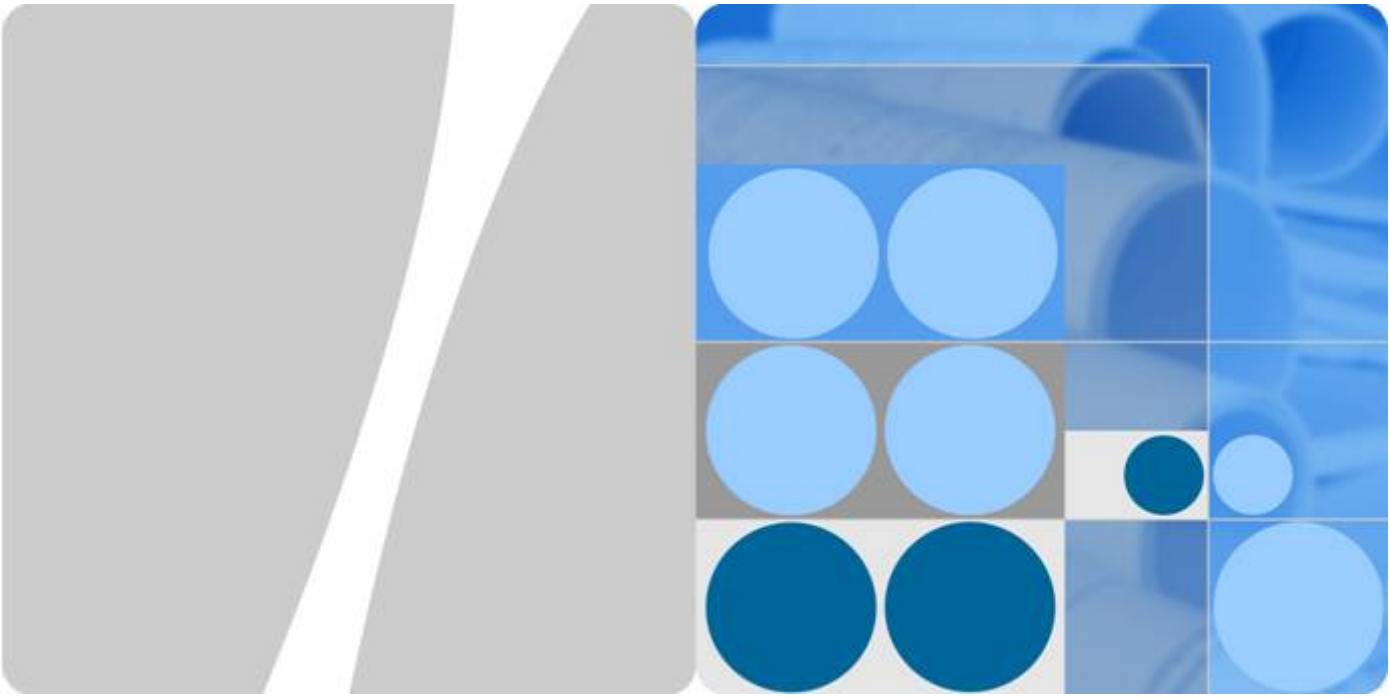

UA5000 Universal Access Unit

V100R019C02

Environment Monitoring

Issue 01

Date 2011-07-30

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About This Document

Intended Audience

This document describes the environment monitoring functions of the indoor and outdoor cabinets.

This document is intended for:

- Network planning engineer
- Hardware installation engineer
- Installation and commissioning engineer
- Field maintenance engineer
- Data configuration engineer
- System maintenance engineer

Symbol Conventions

The following symbols may be found in this document. They 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 or low level of risk which, if not avoided, could result in minor or moderate injury.
 CAUTION	Indicates a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
 TIP	Indicates a tip that may help you solve a problem or save your time.
 NOTE	Provides additional information to emphasize or supplement important points of the main text.

Update History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

Updates in Issue 01 (2011-07-30)

Compared with issue 02 (2011-03-25)of V100R019C01,the document is updated as follows:

The following information is added: **6 ESCM Monitoring Solution(for F02AF Cabinet)**

Contents

1 Environment Monitoring Principles

About This Chapter

The environment monitoring parameters are reported to the control system through the monitoring serial port.

In general, environment monitoring involves monitoring of the environment parameters and the power supply.

- Environment parameters monitoring means monitoring of the environment parameters, the abnormality of which may cause failure or damage to the device. The monitoring parameters include temperature, humidity, water, smoke, MDF, and door status sensor.
- Power monitoring means monitoring of the power supply system, including the mains input, DC PDU, rectifier unit, and battery.

NOTE

One control unit (a control unit consists of one or two control boards) does not support two EMUs.

1.1 Basic Concept

This topic describes the environment monitoring related to the subnode, analog parameter and digital parameter concepts.

Subnode

Environment monitoring is implemented in the node to subnode communication mode. In this mode, a lower device (subnode device) must have a unique ID. Otherwise, in the P2P or multipoint-to-multipoint (MP2MP) communication mode, the communication is confusing. The unique ID of a lower device is called a subnode ID (or a subnode address), which is determined by the hardware (similar to the MAC address of the network adapter). In general, the monitoring board of the lower device provides DIP switches for adjusting the subnode ID.

Make sure that the subnode IDs of all the lower devices corresponding to an upper device are different from each other. Otherwise, the upper device fails to communicate with the lower devices.

Analog Parameter

An analog parameter is a consecutive parameter, such as the temperature, voltage, and current. The analog monitoring port is usually connected to an analog sensor to monitor analog parameters in real time.

The analog sensor has the following attributes:

- Upper and lower alarm thresholds: used to determine whether an alarm for an analog parameter is generated. The analog parameter is in the normal state only when it meets the following criteria:

  Lower alarm threshold±Δ ⩽ Current value ⩽ Upper alarm threshold±Δ

  Here, Δ indicates the hardware tolerance.
- Upper and lower measurement thresholds: indicate that each sensor has its measurement range. The measurement ranges of certain sensors are adjustable. The measurement results vary with the measurement range. The upper and lower alarm thresholds must be within the measurement range.
- Sensor type: Generally, sensors are categorized as current sensors and voltage sensors. This parameter is mandatory when you configure the analog parameters.
- Unit: It is defined based on the object detected by the sensor and the actual precision of the sensor.
- Current value and current status: The analog sensors can report the monitored values of various analog parameters in real time, and display the analog parameter status (overhigh, overlow, or normal).

For the EMU, the analog parameter includes the built-in analog parameter and the extended analog parameter.

- Generally, the built-in analog parameter is fixed. Except the upper and lower alarm thresholds, users cannot modify other built-in analog parameters.
- The extended analog parameters can be modified, and users can configure the analog sensors as required.

Digital Parameter

Compared with an analog parameter, a digital parameter is a discrete value to indicate the status. A digital sensor has only two values: normal or faulty. A digital sensor detects the status by comparing the high level with the low level.

If the level of the digit equals to the valid level, the digit sensor does not report any alarm. Otherwise, an alarm is generated.

For the EMU, the digital parameter includes the built-in digital parameter and the extended digital parameter.

- Generally, the built-in digital parameter is fixed. Except the valid level, users cannot modify other built-in digital parameters.
- The extended digital parameters can be modified, and users can configure digital sensors as required.

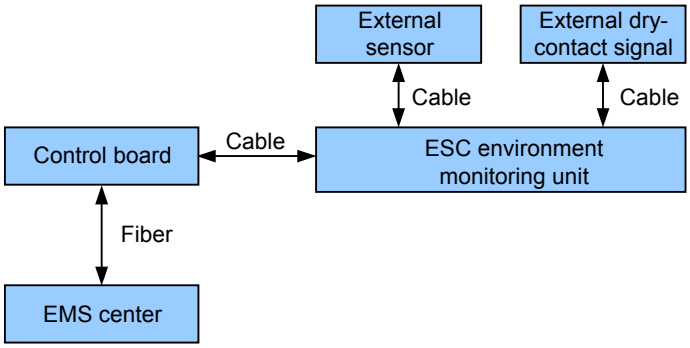
1.2 Environment Monitoring Principle (ESC)

The ESC processes the environment information from relevant sensors to monitor the environment parameters including indoor temperature and humidity, door status, water, and smoke. The ESC communicates with the control board through the serial port, and reports the data to the control board.

Environment monitoring is implemented as follows: The EMU and the control system are connected through a serial port cable and they communicate with each other through the node to subnode protocol (P2MP, RS485) or point-to-point (P2P, RS232) communication protocol. In this way, users can monitor the environment status of the EMU directly on the EMS center.

Figure 1-1 shows the environment monitoring principles when the ESC functions as the EMU.

Figure 1-1 Environment monitoring principles



NOTE

- The ESC collects the monitoring analog and digital parameters and external dry contact signals from external sensors.
- The ESC processes the collected monitoring parameters and then reports the parameters to the control system.
- The network management center (EMS center) can monitor alarms remotely.
- Dry contact signals refer to passive digital signals.

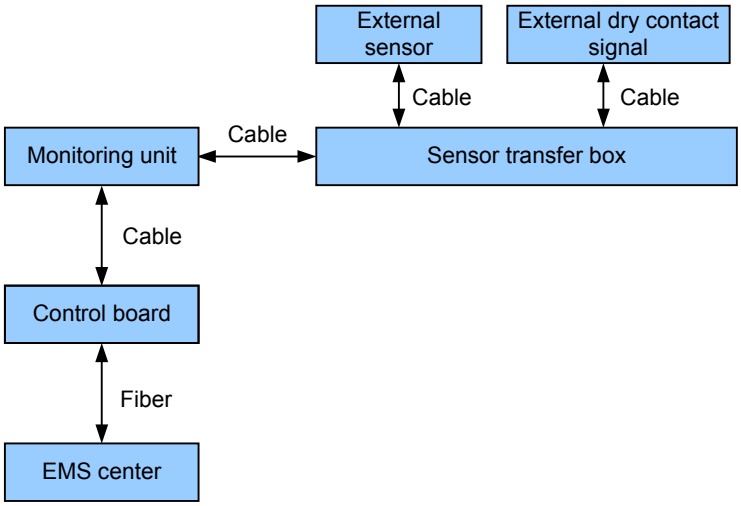
1.3 Environment Monitoring Principle (Power System +Sensor Transfer Box)

The sensor transfer box collects the environment information from relevant sensors and forwards the information to the monitoring module of the power system. The monitoring module of the power system then processes the environment information and reports the information to the control system. With the sensor transfer box, the monitoring function is extended.

Environment monitoring is implemented as follows: The EMU and the control system are connected using a serial port cable and they communicate with each other through the master-slave communication protocol or P2P communication protocol. In this way, users can monitor the environment status of the device on the EMS center.

Figure 1-2 shows the environment monitoring principle.

Figure 1-2 Environment monitoring principle



NOTE

- The sensor transfer box collects the monitored analog and digital parameters and external dry contact signals from external sensors.
- The EMU reports the monitored parameters collected by the sensor transfer box to the control system.
- The network management center (EMS center) can monitor alarms remotely.
- Dry contact signals refer to passive digital signals.

2 Environment Monitoring Application

This topic describes the environment monitoring applications in different cabinets.

Table 2-1 lists the environment monitoring applications in different cabinets.

Table 2-1 Environment monitoring applications in different cabinets

Monitoring Solution	Cabinet Type	Typical Configuration
H303ESC	F02A(DC-powered)	Two HABA shelves
H304ESC	F02AF (DC-powered)	Two HABD shelves+two HABF shelves
ESCM	M200 (DC-powered)	One HABM shelf
2ESCM	F02AF (DC-powered)	Two HABD shelves+two HABF shelves
EPS75-4815AF+PMIB01	F02A (AC-powered)	One HABA shelf
	F01D200	One HABD shelf
	F01D500	One HABD shelf+one HABF shelf
	F01D1000	Two HABD shelves+one HABF shelf
EPS75-4815AF+PMIB02	F02AF (AC-powered)	One HABD shelf+one HABF shelf
EPS30-4815AF+PMIB01	M200 (AC-powered)	One HABM shelf
	F01E200	One HABL/HABM shelf
	F01E400	One HABD shelf

3 H303ESC Monitoring Solution

About This Chapter

In the H303ESC monitoring solution, the H303ESC monitoring board in the EMU converts the monitored parameters and reports them to the control system.

3.1 H303ESC EMU

This topic describes the function and front panel of the H303ESC environment monitoring unit (EMU), and provides the specifications of the H303ESC EMU.

Function

The H303ESC EMU monitors the environment parameters (smoke, water, door-status, MDF, temperature, and humidity) of the entire device, and provides extended monitoring ports.

Front Panel

Figure 3-1 shows the front panel of the H303ESC EMU.

Figure 3-1 Front panel of the H303ESC EMU

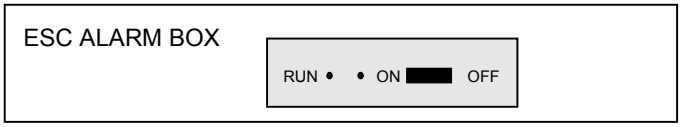
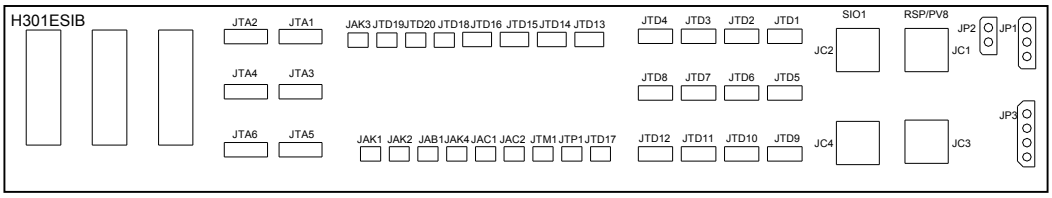


Figure 3-2 shows the rear panel of the H303ESC EMU.

Figure 3-2 Rear panel of the H303ESC EMU



Front Panel Description

The front panel of the H303ESC EMU has one running status LED and one buzzer switch.

Table 3-1 describes the running status LED.

Table 3-1 Running status LED

Item	Status	Description
RUN	On for 1s and off for 1s repeatedly	The EMU works in the normal state
	0.5s on and 0.5s off repeatedly	The EMU is faulty

Table 3-2 describes the buzzer switch.

Table 3-2 Buzzer switch

Item	Status	Description
Buzzer switch	ON	The communication between the monitoring unit and the host is normal
	OFF	The communication between the monitoring unit and the host is faulty

Terminal Block

Table 3-3 describes the terminal blocks of the H303ESC EMU.

Table 3-3 Terminal blocks of the H303ESC EMU

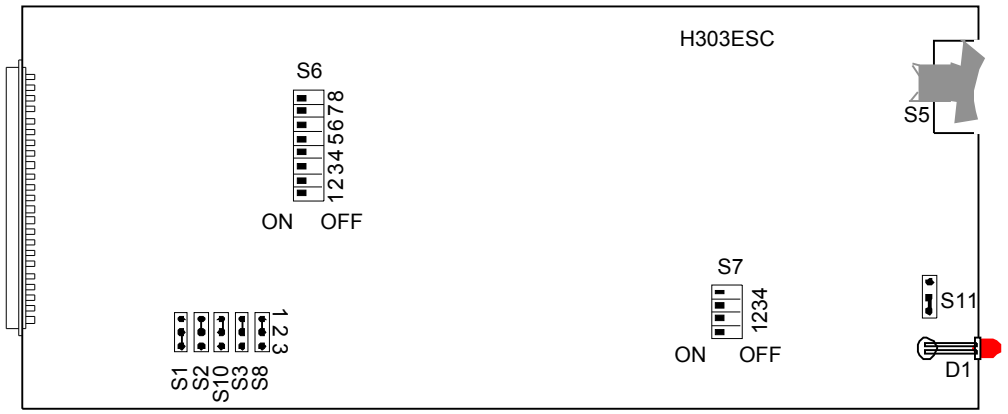
Silk Screen	Function	Remarks
JTD1-JTD16	Socket for the standby Boolean value input	● Used to monitor the PDU status, fan tray status, and other Boolean values ● Connected to the monitored devices according to the application scenarios
JTD17-JTD20	Socket for the -48 V detection signal input	Connected to the detected -48 V power
JAC1	Socket for the first optical coupling control output	Connected to the port on the controlled device
JAC2	Relay output (reserved)	Unavailable
JAK1 and JAK2	Socket for the external alarm device	Connected to the alarm components, such as the row and column alarm LEDs
JAK4	Socket for the dry contact output	Connected to the port on the controlled device
JTM1	Socket for the door-status sensor	Connected to the door-status sensor
JAB1	Socket for the buzzer	Connected to the buzzer on the cabinet
JTP1	Socket for the MDF sensor	Connected to the alarm unit on the MDF

Silk Screen	Function	Remarks
JTA1-JTA3	Socket for the standby analog signal output/input	● Connected to the external sensor, and outputting the 4-20 mA current or the 0-5 V voltage ● Selecting the type of the accessed signals through the DIP switches
JTA4-JTA6	Socket for the standby analog signal output/input	● Connected to the external sensor, and outputs the 4-20 mA current or the 0-5 V voltage ● Connected to the analog sensors
FAN	Socket for fan control	Connected to the power port on the controlled fan
BGND, -48 V	Power input	Connected to the DC busbar
GND	Communication ground	Connected to the working ground of the control board
RSP/PV8	Communicating with the upper-layer device through the active communication port in the RS-232 mode	● RJ-45 port ● Connected to the communication port on the active control board
SIO2	Communicating with the upper-layer device through the active communication port in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the communication port on the standby control board
SIO1	Communicating with the power supply device through the active communication port in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the supported primary power supply device
SIO3	Transparent transmission port; working in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the device that requires transparent transmission

Jumper and DIP Switch

The H303ESC board resides in the right of the EMU and provides two DIP switches: S6 and S7, and six jumpers: S1, S2, S3, S8, S10, and S11, as shown in **Figure 3-3**.

Figure 3-3 Layout of the H303ESC DIP switches



DIP switch S6 is used to set the type of external analog sensor. **Table 3-4** describes the meanings and settings of S6.

Table 3-4 Meanings and settings of H303ESC S6

DIP Switch	Setting	Meaning	Default Setting
S6-1 to S6-6	ON	The external analog sensor is of the current type	ON
	OFF	The external analog sensor is of the voltage type	
S6-7 to S6-8	Reserved	Unavailable	-

DIP switch S7 is used to set the reporting mode and ratio. **Table 3-5** describes the meanings and settings of S7.

Table 3-5 Meanings and settings of H303ESC S7

DIP Switch	Setting	Meaning	Default Setting
S7-1	ON	The H303ESC board is used in the access network	ON
	OFF	The H303ESC board is used in the exchange	
S7-2	ON	The H303ESC board uses one serial port for reporting	ON
	OFF	The H303ESC board uses two serial ports for reporting	
S7-3	Reserved	Unavailable	ON

DIP Switch	Setting	Meaning	Default Setting
S7-4	ON	The reporting rate of the serial port is 19200 bit/s	ON
	OFF	The reporting rate of the serial port is 9600 bit/s	

Jumpers S1, S2, S3, S8, and S10 are used to set the type of the serial port, and their settings are described in **Table 3-6**.

Table 3-6 Settings of H303ESC S1, S2, S3, S8, and S11

Jumper	Setting	Meaning	Default Setting
S1	Pins 1-2 connected	The serial port SIO1 is an RS-232 port	Pins 2-3 connected
	Pins 2-3 connected	The serial port SIO1 is an RS-422 port	
S2	Pins 1-2 connected	The serial port SIO2 is an RS-232 port	Pins 2-3 connected
	Pins 2-3 connected	The serial port SIO2 is an RS-422 port	
S3, S8, S10	Pins 1-2 of S3, S8, and S10 connected	The serial port SIO3 is an RS-232 port	Pins 1-2 of all jumpers connected
	Pins 2-3 of S3 connected; pins 1-2 of S8 and S10 connected	The serial port SIO3 is an RS-422 port	
	Pins 2-3 of S8 and S10 connected, S3 connected in any way	The serial port SIO3 is an RS-485 port	

S11 is used to set whether the running status LED on the front panel is valid, and the settings are as described in **Table 3-7**.

Table 3-7 Settings of H303ESC S11

Jumper	Setting	Meaning	Default Setting
S11	Pins 1-2 connected	The running status LED is valid	Pins 1-2 connected

Jumper	Setting	Meaning	Default Setting
	Pins 2-3 connected	The running status LED is invalid	

Dimensions

The dimensions of the H303ESC EMU are 436 mm (W) x 296.7 mm (D) x 86.1 mm (H).

3.2 Checking Environment Monitoring Cables

The sensors detect various monitoring parameters and send them to the EMU for processing. The H303ESC board converts the monitoring parameters of the sensors and sends them to the control system. Therefore, make sure that the connection from H303ESC board to the control system is correct.

Figure 3-4 shows the connections of environment monitoring cables in the F02A cabinet configured with the J1-type PDU. **Table 3-8** describes the cable connections. By referring to the connection diagram, check whether the connections from each sensor to the H303ESC board and from the H303ESC board to the control system are correct.

Figure 3-4 Connections of environment monitoring cables in the F02A cabinet configured with the J1-type PDU

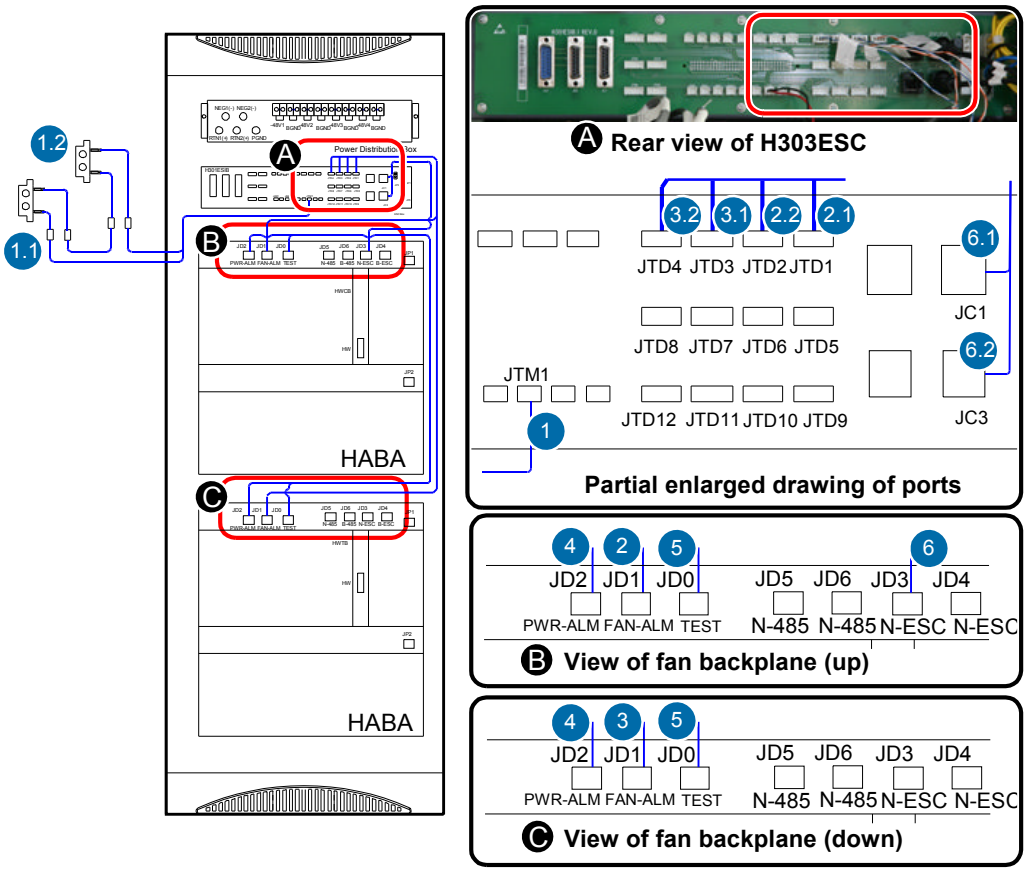


Table 3-8 Connections of environment monitoring cables in the F02A cabinet configured with the J1-type PDU

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Door status sensor connecting cable	1	H303ESC JTM1	1	Door status sensors of the front door and the rear door
Fan monitoring cable	2	HABA JD1(FAN-ALM)	2.1	H303ESC JTD1
			2.2	H303ESC JTD2
Fan monitoring cable	3	Subtended HABA JD1(FAN-ALM)	3.1	H303ESC JTD3
			3.2	H303ESC JTD4
Monitoring signal subtending cable	5	HABA JD0	5	Subtended HABA JD0
	4	HABA JD2	4	Subtended HABA JD2
ESC monitoring cable	6	HABA JD3	6.1	H303ESC JC1
			6.2	H303ESC JC3

Figure 3-5 shows the connections of environment monitoring cables in the F02A cabinet configured with the J2-type PDU. **Table 3-9** describes the cable connections. By referring to the connection diagram, check whether the connections from each sensor to the H303ESC board and from the H303ESC board to the control system are correct.

Figure 3-5 Connections of environment monitoring cables in the F02A cabinet configured with the J2-type PDU

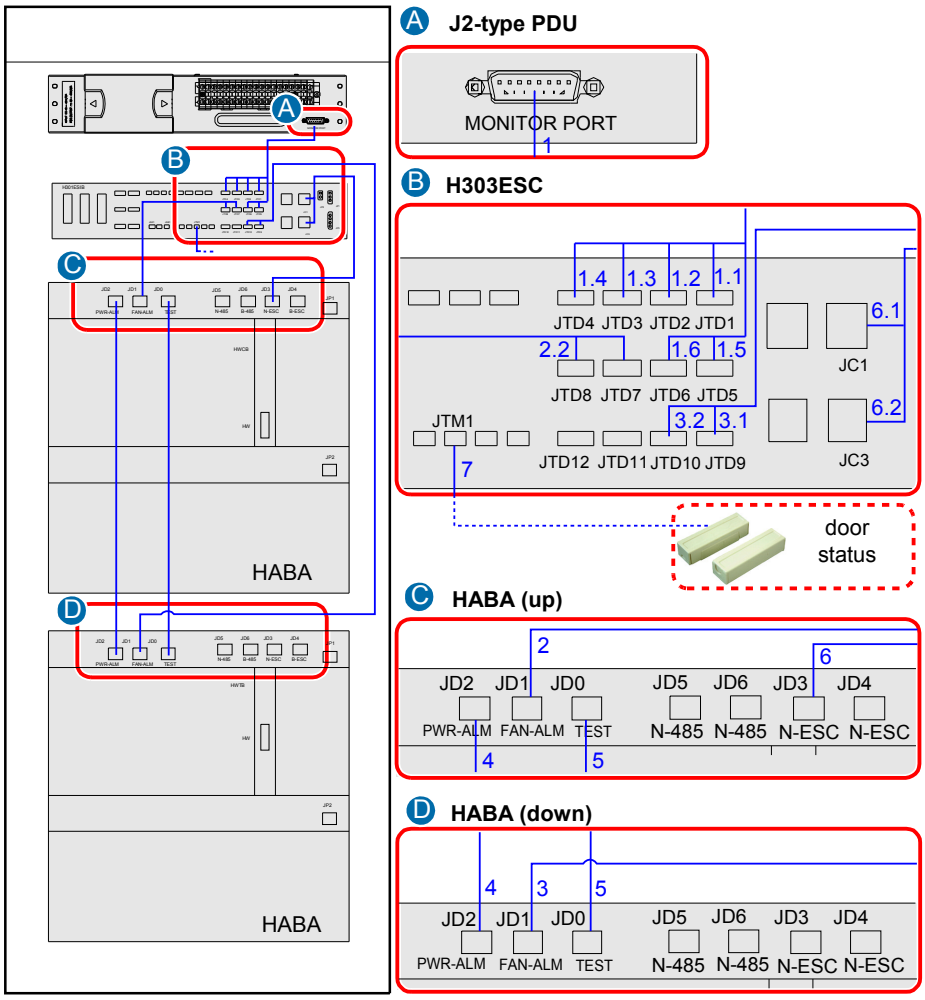


Table 3-9 Connections of environment monitoring cables in the F02A cabinet configured with the J2-type PDU

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Monitoring cable of the J2-type PDU	1	MONITOR PORT of J2-type PDU	1	H303ESC JTD1
				H303ESC JTD2
				H303ESC JTD3
				H303ESC JTD4
				H303ESC JTD5
				H303ESC JTD6

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Fan monitoring cable	2	HABA JD1(FAN-ALM)	2.1	H303ESC JTD7
			2.2	H303ESC JTD8
Fan monitoring cable	3	Subtended HABA JD1(FAN-ALM)	3.1	H303ESC JTD9
			3.2	H303ESC JTD10
Monitoring signal subtending cable	5	HABA JD0	5	Subtended HABA JD0
	4	HABA JD2	4	Subtended HABA JD2
ESC monitoring cable	6	HABA JD3	6.1	H303ESC JC1
			6.2	H303ESC JC3
Door status sensor connecting cable	7	H303ESC JTM1	7	Door status sensors of the front door and the rear door

3.3 Configuring the Environment Monitoring Parameters of the H303ESC Board

This topic describes how to configure the environment monitoring parameters of the H303ESC board through the CLI.

Mapping Between Monitoring Parameters and Device Ports

Table 3-10 describes the mapping between the monitoring parameters displayed on the host and the ports on the H303ESC.

Table 3-10 Mapping between the monitoring parameters displayed on the host and the ports on the H303ESC

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet
Analog 0	Temperature	Temperature
Analog 1	Humidity	Humidity
Analog 2	JTA1	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 3	JTA2	Not connected by default, used to add a user-defined monitoring analog parameter

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet
Analog 4	JTA3	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 5	JTA4	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 6	JTA5	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 7	JTA6	Not connected by default, used to add a user-defined monitoring analog parameter
Digital 0	JTP1 (MDF)	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 1	JTM1 (door status)	Door status sensor
Digital 2	JTD1	Fans of the upper HABA shelf
Digital 3	JTD2	Fans of the upper HABA shelf
Digital 4	JTD3	Fans of the lower HABA shelf
Digital 5	JTD4	Fans of the lower HABA shelf
Digital 6	JTD5	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 7	JTD6	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 8	JTD7	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 9	JTD8	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 10	JTD9	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 11	JTD10	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 12	JTD11	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 13	JTD12	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 14	JTD13	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 15	Reserved	Unavailable

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet
Digital 16	Reserved	Unavailable
Digital 17	Reserved	Unavailable
Digital 18	Reserved	Unavailable
Digital 19	Reserved	Unavailable
Digital 20	Reserved	Unavailable
Digital 21	Reserved	Unavailable
Digital 22	Reserved	Unavailable

NOTE

Before adding a user-defined monitoring analog or digital parameter, make sure that the port corresponding to this parameter is properly connected to an environment monitoring cable.

Data Plan

Table 3-11 provides the data plan for configuring the H303ESC board.

Table 3-11 Data plan for configuring the H303ESC board

Item	Data	Remarks
EMU	Type: H303ESC	H303ESC is displayed as **H303ESC** on the CLI.
	SN: 0	-
	Subnode ID: 30	The serial port of the H303ESC is an RS232 serial port, and the subnode ID must be set to 30.
Analog parameters	Analog parameter ID: 0	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the ambient temperature of the device.
	Upper alarm threshold of analog parameter 0: 50	When the ambient temperature of the device is equal to or higher than 50°C, the host reports an alarm. Default: 55°C.

Item	Data	Remarks
	Lower alarm threshold of analog parameter 0: 10	When the ambient temperature of the device is equal to or lower than 10°C, the host reports an alarm. Default: 5°C.
	Analog parameter ID: 1	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the humidity of the device.
	Upper alarm threshold of analog parameter 1: 80% RH	When the humidity of the device is equal to or higher than 80% RH, the host reports an alarm. Default: 80% RH.
	Lower alarm threshold of analog parameter 1: 5% RH	When the humidity of the device is equal to or lower than 5% RH, the host reports an alarm. Default: 0% RH.
	Analog parameter ID: 4	The user-defined voltage monitoring analog parameter is added to monitor the voltage of the device.
	Upper alarm threshold of analog parameter 4: 75 V	When the voltage of the device is equal to or higher than -75 V, the host reports an alarm.
	Lower alarm threshold of analog parameter 4: 45 V	When the voltage of the device is equal to or lower than -45 V, the host reports an alarm.
	Name of analog parameter 4: Supply_Voltage	-
	Alarm ID of analog parameter 4: 3	The user-defined voltage alarm of the system is used.
	Unit of analog parameter 4: volt	-
	Sensor type of analog parameter 4: voltage type	-
Digital parameters	Digital parameter ID: 0	The monitoring digital parameter of the MDF sensor is set here to monitor the MDF status. When the MDF is faulty, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 0: high level	When the high level represents the valid level, the host does not report an alarm in the case of high level.

Item	Data	Remarks
	Digital parameter ID: 1	The monitoring digital parameter of the door status sensor is set here to monitor the door status. When the cabinet door is opened, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 2	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the status of the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 2: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 3	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the status of the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 3: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 4	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the status of the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 4: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 5	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the status of the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 5: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

NOTE

The preceding data is configured according to the actual requirements. When the actually planned value of a parameter is the same as the default value, it is not necessary to configure the parameter.

Configuration Process

The monitoring parameters can be reported to the control board and the service processing board only when the data of the H303ESC board is correctly configured in the system. **Figure 3-6** shows the configuration process, and **Table 3-12** lists the commands used during the configuration.

Figure 3-6 Configuration process of the H303ESC board

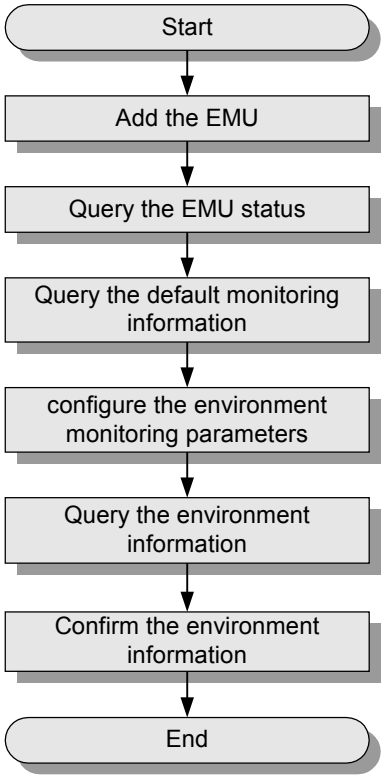


Table 3-12 Commands for configuring the H303ESC board

To...	Run the Command...
Add an EMU	**emu add**
Query the EMU status	**display emu**
Query the system configuration	**display esc system parameter**
Query the environment information	**display esc environment info**

To...	Run the Command...
Configure the analog parameters	**esc analog** IDs of user-defined alarms in the analog parameters: IDs 1-4 are reserved alarm IDs in the system (1: temperature; 2: humidity; 3: voltage; 4: current), and IDs 5-20 are alarm IDs allocated to other user-defined alarms by users.
Configure the digital parameters	**esc digital** IDs of user-defined alarms in the digital parameters: IDs 1-20 are reserved alarm IDs in the system (1: AC_voltage; 2: AC_switch; 3: Battery_voltage; 4: Battery_fuse; 5: Load_fuse; 6: Rectifier; 7: DC_power; 8: Cupboard_door; 9: Room_door; 10: Window; 11: Theft; 12: Wiring; 13: Fan; 14: Fire; 15: Fog; 16: Water; 17: Diesel; 18: Smell 19: Air_conditioner; 20: SPD), and IDs 21-52 are alarm IDs allocated to other user-defined alarms by users.

The following considers the configuration in the F02A cabinet as an example to describe the process of configuring the environment monitoring parameters of the H303ESC board.

1. Log in to the UA5000 through the maintenance terminal and add an EMU.
```
huawei(config)#emu add 0 H303ESC 0 30 rs232 H303ESC
```
2. Query the status of the H303ESC board.
```
huawei(config)#display emu 0
  EMU ID: 0
  --------------------------------------------------------------------------------
  EMU name    : H303ESC
  EMU type    : H303ESC
  Used or not : Used
  EMU state   : Normal
  Frame ID    : 0
  Subnode     : 30
  COM port    : RS232
  --------------------------------------------------------------------------------
```
3. Enter the H303ESC configuration mode and query the default analog and digital parameters.
```
huawei(config)#interface emu 0
huawei(config-if-h303esc-0)#display esc system parameter

  EMU ID: 0                              ESC system parameter
  --------------------------------------------------------------------------------
  FAN run mode: Auto  Auto open temperature: 45 C  Auto close temperature: 30
C
  AnalogID Name           AlmUpper AlmLower TestUpper TestLower Unit    Type
     0     Temperature        55      5        100       -27     C       Voltage
     1     Humidity           80      0        100       0       %R.H.   Voltage
     2     -                  127     -128     127       -128    -       Voltage
     3     -                  127     -128     127       -128    -       Voltage
     4     -                  127     -128     127       -128    -       Voltage
     5     -                  127     -128     127       -128    -       Voltage
     6     -                  127     -128     127       -128    -       Voltage
     7     -                  127     -128     127       -128    -       Voltage
  --------------------------------------------------------------------------------
  DigitalID Name              Level   |DigitalID Name              Level
     0     Wiring               1     |   1     Door0               0
```

```
   2     -                     1     |   3     -                     1
   4     -                     1     |   5     -                     1
   6     -                     1     |   7     -                     1
   8     -                     1     |   9     -                     1
   10    -                     1     |   11    -                     1
   12    -                     1     |   13    -                     1
   14    -                     1     |   15    -                     1
   16    -                     1     |   17    -                     1
   18    -                     1     |   19    -                     1
   20    -                     1     |   21    -                     1
  ------------------------------------------------------------------------------
  COM ID  Command BaudRate  DataLength  StopLength  ParityType
    0       -       -         -           -         -
    1       -       -         -           -         -
  PowerNumber  : 0             PowerType  : -
  ------------------------------------------------------------------------------
```

The results show that certain monitoring parameters, such as temperature, humidity, door status, and MDF, have been configured automatically in the system. Other monitoring parameters, however, need to be configured manually.

4. Configure the analog parameters.

```
huawei(config-if-h303esc-0)#esc analog 0 alarm-upper-limit 50 alarm-lower-
limit 10
huawei(config-if-h303esc-0)#esc analog 1 alarm-upper-limit 80 alarm-lower-
limit 5
huawei(config-if-h303esc-0)#esc analog 4 alarm-upper-limit 75 alarm-lower-
limit 45 name Supply_Voltage sensor-type 0:voltage analog-alarm 3 unit Volt
```

5. Configure the digital parameters.

```
huawei(config-if-h303esc-0)#esc digital 2 available-level low-level digital-
alarm 13 name fan1
huawei(config-if-h303esc-0)#esc digital 3 available-level low-level digital-
alarm 13 name fan2
huawei(config-if-h303esc-0)#esc digital 4 available-level low-level digital-
alarm 13 name fan3
huawei(config-if-h303esc-0)#esc digital 5 available-level low-level digital-
alarm 13 name fan4
```

6. Query the environment information, and confirm that the environment monitoring functions are normal and the door status alarm other than alarms for other monitoring parameters is generated.

```
huawei(config-if-h303esc-0)#display esc environment info
  EMU ID: 0                          ESC environment state
  FAN control mode :Auto  FAN run state: Open
  ---------------------------Analog environment info--------------------------
  ID Name               State    Value   AlmUpper   AlmLower   Unit
  0  Temperature        Normal   29.00      50         10        C
  1  Humidity           Normal   30.98      80         5        %R.H.
  2  -                  Normal   -128.00    127        -128     -
  3  -                  Normal   -128.00    127        -128     -
  4  Supply_Voltage     Normal   53.50      75         45       -
  5                     Normal   -128.00    127        -128     -
  6  -                  Normal   -128.00    127        -128     -
  7  -                  Normal   -128.00    127        -128     -
  ---------------------------Digital environment
info---------------------------
  ID Name               State  Value |ID Name               State  Value
  0  Wiring             Normal 1     |1  Door0              Alarm  1
  2  fan1               Normal 0     |3  fan2               Normal 0
  4  fan3               Normal 0     |5  fan4               Normal 0
  6  -                  Normal 1     |7  -                  Normal 1
  8  -                  Normal 1     |9  -                  Normal 1
  10 -                  Normal 1     |11 -                  Normal 1
  12 -                  Normal 1     |13 -                  Normal 1
  14 -                  Normal 1     |15 -                  Normal 1
  16 -                  Normal 1     |17 -                  Normal 1
  18 -                  Normal 1     |19 -                  Normal 1
  20 -                  Normal 1     |21 -                  Normal 1
  ------------------------------------------------------------------------------
```

NOTE

Door status alarm "Door0" is generated because the door is open. At this time, if you turn on the buzzer on the front panel of the H303ESC board, the buzzer generates a buzzing tone.

