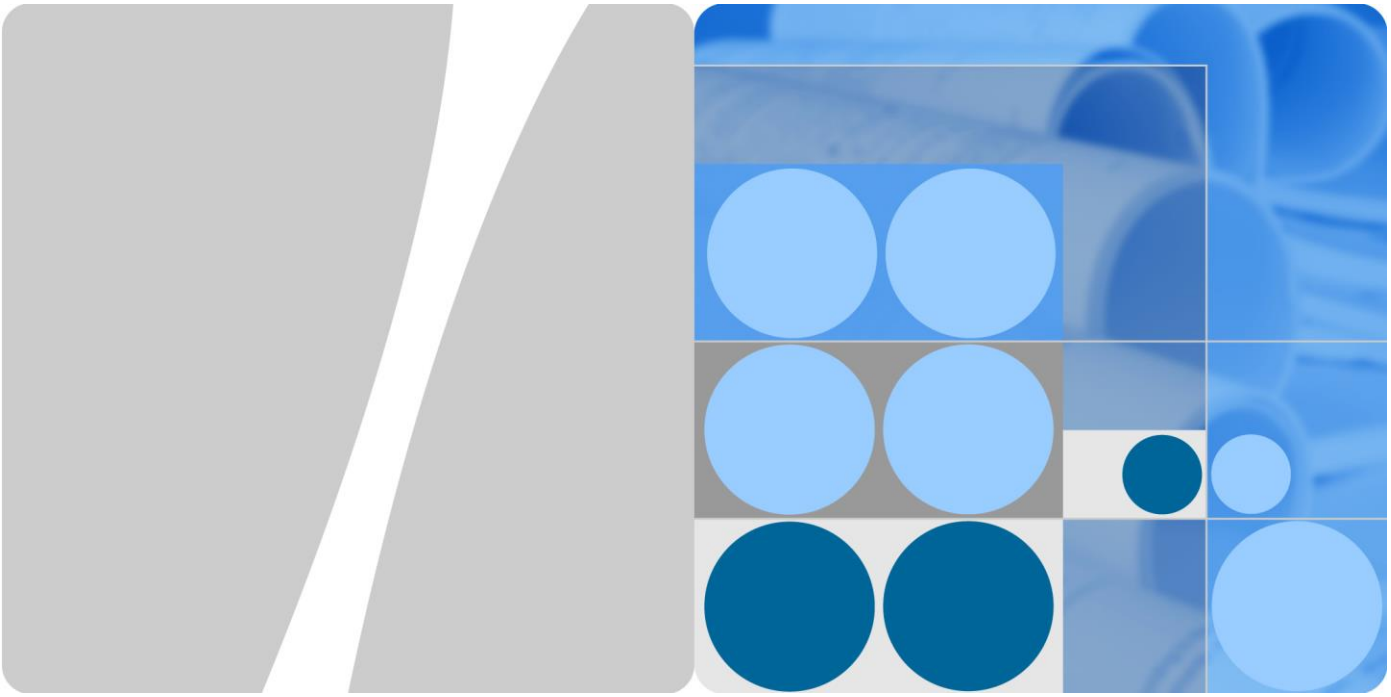

UPS5000-H-1200 kVA

Product Description (100 kVA Power Modules)

Issue 02

Date 2020-10-15

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About This Document

Purpose

This document describes the UPS5000-H-1200 kVA in terms of its model description, positioning, features, application scenarios, configurations, product architecture, and technical specifications.

Intended Audience

This document is intended for:

- Sales engineers
- System engineers
- Technical support engineers

Symbol Conventions

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

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

Symbol	Description
	deterioration.

Change History

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

Issue 02 (2020-10-15)

Updated certain technical specifications.

Issue 01 (2020-07-15)

This issue is the first release.

Contents

1 Model Description

Figure 1-1 UPS model number

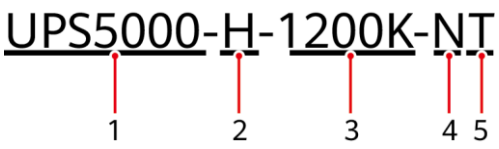


Table 1-1 Model number description

No.	Item	Description
1	Product category	UPS5000
2	Product subcategory	H: high power density and high efficiency
3	Rated capacity	Output capacity in full configuration: 1200 kVA
4	Switch configuration	N: no switch
5	Cabling	T: Cables can only be routed in from the top.

2 Product Positioning and Features

2.1 Positioning

The UPS5000-H is a high-end modular UPS launched by Huawei. It adopts online double conversion and modular redundancy design for components. Based on the digital signal processing (DSP) technology, the UPS5000-H features high efficiency and power density.

The UPS5000-H provides reliable, efficient, and simple solutions. It supplies reliable and high-quality power to:

- Large-sized data centers of governments and enterprises
- ISP data centers
- Internet data centers
- DR data centers
- Cloud data centers
- Infrastructures, large-sized control equipment rooms, and railways

2.2 Highlights

High Reliability and Redundancy

- The power module, monitoring module, bypass module, and control module use modular design and support hot swap. It is quite easy to replace, install, expand, and maintain the modules.
- The control module and power module use redundancy design, which ensures high system reliability.
- The iPower fault warning function is supported. If a battery, capacitor, fan, or any other key component fails, a warning is generated to prevent the fault from escalating.

High Power Density

The power density of power modules can reach 100 kW/3 U, which is the highest in the industry.

High Space Usage

Space is efficiently used. The UPS saves space for placing more IT equipment and reduces the footprint by 50% compared with traditional solutions of combining cabinets.

Easy Management and Monitoring

The UPS is configured with an SNMP card, which reduces the management cost and features simple and flexible configurations. Huawei NetEco 6000 easily implements remote centralized management.

2.3 Features

High Reliability

- UPS power and control modules use redundant design. No single-point fault occurs.
- The UPS supports a wide input voltage range of 138–485 V AC (line voltage) to adapt to poor power grids.
- The load power is not derated for linear and non-linear loads whose PF is greater than 0.5. The UPS perfectly matches all kinds of loads.
- The UPS passes reliability tests which focus on high temperature, high humidity, and dust adaptation. The impact of environment on the UPS reliability is reduced.

High Efficiency

- High efficiency is ensured even with a low load rate. If the load rate is extremely low, the intelligent rotation hibernation technology ensures redundancy and improves the UPS efficiency.
- Space is efficiently used. The UPS saves space for placing more IT equipment and reduces the footprint by 50% compared with traditional solutions.

High Loading Capability

The UPS has an output power factor (PF) of 1.0, which is suitable for linear and non-linear loads with a PF greater than 0.5. This allows the UPS to connect to more loads and reduces customer investments.

Easy O&M

- Power, bypass, and control modules are hot swappable. A common engineer can finish maintenance within 5 minutes.
- Smooth capacity expansion is supported. The initial investment on the UPS is reduced and the UPS operating efficiency is improved.
- The power supply and distribution status is monitored in real time. Core parameters of the UPS power supply and distribution system are automatically inspected, so manual inspection is not required.

3 Application Scenarios

The UPS5000-H is suitable for power systems in various indoor scenarios, including large-sized data centers or communications centers, equipment rooms of large-sized enterprises, equipment rooms of financial systems, industrial automated equipment, and scheduling centers.

NOTE

If the mains and bypass use different power sources, ensure that the neutral wires of the mains and bypass input power sources are equipotential. For example, the mains and bypass inputs are from the same transformer.

