

4.1.2 Air Conditioner

NOTE

Alarms such as Internal Fan Fault, External Fan Fault, Compressor Fault, Cab Ret Air TS Fault, Evaporator Frozen, or Frequent High Press are displayed on the SMU liquid crystal display (LCD).

Table 4-2 Air conditioner maintenance

No.	Maintenance Item	Possible Cause	Troubleshooting
1	The air conditioner fails to start.	• The circuit is open-circuited or short-circuited. • The controller is faulty.	1. Check the short-circuit or open-circuit point, and maintain the general power supply. 2. Replace the controller.
2	The internal circulation fan fails to start.	• The terminal is loose. • The power supply is faulty. • The fan is stuck.	1. Check that the power terminal of the fan is tightened. 2. Check that the voltage of the DC power is within the operating range. 3. Check that the fan is not stuck by foreign matters.

No.	Maintenance Item	Possible Cause	Troubleshooting
3	The external circulation fan fails to start.	• The terminal is loose. • The power supply is faulty. • The fan is stuck. • There is no requirement for cooling.	1. Check that the power terminal of the fan is tightened. 2. Check that the voltage of the DC power is within the operating range. 3. Check that the fan is not stuck by foreign matters. 4. Check the output status of the fan in the cabinet.
4	The fan generates abnormal noise.	• The fan bearing wears out. • The fan blades produce friction sounds.	1. Replace the fan. 2. Check whether the cables hinder fan blade operation.
5	The compressor fails to start.	• The cable connection is loose. • The power is off. • The power supply is faulty. • The compressor motor is burned. • There is no requirement for cooling. • Shutdown delay occurs. • The contact of the compressor protector is open. • The system high pressure switch is turned off.	1. Secure cable connectors. 2. Check the main power switch. 3. Check that the voltage of the DC power is within the operating range. 4. Replace the compressor. 5. Check the temperature inside the cabinet. 6. The delay interval for the compressor startup is 3 minutes. 7. Check whether the contact of the compressor protector is open. 8. Check whether the external ambient temperature is too high, whether the air volume of the external circulation fan is insufficient, and whether the contact of the high pressure switch is open.
6	The cooling effect is unsatisfactory.	The air volume of the external circulation fan is insufficient.	Clean the foreign matter on the coil pipe or at the air intake vent.

4.1.3 ATS

Table 4-3 ATS troubleshooting

Symptom	Alarm	Possible Causes	Solution
Communication is abnormal (the RUN indicator blinks at 0.5 Hz).	CAN communication interruption alarm	• The communications cable is loose. • The ATS main control box is faulty.	• Reconnect the communications cable. • Replace the ATS main control box.
The ALM indicator is steady on.	• ATS contactor fault • AC SPD fault • Communication failure	• The contactor is faulty. • The SPD is faulty. • The meter chip is faulty.	• Replace the ATS. • Replace the SPD. • Replace the ATS main control box.
AC input overvoltage alarm	AC input overvoltage alarm	• The input voltage of DG 1 is abnormal. • The mains or DG 2 input voltage is abnormal. • The ATS main control box is faulty.	• If the AC input is from mains, contact the mains supplier. • If the DG supplies AC power, check and repair the DG by referring to the DG user manual. • Replace the ATS main control box.
AC input undervoltage alarm	AC input undervoltage alarm		
Mains failure alarm	Mains failure alarm	There is no mains supply.	
Input overcurrent alarm	Input overcurrent alarm	The load circuit is subject to short circuits or overload.	• Check whether load short circuit occurs. • Check that the load capacity is within the maximum threshold. If capacity expansion is required, contact site engineers.

4.1.4 AC/DC Power Distribution

Table 4-4 AC/DC power distribution maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check for AC input undervoltage.	• AC input power cables have a large voltage drop. • AC input power cables are in poor contact. • The mains voltage is too low.	1. Replace AC input power cables with shorter or thicker cables. 2. Connect AC input power cables securely. 3. Provide the voltage data to the power supplier.
2	Check for AC input overvoltage.	The mains voltage is too high.	Provide the voltage data to the power supplier.
3	Check whether the AC input voltage is open-phase.	• AC input power cables are in poor contact, short-circuited, or damaged. • The mains supply has failed.	1. Check and rectify the cables. 2. Provide the open-phase data to the power supplier.
4	Check whether a DC output circuit breaker is OFF and a fuse is blown.	• Load overcurrent occurs. • Load short-circuit occurs.	Rectify any overcurrent or short circuit. Turn on the circuit breaker or replace the fuse.
5	Check for DC busbar overvoltage.	A rectifier is abnormal.	Replace the abnormal rectifier.
6	Check for DC busbar undervoltage.	• The AC power supply has failed. • The system is overloaded. • A rectifier is abnormal.	1. Resume the AC power supply. 2. Check the load status and rectify faults if any. 3. Replace the abnormal rectifier.

4.1.5 Rectifier

Table 4-5 Rectifier maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check the green indicator status (normal: steady on).	Off: • There is no AC input. • The rectifier is faulty.	1. Check the rectifier AC input. 2. Replace the rectifier.

No.	Maintenance Item	Possible Fault Cause	Suggestion
2	Check the yellow indicator status (normal: off).	Steady on: • Because the ambient temperature is high, the rectifier power is limited. • Because the ambient temperature exceeds the upper or lower threshold, the rectifier shuts down for protection. • AC input over/ undervoltage protection is triggered. • The rectifier is in hibernation.	1. Check the ambient temperature status, and clean the cabinet air channel. 2. Rectify faults in the indoor temperature control system. 3. Check the AC input voltage. 4. The rectifier is in hibernation. No action is required.
		Blinking: • The rectifier communication has failed • The rectifier is faulty.	1. Check that the rectifier communications cable is securely connected. 2. Replace the rectifier.
3	Check the red indicator status (normal: off).	Steady on: • The rectifier is latched off due to output overvoltage. • The rectifier is faulty.	1. Check that the cabinet is not connected to an external DC power source that has a voltage of greater than 58.5 V DC. 2. Check that the rectifier output voltage is within 58.5 V DC. 3. Replace the rectifier.

4.1.6 SMU

Table 4-6 SMU maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check the green indicator status.	Off: • There is no DC input. • The SMU is faulty.	1. Check that the DC input power cable is securely connected. 2. Check that the communications cable is securely connected. 3. Replace the SMU.

No.	Maintenance Item	Possible Fault Cause	Suggestion
2	Check the red indicator status.	Steady on: • A critical or major alarm is generated. • The SMU is faulty.	1. Check related components based on alarms. 2. Replace the SMU.
3	Check the LCD display status.	• The LCD flat cable is loose. • The SMU is faulty.	1. Check that the LCD flat cable is securely connected. 2. Replace the SMU.
4	Check that the SMU can communicate with the network management system (NMS).	• The communications cable is loose. • Networking parameters are not correctly set.	1. Check that the communications cable is securely connected. 2. Check that networking parameter settings are correct.

4.1.7 Parameters on the SMU

Table 4-7 SMU parameter maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check whether the displayed battery capacity and number of battery strings are the same as the actual data.	• Parameters are set incorrectly. • The number of batteries is changed, or batteries are replaced.	Set battery parameters again.
2	Check **Charge Current Limit Coefficient**. The value is typically **0.1C** and adjustable.	N/A	Change the value as required. Otherwise, retain **0.10C**.
3	Check whether the displayed battery temperature is the same as the actual temperature.	• The battery temperature sensor is faulty. • The SMU is faulty.	1. Replace the battery temperature sensor. 2. Replace the SMU.
4	Check whether the displayed total load current is the same as the actual current measured by a clamp meter.	• Battery current detection fault. • The SMU is faulty.	1. Check that the current monitoring cable is securely connected. 2. Replace the SMU.

No.	Maintenance Item	Possible Fault Cause	Suggestion
5	Check whether the displayed battery charge current is the same as the actual current measured by a clamp meter.	• The current monitoring cable is loose. • The SMU is faulty.	1. Check that the current monitoring cable is securely connected. 2. Replace the SMU.
6	Check whether the difference between the displayed DC output voltage and the measured DC busbar voltage is less than 0.5 V DC.	• The cabinet busbar and cables are loose or in poor contact. • The SMU is faulty.	1. Check and secure the cabinet busbar and cable connections. 2. Replace the SMU.

4.1.8 Inverter

DANGER

- If you need to maintain AC load cables, switch off the L and N AC output circuit breakers at this layer or disconnect the DC input at all layers.
- If you need to maintain the inverter, disconnect the DC input at all layers.

Table 4-8 Troubleshooting

Symptom	Possible Cause	Suggestion
No information is displayed after the system is powered on.	• The DC loop is disconnected. • The DC input voltage is abnormal. • The DC input power cable is connected reversely.	• Connect the DC loop. • Adjust the DC voltage to a normal value (43.2–58 V DC). • Connect the DC input power cable correctly.
Undervoltage protection is triggered after the system is powered on and loads are added.	• The DC input voltage is less than the minimum value. • The DC loop cable is loose.	• Adjust the DC voltage to a normal value (43.2–58 V DC). • Connect the DC loop cable securely.
Overload protection is triggered after the system is powered on.	The load power is greater than the maximum value.	Decrease the load power to a proper range.

Symptom	Possible Cause	Suggestion
The fault indicator is steady red.	• The SPD is faulty. • A power frequency synchronization exception, carrier synchronization exception, INV_BPS exception, or parallel system CAN exception occurs. • Hardware address conflict, phase address exception, or multi-host conflict occurs.	• Replace the inverter. • Check whether the edge connectors of the inverter module and connectors are normal. Remove and reinstall the inverter module. If the fault persists, replace the inverter and inverter module. • Check whether the DIP switch is correctly set. If the DIP switch setting is correct and the hardware addresses still conflict, replace the inverter.

4.1.9 Inverter Module I23002G1

Table 4-9 Inverter module maintenance

Maintenance Object	Maintenance Method
Inverter Module (I23002G1)	Check the running status of the inverter module by observing the indicators on the inverter module. For details about the indicator status description, see **Table 3-50**.

4.1.10 Cables

Table 4-10 Cable maintenance

No.	Maintenance Item	Possible Fault Cause	Suggestion
1	Check whether signal cables and power cables are separately bound.	Cables are not properly installed.	Bind signal cables and power cables separately.
2	Check whether all cables are bound properly.	Cables are not properly installed.	Bind cables properly.
3	Check whether the cabinet ground bar is securely connected to the site or equipment room ground point.	Cables are not properly installed.	Connect the cabinet ground bar to the site or equipment room ground point.
4	Check whether ground cables are rusty.	Cables corrode after being used for a long time.	Replace rusty cables.

No.	Maintenance Item	Possible Fault Cause	Suggestion
5	Check whether the DC RTN + busbar is grounded.	The DC RTN+ busbar is not properly grounded.	Connect the ground cable to the DC RTN+ busbar properly.
6	Check whether cables have overheated and are deteriorating.	• Cables are too thin. • Cables are not properly routed.	• Replace the cables with cables of the required thickness. • Route the cables properly.
7	Check whether cables are misshapen by metal parts.	Cables are not properly installed.	Replace the cables and adjust the cable routing.
8	Check whether cables pass behind the air exhaust vents of rectifiers.	Cables are not properly installed.	Adjust the cable routing to prevent cable overheating.
9	Check whether cable insulation is damaged.	Cable insulation is damaged.	Reinsulate the cables with insulation tape.

4.1.11 Routine Maintenance for ESMs

NOTICE

- 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.
- Install ESMs in a dry and, clean, and ventilated environment that is far away from sources of ignition. Avoid direct exposure to sunlight or rain water.
- Keep ESMs away from strong infrared radiation, organic solvents, and corrosive gases.
- Ensure that battery cables do not come in contact with water.

Table 4-11 ESMs Routine maintenance

Maintenance Interval	Maintenance Item	Measure
Monthly	Operating environment	Keep ESMs far away from heat sources and avoid direct exposure to sunlight.
	Exterior	If an ESM experiences damage, leakage, or deformity, disconnect, take pictures, and then replace the faulty ESM.
Quarterly	Cleanliness	Clean the ESM exterior using dry cotton cloth. Exercise caution when cleaning an ESM because its voltage is high.

Maintenance Interval	Maintenance Item	Measure
	Connection	Check the bolt at every terminal and tighten any loose bolt. If a cable temperature exceeds 40°C (feels hot), locate the cause.
Semi-annual	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 and rectify them. • In the first year, collect real-time data when discharging is about to complete at least once every six months. If a network management system is configured, collect data remotely. • From the second year, check the capacity quarterly.

4.2 Identifying Component Faults

4.2.1 Identifying SMU Faults

The following lists the SMU faults:

- The DC output is normal but the green indicator on the SMU is off.
- The SMU breaks down or cannot be started. Its LCD has abnormal display or buttons cannot be operated.
- With alarm reporting enabled, the SMU does not report alarms when the power system is faulty.
- The SMU reports an alarm whereas the power system does not experience the fault.
- The SMU fails to communicate with the connected lower-level devices even though the communications cables are correctly connected.
- Communication between the SMU and all rectifiers fails even though the rectifiers and the communications cables are normal.
- The SMU cannot monitor AC or DC power distribution when communications cables are intact and AC and DC power distribution is normal.
- Parameters cannot be set or running information cannot be viewed on the SMU.

4.2.2 Identifying Rectifier Faults

The following lists the rectifier faults

- The AC input and slot connector are normal, but the Fault indicator (red) is steady on or all indicators are off.
- The slot connector and SMU are normal, but the Alarm indicator (yellow) still blinks after the rectifier is reinstalled.
- The AC input and SMU are normal, but the SMU cannot control the rectifier.

4.2.3 Identifying Circuit Breaker Faults

If the load fuse is blown, it indicates that the circuit breaker trips. If the circuit breaker is switched on and the downstream device is still not powered (the busbar has power), the circuit breaker is faulty and needs to be replaced.

4.2.4 Locating AC Input Module Faults

The AC input module faults are described as follows:

- The SMU LCD displays AC SPD fault.
- If the AC power supply is normal and the PSU has no output after the circuit breaker is switched on (the upstream power supply is available), the circuit breaker is faulty.

