

**PowerCube 5000
V100R003C00**

User Manual (SUN2000-150KTL-S0)

Issue **03**
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About This Document

Purpose

This document describes the PowerCube 5000 V100R003C00 (PowerCube 5000 for short) solution in terms of its overview, installation, commissioning, routine maintenance, troubleshooting, and parts replacement.

The figures provided in this document are for reference only.

Intended Audience

This document is intended for:



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




Symbol Conventions

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

Change History

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

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Symbol	Description
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Issue 03 (2019-07-01)

- Deleted the insulation detection module IMU02C.
- Added the section "Clearing the EPO State".

Issue 02 (2018-12-07)

Updated "Alarm List".

Issue 01 (2018-01-18)

This issue is the first official release.

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1 Safety Precautions

1.1 General Safety Precautions

- Ensure that the product is used in an environment that meets the product design specifications (such as the grid power, input voltage, temperature, and humidity) to avoid causing malfunctions, damaging components, or voiding the warranty.
- Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment.
- Comply with local laws and regulations. The safety instructions in this document are only supplements to the local laws and regulations.
- Do not operate the device or cables during lightning strikes.
- When maintaining outdoor devices after raining, gently open the cabinet door and clear water around door seams to prevent sprays from splashing into the cabinet.
- Remove metal objects such as the watch, bracelet, or ring during operations.
- Use insulated tools during operations.
- Bolts should be tightened to the required torque with a torque tool and marked using red and blue colors. Installation personnel should mark tightened bolts in blue. Inspection personnel should confirm that the bolts are tightened and then mark them in red.
- During installation and maintenance, follow the specified procedure.
- Before you touch any conductor surface or terminal, use an electric meter to measure the contact point voltage. Ensure that the contact point has no voltage or the voltage is within the specified range.
- If AC input power cables need to be routed from the top, bend the cables in the U shape outside the cabinet and then route them into the cabinet.
- If the power system is not connected to batteries or the battery capacity is insufficient, the load may power off during maintenance or fault locating.
- Before laying out cables which have been stored in a temperature lower than 0°C, move the cables to an environment of the ambient temperature and store them at the ambient temperature for at least 24 hours.
- After device installation, perform routine check and maintenance according to the user manual and replace faulty components in a timely manner to ensure secure device running.

1.2 Electrical Safety

Grounding

- When installing a device, install the ground cable first. When uninstalling a device, remove the ground cable last.
- Before operating a device, ensure that the device is properly grounded. Ensure that the ground cable is installed securely (the ground resistance should be less than 0.1 ohm). Inappropriate grounding may cause device damage and personal injury.

AC and DC Power



- The power system is powered by high-voltage power sources. Direct or indirect contact (through damp objects) with high-voltage power sources may result in serious injury or death.
 - Non-standard and improper operations may result in fire or electric shocks.
-
- Before making electrical connections, turn off the protection switch on the upstream device to cut the power supply.
 - Before connecting the AC power supply, ensure that electrical connections are complete.
 - Before connecting cables to loads or battery cables, check cable and terminal polarities to prevent reverse connections.

ESD

- To prevent electrostatic-sensitive components from being damaged by static from human bodies, wear a grounded electrostatic discharge (ESD) wrist strap or ESD gloves when touching circuit boards.
- When holding a board, hold its edge without touching any components, especially chips.
- Package boards with ESD packaging materials before storing or transporting them.

Liquid Prevention

- Do not place the product in areas prone to water leakage, such as near air conditioner vents, ventilation vents, or feeder windows of the equipment room.
- Ensure that there is no condensation inside the product or equipment room.
- Ensure that no liquid enters the product. Otherwise, short circuits will occur and may result in serious injury or death.
- If any liquid is detected inside the product, immediately disconnect the power supply and contact the administrator.

1.3 Battery Safety

Before installing, operating, and maintaining batteries, read the instructions provided by the battery 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 battery vendor.

Basic Requirements

- Before performing installation or maintenance, put on goggles, rubber gloves, and protective clothing to prevent injury caused by electrolyte overflow.
- When moving batteries, do not turn them upside down or tilt them.
- Keep the battery loop disconnected during installation and maintenance.
- Secure battery cables to a torque specified in the battery documentation. Loose connections will result in excessive voltage drops or cause batteries to burn out when the current is high.
- Do not tamper with the explosion-proof valve or vent valve. Otherwise, electrolyte may leak out.
- Ensure that batteries are from the same manufacturer, of the same model, and in the same batch. Do not mix old and new batteries together.
- Dispose of waste batteries in strict accordance with local laws and regulations.
- Ensure that the load-bearing capacity of the floor in the installation area is sufficient. Install additional supports if required.
- Install batteries in a dry clean, and ventilated environment that is free from sources of ignition. Do not expose batteries to sunlight or water.

DANGER

- Avoid ingestion of battery components.
 - Protect batteries from mechanical vibration, collision, punctures, and strong impact. Otherwise, the batteries may short-circuit inside, leading to high temperatures and potential ignition.
 - Do not throw batteries in fire or expose batteries to high temperatures for long periods of time, because this may cause batteries to ignite.
 - Do not charge lithium batteries at a temperature below 0°C; otherwise, an explosion may occur.
 - Do not immerse batteries and cables in water or expose them to rain.
 - There is a risk of explosion if a battery is replaced with an incorrect model.
-

Preventing Battery Short Circuits

DANGER

Short circuit inside a battery or on the battery loop must be prevented to avoid fire and prevent personal injury.

If conditions permit, disconnect the batteries in use before performing any other operations on them.

Preventing Flammable Gas

NOTICE

- Do not use unsealed batteries.
- Lead-acid batteries emit flammable gas when used. Therefore, store these batteries in well-ventilated areas, and implement fire-prevention measures.

Preventing Battery Leakage

NOTICE

High temperatures may result in battery distortion, damage, or electrolyte overflow.

If the temperature of a lead-acid battery exceeds 60°C, check the battery for electrolyte overflow. If electrolyte overflow occurs, handle the situation immediately. Avoid moving batteries with electrolyte leakage to prevent possible injury. Neutralize and absorb the leakage with sodium bicarbonate (NaHCO₃) or sodium carbonate (Na₂CO₃) before moving the batteries.

Protect your skin and eyes from lithium battery electrolyte leakage. If your body comes in contact with electrolyte leakage, wash with clean water immediately and visit a doctor if the situation is serious.

Preventing Battery Overdischarge

After you connect batteries, ensure that the battery loop is disconnected before powering on the power system. This prevents battery overdischarge, which may damage batteries.

Charge batteries that have not been used for a long time to avoid battery overdischarge.

Preventing Battery Overcharge

CAUTION

Do not use battery chargers not approved by Huawei to charge batteries. Otherwise, batteries may overcharge, which may result in battery overheating or even fire.

1.4 DG Safety

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.

⚠ DANGER

- Do not operate the DG before reading and understanding the instructions and warnings provided by the DG vendor. Otherwise, personal injury may occur.
- Before performing installation or maintenance, put on a safety helmet, goggles, and other protective equipment to avoid personal injury.
- During installation and maintenance, strictly follow the instructions provided by the DG vendor to avoid burns, explosions, and fire.
- Remove all your jewelry and employee cards before installation and maintenance. Tie your hair back and place it under your helmet to avoid entanglement with any rotating components (such as a fan or drive bearing) to prevent personal injury or death.
- Keep sparks, open flame, and any other flammable objects away from the DG.

Dispose of harmful waste, such as engine oil, diesel, and coolant, in accordance with local laws and regulations.

1.5 Cable Layout

- When routing cables, ensure that a sufficient distance exists between the cables and the DC busbar, shunt, and fuse. This prevents damage to the insulation layer of the cables.
- Route and bind signal cables and power cables separately.
- Ensure that cables meet the VW-1 testing requirements.
- Do not route cables behind the air exhaust vents of rectifiers in the cabinet.
- Ensure that all cables are securely bound.

1.6 Mechanical Safety

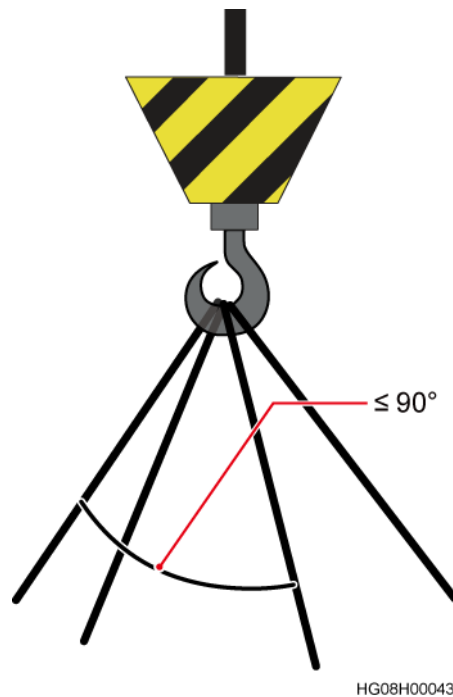
Hoisting Devices

⚠ DANGER

Do not walk under hoisted objects.

-
- Only trained and qualified personnel should perform hoisting operations.
 - Check that all hoisting tools are available and in good condition.
 - Before hoisting objects, ensure that hoisting tools are firmly fixed onto a load-bearing object or wall.
 - Ensure that the angle formed by each hoisting cable is less than 90 degrees.
 - If metal hoisting cables are used, place protective pads between the cables and the cabinet to prevent scratches to the cabinet surface.

Figure 1-1 Hoisting heavy objects



Drilling Holes

NOTICE

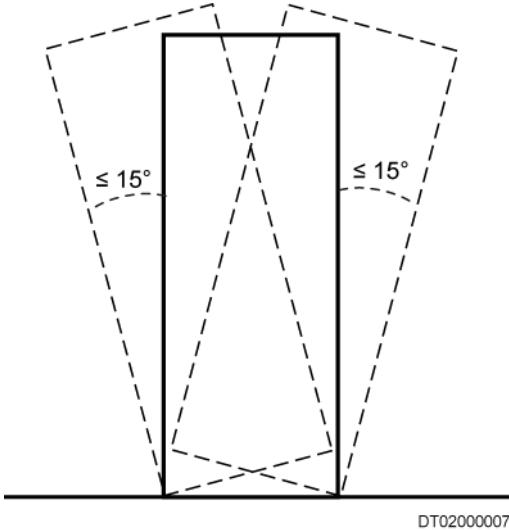
Do not drill holes into a cabinet without permission. Incorrect drilling operations may affect the electromagnetic shielding of the cabinet and damage cables inside. Metal shavings from drilling may short-circuit boards inside the cabinet.

- Before drilling holes into a cabinet, wear goggles and protective gloves. Remove cables from inside the cabinet.
- After drilling, clean up any metal shavings that have accumulated inside or outside the cabinet.

Moving Heavy Objects

- Only trained personnel are allowed to move heavy objects.
- Wear protective gloves and shoes before moving heavy objects.
- Be cautious to prevent injury when moving heavy objects.
- At least two people are required to move heavy objects.
- When you transport cabinets, ensure that there is no excessive tilt and no sudden jolt. The maximum allowed tilt angle when loading and unloading a cabinet is 15 degrees. Secure the cabinet to a pallet truck before you transport it.
- When you move a cabinet, ensure that it does not bump into other objects or fall down.

Figure 1-2 Transportation gradient



2 Introduction

2.1 Introduction

The PowerCube 5000 V100R003C00 system is a high-power solar power system developed for areas where grid power is unavailable. It features efficient energy yield, reliable power supply, and intelligent operation and maintenance (O&M). As a comprehensive and systematic solution, this system uses modular design and provides intelligent monitoring. It supports solar input, three-phase four-wire AC output, and online capacity expansion of power modules.

Figure 2-1 Networking

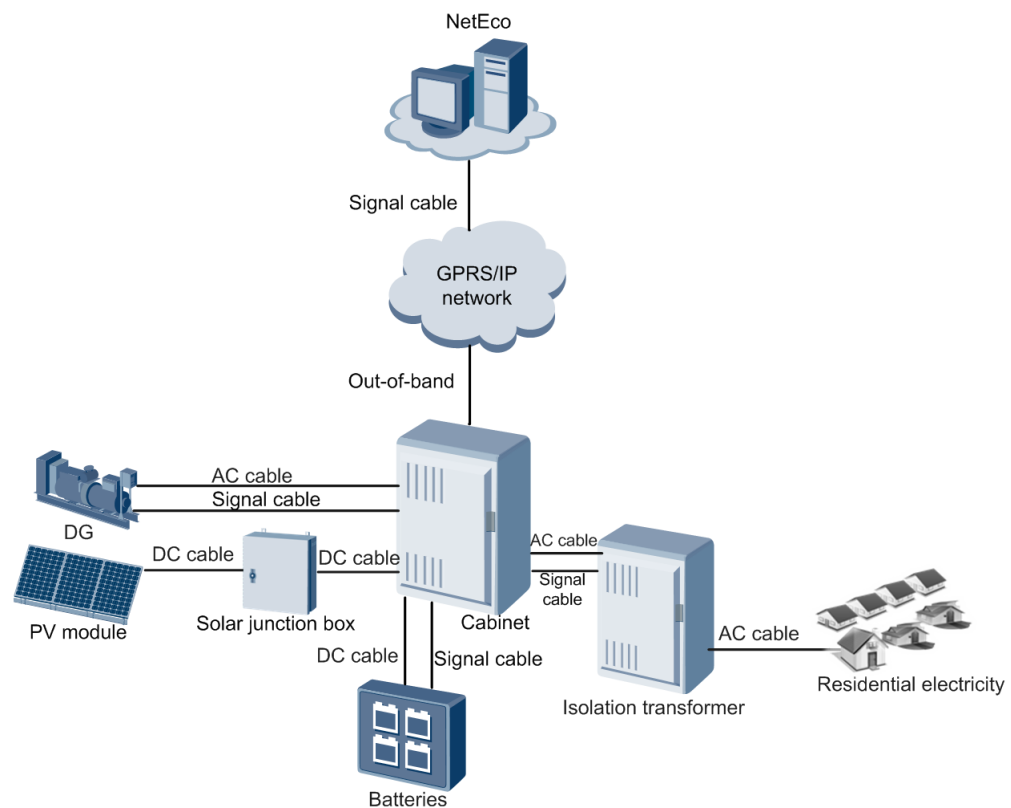
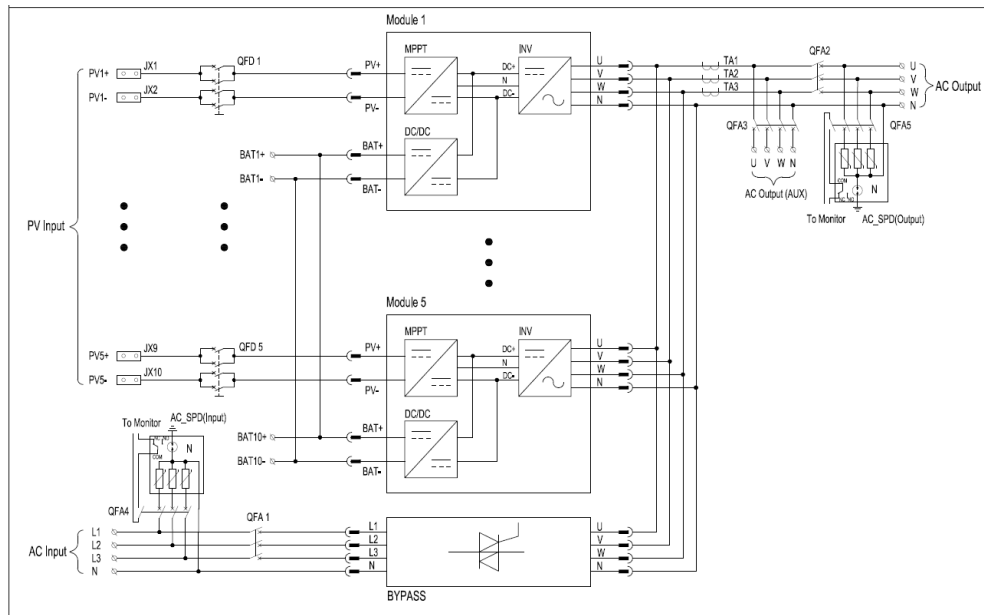


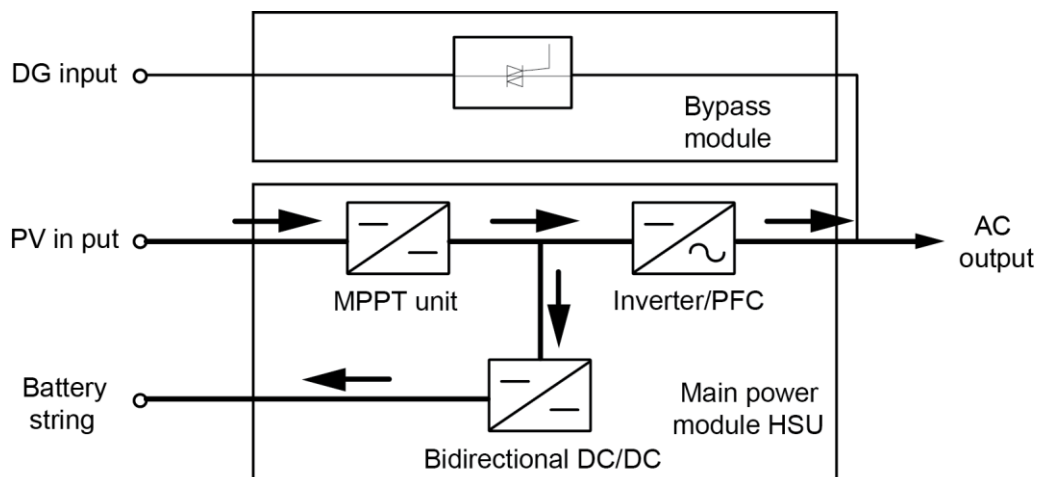
Figure 2-2 Electrical conceptual diagrams



2.2 Working Mode

PV inverter working mode: The PV input is supplied with DC voltage through the MPPT, and then the inverter converts the DC voltage into AC voltage output. In this case, the bidirectional DC/DC unit works to provide charging energy for the battery.

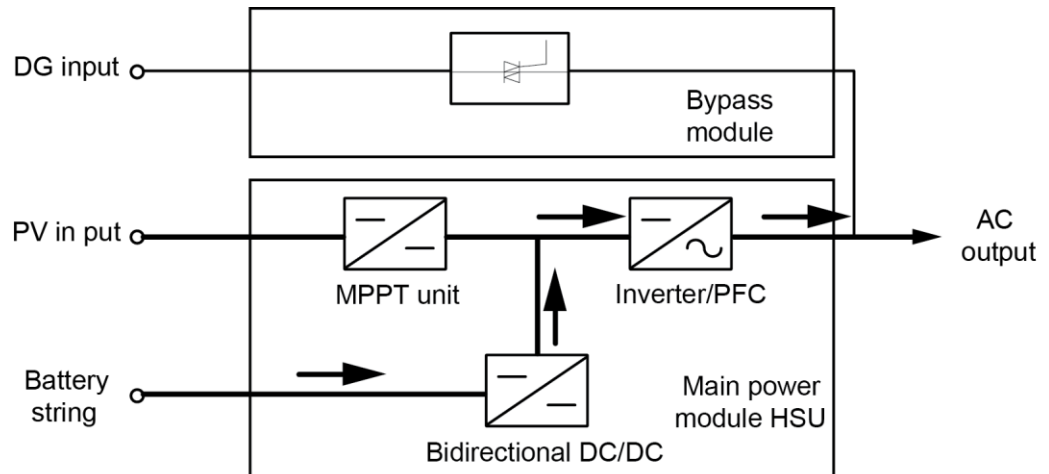
Figure 2-3 PV working mode



IS06N00008

Battery working mode: The battery provides DC voltage through the bidirectional DC/DC unit, and then the inverter converts the DC voltage to the AC voltage output. In this case, the bidirectional DC/DC works to provide charging energy for the internal bus bar of the HSU.