Figure 3-1 Typical application scenario of a single UPS

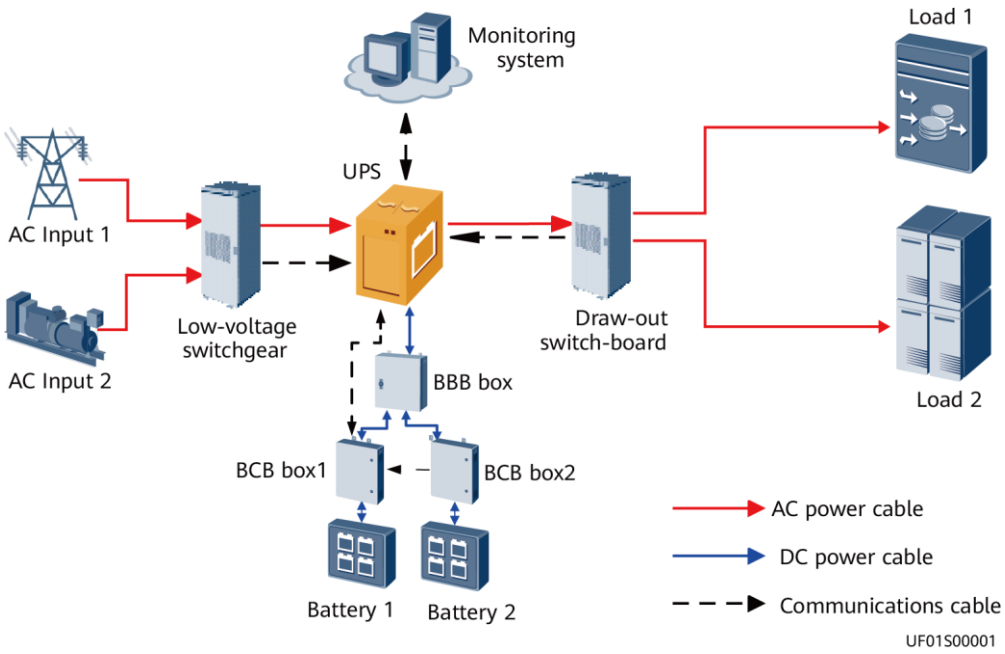


Figure 3-2 Typical application scenario of 1+1 parallel system

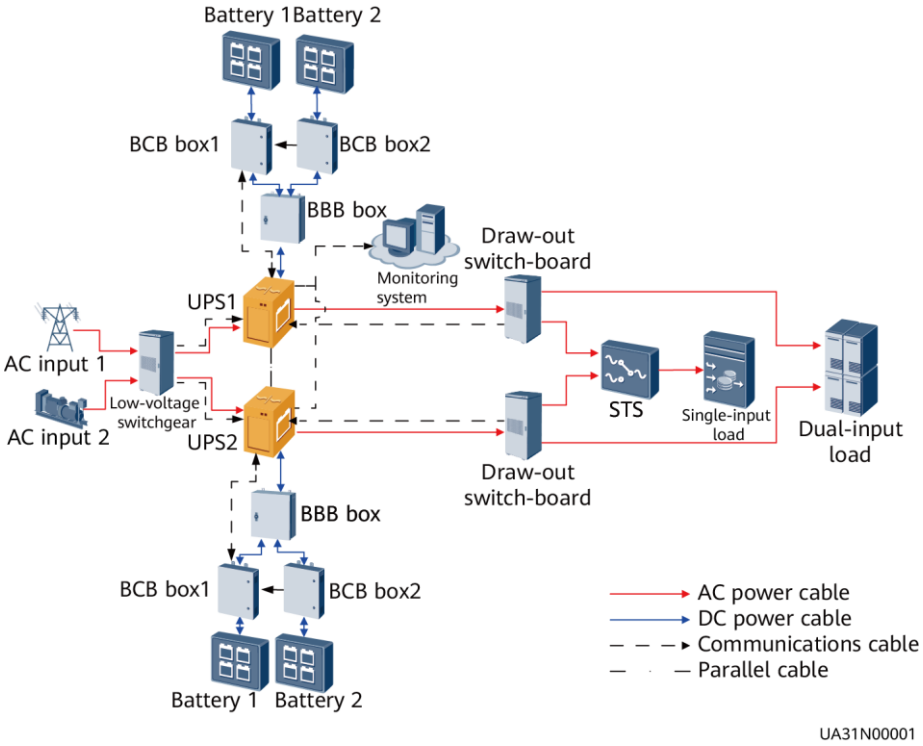
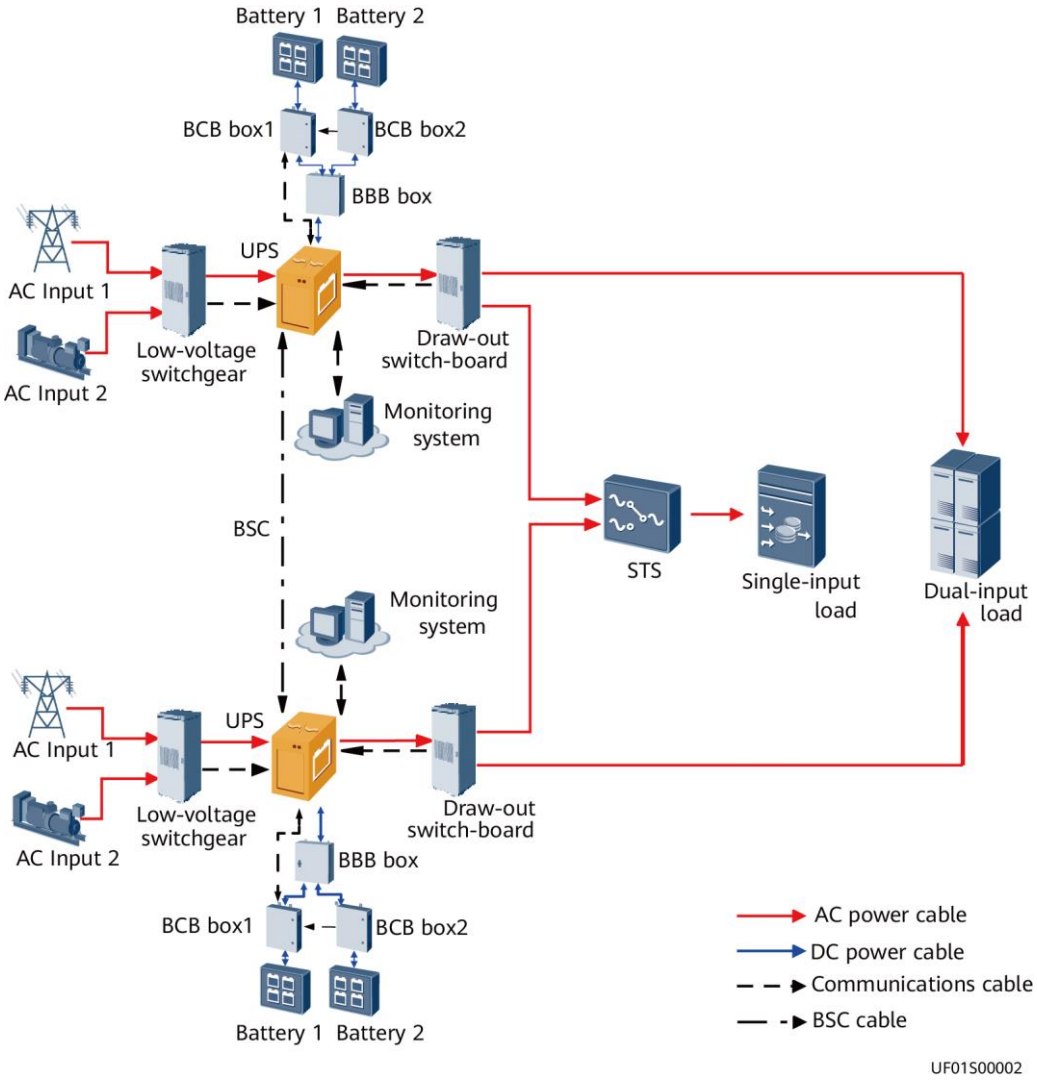


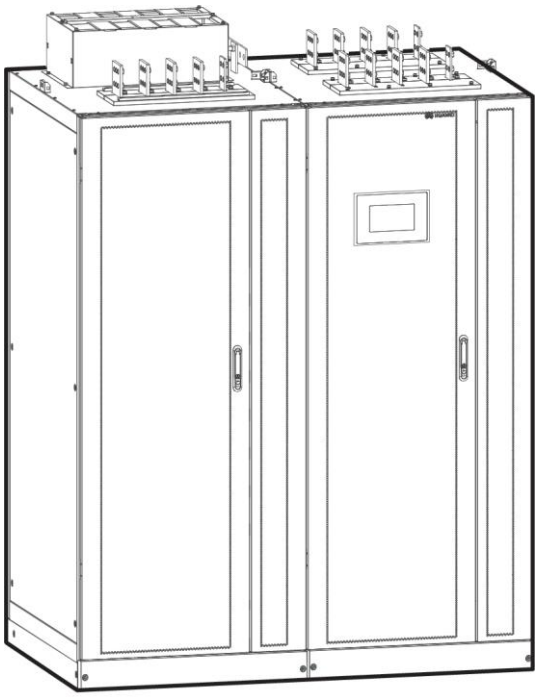
Figure 3-3 Typical application scenario of a dual-bus system