4.2.5 ESM Troubleshooting

Table 4-12 ESM troubleshooting

Fault Type	Possible Cause	Troubleshooting
High temperature alarm	The battery temperature sensor detects that the ESM temperature exceeds the specified value.	Check whether the temperature sensor is located in a high-temperature environment. If so, determine the cause of abnormal temperature near the sensor and rectify the fault.
Overvoltage or undervoltage alarm	The ESM voltage exceeds the specified value.	1. Check whether the ESM is securely connected to the system and whether the connector is rusty or oxidized. If so, polish the corroded layer. 2. Check that the connector is connected properly. Secure any loose connector.
Short-time battery discharge or unbalanced discharge current	Connections are loose.	Check whether the charge and discharge loops of each battery terminal are securely connected.
	The power system parameter settings are incorrect.	Check whether the power system parameters are correctly set.

4.3 Replacing Components

NOTICE

- Ensure that loads are supplied with power when replacing major components. For example, keep the switches for primary loads in the ON position, and do not turn off the battery switch and AC input switch at the same time.
- Seek the customer's prior consent if load disconnection is required.
- Rectifiers and the SMU are hot-swappable.

4.3.1 Replacing an SMU02C

Prerequisites

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

Procedure

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

NOTE

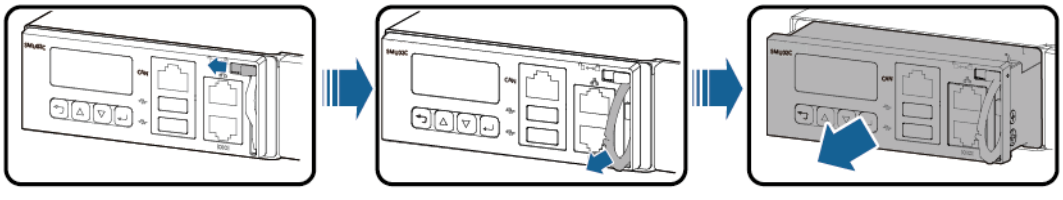
Record the software version of the old SMU. If the old SMU is damaged and version information cannot be viewed, send the bar codes of the old SMU and cabinet to technical support engineers.

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

Step 3 Push the locking latch leftward.

Step 4 Pull the handle outwards and remove the SMU02C from the subrack.

Figure 4-1 Removing the SMU02C

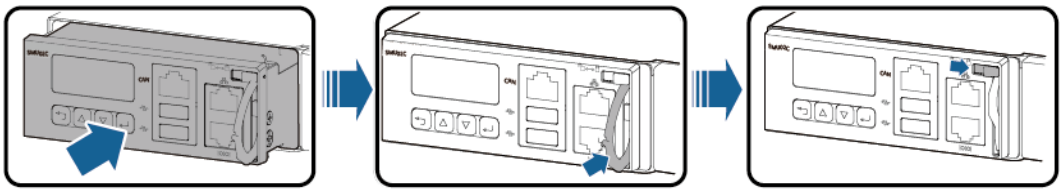


PC03I00000

Step 5 Place the new SMU02C in the slot, push the locking latch leftwards, and pull out the handle.

Step 6 Gently push the SMU02C along the guide rails until it is engaged. Close the handle, and push the locking latch rightwards.

Figure 4-2 Installing the SMU02C



PC03I00001

Step 7 Reconnect the communications cable to the SMU02C panel based on the recorded information.

Step 8 Set SMU02C parameters.

NOTE

After installing the new SMU, power on the SMU and check the software version of the new SMU. If the software version of the new SMU is earlier than that of the old SMU, upgrade the software.

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

----End

Follow-up Procedure

Put the removed component in an ESD box or bag and return it to the local warehouse.

4.3.2 Replacing a UIM05B1

Prerequisites

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

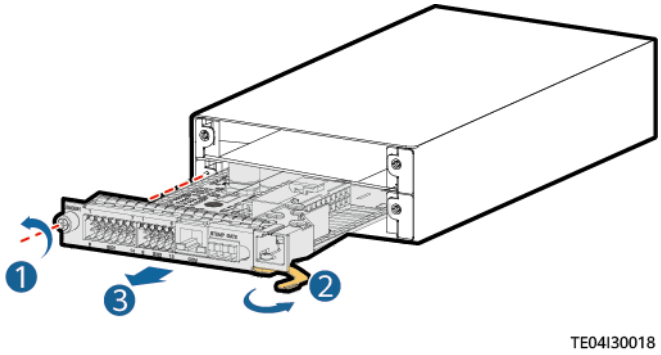
Procedure

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

Step 2 Record the connection positions of cables on the UIM05B1 panel and remove the cables.

Step 3 Loosen the screws on the UIM05B1 panel, pull the handle until it is engaged, and take out the UIM05B1.

Figure 4-3 Removing the UIM05B1



Step 4 Install the new UIM05B1.

Step 5 Install the cables based on the recorded information.

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

----End

Follow-up Procedure

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

4.3.3 Replacing a R4875G5/R4850G5

Prerequisites

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

CAUTION

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

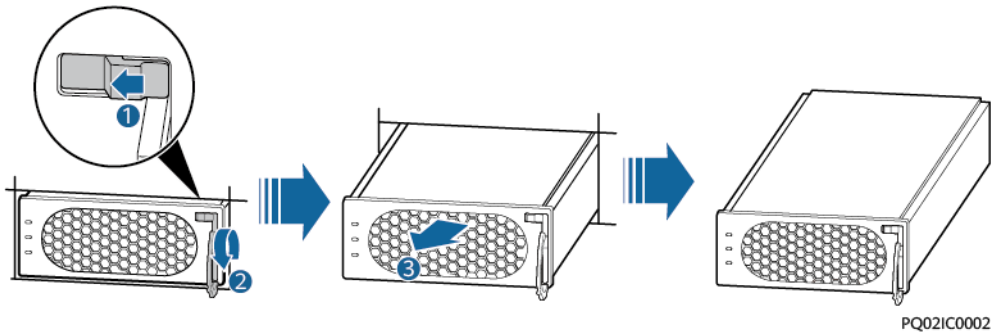
Procedure

Step 1 Put on protective gloves.

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

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

Figure 4-4 Removing a rectifier

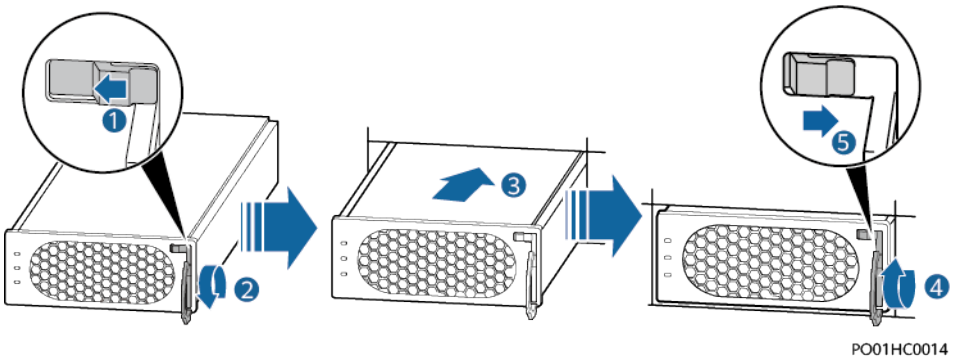


Step 4 Push the locking latch on the new rectifier towards the left, and pull out the handle.

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

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

Figure 4-5 Installing a rectifier



Step 7 Take off protective gloves.

----End

Follow-up Procedure

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

4.3.4 Replacing an S4875G1

Prerequisites

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

CAUTION

Protect yourself from being burnt when moving an operating SSU because it has a high temperature.

Procedure

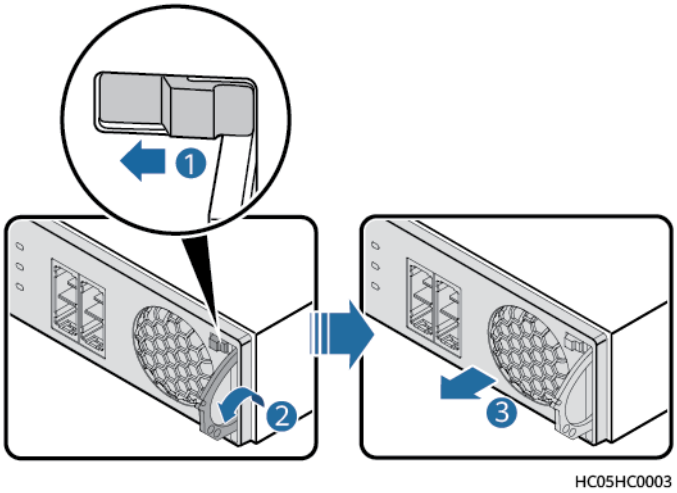
Step 1 Put on protective gloves.

Step 2 Switch off the PVDU circuit breaker and remove cables from the SSU and label it.

Step 3 Push the locking latch at the right side of the SSU panel towards the left.

Step 4 Gently pull the handle outwards, and then remove the SSU from the subrack.

Figure 4-6 Removing an SSU

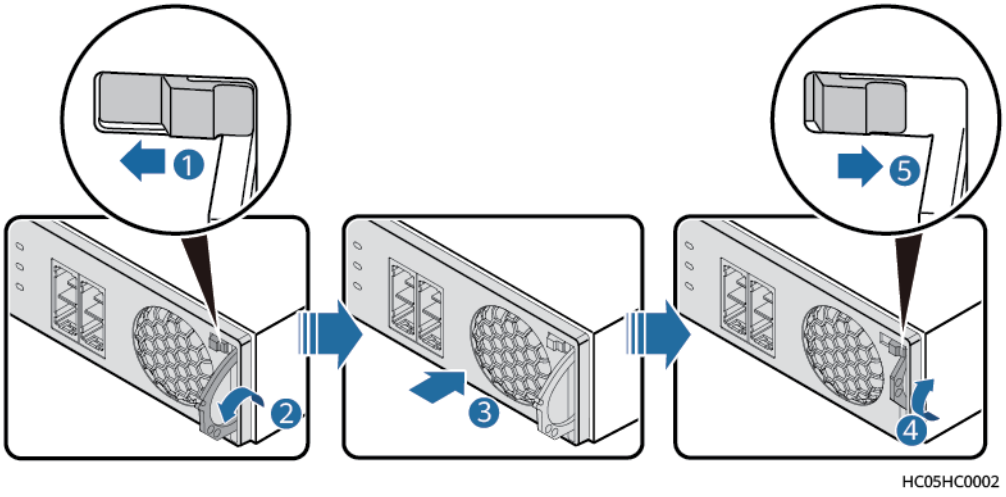


Step 5 Push the locking latch on the new SSU towards the left, and pull out the handle.

Step 6 Place the new SSU at the entry to the corresponding slot.

Step 7 Gently slide the SSU into the slot along guide rails until it is engaged. Close the handle, and push the locking latch towards the right to lock the handle.

Figure 4-7 Installing a new SSU



CAUTION

Do not connect the positive and negative DC input cables in reverse.

Step 8 Reconnect the cables labelled to the new SSU and switch on the PVDU circuit breaker.

Step 9 Take off the protective gloves.

----End

Follow-up Procedure

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

4.3.5 Replacing an M48500N1

Prerequisites

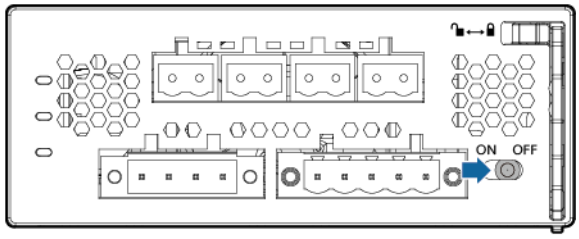
- You have obtained an ESD wrist strap, a pair of ESD gloves, an ESD box or bag, the cabinet door key, and tools.
- The new M48500N1 module is intact.

Procedure

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

Step 2 Turn the switch on the M48500N1 module panel to OFF.

Figure 4-8 Turning the switch on the M48500N1 module panel to OFF



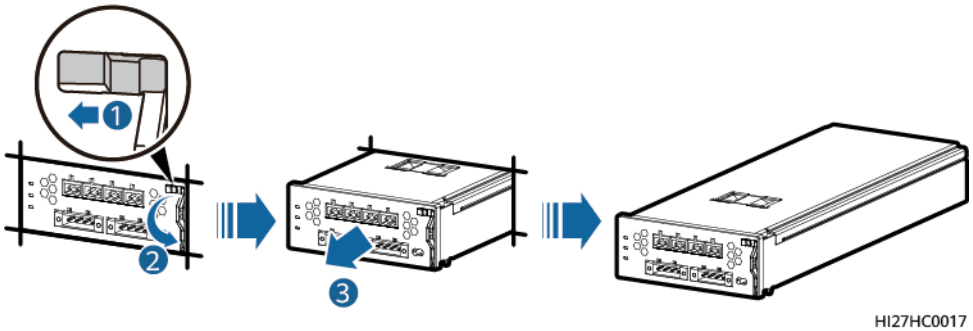
Step 3 Record the cable connection positions on the M48500N1 module and label the cables.

Step 4 Remove the cables from the M48500N1 module.

Step 5 Push the locking latch to the left.

Step 6 Pull out the handle of the M48500N1 module to remove it from the subrack.

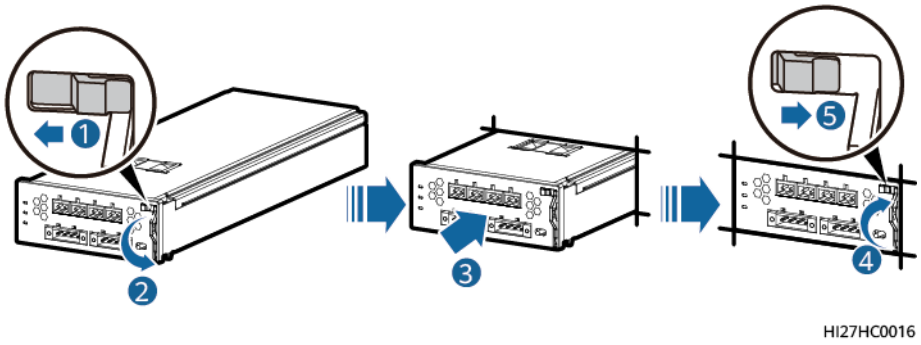
Figure 4-9 Removing the old M48500N1



Step 7 Insert the new M48500N1 module into the slot, push the locking latch to the left, and pull out the handle.

Step 8 Gently push the M48500N1 module along the guide rails into the subrack. Close the handle, and push the locking latch to the right.