7. Save the data.

```
huawei(config-if-h303esc-0)#quit
huawei(config)#save
```

8. Close all the doors of the cabinet, and confirm that the buzzing tone disappears. Query the environment information again, and confirm that no door status alarm is generated.

4 H304ESC Monitoring Solution

About This Chapter

In the H304ESC monitoring solution, the H304ESC monitoring board in the EMU converts the monitored parameters and reports them to the control system.

4.1 H304ESC EMU

This topic describes the function and front panel of the H304ESC environment monitoring unit (EMU), and provides the specifications of the H304ESC EMU.

Function

The H304ESC EMU monitors the environment parameters (smoke, water, door status, MDF, temperature, and humidity) of the entire device, and provides extended monitoring ports.

Front Panel

Figure 4-1 shows the front panel of the H304ESC EMU.

Figure 4-1 Front panel of the H304ESC EMU

Front Panel Description

The front panel of the H304ESC EMU has one running status LED and one buzzer switch.

Table 4-1 describes the running status LED.

Table 4-1 Running status LED

Name	Status	Description
RUN	On for 1s and off for 1s repeatedly	The EMU works in the normal state
	0.5s on and 0.5s off repeatedly	The EMU is faulty

Table 4-2 describes the buzzer switch.

Table 4-2 Buzzer switch

Name	Status	Description
Buzzer switch	ON	The communication between the monitoring unit and the host is normal
	OFF	The communication between the monitoring unit and the host is faulty

Terminal Block

Table 4-3 describes the terminal blocks of the H304ESC EMU.

Table 4-3 Terminal blocks of the H304ESC EMU

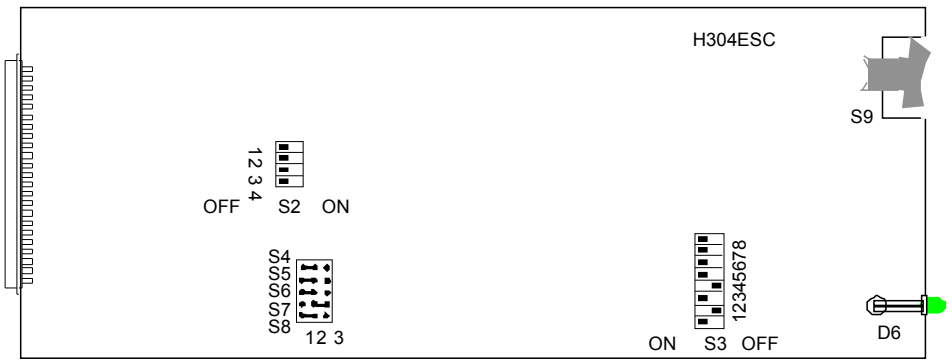
Silk Screen	Function	Remarks
JTD1-JTD12	Socket for the standby digital signal input	● Used to monitor the PDU status, fan tray status, and other Boolean values ● Connected to the monitored devices according to the application scenarios
JTD13	Only for the water sensor	Connected to the water sensor
JTD14-JTD16	Not available (reserved for special usage)	Not available
JTD17-JTD20	Socket for the -48 V detection signal input	Connected to the detected -48 V power supply
JAC1	Relay output	Connected to the port on the controlled device
JAC2	Relay output	Reserved
JAK1 and JAK2	Socket for the external alarm device	Connected to the alarm components, such as the row and column alarm LEDs
JAK4	Socket for the dry contact output	Connected to the port on the controlled device
JTM1	Socket for the door status sensor	Connected to the door-status sensor
JAB1	Socket for the buzzer	Connected to the buzzer on the cabinet
JTP1	Socket for the MDF sensor	Connected to the alarm unit on the MDF
JTA1-JTA3	Socket for the standby analog signal output/input	● Connected to the external sensor, and outputting the 4-20 mA current or the 0-5 V voltage ● Selecting the type of the accessed signals through the DIP switches
JTA4-JTA6	Not available	Not available

Silk Screen	Function	Remarks
FAN	Socket for fan control	Connected to the power port on the controlled fan
BGND, -48 V	Power input	Connected to the DC busbar
GND	Communication ground	Connected to the working ground of the control board
RSP/PV8	Communicating with the upper-layer device through the active communication port in the RS-232 mode	● RJ-45 port ● Connected to the communication port on the active control board
SIO2	Communicating with the upper-layer device through the active communication port in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the communication port on the standby control board
SIO1	Communicating with the power supply device through the active communication port in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the supported primary power supply device
SIO3	Transparent transmission port; working in the RS-232 or RS-422 mode	● RJ-45 port ● Connected to the device that requires transparent transmission

Jumper and DIP Switch

The H304ESC provides two DIP switches: S2 and S3, and five jumpers: S4-S8, as shown in **Figure 4-2**.

Figure 4-2 Layout of the H304ESC DIP switches



DIP switch S2 is used to set the type of external analog sensors. **Table 4-4** describes the meanings and settings of S2 on the H304ESC.

Table 4-4 Setting of S2 on the H304ESC

DIP Switch	Setting	Meaning	Default Setting
S2-1	ON	The external sensor of JTA1 is of the current type	OFF
	OFF	The external sensor of JTA1 is of the voltage type	
S2-2	ON	The external sensor of JTA2 is of the current type	OFF
	OFF	The external sensor of JTA2 is of the voltage type	
S2-3	ON	The external sensor of JTA3 is of the current type	OFF
	OFF	The external sensor of JTA3 is of the voltage type	
S2-4	Reserved	Unavailable	-

DIP switch S3 is used to set the reporting mode and rate. **Table 4-5** describes the settings of S3 on the H304ESC.

Table 4-5 Settings of S3 on the H304ESC

DIP Switch	Setting	Meaning	Default Setting
S3-1	ON	The H304ESC is used in the access network	ON
	OFF	The H304ESC is used in the exchange	
S3-2	ON	The H304ESC uses one serial port for reporting	OFF
	OFF	The H304ESC uses two serial ports for reporting	
S3-3	Reserved	Unavailable	-
S3-4	ON	The reporting rate of the serial port is 19200 bit/s	OFF
	OFF	The reporting rate of the serial port is 9600 bit/s	
S3-5 to S3-8	Reserved	Unavailable	-

Jumpers S4-S8 are used to set the type of the serial port, and their settings are described in **Table 4-6**.

Table 4-6 Settings of S4-S8 on the H304ESC

Jumper	Setting	Meaning	Default Setting
S4	Pins 1-2 connected	The serial port SIO1 is an RS-232 port	Pins 1-2 connected
	Pins 2-3 connected	The serial port SIO1 is an RS-422 port	
S5	Pins 1-2 connected	The serial port SIO2 is an RS-232 port	Pins 1-2 connected
	Pins 2-3 connected	The serial port SIO2 is an RS-422 port	
S6-S8	Pins 2-3 of S7 connected; pins 1-2 of S6 and S8 connected	The serial port SIO3 is an RS-232 port	Pins 2-3 of S7 connected; pins 1-2 of S6 and S8 connected
	Pins 2-3 of S7 and S8 connected; pins 1-2 of S6 connected	The serial port SIO3 is an RS-422 port	

Dimensions

The dimensions of the H304ESC EMU are 436 mm (W) x 307 mm (D) x 42 mm (H).

4.2 Checking Environment Monitoring Cables

The sensors detect various monitoring parameters and send them to the EMU for processing. The H304ESC board converts the monitoring parameters of the sensors and reports the converted parameters to the control system. Therefore, make sure that the connection from the H304ESC board to the control system is correct.

Figure 4-3 shows the connections of environment monitoring cables in the F02AF cabinet configured with the C-type PDU. **Table 4-7** describes the cable connections. By referring to the cable connection diagram, check whether the connections from each sensor to the H304ESC board and from the H304ESC board to the control system are correct.

Figure 4-3 Connections of environment monitoring cables in the F02AF cabinet configured with the C-type PDU

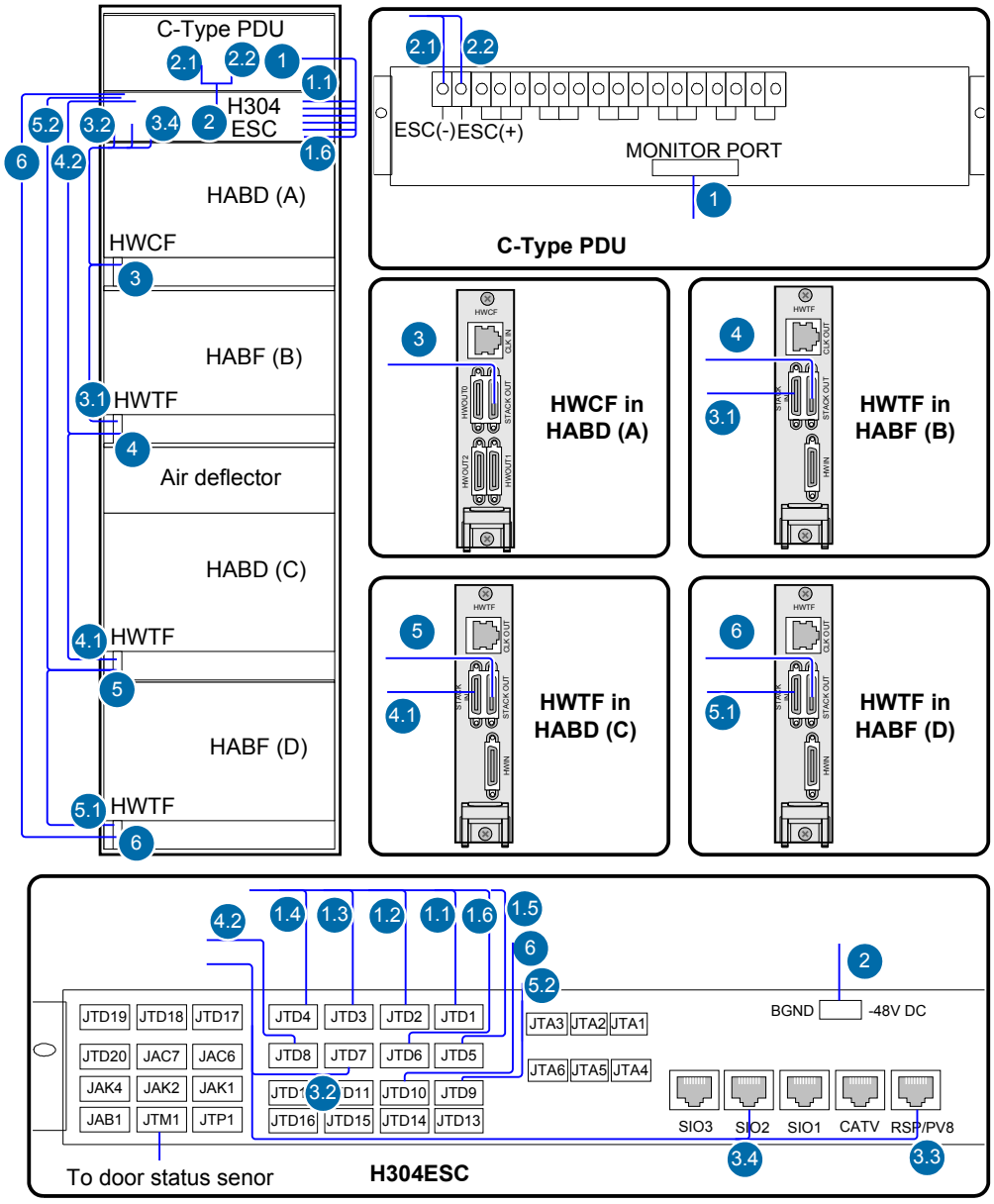


Table 4-7 Connections of environment monitoring cables in the F02AF cabinet configured with the C-type PDU

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Monitoring cable of the C-type PDU	1	MONITOR PORT of the C-type PDU	1.1	JTD1 port of the H304ESC
			1.2	JTD2 port of the H304ESC
			1.3	JTD3 port of the H304ESC

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
			1.4	JTD4 port of the H304ESC
			1.5	JTD5 port of the H304ESC
			1.6	JTD6 port of the H304ESC
-48 V power cable of the H304ESC	2.1	Power output terminal on the C-type PDU	2	-48 VDC power port of the H304ESC
	2.2			
Test and alarm cable	3	STACK OUT port on the HWCF transfer board of the HABD (A)	3.1	STACK IN port on the HWTF transfer board of the HABF(B)
			3.2	JTD7 port of the H304ESC
			3.3	RSP/PV8 port of the H304ESC
			3.4	SIO2 port of the H304ESC
Test and alarm subtending cable	4	STACK OUT port on the HWTF transfer board of the HABF (B) shelf	4.1	STACK IN port on the HWTF transfer board of the HABD(C) shelf
			4.2	JTD8 port of the H304ESC
Test and alarm subtending cable	5	STACK OUT port on the HWTF transfer board of the HABD (C) shelf	5.1	STACK IN port on the HWTF transfer board of the HABF(D) shelf
			5.2	JTD9 port of the H304ESC
Test and alarm subtending cable	6	STACK OUT port on the HWTF transfer board of the HABF (D) shelf	6	JTD10 port of the H304ESC
Door status sensor connecting cable	7	Door status sensor	7	JTM1 terminal of the H304ESC

Figure 4-4 shows the connections of environment monitoring cables in the F02AF cabinet configured with the H-type PDU. **Table 4-8** describes the cable connections. By referring to the cable connection diagram, check whether the connections from each sensor to the H304ESC board and from the H304ESC board to the control system are correct.

Figure 4-4 Connections of environment monitoring cables in the F02AF cabinet configured with the H-type PDU

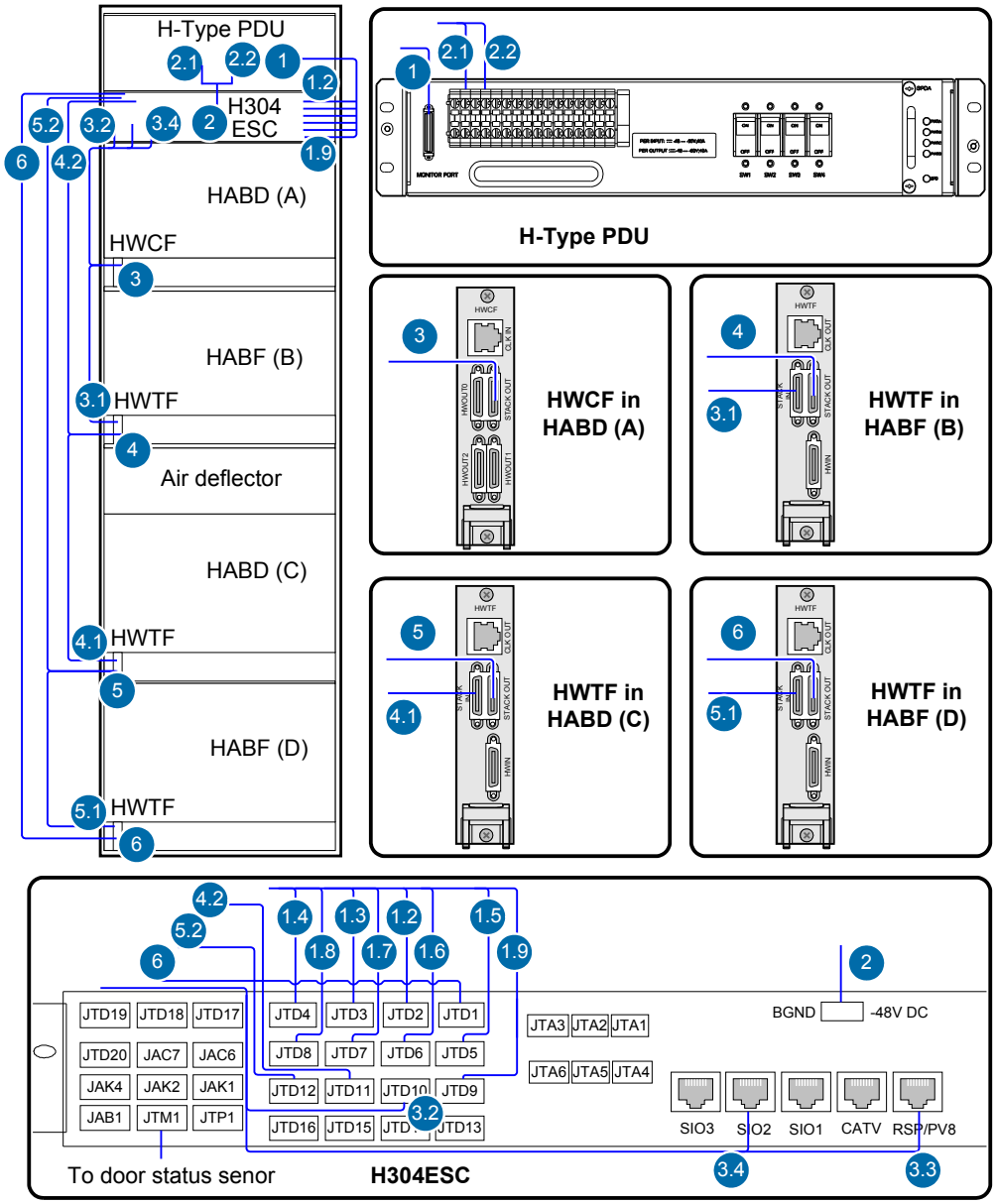


Table 4-8 Connections of environment monitoring cables in the F02AF cabinet configured with the H-type PDU

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Monitoring cable of the H-type PDU	1	MONITOR PORT of the H-type PDU	1.2	JTD2 port of the H304ESC
			1.3	JTD3 port of the H304ESC
			1.4	JTD4 port of the H304ESC

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
			1.5	JTD5 port of the H304ESC
			1.6	JTD6 port of the H304ESC
			1.7	JTD7 port of the H304ESC
			1.8	JTD8 port of the H304ESC
			1.9	JTD9 port of the H304ESC
-48 V power cable of the H304ESC	2.1	Power output terminal on the H-type PDU	2	-48 VDC power port of the H304ESC
	2.2			
Test and alarm cable	3	STACK OUT port on the HWCF transfer board of the HABD (A)	3.1	STACK IN port on the HWTF transfer board of the HABF(B)
			3.2	JTD10 port of the H304ESC
			3.3	RSP/PV8 port of the H304ESC
			3.4	SIO2 port of the H304ESC
Test and alarm subtending cable	4	STACK OUT port on the HWTF transfer board of the HABF (B) shelf	4.1	STACK IN port on the HWTF transfer board of the HABD(C) shelf
			4.2	JTD11 port of the H304ESC
Test and alarm subtending cable	5	STACK OUT port on the HWTF transfer board of the HABD (C) shelf	5.1	STACK IN port on the HWTF transfer board of the HABF(D) shelf
			5.2	JTD12 port of the H304ESC
Test and alarm subtending cable	6	STACK OUT port on the HWTF transfer board of the HABF (D) shelf	6	JTD1 port of the H304ESC
Door status sensor connecting cable	7	Door status sensor	7	JTM1 terminal of the H304ESC

4.3 Configuring the Environment Monitoring Parameters of the H304ESC Board

This topic describes how to configure the environment monitoring parameters of the H304ESC board through the CLI.

Mapping Between Monitoring Parameters and Device Ports

Table 4-9 describes the mapping between the monitoring parameters displayed on the host and the ports on the H304ESC.

Table 4-9 Mapping between the monitoring parameters displayed on the host and the ports on the H304ESC

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02AF Cabinet (Configured with the C-Type PDU)	Application in the F02AF Cabinet (Configured with the H-Type PDU)
Analog 0	Temperature	Temperature	Temperature
Analog 1	Reserved	Unavailable	Unavailable
Analog 2	Reserved	Unavailable	Unavailable
Analog 3	Reserved	Unavailable	Unavailable
Analog 4	Power supply voltage	Power supply voltage	Power supply voltage
Analog 5	JTA1	Not connected by default, used to add a user-defined monitoring analog parameter	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 6	JTA2	Not connected by default, used to add a user-defined monitoring analog parameter	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 7	JTA3	Not connected by default, used to add a user-defined monitoring analog parameter	Not connected by default, used to add a user-defined monitoring analog parameter
Digital 0	JTP1 (MDF)	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 1	JTM1 (door status)	Door status sensor	Door status sensor

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02AF Cabinet (Configured with the C-Type PDU)	Application in the F02AF Cabinet (Configured with the H-Type PDU)
Digital 2	JTD1	Surge protection circuit of the first DC input of the C-type PDU	Fans of the HABF shelf connected to the subtended HABD shelf
Digital 3	JTD2	Surge protection circuit of the second DC input of the C-type PDU	Switch 1 input of the H-type PDU
Digital 4	JTD3	First output control switch SW1 of the C-type PDU	Switch 2 input of the H-type PDU
Digital 5	JTD4	Second output control switch SW2 of the C-type PDU	Switch 3 input of the H-type PDU
Digital 6	JTD5	Third output control switch SW3 of the C-type PDU	Switch 4 input of the H-type PDU
Digital 7	JTD6	Monitoring alarm of the C-type PDU	Input tributary 1 detection of the H-type PDU
Digital 8	JTD7	Fans of the master HABD shelf	Input tributary 2 detection of the H-type PDU
Digital 9	JTD8	Fans of the HABF shelf connected to the master HABD shelf	Input tributary 3 detection of the H-type PDU
Digital 10	JTD9	Fans of the HABD shelf subtended to the master HABD shelf	Input tributary 4 detection of the H-type PDU
Digital 11	JTD10	Fans of the HABF shelf connected to the subtended HABD shelf	Fans of the master HABD shelf
Digital 12	JTD11	Not connected by default, used to add a user-defined monitoring digital parameter.	Fans of the HABF shelf connected to the master HABD shelf
Digital 13	JTD12	Not connected by default, used to add a user-defined monitoring digital parameter.	Fans of the HABD shelf subtended to the master HABD shelf
Digital 14	Reserved	Unavailable	Unavailable
Digital 15	Reserved	Unavailable	Unavailable
Digital 16	Reserved	Unavailable	Unavailable

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02AF Cabinet (Configured with the C-Type PDU)	Application in the F02AF Cabinet (Configured with the H-Type PDU)
Digital 17	Reserved	Unavailable	Unavailable
Digital 18	Reserved	Unavailable	Unavailable
Digital 19	Reserved	Unavailable	Unavailable
Digital 20	Reserved	Unavailable	Unavailable
Digital 21	Reserved	Unavailable	Unavailable
Digital 22	Reserved	Unavailable	Unavailable

NOTE

Before adding a user-defined analog or monitoring digital parameter, make sure that the port corresponding to this parameter is connected with an environment monitoring cable.

Data Plan

NOTE

- The preceding data is configured according to the actual requirements. When the actually planned value of a parameter is the same as the default value, it is not necessary to configure the parameter.
- The configuration of the monitoring parameters in the F02AF cabinet configured with the C-type PDU is basically the same as that in the F02AF cabinet configured with the H-type PDU. The only difference lies in the definition of the PDU monitoring parameter, but the valid levels for these two PDUs are both set to low level.

Table 4-10 provides the data plan for configuring the H304ESC board. In this topic, the application in the F02AF cabinet with the C-type PDU is considered as an example.

Table 4-10 Data plan for configuring the H304ESC board

Item	Data	Remarks
EMU	Type: H304ESC	H304ESC is displayed as H304ESC on the CLI.
	SN: 0	-
	Subnode ID: 30	The serial port of the H304ESC is an RS-232 serial port, and the subnode ID must be set to 30.
Analog parameters	Analog parameter ID: 0	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the ambient temperature of the device.

Item	Data	Remarks
	Upper alarm threshold of analog parameter 0: 50	When the ambient temperature of the device is equal to or higher than 50°C, the host reports an alarm. Default: 55°C.
	Lower alarm threshold of analog parameter 0: 5	When the ambient temperature of the device is equal to or lower than 5°C, the host reports an alarm. Default: 5°C.
	Analog parameter ID: 4	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the voltage of the device.
	Upper alarm threshold of analog parameter 4: 75 V	When the voltage of the device is equal to or higher than -75 V, the host reports an alarm. Default: 75 V.
	Lower alarm threshold of analog parameter 4: 45 V	When the voltage of the device is equal to or lower than -45 V, the host reports an alarm. Default: 45 V.
	Analog parameter ID: 5	The user-defined humidity monitoring analog parameter is added to monitor the humidity of the device.
	Upper alarm threshold of analog parameter 5: 80	When the humidity of the device is equal to or higher than 80% RH, the host reports an alarm.
	Lower alarm threshold of analog parameter 5: 0	When the humidity of the device is equal to or lower than 0% RH, the host reports an alarm.
	Name of analog parameter 5: Humidity	-
	Alarm ID of analog parameter 5: 2	The user-defined humidity alarm of the system is used.
	Unit of analog parameter 5: % RH	-
	Sensor type of analog parameter 5: voltage type	-
Digital parameters	Digital parameter ID: 0	The monitoring digital parameter of the MDF sensor is set here to monitor the MDF status. When the MDF is faulty, the host reports an alarm. Allocated by default (unable to be changed by the user).

Item	Data	Remarks
	Valid level of digital parameter 0: high level	When the high level represents the valid level, the host does not report an alarm in the case of high level.
	Digital parameter ID: 1	The monitoring digital parameter of the door status sensor is set here to monitor the door status. When the cabinet door is opened, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 2	The monitoring digital parameter of the surge protection circuit of the first DC input is set here to monitor the status of the protection circuit. When the protection circuit fails, the host reports an alarm.
	Valid level of digital parameter 2: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 3	The monitoring digital parameter of the surge protection circuit of the second DC input is set here to monitor the status of the protection circuit. When the protection circuit fails, the host reports an alarm.
	Valid level of digital parameter 3: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 4	The monitoring digital parameter of SW1 is set here to monitor the status of SW1. When SW1 is turned off, the host reports an alarm.
	Valid level of digital parameter 4: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 5	The monitoring digital parameter of SW2 is set here to monitor the status of SW2. When SW2 is turned off, the host reports an alarm.
	Valid level of digital parameter 5: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

Item	Data	Remarks
	Digital parameter ID: 6	The monitoring digital parameter of SW3 is set here to monitor the status of SW3. When SW3 is turned off, the host reports an alarm.
	Valid level of digital parameter 6: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 8	The monitoring digital parameter of the fans of the master HABD shelf is set here to monitor the status of the fans of the master HABD shelf. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 8: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 9	The monitoring digital parameter of the fans of the HABF shelf connected to the master HABD shelf is set here to monitor the status of the fans of the HABF shelf. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 9: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 10	The monitoring digital parameter of the fans of the HABD shelf subtended to the master HABD shelf is set here to monitor the status of the fans of the HABD shelf. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 10: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 11	The monitoring digital parameter of the fans of the HABF shelf connected to the subtended HABD shelf is set here to monitor the status of the fans of the HABF shelf. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 11: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

Configuration Process

The monitoring parameters can be reported to the control board only when the data of the H304ESC board is correctly configured in the system. **Figure 4-5** shows the configuration process, and **Table 4-11** lists the commands used during the configuration.

Figure 4-5 Configuration process of the H304ESC board

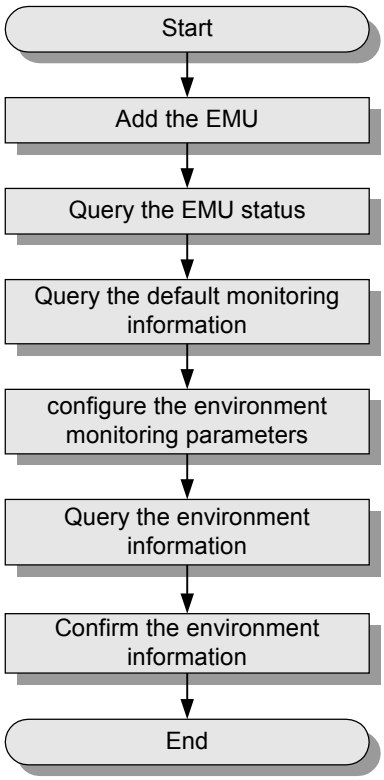


Table 4-11 Commands for configuring the H304ESC board

To...	Run the Command...
Add an EMU	**emu add**
Query the status of the EMU	**display emu**
Query the system configuration	**display esc system parameter**
Query the environment information	**display esc environment info**
Configure the analog parameters	**esc analog** IDs of user-defined alarms in the analog parameters: IDs 1-4 are reserved alarm IDs in the system (1: temperature; 2: humidity; 3: voltage; 4: current), and IDs 5-20 are alarm IDs allocated to other user-defined alarms by users.

To...	Run the Command...
Configure the digital parameters	**esc digital** IDs of user-defined alarms in the digital parameters: IDs 1-20 are reserved alarm IDs in the system (1: AC_voltage; 2: AC_switch; 3: Battery_voltage; 4: Battery_fuse; 5: Load_fuse; 6: Rectifier; 7: DC_power; 8: Cupboard_door; 9: Room_door; 10: Window; 11: Theft; 12: Wiring; 13: Fan; 14: Fire; 15: Fog; 16: Water; 17: Diesel; 18: Smell 19: Air_conditioner; 20: SPD), and IDs 21-52 are alarm IDs allocated to other user-defined alarms by users.

The following considers the configuration in the F02AF cabinet with the C-type PDU as an example to describe the process of configuring the environment monitoring parameters of the H304ESC board.

1. Log in to the UA5000 through the maintenance terminal and add an EMU.

```
huawei(config)#emu add 0 H304ESC 0 30 rs232 H304ESC
```

2. Query the status of the H304ESC board.

```
huawei(config)#display emu 0
EMU ID: 0
  ------------------------------------------------------------------------------
  EMU name    : H304ESC
  EMU type    : H304ESC
  Used or not : Used
  EMU state   : Normal
  Frame ID    : 0
  Subnode     : 30
  COM port    : RS232
  ------------------------------------------------------------------------------
```

3. Enter the H304ESC configuration mode and query the default analog and digital parameters.

```
huawei(config)#interface emu 0
huawei(config-if-h304esc-0)#display esc system parameter
EMU ID: 0                              ESC system parameter
------------------------------------------------------------------------------
 FAN run mode: Auto  Auto open temperature: 45 C  Auto close temperature: 30 C
AnalogID Name            AlmUpper AlmLower TestUpper TestLower Unit    Type
  0     Temperature        55      5        100       -27      C       Voltage
  1     -                  127     -128     127       -128     -       Voltage
  2     -                  127     -128     127       -128     -       Voltage
  3     -                  127     -128     127       -128     -       Voltage
  4     Supply_Voltage     75      45       100       0        Volt    Voltage
  5     -                  127     -128     127       -128     -       Voltage
  6     -                  127     -128     127       -128     -       Voltage
  7     -                  127     -128     127       -128     -       Voltage
------------------------------------------------------------------------------
DigitalID Name               Level   |DigitalID Name               Level
  0     Wiring                1      |   1     Door0                0
  2     -                     1      |   3     -                    1
  4     -                     1      |   5     -                    1
  6     -                     1      |   7     -                    1
  8     -                     1      |   9     -                    1
  10    -                     1      |   11    -                    1
  12    -                     1      |   13    -                    1
  14    -                     1      |   15    -                    1
  16    -                     1      |   17    -                    1
  18    -                     1      |   19    -                    1
  20    -                     1      |   21    -                    1
```

```
--------------------------------------------------------------------------
COM ID  Command BaudRate  DataLength  StopLength  ParityType
  0       -       -         -           -         -
  1       -       -         -           -         -
PowerNumber  : 0              PowerType  : -
Battery off permission: Permit    Battery off voltage: 43.2V
Battery0 capacity: 100A   Battery1 capacity: 100A    Equalizing time: 60days
--------------------------------------------------------------------------
```

The results show that certain monitoring parameters, such as temperature, voltage, door status, and MDF, have been configured automatically in the system. Other monitoring parameters, however, need to be configured manually.

4. Configure the analog parameters.

```
huawei(config-if-h304esc-0)#esc analog 0 alarm-upper-limit 50 alarm-lower-
limit 5
huawei(config-if-h304esc-0)#esc analog 5 alarm-upper-limit 80 alarm-lower-
limit 0 name Humidity sensor-type 0:voltage analog-alarm 2 unit %RH
```

5. Configure the digital parameters.

```
huawei(config-if-h304esc-0)#esc digital 2 available-level low-level name SPD1
huawei(config-if-h304esc-0)#esc digital 3 available-level low-level name SPD2
huawei(config-if-h304esc-0)#esc digital 4 available-level low-level name SW1
huawei(config-if-h304esc-0)#esc digital 5 available-level low-level name SW2
huawei(config-if-h304esc-0)#esc digital 6 available-level low-level name SW3
huawei(config-if-h304esc-0)#esc digital 8 available-level low-level name fan1
huawei(config-if-h304esc-0)#esc digital 9 available-level low-level name fan2
huawei(config-if-h304esc-0)#esc digital 10 available-level low-level name fan3
huawei(config-if-h304esc-0)#esc digital 11 available-level low-level name fan4
```

6. Query the environment information, and confirm that the environment monitoring functions are normal and the door status alarm other than alarms for other monitoring parameters is generated.

```
huawei(config-if-h304esc-0)#display esc environment info
  EMU ID: 0                          ESC environment state
  FAN control mode :Auto  FAN run state: Close  Battery charge state: Floating
  --------------------------Analog environment info--------------------------
  ID Name                State    Value   AlmUpper   AlmLower   Unit
  0  Temperature         Normal   29.00      55         5        C
  1  -                   Normal   0.00       127        -128     -
  2  -                   Normal   0.00       127        -128     -
  3  -                   Normal   -128.00    127        -128     -
  4  Supply_Voltage      Normal   52.73      75         45       Volt
  5  Humidity            Normal   30.98      80         0        -
  6  -                   Normal   -128.00    127        -128     -
  7  -                   Normal   -128.00    127        -128     -
  --------------------------Digital environment info
  ID Name                State  Value |ID Name                State  Value
  0  Wiring              Normal 1     |1  Door0               Alarm  1
  2  SPD1                Normal 0     |3  SPD2                Normal 0
  4  SW1                 Normal 0     |5  SW2                 Normal 0
  6  SW3                 Normal 0     |7  -                   Normal 1
  8  fan1                Normal 0     |9  fan2                Normal 0
  10 fan3                Normal 0     |11 fan4                Normal 0
  12 -                   Normal 1     |13 -                   Normal 1
  14 -                   Normal 1     |15 -                   Normal 1
  16 -                   Normal 1     |17 -                   Normal 1
  18 -                   Normal 1     |19 -                   Normal 1
  20 -                   Normal 1     |21 -                   Normal 1
  --------------------------------------------------------------------------
```

NOTE

Door status alarm "Door0" is generated because the door is open. At this time, if you turn on the buzzer on the front panel of the H304ESC board, the buzzer generates a buzzing tone.

7. Save the data.

```
huawei(config-if-h304esc-0)#quit
huawei(config)#save
```

8. Close all the doors of the cabinet, and confirm that the buzzing tone disappears. Query the environment information again, and confirm that no door status alarm is generated.

5 ESCM Monitoring Solution(for M200 Cabinet)

About This Chapter

In the ESCM monitoring solution, the H521ESCM monitoring board in the EMU converts the monitored parameters and reports them to the control system.

5.1 ESCM EMU
This topic covers the function, front panel, and specifications of the ESCM environment monitoring unit (EMU).

5.2 Checking Environment Monitoring Cables
The sensors, which collect environment parameters, are connected to the terminal blocks of the ESCM through sensor cables. The ESCM processes the environment parameters collected by the sensors and then reports the parameters to the control system through the COM port. During the deployment, make sure that the cables are properly connected and that connectors are fastened.

5.3 Configuring the Environment Monitoring Parameters of the ESCM
This topic describes how to configure the temperature, door status, MDF and power supply monitoring parameters of the ESCM.

5.1 ESCM EMU

This topic covers the function, front panel, and specifications of the ESCM environment monitoring unit (EMU).

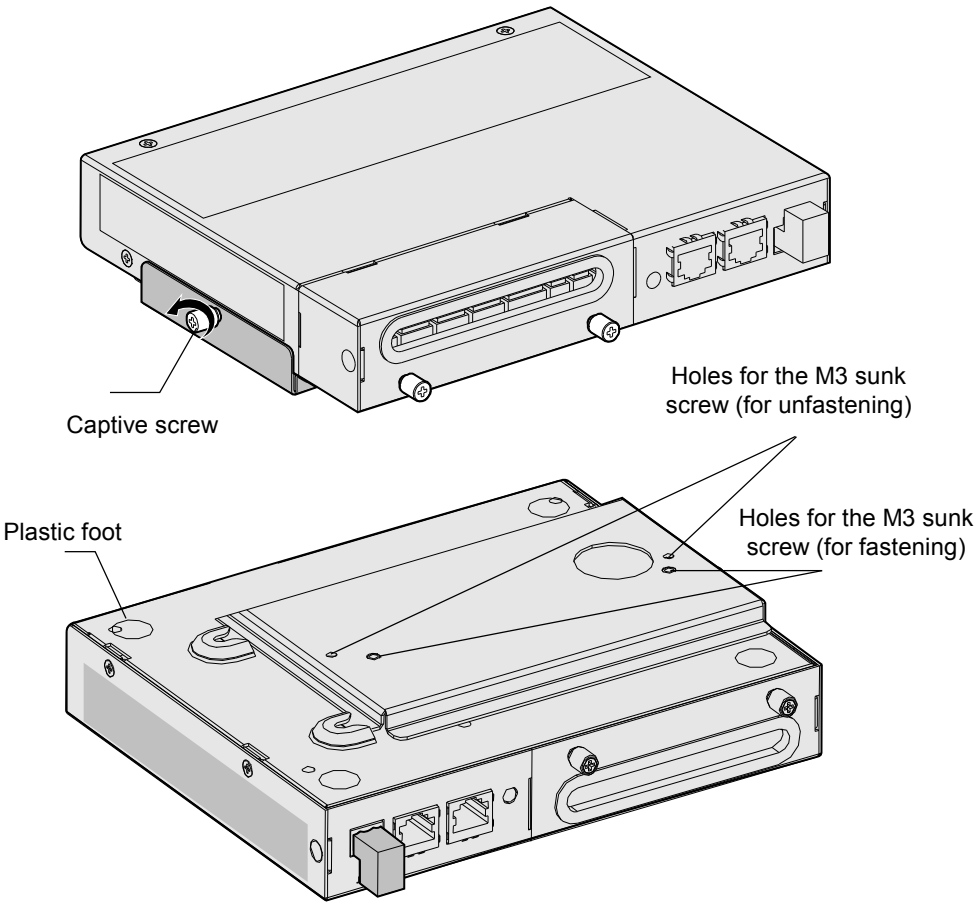
Function

The ESCM EMU includes the environment monitoring board, terminal block, and DIP switch. It monitors the environment parameters of the whole device, such as smoke, water, door status, MDF, temperature, and humidity, and also provides the extended monitoring port.

Structure

Figure 5-1 shows the structure of the ESCM EMU.

Figure 5-1 Structure of the ESCM EMU



Front Panel

Figure 5-2 shows the front panel of the ESCM EMU.