4 System Components

4.1 Appearance

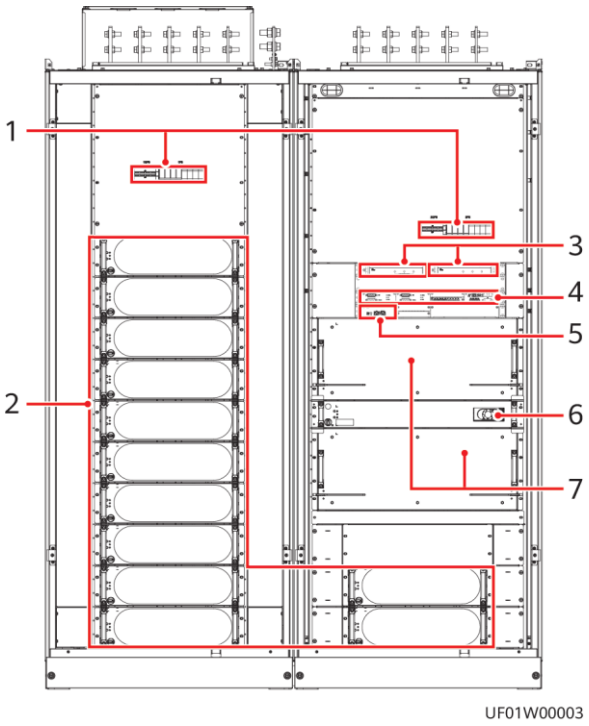
Figure 4-1 Appearance



UF01W00002

4.2 Structure

Figure 4-2 Structure with the door open



(1) Surge protective devices (SPDs) and SPD switches

(2) Power modules

(3) Surge protection boxes

(4) Control module

(5) Intelligent detection card

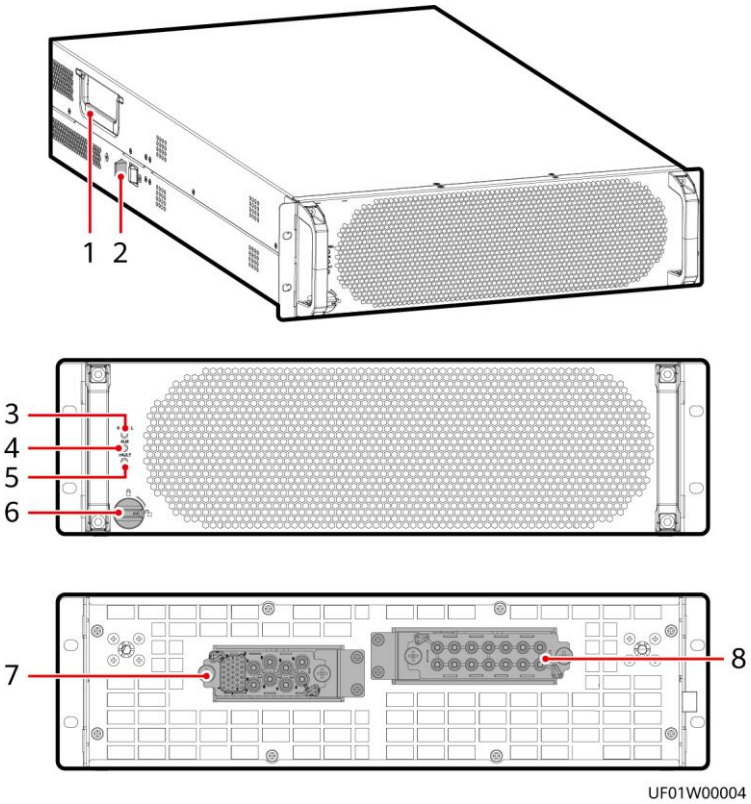
(6) Bypass control module

(7) Bypass modules

4.3 Power Module

Appearance

Figure 4-3 Power module



(1) Handle (2) Positioning lock (3) Running indicator (4) Alarm indicator

(5) Fault indicator (6) Ready switch (7) Output ports (8) Input ports

Table 4-1 Indicator description

Indicator	Color	Status	Description
Running indicator	Green	Steady on	The system is working in inverter mode.
		Blinking at long intervals	• The inverter is ready and in standby state (blinking at 0.5 Hz, on for 1s and off for 1s). • The inverter is not started (blinking at 0.2 Hz, on for 2.5s and off for 2.5s).
		Blinking at short intervals	The module is not configured, the inverter software and rectifier software are being upgraded, or the inverter software is being upgraded (blinking at 4 Hz, on for 0.125s and off

Indicator	Color	Status	Description
			for 0.125s).
		Off	The software is being upgraded.
Alarm indicator	Yellow	Steady on	A minor alarm is generated for the inverter or rectifier.
		Off	There is no minor alarm for the inverter or rectifier, or the software is being upgraded.
Fault indicator	Red	Steady on	A critical alarm is generated for the inverter or rectifier.
		Off	There is no critical alarm for the inverter or rectifier, or the software is being upgraded.

Functions

The main power module consists of a power factor correction (PFC) rectifier and inverter. It performs AC/DC or DC/DC conversion on the mains and battery inputs, and stabilizes the bus voltage. The inverter (DC/AC) converts the inputs into sine wave outputs.

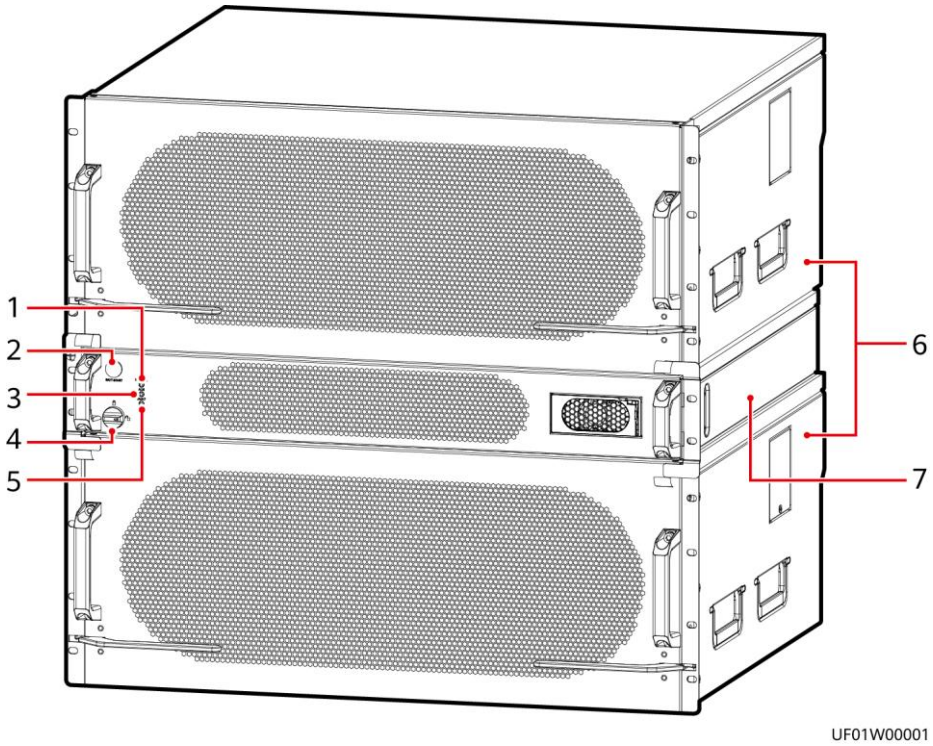
Specifications

- Dimensions (H x W x D): 130 mm x 442 mm x 750 mm
- Weight: < 55 kg
- Rated output capacity: 100 kVA/100 kW

4.4 Bypass Module

Appearance

Figure 4-4 Bypass module



(1) Running indicator	(2) Battery cold start button	(3) Alarm indicator	(4) Ready switch
(5) Fault indicator	(6) Bypass modules	(7) Bypass control module	

Table 4-2 Indicator description

Indicator	Color	Status	Description
Running indicator	Green	Steady on	The system is working in bypass mode.
		Blinking at long intervals	The bypass has no output (blinking at 0.2 Hz, on for 2.5s and off for 2.5s).
		Blinking at short intervals	The bypass is not configured or the software is being upgraded (blinking at 4 Hz, on for 0.125s and off for 0.125s).
		Off	The bypass software is being upgraded.

Indicator	Color	Status	Description
Alarm indicator	Yellow	Steady on	A minor alarm is generated for the bypass.
		Off	There is no minor alarm for the bypass, or the software is being upgraded.
Fault indicator	Red	Steady on	A critical alarm is generated for the bypass.
		Off	There is no critical alarm for the bypass, or the software is being upgraded.

Functions

The UPS works in bypass mode under the following circumstances:

The ECO mode is used and the bypass voltage is within the specified range.

The power module overload times out.

In inverter mode, both the active and standby energy control modules (ECMs) of the bypass unit are faulty.

The system runs abnormally.

The UPS is transferred to bypass mode manually.