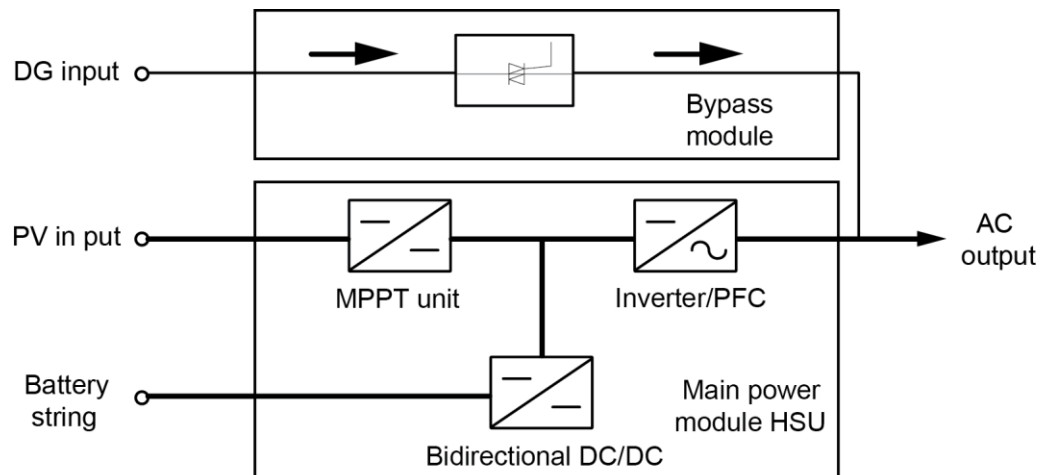
Figure 2-4 Battery working mode



IS06N00009

DG working mode 1: DG input supplies power to loads through the bypass module.

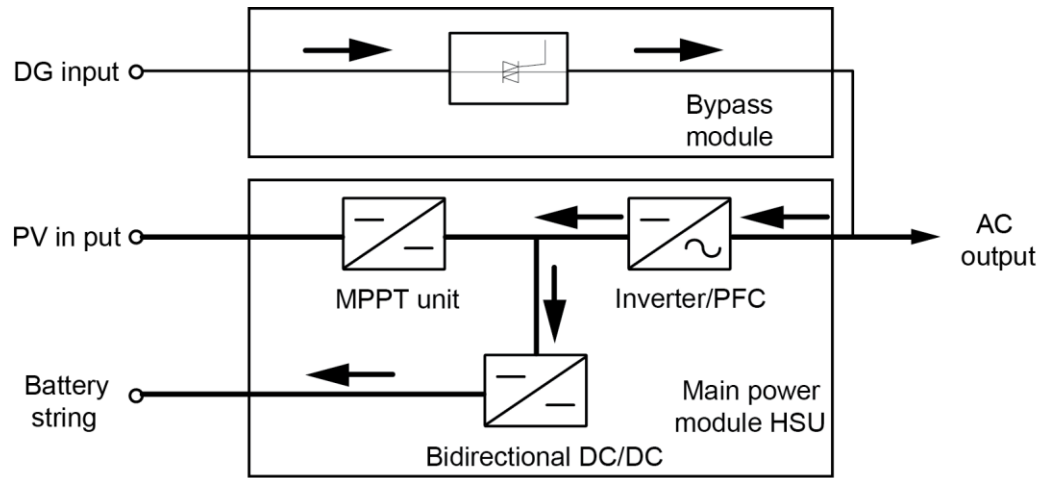
Figure 2-5 DG working mode 1



IS06N00010

DG working mode 2: DG input supplies power to loads through the bypass module, and charges the battery through the reverse PFC and bidirectional DC/DC circuit.

Figure 2-6 DG working mode 2

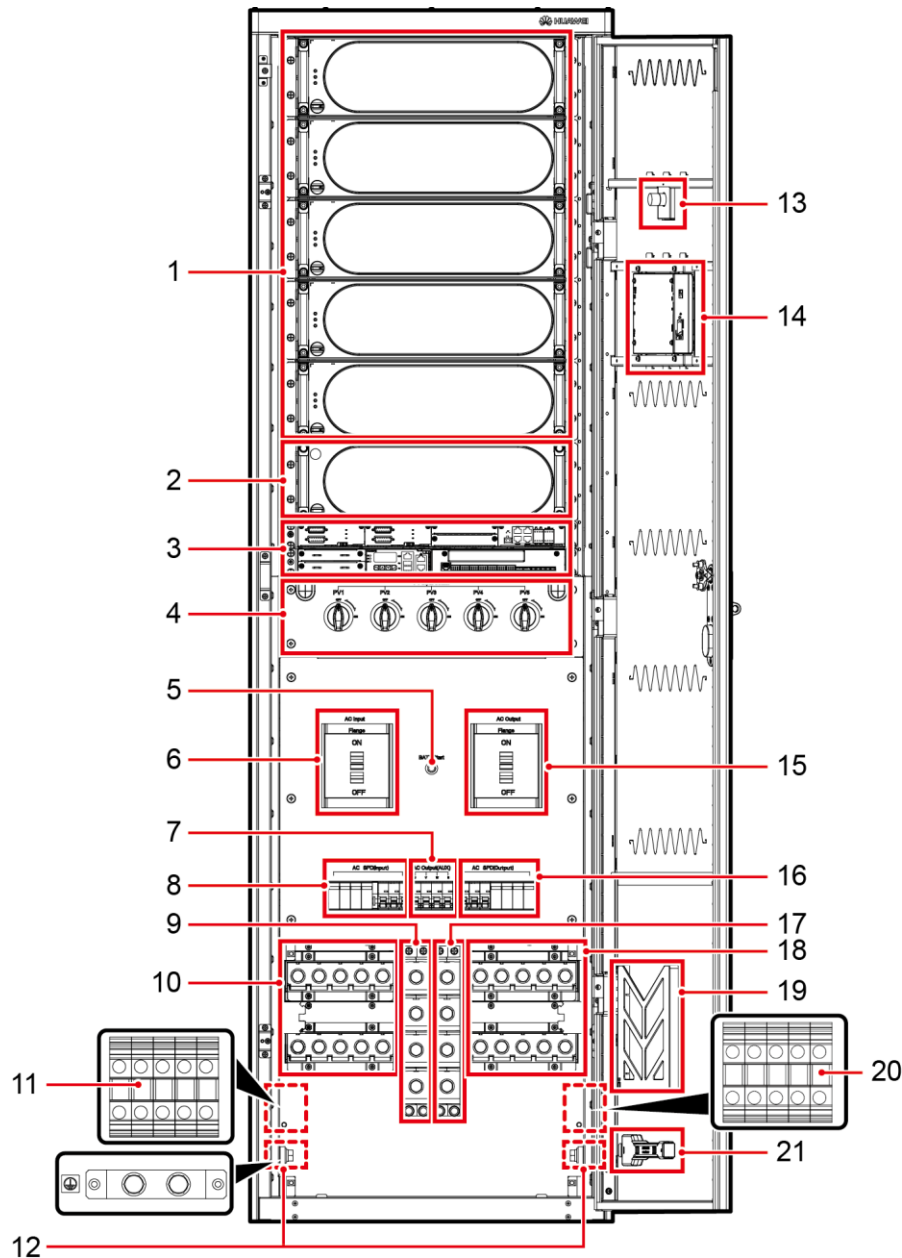


IS06N00011

3 Cabinet Description

3.1 Cabinet SUN2000-150KTL-S0

Figure 3-1 Interior



HI33W00029

- | | | |
|--------------------------------------------|--------------------------------------------------------------------|--------------------------------------------|
| (1) Power module HSU | (2) Bypass module BPS | (3) Monitoring unit |
| (4) Solar input switches | (5) Battery cold start button | (6) AC input switch |
| (7) Auxiliary AC output switch | (8) AC input surge protective device (SPD) and SPD circuit breaker | (9) AC input port |
| (10) Positive terminal block for batteries | (11) Positive PV input port | (12) Ground bar |
| (13) Emergency power-off (EPO) button | (14) Monitor screen | (15) AC output switch |
| (16) AC output SPD and SPD circuit breaker | (17) AC output port | (18) Negative terminal block for batteries |

- (19) Document holder (20) Negative PV input port (21) Auxiliary switch lever

Table 3-1 Specifications





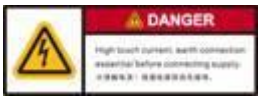
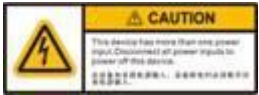
Item		Specifications
Capacity		<ul style="list-style-type: none"> Maximum load power of one cabinet plus five HSUs: 165 kVA; supports parallel connection of dual cabinets, with the maximum capacity of 330 kVA Maximum battery capacity of the system: 7500 Ah/480 V
Dimensions (W x D x H)		600 mm x 850 mm x 2000 mm
Pollution degree		Pollution degree 2
Operating temperature		-10°C to +55°C (without solar radiation)
Relative humidity		5%–95% RH (non-condensing)
Operating altitude		4000 m
Protection level		IP21
PV input overvoltage level		OVC II
Bypass input overvoltage		OVC II
Operating environment		Indoor
Installation mode		Floor-mounted
Temperature control mode		Natural cooling
Capacity expansion by parallel connection		HSUs can be connected in parallel to expand the capacity. Up to five HSUs can be connected in parallel online in a single cabinet, and two cabinets can be connected in parallel.
Input specifications	Maximum input power	165 kW (a total of five modules)
	Maximum input voltage	1000 V DC
	Maximum input current (per MPPT circuit)	70 A
	Maximum inverter backfeed current to the PV array	0 A

Item		Specifications
	Minimum startup voltage	≈ 350 V DC (first startup)
	MPPT voltage range	250–900 V DC
	Full-load MPPT voltage range	480–850 V DC
	Rated input voltage	620 V DC
	Number of inputs	5
Battery specifications	Rated battery voltage	512/535 V DC
	Maximum battery current	500 A
Output specifications	Rated output power	150 kVA
	Maximum apparent power	165 kVA
	Maximum AC output power	165 kVA
	Rated output voltage	380/400/415 V AC
	Frequency	50/60 Hz
	Maximum output current	300 A
	Power factor	0.8
DG output specifications	Rated input voltage	380/400/415 V AC
	Maximum AC input current	300 A
	Frequency	50/60 Hz

3.2 Label Descriptions

The following describes the labels on the SUN2000-150KTL-S0 cabinet and their meanings.

Table 3-2 Label description 1

Label	Name	Description
	Burn warning	Do not touch the product because the shell is hot when it is running.
	General grounding	Indicates the position for connecting the PE cable.
	High voltage hazard	High voltage exists in the cabinet after power-on. Only qualified and trained electrical technicians are allowed to operate the product.
	Delayed discharge	High voltage exists in the cabinet after power-on. Only qualified and trained electrical technicians are allowed to operate the product. Residual voltage exists in the cabinet after power-off. It takes 5 minutes for the product to discharge to a safe voltage.
	High electrical leakage warning	The product has a large contact current when it is running, which can cause electric shock. Before powering on the product, ensure that the cabinet is reliably grounded.
	Multi-power input warning	The product has multiple power inputs. Before powering off and maintaining the product, ensure that all power inputs are switched off.



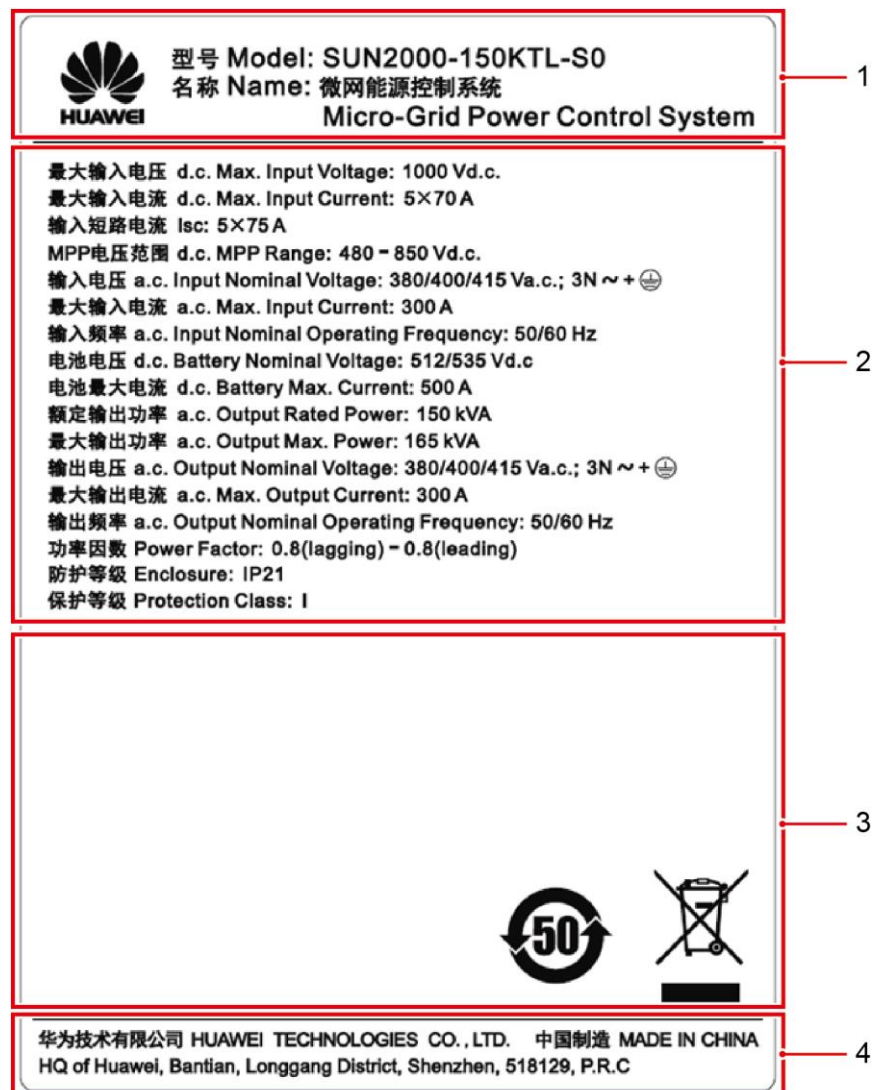
Label	Name	Description
	Refer to documentation	Reminds operators to refer to the documentation provided with the product.
	Switch off before installation and maintenance	Reminds operators to turn off all AC input, PV input, and battery switches before installation and maintenance.

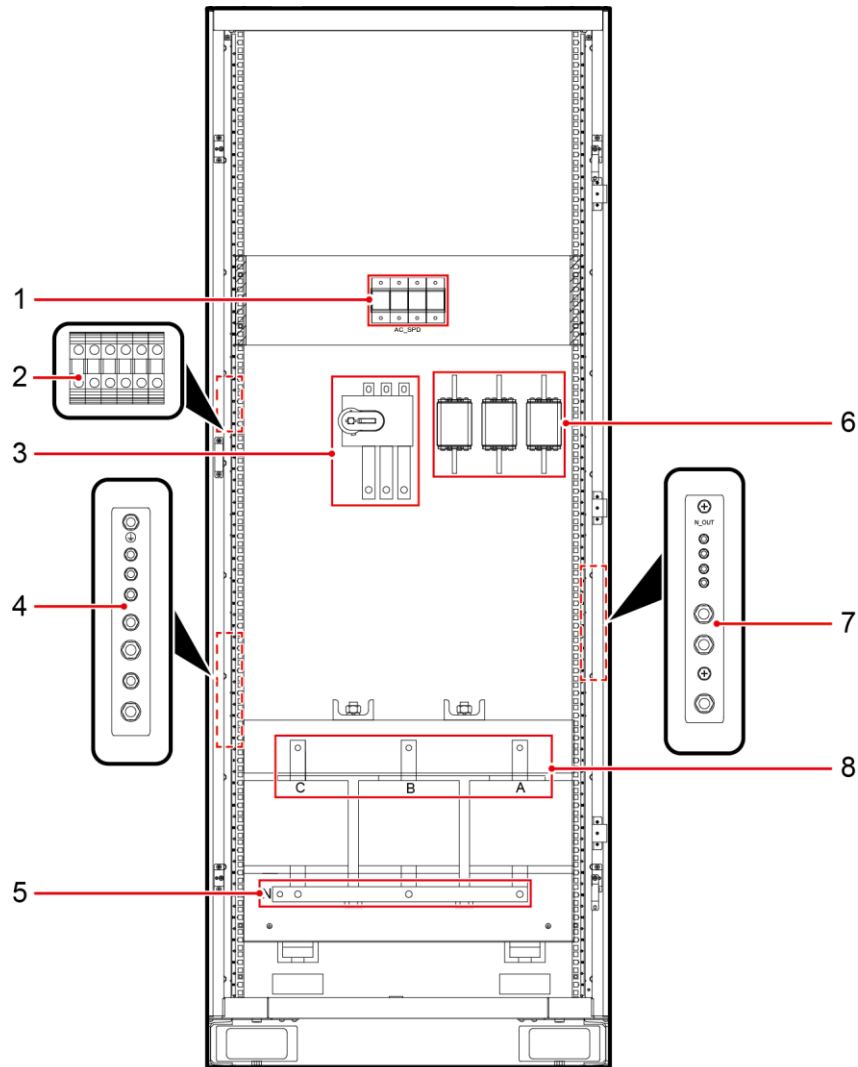
Figure 3-2 Label description 2



- (1) Trademark and product model
- (2) Important technical specifications
- (3) Compliance symbols
- (4) Company name and country of manufacture

3.3 Isolation Transformer ITC80D

Figure 3-3 Appearance



HI33W00032

- (1) AC SPD
- (2) Alarm cable port
- (3) Output disconnector
- (4) Ground bar
- (5) N input bar
- (6) SPD fuses
- (7) N output bar
- (8) AC input L bar

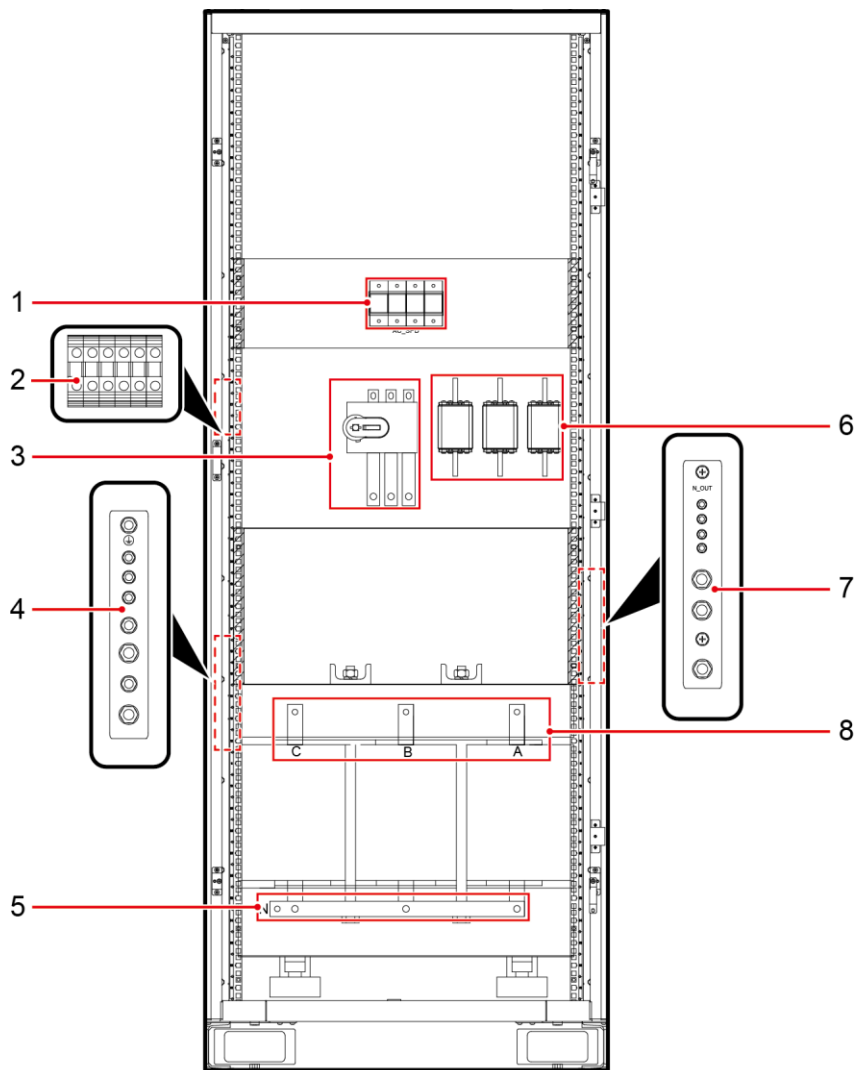
Table 3-3 Specifications

Item	Specifications
Capacity	80 kVA
Application scenario	2 modules, 60 kW

Item	Specifications
Voltage	380 V/400 V/415 V
Dimensions (H x W x D)	2000 mm x 800 mm x 850 mm
Installation mode	Floor-mounted