Figure 5-2 Front panel of the ESCM EMU

Indicator on the Front Panel

The ESCM EMU has one indicator on its front panel.

Table 5-1 describes the indicator.

Table 5-1 Indicator

Name	Color	Status	Description
RUN	Green	Blinking 1s on and 1s off	The environment monitoring board in the ESCM EMU functions properly.
	Red	Blinking 0.3s on and 0.3s off	The environment monitoring board is faulty. That is, certain alarms are generated, such as: ● Alarm indicating that the MDF is faulty ● Alarm indicating that the temperature or the system voltage exceeds the preset upper or lower limit
	Yellow	Blinking 0.3s on and 0.3s off	The environment monitoring board is not registered.
		Blinking 1s on and 1s off	The environment monitoring board generates alarms that do not interrupt services. These alarms can be ● Alarm of the environment analog parameter ● Alarm of the external digital parameter
		Blinks irregularly	An application program is being loaded or upgraded online. The loading speed determines the frequency of blinking.

Name	Color	Status	Description
		Always on	Communication between the environment monitoring board and the control board is interrupted.

Terminal Block

Table 5-2 describes the terminal blocks of the ESCM EMU.

Table 5-2 Terminal blocks of the ESCM EMU

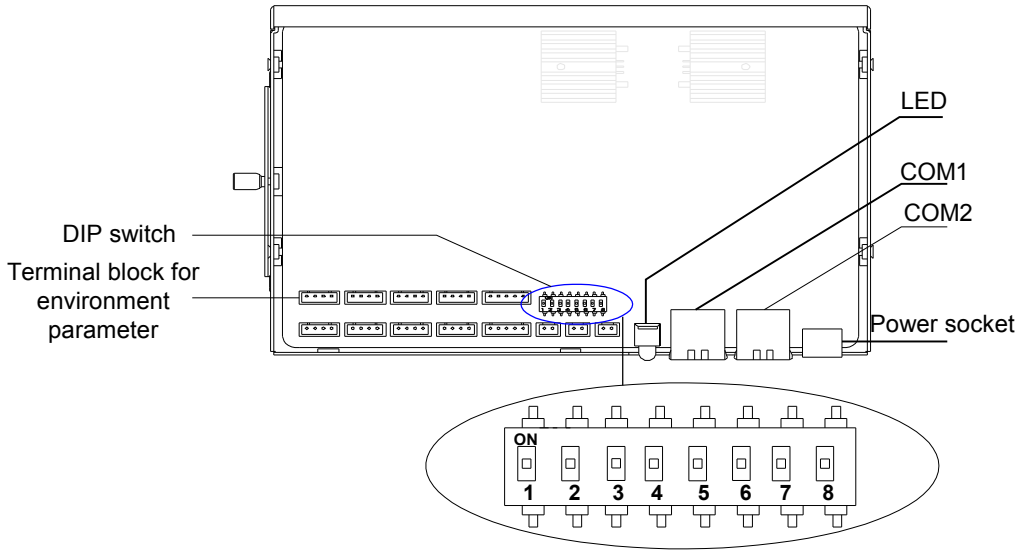
Silk Screen	Function	Remarks
JTD1-JTD6	Indicate the socket for the digital parameter input. ● Used to monitor digital parameters. ● Connect to the monitored devices according to the application scenarios.	Supported
JTD7	Applies to the smoke sensor only. Connects to the smoke sensor.	Supported
JTA1-JTA2	Apply to the temperature and humidity sensor only. Connects to the temperature and humidity sensor.	Supported
JAC	Indicates the relay output.	Not supported
JTM1	Indicates the socket for the door status sensor.	Supported
JTP1	Indicates the socket for the MDF sensor.	Supported
COM1	Communicates with the upper device in the RS-232 or RS-485 mode. ● Supports the RJ45 connector. ● Connects to the communication port of the active control board.	Supported
COM2	Communicates with the upper system in the RS-232 or RS-485 mode. ● Supports the RJ45 connector. ● Connects to the communication port of the standby control board.	Supported
48VDC INPUT	Indicates the socket for the power input. ● The power socket has two slots. The left slot is identified as RTN (-), and the right slot NEG (+). ● Connects to the -48 V output terminal of the power system.	Supported

Silk Screen	Function	Remarks
Ground terminal	Connects to the ground point of the cabinet by using a ground cable. The ground terminal is located on the left upper corner at the rear of the EMU, and there is a grounding symbol to identify the ground terminal on the EMU.	Supported

DIP Switch

The ESCM EMU provides a DIP switch: S1, as shown in **Figure 5-3**.

Figure 5-3 Layout of S1 on the ESCM EMU



S1 has eight available electrical switches. ON indicates 0, and OFF indicates 1. **Table 5-3** describes the settings of S1.

Table 5-3 Settings of S1

Electrical Switch	Setting	Indication	Factory Default
S1-1 to S1-4	Address of the environment monitoring board	● When the ESCM EMU adopts the RS-232 communication mode, these bits are invalid. ● When the ESCM EMU adopts the RS-485 communication mode, these bits are used to set the address of the environment monitoring board.	S1-1: ON S1-2: ON S1-3: OFF S1-4: OFF

Electrical Switch	Setting	Indication	Factory Default
S1-5	Not supported	-	ON
S1-6	ON	The rate of the serial port is 19200 bit/s.	OFF
	OFF	The rate of the serial port is 9600 bit/s.	
S1-7	ON	The external sensor of JTA1 is of the current type.	ON
	OFF	The external sensor of JTA1 is of the voltage type.	
S1-8	ON	The external sensor of JTA2 is of the current type.	ON
	OFF	The external sensor of JTA2 is of the voltage type.	

When the ESCM EMU adopts the RS-485 communication mode, S1-1 to S1-4 are used to set the address of the environment monitoring board. **Table 5-4** shows the settings of S1-1 to S1-4.

Table 5-4 Settings of S1-1 to S1-4

S1-4	S1-3	S1-2	S1-1	Address Value
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C

S1-4	S1-3	S1-2	S1-1	Address Value
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Specifications

Table 5-5 lists specifications of the ESCM EMU.

Table 5-5 Specifications of the ESCM EMU

EMU	Dimensions (W x D x H)
ESCM	185 mm x 150 mm x 35 mm

5.2 Checking Environment Monitoring Cables

The sensors, which collect environment parameters, are connected to the terminal blocks of the ESCM through sensor cables. The ESCM processes the environment parameters collected by the sensors and then reports the parameters to the control system through the COM port. During the deployment, make sure that the cables are properly connected and that connectors are fastened.

The connection of the cable from the ESCM to the control system is as follows:

- One end is an RJ-45 connector and is connected to the communication port COM1 of the ESCM.
- The other end of the cable is also an RJ-45 connector and is connected to the monitoring serial port on the PSTF transfer board of the HABM shelf.

Figure 5-4 shows the connections of environment monitoring cables in the M200 cabinet configured with the ESCM. Table 5-6 describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the ESCM and from the ESCM to the control system are correct.

Figure 5-4 Connections of environment monitoring cables in the M200 cabinet

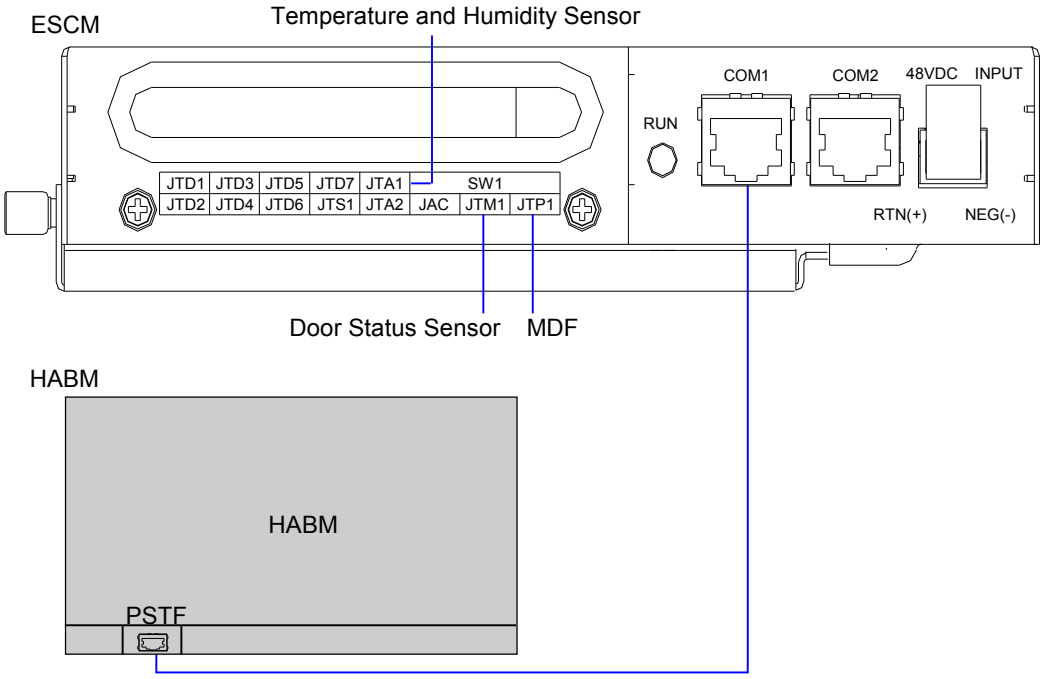


Table 5-6 Connections of environment monitoring cables in the M200 cabinet

Cable	One End Connects to...	The Other End Connects to...
Door status sensor connecting cable	Door status sensor	JTM1 terminal of the ESCM
MDF monitoring cable	MDF monitoring point	JTP1 terminal of the ESCM
Temperature-humidity sensor monitoring cable	Temperature and humidity sensor	JTA1 terminal of the ESCM
ESC monitoring cable	Communication port on the PSTF transfer board of the HABM	COM1 terminal of the ESCM

5.3 Configuring the Environment Monitoring Parameters of the ESCM

This topic describes how to configure the temperature, door status, MDF and power supply monitoring parameters of the ESCM.

Mapping Between Monitoring Parameters and Device Ports

Table 5-7 describes the mapping between the monitoring parameters displayed on the host and the ports on the ESCM.

Table 5-7 Mapping between the monitoring parameters displayed on the host and the ports on the ESCM

Monitoring Parameter Displayed on the Host	Device Port	Application in the M200 Cabinet
Temperature	Temperature	Temperature
Input_-48V_0	Voltage	Voltage
Analog 3	JTA1	Humidity
Analog 4	JTA2	Not connected by default, used to add a user-defined monitoring analog parameter
Wiring	JTP1 (MDF)	MDF
Door0	JTM1 (door status)	Door status sensor
Digital 2	JTD1	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 3	JTD2	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 4	JTD3	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 5	JTD4	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 6	JTD5	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 7	JTD6	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 8	JTD7	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 9	JTS1 (water)	Not connected by default, used to add a user-defined monitoring digital parameter

NOTE

Before adding a user-defined analog or monitoring digital parameter, make sure that the port corresponding to this analog or monitoring digital parameter is properly connected with an environment monitoring cable.

Data Plan

Table 5-8 provides the data plan for configuring the ESCM.

Table 5-8 Data plan for configuring the ESCM

Item	Data	Remarks
EMU	Type: ESCM	ESCM is displayed as **ESCM** on the CLI.
	SN: 0	-
	Subnode ID: 30	The serial port of the ESCM is an RS232 serial port, and the subnode ID must be set to 30.
Analog parameters	Analog parameter ID: 0	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the ambient temperature of the device.
	Upper alarm threshold of analog parameter 0: 50	When the ambient temperature of the device is equal to or higher than 50°C, the host reports an alarm. Default: 55°C.
	Lower alarm threshold of analog parameter 0: 10	When the ambient temperature of the device is equal to or lower than 10°C, the host reports an alarm. Default: 5°C.
	Analog parameter ID: 1	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the voltage of the device.
	Upper alarm threshold of analog parameter 1: 75 V	When the voltage of the device is equal to or lower than -75V, the host reports an alarm. Default: -75V.
	Lower alarm threshold of analog parameter 1: 45 V	When the voltage of the device is equal to or lower than -45 V, the host reports an alarm. Default: -45 V.
	Analog parameter ID: 2	The user-defined humidity monitoring analog parameter is added to monitor the humidity of the device.
	Upper alarm threshold of analog parameter 2: 80	When the humidity of the device is equal to or lower than 80% RH, the host reports an alarm.
	Lower alarm threshold of analog parameter 2: 0	When the humidity of the device is equal to or lower than 0% RH, the host reports an alarm.

Item	Data	Remarks
	Name of analog parameter 2: Humidity	-
	Alarm ID of analog parameter 2: 2	The user-defined humidity alarm of the system is used.
	Unit of analog parameter 2: % RH	-
	Sensor type of analog parameter 2: voltage type	-
Digital parameters	Digital parameter ID: 0	The monitoring digital parameter of the MDF sensor is set here to monitor the status of the MDF. When the MDF is faulty, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 0: high level	When the high level represents the valid level, the host does not report an alarm in the case of high level.
	Digital parameter ID: 1	The monitoring digital parameter of the door status sensor is set here to monitor the door status. When the cabinet door is opened, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 9	The user-defined water monitoring analog parameter is added.
	Valid level of digital parameter 9: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

NOTE

The preceding data is configured according to the actual requirements. When the actually planned value of a parameter is the same as the default value, it is not necessary to configure the parameter.

Configuration Process

The monitoring parameters can be reported to the control board only when the data of the ESCM is correctly configured in the system. **Figure 5-5** shows the configuration process, and **Table 5-9** lists the commands used during the configuration.

Figure 5-5 Configuration process of the ESCM

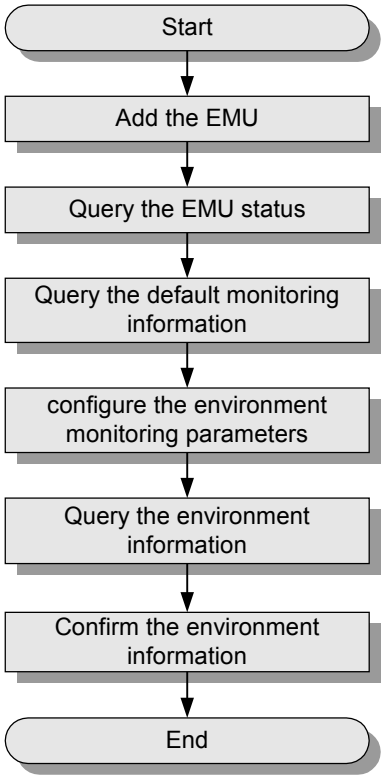


Table 5-9 Commands for configuring the ESCM

To...	Run the Command...
Add an EMU	**emu add**
Query the EMU status	**display emu**
Query the system configuration	**display esc system parameter**
Query the environment information	**display esc environment info**
Configure the digital parameters	**esc analog** IDs of user-defined alarms in the analog parameters: IDs 1-4 are reserved alarm IDs in the system (1: temperature; 2: humidity; 3: voltage; 4: current), and IDs 5-20 are alarm IDs allocated to other user-defined alarms by users.

To...	Run the Command...
Configure the analog parameters	**esc digital** IDs of user-defined alarms in the digital parameters: IDs 1-20 are reserved alarm IDs in the system (1: AC_voltage; 2: AC_switch; 3: Battery_voltage; 4: Battery_fuse; 5: Load_fuse; 6: Rectifier; 7: DC_power; 8: Cupboard_door; 9: Room_door; 10: Window; 11: Theft; 12: Wiring; 13: Fan; 14: Fire; 15: Fog; 16: Water; 17: Diesel; 18: Smell 19: Air_conditioner; 20: SPD), and IDs 21-52 are alarm IDs allocated to other user-defined alarms by users.

The following considers the configuration in the M200 cabinet as an example to describe the process of configuring the environment monitoring parameters of the ESCM.

1. Log in to the UA5000 through the maintenance terminal and add an EMU.

   ```
   huawei(config)#emu add 0 MiniESC 0 30 rs232 MiniESC
   ```

2. Enter the ESCM configuration mode and query the default analog and digital parameters.

   ```
   huawei(config)#display emu 0
     EMU ID: 0
     ------------------------------------------------------------------------------
     EMU name    : MiniESC
     EMU type    : MiniESC
     Used or not : Used
     EMU state   : Normal
     Frame ID    : 0
     Subnode     : 30
     COM port    : RS232
   ```

3. Enter the ESCM configuration mode and query the default analog and digital parameters.

   ```
   huawei(config)#interface emu 0
   huawei(config-if-MiniESC-0)#display esc system parameter

     EMU ID: 0                              ESC system parameter
     ------------------------------------------------------------------------------
     FAN run mode: Auto  Auto open temperature: 45 C  Auto close temperature: 30
   C
     AnalogID Name           AlmUpper AlmLower TestHigh  TestLow   Unit    type
        0     Temperature        55      5        100       -27     C       Voltage
        1     Input_-48V_0       75      45       75        0       volt    Voltage
        2     -                  127     -128     127       -128    -       Voltage
        3     -                  127     -128     127       -128    -       Voltage
     ------------------------------------------------------------------------------
     DigitalID Name        Available Level|DigitalID Name        Available Level
        0     Wiring                1     |   1     Door0                 0
        2     -                     1     |   3     -                     1
        4     -                     1     |   5     -                     1
        6     -                     1     |   7     -                     1
        8     -                     1     |   9     -                     1
     ------------------------------------------------------------------------------
   ```

   The results show that certain monitoring parameters, such as temperature, voltage, door status, and MDF, have been configured automatically in the system. Other monitoring parameters, however, need to be configured manually.

4. Configure the analog parameters.

   ```
   huawei(config-if-MiniESC-0)#esc analog 0 alarm-upper-limit 50 alarm-lower-
   limit 10
   ```

```
huawei(config-if-MiniESC-0)#esc analog 2 alarm-upper-limit 80 alarm-lower-
limit 0 name Humidity sensor-type 0:voltage analog-alarm 2 unit %RH
```

5. Configure the digital parameters.

```
huawei(config-if-MiniESC-0)#esc digital 9 available-level low-level name sz19
digital-alarm  7
```

6. Query the default configuration of the analog and digital parameters.

```
huawei(config-if-MiniESC-0)#display esc environment info
  EMU ID: 0                              ESC environment state
  FAN control mode :Auto  FAN run state: Open
  ---------------------------Analog environment info--------------------------
  ID Name                State    Value   AlmUpper   AlmLower   Unit
  0  Temperature         Normal   29.00      50         10       C
  1  Input_-48v_0        Normal   53.906     75         45       V
  2  Humidity            Normal   -128.00    127        -128     -
  3  -                   Normal   -128.00    127        -128     -
  ---------------------------Digital environment
info----------------------------
  ID Name                State  Value |ID Name                State  Value
  0  Wiring              Normal 1     |1  Door0              Alarm  1
  2  -                   Normal 1     |3  -                  Normal 1
  4  -                   Normal 1     |5  -                  Normal 1
  6  -                   Normal 1     |7  -                  Normal 1
  8  -                   Normal 1     |9  sz19               Normal 0
  ------------------------------------------------------------------------------
```

NOTE

The door status alarm "Door0" is generated because the door is open.

7. Save the data.

```
huawei(config-if-MiniESC-0)#quit
huawei(config)#save
```

8. Close all the cabinet doors. Query the environment information again, and confirm that no door status alarm is generated.

6 ESCM Monitoring Solution(for F02AF Cabinet)

About This Chapter

Two ESCM environment monitoring units (EMUs) are configured in the F02AF cabinet. In this solution, the H521ESCM monitoring board in the ESCM is used to convert monitoring parameters and report monitoring parameters to the main control system.

6.1 ESCM EMU

This topic covers the function, front panel, and specifications of the ESCM environment monitoring unit (EMU).

Function

The ESCM EMU includes the environment monitoring board, terminal block, and DIP switch. It monitors the environment parameters of the whole device, such as smoke, water, door status, MDF, temperature, and humidity, and also provides the extended monitoring port.

Structure

Figure 6-1 shows the structure of the ESCM EMU. When two ESCMs are configured for the F02AF cabinet, they are placed on the tray side by side. **Figure 6-2**shows the appearance of the tray.

Figure 6-1 Structure of the ESCM EMU

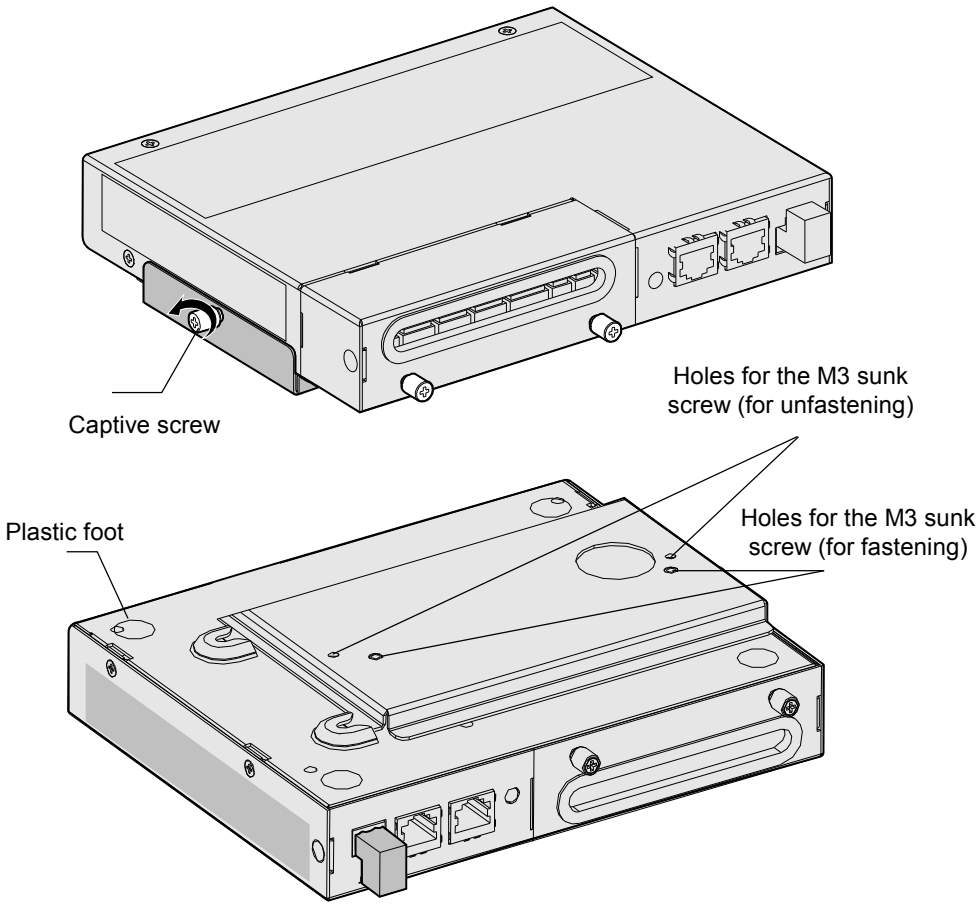


Figure 6-2 Appearance of the tray

Front Panel

Figure 6-3 shows the front panel of the ESCM EMU.

Figure 6-3 Front panel of the ESCM EMU

Indicator on the Front Panel

The ESCM EMU has one indicator on its front panel.

Table 6-1 describes the indicator.

Table 6-1 Indicator

Name	Color	Status	Description
RUN	Green	Blinking 1s on and 1s off	The environment monitoring board in the ESCM EMU functions properly.
	Red	Blinking 0.3s on and 0.3s off	The environment monitoring board is faulty. That is, certain alarms are generated, such as: ● Alarm indicating that the MDF is faulty ● Alarm indicating that the temperature or the system voltage exceeds the preset upper or lower limit

Name	Color	Status	Description
	Yellow	Blinking 0.3s on and 0.3s off	The environment monitoring board is not registered.
		Blinking 1s on and 1s off	The environment monitoring board generates alarms that do not interrupt services. These alarms can be ● Alarm of the environment analog parameter ● Alarm of the external digital parameter
		Blinks irregularly	An application program is being loaded or upgraded online. The loading speed determines the frequency of blinking.
		Always on	Communication between the environment monitoring board and the control board is interrupted.

Terminal Block

Table 6-2 describes the terminal blocks of the ESCM EMU.

Table 6-2 Terminal blocks of the ESCM EMU

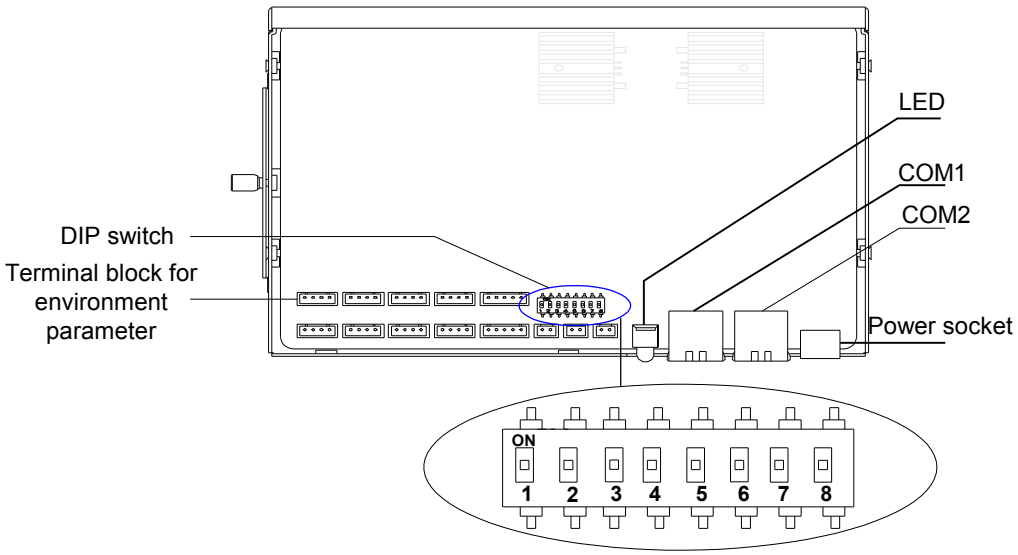
Silk Screen	Function	Remarks
JTD1-JTD6	Indicate the socket for the digital parameter input. ● Used to monitor digital parameters. ● Connect to the monitored devices according to the application scenarios.	Supported
JTD7	Applies to the smoke sensor only. Connects to the smoke sensor.	Supported
JTA1-JTA2	Apply to the temperature and humidity sensor only. Connects to the temperature and humidity sensor.	Supported
JAC	Indicates the relay output.	Not supported
JTM1	Indicates the socket for the door status sensor.	Supported
JTP1	Indicates the socket for the MDF sensor.	Supported
COM1	Communicates with the upper device in the RS-232 or RS-485 mode.	Supported

Silk Screen	Function	Remarks
COM2	Communicates with the upper system in the RS-232 or RS-485 mode.	Supported
48VDC INPUT	Indicates the socket for the power input. ● The power socket has two slots. The left slot is identified as RTN (-), and the right slot NEG (+). ● Connects to the -48 V output terminal of the power system.	Supported
Ground terminal	Connects to the ground point of the cabinet by using a ground cable. The ground terminal is located on the left upper corner at the rear of the EMU, and there is a grounding symbol to identify the ground terminal on the EMU.	Supported

DIP Switch

The ESCM EMU provides a DIP switch: S1, as shown in **Figure 6-4**.

Figure 6-4 Layout of S1 on the ESCM EMU



S1 has eight available electrical switches. ON indicates 0, and OFF indicates 1. **Table 6-3** describes the settings of S1.

Table 6-3 Settings of S1

Electrical Switch	Setting	Indication	Factory Default
S1-1 to S1-4	Address of the environment monitoring board	● When the ESCM EMU adopts the RS-232 communication mode, these bits are invalid. ● When the ESCM EMU adopts the RS-485 communication mode, these bits are used to set the address of the environment monitoring board.	S1-1: ON S1-2: ON S1-3: OFF S1-4: OFF
S1-5	Not supported	-	ON
S1-6	ON	The rate of the serial port is 19200 bit/s.	OFF
	OFF	The rate of the serial port is 9600 bit/s.	
S1-7	ON	The external sensor of JTA1 is of the current type.	ON
	OFF	The external sensor of JTA1 is of the voltage type.	
S1-8	ON	The external sensor of JTA2 is of the current type.	ON
	OFF	The external sensor of JTA2 is of the voltage type.	

When the ESCM EMU adopts the RS-485 communication mode, S1-1 to S1-4 are used to set the address of the environment monitoring board. **Table 6-4** shows the settings of S1-1 to S1-4.

Table 6-4 Settings of S1-1 to S1-4

S1-4	S1-3	S1-2	S1-1	Address Value
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6

S1-4	S1-3	S1-2	S1-1	Address Value
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Specifications

Table 6-5 lists specifications of the ESCM EMU.

Table 6-5 Specifications of the ESCM EMU

EMU	Dimensions (W x D x H)
ESCM	185 mm x 150 mm x 35 mm

6.2 Checking Environment Monitoring Cables

The sensors, which collect environment parameters, are connected to the terminal blocks of the ESCM through sensor cables. The ESCM processes the environment parameters collected by the sensors and then reports the parameters to the control system through the COM port. During the deployment, make sure that the cables are properly connected and that connectors are fastened.

Figure 6-5 shows the connections of the environment monitoring cable when two ESCMs are configured for the F02AF cabinet. Figure 6-6 shows the connections between the ESCM and external sensors. Table 6-6 lists the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the ESCM and from the ESCM to the control system are correct.

Figure 6-5 Connections of environment monitoring cables in the F02AF cabinet

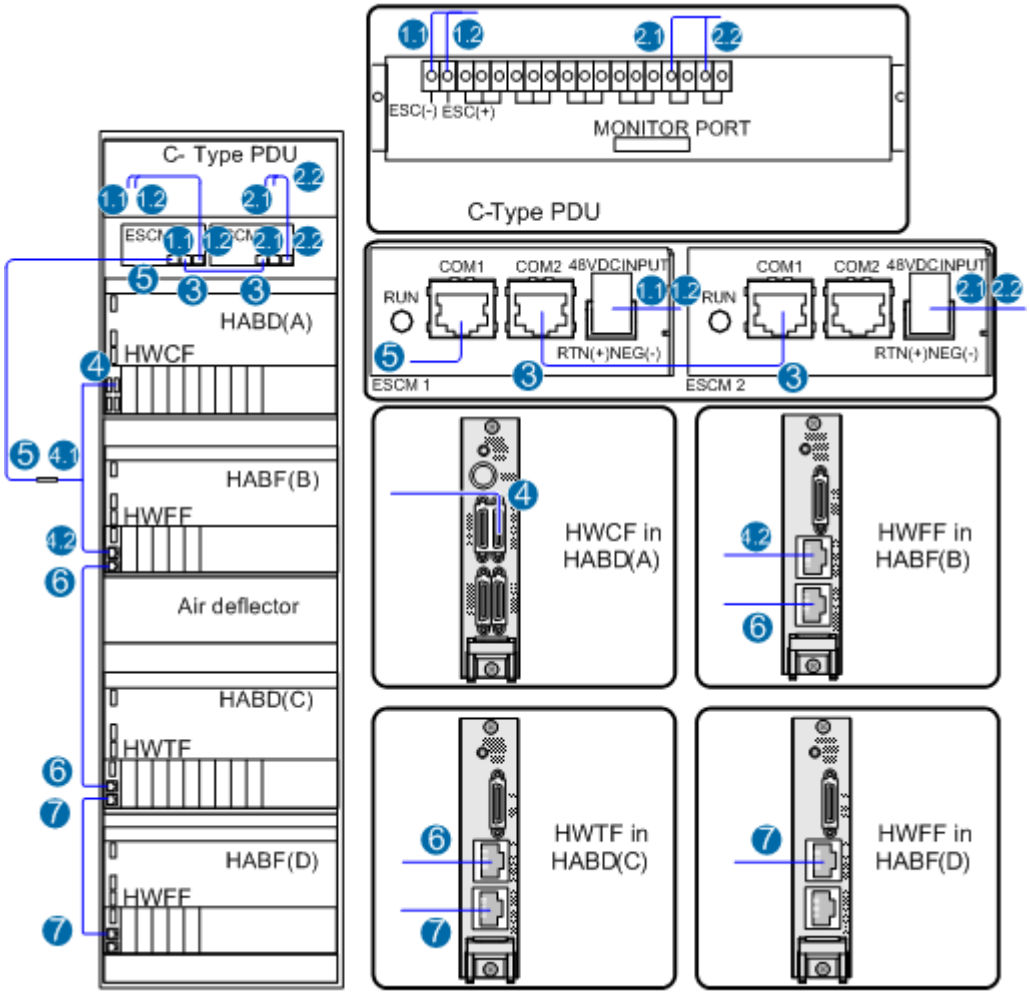


Figure 6-6 Connections between the ESCM and external sensors

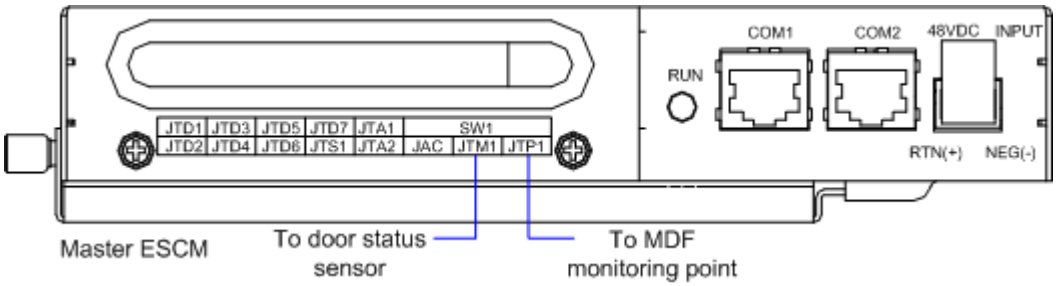


Table 6-6 Connections of environment monitoring cables in the F02AF cabinet

Cable	One End Connects to...		The Other End Connects to...	
	No.	Position	No.	Position
Door status sensor connecting cable	-	Door status sensor	-	Master ESCM JTM1
MDF monitoring cable	-	MDF monitoring point	-	Master ESCM JTP1
–48V feeder cable	1.1	Power output terminal on the C-type PDU	1.1	Master ESCM 48V DC INPUT
	2.1		2.1	Slave ESCM 48V DC INPUT
GND feeder cable	1.2	Power output terminal on the C-type PDU	1.2	Master ESCM 1 48V DC INPUT
	2.2		2.2	Slave ESCM 48V DC INPUT
Through cable	3	Master ESCM COM2	3	Slave ESCM COM1
Signal Cable	4	STACK OUT port on the HWCF transfer board of the HABD (A)	4.1	Connect the RJ45 female connector (label: N-RS485) to serial port cable 5 between HWCF and MINIESC.
			4.2	Connect the RJ45 connector to the STACK IN port on the HWFF transfer board of HABF (B).
HWCF to MINIESC serial port cable	5	Master ESCM COM1	5	RJ45 female connector 4.1 (label: N-RS485)
Test Subtending Cable	6	STACK OUT port on the HWFF transfer board of the HABF (B) shelf	6	STACK IN port on the HWTF transfer board of the HABD(C) shelf
Test Subtending Cable	7	STACK OUT port on the HWTF transfer board of the HABD (C) shelf	7	STACK IN port on the HWFF transfer board of the HABF(D) shelf

6.3 Configuring the Monitoring Through the ESCM (for F02AF Cabinet)

This topic describes how to configure the temperature, door status, MDF and power supply monitoring parameters of the ESCM.

Mapping Between Monitoring Parameters and Device Ports

The F02A cabinet is configured with two ESCM environment monitoring units (EMUs). This is because when a large number of monitoring parameters are used, one ESCM EMU cannot meet the requirements. **Table 6-7** lists the mapping between monitoring parameters and ESCM ports.

Table 6-7 Mapping between the monitoring parameters displayed on the host and the ports on the ESCM

Monitoring Parameter on Host	Device Port	Application in F02AF Cabinet
Temperature	Temperature	Temperature
Input_-48V_0	Voltage	Voltage
Analog 2	JTA1	Not connected by default, used to add a user-defined monitoring analog parameter
Analog 3	JTA2	Not connected by default, used to add a user-defined monitoring analog parameter
Wiring	JTP1 (MDF)	Not connected by default, only used to monitor the MDF
Door0	JTM1 (door status)	Connected by default, only used to monitor the door status
Digital 2	JTD1	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 3	JTD2	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 4	JTD3	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 5	JTD4	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 6	JTD5	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 7	JTD6	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 8	JTD7 (smoke)	Not connected by default, only used to monitor fog and smoke
Digital 9	JTS1 (water)	Not connected by default, only used to monitor water

NOTE

Before adding a user-defined analog or digital monitoring parameter, make sure that the port corresponding to this analog or digital monitoring parameter is properly connected to an environment monitoring cable.

Data Plan

Table 6-8 provides the data plan for configuring the ESCM.

Table 6-8 Data plan for configuring the ESCM

Item	Data	Remarks
EMU	Type: ESCM	ESCM is displayed as **MiniESC** on the CLI.
	SN: 0	-
	Subnode ID: 0 **NOTE** When the second ESCM EMU is added, the subnode must be set to 2.	The DIP switch of the ESCM hardware is set to 0. **NOTE** When the second ESCM EMU is added, the DIP switch must be set to 2.
	Serial port: RS485	-
Analog parameters	Analog parameter ID: 0	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the ambient temperature of the device.
	Upper alarm threshold of analog parameter 0: 50	When the ambient temperature of the device is equal to or higher than 50°C, the host reports an alarm. Default: 55°C.
	Lower alarm threshold of analog parameter 0: 5	When the ambient temperature of the device is equal to or lower than 5°C, the host reports an alarm. Default: 5°C.
	Analog parameter ID: 1	This analog parameter is set according to the actual requirements. The built-in analog parameter is set here to monitor the input voltage of the ESCM.
	Upper alarm threshold of analog parameter 1: 75 V	When the voltage of the device is equal to or lower than -75V, the host reports an alarm. Default: -72V.
	Lower alarm threshold of analog parameter 1: 45 V	When the voltage of the device is equal to or lower than -45 V, the host reports an alarm. Default: -38 V.

Item	Data	Remarks
Digital parameters	Digital parameter ID: 0	The monitoring digital parameter of the MDF sensor is set here to monitor the status of the MDF. When the MDF is faulty, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 0: high level	When the high level represents the valid level, the host does not report an alarm in the case of high level.
	Digital parameter ID: 1	The monitoring digital parameter of the door status sensor is set here to monitor the door status. When the cabinet door is opened, the host reports an alarm. Allocated by default (unable to be changed by the user).
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 9	The monitoring digital parameter of the water .
	Valid level of digital parameter 9: high level	When the low level represents the valid level, the host does not report an alarm in the case of low level. Default: high level.

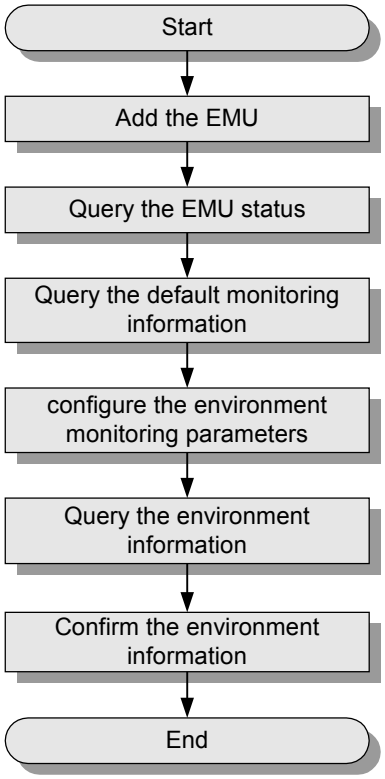
NOTE

The preceding data is configured according to the actual requirements. When the actually planned value of a parameter is the same as the default value, it is not necessary to configure the parameter.

Configuration Process

The monitoring parameters can be reported to the control board only when the data of the ESCM is correctly configured in the system. **Figure 6-7** shows the configuration process.