Specifications

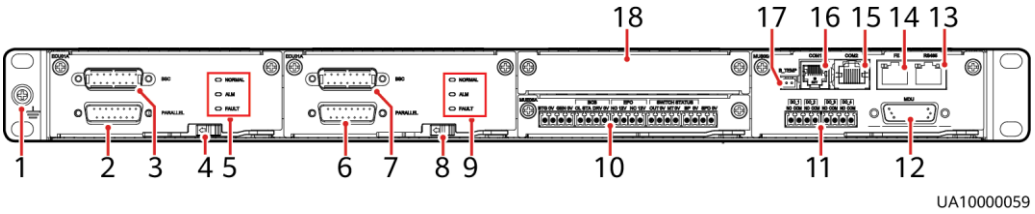
- Dimensions (H x W x D):
  - Bypass module: 263.5 mm x 642 mm x 668 mm
  - Bypass control module: 86.1 mm x 642 mm x 600 mm
- Weight:
  - Bypass module: < 90 kg
  - Bypass control module: < 16 kg

4.5 Control Module

4.5.1 Overview

The control module in a standard configuration contains two ECMs, one dry contact card, and one monitoring interface card from left to right. The four cards are hot-swappable. One subrack is reserved above the dry contact card. A backfeed protection card or dry contact extended card can be inserted into the subrack.

Figure 4-5 Signal panel of the control module



(1) Ground terminal	(2) Parallel port 1	(3) BSC port 1	(4) Ready switch on ECM 1
(5) ECM 1 indicators	(6) Parallel port 2	(7) BSC port 2	(8) Ready switch on ECM 2
(9) ECM 2 indicators	(10) Dry contact card	(11) Dry contacts	(12) MDU port
(13) RS485 port	(14) FE port	(15) COM2 port	(16) COM1 port
(17) Battery temperature sensor port	(18) Optional card subrack cover		

NOTE

Ports are protected by a security mechanism.

4.5.2 ECM

Appearance

The control module consists of one active ECM and one standby ECM.

Figure 4-6 ECM

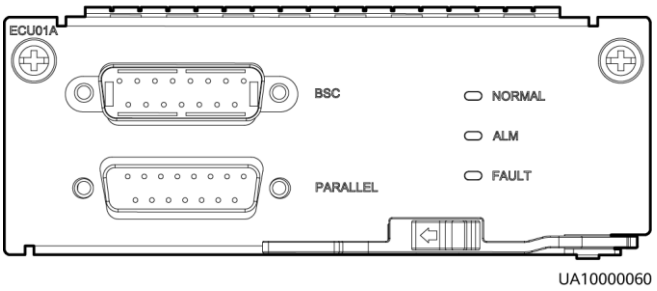


Table 4-3 ECM functions

Silk Screen	Description

Silk Screen	Description
PARALLEL	The PARALLEL port transmits parallel signals between racks.
BSC	The BSC port is used in a dual-bus system to synchronize output frequencies and phases between UPS systems, ensuring that two buses can switch with each other. BSC cables are hot-swappable.

NOTE

No parallel cable is required for a single UPS.

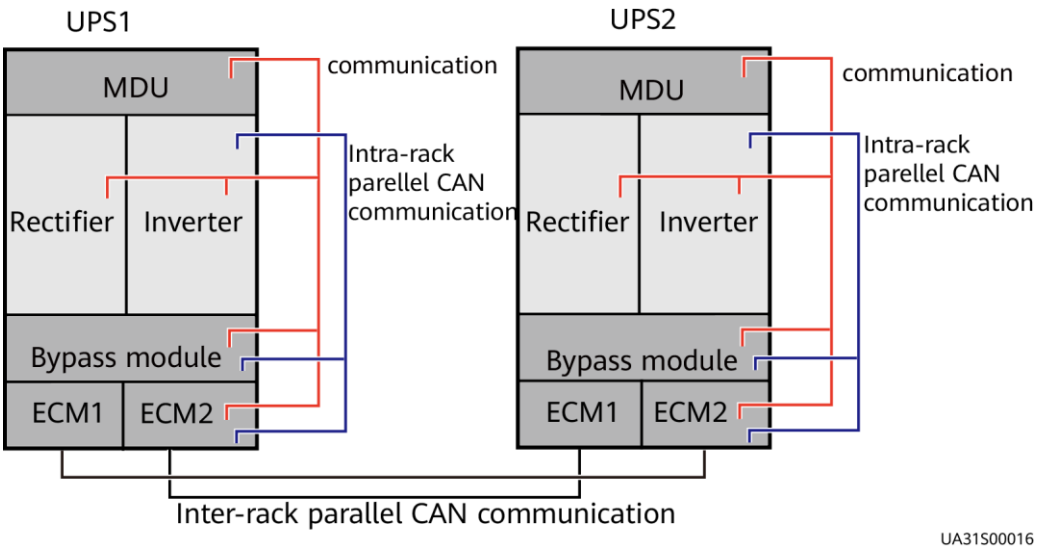
Table 4-4 Indicator description

Indicator	Color	Status	Description
NORMAL	Green	Steady on	This ECM is the active ECM.
		Blinking at 0.5 Hz	This ECM is the standby ECM and it is ready.
		Off	This ECM is not ready or the software of this ECM is being upgraded.
		Blinking at 4 Hz	The ECM software is being upgraded or not configured.
ALM	Yellow	Steady on	The ECM has a minor alarm, but it does not need to be replaced.
		Off	The ECM has no minor alarm or the software of the ECM is being upgraded.
FAULT	Red	Steady on	The ECM has a critical alarm.
		Off	The ECM has no critical alarm or the software of the ECM is being upgraded.

Functions

- As a control interface for the entire system, the ECM communicates with each module and provides a bus for communication between the dry contact card and the system control card. The ECM ensures equalized output currents between modules so that load power is equally shared.
- The ECM provides module working status information to the monitoring system.
- The ECM controls the running of a single UPS and a parallel system, and reports the UPS status information to other monitoring modules.
- The system provides three types of CAN communication: monitoring CAN communication, intra-rack parallel CAN communication, and inter-rack parallel CAN communication.

Figure 4-7 Logical connections for CAN communication



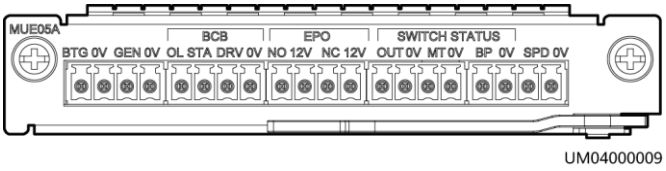
Specifications

- Hot-swappable
- 1 U high

4.5.3 Dry Contact Card

Appearance

Figure 4-8 Dry contact card



NOTICE

For dry contact outputs, the rated DC voltage and current are 24 V DC and 0.6 A and the maximum values are 30 V DC and 1.0 A. The rated AC voltage and current are 24 V AC and 0.6 A and the maximum values are 30 V AC and 1.0 A. During cable connection, ensure that the voltage and current do not exceed these maximum values.

Table 4-5 Functions of control signal ports on the dry contact card

Silk Screen	Signal Description	Status Description	Initial Status
BTG	Port for monitoring battery	• Closed: There is a	Open

Silk Screen	Signal Description	Status Description	Initial Status
	grounding failures	battery grounding failure. • Open: There is no battery grounding failure.	
0V	Port for signal ground		
GEN	Port for detecting the diesel generator (DG) mode	• Closed: DG mode • Open: non-DG mode	Open
0V	Port for signal ground		
BCB_OL	Port for monitoring the battery circuit breaker (BCB) box	• Grounded: BCB box connected • Disconnected: BCB box not connected	Grounded
BCB_STA	Port for monitoring the BCB	• Closed: The BCB is ON. • Open: The BCB is OFF.	Open
BCB_DRV	Port for controlling BCB trip. When the voltage is +12 V, the BCB trips.	• 0 V: BCB not tripped • 12 V: BCB tripped	0 V
BCB_0V	Port for signal ground		
EPO_NO	If the normally open (NO) port is connected to the EPO_12V port, emergency power-off (EPO) is triggered.	Closing the EPO port triggers EPO.	Open
EPO_12V	+12 V		
EPO_NC	If the normally closed (NC) port is disconnected from the EPO_12V port, EPO is triggered.	Opening the EPO port triggers EPO.	Closed
EPO_12V	+12 V		
SWITCH STATUS_OUT	Port for monitoring the UPS output circuit breaker	• Closed: The UPS output circuit breaker is ON. • Open: The UPS output circuit breaker is OFF.	Closed
SWITCH STATUS_0V	Port for signal ground		
SWITCH STATUS_MT	Port for monitoring the maintenance switch	• Open: The maintenance	Open

Silk Screen	Signal Description	Status Description	Initial Status
SWITCH STATUS_0V	Port for signal ground	switch is ON. • Closed: The maintenance switch is OFF.	
SWITCH STATUS_BP	Port for monitoring the bypass input circuit breaker	• Closed: The bypass input circuit breaker is ON. • Open: The bypass input circuit breaker is OFF.	Closed
SWITCH STATUS_0V	Port for signal ground		
SPD	Port for monitoring the input AC SPD	• Closed: The input AC SPD is normal. • Open: The input AC SPD fails.	Closed
0V	Port for signal ground		

NOTE

- A dry contact card port takes effect only after you set it in the software. You need to disable unused dry contact signals.
- Set the EPO port to NO or NC as required.
- If multiple UPSs are connected in parallel, connect all used dry contact signals to each UPS.
- Signal cables must be double-insulated twisted cables. If the cable length is within 25–50 m, the cross-sectional area must be 0.5–1.5 mm^2.