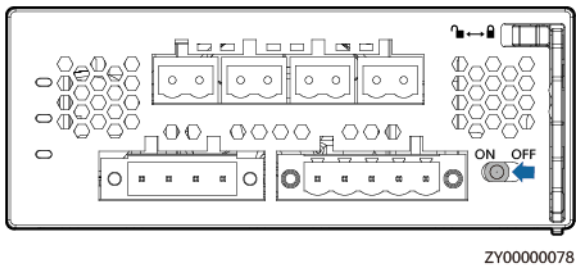
Figure 4-10 Installing a new M48500N1



Step 9 Connect the cables to the new M48500N1 module based on the recorded information.

Step 10 Turn the switch on the new M48500N1 module to ON.

Figure 4-11 Turning the switch on the new M48500N1 module to ON



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

----End

Follow-up Procedure

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

4.3.6 Replacing a BCU-1203A

Prerequisites

- The protective gloves, Phillips screwdriver, and key to the cabinet door are available.
- The new BCU-1203A is intact.

> **CAUTION**
>
> To prevent burns, exercise caution when removing a BCU-1203A because it may be hot as a result of continuous operation.

Procedure

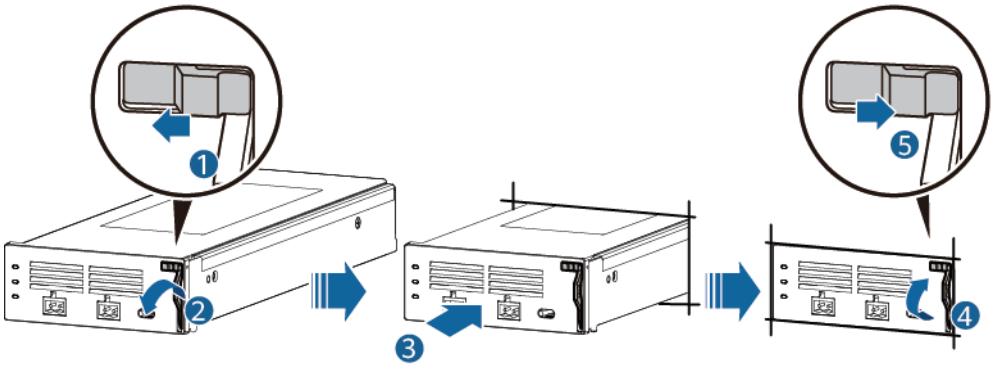
Step 1 Wear protective gloves.

Step 2 Record the connection positions of cables on the BCU-1203A and remove the cables.

Step 3 Remove the BCU-1203A.

Step 4 Install the new BCU-1203A in position.

Figure 4-12 Installing a BCU-1203A



Step 5 Reconnect the cables to the BCU-1203A based on the recorded information.

Step 6 Remove the protective gloves.

----End

Follow-up Procedure

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

4.3.7 Replacing a BC-1206A

Prerequisites

- The protective gloves, Phillips screwdriver, and key to the cabinet door are available.
- The new BC-1206A is intact.

Procedure

Step 1 Wear protective gloves.

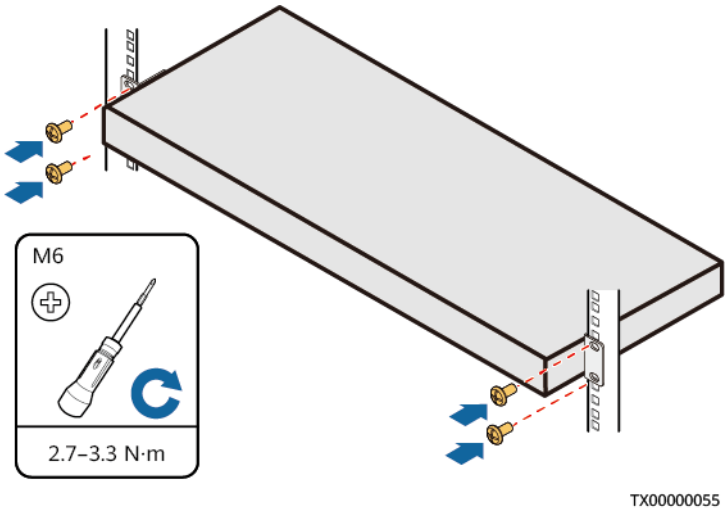
Step 2 Record the connection positions of cables on the BC-1206A and BCU-1203A and remove the cables.

Step 3 Remove the BCU-1203A.

Step 4 Remove the faulty BC-1206A.

Step 5 Install the new BC-1206A.

Figure 4-13 Installing a new BC-1206A



Step 6 Install the removed BCU-1203A on the new BC-1206A.

Step 7 Reconnect the cables to the BC-1206A and BCU-1203A based on the recorded information.

Step 8 Remove the protective gloves.

----End

Follow-up Procedure

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

4.3.8 Replacing a CIM02C

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new CIM02C is intact.

Procedure

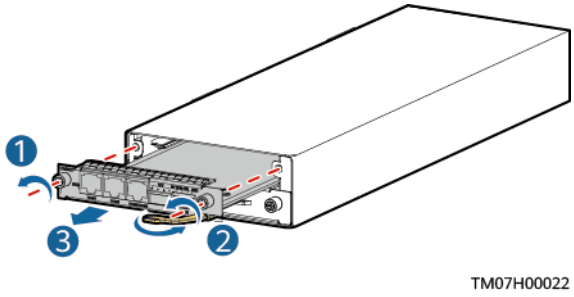
Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

Step 2 Note where cables are connected to the CIM02C panel. Record these positions and disconnect the cables.

Step 3 Loosen the screws on both sides of the CIM02C panel.

Step 4 Pull the handle rightwards and take out the CIM02C.

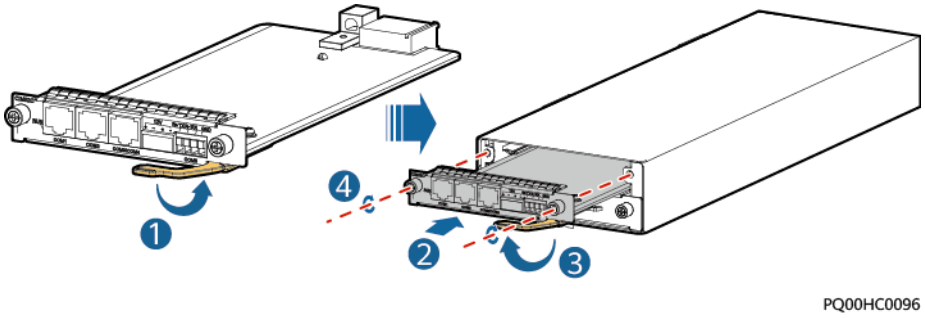
Figure 4-14 Removing the CIM02C



Step 5 Place the new CIM02C into the correct slot in the subrack, and push the CIM02C until its front panel is flush with the front panel of the subrack.

Step 6 Push the handle inwards until it is engaged, and then tighten the screws.

Figure 4-15 Installing the CIM02C



Step 7 Reconnect the cables to the new CIM02C panel based on the information you recorded.

Step 8 Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

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

4.3.9 Replacing a NIM01C3

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new NIM01C3 is intact.

Procedure

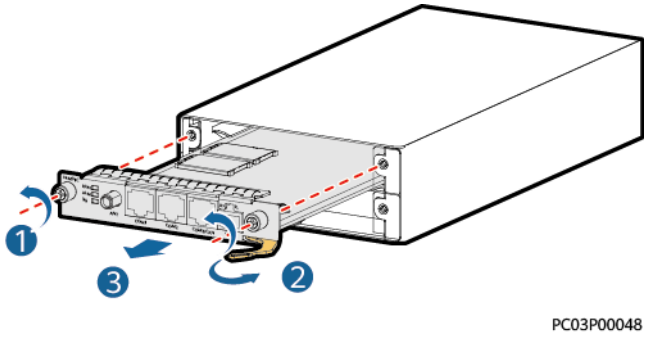
Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

Step 2 Record all cable connection positions on the communications expansion module and disconnect the cables.

Step 3 Loosen the screws on both sides of the communications expansion module.

Step 4 Pull the handle rightwards and remove the communications expansion module.

Figure 4-16 Removing a communications expansion module

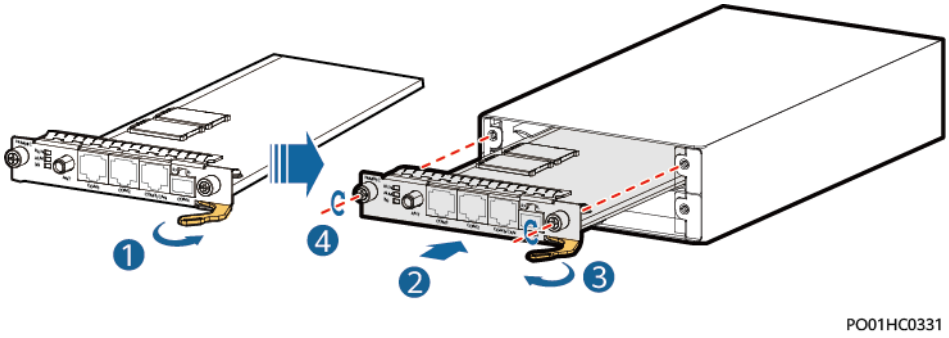


Step 5 Remove the SIM card from the SIM card slot, and insert the new communications expansion module. Skip this step if no SIM card is installed.

Step 6 Place the new NIM01C3 in the corresponding slot of the monitoring unit subrack, and push the NIM01C3 until its front panel is flush with the front panel of the monitoring unit subrack.

Step 7 Push the handle inwards until it is engaged, and then tighten the screws.

Figure 4-17 Installing a communications expansion module



Step 8 Reconnect cables to the panel of the new communications expansion module based on the recorded information.

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

----End

Follow-up Procedure

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

4.3.10 Replacing a DG Expansion Module GIM01C

Prerequisites

- The ESD wrist strap, ESD gloves, and key to the cabinet door are available.
- The new GIM01C is intact.

Procedure

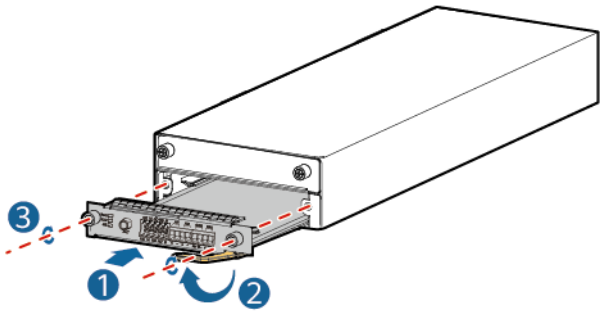
Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Record the connection positions of cables on the GIM01C panel and disconnect the cables.

Step 3 Unscrew and take out the faulty GIM01C.

Step 4 Install the new GIM01C in the correct slot.

Figure 4-18 Installing the GIM01C



TX00000052

Step 5 Connect all the cables on the GIM01C board to the new GIM01C based on the recorded information.

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

----End

Follow-up Procedure

Put the replaced component in an ESD box or bag and return it to the local warehouse.

4.3.11 Replacing an Inverter ETP23006-C1A1

To replace an inverter, perform the following steps.

Prerequisites

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

- You are authorized to enter the site with the key.

Context

An inverter needs to be replaced if it is faulty and cannot be repaired immediately.

Procedure

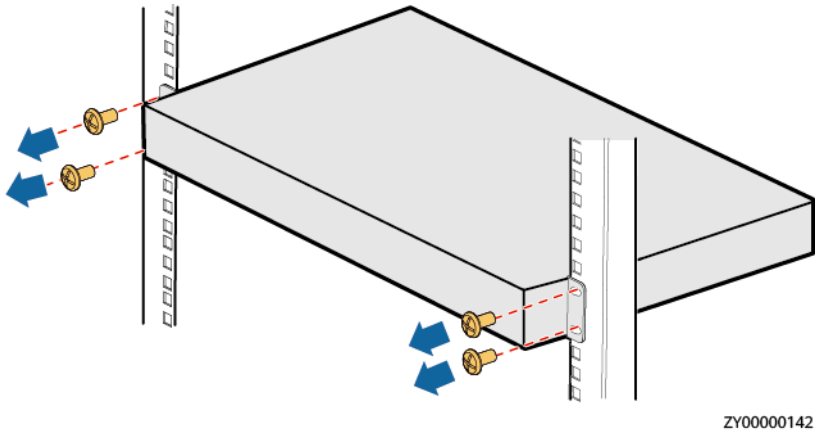
Step 1 Wear an ESD wrist strap or ESD gloves.

Step 2 Switch off the upstream DC output circuit breaker for the inverter.

Step 3 Record the cable connection positions on the inverter to be replaced, and disconnect the cables.

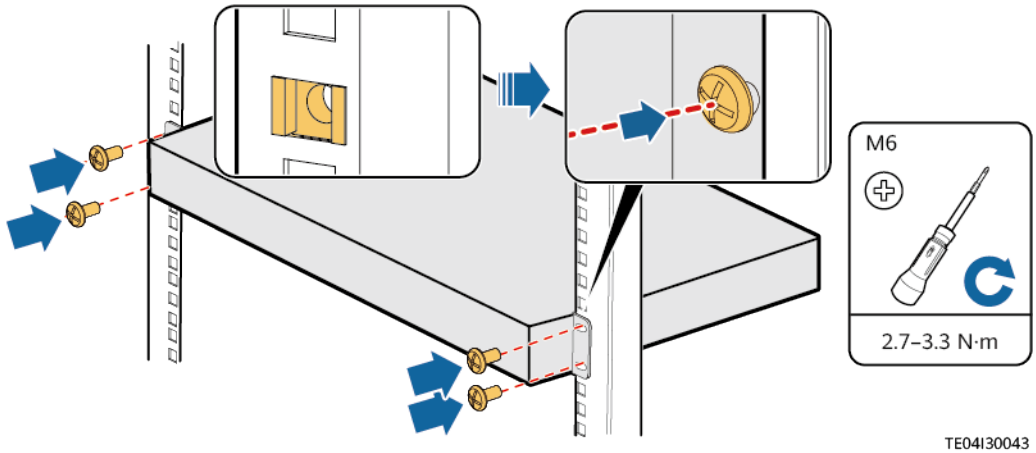
Step 4 Remove the inverter.

Figure 4-19 Removing the inverter



Step 5 Install a new inverter.

Figure 4-20 Installing an inverter



Step 6 Remove the inverter modules from the old inverter and install them on the new inverter.

Step 7 Connect the cables to the inverter based on the recorded information.

Step 8 Remove the ESD wrist strap or gloves and put all the tools away.

----End

Follow-up Procedure

Pack the removed components and send them to the local warehouse.