Figure 6-7 Configuration process of the ESCM



Procedure

Step 1 Configure the first ESCM EMU.

1. Run the **emu add** command to add an EMU after logging in to the UA5000 through the maintenance terminal.

```
huawei(config)#emu add 0 MiniESC 0 0 rs485 MiniESC-1
```

2. Run the **display emu** command to query the run state of the ESCM.

```
huawei(config)#display emu 0

  EMU ID:
0

--------------------------------------------------------------------------------
  EMU name    :
MiniESC-1
  EMU type    :
MiniESC
  EMU state   :
Normal
  Frame ID    :
0
  Subnode     :
0
  COM Port    :
RS485

--------------------------------------------------------------------------------
```

3. Access the ESCM environment monitoring configuration mode, and then run the **display esc system parameter** command to query the default configuration information about analog and digital parameters.

```
huawei(config)#interface emu 0
huawei(config-if-MiniESC-0)#display esc system parameter
EMU ID: 0                              ESC system parameter

--------------------------------------------------------------------------------
  AnalogID Name              AlmUpper AlmLower TestHigh TestLow Unit
type
     0     Temperature          55      5        100      -27   C
Voltage
     1     Input_-48V_0         72      38       75       0     volt
Voltage
     2     -                    127     -128     127      -128  -
Voltage
     3     -                    127     -128     127      -128  -
Voltage

--------------------------------------------------------------------------------
  DigitalID Name        Available Level|DigitalID Name        Available
Level
     0     Wiring                1     |   1     Door0
0
     2     -                     1     |   3     -
1
     4     -                     1     |   5     -
1
     6     -                     1     |   7     -
1
     8     -                     1     |   9     Water
1
  --------------------------------------------------------------------------------
```

NOTE

The query result indicates that the monitoring systems for temperature, voltage, door status, water, and MDF are configured automatically. Check whether the configurations are the same as the data planning. If they are different, configure the monitoring system according to the data planning.

4. Run the **esc analog** command to set analog parameters.

```
huawei(config-if-MiniESC-0)#esc analog 0 alarm-upper-limit 50
huawei(config-if-MiniESC-0)#esc analog 1 alarm-upper-limit 75 alarm-lower-
limit 45
```

5. Run the **display esc system parameter** command to query whether the configuration information about analog and digital parameters is consistent with the data plan.

```
huawei(config-if-MiniESC-0)#display esc system  parameter

  EMU ID: 0                              ESC system
parameter

--------------------------------------------------------------------------------
  AnalogID Name              AlmUpper AlmLower TestHigh TestLow Unit
type
     0     Temperature          50      5        100      -27   C
Voltage
     1     Input_-48V_0         75      45       75       0     volt
Voltage
     2     -                    127     -128     127      -128  -
Voltage
     3     -                    127     -128     127      -128  -
Voltage

--------------------------------------------------------------------------------
  DigitalID Name        Available Level|DigitalID Name        Available
Level
     0     Wiring                1     |   1     Door0
0
```

```
     2     -                    1     |   3     -
1
     4     -                    1     |   5     -
1
     6     -                    1     |   7     -
1
     8     -                    1     |   9     Water
1

--------------------------------------------------------------------------
```

6. Run the **save** command to save data.

```
huawei(config-if-MiniESC-0)#quit
huawei(config)#save
```

Step 2 Configure the second ESCM EMU.

1. Run the **emu add** command to add an EMU after logging in to the UA5000 through the maintenance terminal.

```
huawei(config)#emu add 1 MiniESC 0 2 rs485 MiniESC-2
```

2. The subsequent steps are the same as that in configuring the first ESCM EMU and therefore are omitted here.

----End

Result

1. Run the **display esc environment info** command to query the environment information. Ensure that the current environment monitoring function is normal and that no alarm is generated for monitoring parameters except the door status parameter.

```
huawei(config-if-MiniESC-0)#display esc environment info
  EMU ID: 0                           ESC environment
state
  FAN control mode :Auto  FAN run state:
Open
  ---------------------------Analog environment
info---------------------------
  ID Name                State    Value   AlmUpper   AlmLower
Unit
  0  Temperature         Normal   29.00      50         5
C
  1  Input_-48v_0        Normal   53.906     75         45
V
  2  -                   Normal   -128.00    127        -128
-
  3  -                   Normal   -128.00    127        -128
-
  ---------------------------Digital environment
info---------------------------
  ID Name                State  Value |ID Name                State
Value
  0  Wiring              Normal 1     |1  Door0               Alarm
1
  2  -                   Normal 1     |3  -                   Normal
1
  4  -                   Normal 1     |5  -                   Normal
1
  6  -                   Normal 1     |7  -                   Normal
1
  8  -                   Normal 1     |9  Water               Normal
1
 --------------------------------------------------------------------------
```

2. Close the cabinet door, and use the **display esc environment info** command to query the environment information, the door status normal.

7 EPS30-4815AF Monitoring Solution

About This Chapter

The EPS30-4815AF monitoring solution is implemented by the EPMU03 monitoring module in the EPS30-4815AF power system. In this solution, the EPMU03 monitoring module reports the monitored parameters collected by the sensor transfer box to the control system.

7.1 EPS30-4815AF Power System

The AC-powered cabinet uses the EPS30-4815AF power system to convert the AC input into the DC power for power distribution.

Function

The EPS30-4815AF power system converts one AC input into two DC outputs to implement the DC power distribution. It can be connected to one set of batteries and use its monitoring module to manage the batteries.

The EPS30-4815AF power system can also use the external sensor transfer box to collect and report the status of sensors and standby detected parameters.

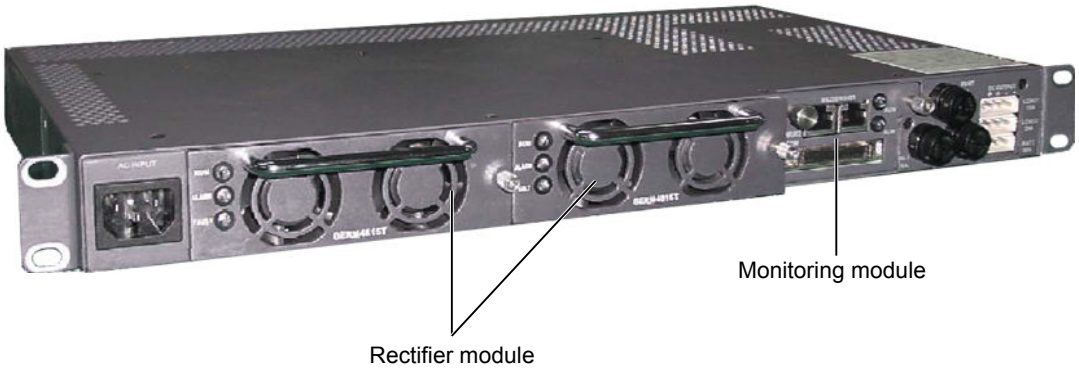
NOTE

The rectifier modules of the EPS30-4815AF power system work in the load balancing and mutual hot backup mode.

Appearance

Figure 7-1 shows the appearance of the EPS30-4815AF power system.

Figure 7-1 Appearance of the EPS30-4815AF power system



Configuration

Table 7-1 lists the component configuration of the EPS30-4815AF power system.

Table 7-1 Component configuration of the EPS30-4815AF power system

Component	Configuration
GERM4815T rectifier module	1 to 2 (optional)
EPMU03 monitoring module	1

Component	Configuration
Rack-EPS30-4815AFEM AC/DC power supply unit	1

The EPS30-4815AF power system can be configured with two rectifier modules, which are connected in parallel for output.

Table 7-2 shows the mapping between the quantity of rectifier modules in the EPS30-4815AF power system and the maximum output current.

Table 7-2 Mapping between the quantity of rectifier modules of the EPS30-4815AF power system and the maximum output current

Quantity of Rectifier Modules	Maximum Output Current
1	15 A
2	30 A

Indicator

Table 7-3 describes the indicators on the rectifier module of the EPS30-4815AF power system.

Table 7-3 Indicators on the rectifier module of the EPS30-4815AF power system

Indicator	Status	Description
RUN	Steady green	The rectifier module functions properly.
	Off	This indicator is off when the red indicator is on or the yellow indicator is on (not caused by output overcurrent).
ALM	Steady yellow	The ALM indicator of the rectifier module is valid when PS-off, OTP, and primary protection are valid, or when overcurrent occurs.
	Blinking yellow	The communication of the rectifier module is interrupted.
	Off	The rectifier module functions properly.
FAULT	Steady red	The FAULT indicator of the rectifier module is valid when PS-enable and Vo-OV are valid, or when fan fault, no output, or output short circuit occurs.
	Off	The rectifier module functions properly.

Table 7-4 describes the indicators on the monitoring module of the EPS30-4815AF power system.

Table 7-4 Indicators on the monitoring module of the EPS30-4815AF power system

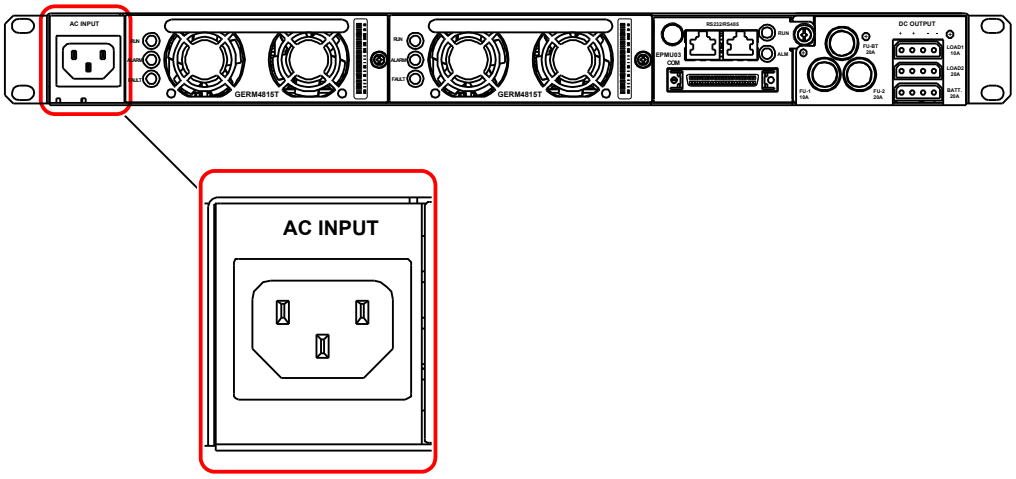
Indicator	Status	Description
RUN	Green and blinking 1s on and 1s off	The monitoring module functions properly.
	Blinking green quickly	The monitoring module hardware is normal but the communication between the monitoring module and the upper device is abnormal.
	Off	The monitoring module is faulty or there is no power input.
ALM	Steady red	The system generates a critical alarm or the battery is disconnected.
	Off	The system does not generate any critical alarm and the battery is already connected.

Input Terminal

The EPS30-4815AF power system supports one 220 V AC power input and the standard 3-pin connector is used.

Figure 7-2 shows the input terminals of the EPS30-4815AF power system.

Figure 7-2 Input terminals of the EPS30-4815AF power system



Output Terminal

The EPS30-4815AF power system supports three output terminals. The two pins on the left of the output terminal are the output positive pole and the two pins on the right of the output terminal are the output negative pole.

Figure 7-3 shows the output terminals of the EPS30-4815AF power system.

Figure 7-3 Output terminals of the EPS30-4815AF power system

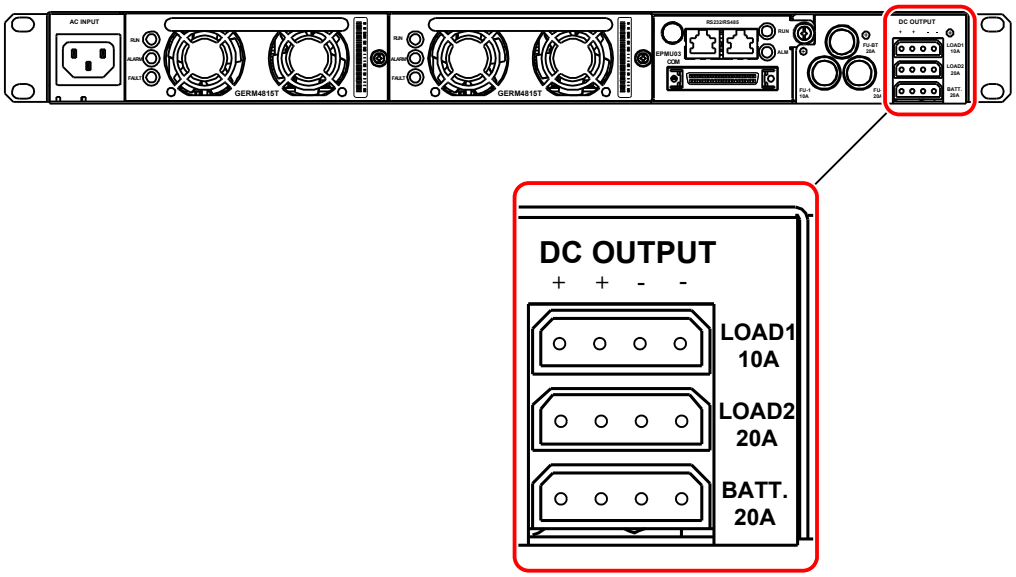


Figure 7-4 shows the fuses of the output tributaries in the EPS30-4815AF power system.

Figure 7-4 Fuses of the output tributaries in the EPS30-4815AF power system

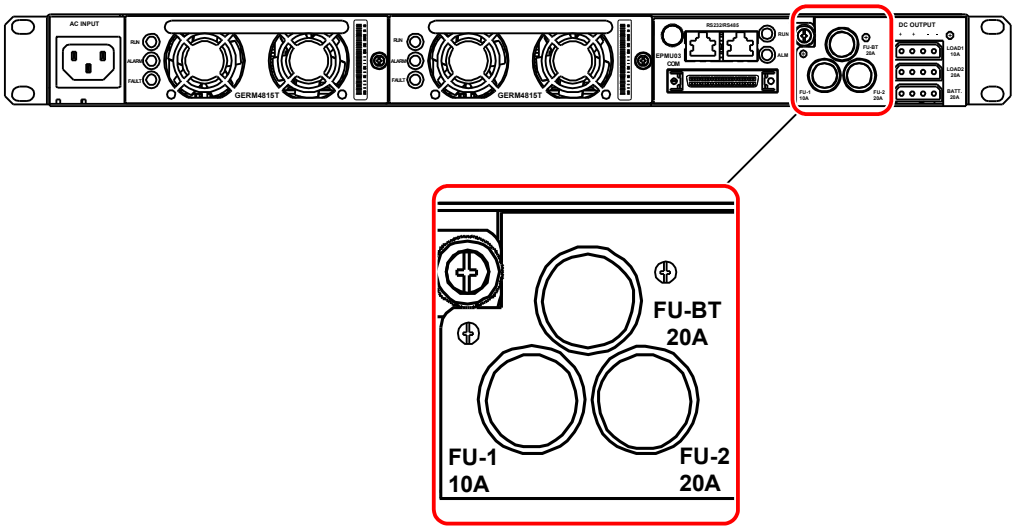


Table 7-5 shows the mapping between the fuses of the output tributaries and the load tributaries.

Table 7-5 Mapping between the fuses of the output tributaries and the load tributaries

Fuse of the Output Tributary	Load Tributary
FU-1 (10 A)	LOAD1 (10 A)
FU-2 (20 A)	LOAD2 (20 A)
FU-BT (20 A)	BATT (20 A)

Specifications

Table 7-6 lists the specifications of the EPS30-4815AF power system.

Table 7-6 Specifications of the EPS30-4815AF power system

Parameter	Specification
Input	● Rated input voltage: 220 V AC (90-290 V AC) (Note that in the range of 90-176 V AC, the output current also decreases linearly, limited within a specified range.) ● Maximum input current: 10 A ● Frequency: 50 Hz (45-65 Hz)
Output	● Rated output voltage: –53.5 V DC ● Voltage range: –43.2 V DC to –57.6 V DC ● Output current: – LOAD1: 10 A (fuse) – LOAD2: 20 A (fuse) – BATT: 20 A (fuse)
Efficiency	⩾ 89% (in rated working state, 50% to 100% load)
Operating temperature range	-33°C to +65°C (Note that in the range of +50°C to +65°C, the output current also decreases linearly, limited within a specified range.)
Cooling method	Forced air cooling, with the built-in fan in the rectifier module
Dimensions (excluding mounting ears)	442 mm x 250 mm x 43.6 mm (W x D x H)

7.2 PMIB01 Sensor Transfer Box

This topic describes the application and front panel of the sensor transfer box, and provides the specifications of the sensor transfer box.

Function

The sensor transfer box provides various terminal blocks to connect the EMU and external sensors.

Overview

The sensor transfer box is an optional part. It provides diverse terminal blocks to connect the monitoring unit to the sensors.

Front Panel

Figure 7-5 shows the PMIB01 sensor transfer box.

Figure 7-5 Front panel of the PMIB01 sensor transfer box

Terminal Block

Figure 7-6 and Table 7-7 describe the terminal blocks of the PMIB01 sensor transfer box.

Figure 7-6 Terminal blocks of the PMIB01 sensor transfer box

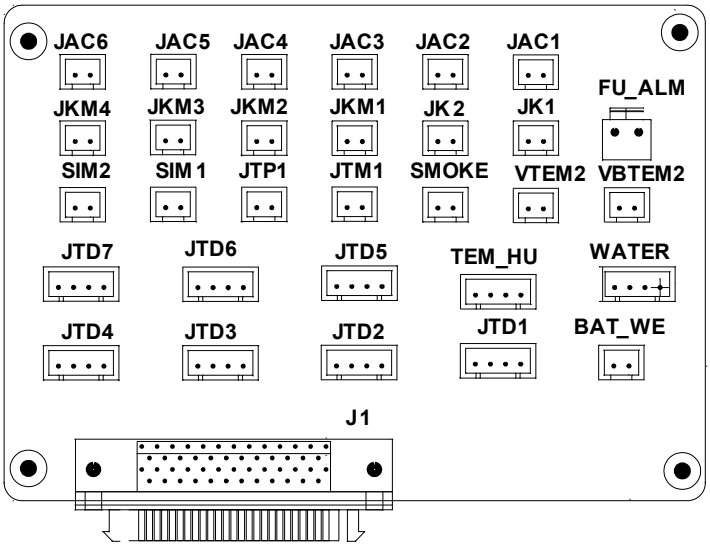


Table 7-7 Pin Function of the Terminal blocks

Silk Screen	Signal Port	Pin Function	Remarks
BAT_WE	Sensor port of battery temperature 1	● Pin 1 is for grounding. ● Pin 2 is for the signal cable. ● Pin 3 is reserved. ● Pin 4 is for the +12 V power supply. The external sensor outputs the 0-5 V voltage signal.	Used
VBTEM2	Sensor port of battery temperature 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
WATER	Water sensor port	● Pin 1 is for the +12 V power supply. ● Pin 2 is for the signal cable. ● Pin 3 is for grounding. ● Pin 4 is reserved. When the impedance between pin 2 and pin 3 drops to a certain range, alarms are triggered.	-
TEM_HU	Sensor port of temperature and humidity 1	● Pin 1 and pin 3 are for the +24 V power supply. ● Pin 2 is for the temperature signal cable. ● Pin 4 is for the humidity signal cable.	Used
VTEM2	Sensor port of temperature and humidity 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
JTP1	Sensor port of the MDF	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	Used
SMOKE	Smoke sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply.	-

Silk Screen	Signal Port	Pin Function	Remarks
JTM1	Door-status sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply. By default, when pin 1 and pin 2 are connected, the door is in the normal state; when they are disconnected, alarms are triggered. If no door-status sensor is used, connect pin 1 and pin 2 to disable door-status alarms.	Used
JK1, JK2	Alarm digital ports	The maximum voltage is 60 VDC and the maximum load current is 500 mA. ● When minor alarms are generated, JK2 is short-circuited. ● When critical alarms are generated, JK1 is short-circuited. ● Users can define alarm levels through the BAM program.	Reserved
JKM1-JKM4	Digital ports	The maximum voltage is 5.6 VDC and the maximum current is 20 mA.	-
SIM1, SIM2	Battery unbalanced sensor ports	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	-
JAC1-JAC6	Output ports of the optical coupler	Pin 1 and pin 2 are connected to pole C and pole E of the optical coupler. The optical coupling parameter Vce max is 40 VDC and Ic max is 80 mA. Avoid setting the parameters to the maximum values.	Reserved
FU_ALM	Detecting port of the battery fuse	● Pin 1 is for the signal cable FU1+ and is connected to the negative pole of the battery. ● Pin 2 is reserved for the FU1- signal.	-
JTD1-JTD7	Input ports of the standby Boolean value	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the +12 V power supply. ● Pin 3 is for the signal cable. ● Pin 4 is for grounding. According to the actual requirements, access related passive digital signals to pins 2 and 3.	Reserved

Silk Screen	Signal Port	Pin Function	Remarks
J1	DB50 port	The port connects the monitoring transfer board and the monitoring board to input the sensor signals and the output the control signals.	-

NOTE

"JTD1-JTD7" are the input ports of the standby Boolean value. By default, the sensors are not configured. You can determine the type of signal to be accessed. With related configuration, the monitor unit can monitor them.

Specifications

Table 7-8 lists the specifications of the PMIB01 sensor transfer box.

Table 7-8 Specifications of the PMIB01 sensor transfer box

Sensor Transfer Box	Dimensions (W x D x H)
PMIB01	140 mm x 96 mm x 31 mm

7.3 Checking Environment Monitoring Cables

The EPMU03 monitoring module monitors the environment parameters collected by the sensors in real time, and reports the alarm information to the control system. Therefore, make sure that the connections from the sensors to the ports of the PMIB01, from the PMIB01 to the EPMU03, and from the EPMU03 to the control system are correct.

Checking Environment Monitoring Cables in the F01E200 Cabinet

Figure 7-7 shows the connections of environment monitoring cables in the F01E200 cabinet. Table 7-9 describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the PMIB01, from the PMIB01 to the EPMU03, and from the EPMU03 to the control system are correct.

Figure 7-7 Connections of environment monitoring cables in the F01E200 cabinet

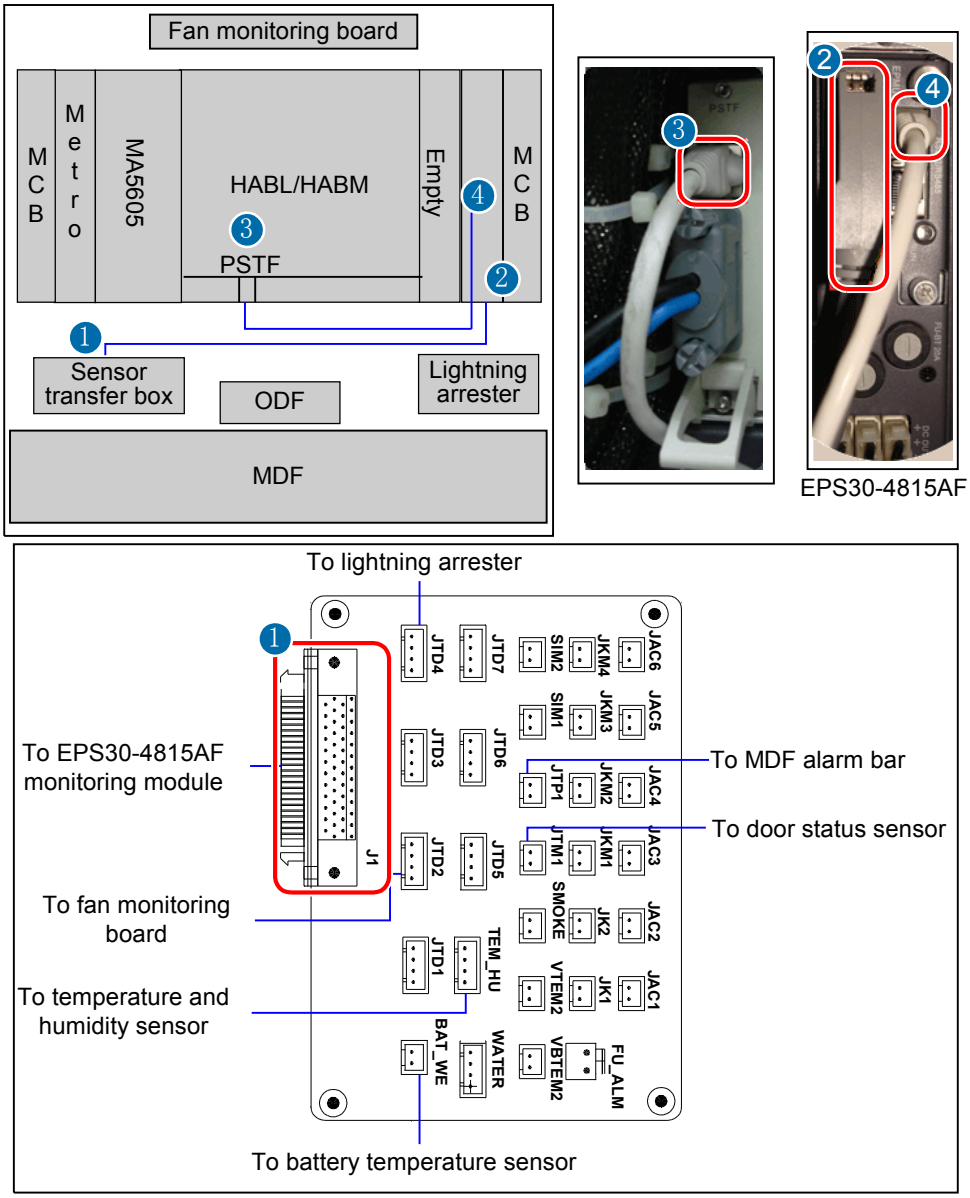


Table 7-9 Connections of environment monitoring cables in the F01E200 cabinet

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
Monitoring cable of the fan monitoring board	JTD2 terminal of the sensor transfer box	J103 port on the fan monitoring board
Lightning arrester (SPD) monitoring cable	JTD4 terminal of the sensor transfer box	ALARM port of the lightning arrester (SPD)
MDF monitoring cable	JTP1 terminal of the sensor transfer box	Alarm bar of the MDF

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
Monitoring cable of the Door status sensor	JTM1 terminal of the sensor transfer box	Door status sensor
Monitoring cable of the temperature and humidity sensor	TEM-HU terminal of the sensor transfer box	Temperature and humidity sensor
Monitoring cable of the battery temperature sensor	BAT_WE terminal of the sensor transfer box	Temperature sensor of the battery
Monitoring cable	(1): J1 terminal of the sensor transfer box	(2): EPS30-4815AF
Test and alarm cable	(3): Communication port on the PSTF transfer board of the HABL/HABM	(4): RS485/RS232 ports on the monitoring unit of the EPS30-4815AF

Checking Environment Monitoring Cables in the F01E400 Cabinet

Figure 7-8 shows the connections of environment monitoring cables in the F01E400 cabinet. **Table 7-10** describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the PMIB01, from the PMIB01 to the EPMU03, and from the EPMU03 to the control system are correct.

Figure 7-8 Connections of environment monitoring cables in the F01E400 cabinet

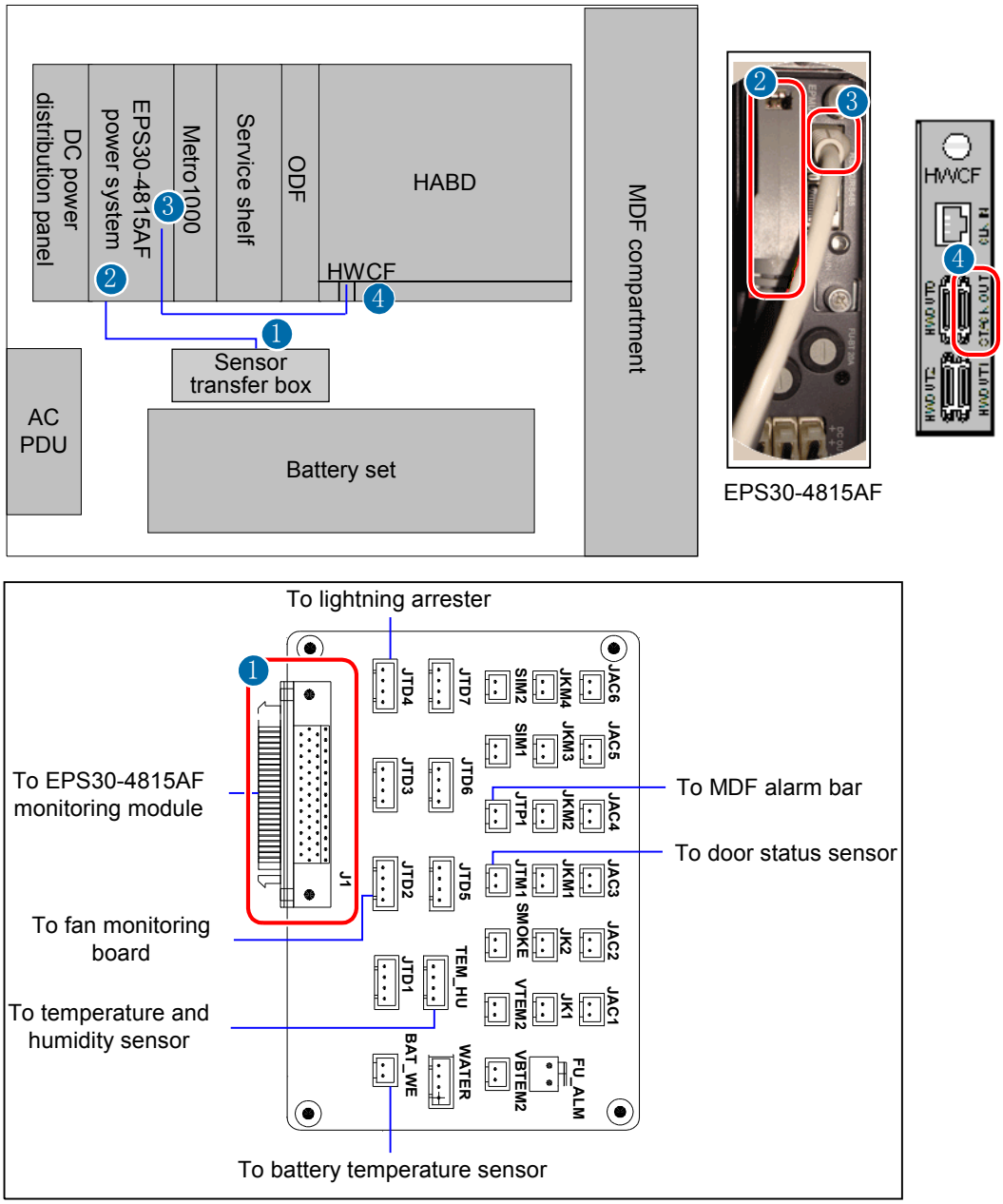


Table 7-10 Connections of environment monitoring cables in the F01E400 cabinet

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
Monitoring cable of the fan monitoring board	JTD2 terminal of the sensor transfer box	J103 port on the fan monitoring board
Lightning arrester (SPD) monitoring cable	JTD4 terminal of the sensor transfer box	ALARM port of the lightning arrester (SPD)

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
MDF monitoring cable	JTP1 terminal of the sensor transfer box	Alarm bar of the MDF
Monitoring cable of the Door status sensor	JTM1 terminal of the sensor transfer box	Door status sensor
Monitoring cable of the temperature and humidity sensor	TEM-HU terminal of the sensor transfer box	Temperature and humidity sensor
Monitoring cable of the battery temperature sensor	BAT_WE terminal of the sensor transfer box	Temperature sensor of the battery
Monitoring cable	(1): J1 terminal of the sensor transfer box	(2): EPS30-4815AF
Monitoring cable	STACK OUT port on the HWCF transfer board of the HABD	(4): RS485/RS232 ports on the monitoring unit of the EPS30-4815AF

Checking Environment Monitoring Cables in the M200 Cabinet

Figure 7-9 shows the connections of environment monitoring cables in the M200 cabinet. **Table 7-11** describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the PMIB01, from the PMIB01 to the EPMU03, and from the EPMU03 to the control system are correct.

Figure 7-9 Connections of environment monitoring cables in the M200 cabinet

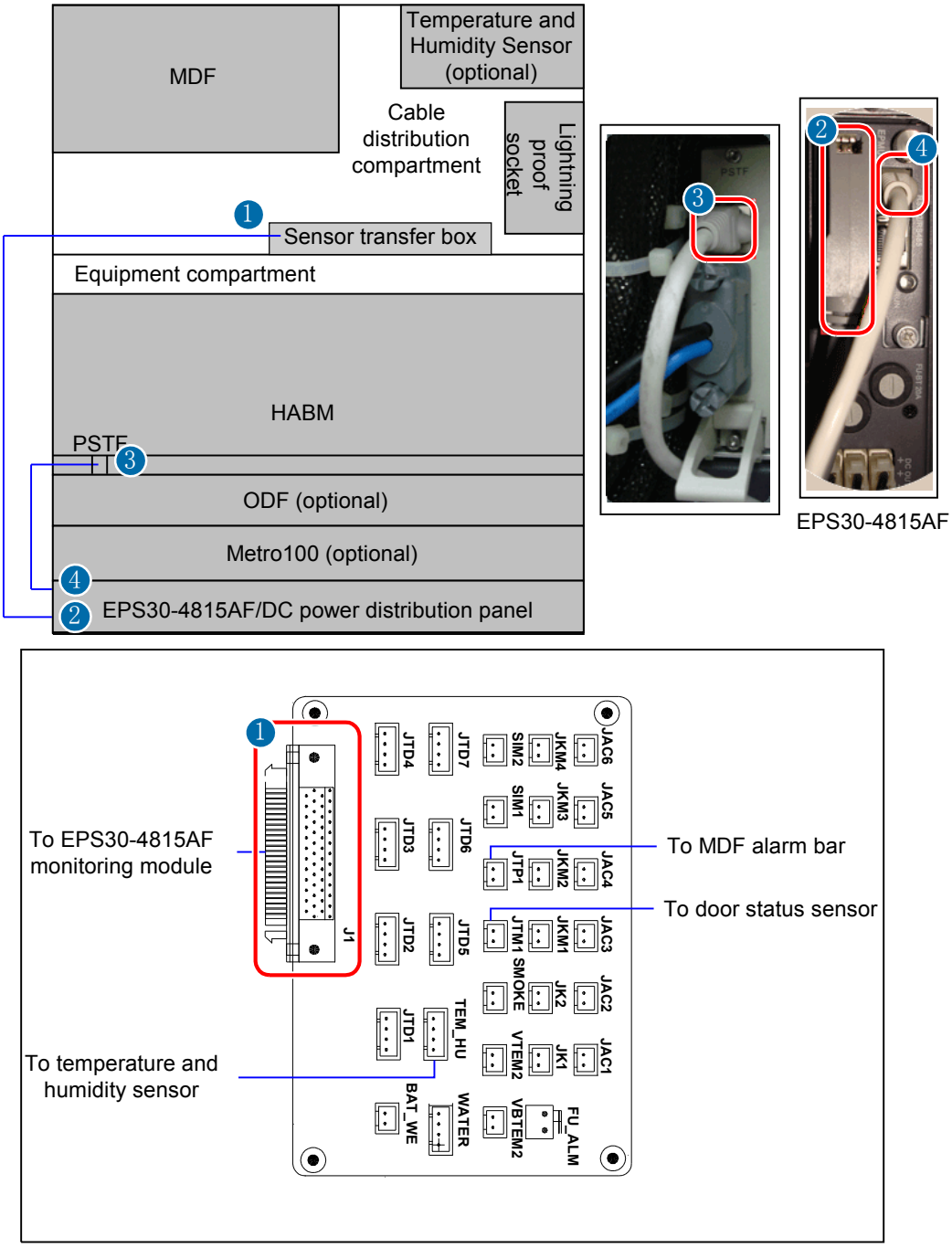


Table 7-11 Connections of environment monitoring cables in the M200 cabinet

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
MDF monitoring cable	JTP1 terminal of the sensor transfer box	Alarm bar of the MDF

Cable	Connect One End of the Cable to...	Connect the Other End of the Cable to...
Monitoring cable of the Door status sensor	JTM1 terminal of the sensor transfer box	Door status sensor
Monitoring cable of the temperature and humidity sensor	TEM-HU terminal of the sensor transfer box	Temperature and humidity sensor
Monitoring cable	(1): J1 terminal of the sensor transfer box	(2): EPS30-4815AF
Test and alarm cable	(3): Communication port on the PSTF transfer board of the HABM	(4): RS485/RS232 ports on the monitoring unit of the EPS30-4815AF

7.4 Configuring the Environment Monitoring Parameters of the EPS30-4815AF

This topic describes how to configure the environment monitoring parameters of the EPS30-4815AF through the CLI.

Mapping Between Monitoring Parameters and Device Ports

Table 7-12 describes the mapping between the monitoring parameters displayed on the host and the ports on the sensor transfer box.

Table 7-12 Mapping between the monitoring parameters displayed on the host and the ports on the sensor transfer box

Monitoring Parameter Displayed on the Host	Device Port	Application in the M200 Cabinet	Application in the F01E200 Cabinet	Application in the F01E400 Cabinet
Digital 0	JTD1	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 1	JTD2	Not connected by default, used to add a user-defined monitoring digital parameter	Fan monitoring board	Fan monitoring board

Monitoring Parameter Displayed on the Host	Device Port	Application in the M200 Cabinet	Application in the F01E200 Cabinet	Application in the F01E400 Cabinet
Digital 2	JTD3	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 3	JTD4	Not connected by default, used to add a user-defined monitoring digital parameter	Lightning arrester	Lightning arrester
Digital 4	JTD5	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 5	JTD6	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Digital 6	JTD7	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter
Door alarm	JTM1	Door status sensor	Door status sensor	Door status sensor
Wiring alarm	JTP1	MDF	MDF	MDF
Battery Tem	BAT_WE	Not connected by default, used to add a user-defined monitoring digital parameter	Battery temperature sensor	Battery temperature sensor
environment Tem/ environment Hum	TEM-HU	Temperature and humidity sensor	Temperature and humidity sensor	Temperature and humidity sensor

NOTE

Before adding a user-defined analog or monitoring digital parameter, make sure that the port corresponding to this analog or monitoring digital parameter is properly connected with an environment monitoring cable.

Data Plan

The data plan for configuring monitoring parameters of the EPS30-4815AF in the M200 cabinet is the same that in the F01E200 and F01E400 cabinets. In this topic, the application in the F01E400 cabinet is considered as an example. **Table 7-13** provides the data plan for configuring the monitoring parameters of the EPS30-4815AF.

Table 7-13 Data plan for configuring the monitoring parameters of the EPS30-4815AF

Item	Data Plan for the F01E400 Cabinet	Remarks
EMU	Type: POWER4845	During the configuration of the EPS30-4815AF, the type of the EPS30-4815AF is selected as **POWER4845**.
	SN: 0	-
	Subnode ID: 0	The subnode ID must be the same as the subnode setting of the corresponding DIP switch on the EMU, but the subnode ID must be different from IDs of the other subnodes on the same bus.
Charging parameters of the battery	Charging mode of the battery: automatic	This parameter is set according to the actual requirements. automatic: The power system automatically adjusts the charging mode of the battery according to the status of the battery set. equalizing: The battery is charged forcibly so as to quickly compensate for the lost capacity of the battery. floating: The battery adjusts charging/ discharging when it is in saturation. Default: automatic.
	Equalized charging voltage of the battery: 56.5 V	This parameter is set according to the actual requirements. When setting the equalized charging voltage of the battery, make sure that DC overvoltage - 1 V > equalized charging voltage > float charging voltage + 2 V, and that DC undervoltage > load power-off voltage > battery power-off voltage. Default: 56.5 V.
	Float charging voltage of the battery: 53.5 V	This parameter is set according to the actual requirements. When setting the float charging of the battery, make sure that DC overvoltage - 1 V > equalized charging voltage > float charging voltage + 2 V, and that DC undervoltage > load power-off voltage > battery power-off voltage. Default: 53.5 V.