Functions

The dry contact card allows the UPS to detect and manage the switch status of the battery system (including the external battery switch) and implement remote EPO.

Specifications

- Hot-swappable
- 0.5 U high

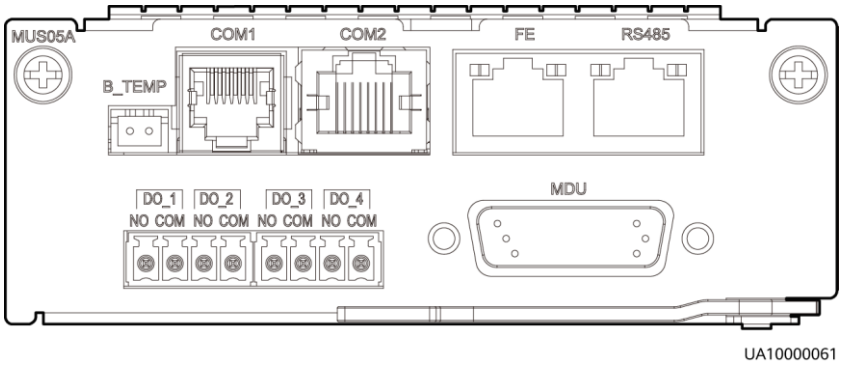
4.5.4 Monitoring Interface Card

NOTICE

- The FE port resembles the RS485 port. Therefore, follow the silk screens when you connect communications cables. If you mistake the RS485 port as the FE port during cable connection, the WebUI communication fails. If you mistake the FE port as the RS485 port during cable connection, RS485 communication fails.
- Dry contact signals take effect after you set them. Disable unused dry contact signals on the monitoring system.
- When multiple UPSs are connected in parallel, all dry contact signals to be used need to connect to each UPS.

The monitoring interface card provides external ports as well as monitoring and control functions for the MDU. The monitoring interface card provides the ambient temperature and humidity sensor port, iBattery port, FE port, battery temperature monitoring port, and network management port. The MDU monitors the UPS, allows users to set parameters, delivers commands, reports system information, and displays key UPS information and parameters on the LCD.

Figure 4-9 Monitoring interface card



NOTE

DO_1 to DO_4 meet the maximum voltage and current requirements of 30 V DC/1 A or 60 V DC/0.5 A.

Table 4-6 Description of ports on the monitoring interface card

Port	Silk Screen	Description
DO_1	NO	• DO_1, DO_2, DO_3, and DO_4 indicate alarm outputs. The default values are **Critical alarm**, **Minor alarm**, **Bypass mode**, and **Battery mode**, respectively. • The value can be set to **Disable**, **Critical alarm**, **Minor alarm**, **Bypass mode**, **Battery mode**, **Low batt. volt.**, **Low battery SOC**, **Abnormal mains**, **Sys maint breaker enable**, **Sys outp breaker enable**, **Maint. breaker closed**, **No power supplied**, **Mains supplies power**, **ECO mode**,
	COM	
DO_2	NO	
	COM	
DO_3	NO	
	COM	
DO_4	NO	

Port	Silk Screen	Description
	COM	**Battery test**, and **Batt. Volt. Below Thres.** • Configure power segment settings based on backup time.
DB26	MDU	Supports FE, RS485, I2C, CAN, and other signals.
Battery temperature sensor port	B_TEMP	Connects to an indoor battery temperature sensor.
Southbound communications port 1	COM1	• Supported protocol: Modbus-RTU • Connects to an ambient temperature and humidity sensor over two wires.
Southbound communications port 2	COM2	• Supported protocol: Modbus-RTU • Connects to a southbound device, such as an iBattery.
Network port	FE	• Supported protocols: Modbus-TCP, HTTPS, and SNMP • Connects to the network port on a PC. • Network port for connecting to the web service and for SNMP networking
Northbound communications port	RS485	• Supported protocol: Modbus-RTU • Connects to a northbound network management device or third-party network management device over two wires.

NOTE

- Signal cables must be double-insulated twisted cables. If the cable length is within 25–50 m, the cross-sectional area must be 0.5–1.5 mm^2.
- RS485 cables and FE cables must be shielded cables.

Figure 4-10 and Figure 4-11 are recommended wiring methods for DO ports.

Figure 4-10 Wiring method 1

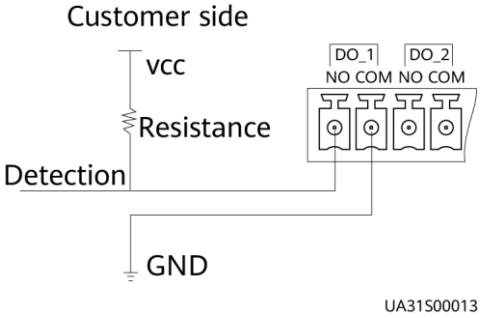


Figure 4-11 Wiring method 2

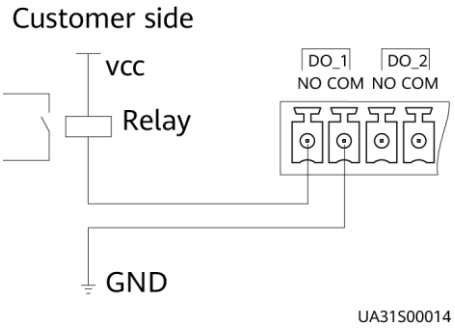


Figure 4-12 COM1 port pins

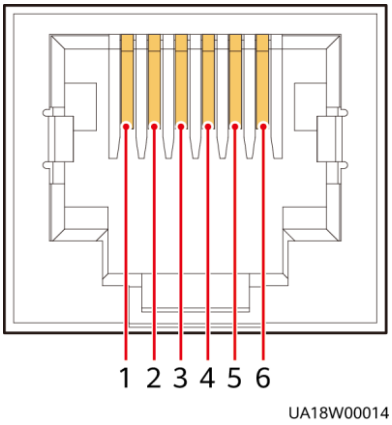


Table 4-7 Pin definitions for the COM1 port

Pin	Description
1	GND
2	-
3	RS485–
4	RS485+
5	-
6	12V_PORT

Figure 4-13 COM2 port pins

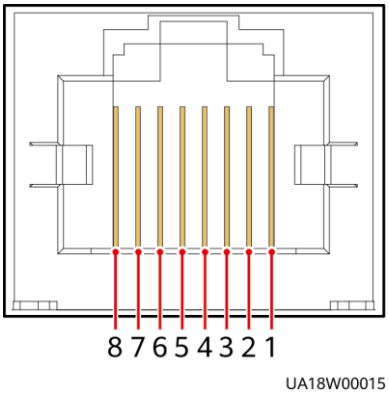


Table 4-8 Pin definitions for the COM2 port

Pin	Description
1	RS485+
2	RS485–
3	-
4	RS485+
5	RS485–
6	GND
7	CANHo
8	CANLo

Figure 4-14 RS485 port pins

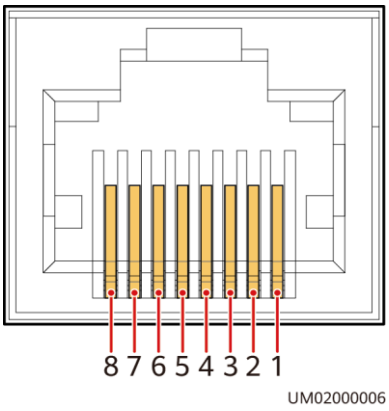


Table 4-9 Pin definitions for the RS485 port

Pin	Description
1	RS485_T+
2	RS485_T–
3	-
4	RS485_R+
5	RS485_R–
6	GND
7	-
8	-

NOTE

If cables are prepared onsite, follow the three methods below:

- Connect pin 1 and pin 2. Pin 1 connects to RS485+ and pin 2 connects to RS485–.
- Connect pin 4 and pin 5. Pin 4 connects to RS485+ and pin 5 connects to RS485–.
- Connect pins 1, 2, 4, and 5. Twist cables to pin 1 and pin 4 into one cable and then connect it to RS485+. Twist cables to pin 2 and pin 5 into one and then connect it to RS485–.