4.3.12 Replacing an Inverter Module I23002G1

Prerequisites

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

CAUTION

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

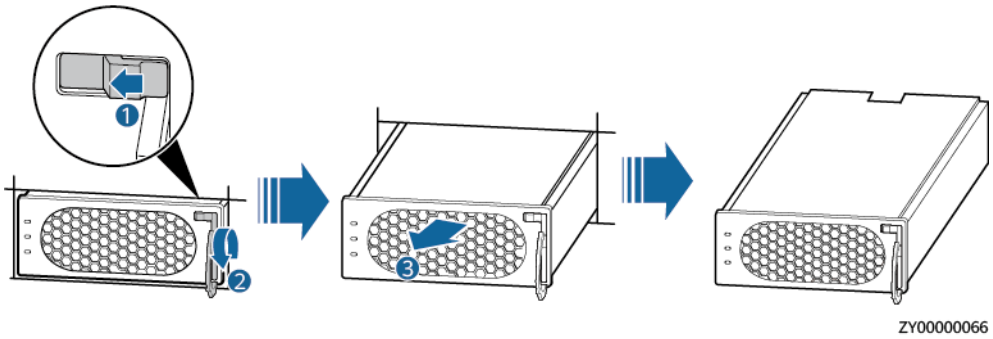
Procedure

Step 1 Wear protective gloves.

Step 2 Push the locking latch on the right side of the inverter module panel toward the left.

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

Figure 4-21 Removing an inverter module

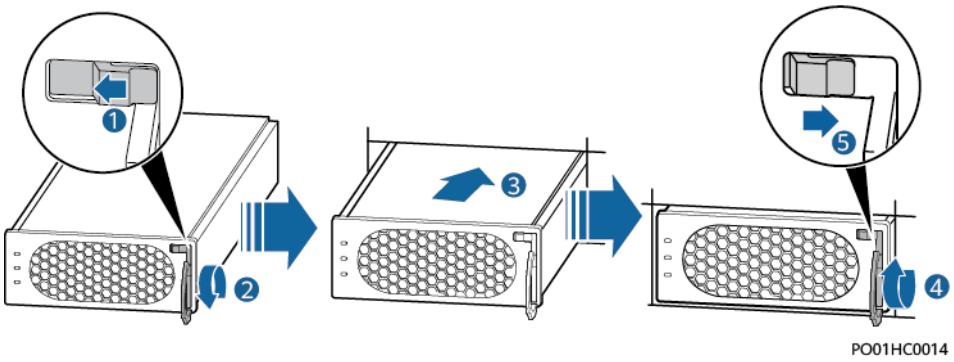


Step 4 Push the locking latch on the new inverter module toward the left, and pull out the handle.

Step 5 Place the new inverter module at the entry of the correct slot.

Step 6 Gently slide the inverter module along the guide rails until it is in place, close the handle, and push the locking latch toward the right to lock the handle.

Figure 4-22 Installing a new inverter module



Step 7 Remove the protective gloves.

----End

Follow-up Procedure

Pack the removed components and send them to the local warehouse.

4.3.13 Replacing an ATS Main Control Box

The ATS main control box needs to be replaced if it is faulty and cannot be repaired immediately.

Prerequisites

- You have prepared an ESD wrist strap or a pair of ESD gloves, a Phillips screwdriver, a flat-head screwdriver, a cable cutter, cable ties, an ESD box or bag, and the cabinet door key.
- You have confirmed the model of the ATS main control box to be replaced and prepared a replacement main control box.
- You are authorized to enter the site.

Context

- The ATS main control box is not hot-swappable.
- The ATS main control box replacement may cause system power failures. To prevent power failures, ensure that other power systems, such as the battery, provide continuous power supply.

Procedure

Step 1 Put on an ESD wrist strap or a pair of ESD gloves.

Step 2 Switch all AC input circuit breakers on the ATS to OFF.

DANGER

To avoid personal injury, ensure that AC power is off before replacing an ATS main control box.

Step 3 Disconnect cables from the faulty ATS main control box. Insulate each cable and label it immediately after disconnecting it.

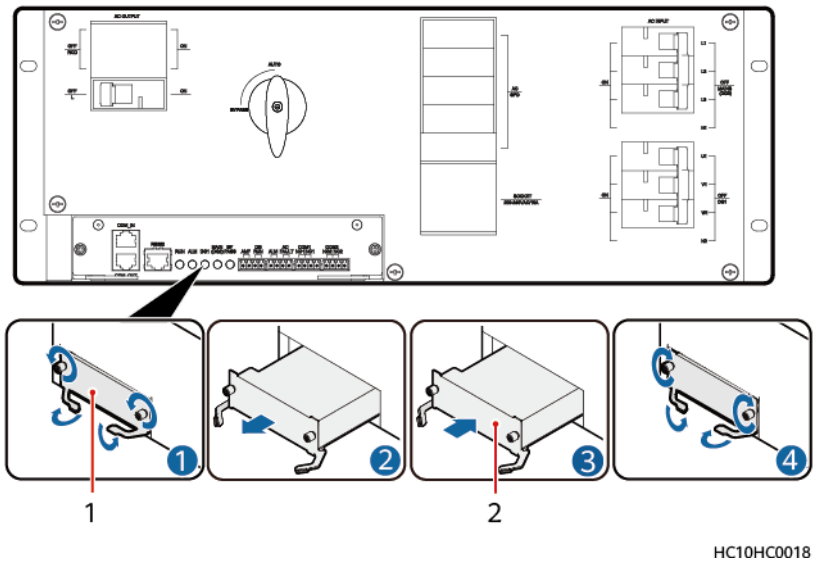
Step 4 Remove the faulty ATS main control box and install the replacement main control box, as shown in the following figure.

NOTICE

If the ATS is at the end of CAN cascading, set a build-out resistor before installing the replacement main control box.

1. Loosen the two captive screws on the panel of the faulty ATS main control box using a screwdriver. Hold the ejector lever and pull out the faulty main control box.
2. Hold the ejector lever of the replacement ATS main control box and insert the main control box into the ATS subrack until its front panel aligns with that of the ATS subrack.
3. Close the ejector lever.
4. Tighten the captive screws using a screwdriver.

Figure 4-23 Replacing an ATS main control box



(1) Faulty ATS main control box (2) Replacement ATS main control box

Step 5 Reconnect the cables to the replacement ATS main control box based on the cable labels.

Step 6 Set parameters again according to the appropriate installation guide.

Step 7 Remove the ESD wrist strap or gloves and put all the tools away.

----End

Follow-up Procedure

- Place the replaced component into the ESD box or bag and then place the ESD box or bag into the carbon box with foams or the bag of a new component.
- Fill in the fault card with the information regarding the faulty component.
- Contact your local Huawei office to handle the faulty component.

4.3.14 Replacing an ACDB380-63-2B

Perform the following steps to replace an ACDB380-63-2B.

Prerequisites

- The ESD wrist strap or ESD gloves, Phillips screwdriver, ESD box or bag, and cabinet door key are available.
- You are authorized to enter the site with the key.

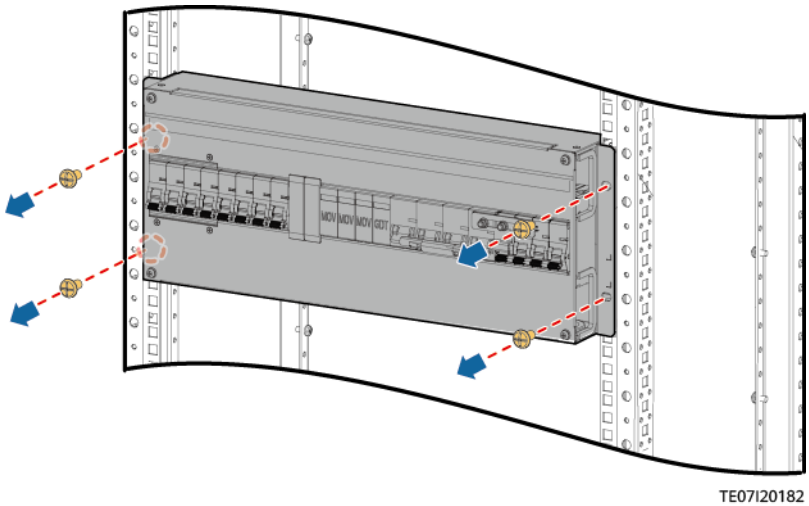
Procedure

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

Step 2 Record the cable connection positions on the ACDB380-63-2B and disconnect the cables.

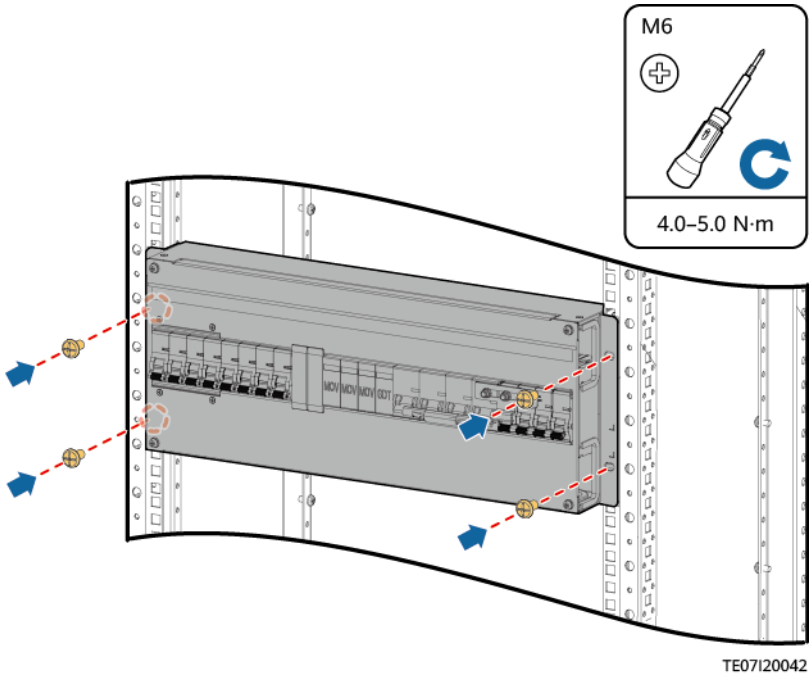
Step 3 Remove the ACDB380-63-2B.

Figure 4-24 Removing an ACDB380-63-2B



Step 4 Install a new ACDB380-63-2B.

Figure 4-25 Installing an ACDB380-63-2B



Step 5 Connect the cables to the ACDB380-63-2B based on the recorded information.

Step 6 Remove the ESD wrist strap or gloves and put all the tools away.

----End

4.3.15 Replacing a PDU2000-16-1PH-7

Context

- A cabinet door key, flat-head screwdriver, and Phillips screwdriver are available.
- The new PDU2000 is intact.

Procedure

Step 1 Switch off the circuit breaker of the PDU2000 on the ACDB220-63-12B.

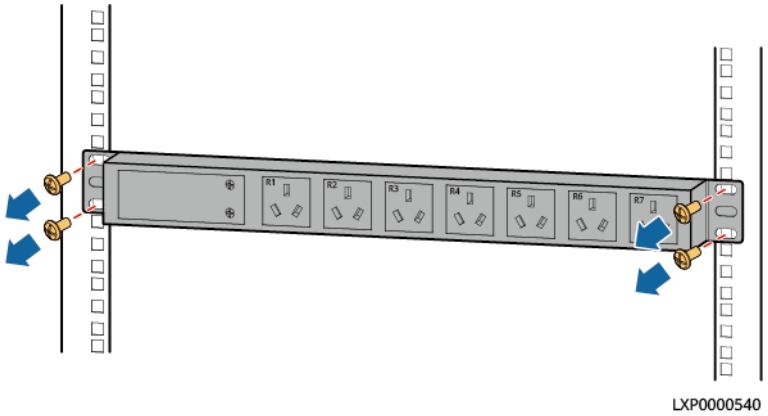
Step 2 Remove the PDU2000 input cable from the inverter.

Step 3 Remove the load cable plugs from the PDU2000 output sockets and record them.

Step 4 Remove the PDU2000 ground cable.

Step 5 Remove the PDU2000.

Figure 4-26 Removing a PDU2000



Step 6 Install the new PDU2000.

Step 7 Open the cover on the PDU2000 input wiring terminals.

Step 8 Install the PDU2000 ground cable.

Step 9 Connect one end of the PDU2000 input cable to the PDU2000 input terminal and the other end to the ACDB220-63-12B output terminal.

Step 10 Reinstall the cover on the PDU2000 input wiring terminals.

Step 11 Connect the load cable plugs to the PDU2000 output sockets.

Step 12 Switch on the circuit breaker of the PDU2000 on the ACDB220-63-12B.

----End

Follow-up Procedure

Pack the removed components and send them to the local warehouse.

4.3.16 Replacing an ACDB220-63-12B

Perform the following steps to replace an ACDB220-63-12B.

Prerequisites

- The ESD wrist strap or ESD gloves, Phillips screwdriver, ESD box or bag, and cabinet door key are available.
- You are authorized to enter the site with the key.

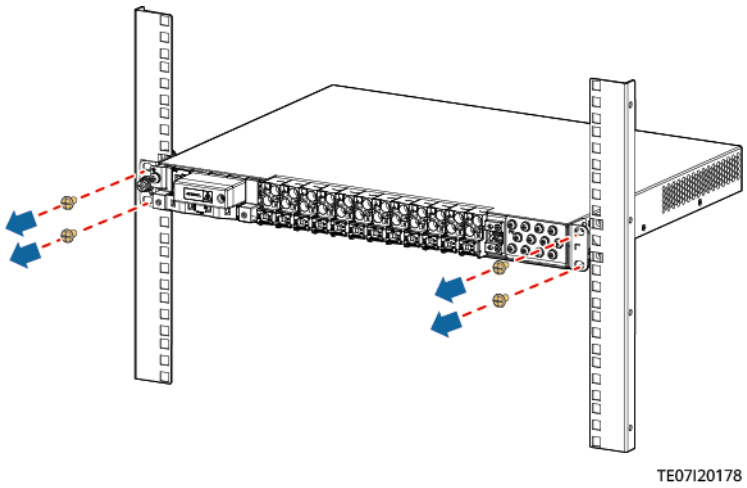
Procedure

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

Step 2 Record the cable connection positions on the ACDB220-63-12B and disconnect the cables.