3.4 Isolation Transformer ITC120D

Figure 3-4 Appearance



HI33W00033

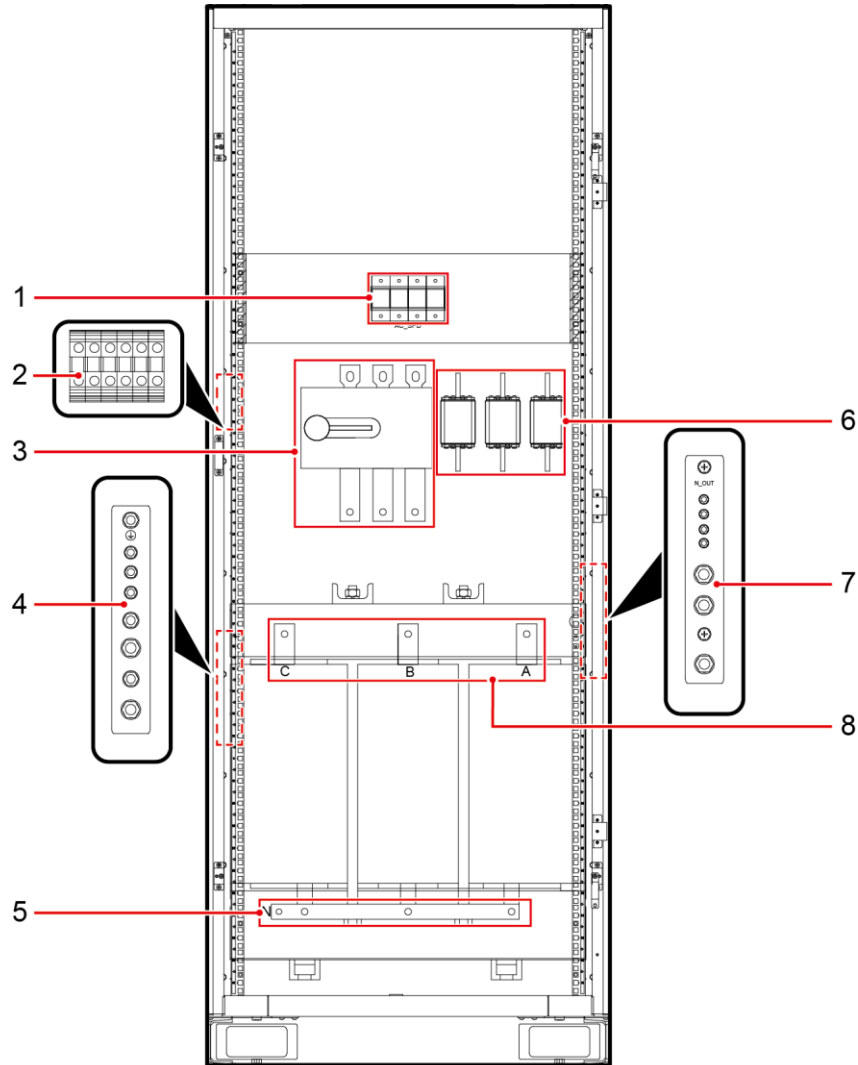
- (1) AC SPD
- (2) Alarm cable port
- (3) Output disconnector
- (4) Ground bar
- (5) N input bar
- (6) SPD fuses
- (7) N output bar
- (8) AC input L bar

Table 3-4 Specifications

Item	Specifications
Capacity	120 kVA
Application scenario	3 modules, 90 kW
Voltage	380 V/400 V/415 V
Dimensions (H x W x D)	2000 mm x 800 mm x 850 mm
Installation mode	Floor-mounted

3.5 Isolation Transformer ITC200D

Figure 3-5 Appearance



HI33W00034

- (1) AC SPD
- (2) Alarm cable port
- (3) Output disconnector
- (4) Ground bar
- (5) N input bar
- (6) SPD fuses
- (7) N output bar
- (8) AC input L bar

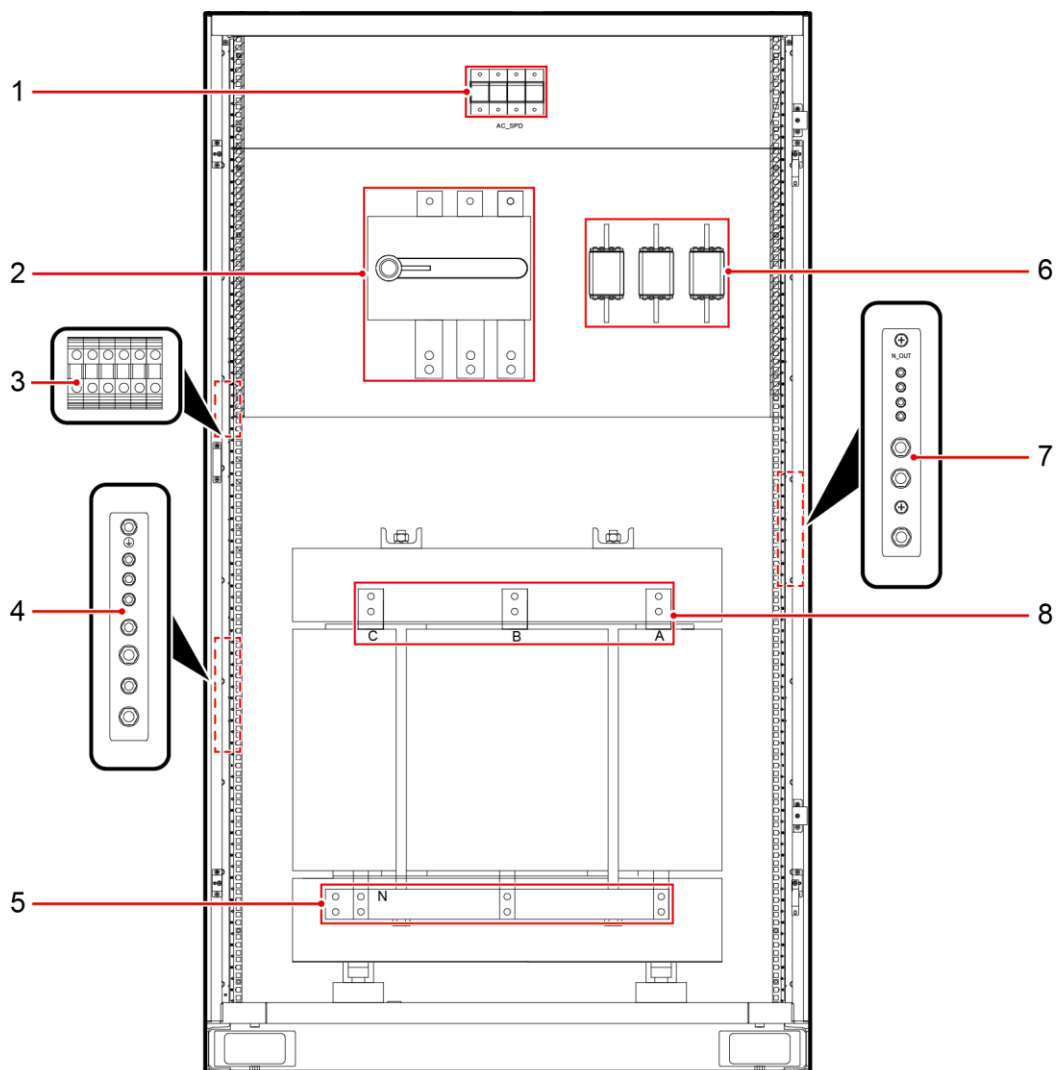
Table 3-5 Specifications

Item	Specifications
Capacity	200 kVA
Application scenario	5 modules, 150 kW

Item	Specifications
Voltage	380 V/400 V/415 V
Dimensions (H x W x D)	2000 mm x 800 mm x 850 mm
Installation mode	Floor-mounted

3.6 Isolation Transformer ITC400D

Figure 3-6 Appearance



HI33W00035

- (1) AC SPD
- (2) Output disconnector
- (3) Alarm cable port
- (4) Ground bar
- (5) N input bar
- (6) SPD fuses
- (7) N output bar
- (8) AC input L bar

Table 3-6 Specifications

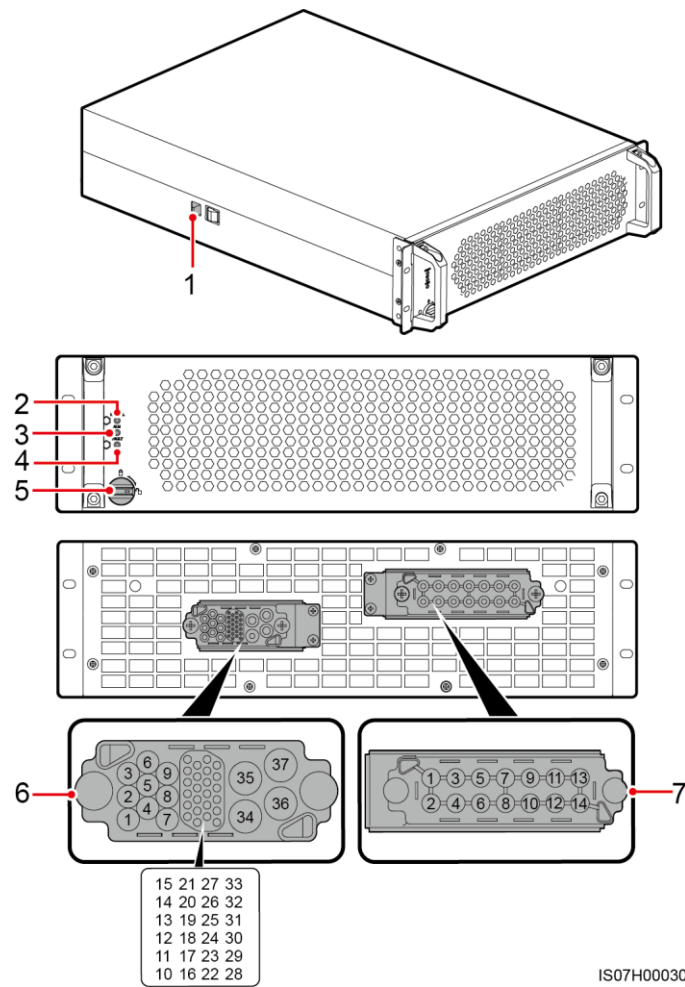
Item	Specifications
Capacity	400 kVA
Application scenario	Parallel connection: 10 modules, 300 kW
Voltage	380 V/400 V/415 V
Dimensions (H x W x D)	2000 mm x 1200 mm x 850 mm
Installation mode	Floor-mounted

4 Component Description

4.1 Power Module HSU

The power module HSU is mainly composed of a PV boost unit, battery bidirectional conversion unit, and inverter/PFC unit. The HSU implements DC/DC conversion for PV input to charge batteries, or stabilizes the bus voltage and then converts it into sine wave output through the inverter (DC/AC). It also provides the PFC function. When there is no power from PV and batteries, the DG supplies power to the PFC circuit and battery bidirectional conversion unit to charge the batteries. The HSU also provides AC power for customer equipment.

Figure 4-1 Overview



- (1) Positioning lock
- (2) Power indicator
- (3) Alarm indicator
- (4) Fault indicator
- (5) Ready switch
- (6) Inverter output port and signal port
- (7) PV input port and battery port

Table 4-1 Inverter output port and signal port

Wiring Terminal	Terminal No.	Signal Label	Signal Name
Inverter output port and signal port	1	SW	Cold start button signal
	2	NA	Empty pin/reserved
	3	+48V_BUS	48 V auxiliary power supply+
	4	NA	Empty pin/reserved

Wiring Terminal	Terminal No.	Signal Label	Signal Name
	5	NA	Empty pin/reserved
	6	-48V_BUS	48 V auxiliary power supply-
	7	SPS-	Cold start button signal ground
	8	NA	Empty pin/reserved
	9	NA	Empty pin/reserved
	10	CAN_H_M OD_1	CAN signal H for modules connected in parallel
	11	CAN_L_M OD_1	CAN signal L for modules connected in parallel
	12	CAN_H_M OD_2	CAN signal H for modules connected in parallel
	13	CAN_L_M OD_2	CAN signal L for modules connected in parallel
	14	NA	Empty pin/reserved
	15	NA	Empty pin/reserved
	16	CAN_H_M ON	Monitoring CAN signal H
	17	CAN_L_M ON	Monitoring CAN signal L
	18	EPO+	EPO
	19	MOD_ID_ A_1	Analog signal- address
	20	CARR_SY NC_1	Carrier synchronization
	21	CARR_SY NC_2	Carrier synchronization
	22	INVBP_ST A_1	Bypass inverter status
	23	INVBP_ST A_2	Bypass inverter status
	24	INV_SYN C_1	Power frequency synchronization
	25	INV_SYN C_2	Power frequency synchronization
	26	MOD_CAB LE_FAUL	Parallel connection cable fault signal

Wiring Terminal	Terminal No.	Signal Label	Signal Name
		T	
	27	MOD_ID_D	Digital signal– address
	28	GND	GND
	29	GND	GND
	30	+15V_BUS	Redundant operation power supply for the entire system
	31	+15V_BUS	Redundant operation power supply for the entire system
	32	-15V_BUS	Redundant operation power supply for the entire system
	33	-15V_BUS	Redundant operation power supply for the entire system
	34	OUT_C	Inverter output phase C
	35	N	Inverter output cable N
	36	OUT_B	Inverter output phase B
	37	OUT_A	Inverter output cable A

Table 4-2 PV input port and battery port

Wiring Terminal	Port No.	Signal Label	Signal Name
PV input port and battery port	1	BAT-	Battery port-
	2	BAT-	Battery port-
	3	NA	NA
	4	NA	NA
	5	BAT+	Battery port+
	6	BAT+	Battery port+
	7	NA	NA
	8	NA	NA
	9	PV-	PV input-
	10	NA	NA
	11	NA	NA
	12	PV+	PV input+

Wiring Terminal	Port No.	Signal Label	Signal Name
	13	PE	PE
	14	NA	NA

Table 4-3 Indicator description

Function	Color	Status	Meaning
Power indicator	Green	Off	The HSU has no input power.
		On	The HSU output is normal.
		Blinking	0.5 Hz: 1. The HSU works in bypass mode (on for 1s, off for 1s) 2. The HSU has no AC output (on for 0.125s, off for 1.875s) 4 Hz: 1. The HSU is being configured. 2. The HSU is being loaded online.
Alarm indicator	Yellow	Off	No protection is triggered by external conditions.
		Blinking	0.5 Hz (on for 1s, off for 1s) <ul style="list-style-type: none"> There is a PFC soft-start failure alarm. DC bus pre-charging has failed.
		On	Protection is triggered by external conditions or temporary malfunction is caused by internal factors. Examples: ambient overtemperature and pre-temperature, low ambient temperature, internal overtemperature, PV input overvoltage, PV input undervoltage, PV input reverse connection, PV insulation abnormality/RCD overcurrent, battery overvoltage or undervoltage, battery power-off, battery reverse connection, battery abnormal low voltage, DC bus overvoltage or undervoltage, charger soft-start failure (not lockout), battery cold-start failure (not lockout), PV soft-start failure (not lockout), node address conflict alarm, PV input overpower, PV main relay not closed due to high voltage difference, inverter output fault (not lockout), inverter output short circuit (not lockout), DC bus overvoltage, 15 V bus low voltage, module inverter output overload timeout, secondary phase lock loss, output fault (not lockout)
Fault indicator	Red	Off	There is no internal fault or EPO.
		On	Protection, protective lockout, EPO, or module unreadiness is caused by internal component faults. Examples: 15 V auxiliary power board abnormality, 48 V auxiliary power failure, SPD fault, PV/battery auxiliary relay fault, PV input overcurrent, charger soft-start failure (lockout), battery cold-start failure (lockout), fan fault, internal SPI communication failure, PV soft-start failure (lockout), battery main relay not closed due to high voltage difference, battery open circuit, PV reverse leakage overcurrent, battery open circuit, battery charger output overvoltage, battery charge overcurrent, battery discharge overcurrent, PV/battery input main relay short circuit, PV/battery input main relay open circuit, unbalance between positive and

Function	Color	Status	Meaning
			negative bus voltages, inverter relay short circuit/open circuit fault, output turn-on fault, internal XNTF communication fault, intra-rack power frequency synchronization fault (dual-way fault), intra-rack carrier synchronization fault (dual-way fault), intra-rack parallel CAN fault (dual-way fault), inverter output short circuit (lockout), A/B/C bridge arm short circuit, inverter self-check fault, staggered bridge arm asymmetry fault, balance circuit abnormality, AC output voltage sampling abnormality, inverter software version mismatch, inverter output voltage DC component abnormality, parallel current equalization abnormality, output fault lockout

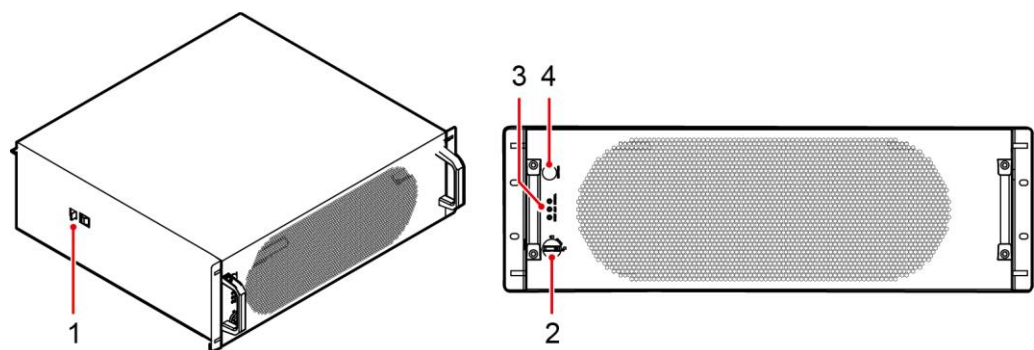
Table 4-4 Specifications

Item	Specifications
Dimensions (H x W x D)	130 mm x 442 mm x 620 mm
Weight	< 34 kg
Operating temperature	-25°C to +55°C
Rated output capacity	33 kVA
AC output voltage	380/400/415 V AC
Battery voltage	336-680 V DC
PV input voltage range	200-980 V DC
PV input power	Max: 33 kW

4.2 Bypass Module BPS

The BPS supplies power when the power from the DG is in use.

Figure 4-2 Overview



HI33W00031

(1) Positioning lock

(2) Ready switch

(3) Indicators

(4) Battery cold start button



NOTE

- The power supply can be manually connected only if the battery cold start button is held down for 5s at least.
- A short circuit in the BPS power supply to loads may cause a DG output short circuit.