4.6 Intelligent Detection Card

Appearance

Figure 4-15 Intelligent detection card

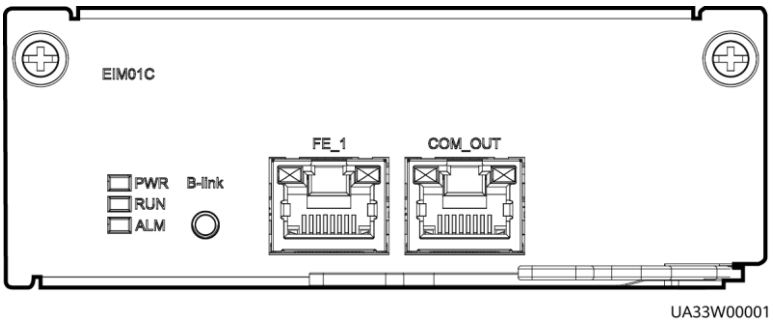


Table 4-10 Intelligent detection card function

Silk Screen	Description
FE_1	Reserved

Silk Screen	Description
COM_OUT	Reserved

Table 4-11 Indicator description

Indicator	Color	Status	Description
PWR	Green	Steady on	Indicates the CPU power status of the intelligent detection card. The indicator is steady on after the card is powered on and does not need to be controlled by the CPU.
		Off	Indicates that the intelligent detection card is powered off.
RUN	Green	Blinking at 0.5 Hz	The intelligent detection board is running properly.
		Blinking at 4 Hz	The communication is interrupted.
ALM	Red	Steady on	An alarm is generated.
		Off	No alarm is generated.

NOTE

- Signal cables must be double-insulated twisted cables. If the cable length is within 25–50 m, the cross-sectional area must be 0.5–1.5 mm^2.
- FE cables are shielded cables.

Figure 4-16 COM_OUT port pins

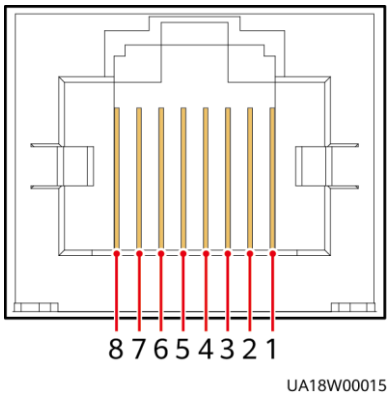


Table 4-12 Pin definitions for the COM_OUT port

Pin	Description

Pin	Description
1	RS485+
2	RS485–
3	-
4	RS485+
5	RS485–
6	-
7	CANH
8	CANL

Figure 4-17 FE_1 port pins

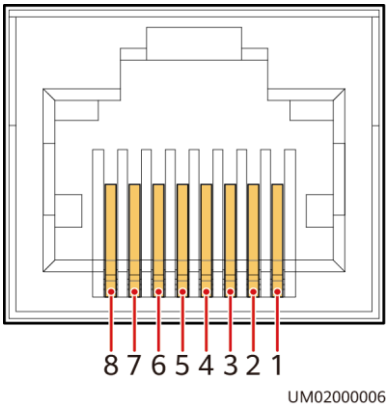


Table 4-13 Pin definitions for the FE_1 port

Pin	Description
1	FE4_TX+
2	FE4_TX-
3	FE4_RX+
4	-
5	-
6	FE4_RX-
7	-
8	-

Functions

In the integrated UPS solution, the intelligent detection card detects the temperatures of the copper bars, switches, and environments of the battery, bypass input, mains input, output, bypass input of the switch cabinet, mains input of the switch cabinet, and output of the switch cabinet, and monitors the status of the mains input, bypass input, and output switches of the switch cabinet.

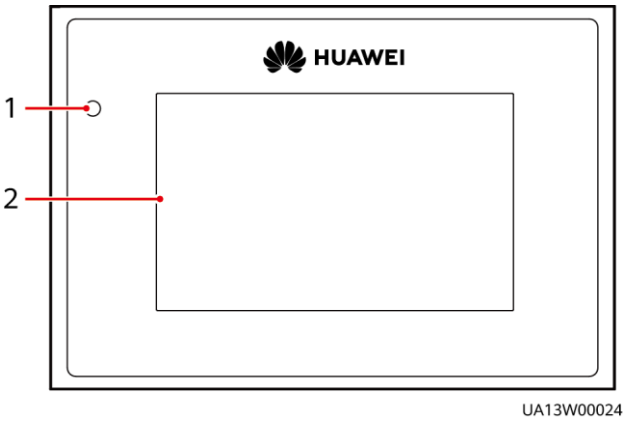
Specifications

- Hot-swappable
- 1 U high

4.7 MDU

Appearance

Figure 4-18 MDU



(1) Status indicator (2) LCD touchscreen

Table 4-14 Indicator status

Status	Color	Meaning
On	Red	A critical alarm has been generated, and the buzzer sounds continuously.
	Yellow	A minor alarm has been generated, and the buzzer buzzes intermittently at 2 Hz.
	Green	The UPS is running properly or a warning has been generated.

Status	Color	Meaning
Off	-	The MDU is powered off.

NOTE

The indicator on the MDU panel is yellow when the bypass supplies power in non-ECO mode.

Figure 4-19 MDU ports

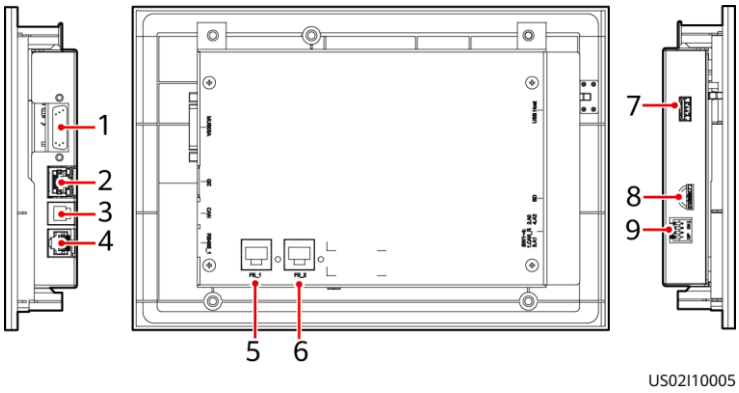


Table 4-15 MDU port description

No.	Port Name	Description
1	MUS05A (DB26)	Connects to the MDU and monitoring interface card.
2	GE	Network port
3	CAN	Reserved
4	RS485_1	Reserved
5	FE_1	Reserved
6	FE_2	Reserved
7	USB Host	• After installing the WiFi module, locally connect to the UPS over the Service Expert app. Obtain the initial startup password during deployment. View or obtain UPS running information during inspection. **NOTE** Only Huawei service engineers or authorized service engineers are allowed to use the WiFi module. To ensure security, remove the WiFi module immediately after use. • Insert a USB flash drive to import and export configuration files, export run logs, and upgrade software.

No.	Port Name	Description
8	SD	Reserved
9	DIP switch	Implements specific functions by using the DIP switch and specific buttons; controls the CAN communication build-out resistor in a parallel system.

Functions

The MDU allows you to control UPS operations, view the running status and alarms, and set parameters.

Specifications

Dimensions (H x W x D): 175 mm x 264 mm x 40 mm

5 Optional Components

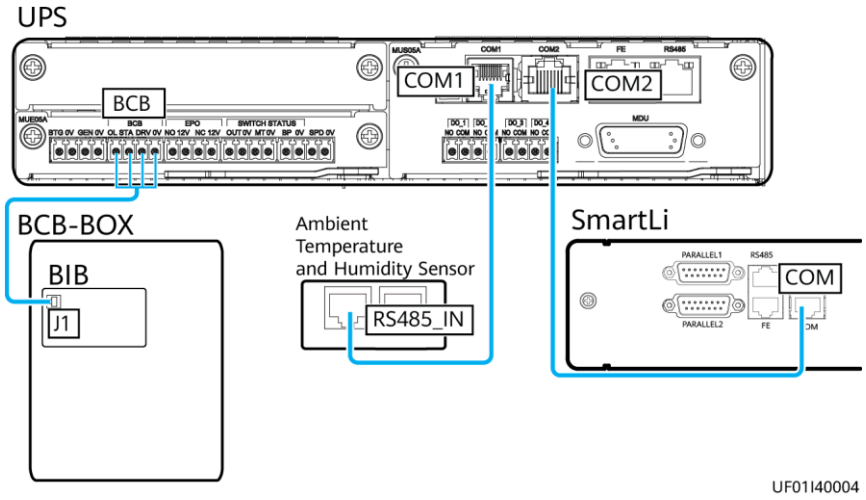
5.1 List of Optional Components

Optional Component	Model	Function
BCB-BOX	• PDU8000-0400DCV8-BXA001 • PDU8000-0630DCV8-BXA001 • PDU8000-0800DCV8-BXA001	Controls the connection between battery strings and the UPS, and supports overload protection, short circuit protection, and remote trip control.
Dry contact extended card	-	Provides extended monitoring ports: five relay output ports and five input ports.
Backfeed protection card	-	Detects mains and bypass backfeed and provides protection.
ECM extended subrack	-	Installed when the UPS is equipped with a backfeed protection card and dry contact extended card.
Ambient temperature and humidity sensor	-	Monitors ambient temperature and humidity.
BSC cable	5 m/10 m/15 m/60 m	Transmits bus synchronization signals in a dual-bus system.
Parallel cable	5 m/10 m/15 m	Connects UPSs in parallel.
Top air-flow cabinet	-	Applies to the top airflow scenario.