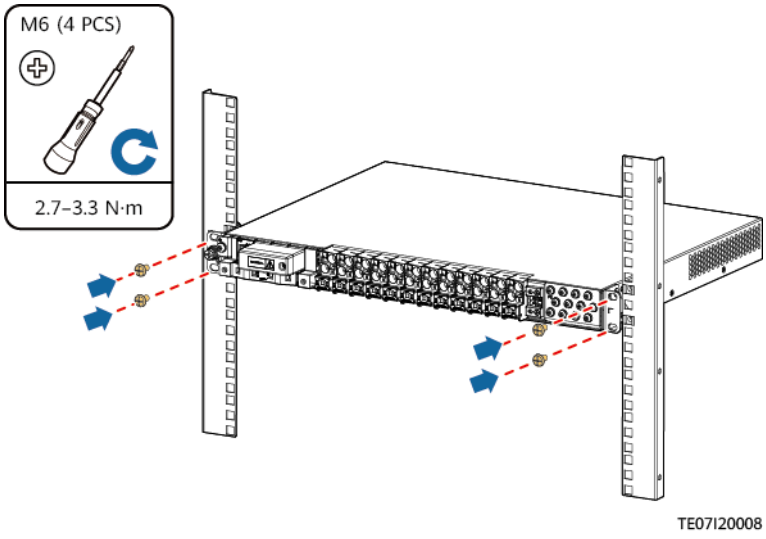
Step 3 Remove the ACDB220-63-12B.

Figure 4-27 Removing an ACDB220-63-12B



Step 4 Install a new ACDB220-63-12B.

Figure 4-28 Installing an ACDB220-63-12B



Step 5 Connect the cables to the ACDB220-63-12B based on the recorded information.

Step 6 Remove the ESD wrist strap or gloves and put all the tools away.

----End

4.3.17 Replacing an ACDB220-40-1B

Prerequisites

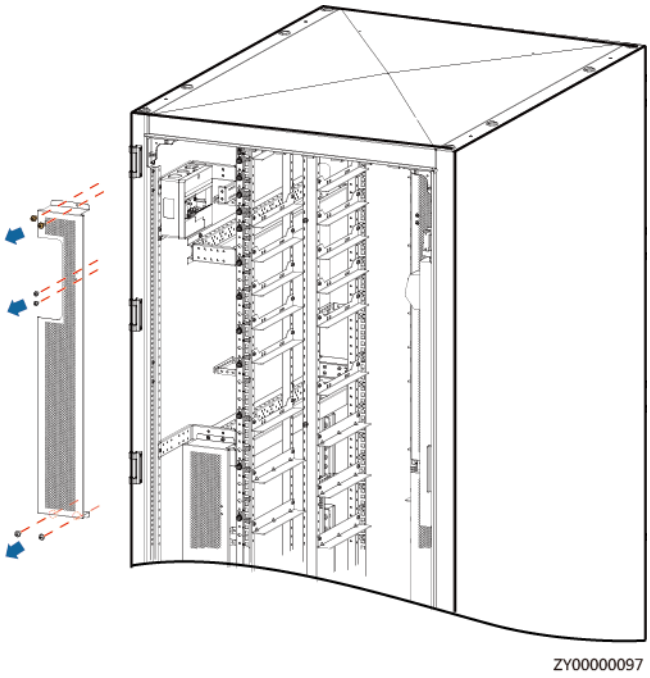
- The ESD wrist strap or ESD gloves, Phillips screwdriver, ESD box or bag, and cabinet door key are available.
- You are authorized to enter the site with the key.

Procedure

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

Step 2 Remove the baffle plate.

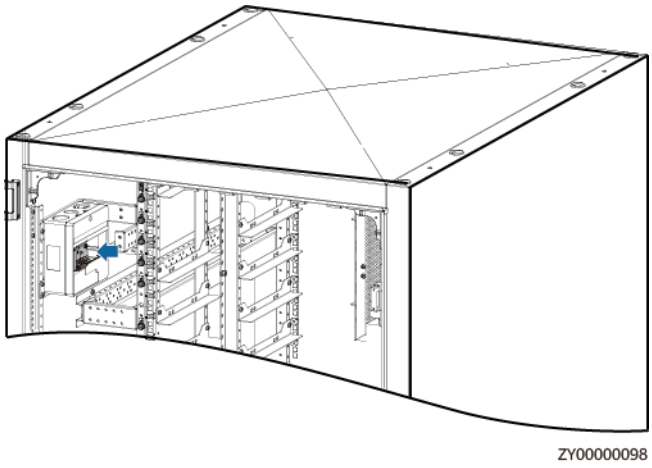
Figure 4-29 Removing the baffle plate



Step 3 Record the cable connection of the automatic reclosing residual current device (RCD) to be replaced, and disconnect the cables.

Step 4 Remove the automatic reclosing RCD.

Figure 4-30 Removing the automatic reclosing RCD



Step 5 Install the new automatic reclosing RCD.

Step 6 Connect the cables to the ACDB220-40-1B based on the recorded information.

Step 7 Install the baffle plate.

Step 8 Remove the ESD wrist strap or gloves and put all the tools away.

----End

4.3.18 Replacing an ESM

Prerequisites

- The protective gloves, Phillips screwdriver and socket wrench are available.
- You have confirmed the model of the ESM to be replaced and prepared a new ESM.
- You are authorized to enter the site with the key.
- If a gyroscope is configured, disable the gyroscope function. For details, see the Intelligent Displacement Lock and IoT Module Installation Guide (ESM). The document download path is **https://support.huawei.com/enterprise/.**

Context

ESM replacement may cause a system power failure. To prevent power failures, ensure that other power sources, such as the mains, diesel generator, or a third-party DC power source, provide continuous power supply.

Replacement Requirements

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

1. If the intelligent displacement lock anti-theft function is disabled, hold down the Manual ON/OFF button for at least 15s to enter the maintenance mode.
2. In the maintenance mode, hold down the Manual ON/OFF button for at least 15s to exit the maintenance mode.

Before replacing an ESM in an actual maintenance scenario, hold down the Manual ON/OFF button for the ESM to power off. After the ESM is replaced, hold down the Manual ON/OFF button for at least 15s on the new ESM to exit the maintenance mode.

Removing the Old ESM

Step 1 Wear the protective gloves.

Step 2 Use the Manual ON/OFF button on the ESM to turn off the battery output.

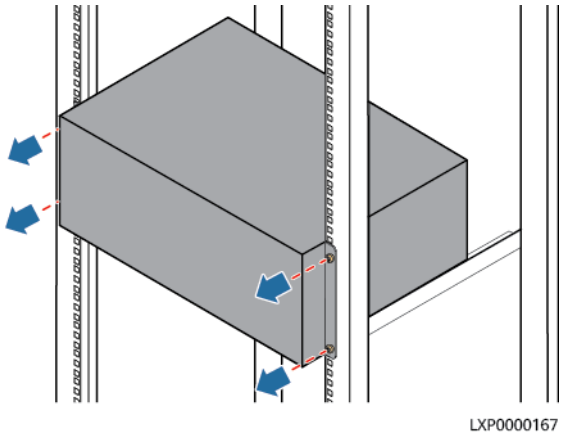
Step 3 Disconnect the cables from the old ESM. Insulate each cable and label it immediately after disconnecting it.

CAUTION

When removing cables, use a professional insulated tool to remove the negative cable from one end of the busbar, and then remove the positive and negative cables from the ESM to prevent short circuits.

Step 4 Loosen the screws on the panel and remove the ESM.

Figure 4-31 Removing the old ESM

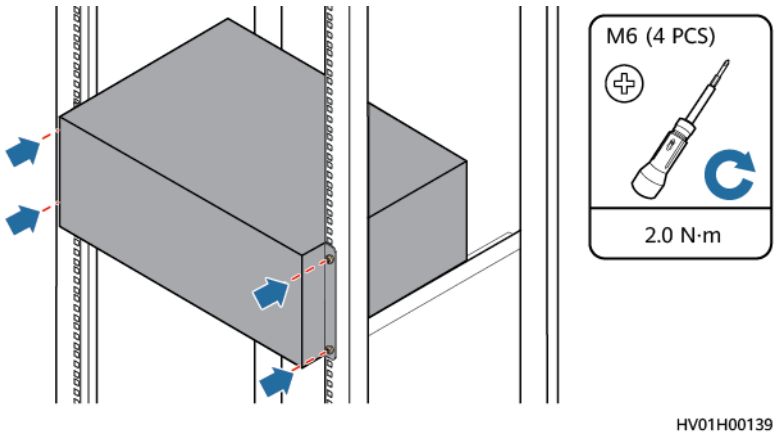


----End

Installing the New ESM

Step 1 Install the new ESM and tighten the screws.

Figure 4-32 Installing the new ESM



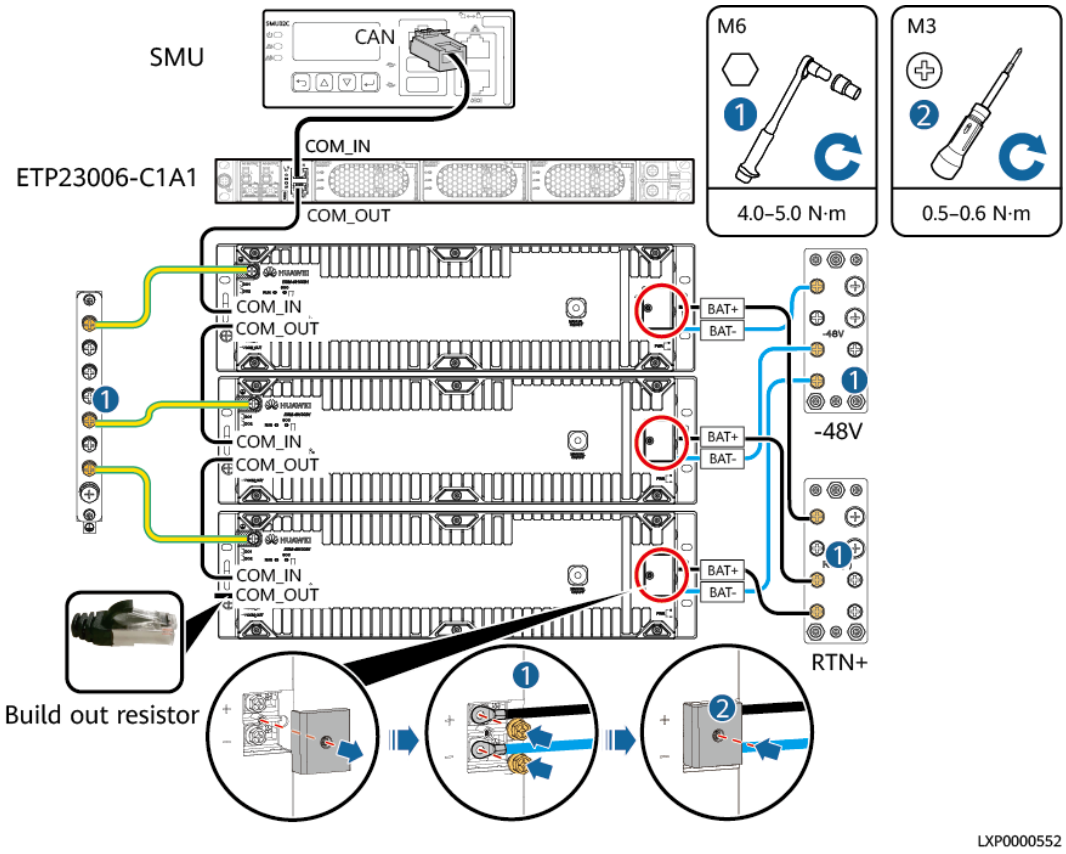
Step 2 Hold down the Manual ON/OFF button for 15s for the ESM to enter the maintenance mode. In this mode, all indicators blink, the ESM board is activated, but the ESM will not be charged or discharged.

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

NOTICE

- When installing battery cables, connect the negative cable and then the positive cable.
- If an ATS is configured, connect the ATS to the ESM using a communications cable.
- The ground bar and busbar in the following figure are for reference only.

Figure 4-33 Installing ESM cables (using three ESM-48100B1s as an example)



Step 4 Hold down the Manual ON/OFF button for 15s for the ESM to exit the maintenance mode. The ESM is automatically activated and connects to the power system.

Step 5 Remove the protective gloves and pack up all tools.

----End

Follow-up Operations

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

4.3.19 Replacing an Air Conditioner PC3000D-2

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, a Phillips screwdriver, a wrench, an ESD bag, and the cabinet door key.
- You have confirmed the model of the air conditioner to be replaced and prepared a replacement air conditioner.
- You are authorized to enter the site with the key.

Context

You need only to disconnect the air conditioner power supply, but not the AC input to the system.

Procedure

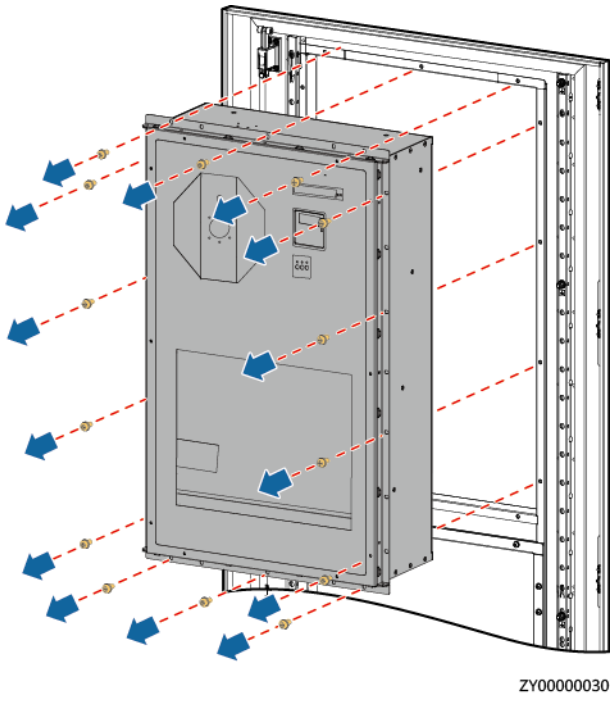
Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Power off the air conditioner and record the cable information.

Step 3 Record the positions where cables are connected to the air conditioner, and disconnect the cables.