Item	Data Plan for the F01E400 Cabinet	Remarks
Battery management parameters	Current-limiting coefficient for battery charging: 0.15	This parameter is set according to the actual requirements. In the normal state, the current of the power supply is not limited. The current-limiting function is enabled when the charging current of the battery set > current-limiting coefficient x nominal capacity of the battery set. Default value: 0.15.
	Interval of battery equalized charging: 60 days	This parameter is set according to the actual requirements. If the continuous float charging duration of the rectifier unit exceeds the preset equalized charging interval, the battery enters the equalized charging state. Default: 60 days.
	Number of battery sets: 1	This parameter is set according to the actual requirements. The number of battery sets can be set to 0 or 1. That is, the system supports up to one battery set. Default: 1.
	Capacity of the battery set: 75 AH	The battery capacity is configured according to the actual value. The F01E200 cabinet uses the 50 AH batteries, the F01E400 cabinet uses the 75 AH batteries, and the M200 cabinet has no batteries. Default: 130 AH.
Temperature compensation parameters of the battery	Upper temperature threshold of the battery set: 80°C	This parameter is set according to the actual requirements. Default: 60°C.
	Lower temperature threshold of the battery set: -20°C	This parameter is set according to the actual requirements. Default: -40°C.
	Temperature compensation coefficient of the battery set: 80 mV	This parameter is set according to the actual requirements. The temperature compensation coefficient refers to the variable of the float charging voltage of the battery set when the temperature of the battery set changes by every 1° C. Default: 100 mV.
Power supply load power-off and battery set power-off parameters	Load power-off permission status: forbid	This parameter is set according to the actual requirements. Default: permit.

Item	Data Plan for the F01E400 Cabinet	Remarks
	Battery set power-off permission status: permit	This parameter is set according to the actual requirements. Default: permit.
	Load power-off voltage: 44 V	This parameter is set according to the actual requirements. Default: 43.5 V.
	Battery set power-off voltage: 43 V	This parameter is set according to the actual requirements. Default: 43 V.
Power distribution parameters	AC overvoltage alarm threshold of the power supply: 280 V	This parameter is set according to the actual requirements. When the AC voltage exceeds the preset overvoltage alarm threshold, the system reports an AC overvoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 280 V.
	AC undervoltage alarm threshold of the power supply: 180 V	This parameter is set according to the actual requirements. When the AC voltage falls below the preset undervoltage alarm threshold, the system reports an AC undervoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 180 V.
	DC overvoltage alarm threshold of the power supply: 58 V	This parameter is set according to the actual requirements. When the DC voltage exceeds the preset overvoltage alarm threshold, the system reports a DC overvoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 58 V.
	DC undervoltage alarm threshold of the power supply: 45 V	This parameter is set according to the actual requirements. When the DC voltage falls below the preset undervoltage alarm threshold, the system reports a DC undervoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 45 V.
Rectifier unit parameter	Number of rectifier units: 2	This parameter is set according to the actual requirements. The EPS30-4815AF supports up to two rectifier units. Default value: 3.

Item	Data Plan for the F01E400 Cabinet	Remarks
Load and battery high-temperature power-off parameters	Load high-temperature power-off permission status: forbid	This parameter is set according to the actual requirements. Default: permit.
	Battery high-temperature power-off permission status: permit	This parameter is set according to the actual requirements. Default: permit.
	Temperature for load high-temperature power-off: 70°C	This parameter is set according to the actual requirements. Default: 65°C.
	Temperature for battery high-temperature power-off: 53°C	This parameter is set according to the actual requirements. Default: 50°C.
Environment monitoring parameters	Upper alarm threshold of the temperature: 68°C	This parameter is set according to the actual requirements. When the actual temperature reaches or is higher than the upper alarm threshold, the system reports an alarm. Default: 50°C.
	Lower alarm threshold of the temperature: -5°C	This parameter is set according to the actual requirements. When the actual temperature is equal to or lower than the lower alarm threshold, the system reports an alarm. Default: 0°C.
	Upper alarm threshold of the humidity: 80% RH	This parameter is set according to the actual requirements. When the actual humidity reaches or is higher than the upper alarm threshold, the system reports an alarm. Default: 80% RH.
	Lower alarm threshold of the humidity: 10% RH	This parameter is set according to the actual requirements. When the actual humidity is equal to or lower than the lower alarm threshold, the system reports an alarm. Default: 10% RH.
External extended digital parameters	Digital parameter ID: 1	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

Item	Data Plan for the F01E400 Cabinet	Remarks
	Digital parameter ID: 3	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the lightning arrester is set here to monitor the lightning arrester. When the lightning arrester is faulty, the host reports an alarm.
	Valid level of digital parameter 2: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

NOTE

The preceding data is configured according to the actual requirements. When the actually planned value of a parameter is the same as the default value, it is not necessary to configure the parameter.

Configuration Process

The monitoring parameters can be reported to the control board and the service processing board only when the data for the EPS30-4815AF is configured correctly in the system.

Figure 7-10 shows the configuration process, and **Table 7-14** lists the commands used during the configuration.

Figure 7-10 Configuration process of the EPS30-4815AF

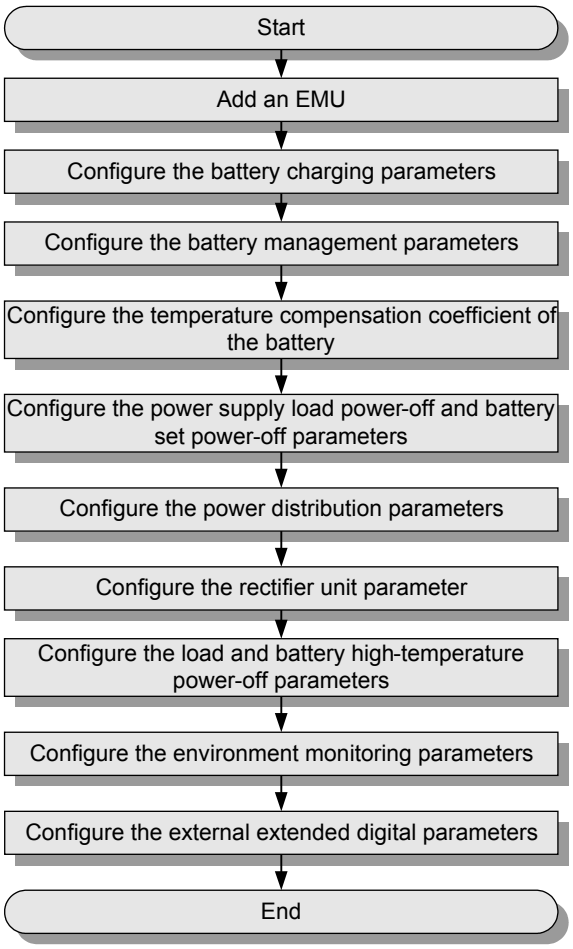


Table 7-14 Commands for configuring the EPS30-4815AF

To...	Run the Command...
Add an EMU	**emu add**
Configure the battery charging parameters	**power charge**
Configure the battery management parameters	**power battery parameter**
Configure the temperature compensation coefficient of the battery	**power battery temperature**
Configure the power supply load power-off and battery set power-off parameters	**power off**

To...	Run the Command...
Configure the power distribution parameters	**power supply-parameter**
Configure the rectifier unit parameter	**power module-num**
Configure the load and battery high-temperature power-off parameters	**power temperature-off**
Configure the environment monitoring parameters	**power environment**
Configure the external extended digital parameters	**power outside-digital** IDs of user-defined alarms in the digital parameters: IDs 1-20 are reserved alarm IDs in the system (1: AC_voltage; 2: AC_switch; 3: Battery_voltage; 4: Battery_fuse; 5: Load_fuse; 6: Rectifier; 7: DC_power; 8: Cupboard_door; 9: Room_door; 10: Window; 11: Theft; 12: Wiring; 13: Fan; 14: Fire; 15: Fog; 16: Water; 17: Diesel; 18: Smell 19: Air_conditioner; 20: SPD), and IDs 21-52 are alarm IDs allocated to other user-defined alarms by users.
Query the configuration parameters of the power system	**display power system parameter**

The following considers the configuration in the F01E400 cabinet as an example to describe the process of configuring the environment monitoring parameters of the EPS30-4815AF.

1. Log in to the UA5000 through the maintenance terminal and add an EMU.

```
huawei(config)#emu add 0 POWER4845 0 0 RS232 POWER4830
```

2. Query the status of the EPS30-4815AF.

```
huawei(config)#display emu 0
------------------------------------------------------------------------
  EMU name    : POWER4830
  EMU type    : Pwr4845
  EMU state   : Normal
  Frame ID    : 0
  Subnode     : 0
  COM Port    : RS232
------------------------------------------------------------------------
```

3. Enter the environment monitoring configuration mode and query the default configuration.

```
huawei(config)#interface emu 0
huawei(config-if-power4845-0)#display power system parameter
  EMU ID: 0                          Power system information
  ------------------------------------------------------------------------
  charge control state  : automatic control
  equalizing Voltage : 56.500V    floating Voltage: 53.500V
  charge lmt quotiety: 0.150        equalizing time   : 60 days
  battery number     : 1
  battery 0 capacity : 130  AH
  battery Temperature Upper  : 60   C     battery Temperature Lower : -40  C
  Temp redeem quotiety: 100mV
```

```
  load off permit    : permit      load off voltage    : 43.500V
  battery off permit : permit      battery off voltage : 43.000V
  shunt quotiety     : 100A
  AC over alarm voltage  : 280V        AC lack alarm voltage : 180V
  DC over alarm voltage  : 58 V        DC lack alarm voltage : 45V
  power module number: 3
  module 0 address    : 1           module 0 control state: On
  module 1 address    : 2           module 1 control state: On
  module 2 address    : No Configured          module 2 control state: -
  Load high-temperature-off permit: permit
  Load high-temperature-off temperature(C): 65
  Battery high-temperature-off permit: permit
  Battery high-temperature-off temperature(C): 50
  ------------------------------------------------------------------------------
huawei(config-if-power4845-0)#display power environment parameter

  EMU ID: 0                            power environment configration
parameter

  ------------------------------------------------------------------------------
  AnalogID Name              AlmUpper AlmLower TestHigh TestLow Unit    type
     0     Temperature          50      0        55       -5    C
Current
     1     Humidity             80      10       100      0     %R.H.
Current
  ------------------------------------------------------------------------------
  DigitalID Name        Available Level|DigitalID Name        Available Level
     0     -                     1     |   1     -                     1
     2     -                     1     |   3     -                     1
     4     -                     1     |   5     -                     1
     6     -                     1
  ------------------------------------------------------------------------------
```

The results show that the power, temperature, and humidity parameters have been configured automatically in the system; however, certain parameters need to be modified, and certain extended monitoring parameters need to be added.

4. Configure the battery charging parameters.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power charge** command.

5. Configure the battery management parameters.

   ```
   huawei(config-if-power4845-0)#power battery parameter 0.15 60 1 75
   ```

6. Configure the temperature compensation coefficient of the battery.

   ```
   huawei(config-if-power4845-0)#power battery temperature 80 -20 80
   ```

7. Configure the power supply load power-off and battery set power-off parameters.

   ```
   huawei(config-if-power4845-0)#power off load-off-state forbid load-off-voltage
   44
   ```

8. Configure the power distribution parameters.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power supply-parameter** command.

9. Configure the rectifier unit parameter.

   ```
   huawei(config-if-power4845-0)#power module-num 2 1 2
   ```

10. Configure the load and battery high-temperature power-off parameters.

    ```
    huawei(config-if-power4845-0)#power temperature-off load-off-state forbid
    load-off-temperature 70 battery-off-state permit battery-off-temperature 53
    ```

11. Configure the environment parameters.

    - Configure the temperature parameters.

    ```
    huawei(config-if-power4845-0)#power environment temperature 68 -5 80 -20
    ```

- Configure the humidity parameters.

  If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power environment humidity** command.

12. Configure the extended digital parameters.

```
huawei(config-if-power4845-0)#power outside_digital 1 available-level low-
level name Fan
huawei(config-if-power4845-0)#power outside_digital 3 available-level low-
level name SPD
```

13. Query the configuration.

```
huawei(config-if-power4845-0)#display power system parameter
  EMU ID: 0                              Power system information
  ------------------------------------------------------------------------------
  charge control state  : automatic control
  equalizing Voltage : 56.500V    floating Voltage: 53.500V
  charge lmt quotiety: 0.150        equalizing time   : 60 days
  battery number     : 1
  battery 0 capacity : 75  AH
  battery Temperature Upper  : 80   C     battery Temperature Lower : -20  C
  Temp redeem quotiety: 80mV
  load off permit    : forbid      load off voltage    : 44.000V
  battery off permit : permit      battery off voltage : 43.000V
  shunt quotiety     : 100A
  AC over alarm voltage  : 280V        AC lack alarm voltage : 180V
  DC over alarm voltage  : 58 V        DC lack alarm voltage : 45V
  power module number: 2
  module 0 address    : 1           module 0 control state: On
  module 1 address    : 2           module 1 control state: On
  Load high-temperature-off permit: forbid
  Load high-temperature-off temperature(C): 70
  Battery high-temperature-off permit: permit
  Battery high-temperature-off temperature(C): 53
  ------------------------------------------------------------------------------
huawei(config-if-power4845-0)#display power environment parameter

  EMU ID: 0                             power environment configration
parameter

  ------------------------------------------------------------------------------
  AnalogID Name              AlmUpper AlmLower TestHigh TestLow Unit    type
     0     Temperature          68      -5       80       -20   C
Current
     1     Humidity             80      10       100      0     %R.H.
Current
  ------------------------------------------------------------------------------
  DigitalID Name        Available Level|DigitalID Name        Available Level
     0     -                    1     |   1     Fan                   0
     2     -                    1     |   3     SPD                   0
     4     -                    1     |   5     -                     1
     6     -                    1
  ------------------------------------------------------------------------------
```

14. Query the alarm information, and confirm that the door status alarm other than alarms for other monitoring parameters is generated.

```
huawei(config-if-power4845-0)#display power alarm
  EMU ID: 0                              Power alarm information
  ------------------------------------------------------------------
  mains supply yes : yes            mains supply lack : normal
  total vol lack   : normal
  load fuse 0      : connect        second fuse      : connect
  load off         : on             battery off       : on
  battery 1 loop   : connect
  environment Temperature : Normal         environment Humidity   : Normal
  door alarm       : Alarm          water alarm       : Normal
  fog alarm        : Normal
  module 0         : normal
```

```
module 1         : normal
Battery temperature off state : Normal  Load temperature off state : Normal
------------------------------------------------------------------------
DigitalID Name             Alarm State|DigitalID Name            Alarm State
   0     -                 Normal  |   1     Fan                  Normal
   2     -                 Normal  |   3     SPD                  Normal
   4     -                 Normal  |   5     -                    Normal
   6     -                 Normal
------------------------------------------------------------------------
```

NOTE

Two door status sensors of the device are in serial connection, and are monitored as one variable. They are automatically configured by the system. The door alarm is generated because the cabinet door is open.

15. Save the data.

```
huawei(config-if-power4845-0)#quit
huawei(config)#save
```

16. Close all doors of the cabinet. Then, query the alarm information again, and confirm that there is no alarm for any monitoring parameter.

8 EPS75-4815AF Monitoring Solution

About This Chapter

The EPS75-4815AF monitoring solution is implemented by the EPMU02 monitoring module in the EPS75-4815AF power system. In this solution, the EPMU02 monitoring module reports the monitored parameters reported by the sensor transfer box to the control system.

8.1 EPS75-4815AF Power System
The AC-powered cabinet uses the EPS75-4815AF power system to convert the AC input into the DC and then distribute the power.

8.2 PMIB01 Sensor Transfer Box
This topic describes the application and front panel of the sensor transfer box, and provides the specifications of the sensor transfer box.

8.3 PMIB02 Sensor Transfer Box
This topic describes the application and front panel of the sensor transfer box, and provides the specifications of the sensor transfer box.

8.4 Checking Environment Monitoring Cables
The EPMU02T monitoring module monitors the environment parameters collected by the sensors in real time, and reports the alarm information to the control system. Therefore, make sure that the connections from the sensors to the ports of the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

8.5 Configuring the Environment Monitoring Parameters of the EPS75-4815AF
This topic describes how to configure the environment monitoring parameters of the EPS75-4815AF through the CLI.

8.1 EPS75-4815AF Power System

The AC-powered cabinet uses the EPS75-4815AF power system to convert the AC input into the DC and then distribute the power.

Functions

The EPS75-4815AF power system converts one AC input into six DC outputs to implement the DC power distribution. It can be connected to one to two sets of batteries and use its monitoring module to manage batteries.

The EPS75-4815AF power system can also use the external sensor transfer box to collect and report the status of sensors and standby detected parameters.

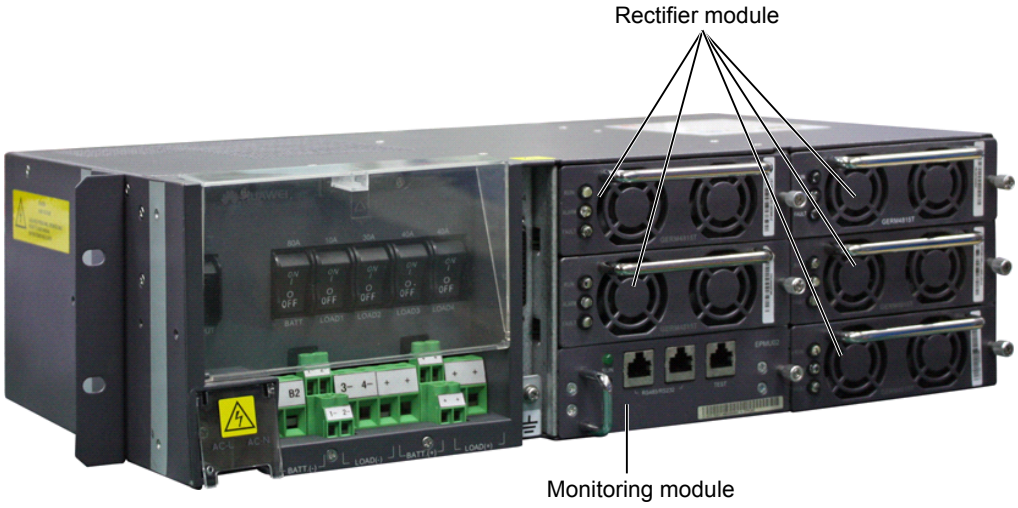
NOTE

The rectifier modules of the EPS75-4815AF power system work in the load balancing and mutual hot backup mode.

Appearance

Figure 8-1 shows the appearance of the EPS75-4815AF power system.

Figure 8-1 Appearance of the EPS75-4815AF power system



Configuration

Table 8-1 lists the component configuration of the EPS75-4815AF power system.

Table 8-1 Component configuration of the EPS75-4815AF power system

Component Name	Configuration
GERM4815T rectifier module	2 to 5 (optional)

Component Name	Configuration
EPMU02 monitoring module	1
Rack-EPS75-4815AF AC/DC power supply unit	1

The EPS75-4815AF power system can be configured with five rectifier modules, which are connected in parallel for output.

Table 8-2 shows the mapping between the number of rectifier modules in the EPS75-4815AF power system and the maximum output current.

Table 8-2 Mapping between the number of rectifier modules in the EPS75-4815AF power system and the maximum output current

Number of Rectifier Modules	Maximum Output Current
1	15 A
2	30 A
3	45 A
4	60 A
5	75 A

LED Description

Table 8-3 describes the LEDs on the rectifier module of the EPS75-4815AF power system.

Table 8-3 LEDs on the rectifier module of the EPS75-4815AF power system

LED	Status	Description
RUN	The green LED is on.	The rectifier module works in the normal state.
	The green LED is off.	This LED is off when the red LED is on or the yellow LED is on which is not caused by the output overcurrent.
ALM	The yellow LED is on.	The ALARM LED of the module is valid when PS-off, OTP, and primary protection are valid, or when overcurrent occurs.
	The yellow LED blinks.	The communication of the rectifier module is interrupted.
	The yellow LED is off	The rectifier module works in the normal state.

LED	Status	Description
FAULT	The red LED is on.	The FAULT LED of the module is valid when PS-enable and Vo-OV are valid, or when fan fault, no output, or output short circuit occurs.
	The red LED is off.	The rectifier module works in the normal state.

Table 8-4 describes the LEDs on the monitoring module of the EPS75-4815AF power system.

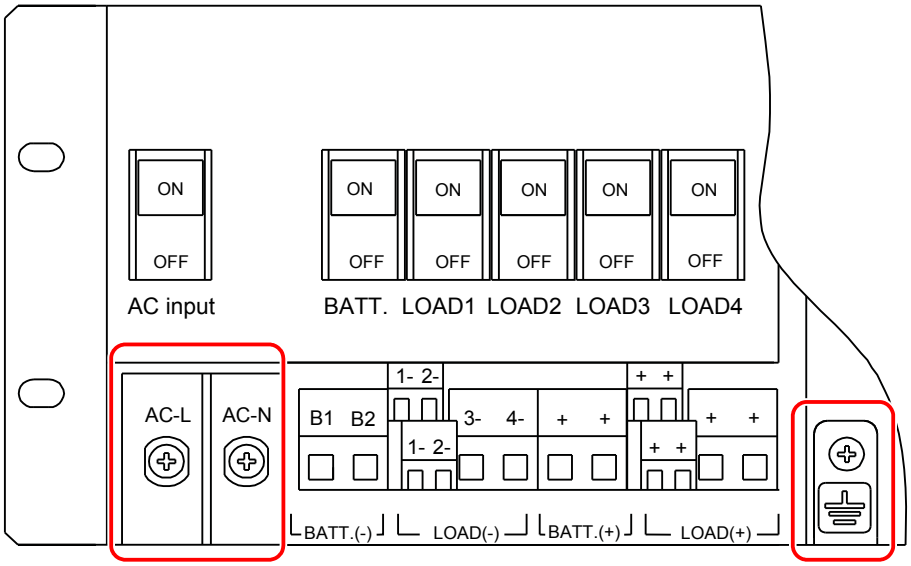
Table 8-4 LEDs on the monitoring module of the EPS75-4815AF power system

LED	Status	Description
RUN	The green LED is on for 1s and off for 1s repeatedly.	The monitoring module works in the normal state.
	The green LED is blinks quickly	The monitoring unit hardware is normal but the communication between the monitoring unit and the upper layer device is faulty.
	The green LED is off.	The monitoring module is faulty or there is no AC power input.
ALM	The red LED is on.	The system generates an critical alarm or the battery is disconnected.
	The red LED is off.	The system does not generate any critical alarm and the battery is already connected.

Input Terminals

Figure 8-2 shows the input terminals of the EPS75-4815AF power system.

Figure 8-2 Input terminals of the EPS75-4815AF power system



The EPS75-4815AF power system supports one 220 VAC input. The connections of the power system are as follows:

- The AC-L terminal is connected to line L of the AC power cable.
- The AC-N terminal is connected to line N of the AC power cable.
- The grounding point is connected to the PGND cable.

Output Terminals

Figure 8-3 shows the output terminals of the EPS75-4815AF power system.

Figure 8-3 Output terminals of the EPS75-4815AF power system

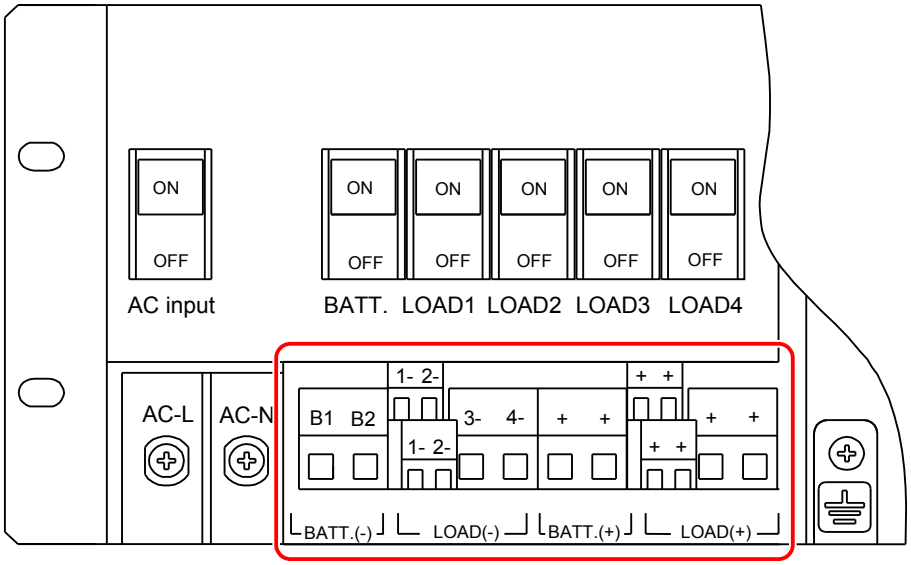


Figure 8-4 shows the output tributary switches of the EPS75-4815AF power system.

Figure 8-4 Output tributary switches of the EPS75-4815AF power system

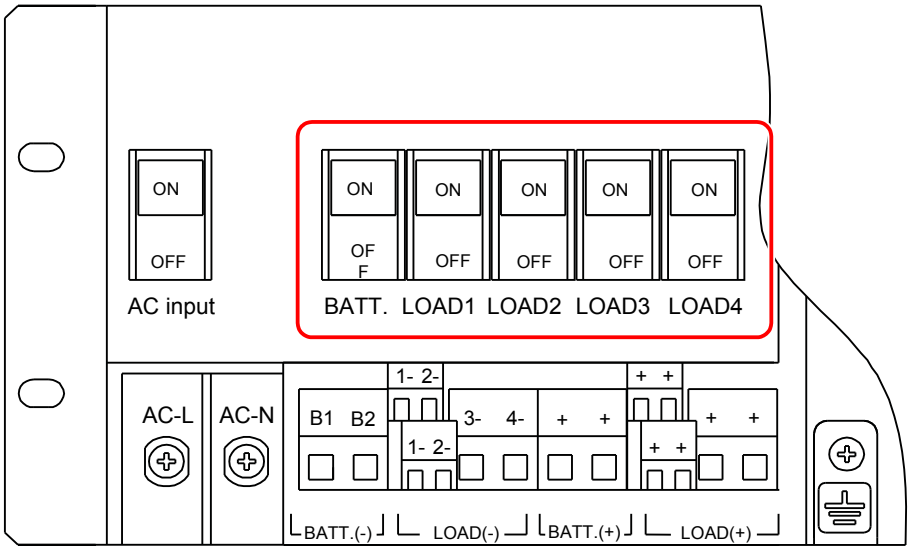


Table 8-5 shows the mapping between the output tributary switches and the load tributaries.

Table 8-5 Mapping between the output tributary switches and the load tributaries

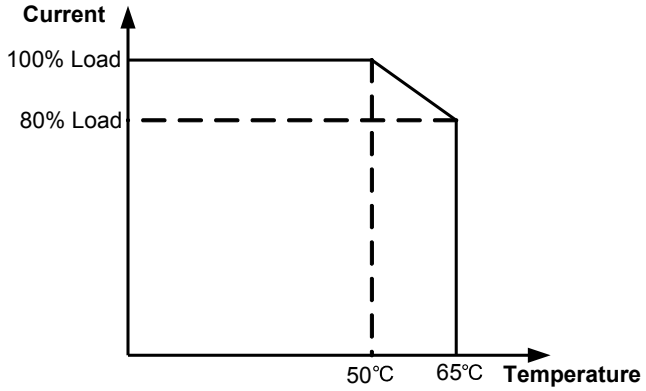
Output Tributary Switch	Load Tributary
BATT.	BATT.(-) (two channels) and BATT.(+) (two channels)
LOAD1	LOAD1(-) (two channels) and LOAD1(+) (two channels)
LOAD2	LOAD2(-) (two channels) and LOAD2(+) (two channels)
LOAD3	LOAD3(-), LOAD3(+)
LOAD4	LOAD4(-), LOAD4(+)

Specifications

Table 8-6 lists the specifications of the EPS75-4815AF power system.

Table 8-6 Specifications of the EPS75-4815AF power system

Item	Specification
Input	● Rated input voltage: 220 VAC (90 VAC to 290 VAC) (Note that in the range of 90 VAC to 175 VAC, the output current also decreases linearly, limited within a specified range.) ● Maximum input current: 28 A ● Frequency: 50 Hz (45 Hz to 65 Hz)
Output	● Rated output voltage: -53.5 VDC ● Voltage range: -42 VDC to -58 VDC ● Output current: – LOAD1: 10 A (MCB) – LOAD2: 30 A (MCB) – LOAD3: 40 A (MCB) – LOAD4: 40 A (MCB) – BATT.: 80 A (MCB)
Efficiency	⩾ 90% (in rated working state)

Item	Specification
Working temperature range	-33 °C to +50 °C, When the environment temperature above 50 degrees, reducing the amount of output, **Figure 8-5** shows the output current and environment temperature relationship. **Figure 8-5** Relationship between output current and environment temperature 
Cooling method	Forced air cooling, with the built-in fan in the rectifier module
Dimensions (W x D x H)	436 mm x 255 mm x 133 mm

8.2 PMIB01 Sensor Transfer Box

This topic describes the application and front panel of the sensor transfer box, and provides the specifications of the sensor transfer box.

Function

The sensor transfer box provides various terminal blocks to connect the EMU and external sensors.

Overview

The sensor transfer box is an optional part. It provides diverse terminal blocks to connect the monitoring unit to the sensors.

Front Panel

Figure 8-6 shows the PMIB01 sensor transfer box.

Figure 8-6 Front panel of the PMIB01 sensor transfer box

Terminal Block

Figure 8-7 and Table 8-7 describe the terminal blocks of the PMIB01 sensor transfer box.

Figure 8-7 Terminal blocks of the PMIB01 sensor transfer box

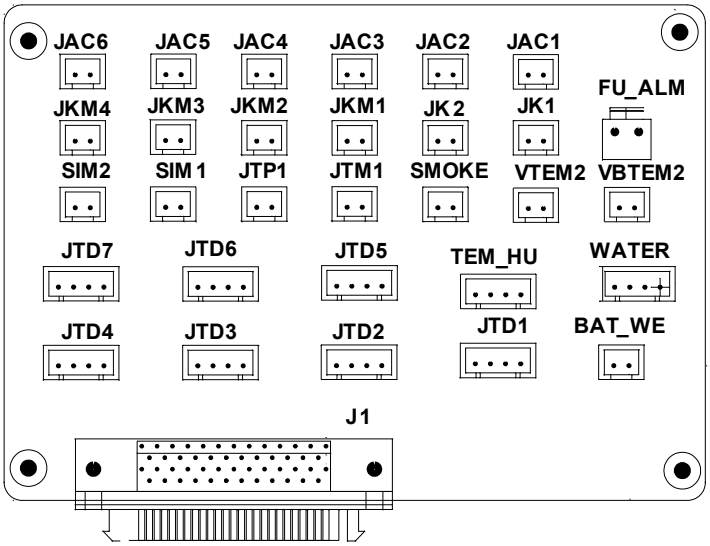


Table 8-7 Pin Function of the Terminal blocks

Silk Screen	Signal Port	Pin Function	Remarks
BAT_WE	Sensor port of battery temperature 1	● Pin 1 is for grounding. ● Pin 2 is for the signal cable. ● Pin 3 is reserved. ● Pin 4 is for the +12 V power supply. The external sensor outputs the 0-5 V voltage signal.	Used
VBTEM2	Sensor port of battery temperature 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
WATER	Water sensor port	● Pin 1 is for the +12 V power supply. ● Pin 2 is for the signal cable. ● Pin 3 is for grounding. ● Pin 4 is reserved. When the impedance between pin 2 and pin 3 drops to a certain range, alarms are triggered.	-
TEM_HU	Sensor port of temperature and humidity 1	● Pin 1 and pin 3 are for the +24 V power supply. ● Pin 2 is for the temperature signal cable. ● Pin 4 is for the humidity signal cable.	Used
VTEM2	Sensor port of temperature and humidity 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
JTP1	Sensor port of the MDF	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	Used
SMOKE	Smoke sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply.	-

Silk Screen	Signal Port	Pin Function	Remarks
JTM1	Door-status sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply. By default, when pin 1 and pin 2 are connected, the door is in the normal state; when they are disconnected, alarms are triggered. If no door-status sensor is used, connect pin 1 and pin 2 to disable door-status alarms.	Used
JK1, JK2	Alarm digital ports	The maximum voltage is 60 VDC and the maximum load current is 500 mA. ● When minor alarms are generated, JK2 is short-circuited. ● When critical alarms are generated, JK1 is short-circuited. ● Users can define alarm levels through the BAM program.	Reserved
JKM1-JKM4	Digital ports	The maximum voltage is 5.6 VDC and the maximum current is 20 mA.	-
SIM1, SIM2	Battery unbalanced sensor ports	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	-
JAC1-JAC6	Output ports of the optical coupler	Pin 1 and pin 2 are connected to pole C and pole E of the optical coupler. The optical coupling parameter Vce max is 40 VDC and Ic max is 80 mA. Avoid setting the parameters to the maximum values.	Reserved
FU_ALM	Detecting port of the battery fuse	● Pin 1 is for the signal cable FU1+ and is connected to the negative pole of the battery. ● Pin 2 is reserved for the FU1- signal.	-
JTD1-JTD7	Input ports of the standby Boolean value	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the +12 V power supply. ● Pin 3 is for the signal cable. ● Pin 4 is for grounding. According to the actual requirements, access related passive digital signals to pins 2 and 3.	Reserved

Silk Screen	Signal Port	Pin Function	Remarks
J1	DB50 port	The port connects the monitoring transfer board and the monitoring board to input the sensor signals and the output the control signals.	-

NOTE

"JTD1-JTD7" are the input ports of the standby Boolean value. By default, the sensors are not configured. You can determine the type of signal to be accessed. With related configuration, the monitor unit can monitor them.

Specifications

Table 8-8 lists the specifications of the PMIB01 sensor transfer box.

Table 8-8 Specifications of the PMIB01 sensor transfer box

Sensor Transfer Box	Dimensions (W x D x H)
PMIB01	140 mm x 96 mm x 31 mm

8.3 PMIB02 Sensor Transfer Box

This topic describes the application and front panel of the sensor transfer box, and provides the specifications of the sensor transfer box.

Function

The sensor transfer box provides various terminal blocks to connect the EMU and external sensors.

Overview

The sensor transfer box is an optional part. It provides diverse terminal blocks to connect the monitoring unit to the external sensors.

Front Panel

Figure 8-8 shows the PMIB02 sensor transfer box.

Figure 8-8 Front panel of the PMIB02 sensor transfer box

Terminal Block

Figure 8-9 and **Table 8-9** describe the terminal blocks of the PMIB02 sensor transfer box.

Figure 8-9 Terminal blocks of the PMIB02 sensor transfer box

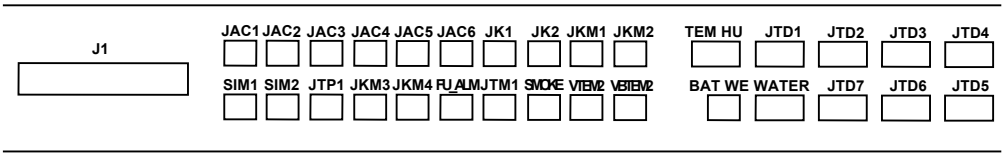


Table 8-9 Function of the terminal blocks

Silk Screen	Signal Port	Pin Function	Remarks
BAT_WE	Sensor port of battery temperature 1	● Pin 1 is for grounding. ● Pin 2 is for the signal cable. ● Pin 3 is reserved. ● Pin 4 is for the +12 V power supply. The external sensor outputs the 0-5 V voltage signal.	Used
VBTEM2	Sensor port of battery temperature 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
WATER	Water sensor port	● Pin 1 is for the +12 V power supply. ● Pin 2 is for the signal cable. ● Pin 3 is for grounding. ● Pin 4 is reserved. When the impedance between pin 2 and pin 3 drops to a certain range, alarms are triggered.	-
TEM_HU	Sensor port of temperature and humidity 1	● Pin 1 and pin 3 are for the +24 V power supply. ● Pin 2 is for the temperature signal cable. ● Pin 4 is for the humidity signal cable.	Used

Silk Screen	Signal Port	Pin Function	Remarks
VTEM2	Sensor port of temperature and humidity 2	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the temperature signal cable. The external sensor outputs the 4-20 mA current signal.	-
JTP1	Sensor port of the MDF	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	Used
SMOKE	Smoke sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply.	-
JTM1	Door-status sensor port	● Pin 1 is for the signal cable. ● Pin 2 is for the +24 V power supply. By default, when pin 1 and pin 2 are connected, the door is in the normal state; when they are disconnected, alarms are triggered. If no door-status sensor is used, connect pin 1 and pin 2 to disable door-status alarms.	Used
JK1, JK2	Alarm digital ports	The maximum voltage is 60 VDC and the maximum load current is 500 mA. ● When minor alarms are generated, JK2 is short-circuited. ● When critical alarms are generated, JK1 is short-circuited. ● Users can define alarm levels through the BAM program.	Reserved
JKM1-JKM4	Digital ports	The maximum voltage is 5.6 VDC and the maximum current is 20 mA.	-
SIM1, SIM2	Battery unbalanced sensor ports	● Pin 1 is for the signal cable. ● Pin 2 is reserved.	-
JAC1-JAC6	Output ports of the optical coupler	Pin 1 and pin 2 are connected to pole C and pole E of the optical coupler. The optical coupling parameter Vce max is 40 VDC and Ic max is 80 mA. Avoid setting the parameters to the maximum values.	Reserved
FU_ALM	Detecting port of the battery fuse	● Pin 1 is for the signal cable FU1+ and is connected to the negative pole of the battery. ● Pin 2 is reserved for the FU1- signal.	-

Silk Screen	Signal Port	Pin Function	Remarks
JTD1-JTD7	Input ports of the standby Boolean value	● Pin 1 is for the +24 V power supply. ● Pin 2 is for the +12 V power supply. ● Pin 3 is for the signal cable. ● Pin 4 is for grounding. According to the actual requirements, access related passive digital signals to pins 2 and 3.	Reserved
J1	DB50 port	The port connects the monitoring transfer board and the monitoring board to input the sensor signals and the output the control signals.	-

NOTE

"JTD1-JTD7" are the input ports of the standby Boolean value. By default, the sensors are not configured. You can determine the type of signal to be accessed. With related configuration, the monitor unit can monitor them.

Specifications

Table 8-10 lists the specifications of the PMIB02 sensor transfer box.