Table 4-5 Indicator description

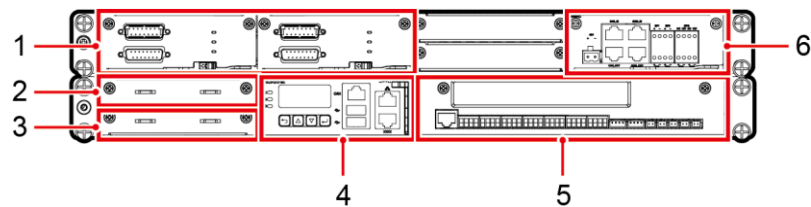
Indicator	Color	Status	Description
Power indicator	Green	Steady on	The BPS is supplying power.
		Blinking at long intervals	The BPS has no output (blinking at 0.2 Hz, on for 2.5s and off for 2.5s).
		Blinking at short intervals	The BPS is not configured or the DSP software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s).
		Off	The BPS CPLD software is being upgraded.
Alarm indicator	Yellow	Steady on	A minor alarm is generated for the BPS.
		Off	There is no minor alarm for the BPS, or the CPLD software is being upgraded.
Fault indicator	Red	Steady on	A critical alarm is generated for the BPS.
		Off	There is no critical alarm for the BPS, or the CPLD software is being upgraded.

Table 4-6 Specifications

Item	Specifications
Dimensions (H x W x D)	600 mm x 200 mm x 600 mm
Weight	< 50 kg
Operating temperature	-25°C to +55°C
Rated output capacity	200 kVA
Rated input and output voltage	380/400/415 V AC

5 Monitoring Unit

Figure 5-1 Overview



HI33W00030

(1) Energy control module (ECM)

(2) Space for the communications expansion module NIM01C3

(3) Space for the DG interface module GIM01C

(4) Monitoring module SMU02S

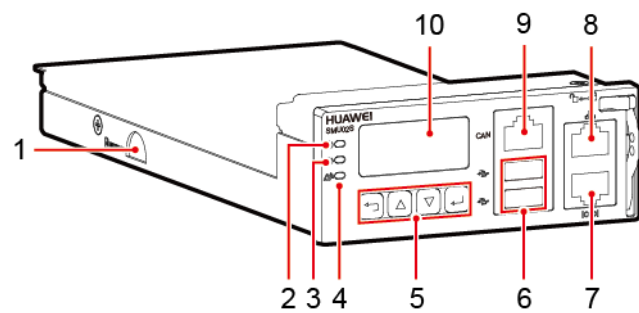
(5) User interface module UIM02C

(6) Monitoring interface module MUS01C

5.1 SMU02S

Panel

Figure 5-2 SMU02S panel



PC03W00018

(1) SD card slot

(2) Running indicator

(3) Minor alarm indicator

- (4) Major alarm indicator (5) Buttons (6) USB port
 (7) RS485/RS232 port (8) Fast Ethernet (FE) port (9) CAN communications port
 (10) LCD





Indicators








Table 5-1 Indicator description

Name	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.
		Blinking fast (4 Hz)	The SMU is running properly but fails to communicate with the host properly.
Minor alarm indicator	Yellow	Off	No minor or warning alarm is generated.
		Steady on	A minor or warning alarm is generated.
Major alarm indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

Buttons

Table 5-2 Button description

Button	Name	Description
	Up	Press Up and Down to scroll through the menus or to change the value of a parameter.
	Down	
	Cancel	Returns to the previous menu without saving the settings.
	Enter	<ul style="list-style-type: none"> Enters the main menu from the standby screen. Enters a submenu from the main menu. Saves menu settings on a submenu.

Button	Name	Description
NOTE		
<ul style="list-style-type: none"> The LCD screen becomes dark if no button is pressed within 30 seconds. You need to log in again if no button is pressed within 1 minute. 		
		<ul style="list-style-type: none"> To increase or decrease a parameter value quickly, hold down  or .
		<ul style="list-style-type: none"> To restart the SMU, hold down  and  for 10 seconds.
		<ul style="list-style-type: none"> To increase (or decrease) the LCD contrast ratio, hold down  and  (or ) for 2 seconds.

SD Card Slot

The SD card has a maximum of 32 GB memory.

USB Port

You can insert a USB flash drive into the USB port to upgrade software, set up a site rapidly, and export configuration files and run logs.

Communications Ports

Table 5-3 Communications port description

Communications Port	Communications Parameter	Communications Protocol
FE	10/100 M autonegotiation	HTTPS, NetEco protocol, SNMP, and TCP-Modbus protocol
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, YDN protocol, and Modbus protocol
CAN	Baud rate: 125 kbit/s	CAN protocol
NOTE		
All these ports are protected by a security mechanism.		

Figure 5-3 Communication port pins

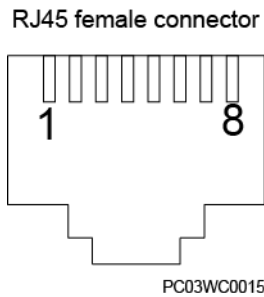


Table 5-4 FE port pin definitions

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

Table 5-5 RS485/RS232 port pin definitions

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

Table 5-6 CAN port pin definitions

Pin	Signal	Description
1	RX+	Receives data over RS485.
2	RX-	

Port Type	Silk Screen	Remarks
	BTEMP	Battery temperature sensor
Dry contact input ports	DIN1	Dry contact input 1
	DIN2	Dry contact input 2
	DIN3	Dry contact input 3
	DIN4	Dry contact input 4
	DIN5	Dry contact input 5
	DIN6	Dry contact input 6
Dry contact output ports	ALM1	Dry contact output 1
	ALM2	Dry contact output 2
	ALM3	Dry contact output 3
	ALM4	Dry contact output 4
	ALM5	Dry contact output 5
	ALM6	Dry contact output 6
	ALM7	Dry contact output 7
	ALM8	Dry contact output 8
Communications port	COM	RS485

Communications Port

Table 5-8 COM port description

Communications Port	Communications Parameter	Communications Protocol	Purpose
COM	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, Modbus and YDN1363 protocols	Connects to a downstream device, such as the intelligent battery detector.
<p>NOTE The COM port is protected by a security mechanism.</p>			

Figure 5-5 Pins in the COM port

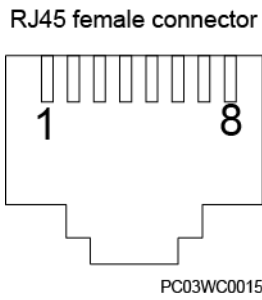


Table 5-9 COM port pin definitions

Pin	Signal	Remarks
1	RX+	Receives data over RS485.
2	RX-	
4	TX+	Transmits data over RS485.
5	TX-	
6	PGND	Protective ground
3, 7, 8	NA	-

Sensor Ports

Figure 5-6 Pins in sensor ports

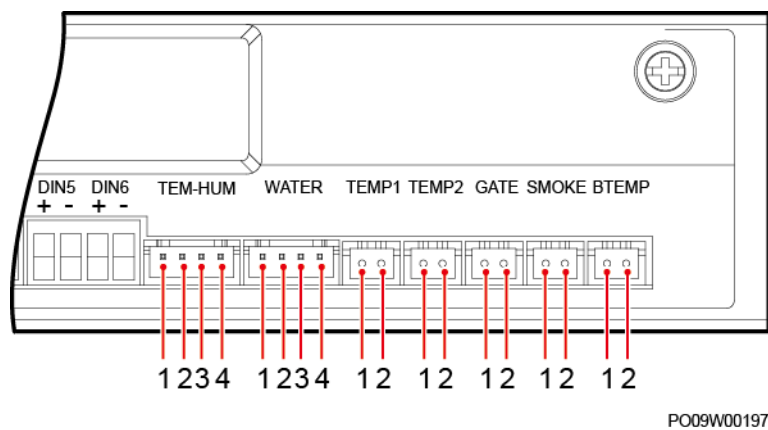


Table 5-10 UIM02C pin definitions

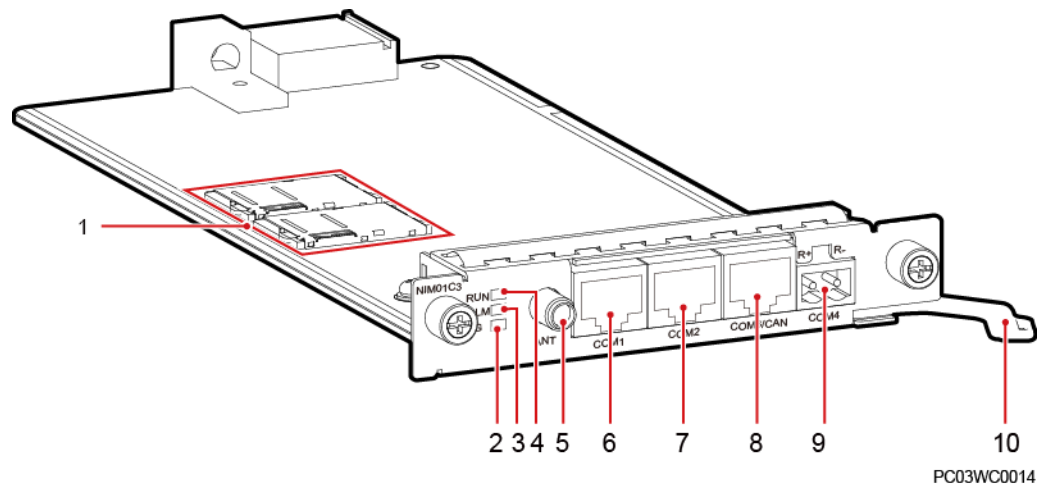
Silk Screen	No.	Pins
TEM-HUM	1	12 V

Silk Screen	No.	Pins
	2	ENV_TEMP
	3	12 V
	4	ENV_HUM
WATER	1	12 V
	2	WATER
	3	GND
	4	-
TEMP1	1	GND
	2	TEMP1
TEMP2	1	GND
	2	TEMP2
GATE	1	GATE+
	2	GATE-
SMOKE	1	SMOKE
	2	12 V
BTEMP	1	GND
	2	BTEMP

5.3 NIM01C3

Panel

Figure 5-7 NIM01C3 panel


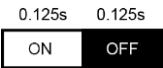


- (1) SIM card slots (2 PCS)
- (2) 4G indicator
- (3) Alarm indicator
- (4) Run indicator
- (5) ANT communications port
- (6) COM1 port
- (7) COM2 port
- (8) COM3/CAN port
- (9) COM4 port
- (10) Handle

Indicators

Table 5-11 Indicator description

Indicator	Color	Status	Description
4G indicator	Green	Steady on	The dial-up connection is in the data service state.
		Blinking at a period of 2s (on for 0.1s and then off for 1.9s) 0.1s 1.9s ON OFF	The network has been registered.
		Blinking at a period of 2s (on for 0.1s, off for 0.1s, on for 0.1s and then off for 1.7s) 0.1s 0.1s 0.1s 1.7s ON OFF ON OFF	A network is in search, or no network is connected.
Alarm indicator	Red	Off	No alarm is generated.
		Steady on	An alarm is generated.

Indicator	Color	Status	Description
Run indicator	Green	Off	The NIM01C3 is not running because it is faulty or has no DC input.
		Blinking at a period of 2s (on for 2s and then off for 1s) 	The NIM01C3 is running and communicating with the host properly.
		Blinking at a period of 0.25s (on for 0.125s and then off for 0.125s) 	The NIM01C3 is running properly, but fails to communicate with the host.

Communications Ports

Table 5-12 Communications port description

Communications Port	Communications Parameter	Description
COM1 port	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	Supports master/slave protocols and Modbus protocols. Supplies 12 V power.
COM2 port	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	Supports master/slave protocols and Modbus protocols. Supplies 12 V power.
COM3/CAN port	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	COM3: Supports master/slave protocols and Modbus protocols. CAN: Supports CAN protocol.
COM4 port	Baud rate: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 14400 bit/s, 19200 bit/s, 115200 bit/s	Supports Modbus protocols.

Figure 5-8 Pins in the COM1, COM2, and COM3 ports

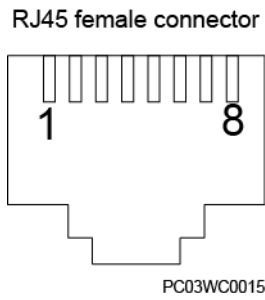


Table 5-13 Description for the pins in the COM1 and COM2 ports

Pin	Signal	Description
1	RS485+	RS485 data +
2	RS485-	RS485 data -
3	12 V	Supply power
4	RS485+	RS485 data +
5	RS485-	RS485 data -
6	NA	-
7	NA	-
8	GND	Grounded

Table 5-14 Description for the COM3/CAN port pins

Pin	Signal	Description
1	RX+	Receives data over RS485.
2	RX-	
3	NA	-
4	TX+	Transmits data over RS485.
5	TX-	
6	GND	Grounded.
7	CANH	CAN high level signal.
8	CANL	CAN low level signal.

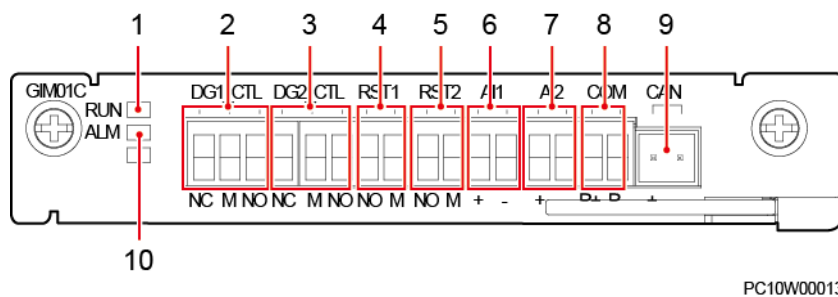
Table 5-15 Description for the COM4 port pins

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

5.4 GIM01C

Panel

Figure 5-9 GIM01C panel



- | | | |
|----------------------------------|------------------------------|----------------------------------|
| (1) Run indicator | (2) DG 1 control ports | (3) DG 2 control ports |
| (4) DG 1 reset ports | (5) DG 2 reset ports | (6) Fuel level 1 detection ports |
| (7) Fuel level 2 detection ports | (8) COM communications ports | (9) CAN communications port |
| (10) Alarm indicator | | |

Indicators

Table 5-16 Indicator description

Name	Color	Status	Remarks
RUN indicator	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 properly but does not communicate with the host properly.
ALM indicator	Red	Reserve	

Ports

Table 5-17 Port description

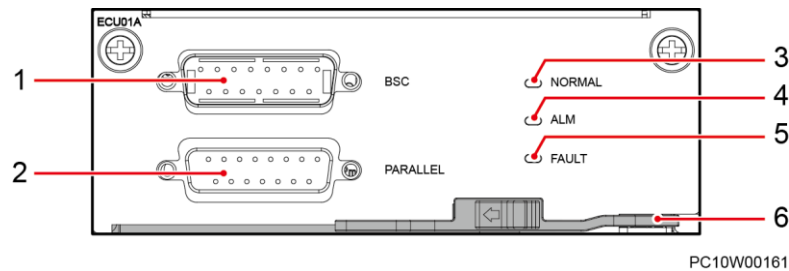
Port Type	Silk Screen		Description	Remarks
DG control port	DG1_CTL	NC	DO normally closed port	Controls DG startup and shutdown.
		M	Common port	
		NO	DO normally open port	
	DG2_CTL	NC	DO normally closed port	
		M	Common port	
		NO	DO normally open port	
DG reset port	RST1	M	Common port	The DG resets if the port is closed.
		NO	DO normally open port	
	RST2	M	Common port	
		NO	DO normally open port	
Fuel level detection port	AI1	+	+12 V power supply	Detect the fuel level.
		-	Analog signal	
	AI2	+	+12 V power supply	
		-	Analog signal	
Communications port	COM	R+	RS485 data +	Used for RS485 communication.
		R-	RS485 data -	
	CAN	+	CAN data +	Used for CAN communication.
		-	CAN data -	

5.5 Energy Monitoring Module ECU01A

Panel

The energy monitoring module ECM (panel silk screen: ECU01A) controls consistency of AC output voltage, frequency, and amplitude between HSUs.

Figure 5-10 Panel



- | | | |
|---------------------|---------------------|-----------------------|
| (1) BSC port | (2) PARALLEL port | (3) Running indicator |
| (4) Alarm indicator | (5) Fault indicator | (6) Handle |

Indicators

Table 5-18 Indicator description

Item	Color	Status	Description
Running indicator	Green	Off	The module is faulty or has no power input.
		Steady on	The module is active and working properly.
		Blinking slowly (0.5 Hz)	The module is standby and ready to work.
		Blinking fast (4 Hz)	The module software is being loaded.
Alarm indicator	Yellow	Off	No minor or warning alarm is generated.
		Steady on	A minor or warning alarm is generated.
Fault indicator	Red	Off	No critical or major alarm is generated.
		Steady on	A critical or major alarm is generated.

Ports

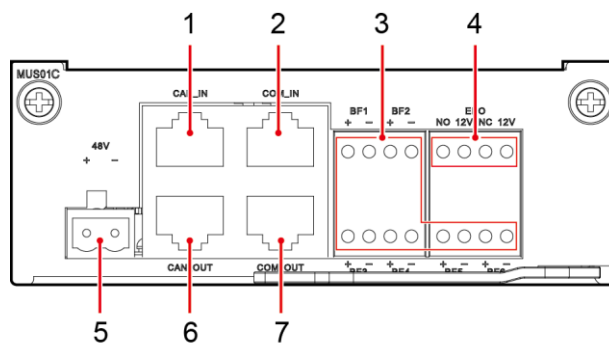
Table 5-19 Port description

Silk Screen	Description
BSC	Reserved
PARALLEL	Inter-cabinet cascading port

5.6 Monitoring Interface Module MUS01C

Panel

Figure 5-11 Panel



PC03W00032

- (1) CAN_IN port
- (2) COM_IN port
- (3) Dry contact input for battery circuit breaker status detection
- (4) EPO detection port
- (5) 48 V power port
- (6) CAN_OUT port
- (7) COM_OUT port

Ports

Table 5-20 Port description

Port Type	Silk Screen	Description
Dry contact input for battery circuit breaker status detection	BF1	Dry contact input 1
	BF2	Dry contact input 2
	BF3	Dry contact input 3

Port Type	Silk Screen	Description
	BF4	Dry contact input 4
	BF5	Dry contact input 5
	BF6	Dry contact input 6
EPO detection port	NO	When NO and 12 V close, EPO is triggered.
	12V	
	NC	When NO and 12 V open, EPO is triggered.
	12V	
Communications port	CAN_IN	Connects to the SMU.
	CAN_OUT	Connects to the MDU.
	COM_IN	Connects to the SMU backplane.
	COM_OUT	Connects to the insulation detection module.
Power supply port	48V	48 V power supply

Communications Ports

Table 5-21 Port description

Communications Port	Communications Parameter	Communications Protocol
CAN_IN	Baud rate: 250 kbit/s	CAN protocol
CAN_OUT	Baud rate: 250 kbit/s	CAN protocol
COM_IN	CAN baud rate: 250 kbit/s Modbus baud rate: 9600 bit/s	CAN and Modbus protocols
COM_OUT	Baud rate: 9600 bit/s	Modbus protocol

Figure 5-12 Pins in a communications port

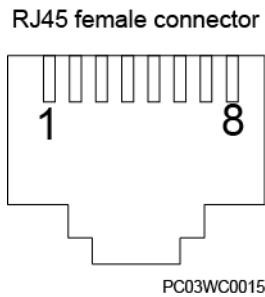


Table 5-22 CAN_IN port pin definitions

Pin	Signal	Description
7	CANH	CAN bus high level
8	CANL	CAN bus low level
1–6	Reserved	-

Table 5-23 CAN_OUT port pin definitions

Pin	Signal	Description
1	CANH	CAN bus high level
2	CANL	CAN bus low level
3	12V	Power supply
8	GND	Ground
4–7	Reserved	-

Table 5-24 COM_IN port pin definitions

Pin	Signal	Description
1	RS485+	RS485 data +
2	RS485-	RS485 data –
7	CANH	CAN bus high level
8	CANL	CAN bus low level
3–6	Reserved	-

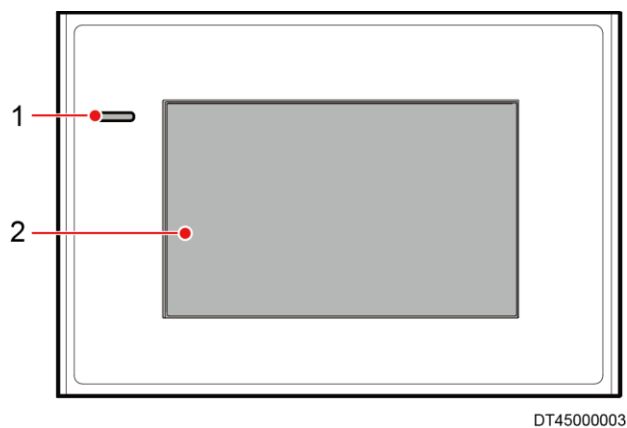
Table 5-25 COM_OUT port pin definitions

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

5.7 Touchscreen MDU

Panel

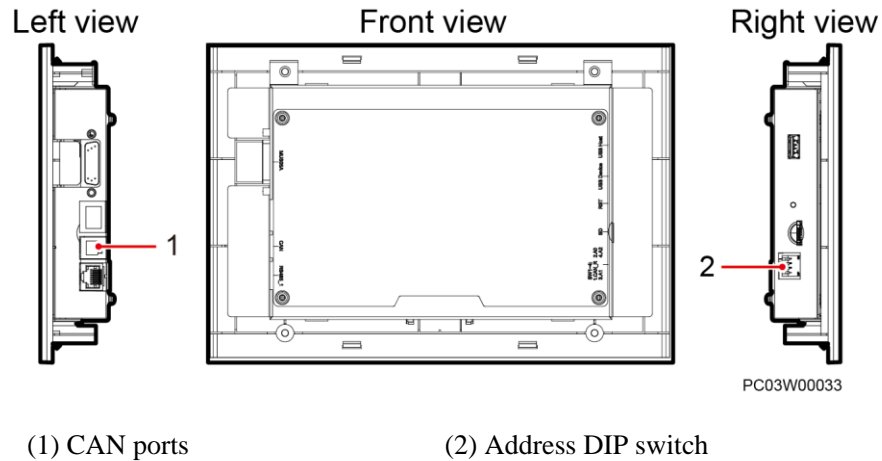
Figure 5-13 Touchscreen MDU (front)



(1) Status/alarm indicator

(2) LCD touchscreen

Figure 5-14 Touchscreen MDU (rear)



NOTE

Users can not use the USB port on MDU. If you need to use the USB port function, use the USB port on SMU.