NOTE

The ECM extended subrack does not support onsite installation. If you require this optional component, inform Huawei when you purchase the UPS so that Huawei can install the subrack before delivery.

Figure 5-1 Signal cable connections for optional components

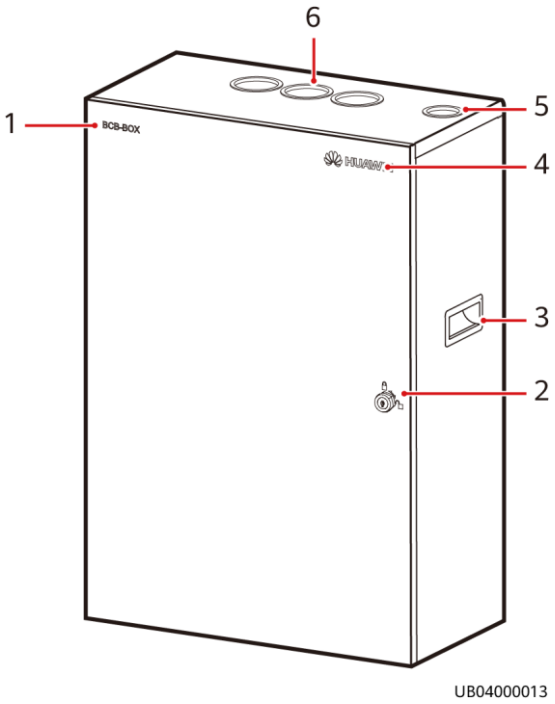


5.2 BCB box

Appearance

Figure 5-2 shows the BCB box PDU8000-0400DCV8-BXA001.

Figure 5-2 BCB box



(1) Silk screen (2) Lock (3) Handle

(4) Huawei logo (4) Signal cable outlet (5) Power cable outlet

Functions

The BCB box controls the connection between battery strings and the UPS and provides overload protection, short-circuit protection, and remote trip control.

Specifications

Table 5-1 lists the technical specifications of the BCB box.

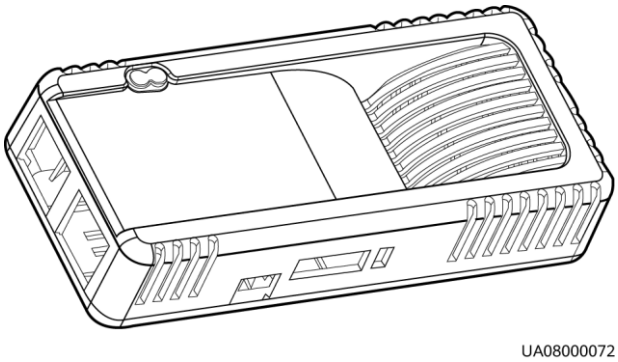
Table 5-1 Technical specifications of the BCB box

Item	PDU8000-0400DCV8-BXA001	PDU8000-0630DCV8-BXA001	PDU8000-0800DCV8-BXA001
Rated current (A)	400	630	800
Rated voltage (V DC)	750	750	750
Breaking capacity (kA)	16	20	36
IP level	20	20	20

5.3 Ambient Temperature and Humidity Sensor

Appearance

Figure 5-3 T/H sensor

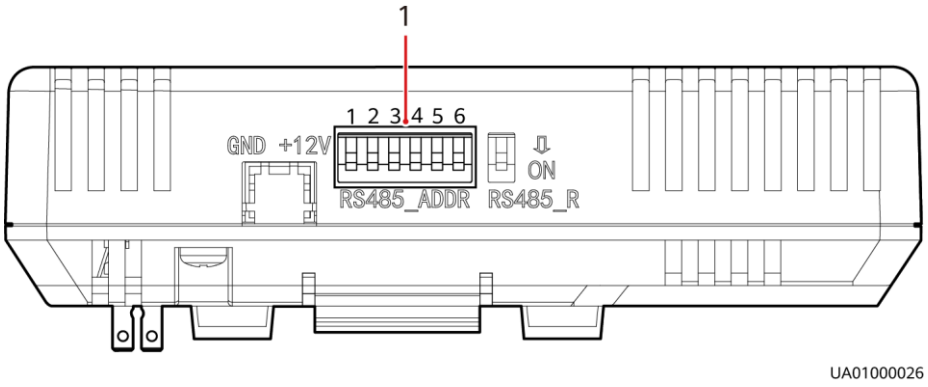


Functions

The ambient temperature and humidity sensor monitors the ambient temperature and humidity in the equipment room to ensure that the equipment works properly. The T/H sensor can be used as a battery temperature sensor.

Before using the T/H sensor, set the dual in-line package (DIP) switch on it. Each T/H sensor has a unique DIP switch address, ranging from 32 to 44. A DIP switch has six binary toggle switches. The leftmost bit is the most significant bit, and the rightmost bit is the least significant bit. Bit 1 indicates ON, and bit 0 indicates OFF.

Figure 5-4 DIP switch on the T/H sensor



(1) DIP switch

Table 5-2 DIP switch address mapping

Toggle Switch	32	33	34	35	36	37	38	39	40	41	42	43	44
1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	1	1	1	1	1
4	0	0	0	0	1	1	1	1	0	0	0	0	1
5	0	0	1	1	0	0	1	1	0	0	1	1	0
6	0	1	0	1	0	1	0	1	0	1	0	1	0

When the address ranges from 16 to 28, the ambient temperature and humidity sensor is used as a battery temperature sensor.

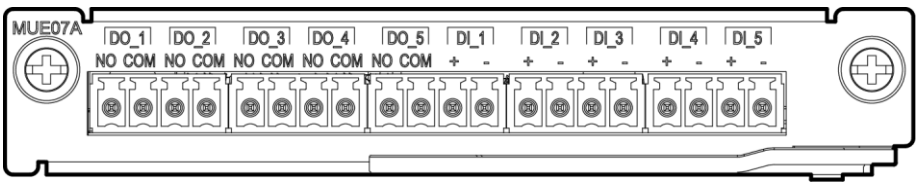
Table 5-3 DIP switch address mapping (battery temperature sensor)

Toggle Switch	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0	1	0	1	0	1	0	1	0	1	0	1	0
2	0	0	1	1	0	0	1	1	0	0	1	1	0
3	0	0	0	0	1	1	1	1	0	0	0	0	1
4	0	0	0	0	0	0	0	0	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1
6	0	0	0	0	0	0	0	0	0	0	0	0	0

5.4 Dry Contact Extended Card

Appearance

Figure 5-5 Dry contact extended card



Function

The dry contact extended card provides five relay dry contact outputs and five signal input ports. It implements abundant alarm and control functions to meet customer requirements.

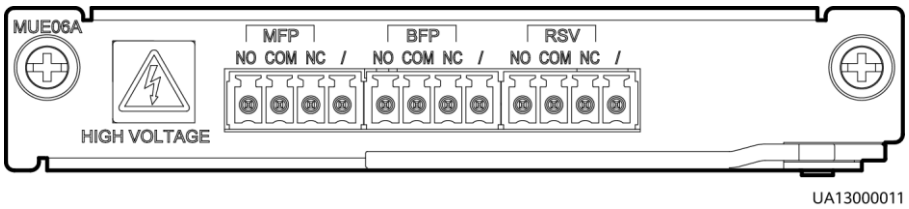
Specifications

- A maximum of one dry contact extended cards can be inserted into the ECM subrack.
- The dry contact extended card is hot-swappable.

5.5 Backfeed Protection Card

Appearance

Figure 5-6 Backfeed protection card



Functions

When a backfeed occurs, the backfeed protection card sends signals to trigger alarm signals or quickly disconnects the feedback loop.