Table 8-10 Specifications of the PMIB02 sensor transfer box

Sensor Transfer Box	Dimensions (W x D x H)
PMIB02	482.6 mm x 70 mm x 43.6 mm

8.4 Checking Environment Monitoring Cables

The EPMU02T monitoring module monitors the environment parameters collected by the sensors in real time, and reports the alarm information to the control system. Therefore, make sure that the connections from the sensors to the ports of the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Checking Environment Monitoring Cables in the AC-powered F02AF Cabinet

Figure 8-10 shows the connections of environment monitoring cables in the AC-powered F02AF cabinet. Table 8-11 describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Figure 8-10 Connections of environment monitoring cables in the AC-powered F02AF cabinet

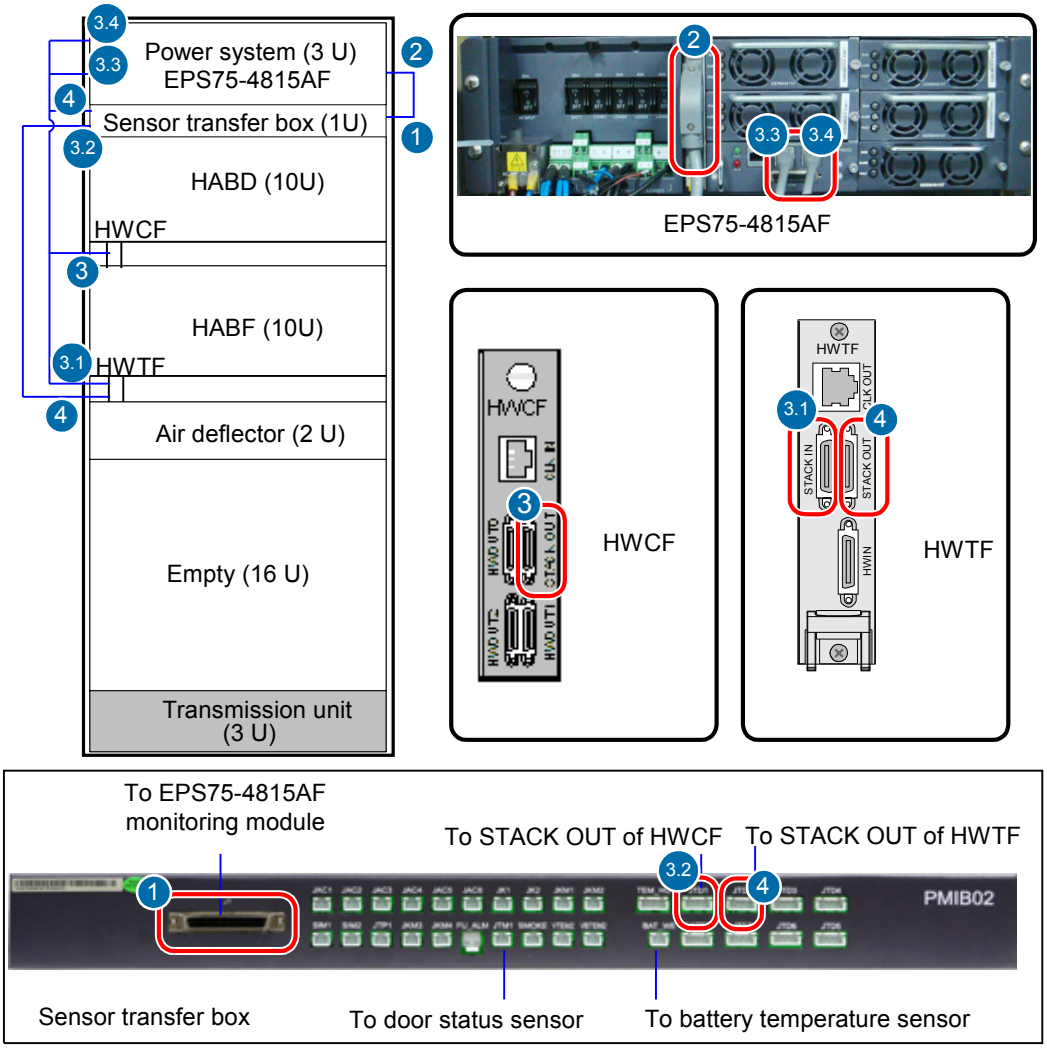


Table 8-11 Connections of environment monitoring cables in the AC-powered F02AF cabinet

Cable	One End Connects to...	The Other End Connects to...
Monitoring cable	(2): EPS75-4815AF	(1): J1 port of the sensor transfer box
Door status sensor communication cable	Door status sensor	JTM1 port of the sensor transfer box
Monitoring cable of the battery temperature sensor	Temperature sensor of the battery	BAT_WE terminal of the sensor transfer box

Cable	One End Connects to...	The Other End Connects to...
Test and alarm cable	(3): STACK OUT port on the HWCF transfer board of the HABD shelf	● (3.2): JTD1 port of the sensor transfer box ● (3.3-3.4): RS485/RS232 ports on the monitoring unit of the EPS75-4815AF ● (3.1): STACK IN port on the HWTF transfer board of the HABF shelf
Test and alarm subtending cable	(4): STACK OUT port on the HWTF transfer board of the HABF shelf	(4): JTD2 port of the sensor transfer box

Checking Environment Monitoring Cables in the AC-powered F02A Cabinet

Figure 8-11 shows the connections of environment monitoring cables in the AC-powered F02A cabinet. **Table 8-12** describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Figure 8-11 Connections of environment monitoring cables in the AC-powered F02A cabinet

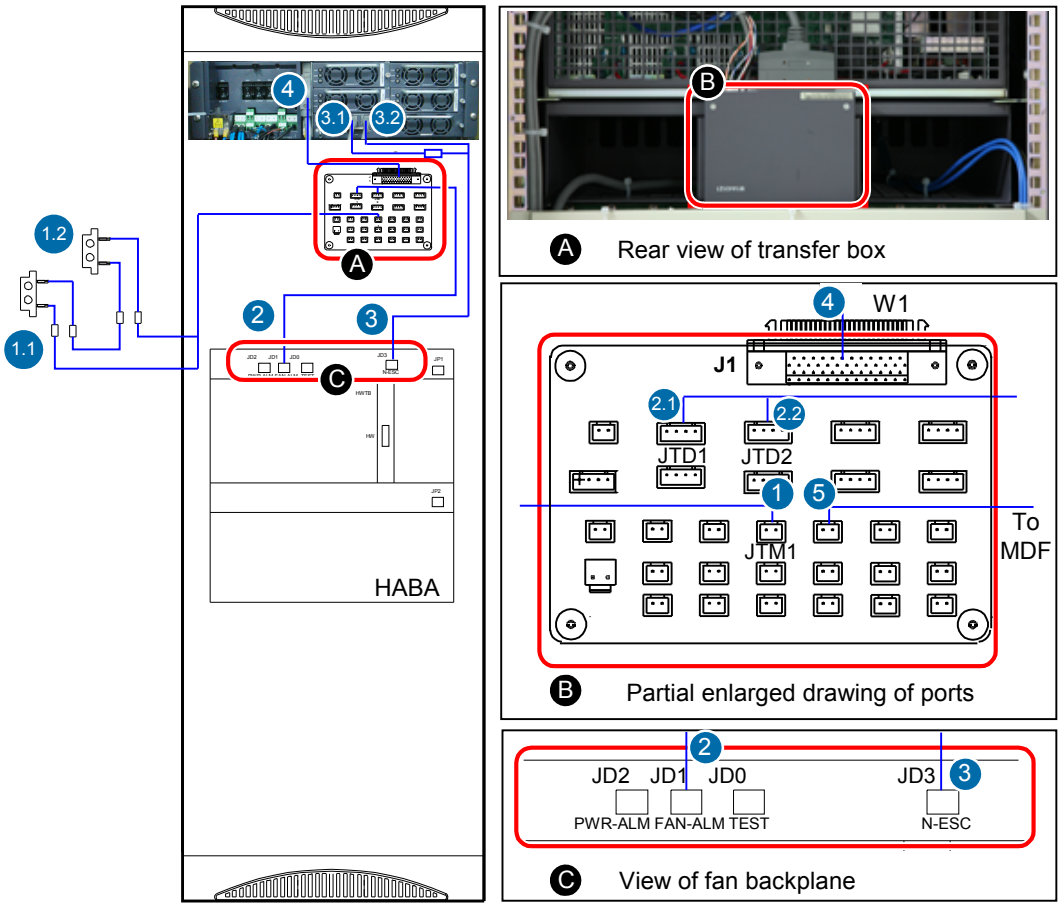


Table 8-12 Connections of environment monitoring cables in the AC-powered F02A cabinet

Cable	One End Connects to...	The Other End Connects to...
Door status sensor connecting cable	(1): JTM1 port of the sensor transfer box	(1.1): Door status sensor of the front door (1.2): Door status sensor of the rear door
Fan monitoring cable	(2): HABA JD1(FAN-ALM)	(2.1): JTD1 port of the sensor transfer box (2.2): JTD2 port of the sensor transfer box
ESC monitoring cable	(3): HABA JD3	(3): EPS75-4815AF RS485/ RS232
Monitoring cable	(4): EPS75-4815AF	(4): J1 port of the sensor transfer box
MDF monitoring cable	MDF monitoring point	(5): JTP1 port of the sensor transfer box

Checking Environment Monitoring Cables in the F01D200 Cabinet

Figure 8-12 shows the connections of environment monitoring cables in the F01D200 cabinet. **Table 8-13** describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Figure 8-12 Connections of environment monitoring cables in the F01D200 cabinet

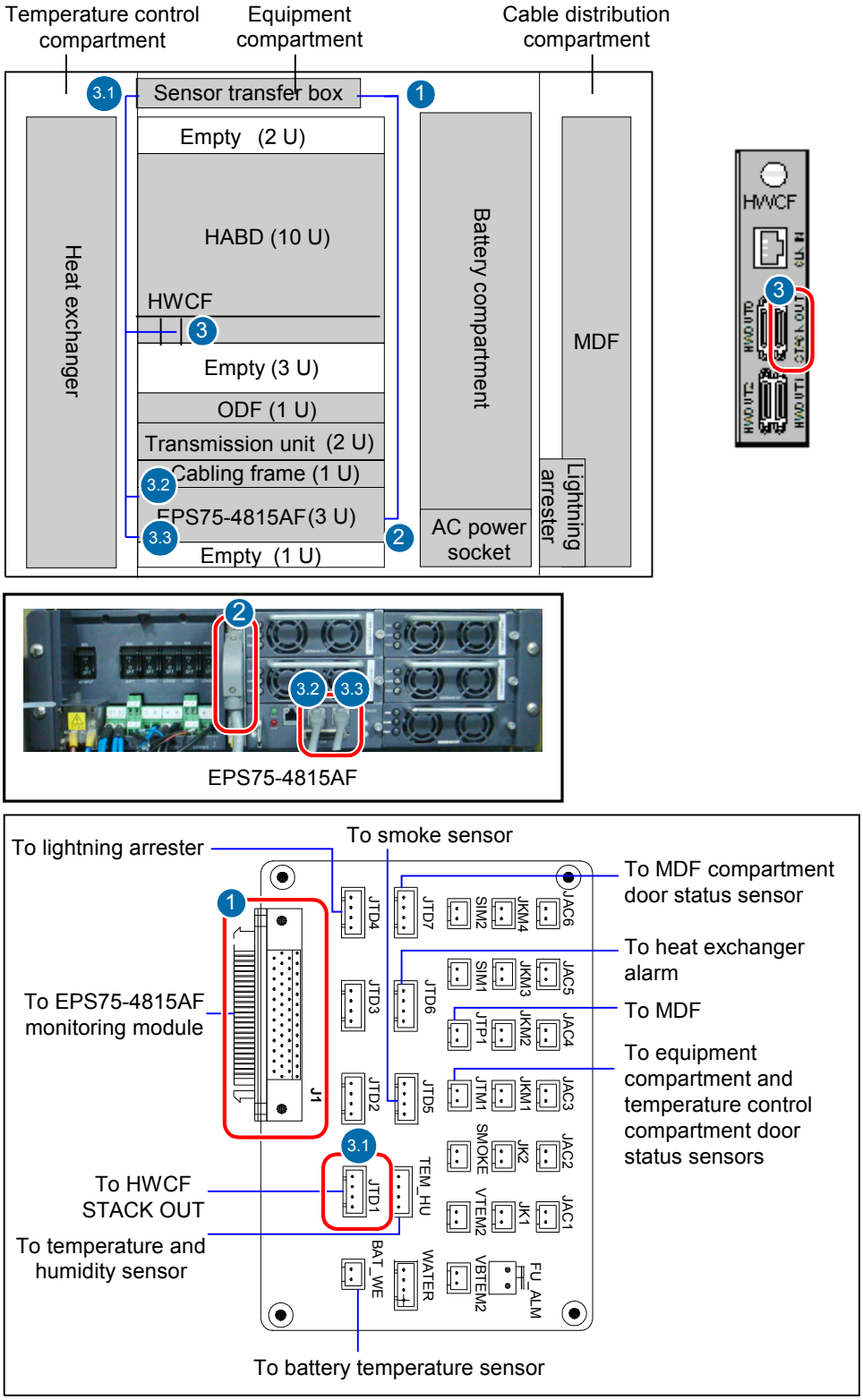


Table 8-13 Connections of environment monitoring cables in the F01D200 cabinet

Cable	One End Connects to...	The Other End Connects to...
Monitoring cable	(2): EPS75-4815AF	(1): J1 port of the sensor transfer box
Test and alarm cable	(3): STACK OUT port on the HWCF transfer board of the HABD shelf	● (3.1): JTD1 port of the sensor transfer box ● (3.2-3.3): RS485/RS232 ports on the monitoring unit of the EPS75-4815AF
Monitoring cable of the lightning arrester	Alarm terminal of the lightning arrester	JTP3 port of the sensor transfer box
Smoke sensor cable	Smoke sensor	JTP5 port of the sensor transfer box
Monitoring cable of the heat exchanger	Heat exchanger	JTP6 port of the sensor transfer box
Door status sensor communication cable	MDF compartment door status sensor	JTP7 port of the sensor transfer box
Monitoring cable of the MDF	Alarm bar of the MDF	JTP1 port of the sensor transfer box
Door status sensor communication cable	Equipment compartment and temperature control compartment door status sensor	JTM1 port of the sensor transfer box
Monitoring cable of the temperature and humidity sensor	Temperature and humidity sensor	TEM-HU terminal of the sensor transfer box
Monitoring cable of the battery temperature sensor	Temperature sensor of the battery	BAT_WE terminal of the sensor transfer box

Checking Environment Monitoring Cables in the F01D500 Cabinet

Figure 8-13 shows the connections of environment monitoring cables in the F01D500 cabinet. **Table 8-14** describes the cable connections. By referring to the cable connection diagram, check whether the connections from the sensors to the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Figure 8-13 Connections of environment monitoring cables in the F01D500 cabinet

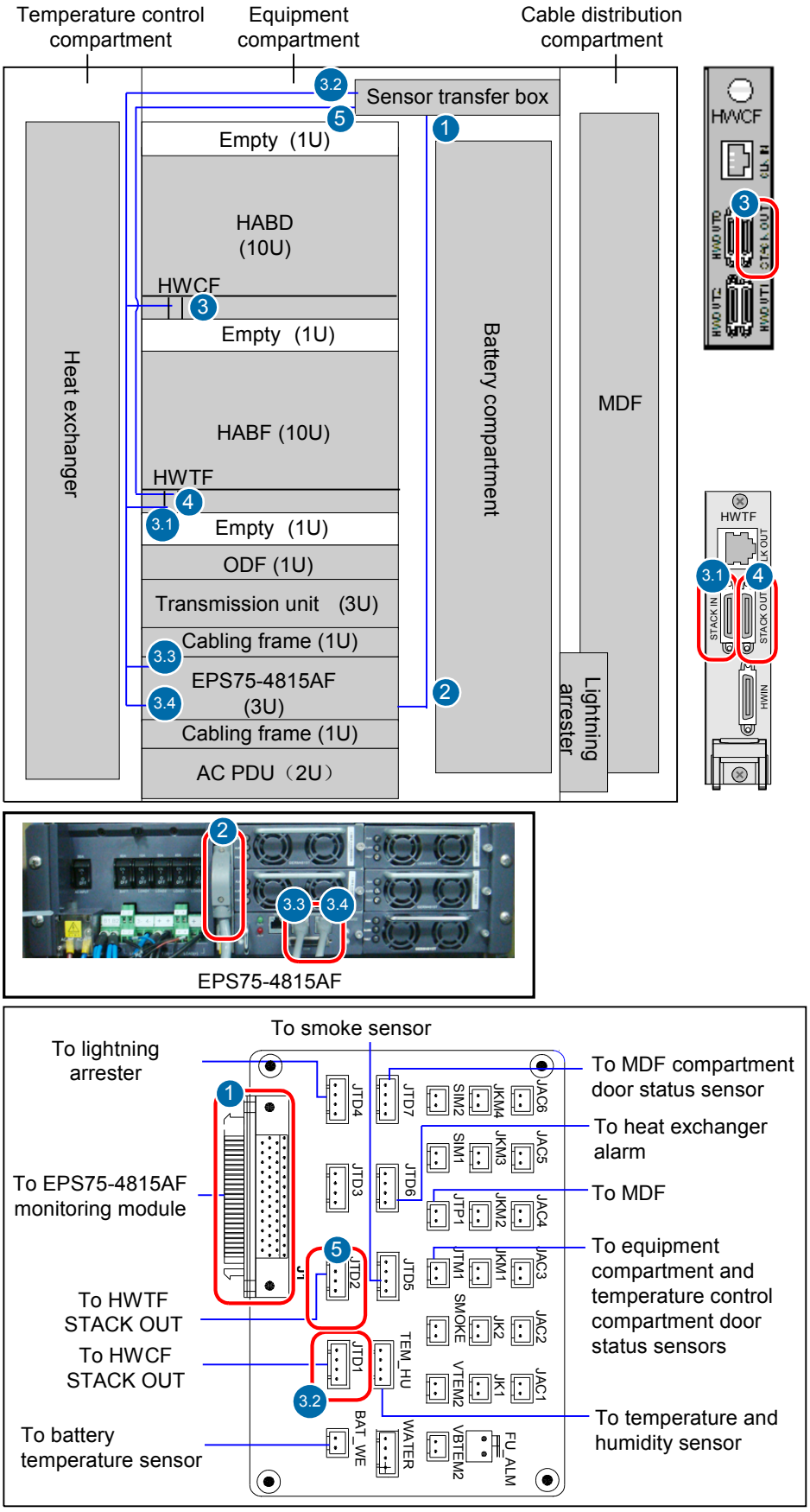


Table 8-14 Connections of environment monitoring cables in the F01D500 cabinet

Cable	One End Connects to...	The Other End Connects to...
Monitoring cable	(2): EPS75-4815AF	(1): J1 port of the sensor transfer box
Test and alarm cable	(3): STACK OUT port on the HWCF transfer board of the HABD shelf	● (3.2): JTD1 port of the sensor transfer box ● (3.3-3.4): RS485/RS232 ports on the monitoring unit of the EPS75-4815AF ● (3.1): STACK IN port on the HWTF transfer board of the HABF shelf
Test and alarm subtending cable	(4): STACK OUT port on the HWTF transfer board of the HABF shelf	(5): JTD2 port of the sensor transfer box
Monitoring cable of the lightning arrester	Alarm terminal of the lightning arrester	JTP3 port of the sensor transfer box
Smoke sensor cable	Smoke sensor	JTP5 port of the sensor transfer box
Monitoring cable of the heat exchanger	Heat exchanger	JTP6 port of the sensor transfer box
Door status sensor communication cable	MDF compartment door status sensor	JTP7 port of the sensor transfer box
Monitoring cable of the MDF	Alarm bar of the MDF	JTP1 port of the sensor transfer box
Door status sensor communication cable	Equipment compartment and temperature control compartment door status sensor	JTM1 port of the sensor transfer box
Monitoring cable of the temperature and humidity sensor	Temperature and humidity sensor	TEM-HU terminal of the sensor transfer box
Monitoring cable of the battery temperature sensor	Temperature sensor of the battery	BAT_WE terminal of the sensor transfer box

Connections of environment monitoring cables in the F01D1000 cabinet

Figure 8-14 shows the connections of environment monitoring cables in the F01D1000 cabinet. **Table 8-15** describes the cable connections. By referring to the cable connection diagram, check

whether the connections from the sensors to the sensor transfer box, from the sensor transfer box to the EPMU02T, and from the EPMU02T to the control system are correct.

Figure 8-14 Connections of environment monitoring cables in the F01D1000 cabinet

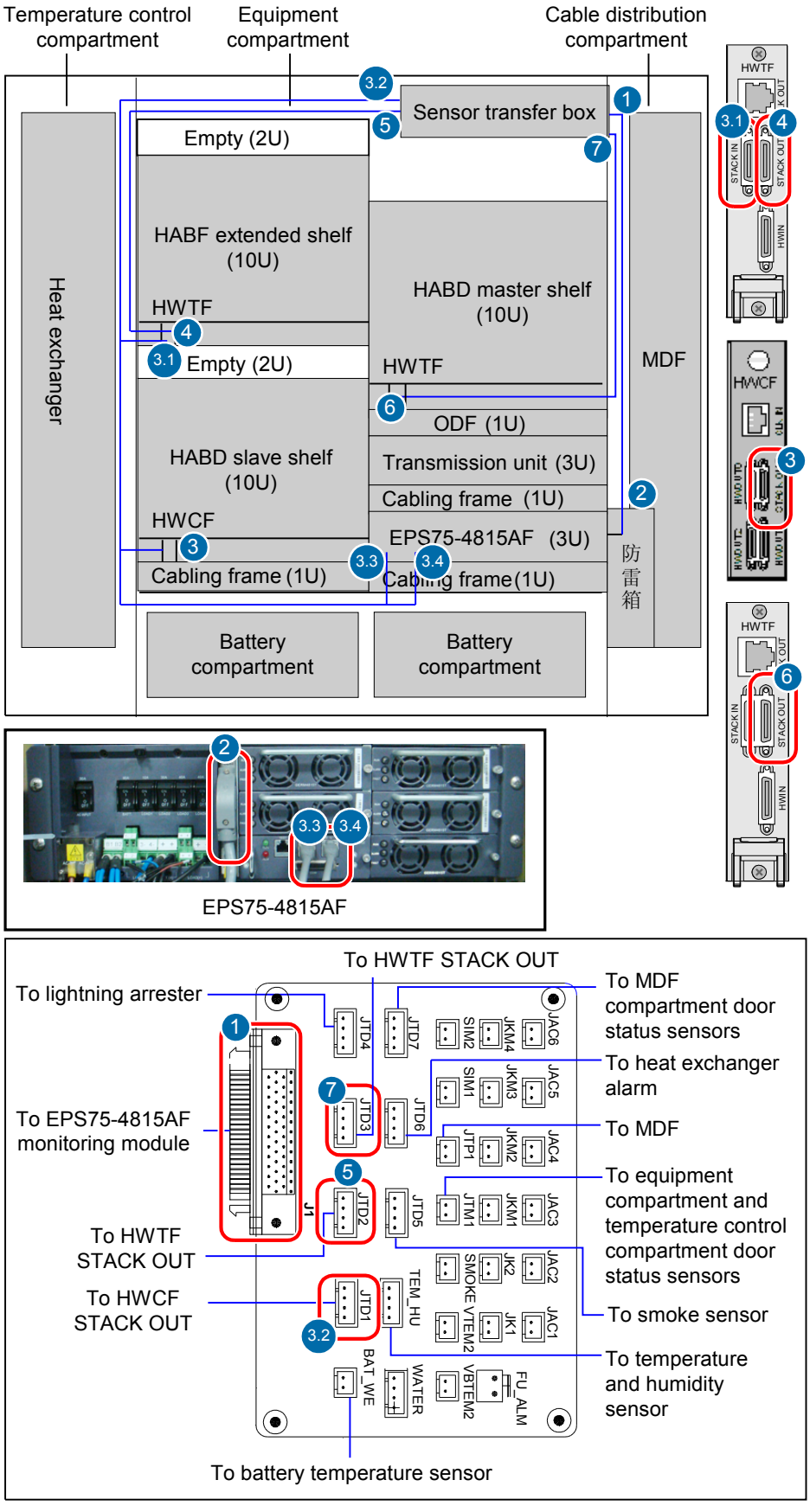


Table 8-15 Connections of environment monitoring cables in the F01D1000 cabinet

Cable	One End Connects to...	The Other End Connects to...
Monitoring cable	(2): EPS75-4815AF	(1): J1 port of the sensor transfer box
Test and alarm cable	(3): STACK OUT port on the HWCF transfer board of the HABD shelf	● (3.2): JTD1 port of the sensor transfer box ● (3.3-3.4): RS485/RS232 ports on the monitoring unit of the EPS75-4815AF ● (3.1): STACK IN port on the HWTF transfer board of the HABF shelf
Test and alarm subtending cable	(4): STACK OUT port on the HWTF transfer board of the HABF shelf	(5): JTD2 port of the sensor transfer box
Monitoring cable of the lightning arrester	Alarm terminal of the lightning arrester	JTP3 port of the sensor transfer box
Smoke sensor cable	Smoke sensor	JTP5 port of the sensor transfer box
Monitoring cable of the heat exchanger	Heat exchanger	JTP6 port of the sensor transfer box
Test and alarm subtending cable	(6): STACK OUT port on the HABD shelf of the right device compartment	(7): JTP7 port of the sensor transfer box
Monitoring cable of the MDF	Alarm bar of the MDF	JTP1 port of the sensor transfer box
Door status sensor communication cable	Equipment compartment and temperature control compartment door status sensor	JTM1 port of the sensor transfer box
Monitoring cable of the temperature and humidity sensor	Temperature and humidity sensor	TEM-HU terminal of the sensor transfer box
Monitoring cable of the battery temperature sensor	Temperature sensor of the battery	BAT_WE terminal of the sensor transfer box

8.5 Configuring the Environment Monitoring Parameters of the EPS75-4815AF

This topic describes how to configure the environment monitoring parameters of the EPS75-4815AF through the CLI.

Mapping Between Monitoring Parameters and Device Ports

Table 8-16 describes the mapping between the monitoring parameters displayed on the sensor transfer box.

Table 8-16 Mapping between the monitoring parameters displayed on the host and the ports on the sensor transfer box

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet	Application in the F02AF Cabinet	Application in the F01D200 Cabinet	Application in the F01D500 Cabinet	Application in the F01D1000 Cabinet
Digital 0	JTD1	Fan monitoring board of the HABA shelf	Fan monitoring board of the HABD shelf	Fan monitoring board of the HABD shelf	Fan monitoring board of the HABD shelf	Fan monitoring board of the HABD shelf
Digital 1	JTD2	Fan monitoring board of the HABA shelf	Fan monitoring board of the HABF shelf	Not connected by default, used to add a user-defined monitoring digital parameter	Fan monitoring board of the HABF shelf	Fan monitoring board of the HABF shelf
Digital 2	JTD3	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Fan monitoring board of the HABD shelf in the right device compartment

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet	Application in the F02AF Cabinet	Application in the F01D200 Cabinet	Application in the F01D500 Cabinet	Application in the F01D1000 Cabinet
Digital 3	JTD4	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Lightning arrester	Lightning arrester	Lightning arrester
Digital 4	JTD5	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Smoke sensor	Smoke sensor	Smoke sensor
Digital 5	JTD6	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Heat exchanger	Heat exchanger	Heat exchanger
Digital 6	JTD7	Not connected by default, used to add a user-defined monitoring digital parameter	Not connected by default, used to add a user-defined monitoring digital parameter	Door status sensor of the MDF compartment	Door status sensor of the MDF compartment	Door status sensor of the MDF compartment
Door alarm	JTM1	Door status sensor	Door status sensor	Door status sensors of the device compartment and heat exchanger compartment	Door status sensors of the device compartment and heat exchanger compartment	Door status sensors of the device compartment and heat exchanger compartment

Monitoring Parameter Displayed on the Host	Device Port	Application in the F02A Cabinet	Application in the F02AF Cabinet	Application in the F01D200 Cabinet	Application in the F01D500 Cabinet	Application in the F01D1000 Cabinet
Wiring alarm	JTP1	MDF	MDF	MDF	MDF	MDF
Battery Tem	BAT_WE	Battery temperature sensor	Battery temperature sensor	Battery temperature sensor	Battery temperature sensor	Battery temperature sensor
environment Tem/ environment Hum	TEM-HU	Not connected by default.	Not connected by default.	Temperature and humidity sensor	Temperature and humidity sensor	Temperature and humidity sensor

NOTE

Before adding a user-defined analog or monitoring digital parameter, make sure that the port corresponding to this parameter is properly connected to an environment monitoring cable.

Data Plan

The data plan of the EPS75-4815AF in the F02A cabinet is the same as that in F02AF, F01D200, F01D500, and F01D1000 cabinets. In this topic, the application in the F01D500 cabinet is considered as an example. **Table 8-18** provides the data plan for configuring the monitoring parameters of the EPS75-4815AF.

Table 8-17 Data plan for configuring the monitoring parameters of the EPS75-4815AF

Item	Data Plan for the F01D500 Cabinet	Remarks
EMU	Type: POWER4875L	During the configuration of the EPS75-4815AF, the type of the EPS75-4815AF is selected as **POWER4875L**.
	SN: 0	-
	Subnode ID: 0	The subnode ID must be the same as the subnode setting of the corresponding DIP switches on the EMU, but the subnode ID must be different from IDs of the other subnodes on the same bus.

Item	Data Plan for the F01D500 Cabinet	Remarks
Charging parameters of the battery	Charging mode of the battery: automatic	This parameter is set according to the actual requirements. automatic: The power system automatically adjusts the charging mode of batteries according to the status of the battery set. equalizing: The battery is charged forcibly so as to quickly compensate for the lost capacity of the battery. floating: The battery adjusts charging/ discharging when it is in saturation. Default: automatic.
	Equalized charging voltage of the battery: 56.5 V	This parameter is set according to the actual requirements. When setting the equalized charging voltage of the battery, make sure that DC overvoltage - 1 V > equalized charging voltage > float charging voltage + 2 V, and that DC undervoltage > load power-off voltage > battery power-off voltage. Default: 56.5 V.
	Float charging voltage of the battery: 53.5 V	This parameter is set according to the actual requirements. When setting the float charging of the battery, make sure that DC overvoltage - 1 V > equalized charging voltage > float charging voltage + 2 V, and that DC undervoltage > load power-off voltage > battery power-off voltage. Default: 53.5 V.
Battery management parameters	Current-limiting coefficient for battery charging: 0.15	This parameter is set according to the actual requirements. In the normal state, the current of the power supply is not limited. The current-limiting function is enabled when the charging current of the battery set > current-limiting coefficient x nominal capacity of the battery set. Default value: 0.15.
	Interval of battery equalized charging: 60 days	This parameter is set according to the actual requirements. If the continuous float charging duration of the rectifier unit exceeds the preset equalized charging interval, the battery enters the equalized charging state. Default: 60 days.

Item	Data Plan for the F01D500 Cabinet	Remarks
	Number of battery sets: 1	This parameter is set according to the actual requirements. The number of battery sets can be set to 0 or 1. That is, the system supports up to one battery set. Default value: 1.
	Capacity of the battery set: 75 AH	The battery capacity is configured according to the actual value. The F02A cabinet uses the 100 AH batteries, the F02AF cabinet uses different external batteries according to the actual conditions, the F01D200 cabinet uses the 80 AH batteries, the F01D500 cabinet uses the 150 AH or 194 AH batteries, and the F01D1000 cabinet uses the 150 AH or 194 AH batteries. Default: 65 AH.
Temperature compensation parameter of the battery	Upper temperature threshold of the battery set: 80°C	This parameter is set according to the actual requirements. Default: 80°C.
	Lower temperature threshold of the battery set: -20°C	This parameter is set according to the actual requirements. Default: -20°C.
	Temperature compensation coefficient of the battery set: 80 mV	This parameter is set according to the actual requirements. The temperature compensation coefficient refers to the variable of the float charging voltage of the battery set when the temperature of the battery set changes by every 1° C. Default: 80 mV.
Power supply load power-off and battery set power-off parameters	Load power-off permission status: forbid	This parameter is set according to the actual requirements. Default: forbid.
	Battery set power-off permission status: permit	This parameter is set according to the actual requirements. Default: permit.
	Load power-off voltage: 44 V	This parameter is set according to the actual requirements. Default: 44 V.
	Battery set power-off voltage: 43 V	This parameter is set according to the actual requirements. Default: 43 V.

Item	Data Plan for the F01D500 Cabinet	Remarks
Power distribution parameters	AC overvoltage alarm threshold of the power supply: 280 V	This parameter is set according to the actual requirements. When the AC voltage exceeds the preset overvoltage alarm threshold, the system reports an AC overvoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 280 V.
	AC undervoltage alarm threshold of the power supply: 180 V	This parameter is set according to the actual requirements. When the AC voltage falls below the preset undervoltage alarm threshold, the system reports an AC undervoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 180 V.
	DC overvoltage alarm threshold of the power supply: 58 V	This parameter is set according to the actual requirements. When the DC voltage exceeds the preset overvoltage alarm threshold, the system reports a DC overvoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 58 V.
	DC undervoltage alarm threshold of the power supply: 45 V	This parameter is set according to the actual requirements. When the DC voltage falls below the preset undervoltage alarm threshold, the system reports a DC undervoltage alarm. In this case, the rectifier unit powers off automatically to protect the system. Default: 45 V.
Rectifier unit parameter	Number of rectifier units: 2	This parameter is set according to the actual requirements. The EPS75-4815AF supports up to two rectifier units. Default value: 5.
Load and battery high-temperature power-off parameters	Load high-temperature power-off permission status: forbid	This parameter is set according to the actual requirements. Default: forbid.
	Battery high-temperature power-off permission status: permit	This parameter is set according to the actual requirements. Default: forbid.
	Temperature for load high-temperature power-off: 70°C	This parameter is set according to the actual requirements. Default: 65°C.

Item	Data Plan for the F01D500 Cabinet	Remarks
	Temperature for battery high-temperature power-off: 53°C	This parameter is set according to the actual requirements. Default: 53°C.
Environment monitoring parameters	Upper alarm threshold of the temperature: 68°C	This parameter is set according to the actual requirements. When the actual temperature reaches or is higher than the upper alarm threshold, the system reports an alarm. Default: 50°C.
	Lower alarm threshold of the temperature: -5°C	This parameter is set according to the actual requirements. When the actual temperature is equal to or lower than the lower alarm threshold, the system reports an alarm. Default: 0°C.
	Upper alarm threshold of the humidity: 80% RH	This parameter is set according to the actual requirements. When the actual humidity reaches or is higher than the upper alarm threshold, the system reports an alarm. Default: 80% RH.
	Lower alarm threshold of the humidity: 10% RH	This parameter is set according to the actual requirements. When the actual humidity is equal to or lower than the lower alarm threshold, the system reports an alarm. Default: 10% RH.
External extended digital parameters	Digital parameter ID: 0	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 0: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 1	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the fan tray is set here to monitor the fan tray. When the fan tray is faulty, the host reports an alarm.
	Valid level of digital parameter 1: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

Item	Data Plan for the F01D500 Cabinet	Remarks
	Digital parameter ID: 3	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the lightning arrester is set here to monitor the status of the lightning arrester. When the lightning arrester is faulty, the host reports an alarm.
	Valid level of digital parameter 3: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 4	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the smoke sensor is set here to monitor whether there is smoke in the actual environment. When there is smoke, the host reports an alarm.
	Valid level of digital parameter 4: high level	When the high level represents the valid level, the host does not report an alarm in the case of high level.
	Digital parameter ID: 5	This digital parameter is set according to the actual requirements. The monitoring digital parameter of the heat exchanger is set here to monitor the status of the heat exchanger. When the heat exchanger is faulty, the host reports an alarm.
	Valid level of digital parameter 5: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.
	Digital parameter ID: 6	This digital parameter is set according to the actual requirements. The digital monitoring parameter of the MDF door status sensor is set here to monitor the MDF door status. When the door of the MDF compartment is open, the host reports an alarm.
	Valid level of digital parameter 6: low level	When the low level represents the valid level, the host does not report an alarm in the case of low level.

Configuration Process

The monitoring parameters can be reported to the control board and the service processing board only when the data for the EPS75-4815AF is configured correctly in the system.

Figure 8-15 shows the configuration process, and **Table 8-18** lists the commands used during the configuration.

Figure 8-15 Configuration process of the EPS75-4815AF

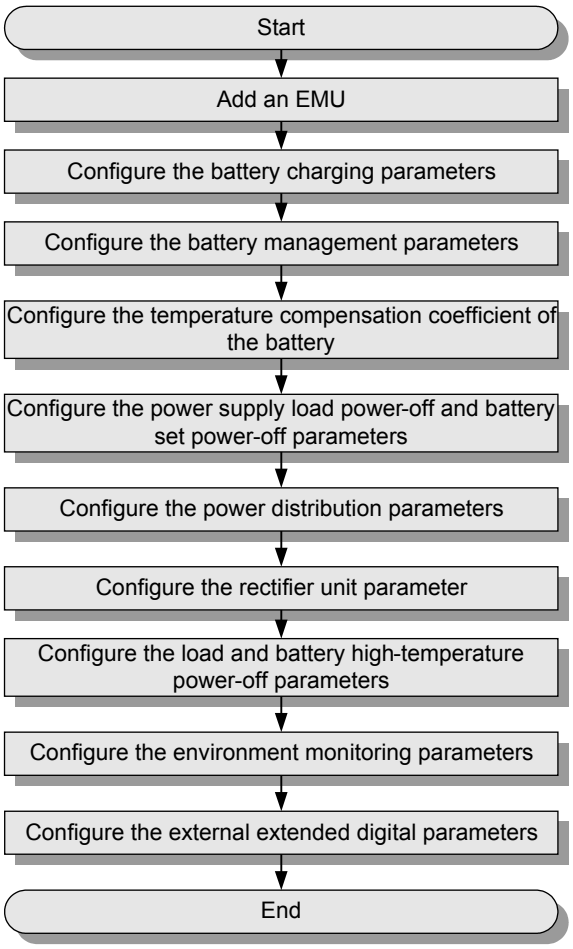


Table 8-18 Commands for configuring the EPS75-4815AF

To...	Run the Command...
Add an EMU	**emu add**
Configure the battery charging parameters	**power charge**
Configure the battery management parameters	**power battery parameter**
Configure the temperature compensation coefficient of the battery	**power battery temperature**

To...	Run the Command...
Configure the power supply load power-off and battery set power-off parameters	**power off**
Configure the power distribution parameters	**power supply-parameter**
Configure the rectifier unit parameter	**power module-num**
Configure the load and battery high-temperature power-off parameters	**power temperature-off**
Configure the environment monitoring parameters	**power environment**
Configure the external extended digital parameters	**power outside-digital** IDs of user-defined alarms in the digital parameters: IDs 1-20 are reserved alarm IDs in the system (1: AC_voltage; 2: AC_switch; 3: Battery_voltage; 4: Battery_fuse; 5: Load_fuse; 6: Rectifier; 7: DC_power; 8: Cupboard_door; 9: Room_door; 10: Window; 11: Theft; 12: Wiring; 13: Fan; 14: Fire; 15: Fog; 16: Water; 17: Diesel; 18: Smell 19: Air_conditioner; 20: SPD), and IDs 21-52 are alarm IDs allocated to other user-defined alarms by users.
Query the configuration parameters of the power system	**display power system parameter**

The following considers the configuration in the F01D500 cabinet as an example to describe the process of configuring the environment monitoring parameters of the EPS75-4815AF.

1. Log in to the PVM through the maintenance terminal and add an EMU.

```
huawei(config)#emu add 0 POWER4875L 0 0 RS232 POWER4875L
```

2. Query the status of the EPS75-4815AF.

```
huawei(config)#display emu 0
------------------------------------------------------------------------
  EMU name    : POWER4875L
  EMU type    : Pwr4875
  EMU state   : Normal
  Frame ID    : 0
  Subnode     : 0
  COM Port    : RS232
------------------------------------------------------------------------
```

3. Enter the environment monitoring configuration mode and query the default configuration.

```
huawei(config)#interface emu 0
huawei(config-if-power4875l-0)#display power system parameter
  EMU ID: 0                              Power system information
  ------------------------------------------------------------------------
  charge control state  : automatic control
  equalizing Voltage : 56.500V    floating Voltage: 53.500V
  charge lmt quotiety: 0.150        equalizing time   : 60 days
  battery number     : 1
```

```
  battery 0 capacity : 65   AH
  battery temperature test upper :  80C  battery temperature test lower: -20C
  temperature redeem quotiety    : 80mV
  battery temperature alarm upper:  50C  battery temperature alarm lower: 0C
  load off permit    : forbid      load off voltage    : 44.000V
  battery off permit : permit      battery off voltage : 43.000V
  AC over alarm voltage  : 280V        AC lack alarm voltage : 180V
  DC over alarm voltage  : 58 V        DC lack alarm voltage : 45V
  power module number: 5
  module 0 address: 1               module 0 switch state   : On
  module 1 address: 2               module 1 switch state   : On
  module 2 address: 3               module 2 switch state   : On
  module 3 address: 4               module 3 switch state   : On
  module 4 address: 5               module 4 switch state   : On
  Load high-temperature-off permit: forbid
  Load high-temperature-off temperature(C): 65
  Battery high-temperature-off permit: forbid
  Battery high-temperature-off temperature(C): 53
  ------------------------------------------------------------------------------
huawei(config-if-power4875l-0)#display power environment parameter
  EMU ID: 2                          Power environment configration
parameter

------------------------------------------------------------------------------
  AnalogID Name            AlmUpper AlmLower TestUpper TestLower Unit
Type
     0     Temperature        50      0        80        -20     C
Current
     1     Humidity           80      10       100       0       %R.H.
Current

------------------------------------------------------------------------------
  DigitalID Name               Level   |DigitalID Name
Level
     0     -                      1     |   1     -
1
     2     -                      1     |   3     -
1
     4     -                      1     |   5     -
1
     6     -
1
  ------------------------------------------------------------------------------
```

The results show that the power, temperature, and humidity parameters have been configured automatically in the system; however, certain parameters need to be modified, and certain extended monitoring parameters need to be added.