Indicators

Table 5-26 Indicator description

Item	Status	Color	Description
Status/alarm indicator	Off	-	The MDU is faulty or the communications cable (with 12 V power supply) is not connected.
	Steady on	Green	The MDU is running properly and there is a warning alarm or no alarm.
		Yellow	The MDU is running properly but there is a major or minor alarm.
		Red	The MDU is running properly but there is a critical.

6 Routine Maintenance

Before equipment faults occur, perform routine maintenance to detect causes of potential faults and handle the faults properly to protect services from being affected.

6.1 Preparations Before Maintenance

Before beginning maintenance tasks, maintenance engineers need to get familiar with the site environment and get the maintenance tools ready.

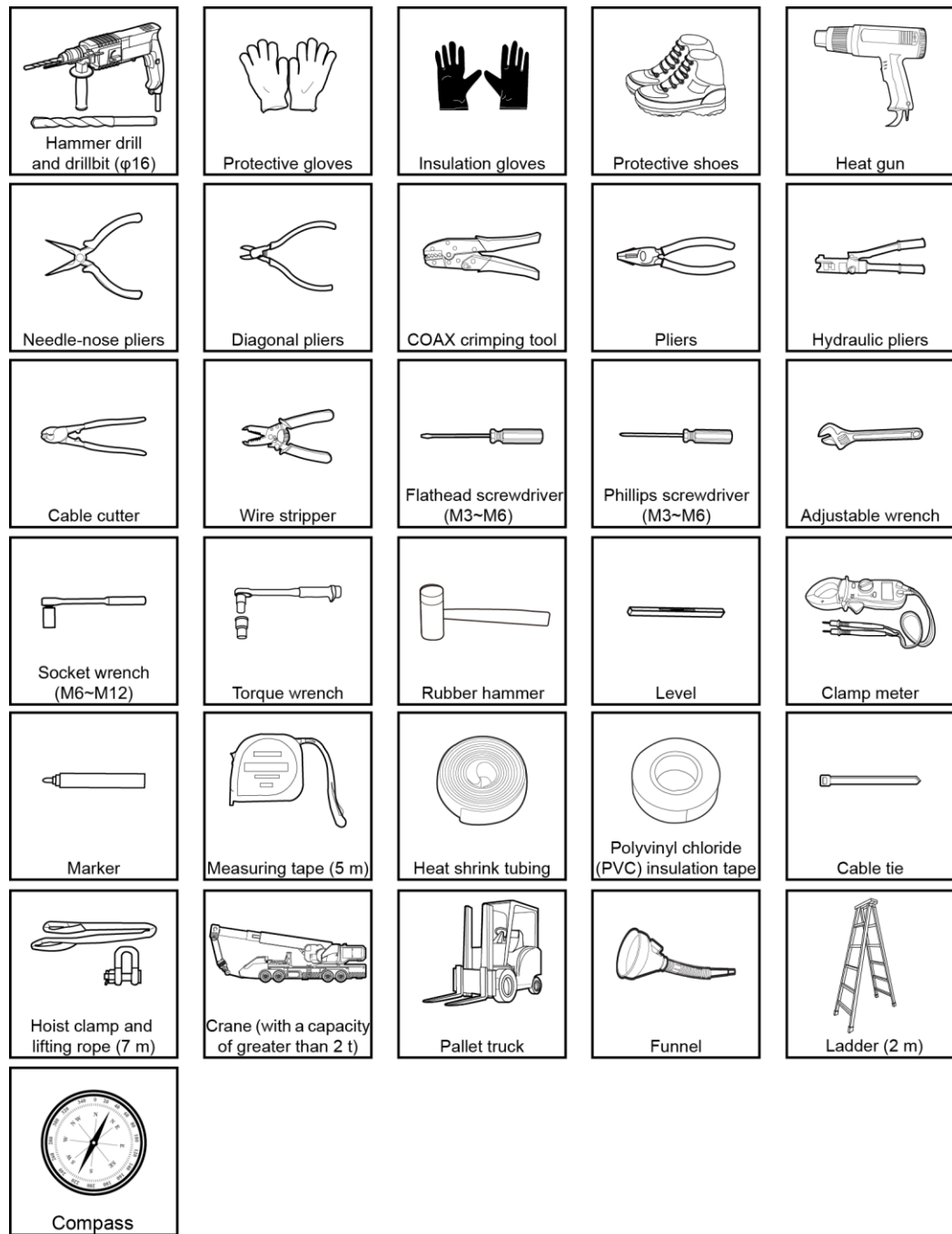
Getting Familiar with the Site

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

Required Tools

The following figure shows the tools.

Figure 6-1 Tools



HTool005

6.2 CCS Routine Maintenance

Maintain the cabinet with cooling system (CCS) periodically based on site requirements. The recommended maintenance interval is six months. If any faults occur, rectify the faults in time. The following table lists the routine maintenance checklist.

Table 6-1 CCS maintenance checklist

Maintenance Item	Check Item	Check Method	Repair Condition	Solution
Cabinet door lock	Check whether the door lock is damaged.	Visual observation or locking and unlocking the door	The door lock is damaged and cannot be used.	Replace the door lock.
Cabinet cleanness	Check whether the cabinet is corroded or rusted.	Visual observation	The cabinet is corroded or rusted.	Remove the rust and apply paint again.
	Check whether a pole or cabinet is deformed.	Visual observation	A pole or cabinet is deformed.	Replace the pole or cabinet.
	Check whether the cabinet surface is dirty with oil stains or dust.	Visual observation	There are oil stains or dust on the cabinet surface.	Use a soft cotton cloth to clean up the oil stains or dust.
Air filter	Check whether dust accumulates on the dust filter.	Visual observation	The air filter is dusty.	Clean the air filter.
Cabinet interior	Check whether temperature inside the cabinet is too high or low.	Using a thermometer	The temperature inside the cabinet is below -20°C or above +50°C.	<ul style="list-style-type: none"> If the temperature is below -20°C, take heating measures. If the temperature is above +50°C, take cooling measures such as enhancing ventilation.
	Check whether the isolation transformer has an overtemperature or ultra overtemperature alarm.	Alarm check	Overload exists or the fan is damaged.	<ul style="list-style-type: none"> The monitoring unit reports an overtemperature alarm for the isolation transformer. If the alarm is generated repeatedly within one week, you are advised to check for a fan fault onsite. The monitoring unit reports an ultra overtemperature

Maintenance Item	Check Item	Check Method	Repair Condition	Solution
				alarm for the isolation transformer. You need to check onsite immediately and clear the alarm.
Fan	Check whether dust accumulates on the fan.	Visual observation	The fan is dusty.	Clean the dust.
	Check whether the fan is intact, and the rotation speed, noise, and vibration are in normal ranges.	Visual observation and listening	The fan is damaged, the vibration is abnormal, or the noise is loud.	Replace the fan.
Appearance	Check whether the paint or electroplated coating on the cabinet is intact.	Visual observation	The cabinet is damaged or deformed.	Repaint and repair the enclosure.
Grounding inspection	Check whether the ground point properly connects to the equipment room ground bar.	Visual observation or using a tool such as screwdriver or wrench	The cable connecting the ground point and the equipment room ground bar is damaged or loose.	Secure the ground point or replace the ground cable.

6.3 ICC Routine Maintenance

Maintain the ICC periodically based on site requirements. The recommended maintenance interval is six months. If any faults occur, rectify the faults in time.

The following table lists the ICC routine maintenance checklist.

Table 6-2 ICC routine maintenance checklist

Maintenance Item	Check Item	Inspection Method	Repair Condition	Solution
Electricity	Check whether the output voltage is normal.	Multimeter	The battery low voltage disconnection (BLVD) or load low voltage disconnection	Refer to the device troubleshooting instructions.

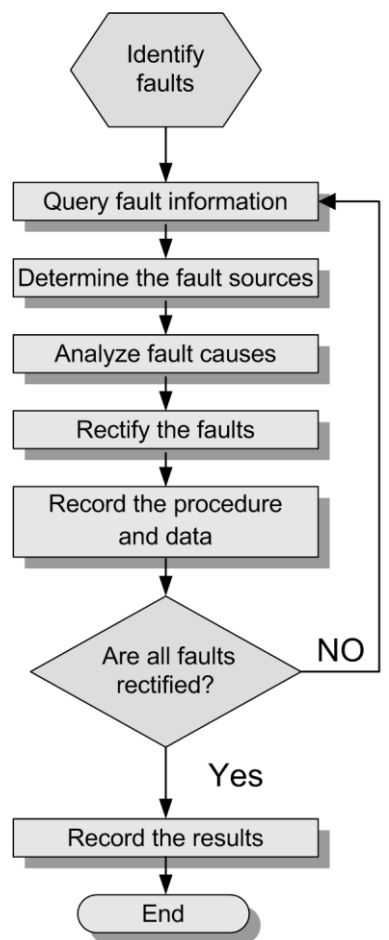
Maintenance Item	Check Item	Inspection Method	Repair Condition	Solution
			(LLVD) voltage exceeds the threshold.	
Preventive maintenance	Check whether the indicators are normal.	Visual inspection	An alarm is generated.	
Cable	Check whether the insulation layer cracks or deteriorates and wiring terminals rust or drop.	Visual inspection	<ul style="list-style-type: none"> • The insulation layer cracks and deteriorates. • A wiring terminal has rust or drops. 	<ul style="list-style-type: none"> • Replace power cables. • Replace wiring terminals.

7 Troubleshooting

7.1 General Troubleshooting Procedure

The following figure shows the general troubleshooting procedure.

Figure 7-1 General troubleshooting procedure



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

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

----End

7.2 Common Troubleshooting Instructions

7.2.1 AC SPD Troubleshooting

Table 7-1 Troubleshooting

Symptom	Possible Cause	Solution
The SPD indication window turns red.	The SPD is damaged.	Replace the AC SPD.
The SPD indication window is green, but there is an AC SPD alarm.	<ol style="list-style-type: none"> The circuit breaker is not properly switched on. The dry contact cable is loose or the alarm configuration is incorrect. The SPD base is damaged. 	<ol style="list-style-type: none"> Switch on the circuit breaker. Check whether the dry contact cable is securely connected and the alarm status is correctly configured. Replace the SPD base.

7.2.2 SMU Troubleshooting

Table 7-2 Troubleshooting

Troubleshooting	Possible Cause	Solution
The SMU02S breaks down or cannot be started. The LCD display is abnormal. The buttons cannot be operated.	The SMU02S is damaged.	Replace the SMU02S.
The SMU02S does not generate an alarm when a	The SMU02S is damaged.	Replace the SMU02S.

Troubleshooting	Possible Cause	Solution
fault occurs in the system.		
The SMU02S generates a false alarm.	The SMU02S is damaged.	Replace the SMU02S.
Communication between the SMU02S and all subordinate equipment is interrupted.	The SMU02S is damaged.	Replace the SMU02S.
The SMU02S fails to control or monitor all modules when these modules run properly and communications cables are connected properly.	The SMU02S is damaged.	Replace the SMU02S.
The SMU02S fails to monitor and control AC power distribution and DC power distribution when AC or DC power is distributed normally and communications cables are connected properly.	The SMU02S is damaged.	Replace the SMU02S.
You cannot set parameters or view operation information on the SMU02S.	The SMU02S is damaged.	Replace the SMU02S.

7.2.3 ECM01A Troubleshooting

Table 7-3 Troubleshooting

Troubleshooting	Possible Causes	Solution
All indicators on the ECM01A are off.	<ul style="list-style-type: none"> The ECM01A is removed. The ECM01A is in poor contact with other components. The ECM01A is damaged. 	<ol style="list-style-type: none"> Check whether the ECM01A is removed. If so, reinsert it. If the ECM01A is present, remove and reinsert it. If the indicators are still off, replace the ECM01A.
The alarm indicator (yellow) on the ECM01A is on.	<ul style="list-style-type: none"> Other components are faulty. The adjacent ECM01A is faulty. 	<ol style="list-style-type: none"> Query monitoring information to determine the fault type and check for intra/inter-rack faults. If the alarm indicator is still on, replace the

Troubleshooting	Possible Causes	Solution
		ECM01A.
The fault indicator (red) on the ECM01A is on.	<ul style="list-style-type: none"> • Other components are faulty. • ECM01A communication between cabinets is abnormal. • EPO is triggered. • The HSU is not ready. • There is a power cabinet address conflict. • The software and hardware types of the ECM01A do not match with each other. • The ECM01A is damaged. 	<ol style="list-style-type: none"> 1. Query monitoring information to determine the fault type and check for intra/inter-rack faults. 2. Check that the ECM01A cables are connected correctly and reliably. 3. Check the EPO button. If EPO is triggered, check whether the fault indicator on the ECM01A is off after it is started. 4. Check that the ready switch on the HSU is in Ready state. 5. Check the cabinet address on the SMU and ensure that there is no cabinet address conflict. 6. If the fault indicator is still on, replace the ECM01A.

7.2.4 MUS01C Troubleshooting

Table 7-4 Troubleshooting

Troubleshooting	Possible Causes	Solution
The network port indicator on the MUS01C is off.	<ul style="list-style-type: none"> • The MUS01C is removed. • The network port indicator is damaged. 	<ol style="list-style-type: none"> 1. Check whether the MUS01C is removed. If so, reinsert it. 2. If the indicator is still off, replace the MUS01C.
The SMU generates an MUS01C communication failure alarm.	The CAN communication link is abnormal.	<ol style="list-style-type: none"> 1. Check that the MUS01C communications cable is connected correctly and reliably. 2. If the cable connection is normal, replace the MUS01C.
The SMU which is normal indicates that the battery circuit breaker is OFF though it is ON.	<ul style="list-style-type: none"> • The cable for detecting the battery circuit breaker status is not connected. 	<ol style="list-style-type: none"> 1. Check that the cable for detecting the battery circuit breaker status is connected correctly and reliably to the MUS01C.

Troubleshooting	Possible Causes	Solution
	<ul style="list-style-type: none"> The MUS01C is damaged. 	2. If the cable connection is normal, replace the MUS01C.
The EPO button has failed though the ECM is normal.	The MUS01C is damaged.	Replace the MUS01C.

7.2.5 HSU Troubleshooting

Table 7-5 Troubleshooting

Troubleshooting	Possible Causes	Solution
All indicators on the HSU are off though it communicates with the SMU properly.	<ul style="list-style-type: none"> The PV and battery inputs are abnormal. The HSU is damaged. 	<ol style="list-style-type: none"> Check that the PV and battery cables are connected correctly and reliably. If the indicators are still off, replace the HSU.
All indicators on the HSU are off and it fails to communicate with the SMU.	<ul style="list-style-type: none"> The HSU is in poor contact with the rack backplane. The HSU is damaged. 	<ol style="list-style-type: none"> Check that the HSU is securely connected to the rack backplane. If the indicators are still off, replace the HSU.
The alarm indicator (yellow) on the HSU is on.	<ul style="list-style-type: none"> Other components are faulty. There is an alarm about the parallel communication link. The HSU is damaged. 	<ol style="list-style-type: none"> Query monitoring information to determine the fault type and check whether components such as the PV, battery, and inverter are normal. Check that the HSU is securely connected to the rack backplane. If the alarm indicator is still on, replace the HSU.
The fault indicator (red) on the HSU is on.	<ul style="list-style-type: none"> Other components are faulty. The parallel communication link is abnormal. EPO is triggered. The HSU is not ready. The HSU is damaged. 	<ol style="list-style-type: none"> Query monitoring information to determine the fault type and check whether components such as the PV and battery are normal. Check that the HSU is securely connected to the rack backplane. Check the EPO button. If EPO is triggered, check whether the fault indicator on the HSU is off after it is started.

Troubleshooting	Possible Causes	Solution
		<ol style="list-style-type: none"> 4. Check that the ready switch on the HSU is in Ready state. 5. If the fault indicator is still on, replace the HSU.
The running indicator (green) on the HSU is on, and the HSU fails to communicate with the SMU which is normal.	<ul style="list-style-type: none"> • The communication link of the HSU is abnormal. • The HSU is damaged. 	<ol style="list-style-type: none"> 1. Check that the HSU is securely connected to the rack backplane. 2. If the communication failure persists, replace the HSU.