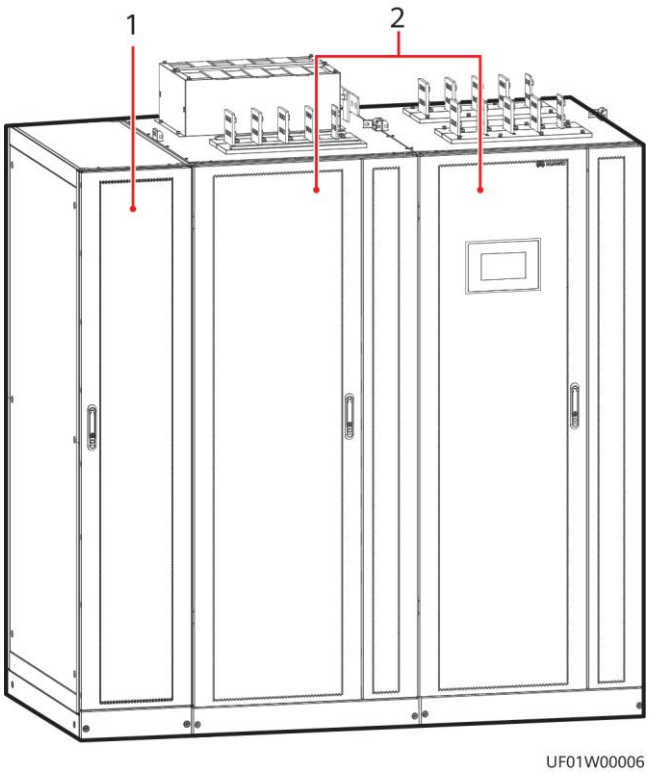
Specifications

The backfeed protection card is hot-swappable.

5.6 Top Air-Flow Cabinet

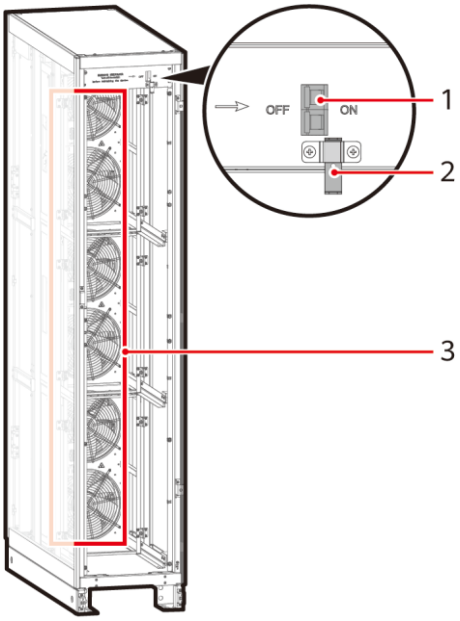
Appearance

Figure 5-7 UPS + top air-flow cabinet



(1) Top air-flow cabinet (2) UPS

Figure 5-8 Top air-flow cabinet



(1) Fan power switch (2) Cover stopper (3) Fans

Function

Applies to the top airflow scenario.

Specifications

Dimensions (H x W x D): 2200 mm x 400 mm x 1000 mm

6 Technical Specifications

Table 6-1 Physical specifications

Item	Specifications
Cabling mode	Battery cables are routed in and out from the top, and input and output cables are connected using the busway.
IP rating	IP20
Communication	Supports dry contacts, RS485 ports, and FE ports. Supports SNMP and Modbus.
Dimensions (H x W x D)	2200 mm x 1600 mm x 1000 mm
Weight	1497 kg

Table 6-2 Environmental specifications

Item	Specifications
Operating temperature	0°C to 55°C Temperature derating coefficient: not derated at 0°C–40°C, derated to 0.9 at 41°C–45°C, derated to 0.8 at 46°C–50°C, and derated to 0.7 at 51°C–55°C
Storage temperature	–40°C to +70°C
Relative humidity	0%–95% RH (non-condensing)
Altitude	0–1000 m When the altitude is greater than 1000 m, the power is derated as described in IEC 62040-3. The upper limit of the altitude is 4000 m.

Table 6-3 Safety compliance

Safety Certification	Standard
CE	EN 62040-1:2013
CB	IEC 62040-1:2013
TUV	EN 62040-1:2013
CQC	CQC 3108-2011
CCC	GB 7260.1-2008
TLC	YD/T 2165-2017

Table 6-4 EMC

EMC Test Item	Standard
Conducted emission	EN/IEC 62040-2
Radiated emission	EN/IEC 62040-2
Low-frequency signal interference	IEC 61000-2-2
ESD immunity	IEC 61000-4-2
Conducted susceptibility	EN/IEC 62040-2 EN/IEC 61000-4-6
Radiated susceptibility	EN/IEC 62040-2 EN/IEC 61000-4-3
Electrical fast transient	EN/IEC 62040-2 IEC 61000-4-4
Surge	EN/IEC 62040-2 IEC 61000-4-5
Voltage dips and short interruptions (220 V AC)	IEC 61000-4-11
Power frequency magnetic field	IEC 61000-4-8

Table 6-5 Mains input electrical specifications

Item	Specifications
Power system	Three-phase four-wire + PE
Rated voltage	380 V AC/400 V AC/415 V AC (line voltage)

Item	Specifications
Voltage range	0–30°C: not derated at 323–485 V AC, derated from 100% load to 45% load at 323–191 V AC, and derated from 45% load to 35% load at 191–138 V AC 30–40°C: not derated at 342–485 V AC, derated from 100% load to 45% load at 342–191 V AC, and derated from 45% load to 35% load at 191–138 V AC
Rated frequency	50 Hz/60 Hz
Frequency range	40–70 Hz
Power factor	• > 0.99 (100% load) • > 0.98 (50% load) • > 0.94 (30% load)
Harmonic current	• THDi < 9% (30% linear load), THDi < 6% (50% linear load), THDi < 3% (100% linear load) • THDi < 11% (30% non-linear load), THDi < 8% (50% non-linear load), THDi < 5% (100% non-linear load)

Table 6-6 Bypass input electrical specifications

Item	Specifications
Power system	Three-phase four-wire + PE
Rated voltage	380 V AC/400 V AC/415 V AC (line voltage)
Rated frequency	50 Hz/60 Hz
Frequency range	50 Hz/60 Hz±6 Hz (adjustable with a tolerance of 0.5–6 Hz, ±2 Hz by default)
Input mode	The mains input and bypass input share a power source (by default) or use different power sources.

Table 6-7 Battery electrical specifications

Item	Specifications
Battery voltage (VRLA battery)	360–600 V DC 12 V batteries (30–50 batteries optional, 0 by default; set based on site requirements) 2 V batteries (180–300 batteries optional, 0 by default; set based on site requirements)
Battery cold start	If a mains outage occurs, batteries can start the UPS to

Item	Specifications
	supply power to loads.
Charger output power	Under rated conditions, the maximum charge power of a module is 15 kW, and the charge current is limited to 30 A.
Battery string sharing (VRLA battery)	Supported in a parallel system
Charging voltage (VRLA battery)	• Equalized charging voltage: 2.35 V/cell • Float charging voltage: 2.25 V/cell
Battery type	• VRLA • SmartLi

NOTICE

The UPS supports the SmartLi. For details about the parameters, see the *SmartLi User Manual*.

Table 6-8 Output electrical specifications

Item	Specifications
Power system	Three-phase four-wire + PE
Voltage	380 V AC/400 V AC/415 V AC (line voltage)
Frequency	• In normal mode, the frequency is synchronous with the bypass input frequency. • In battery mode, the frequency is 50 Hz/60 Hz with a tolerance of ±0.05%.
Voltage distortion	• THD < 1% (linear load) • THD < 3% (non-linear load)
Power factor	1
Transfer time (normal)	• Uninterruptible transfer: 0 ms • Interruptible transfer: < 5 ms
Output voltage imbalance	Voltage imbalance: ±3% Phase imbalance: 120±1° (balanced load), 120±2° (unbalanced load)
Overload capability	Inverter overload capability: • 100% < load ≤ 110%: The UPS transfers to bypass mode after 60 minutes or longer. • 110% < load ≤ 125%: The UPS transfers to bypass mode after 10 minutes or longer.

Item	Specifications
	• 125% < load ≤ 150%: The UPS transfers to bypass mode after 1 minute or longer. • When the load is greater than 150% or a short circuit occurs, the UPS transfers to bypass mode after 200 ms or longer. Bypass overload capability: • The UPS runs continuously at 135% load at 30°C; the UPS generates only alarms and uses overtemperature protection at 135–150% load at 30°C. • The UPS runs continuously at 125% load at 40°C; the UPS generates only alarms and uses overtemperature protection at 125–150% load at 40°C. • The UPS runs for 5 minutes at bypass single-phase or three-phase load of 150%–200% at 40°C; the UPS runs for 1 minute at bypass single-phase or three-phase load greater than 200% at 40°C. • The UPS runs for 100 ms when the load exceeds 1000%.

Table 6-9 System electrical specifications

Item	Specifications
Parallel system reliability	Redundant parallel signals
ECO in a parallel system	Supported
Number of parallel UPSs	2
Power distribution system	TN, TN-C, TN-CS, TT