4. Configure the battery charging parameters.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power charge** command.

5. Configure the battery management parameters.

   ```
   huawei(config-if-power4875l-0)#power battery parameter 0.15 60 1 150
   ```

6. Configure the temperature compensation coefficient of the battery.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power battery temperature** command.

7. Configure the power supply load power-off and battery set power-off parameters.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power off** command.

8. Configure the power distribution parameters.

   If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power supply-parameter** command.

9. Configure the rectifier unit parameter.
10. Configure the load and battery high-temperature power-off parameters.

```
huawei(config-if-power4875l-0)#power temperature-off load-off-state forbid
load-off-temperature 70 battery-off-state permit battery-off-temperature 53
```

11. Configure the environment parameters.
    - Configure the temperature parameters.

```
huawei(config-if-power4875l-0)#power environment temperature 68 -5 80 -20
```

    - Configure the humidity parameters.

      If the planned data is the same as the query result, the parameters need not be configured. If the parameters need to be modified, run the **power environment humidity** command.

12. Configure the extended digital parameters.

```
huawei(config-if-power4875l-0)#power outside_digital 0 available-level low-
level name Fan
huawei(config-if-power4875l-0)#power outside_digital 1 available-level low-
level name HABF_FAN
huawei(config-if-power4875l-0)#power outside_digital 3 available-level low-
level name SPD
huawei(config-if-power4875l-0)#power outside-digital 4 available-level high-
level name Smoke
huawei(config-if-power4875l-0)#power outside-digital 5 available-level low-
level name HEX
huawei(config-if-power4875l-0)#power outside-digital 6 available-level low-
level name MDF-door
```

13. Query the information about the configured parameters and environment parameters of the power system.

```
huawei(config)#interface emu 0
huawei(config-if-power4875l-0)#display power system parameter
  EMU ID: 0                              Power system information
  ---------------------------------------------------------------------------
  charge control state  : automatic control
  equalizing Voltage : 56.500V    floating Voltage: 53.500V
  charge lmt quotiety: 0.150        equalizing time   : 60 days
  battery number     : 1
  battery 0 capacity : 150  AH
  battery temperature test upper :  80C  battery temperature test lower: -20C
  temperature redeem quotiety    : 80mV
  battery temperature alarm upper:  50C  battery temperature alarm lower: 0C
  load off permit    : forbid      load off voltage    : 44.000V
  battery off permit : permit      battery off voltage : 43.000V
  AC over alarm voltage  : 280V        AC lack alarm voltage : 180V
  DC over alarm voltage  : 58 V        DC lack alarm voltage : 45V
  power module number: 5
  module 0 address: 1               module 0 switch state   : On
  module 1 address: 2               module 1 switch state   : On
  module 2 address: 3               module 2 switch state   : On
  module 3 address: 4               module 3 switch state   : On
  module 4 address: 5               module 4 switch state   : On
  Load high-temperature-off permit: forbid
  Load high-temperature-off temperature(C): 70
  Battery high-temperature-off permit: permit
  Battery high-temperature-off temperature(C): 53
  ---------------------------------------------------------------------------
huawei(config-if-power4875l-0)#display power environment parameter
  EMU ID: 2                              Power environment configration
parameter

  ---------------------------------------------------------------------------
  AnalogID Name            AlmUpper AlmLower TestUpper TestLower Unit
Type
     0     Temperature        68      -5       80        -20     C
Current
     1     Humidity           80      10       100       0       %R.H.
```

```
Current

--------------------------------------------------------------------------------
  DigitalID Name               Level   |DigitalID Name
Level
     0     Fan                   0     |   1     HABF_FAN
0
     2     -                     0     |   3     SPD
1
     4     Smoke                 1     |   5     HEX
0
     6     MDF-door
0
  ------------------------------------------------------------------------------
```

14. Query the alarms, and confirm that the door status alarm other than alarms for other monitoring parameters is generated.

```
huawei(config-if-power4875l-0)#display power alarm
  EMU ID: 0                              Power alarm information
  ------------------------------------------------------------------------------
  Mains supply yes : Yes            Mains supply lack : Normal
  Total Vol lack   : Normal
  Load fuse 0      : Connect        Second fuse       : Connect
  Load off         : On             Battery off       : On
  Battery 0 loop   : Disconnect
  Environment Temperature : Normal         Environment Humidity   : Normal
  Door alarm       : Alarm          Water alarm       : Normal
  Fog alarm        : Normal         Wiring alarm      : Normal
  Module 0         : Normal
  Module 1         : Normal
  Module 2         : Normal
  Battery temperature off state : Normal  Load temperature off state : Normal
  ------------------------------------------------------------------------------
  Name                            State |Name                              State
  Spare Dig0(Fan)                 Normal|Spare(HABF_FAN)
Normal
  Spare Dig2                      Normal|Spare Dig3(SPD)
Normal
  Spare Dig4(Smoke)               Normal|Spare Dig5(HEX)                 Alarm
  Spare Dig6(MDF-door)            Alarm
  ------------------------------------------------------------------------------
```

NOTE

The door status sensors of the device compartment and the temperature control compartment are in serial connection, and are monitored as a variable. These two door status sensors are automatically configured by the system. The door status alarm is generated because the door is open.

15. Save the data.

```
huawei(config-if-power4875l-0)#quit
huawei(config)#save
```

16. Close all doors of the cabinet. Then, query the alarm information again, and confirm that there is no alarm for any monitoring parameter.

9 Fan Tray Monitoring Solution

About This Chapter

Fans are monitored through the fan monitoring board that reports the fan status to the control system.

9.10 Configuring the Fan Environment Monitoring Parameters

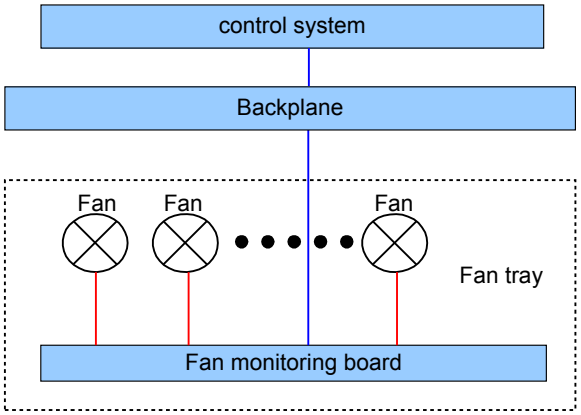
This topic describes how to configure the environment monitoring parameters through the command line interface (CLI).

9.1 Fan Tray Monitoring Principles

This topic describes the principles of monitoring the fan tray through the fan monitoring board.

Figure 9-1 shows the fan tray monitoring principles.

Figure 9-1 Fan tray monitoring principles



NOTE

- The fans connect to the fan monitoring board through the signal cable. The fan monitoring board monitors the working status of the fans.
- The fan tray is connected to the backplane of the shelf through cables directly or indirectly.
- The fan monitoring board reports the collected status to the control system through the backplane.

9.2 LED

The LED on the front panel of the fan tray indicates the running status of the fans. This topic describes the status and meanings of the LED.

The LED is on the right of the fan tray. **Table 9-1** describes the LED of the fan tray.

Table 9-1 LED of the fan tray

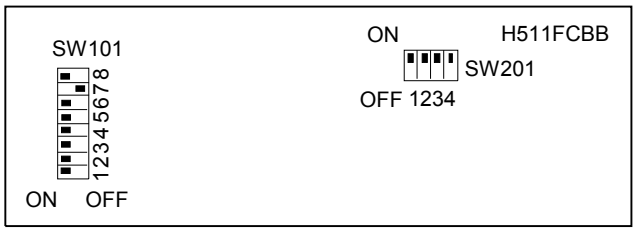
LED	Status	Description
	Green: on for 1s and off for 1s repeatedly	The fan tray works in the normal state.
	Green: on for 0.125s and off for 0.125s repeatedly	The fan tray is faulty.

9.3 DIP Switch

This topic provides the meanings and settings of the DIP switches on the fan tray. The fan tray is configured with the fan monitoring board that provides two sets of DIP switches.

The H511FCBB monitoring board of the fan tray provides two sets of DIP switches: SW101 and SW201. **Figure 9-2** shows the layout of SW101 and SW201.

Figure 9-2 Layout of SW101 and SW201 (default settings)



SW101

Table 9-2 describes the default settings of DIP switches of SW101.

Table 9-2 Default settings of DIP switches of SW101

DIP Switch	Meaning		Default Setting
SW101-1	Sets the address of subnode based on data configurations. ● ON: The address bit is 0. ● OFF: The address bit is 1. The default value of the address bit is 0.		ON
SW101-2			ON
SW101-3			ON
SW101-4	ON	The fan tray communicates with the control board at the baud rate of 19200 bit/s.	ON
	OFF	The fan tray communicates with the control board at the baud rate of 9600 bit/s.	
SW101-5	Sets the number of fans. By default, there are six fans.		ON
SW101-6			ON
SW101-7	Sets the fan speed adjustment mode. By default, the fan speed is adjusted according to the temperature at the air exhaust vent.		OFF
SW101-8			ON

Table 9-3, **Table 9-4**, and **Table 9-5** describe the settings of SW101.

Table 9-3 Settings of SW101-1, SW101-2 and SW101-3

SW101-3	SW101-2	SW101-1	Address Bit Value
ON	ON	ON	0
ON	ON	OFF	1
ON	OFF	ON	2
ON	OFF	OFF	3
OFF	ON	ON	4
OFF	ON	OFF	5
OFF	OFF	ON	6
OFF	OFF	OFF	7

Table 9-4 Settings of SW101-5 and SW101-6

SW101-6	SW101-5	Number of Fans
ON	ON	6
ON	OFF	2
OFF	ON	4
OFF	OFF	3

Table 9-5 Settings of SW101-7 and SW101-8

SW101-8	SW101-7	Adjust Speed According to...	Adjustment Method
ON	ON	Temperature at the air intake vent	Method 1
ON	OFF	Temperature at the air exhaust vent	Method 2
OFF	ON	Reserved	Method 3
OFF	OFF	Temperature at the air intake vent (The fan stops rotating.)	Method 4

SW201

Table 9-6 describes the default settings of DIP switches of SW201.

Table 9-6 Default settings of DIP switches of SW201

DIP Switch	Meaning	Default Setting
SW201-1	By default, set the terminal to corresponde to serial port 0 (mapping J201).	ON
SW201-2		ON
SW201-3	By default, set the terminal to corresponde to serial port 1 (mapping J202).	ON
SW201-4		ON

Table 9-7 and Table 9-8 describe the settings of DIP switches of SW201.

Table 9-7 Settings of SW201-1 and SW201-2

SW201-2	SW201-1	Terminal Matching Serial Port 0
ON	ON	Yes
OFF	OFF	No

Table 9-8 Settings of SW201-3 and SW201-4

SW201-4	SW201-3	Terminal Matching Serial Port 1
ON	ON	Yes
OFF	OFF	No

9.4 LED

The LED on the front panel of the fan tray indicates the running status of the fans. This topic describes the status and meanings of the LED.

The LED is on the right of the fan tray. Table 9-9 describes the LED of the fan tray.

Table 9-9 LED of the fan tray

LED	Status	Description
STATUS	Yellow: on for 0.3s and off for 0.3s repeatedly	The fan tray is not registered or it is being loaded.
	Green: on for 1s and off for 1s repeatedly	The fan tray works in the normal state.
	Yellow: on for 1s and off for 1s repeatedly	The fan tray generates a warning that does not affect the services.

LED	Status	Description
	Yellow: on	The communication is lost.
	Red: on for 0.3s and off for 0.3s repeatedly	The fan tray is faulty, or it generates an alarm when the temperature is very high.

9.5 DIP Switch

The fan tray is configured with the fan monitoring board that provides one set of DIP switches. This topic provides the indications and settings of the DIP switches on the fan tray.

The H801FCBB monitoring board of the fan tray provides a set of DIP switches: SW2. **Figure 9-3** shows the layout of SW2.

Figure 9-3 Layout of SW2 (default settings)

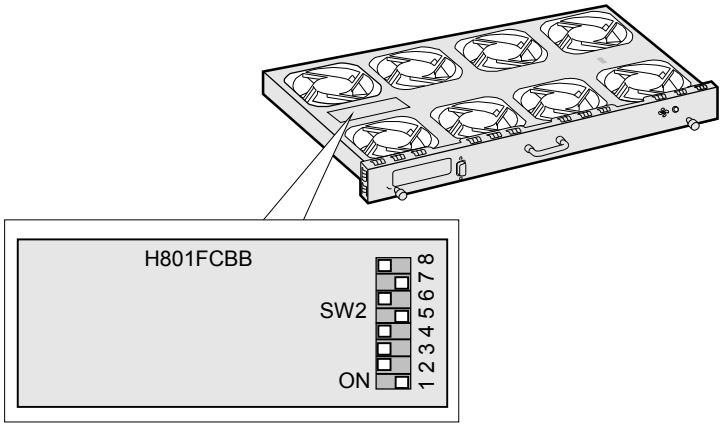


Table 9-10 describes the settings of SW2.

Table 9-10 Settings of SW2

DIP Switch	Indication	
1, 2, 3	Set the corresponding subnode addresses corresponding to the data configuration. ● ON: The address bit is 0. ● OFF: The address bit 1. The default value of the address bit is 1.	
4	ON	The fan tray communicates with the control board at a baud rate of 19200 bit/s. This is the default setting.

DIP Switch	Indication	
	OFF	The fan tray communicates with the control board at a baud rate of 9600 bit/s.
5, 6	Set the number of fans.	
7, 8	Set the fan speed adjustment mode.	

Table 9-11, **Table 9-12**, and **Table 9-13** describe the settings of DIP switches of SW2.

Table 9-11 Settings of SW2-1, SW2-2, and SW2-3

SW2-3	SW2-2	SW2-1	Address Bit Value	Remarks
ON	ON	ON	0	-
ON	ON	OFF	1	Subnode address of the master HABD shelf
ON	OFF	ON	2	-
ON	OFF	OFF	3	Subnode address of the HABF extended shelf subtended to the master HABD shelf
OFF	ON	ON	4	-
OFF	ON	OFF	5	Subnode address of the slave HABD shelf
OFF	OFF	ON	6	-
OFF	OFF	OFF	7	Subnode address of the HABF extended shelf subtended to the slave HABD shelf

Table 9-12 Settings of SW2-5 and SW2-6

SW2-6	SW2-5	Number of Fans	Remarks
ON	ON	6	-
ON	OFF	8	In the UA5000, this item is mandatory.
OFF	ON	4	-
OFF	OFF	10	-

Table 9-13 Settings of SW2-7 and SW2-8

SW2-8	SW2-7	Speed Adjustment Mode	Remarks
ON	ON	Measuring the temperature of the air intake vent	-
ON	OFF	Measuring the temperature of the air exhaust vent	In the UA5000, this item is mandatory.
OFF	ON	Reserved	-
OFF	OFF	Measuring the temperature of the air intake vent when the fan stops rotating	-

9.6 LED

The LED on the front panel of the fan tray indicates the running status of the fans. This topic describes the status and meanings of the LED.

The LED is on the right of the fan tray. **Table 9-14** describes the LED of the fan tray.

Table 9-14 LED of the fan tray

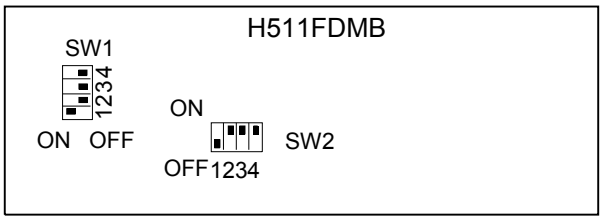
LED	Status	Description
STATUS	Yellow: blinking quickly, on for 0.3s and off for 0.3s	The fan tray is not registered or it is being loaded.
	Green: on for 1s and off for 1s repeatedly	The fan tray works in the normal state.
	Yellow: on for 1s and off for 1s repeatedly	The fan tray generates a warning that does not affect the services.
	Yellow: on	The communication is lost.
	Red: blinking quickly, on for 0.3s and off for 0.3s	The fan tray is faulty, or it generates an alarm of overhigh temperature.

9.7 DIP Switch

The fan tray is configured with the fan monitoring board that provides two sets of DIP switches. This topic provides the indications and settings of the DIP switches on the fan tray.

The H612FCBA monitoring board of the fan tray provides two sets of DIP switches: SW1 and SW2. **Figure 9-4** shows the layout of SW1 and SW2.

Figure 9-4 Layout of SW1 and SW2 (default settings)



NOTE

The PCB board of the H612FCBA board is H511FDMB.

DIP Switches of SW1

Table 9-15 describes the indications and default settings of the DIP switches of SW1.

Table 9-15 DIP switches of SW1

DIP Switch	Connector Corresponding to the Fan	Indication	Default Setting
SW1-1	J1	SW1-1 is a switch to shield the signals of the fault alarms generated by fan trays. In the case of connectors that are not connected to fan trays, set SW1 to shield the signals of alarms before the fan monitoring board works. ● ON: The connector is idle and is not connected to a fan. ● OFF: The connector is connected to a fan.	ON
SW1-2	J2		OFF
SW1-3	J3		OFF
SW1-4	J4		OFF

DIP Switches of SW2

Table 9-16 describes the indications and default settings of the DIP switches of SW2.

Table 9-16 DIP switches of SW2

DIP Switch	Indication	
1, 2, 3	Set the subnode addresses corresponding to the data configurations. ● ON: The address bit is 0. ● OFF: The address bit is 1. The default value of the address bit is 1.	
4	ON	This is a default setting. The fan tray communicates with the control board at a baud rate of 19200 bit/s.
	OFF	The fan tray communicates with the control board at a baud rate of 96000 bit/s.

Table 9-17 describes the settings of SW2-1, SW2-2, and SW2-3.

Table 9-17 Settings of SW2-1, SW2-2, and SW2-3

SW2-3	SW2-2	SW2-1	Address Bit Value
ON	ON	ON	0
ON	ON	OFF	1
ON	OFF	ON	2
ON	OFF	OFF	3
OFF	ON	ON	4
OFF	ON	OFF	5
OFF	OFF	ON	6
OFF	OFF	OFF	7

9.8 LED

The LED on the front panel of the fan tray indicates the running status of the fans. This topic describes the status and meanings of the LED.

The LED is on the right of the fan tray. Table 9-18 describes the LED of the fan tray.

Table 9-18 LED of the fan tray

LED	Status	Description
	Green: on for 1s and off for 1s repeatedly	The fan tray works in the normal state.

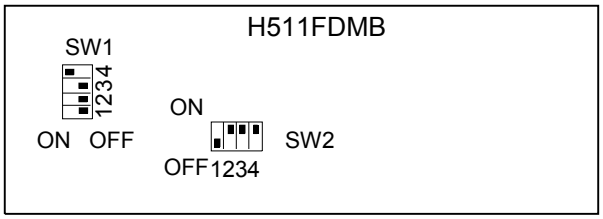
LED	Status	Description
	Yellow: blinking quickly, on for 0.3s and off for 0.3s	The fan tray is not registered or it is being loaded.
	Yellow: on for 1s and off for 1s repeatedly	The fan tray generates a warning that does not affect the services.
	Yellow: on	The communication is lost.
	Red: blinking quickly, on for 0.3s and off for 0.3s	The fan tray is faulty, or it generates an alarm of overhigh temperature.

9.9 DIP Switches

The fan tray is installed with a fan monitoring board. This topic describes the indications and settings of the DIP switches.

Figure 9-5 shows the layout of the H612FCBA board.

Figure 9-5 Layout of the DIP switches on the FCBA board



NOTE

The PCB board of the H612FCBA board is H511FDMB.

Table 9-19 describes the functions of the DIP switches on SW1.

Table 9-19 Functions of DIP switch SW1 on the FCBA board

DIP Switch	Function
1-4	Set whether the connectors are connected to fans. For details, see **Table 9-20**.

- If the switch is set to OFF, the corresponding connector is connected to a fan.
- If the switch is set to ON, the corresponding connector is idle and not connected to a fan.

The three fans on the fan monitoring board of the HABM shelf are connected to corresponding connectors J1, J2, and J3 on the board. **Table 9-20** describes the settings of SW1.

Table 9-20 Settings of SW1 on the FCBA board

SW1-1	SW1-2	SW1-3	SW1-4
J1	J2	J3	J4
OFF	OFF	OFF	ON

Table 9-21 describes the functions of the DIP switches on SW2.

Table 9-21 Functions of SW2 on the FCBA board

DIP Switch	Function
1, 2, 3	Set the subnode addresses. For details, see Table 9-22.
4	Sets the baud rate of the serial port. For details, see Table 9-23.

Table 9-22 Settings of SW2-1 to SW2-3 on the FCBA board

SW2-3	SW2-2	SW2-1	Subnode Address
ON	ON	ON	0
ON	ON	OFF	1
ON	OFF	ON	2
ON	OFF	OFF	3
OFF	ON	ON	4
OFF	ON	OFF	5
OFF	OFF	ON	6
OFF	OFF	OFF	7

Table 9-23 Settings of SW2-4 on the FCBA board

SW2-4	Indication	Default Setting
ON	The baud rate of the serial port is 19200 bit/s.	ON
OFF	The baud rate of the serial port is 9600 bit/s.	

9.10 Configuring the Fan Environment Monitoring Parameters

This topic describes how to configure the environment monitoring parameters through the command line interface (CLI).

Prerequisites

- The subnode setting of the corresponding DIP switch on the fan monitoring board must be different from IDs of the other subnodes on the same bus.
- Set the DIP switch on the fan monitoring board, so that the communication baud rate is set as 19200 bit/s.

Data Plan

Table 9-24 shows the data plan for configuring the fan.

Table 9-24 Fan configuration data plan

Configuration Item	Data	Remarks
EMU	Type: Fan	-
	Number: 1	-
	Subnode ID: 6	The subnode ID must be the same as the subnode setting of the corresponding DIP switch on the fan monitoring board, but the subnode ID must be different from IDs of the other subnodes on the same bus.
	Serial port of environment monitoring communication: RS485	The serial port of environment monitoring communication of the fan tray must be set to RS485.
	Name: Fan	-
Fan speed adjustment mode	Speed adjustment mode of the fan tray: automatic.	In the actual environment, when you need to set the fan speed adjustment mode or adjust the fan speed level manually so as to assure heat dissipation of the device, run this command
Alarm reporting for the fans	Read temperature failure alarm: permit	By default, the alarm reporting is enabled.
	Fan block alarm: permit	

Configuration Item	Data	Remarks
	Temperature too high alarm: permit	
	Power fault alarm: permit	

NOTE

- The automatic fan speed adjustment mode, based on the temperature, is suggested. In level 5, if you do not set the fan speed adjustment mode as automatic, the fan will have air redundancy.
- You can adjust the fan speed level only when the speed adjustment mode of the fan is set to manual.
- When the system is in the abnormal state or the fan is invalid, the fan rotates at a high speed to compensate the air and meet the heat dissipation requirements.

Configuration Process

Figure 9-6 shows the configuration process, and Table 9-25 lists the commands used during the configuration.

Figure 9-6 Configuration process of the fan

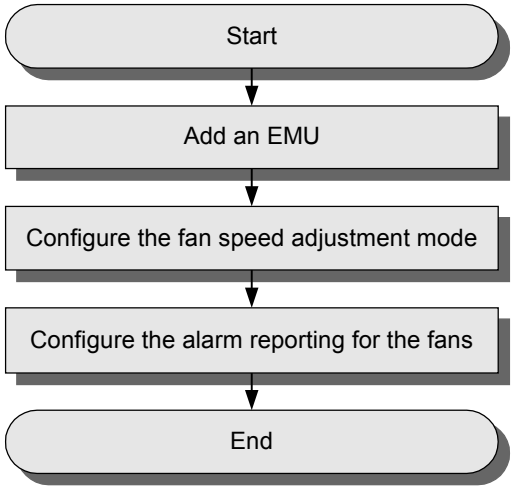


Table 9-25 Commands for configuring the fan

To...	Run the Command...
Add an EMU	**emu add**
Configure the fan speed adjustment mode	**fan_speed**
Configure the alarm reporting for the fans	**fan_alarmset**
Query the parameters of the fans	**display_fan_system_parameter**

Procedure

Step 1 Add the EMU, with the type of fan.

```
huawei(config)#emu add  1 FAN 0 6 rs485 Fan
```

Step 2 Configure the speed adjustment mode for the fans.

```
huawei(config)#interface emu 1
huawei(config-if-fan-1)#fan speed mode automatic
```

Step 3 Configure the alarm reporting for the fans.

```
huawei(config-if-fan-1)#fan alarmset block permit
huawei(config-if-fan-1)#fan alarmset read-tem-fault permit
huawei(config-if-fan-1)#fan alarmset tem-high permit
huawei(config-if-fan-1)#fan alarmset fault permit
```

Step 4 Query the parameters of the fans.

```
huawei(config-if-fan-1)#display fan system parameter

  EMU ID: 1
  FAN configration parameter:
  ----------------------------------------------------------------------
  FAN timing mode: Auto timing
  ----------------------------------------------------------------------
  Alarm_name                        Permit/Forbid
  Read temperature fault                Permit
  Fan block                             Permit
  Temperature high                      Permit
  Power fault                           Permit
  ----------------------------------------------------------------------
```

Step 5 Save the data.

```
huawei(config-if-fan-1)#quit
huawei(config)#save
```

----End

10 Sensors

About This Chapter

Sensors are used to collect the monitoring parameters of the environment, such as temperature and water parameters. This topic provides the appearance and technical specifications of sensors, and describes the working principles and installation of sensors.

10.1 Sensor

This topic describes various types of sensors (sensors can be selectively configured according to customer requirements). In addition, this topic provides the specifications of the temperature and humidity sensor, water sensor, door status sensor, and smoke sensor that must be met when users select these sensors by themselves.

10.2 Sensor Matching Table

This topic describes sensor BOMs, cable BOMs, and sensor applications.

Table 10-1 describes the matching table for the sensors.

Table 10-1 Sensor matching table

Sensor	BOM	Cable BOM	Application	Remarks
Temperature and humidity sensor	33010286	04026802 04026800	H303ESC rear access (F02A) H304ESC front access (F02AF)	It is a configuring part. ● Temperature and humidity sensor cable (with the 5-pin connector), for DC power supply. ● Configure one cable of each type for one temperature and humidity sensor.
		04041584	EPS30-4815AF/ EPS75-4815AF power system (F02A, F02AF, M200, F01E200, F01E400, F01D200, F01D500, and F01D1000)	It is a configuring part. ● Temperature and humidity sensor cable (with the 4-pin connector), for the EPS30-4815AF/ EPS75-4815AF power system. ● Configure one cable for one temperature and humidity sensor.
		04080030	ESCM (M200)	
Door status sensor (switch of the door status sensor)	33010007 Sensor switch - On - Covered-up installation	04025713	H303ESC rear access (F02A) H304ESC front access (F02AF) ESCM (M200) F01E400 F01D200, F01D500, and F01D1000	External door status sensor and matching sensor cable, used in the equipment room of the carrier.

		04047 219	F01E200 M200	
Water sensor (liquid level sensor)	04025 177 (3301 0089)	-	H303ESC rear access (F02A) H304ESC front access (F02AF) EPS30-4815AF/ EPS75-4815AF power system (F02A, F02AF, M200, F01E200, F01E400, F01D200, F01D500, and F01D1000)	It is a pricing part. External water sensor (with its own cable), used in the equipment room of the carrier.
Smoke sensor	33010 204 (ionic) 33010 293 (phot oelect ric)	04041 585	H303ESC rear access (F02A) H304ESC front access (F02AF) EPS30-4815AF/ EPS75-4815AF power system (F02A, F02AF, M200, F01E200, F01E400, F01D200, F01D500, and F01D1000)	External smoke sensor and matching sensor cable (with the 4-pin connector), used in the equipment room of the carrier.
Battery Temperatur e Sensor	33010 296	-	-	Not delivered with the EPS30-4815AF/EPS75-4815AF power system
Main distribution frame (MDF) sensor	-	04200 327	F01D200, F01D500, and F01D1000	-
		04047 083 04047 130	F01E200, F01E400, and M200	-
Lightning arrester sensor	19020 081 19020 086 19020 087	04043 656	F01D200, F01D1000	-
		04047 011	F01E200	-
		04041 581	F01E400,F01D5 00	-

10.2.1 Temperature and Humidity Sensor

The temperature and humidity sensor monitors the temperature and humidity of the equipment room in real time.

The external temperature and humidity sensor monitors the temperature and humidity of the equipment room in real time. The signals output by the external temperature and humidity sensor generally are the standard current analog output (4 mA–20 mA).

Appearance

Figure 10-1 shows the temperature and humidity sensor.

Figure 10-1 Temperature and humidity sensor

NOTE

The temperature and humidity sensor is classified into two types and the functions of these two types are the same.

Technical Specifications

Table 10-2 describes the technical specifications of the temperature and humidity sensor.

Table 10-2 Technical specifications of the temperature and humidity sensor

Parameter Name	**Specification**	
	Temperature sensor	Humidity sensor
Measurement range	-20°C to 80°C	0 to 100%RH
Precision	≤±0.3°C (at 25°C)	≤±2%RH (at 25°C, 30%RH to 80%RH)
Power supply voltage	12 VDC to 24 VDC	

Signal output	4 mA to 20 mA (corresponding to the measurement range linearly)	
Sampled resistance	≤500 ohms	
Sensitive components	Pt100 platinum resistor	S108 humidity-sensible capacitor
Work temperature	-20°C to 80°C	
Storage temperature	-40°C to 60°C (not condensing)	
Shell material	ABS engineering plastic	

FAQ

1. Q: Why is the temperature reported by the EMU higher than the actual temperature?

A: The temperature measured is related with the position where the temperature sensor is placed.

Some sensors are integrated on the boards, while the boards are usually installed at the air exhaust vent at the upper part of the cabinet. Some sensors may be installed at the top of the cabinet, also near the air exhaust vent. Therefore, the reported temperature is usually higher than the actual temperature.

For the sensor integrated on the board, the temperature measured will also be higher than the actual temperature since the board will generate heat during running.

2. Q: Why is the humidity measured by the humidity sensor different from the actual humidity?

A: The possible reasons are as follows:

- The humidity is affected by the temperature. The temperature is reciprocal with the relative humidity, so, the higher the temperature, the lower the relative humidity.
- In general, the temperature sensor and the humidity sensor are integrated together in Huawei. The integrated sensor may be installed at the top of the cabinet. Since the temperature at the exhaust vent is higher than the actual temperature, the relative humidity of that area will become lower.
- It is also the same for the temperature and humidity sensor on the board. The temperature at the board surface is higher than the environment temperature due to the heat generated by the board components, and accordingly, the relative humidity is also lower than the actual humidity.
- The humidity sensor is vulnerable to damage, calibrate it once every one to two years. However, some sensors may have not been calibrated after running for years, and the detection result may differ from the actual value.
- Temperature performance: The humidity sensor can detect the humidity successfully when the temperature is less than 25°C. The accuracy will be affected by the change of the environment temperature.

3. Q: The temperature and humidity exceed the thresholds, but no alarm is generated, and the temperature and humidity are displayed as normal. What is the reason?

A: Such phenomenon happens when the temperature and humidity are at the critical values. The reason is that the board and host will round up the values at calculating, but the error is not too large.

10.2.2 Door Status Sensor

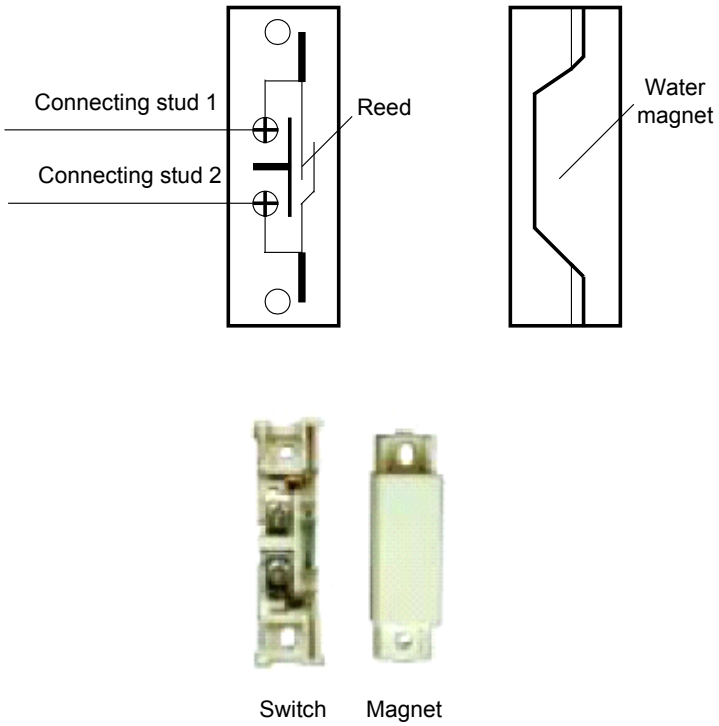
The door status sensor monitors the opening and closing of the door and window.

Appearance

The door status sensor uses the magnetic switch for detecting. The magnetic switch consists of two built-in parts. The reeds of the magnetic switch are attracted together through the electromagnetic interaction. The magnetic switch is used to monitor the opening and closing of the door and window. The output signals are the dry-contact output signals without polarity.

Figure 10-2 shows the door status sensor.

Figure 10-2 Door status sensor



Technical Specifications

Table 10-3 describes the technical specifications of the door status sensor.

Table 10-3 Technical specifications of the door status sensor

Parameter	Specification
Type	HO-03A

Parameter	Specification
Function distance	≥25 mm
Node capacity	Bearable voltage: 150 VDC
	Bearable current: 0.5 A
Impedance	0.3 ohms
Power	10 W
Output signal type	Dry-contact signal

10.2.3 Smoke Sensor

The smoke sensor is used to detect the smoke generated by the fire to prompt the fire in advance.

Appearance

The smoke sensor is sensitive to the white smoke that is generated in burning. The smoke sensor can prompt the fire in advance. At present, Huawei uses two types of smoke sensors: ionic and photoelectric.

Figure 10-3 shows the smoke sensor.

Figure 10-3 Smoke sensor

Principles

The red LED turns solid on when the probe detects the alarm state. When the system is reset, or it is powered off and again powered on, the sensor restores to the state without alarms. At this time, the red LED blinks normally, as shown in **Table 10-4**.

Table 10-4 Description of the LED on the probe

LED	Status	Meaning
Red LED	Solid on	The probe is in the alarming state.
	Blinking	The probe is in the non-alarming state.

Technical Specifications

Table 10-5 describes the technical specifications of the smoke sensor.

Table 10-5 Technical specifications of the smoke sensor

Parameter	Value
Type	JTY-GD-01K
Power supply voltage	24 VDC ± 5%
Work current	<50 uA
Power-on time	≤30 s
Power-on current	<150 uA
Work temperature range	-10°C to +55°C
Work humidity range	≤95% RH (40°C ±2°C, no condensing)
Output signal type	Dry-contact signal

NOTE

The JTY-GD-01K smoke sensor is configured with a 10 m long cable.

10.2.4 Water Sensor

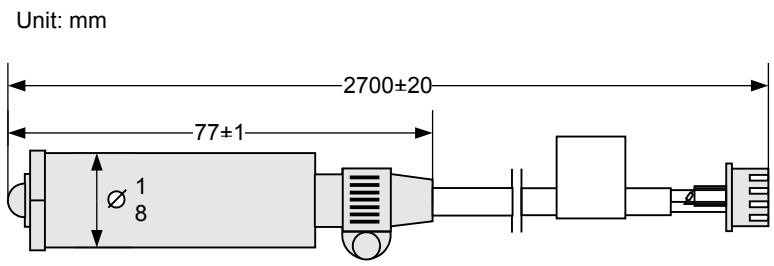
The water sensor is used to monitor the liquid level change.

Appearance

The liquid-level sensor adopted by Huawei is a kind of plug-in spacing liquid-level sensor. This sensor is of the current type. When the sensor enters the liquid, the power supply forms an injection current to the signal end so as to monitor the liquid level change.

Figure 10-4 shows the water sensor.

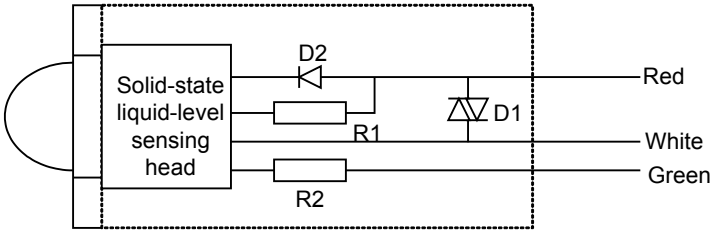
Figure 10-4 Water sensor



Principles

Figure 10-5 shows the electrical principles of the water sensor.

Figure 10-5 Electrical principles of the water sensor



The water sensor is a three-wire interface.

- Green wire: When no liquid contacts the solid-state liquid-level sensing head, the output (green wire) is less than 80uA.
- Red wire: When the measured liquid contacts the solid-state liquid-level sensing head, the output end absorbs the current 10 mA to 15 mA against the power end (red wire). The solid-state liquid-level sensing head adopts the infrared photoelectricity theory. When the detected liquid contacts the sensing head, the light path is changed, and the infrared receiving point is in the stop state. In this way, the reverser is inverted, and outputs the low-level absorbing current.
- White wire: The white wire is the grounding cable.

Technical Specifications

Table 10-6 describes the technical specifications of the water sensor.

Table 10-6 Technical specifications of the water sensor

Parameter	Value
Type	YW517B
Power supply voltage	12 VDC ± 5%
Output current when no liquid is detected	<80 uA
Output current when the liquid is detected	10 mA to 15 mA
Output signal type	Current
Work temperature range	-20°C to +70°C

NOTE

The cable configured for the YW517B water sensor is 2.7 m long.

10.2.5 MDF Sensor

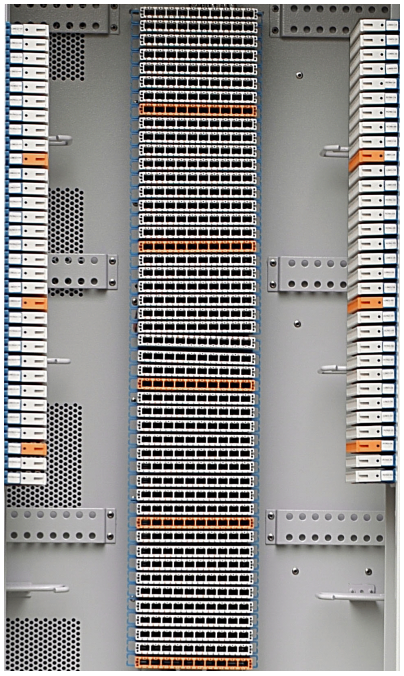
The MDF sensor detects the status of the protective units in the MDF to monitor the MDF status.