7.2.6 BPS Troubleshooting

Table 7-6 Troubleshooting

Troubleshooting	Possible Causes	Solution
All indicators on the BPS are off.	<ul style="list-style-type: none"> • The BPS is in poor contact with the rack backplane. • The BPS is damaged. 	<ol style="list-style-type: none"> 1. Check that the BPS is securely connected to the rack backplane. 2. If the indicators are still off, replace the BPS.
The alarm indicator (yellow) on the BPS is on.	<ul style="list-style-type: none"> • The neutral wire of bypass input is missing or the wire sequence is incorrect. • The bypass input voltage is abnormal. • There is an alarm about the parallel communication link. • The BPS is damaged. 	<ol style="list-style-type: none"> 1. Check that the bypass input cable is connected correctly and securely. 2. Check that the bypass input voltage is normal. 3. Check that the BPS is securely connected to the rack backplane. 4. If the alarm indicator is still on, replace the BPS.
The fault indicator (red) on the BPS is on.	<ul style="list-style-type: none"> • EPO is triggered. • The BPS is not ready. • The parallel communication link is abnormal. • The software and hardware types of the BPS do not match with each other. • The BPS is damaged. 	<ol style="list-style-type: none"> 1. Check the EPO button. If EPO is triggered, check whether the fault indicator on the BPS is off after it is started. 2. Check that the ready switch on the BPS is in Ready state. 3. Check that the BPS is securely connected to the rack backplane. 4. If the fault indicator is still on, replace the BPS.
The running indicator	<ul style="list-style-type: none"> • The communication link 	<ol style="list-style-type: none"> 1. Check that the BPS is

Troubleshooting	Possible Causes	Solution
(green) on the BPS is on, and the BPS fails to communicate with the SMU which is normal.	<p>of the BPS is abnormal.</p> <ul style="list-style-type: none"> The BPS is damaged. 	<p>securely connected to the rack backplane.</p> <ol style="list-style-type: none"> If the communication failure persists, replace the BPS.

7.2.7 Circuit Breaker Troubleshooting

Table 7-7 Troubleshooting

Symptom	Possible Cause	Solution
A circuit breaker is faulty due to overcurrent or a short circuit.	The circuit breaker is in a position between ON and OFF.	Switch the circuit breaker to OFF and then to ON.
The circuit breaker remains faulty after you switch it to OFF and then to ON.	The circuit breaker is damaged.	Replace the circuit breaker.

7.2.8 Clearing the EPO State

Table 7-8 Clearing the EPO state

Symptom	Solution
The EPO button has been pressed, and the SMU is energized.	<ol style="list-style-type: none"> Restore the EPO button. Manually clear the alarm.
The EPO button has been pressed, the SMU is not energized, and the AC input or PV input is energized.	<ol style="list-style-type: none"> Restore the EPO button. Turn off the AC and PV input switches to power off the system. Turn on the AC and PV input switches to power on the system.

8 Parts Replacement

This chapter describes the methods and precautions for replacing common parts and components such as a circuit breaker, fuse, and SPD.



NOTE

- Disconnect the AC power supply before replacing the AC input circuit breaker, SPD, or AC contactor.
- Disconnect the power supply to ensure that boards and cabinets are free from high voltage hazards before replacing AC-powered boards.
- Attach labels to the ports before replacing a board that has complex ports for ease of port location.
- After disconnecting the module input and output, wait for 5 minutes until the DC bus capacitor voltage passes through the bleeder resistor and drops to below the standard safety voltage (60 V DC or 25 V AC).

8.1 Replacing an AC SPD

An AC SPD needs to be replaced if its indication window turns from green to red, indicating that the SPD has failed.

Prerequisites

- An ESD wrist strap or ESD gloves, flat-head screwdriver, cable cutter, cable ties, ESD box or bag, and cabinet door key are available.
- You have confirmed the model of the AC SPD to be replaced and prepared a replacement AC SPD.
- You are authorized to enter the site with the key.

Context

An AC SPD protects all circuits following it by suppressing power surges.

Procedure

Step 1 Wear the ESD wrist strap or ESD gloves.

Step 2 Disconnect the power supply.

- To replace the AC input SPD: Disconnect the external AC power supply and switch the SPD circuit breaker to OFF.

- To replace the AC output SPD: Turn off the AC output switch of the primary loop and switch the SPD circuit breaker to OFF.

⚠ DANGER

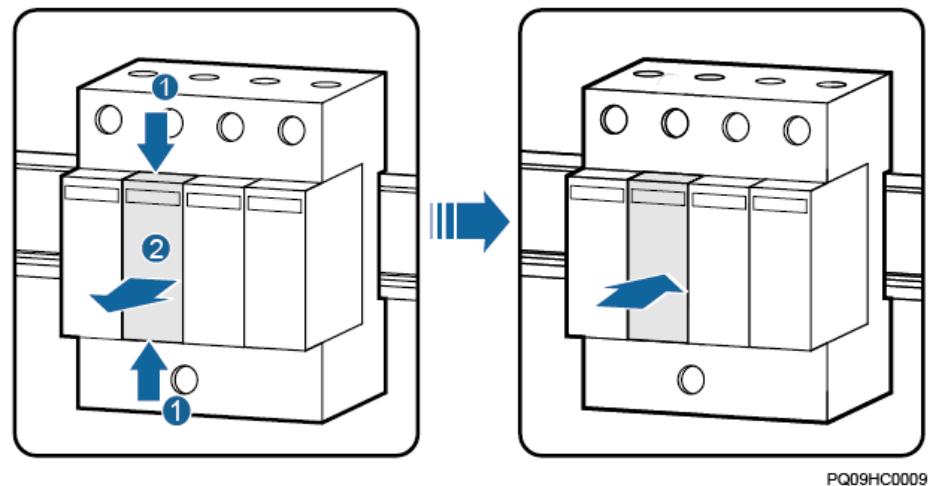
An AC SPD and its modules can be replaced only when the AC power is off. Otherwise, personal injury will be caused.

Step 3 Replace the AC SPD.

If...	Then...
A module in the AC SPD is damaged.	Perform Step 3.1 .
Both the modules and base of the AC SPD are damaged.	Perform Step 3.2 .

- Replace a module in the AC SPD, as shown in the following figure.
 - Hold the faulty module by hand and pull it out.
 - Install a new module in the AC SPD.

Figure 8-1 Replacing a surge protection module



- Replace the AC SPD.
 - Disconnect cables from the faulty AC SPD. Insulate each cable and label it immediately after disconnecting it.
 - Push the contact plate on the top of the AC SPD upwards using a flat-head screwdriver and remove the SPD, as shown in the following figure.

NOTE

The SPDs of different appearances are removed in similar ways. The actual product prevails.

Figure 8-2 Removing an AC SPD (appearance 1)

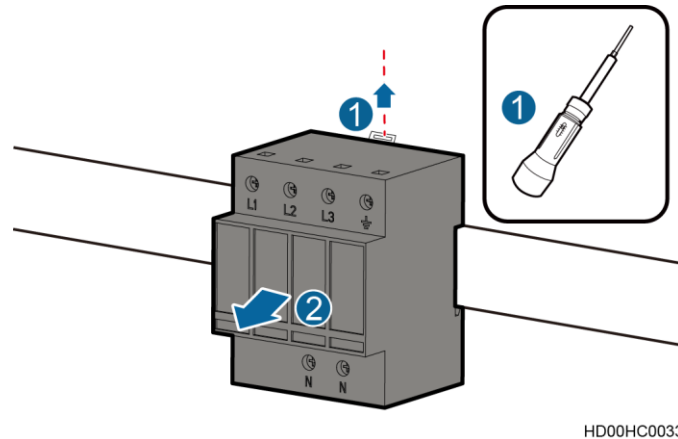
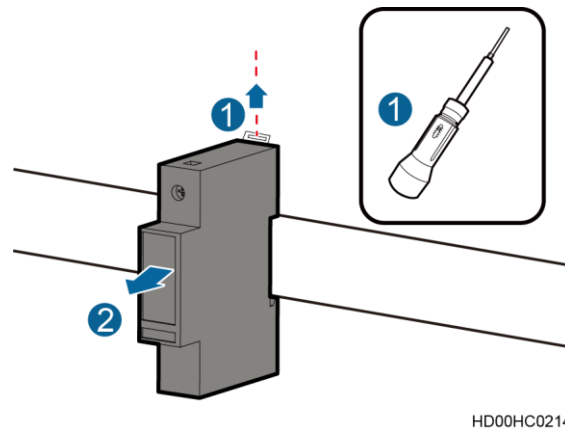


Figure 8-3 Removing an AC SPD (appearance 2)



- c. Place the new AC SPD on the corresponding guide rail, push the contact plate on the top of the circuit breaker upwards using a flat-head screwdriver, and push the AC SPD inwards to secure it.
- d. Reconnect the cables to the AC SPD based on the cable labels.

Step 4 Connect the AC power supply and check that the AC SPD alarm has been cleared.

Step 5 Check whether the AC SPD is running properly by viewing the indication window color. If the indication window is green, the AC SPD is running properly.

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

----End

Follow-up Procedure

- Put the removed component into the ESD box or bag and then place the ESD box or bag into the carton box with foams or the 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.

8.2 Replacing a Circuit Breaker

A circuit breaker needs to be replaced if it is faulty or at the end of its useful life.

Prerequisites

- An ESD wrist strap or ESD gloves, Phillips screwdriver, ESD box or bag, and cabinet door key are available.
- You have confirmed the quantity and model of circuit breakers to be replaced and prepared a replacement circuit breaker.
- You are authorized to enter the site with the key.

Context

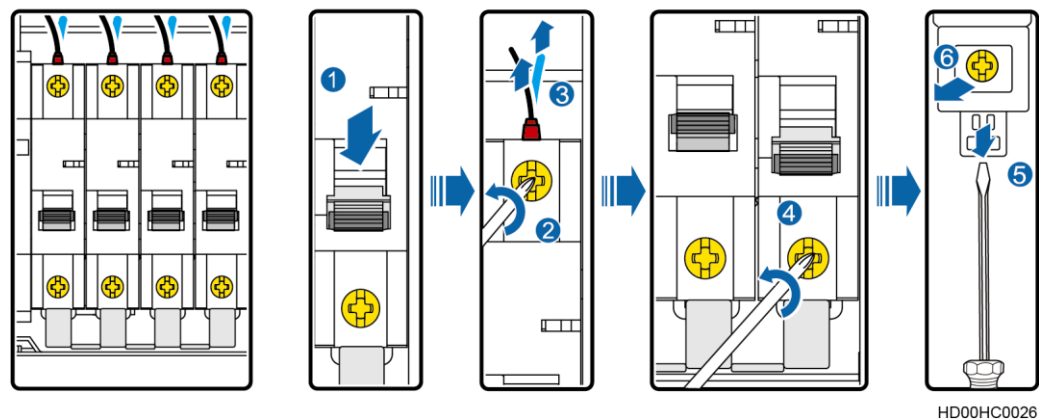


Before replacing a circuit breaker, ensure that the upstream power supply is disconnected.

Procedure

- Step 1** Disconnect the power input to the circuit breaker to be replaced.
- Step 2** Remove the cables or copper bars from the circuit breaker using a Phillips screwdriver, and then insulate the cables or copper bars.
- Step 3** Press the contact plate at the bottom of the circuit breaker using a flat-head screwdriver and then remove the circuit breaker, as shown in the following figure.

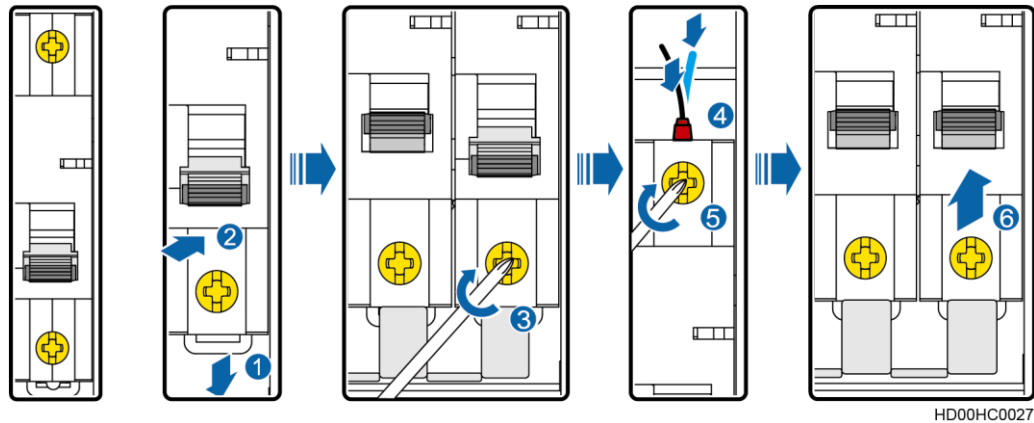
Figure 8-4 Removing a circuit breaker



- Step 4** Press the contact plate at the bottom of the circuit breaker using the screwdriver again to install the new circuit breaker to the correct position. And then push the contact plate upwards using the screwdriver.
- Step 5** Use a Phillips screwdriver to reconnect the cables or copper bars to the new circuit breaker as they were originally installed.

- Step 6** Reconnect the power input to the circuit breaker and switch the circuit breaker to ON, as shown in the following figure.

Figure 8-5 Installing a circuit breaker



----End

Follow-up Procedure

- Put the removed component into the ESD box or bag and then place the ESD box or bag into the carton box with foams or the 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.

8.3 Replacing an HSU

Prerequisites

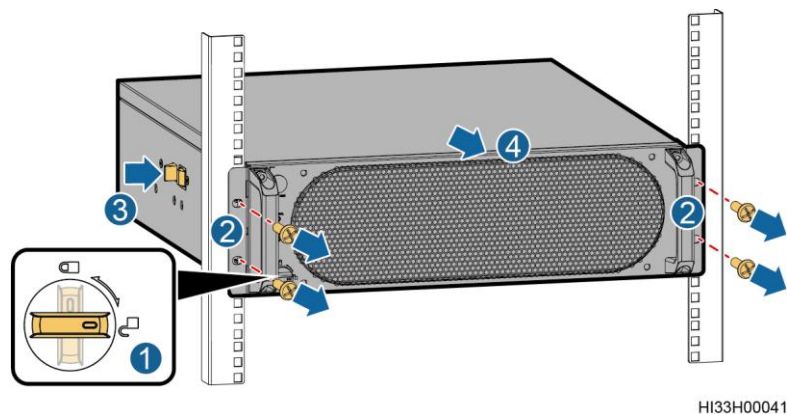
NOTICE

When replacing an HSU, avoid damaging the connectors behind it. Place the HSU horizontal on the ground. Vertical placement is forbidden.

Procedure

- Step 1** Unlock the HSU panel.
- Step 2** Remove the screws that secure the HSU.
- Step 3** Press the positioning lock and remove the HSU.

Figure 8-6 Replacing an HSU



Step 4 Install the new HSU.

----End

8.4 Replacing a BPS

Prerequisites

NOTICE

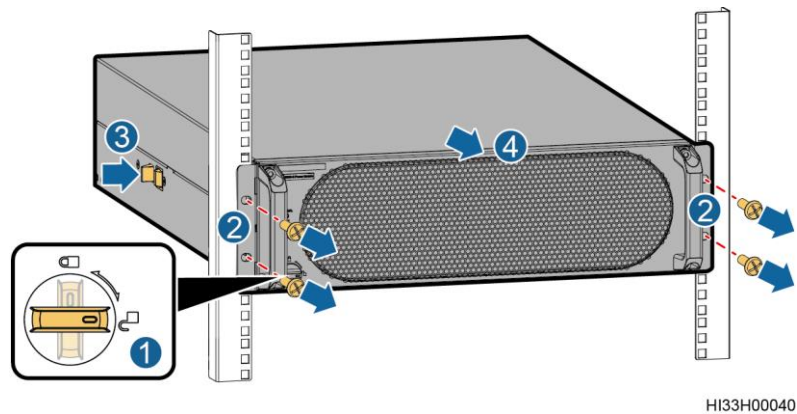
When replacing a BPS, avoid damaging the connectors behind it. Place the BPS horizontal on the ground. Vertical placement is forbidden.

Procedure

Step 1 Unlock the BPS panel.

Step 2 Remove the screws that secure the BPS and remove the BPS.

Figure 8-7 Replacing a BPS



Step 3 Install the new BPS.

----End

8.5 Replacing a Monitoring Unit

8.5.1 Replacing an SMU02S

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, and cabinet door key are available.
- The new SMU02S is intact.

Procedure

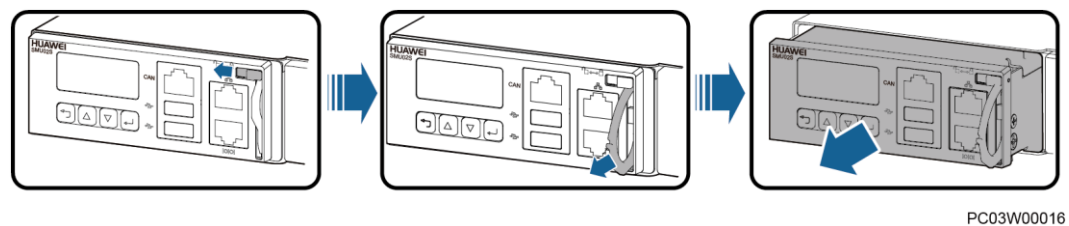
Step 1 Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.

Step 2 Disconnect the communications cable from the SMU02S panel.

Step 3 Push the locking latch leftwards.

Step 4 Pull the handle outwards and remove the SMU02S.

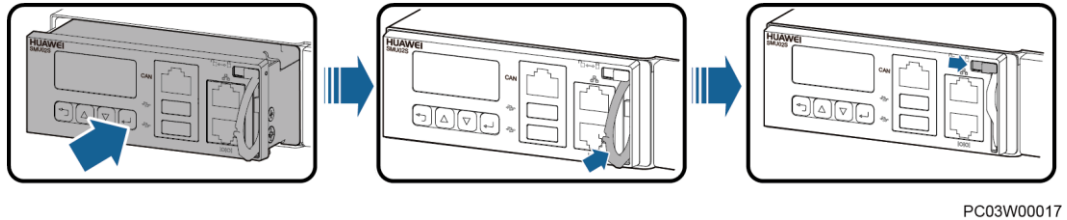
Figure 8-8 Removing the SMU02S



Step 5 Place the new SMU02S in the slot, push the locking latch leftwards, and pull out the handle.

- Step 6** Gently push the SMU02S along guide rails until it is engaged. Close the handle, and push the locking latch rightwards.

Figure 8-9 Installing the SMU02S



- Step 7** Reconnect the communications cable to the SMU02S panel.
- Step 8** Reset SMU02S parameters.

----End

Follow-up Procedure

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

8.5.2 Replacing a UIM02C Board

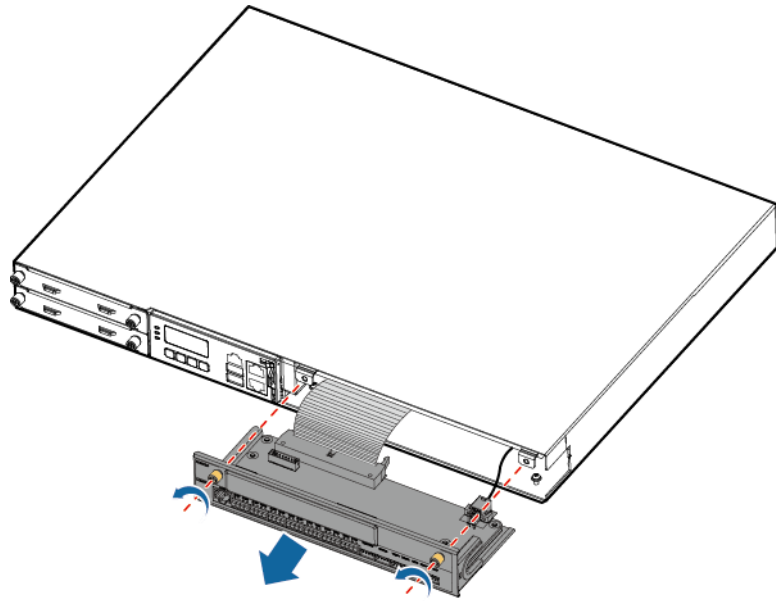
Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new UIM02C board is intact.

Procedure

- Step 1** Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.
- Step 2** Record the position of signal cables connected to the UIM02C panel, and then disconnect the signal cables.
- Step 3** Unscrew and take out the UIM02C.