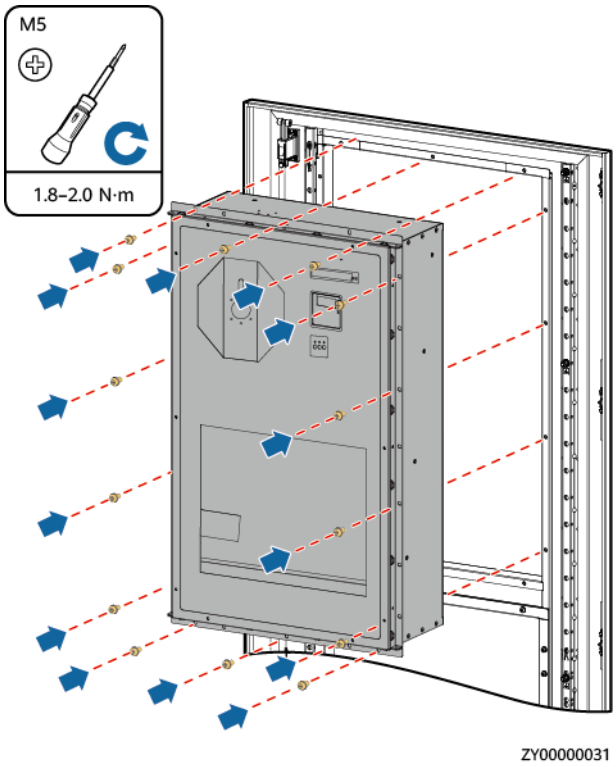
Step 4 Remove the air conditioner.

Figure 4-34 Removing the air conditioner



Step 5 Install the new air conditioner.

Figure 4-35 Installing the new air conditioner



Step 6 Apply sealant on the air conditioner rubber strip and the position where the air conditioner passes through the cabinet.

Step 7 Reconnect the removed cables to the new air conditioner based on the recorded information.

Step 8 Power on the air conditioner.

Step 9 Set the air conditioner address on the air conditioner LCD. For the air conditioner addresses, see **D Device Address Description**.

Table 4-13 Setting air conditioner addresses

Main Menu	Second-Level Menu	Third-Level Menu	Settings
System Func	Para Set	Addr	Set as required.

NOTE

After the air conditioner is powered on, the language setting screen is displayed. The preset password is **0001**.

Step 10 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Send the removed air conditioner for repair.

4.3.20 Replacing an Air Conditioner PC1500D-1

Prerequisites

- You have obtained an ESD wrist strap, a pair of ESD gloves, a Phillips screwdriver, a wrench, an ESD bag, and the cabinet door key.
- You have confirmed the model of the air conditioner to be replaced and prepared a replacement air conditioner.
- You are authorized to enter the site with the key.

Context

You need only to disconnect the air conditioner power supply, but not the AC input to the system.

Procedure

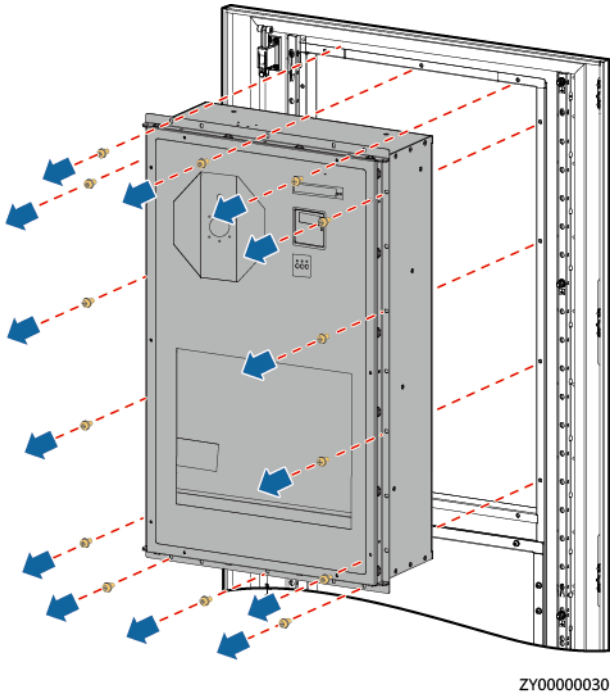
Step 1 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 2 Power off the air conditioner and record the cable information.

Step 3 Record the positions where cables are connected to the air conditioner, and disconnect the cables.

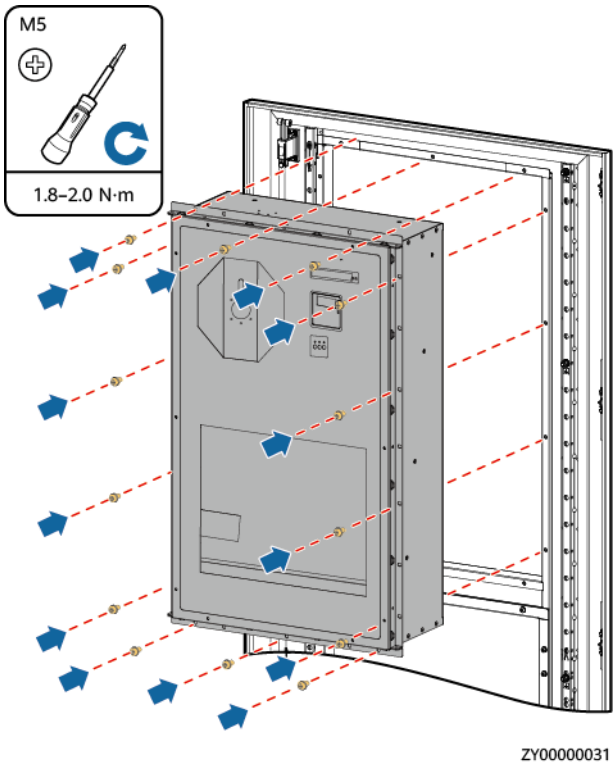
Step 4 Remove the air conditioner.

Figure 4-36 Removing the air conditioner



Step 5 Install the new air conditioner.

Figure 4-37 Installing the new air conditioner



Step 6 Apply sealant on the air conditioner rubber strip and the position where the air conditioner passes through the cabinet.

Step 7 Reconnect the removed cables to the new air conditioner based on the recorded information.

Step 8 Power on the air conditioner.

Step 9 Set the air conditioner address on the air conditioner LCD. For the air conditioner addresses, see **D Device Address Description**.

Table 4-14 Setting air conditioner addresses

Main Menu	Second-Level Menu	Third-Level Menu	Settings
System Func	Para Set	Addr	Set as required.

NOTE

After the air conditioner is powered on, the language setting screen is displayed. The preset password is **0001**.

Step 10 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Send the removed air conditioner for repair.

4.3.21 Replacing an HAU03D-01

Prerequisites

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

> **CAUTION**
>
> Before replacing the heater, ensure that its circuit breaker is OFF.

Procedure

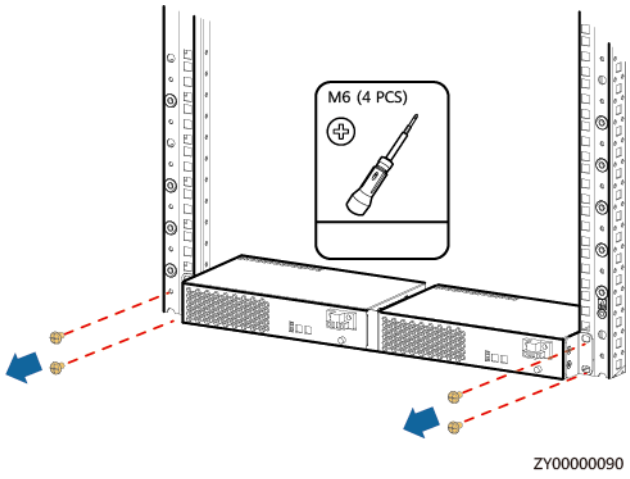
Step 1 Wear the protective gloves.

Step 2 Switch off the heater circuit breaker on the DCDU.

Step 3 Record the cable connection positions on the heater and disconnect the cables.

Step 4 Remove the heater.

Figure 4-38 Removing a heater



Step 5 Install the new heater.

Figure 4-39 Installing a heater

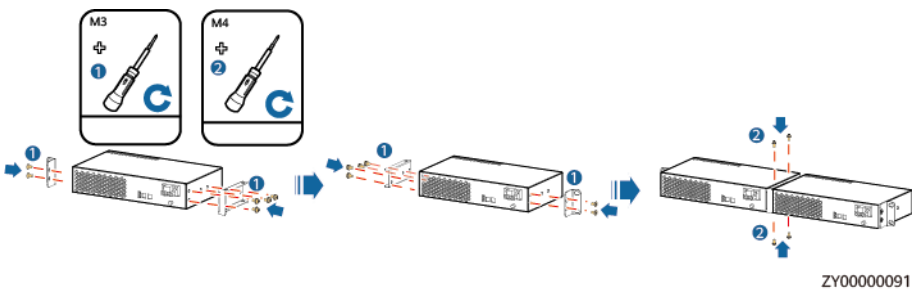
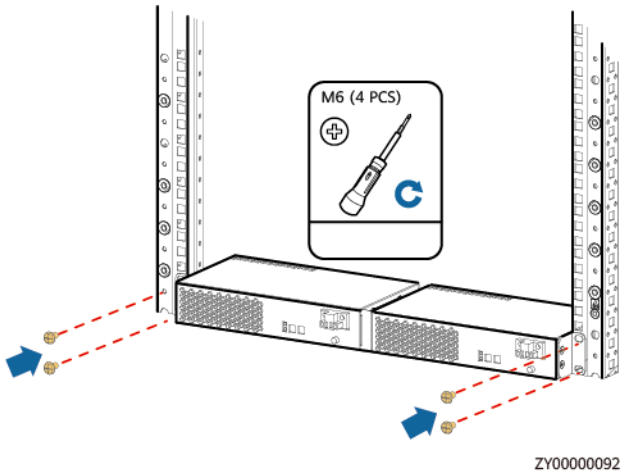


Figure 4-40 Installing a heater on the rack



Step 6 Connect the cables to the heater based on the recorded information.

Step 7 Switch on the heater circuit breaker on the DCDU.

Step 8 Remove the protective gloves.

----End

4.3.22 Replacing an Electronic Lock

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 electronic lock is intact.

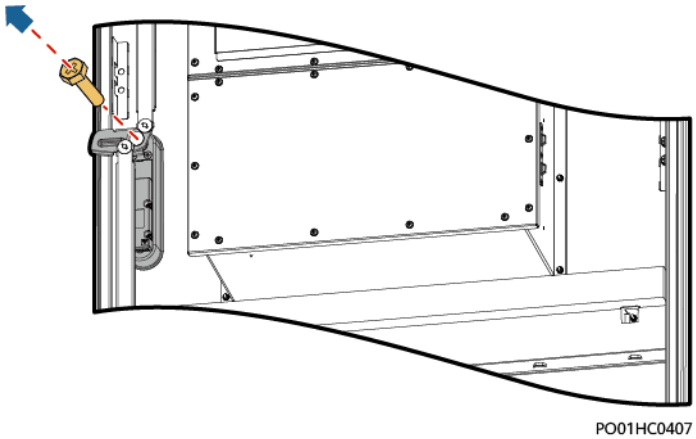
Procedure

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

Step 2 Disconnect the electronic lock cable from the cable connector.

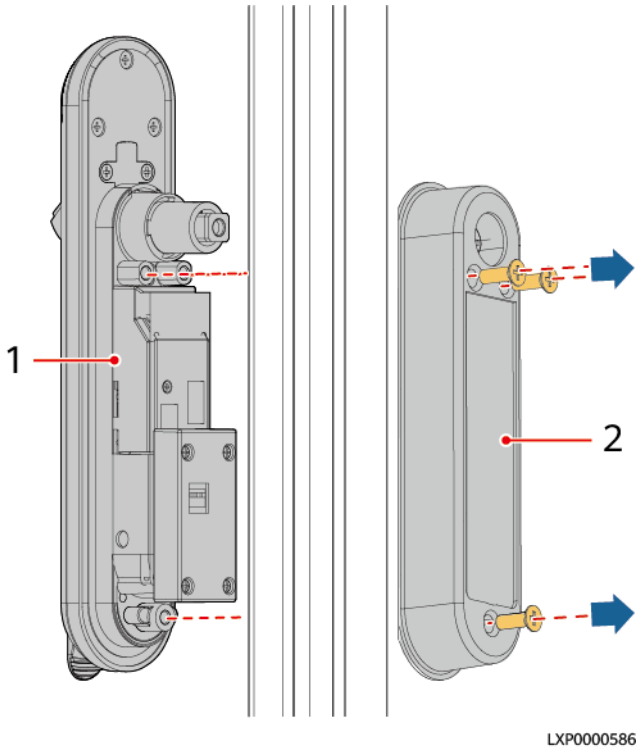
Step 3 Unscrew the electronic lock rotation axis.

Figure 4-41 Unscrewing a rotation axis



Step 4 Unscrew the electronic lock cover, and remove the lock.

Figure 4-42 Removing an electronic lock



(1) Lock (2) Lock cover

Step 5 Record the DIP switch settings of the electronic door lock.

Step 6 Take out a new electronic lock, and unscrew and remove the control box.

Step 7 Set the DIP switch of the electronic door lock based on the recorded information.

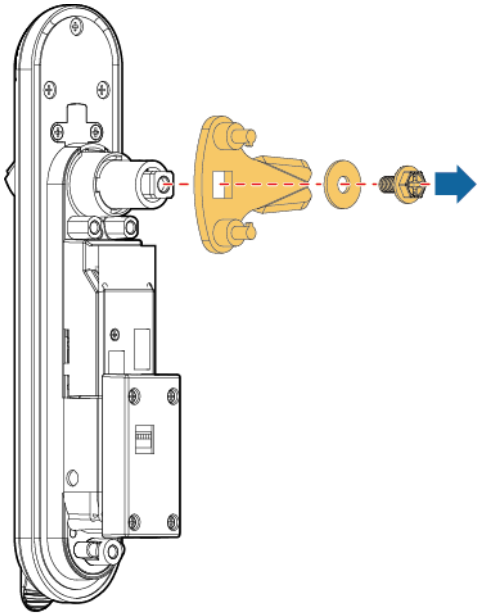
NOTICE

Before powering on the electronic door lock, ensure that the DIP switch settings are the same as those of the original DIP switch.

Step 8 (Optional) Change the door opening direction of the electronic door lock.

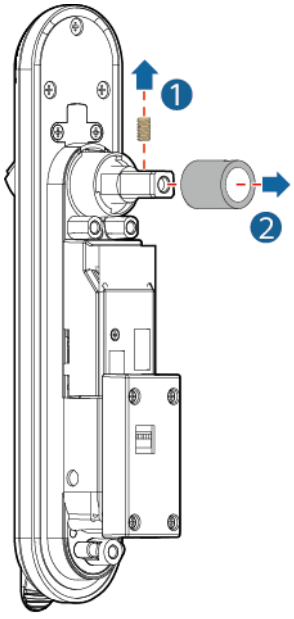
1. Remove the bolt from the lock.