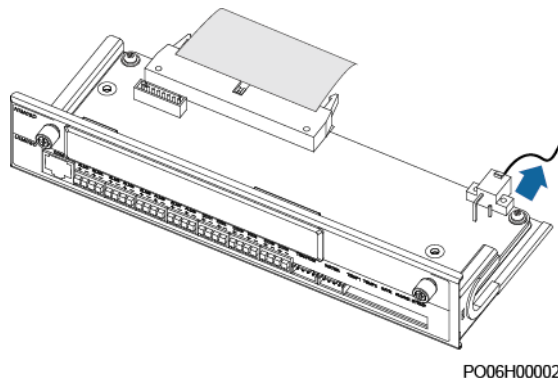
Figure 8-10 Taking out the UIM02C



PC03W00019

Step 4 Disconnect the -48 V power cable from the UIM02C board.

Figure 8-11 Disconnecting the -48 V power cable



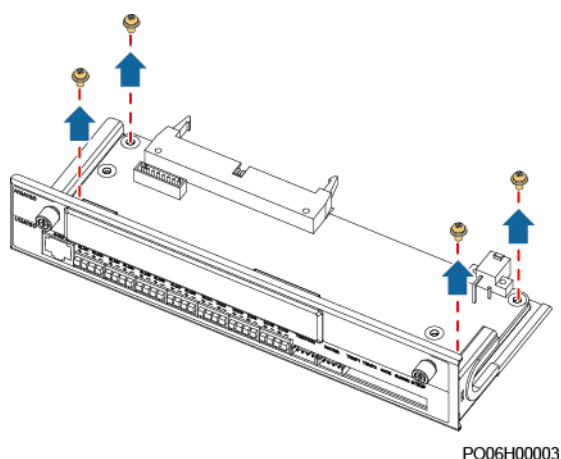
PO06H00002

(1) -48 V power port

Step 5 Record the connection positions of all cables including cables for internal and external circulation fans and flat cables on the UIM02C board, and then disconnect the cables.

Step 6 Remove the UIM02C board.

Figure 8-12 Removing the UIM02C board



- Step 7** Take out and install the new UIM02C board.
- Step 8** Connect all the cables on the UIM02C board to the new UIM02C based on the recorded information.
- Step 9** Reconnect the -48 V power cable to the UIM02C board.
- Step 10** Push the UIM02C in place and tighten the screws.
- Step 11** Reconnect signal cables to the new UIM02C panel based on the recorded information.
- Step 12** Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.
- End

Follow-up Procedure

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

8.5.3 Replacing an NIM01C3

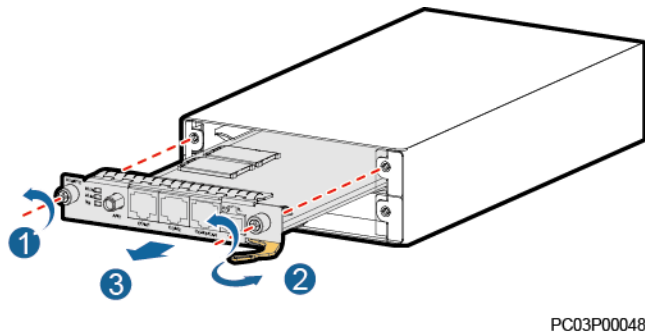
Prerequisites

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

Procedure

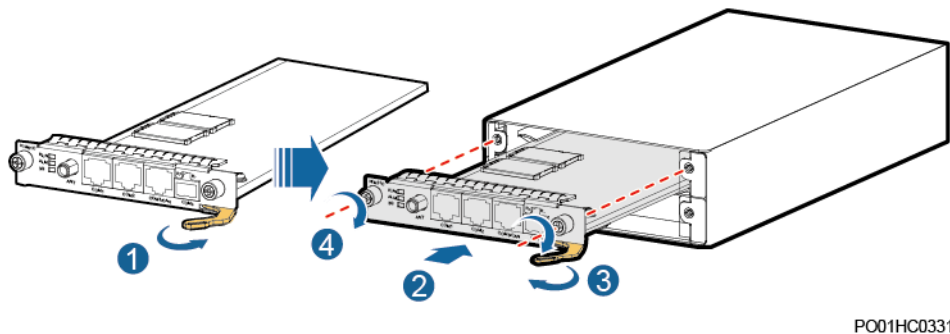
- Step 1** Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.
- Step 2** Record the positions where signal cables connect to the NIM01C3 panel, and then disconnect the signal cables.
- Step 3** Loosen the screws on both sides of the NIM01C3 panel.
- Step 4** Pull the handle rightwards to remove the NIM01C3.

Figure 8-13 Removing an NIM01C3



- Step 5** Remove the SIM card from the SIM card slot of the NIM01C3, and insert it into the SIM card slot of the new NIM01C3. Skip this step if no SIM card is installed.
- Step 6** Place the new NIM01C3 at the entry to the appropriate slot in 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 8-14 Installing an NIM01C3



- Step 8** Connect the signal cables to the original positions on the NIM01C3 panel.
- Step 9** Disconnect the ground cable for the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

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

8.5.4 Replacing a GIM01C

Prerequisites

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

- The new GIM01C is intact.

Procedure

- Step 1** Connect the ground cable to the ESD wrist strap, and put on the ESD wrist strap and ESD gloves.
 - Step 2** Record the connection positions of cables on the GIM01C panel and disconnect the cables.
 - Step 3** Loosen the screws on both sides of the GIM01C panel.
 - Step 4** Pull the handle rightwards and take out the GIM01C.
 - Step 5** Place the new GIM01C at the entry to the appropriate slot in the monitoring unit subrack, and push the GIM01C until its front panel is flush with the front panel of the monitoring unit subrack.
 - Step 6** Push the handle inwards until it is engaged, and then tighten the screws.
 - Step 7** Reconnect the cables to the new GIM01C panel based on the recorded information.
 - Step 8** Disconnect the ground cable from the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.
- End

8.5.5 Replacing an ECU01A

Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new ECU01A is intact.

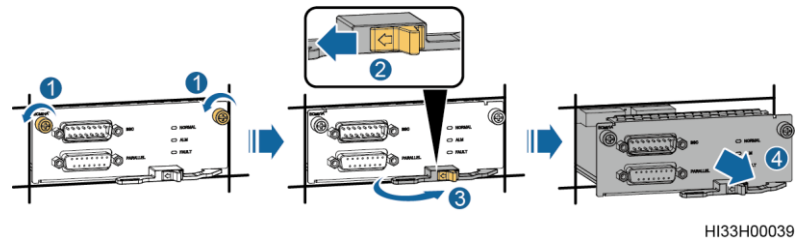
NOTICE

To ensure normal operation of equipment during ECU01A replacement, do not remove two ECU01A modules at the same time.

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 ECU01A panel and disconnect the cables.
- Step 3** Loosen the screws on both sides of the ECU01A panel.
- Step 4** Press the button on the handle and pull the handle rightwards to remove the ECU01A.

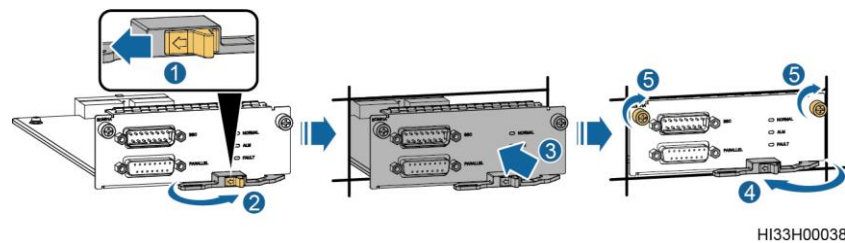
Figure 8-15 Removing an ECU01A



Step 5 Place the new ECU01A into the correct slot in the subrack, and push the ECU01A 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 8-16 Installing an ECU01A



Step 7 Reconnect the cables to the new ECU01A panel based on the recorded information.

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

----End

Follow-up Procedure

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

8.5.6 Replacing an MUS01C

Prerequisites

NOTICE

Before replacing the MUS01C, ensure that the power system is shut down.

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new MUS01C board is intact.

Procedure

Step 1 Shut down the power system on the SMU.

NOTICE

The SMU generates an "EPO Shutdown" alarm.

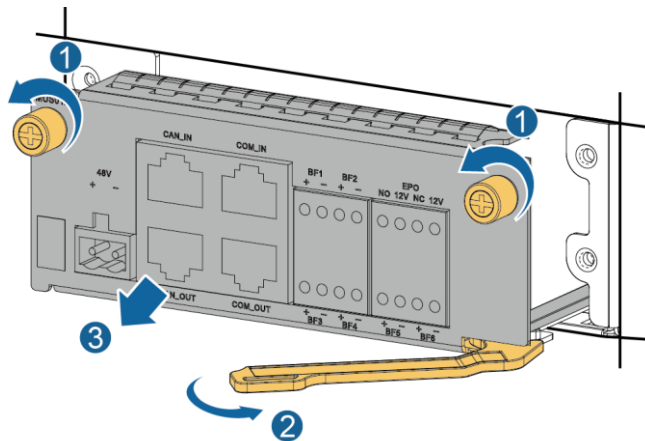
Step 2 Connect the ground cable of the ESD wrist strap, and wear the ESD wrist strap and ESD gloves.

Step 3 Record the connection positions of cables on the MUS01C panel and disconnect the cables.

Step 4 Loosen the screws on both sides of the MUS01C panel.

Step 5 Pull the handle rightwards to remove the MUS01C.

Figure 8-17 Removing an MUS01C

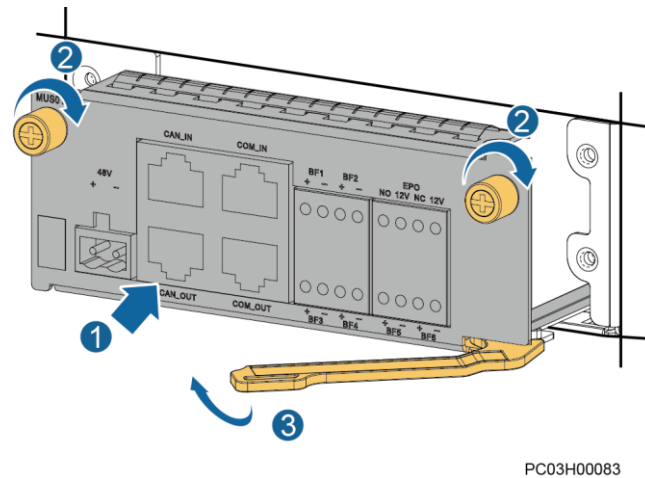


PC03H00082

Step 6 Place the new MUS01C into the correct slot in the subrack, and push the MUS01C until its front panel is flush with the front panel of the subrack.

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

Figure 8-18 Installing an MUS01C



- Step 8** Reconnect the cables to the new MUS01C panel based on the recorded information.
- Step 9** Start the power system on the SMU and check that the "EPO Shutdown" alarm disappears.
- Step 10** Observe the power system for 15 minutes. If no alarm (except the door status alarm) is generated on the SMU during this period, the current and voltage for batteries and loads are normal.
- Step 11** Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.
- End

Follow-up Procedure

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

8.5.7 Replacing an MDU

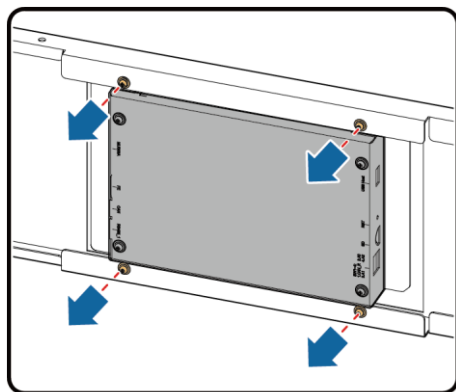
Prerequisites

- An ESD wrist strap, ESD gloves, ESD box or bag, cabinet door key, and required tools are available.
- The new MDU touchscreen 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 MDU and disconnect the cables.
- Step 3** Remove the screws that secure the MDU.

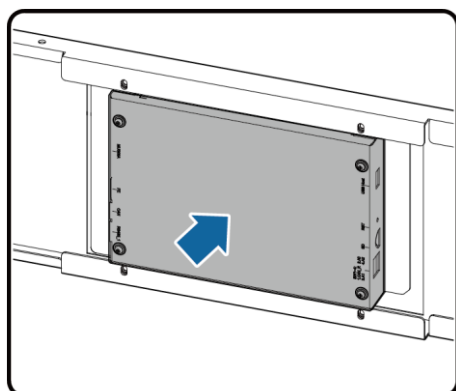
Figure 8-19 Removing screws



PC03H00084

Step 4 Remove the MDU.

Figure 8-20 Removing the MDU



PC03H00085

Step 5 Install the new MDU and tighten screws.

Step 6 Reconnect the cables to the new MDU based on the recorded information.

Step 7 Disconnect the ground cable of the ESD wrist strap, and remove the ESD wrist strap and ESD gloves.

----End

Follow-up Procedure

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

A Alarm List

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
Air conditioner controller	22751	Communication Fail	Major	The communications cable is loose or the address is incorrectly set.	<ol style="list-style-type: none"> 1. Check whether the communications cable is loose. 2. Check whether the correct port is connected. The COM4 port on the communications expansion board is supported by default. To connect to other ports, add them in the port configuration. 3. Check whether the communication address is in 53–58. If no, set the port address to 53–58 on the web page.
	22752	Infrared Code Send Failure	Minor	Code learning is not implemented.	<ol style="list-style-type: none"> 1. Implement the code learning according to the instructions. If the alarm persists, contact the manufacturer for support.
	22753	Air Conditioner High Temperature	Major	The temperature is high.	<ol style="list-style-type: none"> 1. Check whether the temperature sensor of the Big Banian controller is abnormal. 2. Check whether it is a proper threshold to turn on the air conditioner at a very high temperature.
PV	20501	PV Array Lost	Major	<ol style="list-style-type: none"> 1. The detection cable is loose or disconnected. 2. The PV module is missing. 	<ol style="list-style-type: none"> 1. Check whether the cable to the input DI1 port on the basic IO board is abnormally connected. 2. Check whether the signal cable for reporting PV module

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
					thefts is disconnected. 3. Check whether PV modules are stolen.
Controller	21001	SMU Fault	Major	The monitoring module is faulty.	Replace the monitoring module. If the alarm persists, contact Huawei technical support.
	21002	Insufficient Alarm Space	Warning	The number of historical alarms is about to reach the upper threshold.	Export historical alarms in time.
	21003	Abnormal System Voltage Check	Major	The system hardware is faulty.	Contact Huawei technical support.
	21004	Abnormal System Current Check	Major	The system hardware is faulty.	Contact Huawei technical support.
	15264	Mark SC Alarm	Major	No alarms are not reported to the Tower Company's SC due to manual control.	Check whether alarm masking is configured for the SC. If not yet configured, please contact Huawei technical support.
User interface board	21931	Temp1 Sensor Missing	Warning	1. The Temp1 sensor is not connected. 2. The Temp1 sensor connector is loose. 3. The Temp1 sensor is faulty.	1. Check whether the Temp1 sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the faulty temperature sensor.
	21932	Temp2 Sensor Missing	Warning	1. The Temp2 sensor is not connected. 2. The Temp2 sensor connector is loose. 3. The Temp2 sensor is faulty.	1. Check whether the Temp2 sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the faulty temperature sensor.
	21933	Temp1 Sensor Fault	Major	The Temp1 temperature sensor is faulty.	Replace the Temp1 temperature sensor and check whether the alarm is cleared.
	21934	Temp2 Sensor Fault	Major	The Temp2 temperature sensor is faulty.	Replace the Temp2 temperature sensor and check whether the alarm is cleared.
	21935	Temp1 High Temperature	Minor	1. The ambient temperature exceeds	1. Check whether temperature control devices such as the fan

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				the upper threshold. 2. The high temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty.	and air conditioner are malfunctioning. 2. Check whether the high temperature alarm threshold is incorrectly set. 3. Replace the faulty temperature sensor.
	21936	Temp2 High Temperature	Minor	1. The ambient temperature exceeds the upper threshold. 2. The high temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty.	1. Check whether temperature control devices such as the fan and air conditioner are malfunctioning. 2. Check whether the high temperature alarm threshold is incorrectly set. 3. Replace the faulty temperature sensor.
	21937	Temp1 Low Temperature	Minor	1. The ambient temperature is below the lower threshold. 2. The low temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty.	1. Check whether temperature control devices such as the fan and air conditioner are malfunctioning. 2. Check whether the low temperature alarm threshold is incorrectly set. 3. Replace the faulty temperature sensor.
	21938	Temp2 Low Temperature	Minor	1. The ambient temperature is below the lower threshold. 2. The ambient low temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty.	1. Check whether temperature control devices such as the fan and air conditioner are malfunctioning. 2. Check whether the low temperature alarm threshold is incorrectly set. 3. Replace the faulty temperature sensor.
	15324	Transformer Cab SPD Fault	Major	1. The AC SPD is faulty. 2. The AC SPD detection cable connector is loose.	1. Check whether the AC SPD window of the transformer cabinet has turned red. 2. Check whether the AC SPD detection cable connector is loose.
	21940	DIN2 Alarm	Minor	1. The device connected to the dry contact input is faulty. 2. The alarm	1. Maintain the device connected to the dry contact input and check whether the alarm persists. 2. Check whether alarm

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				conditions for the dry contact input are incorrectly set.	conditions for the dry contact input are incorrectly set.
	21941	DIN3 Alarm	Minor	1. The device connected to the dry contact input is faulty. 2. The alarm conditions for the dry contact input are incorrectly set.	1. Maintain the device connected to the dry contact input and check whether the alarm persists. 2. Check whether alarm conditions for the dry contact input are incorrectly set.
	21942	DIN4 Alarm	Minor	1. The device connected to the dry contact input is faulty. 2. The alarm conditions for the dry contact input are incorrectly set.	1. Maintain the device connected to the dry contact input and check whether the alarm persists. 2. Check whether alarm conditions for the dry contact input are incorrectly set.
	15325	XFMR. High Temp	Major	Temperature of the isolation transformer > 100°C.	Check whether the temperature of the transformer cabinet meets the alarm requirements.
	15326	XFMR. Very High Temp	Major	Temperature of the isolation transformer > 160°C.	Check whether the temperature of the transformer cabinet meets the alarm requirements.
HSU	22577	Inverter Fault	Critical	The inverter is faulty.	Replace the power unit or module.
	22580	Inverter Load Current DC Component Overhigh	Minor	The DC component of the inverter output current is excessive.	Replace the power unit or module.
	22581	Incompatible Inverter Version	Critical	Inverter DSP and power hardware version mismatch.	Upgrade the software.
	22582	Inverter Self-check Failure	Critical	Phase A self-check fails.	Replace the power unit or module.
	22583	Inverter Load Voltage DC Component Overhigh	Critical	The DC component of the inverter output voltage is excessive.	Replace the power unit or module.
	22599	PV Input	Critical	PV input overvoltage	Check the PV input voltage.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
		Overvoltage Protection		occurs.	
	22585	PV Input Reverse Connection	Critical	PV input reverse-connection occurs.	Reinstall the batteries and ensure that the polarities are correct.
	22578	Inverter Protection	Critical	Batteries are not properly installed.	Reinstall the batteries and ensure that the polarities are correct.
	22589	DCDC Protection	Critical	<ol style="list-style-type: none"> The battery voltage is higher than the upper threshold. The configured number of batteries is less than the actual number. The actual number of batteries does not meet specifications. 	<ol style="list-style-type: none"> Check the voltage of batteries. Check that the configured number of batteries is consistent with the actual number. Check that the actual number of batteries meets specification requirements. Replace the power unit or module.
	22590	DCDC Fault	Critical	The module is faulty.	Replace the module.
	22591	PV Input Insulation Fault	Critical	Insulation is faulty.	Replace the module.
	22592	DCDC Input SPD Fault	Critical	The SPD is faulty.	Replace the module.
	22593	DC/DC Converter Communication Failure	Major	The rectifier chip fails to communicate.	Replace the power unit or module.
	22594	Inverter Communication Failure	Major	The inverter chip fails to communicate.	Replace the power unit or module.
	22600	Ambient Low Temperature Protection	Critical	The ambient temperature is below -33°C .	Ensure that the ambient temperature is higher than -22°C .
	22901	Fan Fault	Critical	The internal circulation fan is faulty.	Replace the power unit or module.
	22902	Module Not Ready	Critical	The module ready switch is not turned on.	Turn on the module ready switch.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
	22903	Ambient Overtemperature Protection	Critical	The ambient temperature exceeds 85°C.	Check whether the alarm is automatically cleared 5 minutes after the ambient temperature falls below 85°C.
	22904	RCD Leakage Current Exceeded	Critical	The cable is damaged.	1. Check whether the insulation layer for PV input is damaged. 2. Replace the power unit or module.
HSU group	22571	All Inverters Communication Failure	Major	All inverter chips fail to communicate.	Replace the power unit or module.
	22572	DC/DC Converter Configuration Failure	Major	All inverters shut down in emergency.	Replace the power unit or module.
	22573	Inverter Configuration Failure	Major	Parallel configuration of rectifiers and inverters fail.	Replace the power unit or module.
	22574	All DC/DC Converters Communication Failure	Major	All rectifier chips fail to communicate.	Replace the power unit or module.
	22575	EPO Shutdown	Major	Any rectifier or inverter shuts down in emergency.	Replace the power unit or module.
	22576	Module Missing	Major	The module is removed or stolen before the restart.	Reinstall the module.
	22595	Output Over Load Protect	Major	The output power is too high.	Reduce the output power.
	22596	Battery Reverse Connection	Major	Batteries are reversely connected.	Correct the battery polarity.
	22597	Not Enough Capacity	Major	The number of configured modules is insufficient.	Increase the number of modules.
	22598	PV Input Reverse Connection	Critical	The PV inputs of all HSUs are reversely connected.	Check whether the battery polarity is normal. If not, reinstall the battery.
iBAT	14350	Communication Failure	Major	1. The communications cable is disconnected	1. Check whether the communications cable is properly connected. If no,

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				or in poor contact. 2. The BIM is faulty.	reconnect the communications cable. 2. Replace the involved BIM, and check whether the alarm is cleared.
	11365	Battery Cell Imbalance	Warning	1. The battery voltage is imbalanced. 2. The sampling is abnormal.	1. Check whether the single battery is connected abnormally. If yes, reconnect the cable. 2. Check whether the battery voltage is abnormal. If yes, replace the single battery.
	11366	Battery Cell High Temperature	Critical	A battery is faulty.	1. Check whether the single battery cable is incorrectly connected or loose. 2. Check whether the battery is leaking or damaged. If yes, replace the single battery.
	11367	Battery Cell Deterioration	Major	1. An electrochemical cell is damaged. 2. A battery cable is incorrectly connected or the cable connection is loose. 3. Electrochemical cells in the whole battery string deteriorate.	1. Check whether the battery exterior is abnormal such as leakage. 2. Check whether the single battery cable is incorrectly or not securely connected. 3. Replace the batteries, reset the battery capacity, and check whether the alarm is cleared.
	19762	Battery Resistance Abnormal	Minor	The internal resistance of batteries is abnormal, for example, due to loose terminals.	Manually clear the alarm.
	19763	Battery Terminal May Loose	Minor	Battery terminals may be loose.	Tighten the terminals and check whether the alarm is cleared.
	10749	Battery Terminals Loose	Critical	iBAT terminals are loose.	Check whether BIM wiring terminals are loose.
	19761	Battery Cell Under Voltage	Critical	A battery issue such as electrolyte or electric leakage occurs.	Check whether the battery has electrolyte or electric leakage. If yes, replace the battery.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
iBOX	14250	Communication Failure	Major	<ol style="list-style-type: none"> 1. The communications cable is disconnected or in poor contact. 2. The CIM is faulty. 	<ol style="list-style-type: none"> 1. Check whether the communications cable is properly connected. If no, reconnect the communications cable. 2. Replace the involved CIM, and check whether the alarm is cleared.
Battery string	11300	Battery High Temperature	Minor	<ol style="list-style-type: none"> 1. The battery temperature exceeds the high temperature alarm threshold. 2. The battery high temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the temperature control device, such as the fan or air conditioner, in the battery compartment is abnormal. If yes, maintain the temperature control device. 2. Check whether the battery high temperature alarm threshold is incorrectly set. If yes, reset the alarm threshold. 3. Replace the temperature sensor and check whether the alarm is cleared.
	11301	Battery Low Temperature	Warning	<ol style="list-style-type: none"> 1. The battery temperature is below the low temperature threshold. 2. The battery low temperature alarm threshold is incorrectly set. 3. The temperature sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the heater in the battery compartment is abnormal. If yes, maintain the heater. 2. Check whether the battery low temperature alarm threshold is incorrectly set. If yes, reset the alarm threshold. 3. Replace the temperature sensor and check whether the alarm is cleared.
	11302	Battery Temperature Sensor 1 Missing	Warning	<ol style="list-style-type: none"> 1. The sensor is not connected. 2. The sensor connector is loose. 3. The sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the sensor and check whether the alarm is cleared.
	11352	Battery Temperature Sensor 2 Missing	Warning	<ol style="list-style-type: none"> 1. The sensor is not connected. 2. The sensor connector is loose. 3. The sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the sensor and check whether the alarm is

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
					cleared.
	11344	Battery Temperature Sensor 1 Fault	Major	<ol style="list-style-type: none"> 1. The temperature sensor is not connected. 2. The temperature sensor connector is loose. 3. The temperature sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the temperature sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the temperature sensor and check whether the alarm persists.
	11355	Battery Temperature Sensor 2 Fault	Major	<ol style="list-style-type: none"> 1. The temperature sensor is not connected. 2. The temperature sensor connector is loose. 3. The temperature sensor is faulty. 	<ol style="list-style-type: none"> 1. Check whether the temperature sensor is connected. 2. Check whether the sensor connector is loose. 3. Replace the temperature sensor and check whether the alarm persists.
	11405	Battery High Temperature Disconnected	Major	The battery temperature exceeds the upper threshold.	<ol style="list-style-type: none"> 1. Check the temperature sensor. 2. Check whether the disconnection temperature threshold is proper. If yes, turn on the temperature control device such as the air conditioner to cool the battery. If no, adjust the high-temperature disconnection threshold.
	11406	Battery Low Voltage Disconnected	Major	Battery discharge results in low battery voltage.	Check whether the number of batteries is consistent with the actual configuration. If no, set it to the actual number. If no, contact Huawei technical support.
	11356	Battery Charge Overcurrent	Major	<ol style="list-style-type: none"> 1. Battery charge overcurrent occurs. 2. The device is faulty. 	<ol style="list-style-type: none"> 1. Switch off the battery circuit breaker and check whether the battery voltage is abnormal. If yes, replace the battery. 2. Check whether the charge overcurrent alarm threshold is incorrectly set. If yes, reset the alarm threshold. 3. Check whether a rectifier communication failure alarm is generated. If yes, handle the

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
					alarm.
	19796	Battery Loop 1 Disconnect	Major	The fuse of battery circuit breaker 1 is blown.	1. Check whether the alarm condition of loop 1 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 1 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of battery circuit breaker 1 is blown. If yes, replace the fuse.
	19797	Battery Loop 2 Disconnect	Major	The fuse of battery circuit breaker 2 is blown.	1. Check whether the alarm condition of loop 2 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 2 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of battery circuit breaker 2 is blown. If yes, replace the fuse.
	19798	Battery Loop 3 Disconnect	Major	The fuse of battery circuit breaker 3 is blown.	1. Check whether the alarm condition of loop 3 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 3 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of battery circuit breaker 3 is blown. If yes, replace the fuse.
	19799	Battery Loop 4 Disconnect	Major	The fuse of battery circuit breaker 4 is blown.	1. Check whether the alarm condition of loop 4 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 4 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
					battery circuit breaker 4 is blown. If yes, replace the fuse.
	19800	Battery Loop 5 Disconnect	Major	The fuse of battery circuit breaker 5 is blown.	<ol style="list-style-type: none"> 1. Check whether the alarm condition of loop 5 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 5 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of battery circuit breaker 5 is blown. If yes, replace the fuse.
	22701	Battery Loop 6 Disconnect	Major	The fuse of battery circuit breaker 6 is blown.	<ol style="list-style-type: none"> 1. Check whether the alarm condition of loop 6 on the IOBF is disconnected. If no, set the alarm condition to open. 2. Check whether battery circuit breaker 6 is switched on. If no, switch on the battery circuit breaker. 3. Check whether the fuse of battery circuit breaker 6 is blown. If yes, replace the fuse.
	11341	Battery Not Detected	Critical	Batteries are not connected.	<ol style="list-style-type: none"> 1. Manually clear the battery absent alarm and check whether the alarm persists. 2. Check whether batteries are connected to the system. If no, connect them to the system.
	22702	Battery Abnormal Low Voltage	Major	Batteries are not connected or the battery voltage is below the lower threshold.	Check whether batteries are connected to the system. If no, connect them to the system.
	22703	Battery Overvoltage Protect	Major	The number of batteries is incorrectly set or the battery voltage is abnormal.	Check whether the number of batteries is consistent with the actual configuration. If no, set it to the actual number.
Battery string	10558	SOH Low	Major	The actual battery capacity drops due to battery deterioration or damage.	1. Check whether batteries are damaged such as leakage. If yes, replace the batteries, and reset the battery capacity.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
					<p>2. If no, tightly secure the battery connection, and start the equalized charging. After that, start the standard battery test. (This process may take over ten hours.) Check whether the alarm is cleared afterwards.</p> <p>3. Replace the batteries, reset the battery capacity, and check whether the alarm is cleared.</p>
	10559	SOH Warning	Minor	The actual battery capacity drops due to battery deterioration or damage.	Check whether the battery performance is abnormal. If yes, check whether battery replacement is necessary.
Power cabinet	22691	Power Cabinet AC Output SPD Fault	Major	The AC output SPD is faulty.	<p>1. Check whether the AC SPD window on the rack output side has turned red. If yes, replace the AC SPD.</p> <p>2. Check whether the AC SPD monitoring cable connector on the rack output side is loose. If yes, secure the connector.</p>
	22692	HSU Short-Circuit Protection	Critical	HSU short-circuit protection.	Replace the power unit or module.
	22674	The AC Output Switch Open	Critical	The output circuit breaker in the cabinet is OFF.	Check whether the output circuit breaker in the cabinet is OFF.
	22963	AC Input Phase Sequence Incorrect	Major	The input cable phase sequence is incorrect.	Check whether input cables are connected properly.
	22964	AC Output Phase Sequence Incorrect	Major	The output cable phase sequence is incorrect.	Check whether output cables are connected properly.
Communications expansion board	15051	Communication Failure	Major	<p>1. The communications cable is disconnected or in poor contact.</p> <p>2. The communications expansion board is faulty.</p>	<p>1. Check whether the communications cable is properly connected.</p> <p>2. Replace the involved communications expansion board, and check whether the alarm is cleared.</p>

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
	15052	COM1 Low Voltage	Major	The board component has aged.	Check whether the output port voltage is normal using a multimeter.
	15053	COM2 Low Voltage	Major	The board component has aged.	Check whether the output port voltage is normal using a multimeter.
	15054	COM1 Short Circuit	Major	The board power wiring is incorrect.	Check whether the wiring sequence is correct.
	15055	COM2 Short Circuit	Major	The board power wiring is incorrect.	Check whether the wiring sequence is correct.
DG interface module	20001	Communication Fail	Minor	<ol style="list-style-type: none"> 1. The communications cable is faulty. 2. The address is incorrectly set. 3. The communications port is damaged. 4. The communications expansion board is faulty. 	<ol style="list-style-type: none"> 1. Rectify the faults on the communications cable, such as cable damage, loose connectors, bent pins, or misplaced pins. Then check whether the alarm is cleared. 2. Check whether the communications address is correctly set. If the address is incorrect, correct the address and check whether the alarm is cleared. 3. Replace the communications board, and check whether the alarm is cleared. 4. Replace the IS03/IS04 converter and check whether the alarm is cleared.
Energy control and management	22641	ECM1 Fault	Minor	ECU1 is faulty.	Replace the ECM in the first slot.
	22643	ECM Fault	Critical	The DSP and CPLD of the centralized controller fail to communicate.	Replace the power unit or module.
	22644	Abnormal Parallel Cable In The Power Cabinet	Critical	The intra-rack parallel CAN is faulty.	<ol style="list-style-type: none"> 1. Check the parallel board connector. 2. Replace the power unit or module. 3. Replace the parallel cable. 4. Replace the parallel board.
	22645	Incompatible Version	Critical	The DSP version of the central controller does not match the	Load software.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				power hardware version.	
	22646	Abnormal Parallel Cable Between The Power Cabinets	Critical	Intra-rack industrial-frequency synchronization is abnormal.	<ol style="list-style-type: none"> 1. Check the parallel board connector. 2. Replace the power unit or module. 3. Replace the parallel cable. 4. Replace the parallel board.
	22649	Abnormal ECM Power Supply	Critical	The centralized controller has a low voltage of ± 15 V.	<ol style="list-style-type: none"> 1. Clear the fault manually. 2. Replace the ECM. 3. If the fault persists, replace the parallel board.
	22651	Power Cabinet Address Conflict	Critical	A rack address conflict occurs.	Check the rack address setting.
	22656	Parallel Cable Alarm Between Power Cabinets	Minor	An intra-rack industrial-frequency synchronization alarm is generated.	<ol style="list-style-type: none"> 1. Check whether the parallel board connectors are loose. 2. Replace the power unit or module. 3. Replace the parallel cable. 4. Replace the parallel board.
	22658	Bypass Current Imbalance	Minor	The bypass current is unequalized.	<ol style="list-style-type: none"> 1. Check whether the output circuit breaker and bypass input circuit breaker on each rack are ON. 2. Check that the bypass input and output cable length of each rack is appropriate. 3. If the fault persists, remove the bypass unit or module, tap Fault Clear, and replace the bypass unit or module.
	22659	Bypass Input Phase Lock Failed	Minor	The inverter is not synchronized.	<ol style="list-style-type: none"> 1. Check whether the bypass input frequency changes fast. 2. Check whether the output frequency track rate is correctly set.
	22660	ECM Not Ready	Critical	The ECM ejector lever is not fastened.	<ol style="list-style-type: none"> 1. Fasten the ejector level. 2. If the alarm persists, replace the ECM.
	22661	Inconsistent	Critical	The phase sequences	Reconnect the bypass input

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
		Bypass Parallel Cable Connection		of bypass input cable connections are inconsistent between racks in a parallel system.	cable to the involved rack.
	22663	Power Cabinet Power Supply Status Conflict	Critical	The power supply states of racks conflict with each other.	Check the power supply status of each rack after the alarm is cleared. If certain racks have no output, you are advised to start them manually.
	22664	Inconsistent Output Parallel Cable Connection	Critical	After the boot mode is executed, the phase sequences of output cable connections are inconsistent between racks in a parallel system.	Check whether the output wiring phase sequence of the rack is correct and reenter the parallel system phase sequence detection boot mode.
	22665	ECM2 Fault	Minor	ECU2 is faulty.	Replace the ECM in the first slot.
	22669	Configuration Failure	Warning	Configuration of ECM fails.	1. Reconnect the ECM. 2. Restore the SMU to its factory settings.
	22667	Abnormal Program Execution	Warning	Memory check fails.	Replace the power unit or module.
	22668	Communication Fail	Major	The device fails to communicate, and the SMU generates an alarm indicating a communication failure between the SMU and the device.	Check the communication between the SMU and the ECM.
	22642	Communication Alarm Between Active And Standby SCIs	Minor	An exception occurs in the SCI communication between the active and standby ECMs.	Replace the standby ECM. If the fault persists, use another ECM.
	22675	System Output Mismatch Other AC Sources	Critical	The bypass input is incorrectly connected to the bypass output.	Check whether the input and output of the system are correctly connected on-site. If no, contact Huawei technical support.
	22676	Frame ID Conflict	Critical	In single system mode, connect the parallel cables of the	Check whether the ECM is in single system mode and whether a parallel cable is

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				two racks.	connected between two ECMs. If yes, remove the parallel cable. If no, contact Huawei technical support.
DG	22103	Manual Mode	Major	The DG is switched to the manual mode.	Switch the DG to the automatic mode and check whether the alarm is cleared.
	11200	Start Failure	Major	The DG is faulty.	Check whether the DG has difficulty starting.
	11201	Stop Failure	Minor	The DG is faulty.	Check whether the DG has difficulty stopping.
	20001	Lose Phase	Minor	The DG voltage is below the lower threshold.	Maintain the DG and check whether the alarm is cleared.
	11203	Abnormal Stop	Warning	<ol style="list-style-type: none"> 1. The fuel is insufficient. 2. The fuel solenoid valve is faulty. 3. The DG is manually shut down on-site. 4. The dry contact for remote startup is faulty. 5. The system generates a false alarm when the dry contact for DG status detection is faulty. 	<ol style="list-style-type: none"> 1. Add fuel to the fuel tank and check whether the alarm is cleared. 2. Check whether the fuel solenoid valve is faulty. If yes, replace it and check whether the alarm is cleared. 3. Set the system mode to Automatic and check whether the alarm is cleared. 4. Repair the dry contact for remote startup and check whether the alarm is cleared. 5. Repair the dry contact for DG status detection and check whether the alarm is cleared.
	11205	Abnormal Start	Warning	<ol style="list-style-type: none"> 1. The DG is manually shut down on-site. 2. The dry contact for remote startup is faulty. 3. The system generates a false alarm when the dry contact for DG status detection is faulty. 	<ol style="list-style-type: none"> 1. Set the system mode to Automatic and check whether the alarm is cleared. 2. Repair the dry contact for remote startup and check whether the alarm is cleared. 3. Repair the dry contact for DG status detection and check whether the alarm is cleared.
	19968	Running	Warning	One of the three phase voltages of the DG is greater than or equal to 50 V or the	Ignore it.

Device Name	Alarm ID	Alarm Name	Alarm Severity	Fault Cause	Troubleshooting
				external input dry contact is closed (user interface board DI4/DI5).	

B 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.

C EMC Specifications

NOTICE

This is a class A product. In a living environment, this product may cause radio interference; therefore, the user may be required to take appropriate measures.

Item	Specifications	
Electromagnetic interference (EMI)	Conducted emission (CE)	CISRP11-2009 Class A
	Radiated emission (RE)	CISRP11-2009 Class A
	Harmonic current	IEC 61000-3-2
	Voltage fluctuation and flicker	IEC 61000-3-3
Electromagnetic susceptibility (EMS)	ESD	IEC61000-4-2, criterion B Contact discharge: 6 kV; air discharge: 8 kV
	Electrical fast transient (EFT)	IEC61000-4-4, criterion B Signal port: 2 kV; AC power port: 2 kV; DC power port: 2 kV
	Radiated susceptibility (RS)	IEC61000-4-3 10 V/m
	Conducted susceptibility (CS)	IEC61000-4-6 Power port: 10 V
	Surge susceptibility	IEC61000-4-5, criterion B Dry contact output: 0.5 kV in differential mode, 1 kV in common mode Signal and control ports: 2 kV or 250 A

Item	Specifications	
	Surge protection	PV input: 5 kA System output: level A surge protection In: 60 kA, Imax: 100 kA
	Power frequency magnetic field	IEC 61000-4-8
	Voltage dip and short interruption	IEC61000-4-11

D Acronyms and Abbreviations

A

AC alternating current

D

DC direct current

DG diesel generator

E

ECC energy control center

ECM energy control module

EPO emergency power-off

G

GPRS general packet radio service

M

MPPT maximum power point tracking

N

NetEco Network Ecosystem

P

PV photovoltaic module

S

SJB	solar junction box
SMU	site monitoring unit
SOH	status of health
SPD	surge protection device

U

UIM	user interface module
USB	Universal Serial Bus