Figure 4-43 Removing the bolt



2. Remove the shaft sleeve from the lock.

Figure 4-44 Removing the shaft sleeve

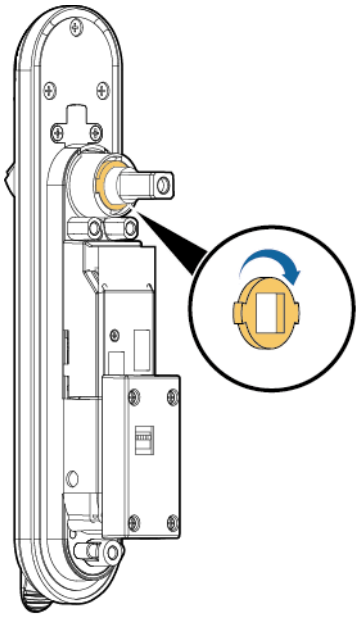


3. Rotate the positioning kit according to the door opening direction.

NOTE

If the ears on the positioning kit are horizontal, the door is right-handed. If they are vertical, the door is left-handed.

Figure 4-45 Rotating the positioning kit



4. Reinstall the shaft sleeve and bolt.

Step 9 Remove the other screws from the lock, reinstall the lock on the cabinet door, and tighten screws on the lock cover.

Step 10 Install screws on the electronic lock rotation axis.

Step 11 Connect the electronic lock cable to the cable connector.

Step 12 On the SMU LCD, choose **Running Control**> **Elock** >**E-lock Group** and see if **Del. Com. Fail Lock** is displayed. If yes, set **Del. Com. Fail Lock** to **Yes**.

NOTE

Del. Com. Fail Lock is displayed when an electronic lock communication failure alarm is generated.

Step 13 Apply sealant to the joint between the electronic door lock and the cabinet door outside the cabinet.

Step 14 Disconnect the ground cable for the ESD wrist strap, and take off the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

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

4.3.23 Replacing a Smoke Sensor

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 smoke sensor is intact.

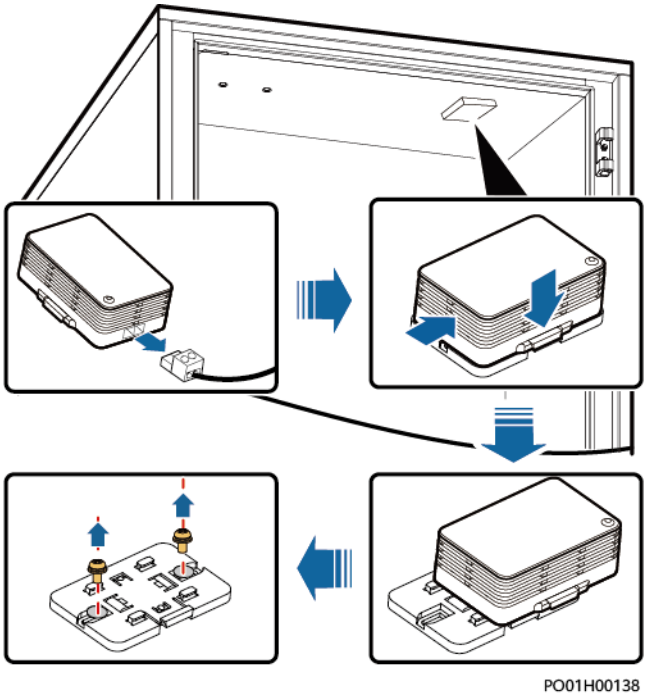
Procedure

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

Step 2 Remove the smoke sensor.

1. Remove the connected cables from the smoke sensor.
2. Hold down the button on the smoke sensor and push the smoke sensor in the OPEN direction.
3. Unscrew the smoke sensor base.

Figure 4-46 Removing the smoke sensor



Step 3 Install a new smoke sensor.

1. Properly place the smoke sensor base and tighten the screws for it.
2. Properly place the new smoke sensor and press and push it in the CLOSE direction.
3. Reconnect the removed cables to the smoke sensor.

Step 4 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 send it to the local warehouse.

4.3.24 Replacing a Digital Temperature and Humidity Sensor

Prerequisites

- Tools and the key to the cabinet door are available.
- The new digital temperature and humidity sensor is intact.

Procedure

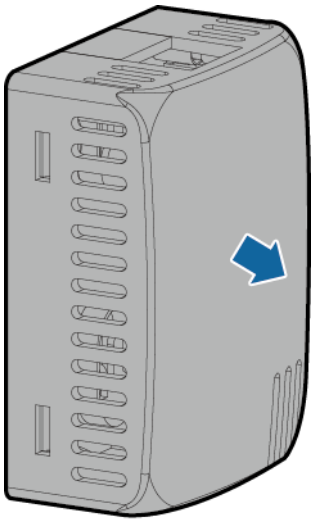
Step 1 Record cable information and installation positions.

Step 2 Record the DIP switch settings.

Step 3 Disconnect the cable from the communications port on the sensor.

Step 4 Remove the faulty sensor.

Figure 4-47 Removing a sensor



Step 5 Put the new sensor at the side of the cabinet.

Step 6 Connect cables based on the recorded information.

Step 7 Set the DIP switch based on the recorded DIP switch information.

----End

Follow-up Procedure

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

4.3.25 Replacing a Water Sensor

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, door key, and required tools are available.

- The new water sensor 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 Disconnect the water sensor from the UIM.

Step 3 Unscrew and remove the water sensor from its support.

Step 4 Install the new water sensor on the support and place the support at the bottom of the cabinet or on the equipment room floor.

Step 5 Connect the water sensor cable to the UIM.

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 send it to the local warehouse.

4.3.26 Replacing a Door Status Sensor

Prerequisites

- You have obtained the cabinet door key and tools.
- The new door status sensor is intact.

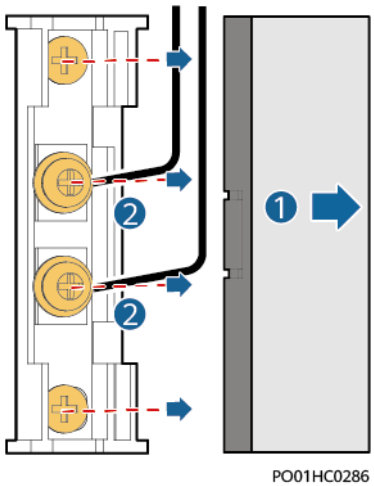
Procedure

Step 1 Open the cabinet door and remove the shell of the door status sensor.

Step 2 Record the positions where the alarm cables connect to the door status sensor, and unscrew the alarm cables.

Step 3 Unscrew the door status sensor and remove the door status sensor.

Figure 4-48 Removing the door status sensor



Step 4 Remove the shell of the new door status sensor and remove the screws from the signal cables.

Step 5 Properly place a new door sensor at the installation position and tighten the screws.

Step 6 Place the alarm cables in sequence and secure the screws.

Step 7 Reinstall the shell of the door status sensor.

----End

Follow-up Procedure

Check that the door status alarm is cleared.

4.3.27 Replacing a Light

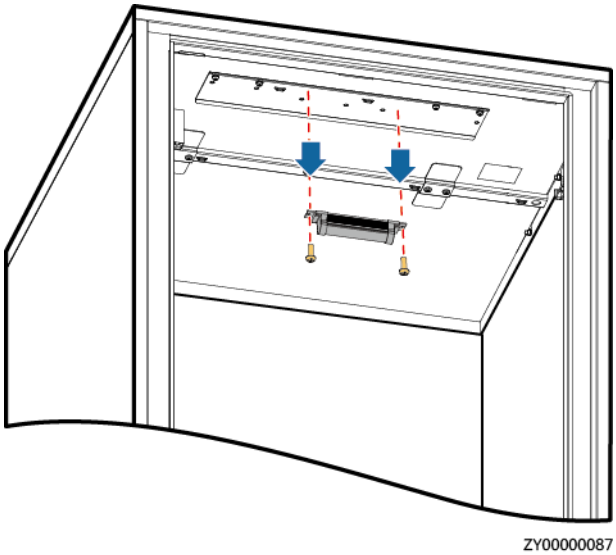
Prerequisites

- You have obtained the cabinet door key, and phillips screwdriver.
- The new light is intact.

Procedure

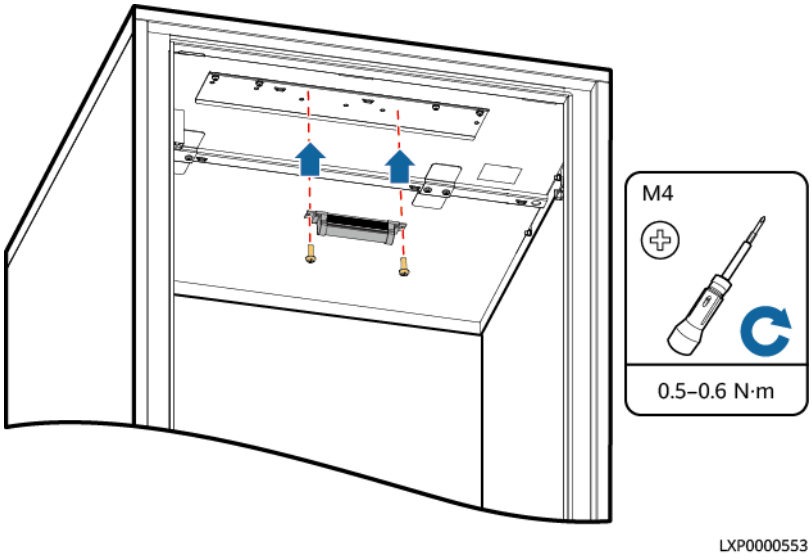
Step 1 Remove the damaged light.

Figure 4-49 Removing the light



Step 2 Install a new light.

Figure 4-50 Install a light



----End

Follow-up Procedure

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

4.3.28 Replacing a Smart ETH Gateway

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, door key, and required tools are available.
- The new smart ETH gateway 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 Switch off the circuit breaker corresponding to the smart ETH gateway.

Step 3 Disconnect the smart ETH gateway cables, record the cable information, and label them.

1. Disconnect the gateway power cable.
2. Disconnect the gateway communications cable.
3. Disconnect the gateway ground cable.

Step 4 Remove the smart ETH gateway.

Step 5 Take out the new smart ETH gateway and install it on the guide rail.

Step 6 Connect the smart ETH gateway cables based on the recorded information.

1. Connect the gateway ground cable.
2. Connect the gateway communications cable.

3. Connect the gateway power cable.

Step 7 Set the circuit breaker corresponding to the smart ETH gateway to ON.

Step 8 Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

4.3.29 Replacing a Circuit Breaker

Prerequisites

- Tools are available.
- The new circuit breaker is intact.

NOTICE

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

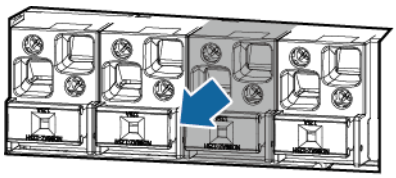
Procedure

Step 1 Switch off the circuit breaker to be replaced.

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

Step 3 Remove the faulty circuit breaker.

Figure 4-51 Removing a circuit breaker



LXP0000528

Step 4 Install the new circuit breaker.

Step 5 Connect cables to the circuit breaker based on the recorded cable information.

Step 6 Switch on the circuit breaker.

----End

Follow-up Procedure

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

4.3.30 Replacing an AC Input Module

Prerequisites

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

NOTICE

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

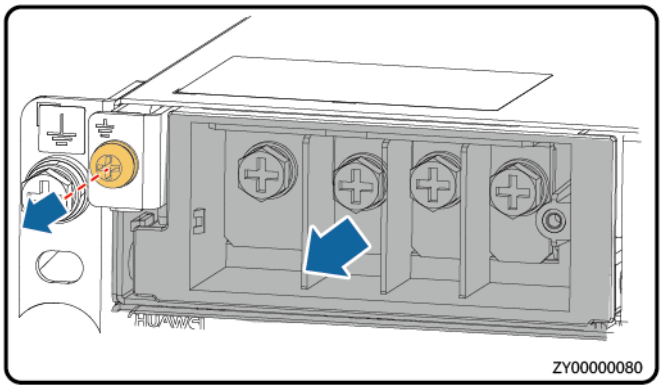
Procedure

Step 1 Switch off the circuit breaker on the AC input module.

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

Step 3 Remove the AC input module.

Figure 4-52 Removing the AC input module



Step 4 Install the new AC input module.

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

----End

Follow-up Procedure

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

4.3.31 Replacing an AC SPD Module

Prerequisites

- You have obtained an ESD wrist strap or a pair of ESD gloves, an ESD box or bag, and the cabinet door key.
- The new AC SPD module is intact and the indication window is green.

DANGER

Do not replace an AC SPD module during a thunderstorm.

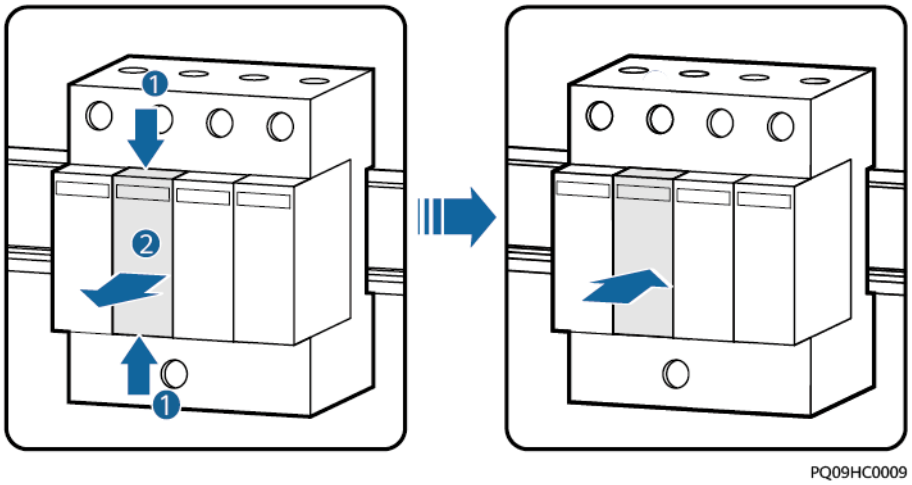
Procedure

Step 1 Connect the ground cable to the ESD wrist strap and wear the ESD wrist strap and ESD gloves

Step 2 Hold down the faulty AC SPD module and pull it out.

Step 3 Install a new AC SPD module.

Figure 4-53 Replacing an AC SPD module



Step 4 Disconnect the ground cable from the ESD wrist strap and take off the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

Check that the alarm for the AC SPD is cleared.

A Technical Specifications

A.1 Environmental Specifications

Table A-1 Environmental Specifications

Item	Specifications
Operating temperature	–40ºC to +55ºC with 1120 W/m^2 solar radiation
Transport temperature	–40ºC to +70ºC
Storage temperature	–40ºC to +70ºC
Relative humidity	5%–98% RH
Altitude	0–5000 m (When the altitude ranges from 2000 m to 5000 m, high temperature derating applies and the operating temperature decreases by 1°C for each additional 200 m.)
Noise level	≤ 45°C: noise ≤ 65 dB(A)@1.5 m; complies with GR 487.
IP rating	IP55
Operating environment	Outdoor class C environment
Others	• There should be no conductive dust, corrosive gas, or explosion hazard. • Dust, corrosive substances, pests, molds, and other indicators should be controlled in accordance with Class 4.1 requirements in ETSI EN 300 019-1-4 (V2.2.1).

A.2 Electrical Specifications

Table A-2 Electrical Specifications

Item	Specifications	
AC input	Input system	• ETP48400-C3B1: 220/380 V AC three-phase four-wire, compatible with 220 V AC single-phase • ETP48400-C3B3: 220/380 V AC three-phase four-wire
	Input voltage	85–300 V AC
	Input frequency	Frequency range: 45–66 Hz; nominal frequency: 50 Hz/60 Hz
	Power factor	≥ 0.99 (load ≥ 50%)
Output	Output voltage range	• 48V DC (–43.2V DC~–57.6V DC) • 220V AC (220V AC±3%)
	Output power	• 48V DC (18KW) • 220V AC (6KV A)
AC input protection	AC input overvoltage protection threshold	> 300 V AC
	AC input overvoltage recovery threshold	When the voltage is restored to 290 V AC, the output resumes.
	AC input undervoltage protection threshold	< 85 V AC
	AC input undervoltage recovery threshold	When the voltage is restored to 90 V AC, the output resumes.
DC output protection	DC output overvoltage protection threshold	Range: –58.5 V DC to –60.5 V DC 1. If overvoltage occurs due to an internal fault, the rectifier locks out. 2. If the external voltage is greater than –63 V for more than 500 ms, the rectifier locks out.
Surge protection	AC input port	Differential mode: 30 kA; common mode: 30 kA (8/20 μs), criterion C
	48 V DC power port	Differential mode: 10 kA; common mode: 10 kA (8/20 μs), criterion C
	220 V AC	Differential mode: 30 kA; common mode: 30 kA (8/20 μs)

Item	Specifications
Safety design	IEC 60950-1, IEC 62368-1
MTBF	200,000 hours (at 25°C)

A.3 EMC Specifications

Table A-3 EMC specifications

Item	Specifications	
Electromagnetic interference (EMI)	Conducted emission (CE)	EN 55032 AC port: Class A; DC port: Class A[1]; signal port: Class A
	Radiated emission (RE)	EN 55032 Enclosure port: Class A
	Harmonic current	IEC 61000-3-12 AC power port: The current of each phase is greater than 16 A.
	Voltage fluctuation and flicker	AC power port: Pst ≤ 1.0, P1t ≤ 0.65, dc ≤ 3%, dmax ≤ 4%. The time when the value of d(t) exceeds 3% is less than or equal to 200 ms.
Electromagnetic susceptibility (EMS)	Electrostatic discharge (ESD)	IEC 61000-4-2 Enclosure port: 6 kV (criterion B) contact discharge; 8 kV (criterion B) air discharge
	Electrical fast transient (EFT)	IEC 61000-4-4 AC power port: 2 kV (criterion B); DC power port: 2 kV (criterion B); signal port: 1 kV (criterion B)
	Radiated susceptibility (RS)	IEC 61000-4-3 Enclosure port: The test frequency range is 80–2700 MHz, 80% AM (1 kHz) modulation is used, and the test level is 10 V/m.
	Conducted susceptibility (CS)	IEC 61000-4-6 • Power port: 10 V • Signal port: 3 V

Item	Specifications	
	Surge susceptibility	IEC 61000-4-5 • AC power port: 6 kV (horizontal), 1.2/50 μs, 2 ohms (criterion B); 6 kV (vertical, two wires to ground), 1.2/50 μs, 2 ohms (criterion B) • DC power port: 2 kV in differential mode, 2 ohms; 4 kV in common mode, 1.2/50 μs, 12 ohms (criterion B) • Signal port: FE port: ±0.5 kV in differential mode; ±2 kV (1.2/50 μs) in common mode; northbound RS485 and RS232 port: 1 kV/2 kV (1.2/50 μs); smoke sensor, temperature sensor, and water sensor port: 500 V/1 kV (1.2/50 μs) Dry contact: ALM1 and ALM8: 2 kV in differential mode/common mode (1.2/50 μs)
	Voltage dip	IEC 61000-4-11 • Voltage interruption (95% decrease) for 10 ms: performance grade B • Voltage interruption (95% decrease) for 20 ms: performance grade B • Voltage dip (decrease by 30%) for 500 ms: performance grade C • Voltage interruption (95% decrease) for 5000 ms: performance grade C

NOTE

1. This is a class A product and may cause radio interference in residential areas. Therefore, users may be required to take appropriate measures.

B Electrical Conceptual Diagrams

Figure B-1 ETP48400-C3B3 electrical conceptual diagram

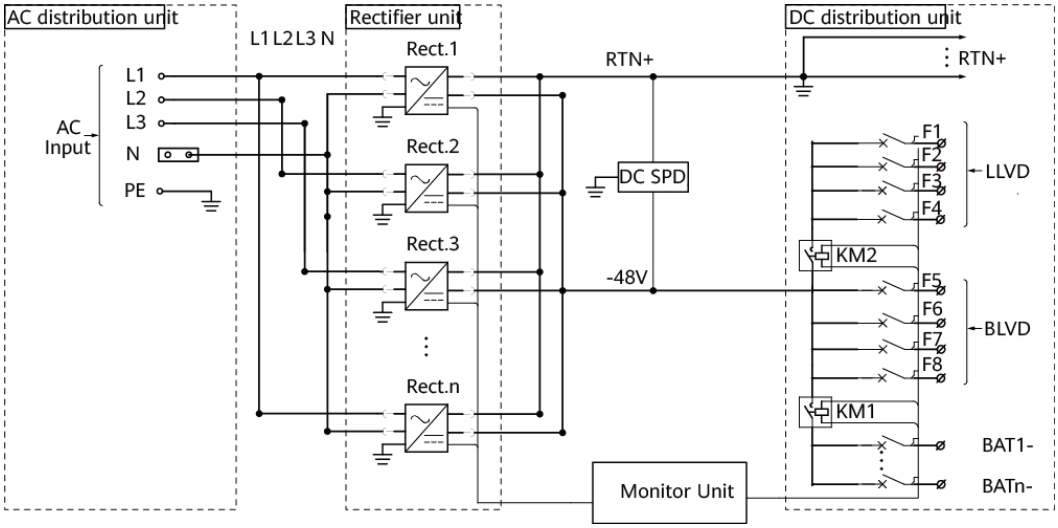
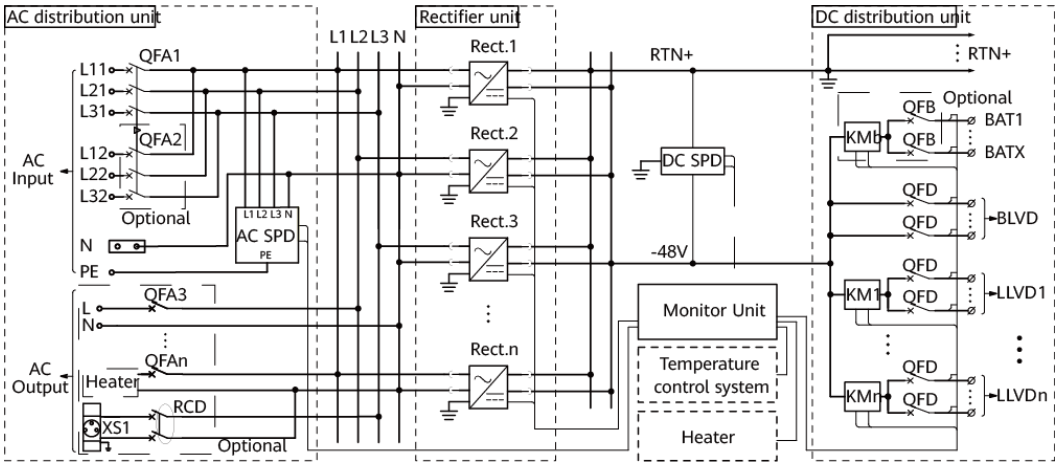


Figure B-2 ETP48400-C3B1 electrical conceptual diagram



C Power Distribution of Circuit Breakers on the Power Subrack

The description in the following table is for reference only. The actual cable connection prevails.

Table C-1 Circuit breaker power distribution

Item	LLVD	BLVD			
Silk screen	F1, F2，F3，F4	F5	F6	F7	F8
Capacity	125 A	125 A	125 A	125 A	63 A
ICC1000-A1-E1	Reserved (inverter)	Inverter	Inverter	DCDB48-200-16B	Reserved

Table C-2 DCDB48-200-16B power distribution description

Silk Screen	Capacity	Load
F1	32 A	Reserved
F2	32 A	Air conditioner 1
F3	32 A	Air conditioner 2
F4	32 A	Air conditioner 3
F5	32 A	Air conditioner 4
F6	16 A	Heater 1
F7	16 A	Heater 2
F8	10 A	Smart ETH gateway
F9	10 A	Light 1
F10	10 A	Light 2

D Device Address Description

The following are the default addresses of the device. The actual addresses prevail.

Table D-1 Address description

Item	Component	Address	Remarks
ICC1000-A1-E1	DC air conditioner (upper front door)	25	Address range: 21–30
	DC air conditioner (lower front door)	27	
	DC air conditioner (upper rear door)	26	
	DC air conditioner (lower rear door)	28	
	Electronic lock (front door)	91	Address range: 91–96
	Electronic lock (rear door)	92	
	Digital Temperature and Humidity Sensor	51	Address range: 51–52 or 56–59

E Associations Between Alarms and Dry Contacts on the UIM

Table E-1 Associations between dry contacts and alarms

Dry Contact Type	Silkscreen	Associated Alarm
Dry contact inputs	DIN1	AC SPD fault alarm
	DIN2	Vibration sensor alarm
	DIN3	User-defined
	DIN4	Heater fault alarm
Dry contact outputs The default setting (closed: alarm; open: normal) can be modified.	ALM1	Defined as DIN1. An alarm is generated when the dry contact is open.
	ALM2	Defined as DIN2. An alarm is generated when the dry contact is open.
	ALM3	Defined as DIN3. An alarm is generated when the dry contact is closed.
	ALM4	User-defined
	ALM5	Heater 1 start/stop control
	ALM6	Heater 2 start/stop control
	ALM7	User-defined
	ALM8	User-defined

F How Do Change the Communications Protocol for COM4 and COM5?

- To use CAN for communication through the COM4 port:

  Take out the CIM02C, remove the jumper caps from pins 1 and 2 in the J18 position shown in **Figure F-1**, and insert the jumper caps to pins 2 and 3.
- To use RS232 for communication through the COM5 port:

  Take out the CIM02C, remove the jumper caps from pins 1 and 2 in the J16 and J17 positions shown in **Figure F-1**, and insert the jumper caps to pins 2 and 3.

Figure F-1 COM4 and COM5 port jumper positions

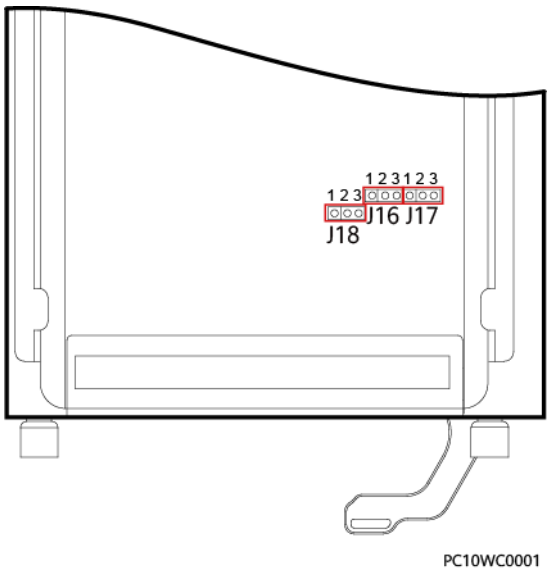
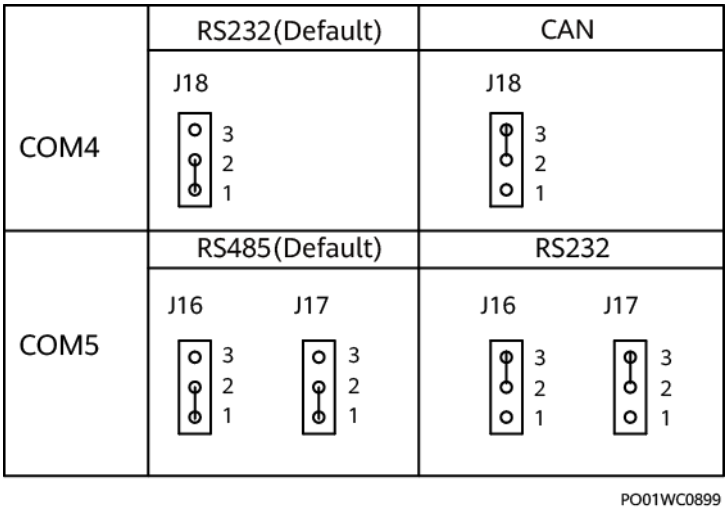


Figure F-2 Jumper connection rules for the COM4 and COM5 ports



G Operating Environment Definitions

Table G-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.

H Acronyms and Abbreviations

B	
BLVD	Battery low voltage disconnection
E	
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
EMS	Electromagnetic susceptibility
H	
HTTPS	Hypertext Transfer Protocol Secure
L	
LLVD	Load low voltage disconnection
I	
IEC	International Electrotechnical Commission
M	
MTBF	Mean time between failures
PSU	Power Supply Unit
S	
SMU	Site monitoring unit
SNMP	Simple Network Management Protocol
SPD	Surge protection device

U

UIM	User interface module