Appearance

The MDF is a kind of connection and protection device in the local call communication. The MDF contains the cable side terminal blocks, exchange side terminal blocks, and protective units. To detect the MDF status is to detect the status of the protective units.

Figure 10-6 shows the MDF.

Figure 10-6 Appearance of the MDF



NOTE

- From the point of detection, each protective unit can be seen as a "switch". All protective units in the MDF form a parallely-connected "switch " array. In normal situation, all "switches" are disconnected, and the detection points are in high level, and the MDF status detected by the ESC board is normal.
- If a subscriber line connected with the protective unit has over voltage or over current, the "switch" will be connected. The detection point will be connected to the PGND point of the equipment. The voltage and current will be released to the ground, and alarm signals will be generated at the same time. The ESC board detects the alarm signals and reports the MDF status to the NMS client.
- In general, the protective unit has a LED. When the protective unit is faulty, the LED is on.

10.2.6 Lightning Arrester Sensor

The lightning arrester has the over-voltage protection function against lightning. It can protect the power supply device and the powered devices.

Appearance

The lightning arrester has the over-voltage protection function against lightning. It can protect the power supply device and the powered devices. The following uses SPD27SZ as an example. **Figure 10-7** and **Figure 10-8** show the appearance of the SPD27SZ lightning arrester.

Figure 10-7 Cover of the SPD27SZ lightning arrester

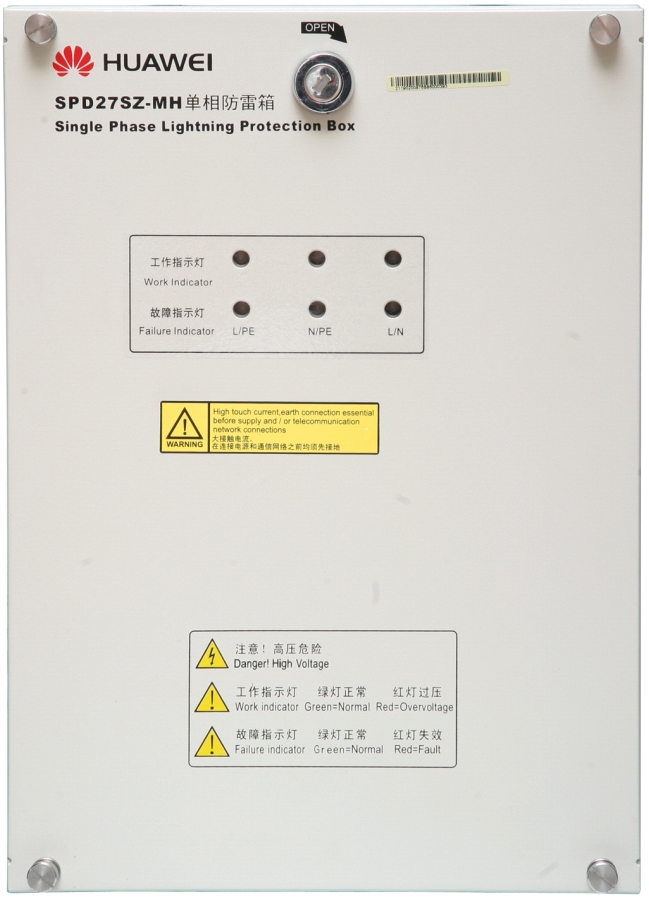
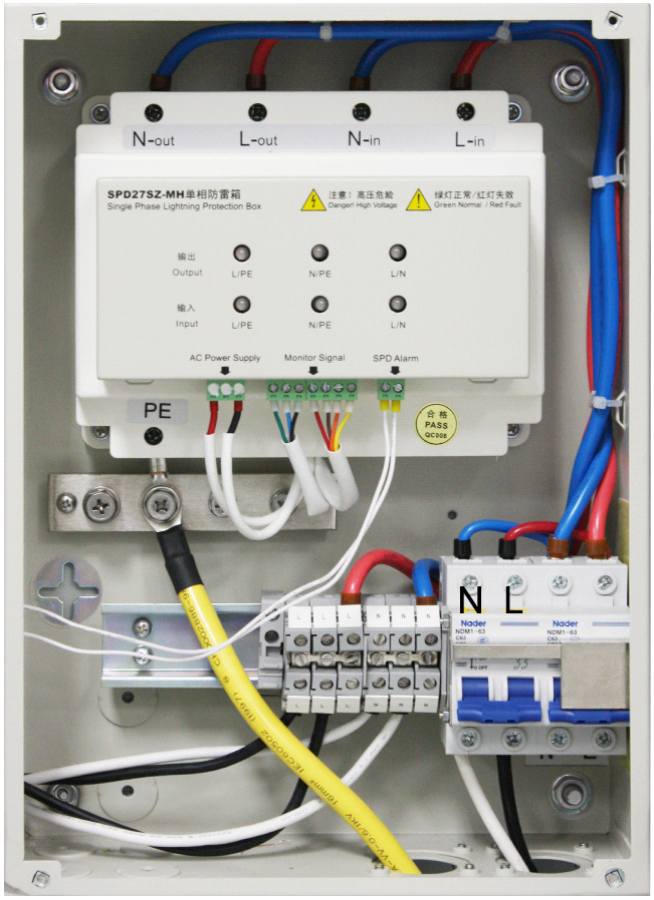


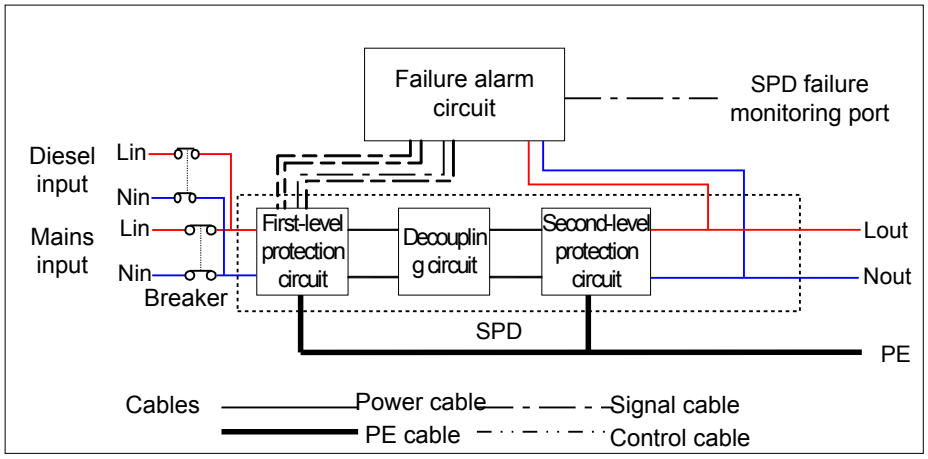
Figure 10-8 Internal of the SPD27SZ lightning arrester



Principles

Figure 10-9 describes the working and alarm principles of the SPD27SZ lightning arrester.

Figure 10-9 Working and alarm principles of the SPD27SZ lightning arrester



- When the lightning pulse arrives, the first-level lightning proof circuit leads most of the current to the ground, and limits the lightning pulse to a specified range. Certain decoupling lightning current is led to the ground through the second-level lightning proof circuit, and therefore, the lightning pulse is limited to a smaller range to ensure the safety of the powered devices.
- The remote alarm reporting port (SPD Alarm) and the over-voltage alarm reporting port (Over Voltage Alarm) are located under the signal processing module (shielding box). They are short-circuited in normal situations, and disconnected in faulty situations.

Table 10-7 describes the alarms and alarm processing of the lightning arrester.

Table 10-7 Alarm table of the lightning arrester

Alarm Class	Phenomenon	Processing Method
AC over-voltage alarm	All the working LEDs are red.	No need for handling. The alarm will be cleared after the AC power voltage is recovered to normal range.
Lightning arrester fault alarm	The failure LED is red.	Replace the lightning arrester

10.2.7 Battery Temperature Sensor

The battery temperature sensor samples the ambient temperature of the battery set to monitor the battery in real time.

Appearance

To sample the ambient temperature of the battery set, install the temperature probe of the battery temperature sensor at a position that best represents the temperature in the battery compartment. Do not connect the temperature probe to other heating devices. There is a separate BOM for the battery temperature sensor.

Figure 10-10 shows the appearance of the battery temperature sensor.

Figure 10-10 Appearance of the battery temperature sensor

Working Principles

- The temperature measurement range of the battery temperature sensor is -20°C to +80°C, with the measurement accuracy of ±0.5°C.
- The battery temperature sensor outputs the 4 mA–20 mA voltage. To be specific, it outputs the 4 mA voltage at -20°C. The voltage increases by 0.16 mA when the temperature increases by 1°C.
- After receiving the voltage signals reported by the battery temperature sensor, the monitoring module resolves the voltage signals and sends to the EMS client. The temperature is displayed in the standard temperature number.

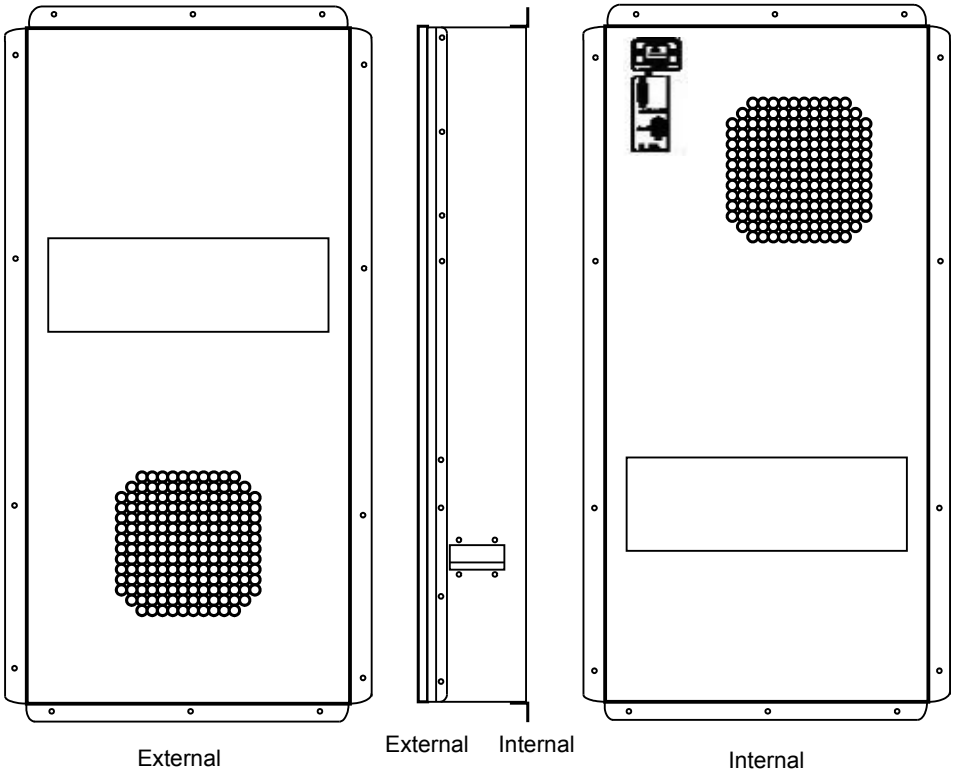
10.2.8 HX02-22SH Heat Exchanger

This topic provides the appearance and specifications of the HX02-22SH heat exchanger, and describes the functions and working principles of the heat exchanger.

Appearance

Figure 10-11 shows the appearance of the HX02-22SH heat exchanger.

Figure 10-11 Appearance of the HX02-22SH heat exchanger



Function

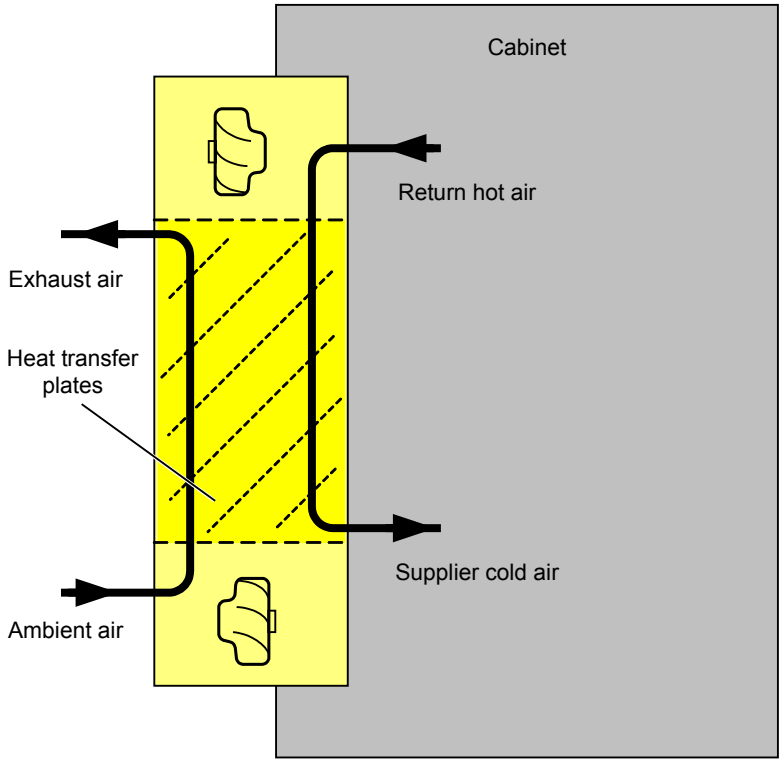
The HX02-22SH heat exchanger contains two independent air cycles (internal cycle and external cycle). The axial flow fans for the internal and external cycles implement air convection, and then transfer heat through the heat exchanger between the two cycles.

Working Principles

The HX02-22SH heat exchanger is used to cool the sealed cabinet. The air inside the sealed cabinet is cooled through heat exchange with the air outside the cabinet. The axial flow fans for the internal and external implement air convection, and then transfer heat through the heat exchanger between the two cycles.

Figure 10-12 illustrates the working principles of the HX02-22SH heat exchanger.

Figure 10-12 Working principles of the HX02-22SH heat exchanger



Monitoring

The HX02-22SH heat exchanger has a built-in monitoring unit to implement the following functions:

- Monitoring fans for the internal and external cycles, and detecting fan speed
- Monitoring the temperature sensor
- Starting and stopping the heater, and detecting heater faults

When detecting any fault associated with the preceding aspects, the HX02-22SH heat exchanger reports a heat exchanger fault.

LED

Table 10-8 describes the LEDs on the front panel of the HX02-22SH heat exchanger.

Table 10-8 LEDs on the front panel of the HX02-22SH heat exchanger

Silkscreen	Function	Status	Definition
RUN	Power supply LED	Green: on	The AC or DC power is available.
		Green: on for 1s and off for 1s repeatedly	The heat exchanger is running in the normal state.

Silkscreen	Function	Status	Definition
		Green: on for 0.5s and off for 0.5s repeatedly	The heat exchanger is running in the normal state, but its communication with the system is interrupted.
		Green: off	No power supply is provided.
Alarming	Alarm LED	Red: on	A fault occurs.
		Red: off	No alarm is generated.

Specifications

Table 10-9 lists the specifications of the HX02-22SH heat exchanger.

Table 10-9 Specifications of the HX02-22SH heat exchanger

Item	Specifications
Dimensions (W x D x H)	410 mm x 154 mm x 970 mm
Weight	23 kg
Heat exchange performance	80 W/K
Typical Power Consumption	100 W

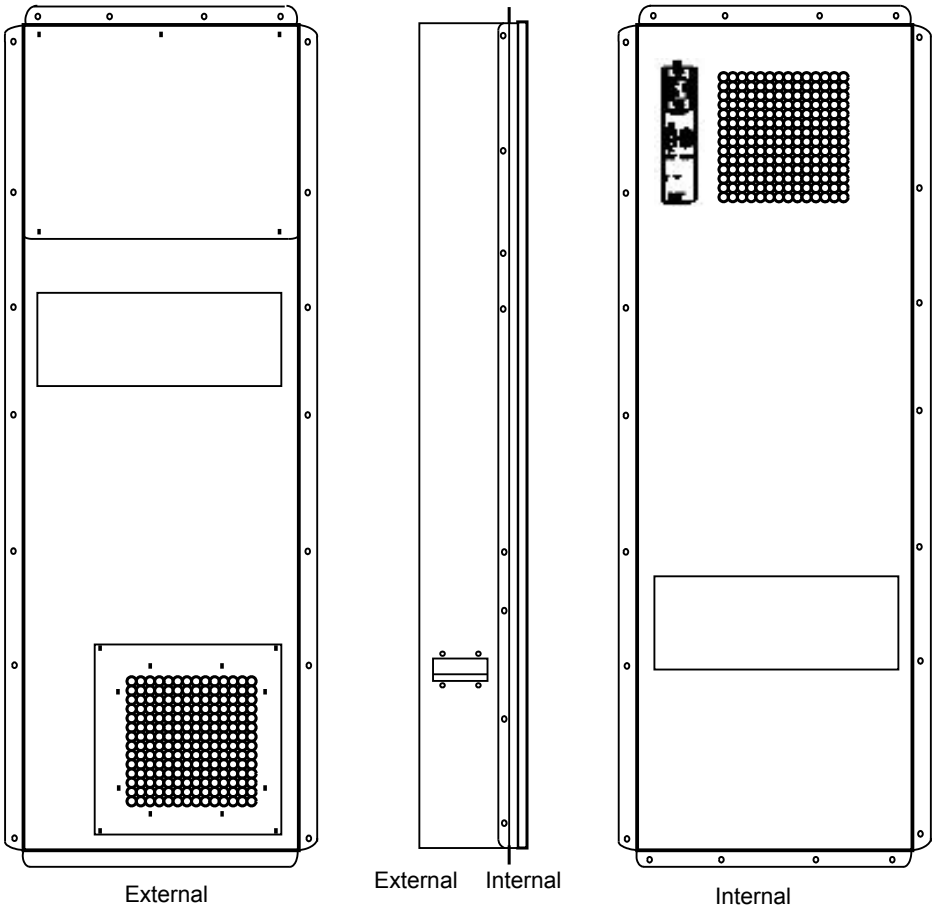
10.2.9 HX03T-22SH Heat Exchanger

This topic provides the appearance of the HX03T-22SH heat exchanger, describes the functions and working principles of it, and lists parameters of it.

Appearance

Figure 10-13 shows the appearance of the HX03T-22SH heat exchanger.

Figure 10-13 Appearance of the HX03T-22SH heat exchanger



Function

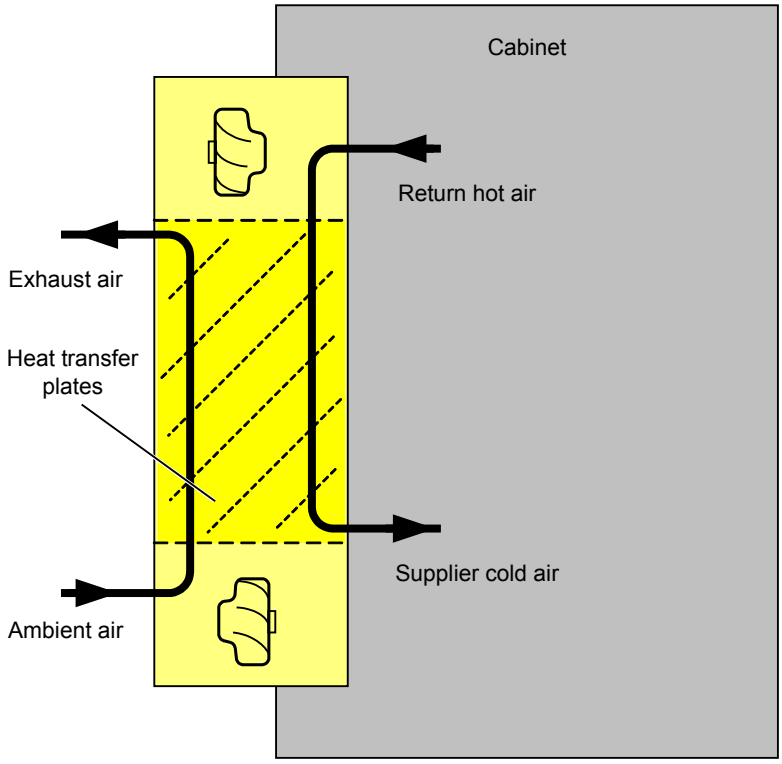
The HX03T-22SH heat exchanger consists of two independent air recycles (internal recycle and external recycle). The axial flow fans for the internal and external recycles support the air convection, which implements the heat exchange through the heat exchanger between the two recycles.

Working Principles

The HX03T-22SH heat exchanger is used to cool the sealed cabinet. The air inside the sealed cabinet is cooled through the heat exchange with the air outside the cabinet. The axial flow fans for the internal and external recycles support the air convection, which implements the heat exchange through the heat exchanger between the two recycles.

Figure 10-14 illustrates the working principles of the HX03T-22SH heat exchanger.

Figure 10-14 Working principles of the HX03T-22SH heat exchanger



Monitoring

The HX03T-22SH heat exchanger has a built-in monitoring unit to implement the following functions:

- Monitoring fans for the internal and external cycles, and detecting fan speed
- Monitoring the temperature sensor
- Starting and stopping the heater, and detecting heater faults

When detecting any fault associated with the preceding aspects, the HX03T-22SH heat exchanger reports a heat exchanger fault.

LED

Table 10-10 describes the LEDs on the front panel of the HX03T-22SH heat exchanger.

Table 10-10 LEDs on the front panel of the HX03T-22SH heat exchanger

Silk Screen	Function	Status	Meaning
RUN	LED that indicates the power status	Green: on	The AC or DC power is on.
		Green: on for 1s and off for 1s repeatedly	The heat exchanger is running in the normal state.

Silk Screen	Function	Status	Meaning
		Green: on for 0.5s and off for 0.5s repeatedly	The heat exchanger is running in the normal state, but the communication with the system is interrupted.
		Green: off	No power supply
Alarming	LED that indicates the alarm status	Red: on	A fault is generated.
		Red: off	No alarm is generated.

Parameters

Table 10-11 lists the parameters of the HX03T-22SH heat exchanger.

Table 10-11 Parameters of the HX03T-22SH heat exchanger

Item	Specifications
Dimensions (W x D x H)	416 mm x 199 mm x 1270 mm
Weight	39 kg
Heat exchange performance	120 W/K
Typical Power Consumption	120 W

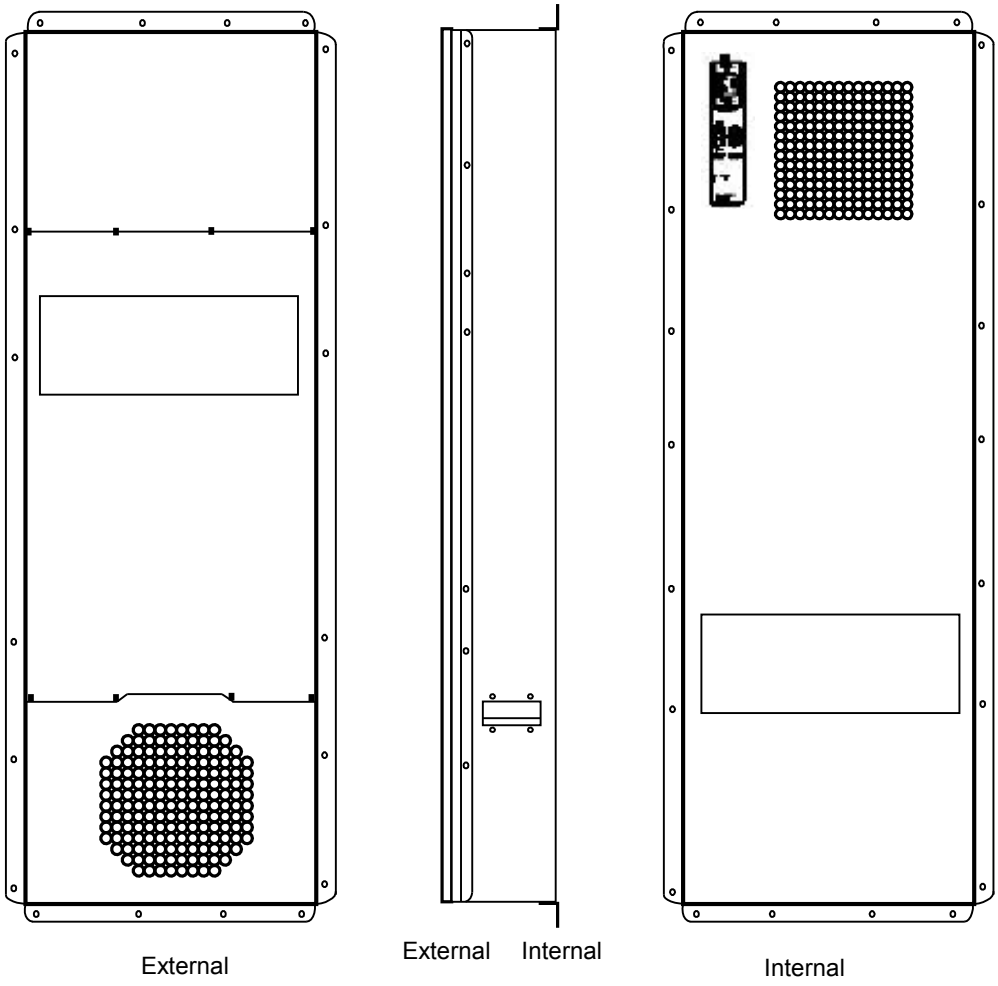
10.2.10 HX03E-22SH Heat Exchanger

This topic provides the appearance of the HX03E-22SH heat exchanger, describes the functions and working principles of it, and lists parameters of it.

Appearance

Figure 10-15 shows the appearance of the HX03E-22SH heat exchanger.

Figure 10-15 Appearance of the HX03E-22SH heat exchanger



Function

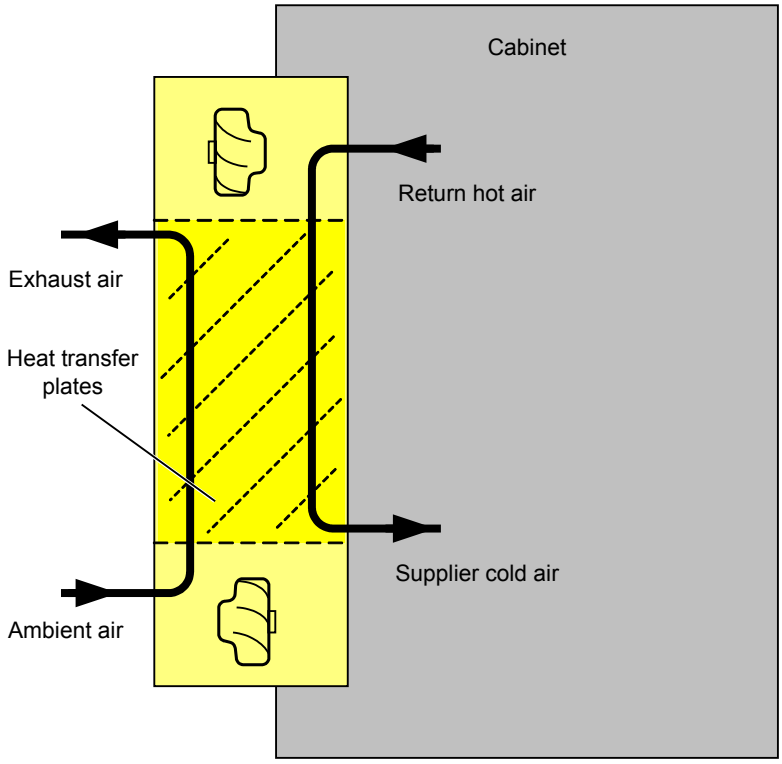
The HX03E-22SH heat exchanger consists of two independent air recycles (internal recycle and external recycle). The axial flow fans for the internal and external recycles support the air convection, which implements the heat exchange through the heat exchanger between the two recycles.

Working Principles

The HX03E-22SH heat exchanger is used to cool the sealed cabinet. The air inside the sealed cabinet is cooled through the heat exchange with the air outside the cabinet. The axial flow fans for the internal and external recycles support the air convection, which implements the heat exchange through the heat exchanger between the two recycles.

Figure 10-16 illustrates the working principles of the HX03E-22SH heat exchanger.

Figure 10-16 Working principles of the HX03E-22SH heat exchanger



Monitoring

The HX03E-22SH heat exchanger has a built-in monitoring unit to implement the following functions:

- Monitoring fans for the internal and external cycles, and detecting fan speed
- Monitoring the temperature sensor
- Starting and stopping the heater, and detecting heater faults

When detecting any fault associated with the preceding aspects, the HX03E-22SH heat exchanger reports a heat exchanger fault.

LED

Table 10-12 describes the LEDs on the front panel of the HX03E-22SH heat exchanger.

Table 10-12 LEDs on the front panel of the HX03E-22SH heat exchanger

Silk Screen	Function	Status	Meaning
RUN	LED that indicates the power status	Green: on	The AC or DC power is on.
		Green: on for 1s and off for 1s repeatedly	The heat exchanger is running in the normal state.

Silk Screen	Function	Status	Meaning
		Green: on for 0.5s and off for 0.5s repeatedly	The heat exchanger is running in the normal state, but the communication with the system is interrupted.
		Green: off	No power supply
Alarming	LED that indicates the alarm status	Red: on	A fault is generated.
		Red: off	No alarm is generated.

Parameters

Table 10-13 lists the parameters of the HX03E-22SH heat exchanger.

Table 10-13 Parameters of the HX03E-22SH heat exchanger

Item	Specifications
Dimensions (W x D x H)	456.2 mm x 242.2 mm x 1308.2 mm
Weight	36 kg
Heat exchange performance	180 W/K
Typical Power Consumption	135 W

10.2.11 Sensors Selected by Users

This topic provides the specifications of the temperature and humidity sensor, water sensor, door status sensor, and smoke sensor that are selected by users.

Specifications of the Temperature and Humidity Sensor

The temperature and humidity sensor selected by users must meet the following specifications.

- Work voltage: 24 V
- Output type of the temperature signal: current type (4 mA to 20 mA)
- Output type of the humidity signal: current type (4 mA to 20 mA)
- Temperature measurement range: -20°C to +80°C
- Humidity measurement range: 0% RH to 100% RH

Figure 10-17 shows the relation between the temperature and output current.

Figure 10-17 Relation between the temperature and output current

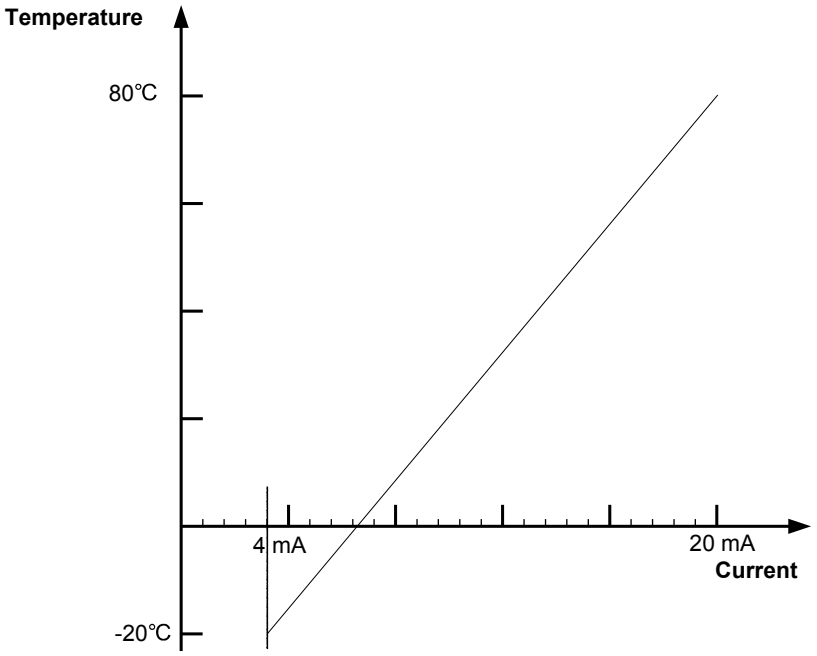
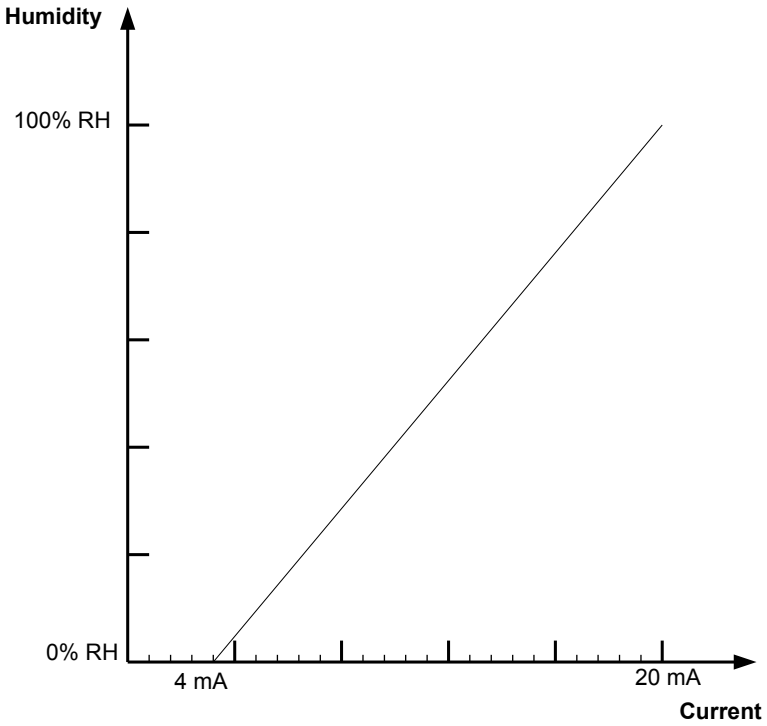


Figure 10-18 shows the relation between the humidity and output current.

Figure 10-18 Relation between the humidity and output current



Specifications of the Water Sensor

The water sensor selected by users must meet the following specifications.

- Work voltage: 24 V or 12 V.
- Table 10-14 shows the specifications of the output signal types.

Table 10-14 Specifications of the output signal types

Water Sensor Type	Specification	
	No liquid is detected.	**Liquid is detected.**
Current type	Output current < 200 uA	Output current > 1 mA
Voltage type	Output voltage > 5 V	Output voltage < 3.3 V
Dry-contact type	Disconnected	Connected

Specifications of the Door Status Sensor

The door status sensor selected by users must meet the following specifications.

- Work voltage: 12 V
- Table 10-15 shows the specifications of the output signal types.

Table 10-15 Specifications of the output signal types

Door Status Sensor Type	Specification	
	Door closed	**Door opened**
Current type	Output current > 1 mA	Output current < 200 uA
Voltage type	Output voltage < 3.3 V	Output voltage > 5 V
Dry-contact type	Connected	Disconnected

Specifications of the Smoke Sensor

The smoke sensor selected by users must meet the following specifications.

- Work voltage: 24 V
- Table 10-16 shows the specifications of the output signal types.

Table 10-16 Specifications of the output signal types

Smoke Sensor Type	Specification	
	No smoke is detected.	**Smoke is detected.**
Current type	Output current < 200 uA	Output current > 1 mA

Smoke Sensor Type	Specification	
	No smoke is detected.	Smoke is detected.
Voltage type	Output voltage > 5 V	Output voltage < 3.3 V
Dry-contact type	Disconnected	Connected

10.3 Installing the Sensors

This section describes how to install the sensors that are provided by Huawei. For those sensors not provided by Huawei, refer to their installation guide accordingly.

10.3.1 Installation Position

This topic describes the installation positions of sensors.

Install sensors in suitable positions so that they can work properly. **Table 10-17** lists the installation position for each type of sensor.

Table 10-17 Installation position for each type of sensor

Sensor	Installation Position
Water sensor	A position where water can flow into easily or a low position.
Smoke sensor	In the middle of the ceiling or at the top of the equipment compartment in the cabinet.
Door status sensor	The joint between the upper edge of the door frame and the door.
Temperature and humidity sensor	A position where the air flows smoothly, with the flowing speed ranging from 0.1 m/s to 1 m/s, for example, at the top of the equipment compartment in the cabinet.
Main distribution frame (MDF) sensor	-
Lightning arrester sensor	-
Battery Temperature Sensor	Install the temperature probe at a position that best represents the temperature in the battery compartment, and do not connect the probe with other heating devices.
Over/Under-voltage protection module	Install the module before the AC power distribution.

10.3.2 Installation Preparation

This topic describes how to prepare for the sensor installation.

Checking the Package

Check the package and ensure that it has no obvious split or collision mark. If the package has any damage that may lead to any hazard to the sensors inside, contact the local representative office for replacement.

Environment Requirement

Check the environment before installation and ensure that the environment meets the technical requirements, as shown in **Table 10-18**.

Table 10-18 Environment requirements

Name	Measurement object	Parameter
Temperature measurement	Measurement Range	–20°C to +80°C
	Measurement precision	±3°C
Humidity measurement	Measurement Range	0% RH to 100% RH
	Measurement precision	±5%
Digital parameter detection	Measurement content	Smoke, door status, water and so on
	Alarming response time	< 10s
Analog parameter detection	Measurement Range	4 mA to 20 mA or 0 V to 5 V
	Measurement precision	±1%
Relay output control	Control response time	< 1s
	Dry-contact output capacity	Voltage: 110 VDC, 125 VAC, maximum load current: 1 A (30 VDC)
Communication rate	RS-232, RS-485	UA5000: 9600 bit/s MA5600T: 19200 bit/s

10.3.3 Installing the Temperature and Humidity Sensor

This section describes the context, precautions and procedure for installing the temperature and humidity sensor.

Context

The requirements for installing the temperature and humidity sensor are as follows:

- Install the sensor against the wall, with a distance of 1.5 m above the ground.

- Install the sensor in a position where the air flows smoothly, with the flowing speed in the range of 0.1 m/s to 1m/s.
- Do not install the sensor in the following situations:
  - The relative humidity is higher than 90% RH for a long period.
  - The temperature is lower than -20°C.
  - Cold or hot wind can blow to the sensor.
  - There is corrosive air, such as sour gas and oil gas, or the air is polluted.
  - Those corners in which the air cannot flow smoothly.
  - The places in which the air flows too quickly, such as the ventilation window of the room, and the ventilation holes of the air conditioner.
- Do not install the sensor to the wiring trough end.

Precautions

- Ensure the installation surface is clean.
- Turn off the power during installation and replacement.
- Do not drill holes around the installed sensors because the dust generated in drilling may affect the sensor functions. If you do need to drill holes around the installed sensors, adopt protection measures.
- Do not touch the humidity-sensible components with your hands.
- Exercise care when taking box cover, circuit board and connecting cables so as to avoid mechanical damage.
- To take the circuit board, hold the edges at two sides of the board, and do not touch the components to so as to avoid pin bending or ESD damage to the components.
- Put the removed circuit board to a clean place.

Procedure

Step 1 Remove the backplane from the temperature and humidity sensor, and you will see three installation holes on the backplane. Mark holes on the wall by using a pencil.

Step 2 Select a Φ6 bit, and use the drill to drill holes at the marked positions on the wall.

Step 3 Insert the plastic expansion tube M6 x 26 into the installation hole.

Step 4 Use the M2 tapping screw to fix the temperature and humidity sensor against the wall.

Step 5 Install the main body of the temperature and humidity sensor to the backplane.

Step 6 Connect the sensor cable. **Figure 10-19**, and **Figure 10-20** show the connections of the monitoring cables used by the temperature and humidity sensor.

NOTE

In the above figures, JTAx refers to the analog parameter port on the ESC, which is determined by the main label on the monitoring cable. Insert the monitoring cable to the corresponding analog port.

Figure 10-19 Connections of the temperature and humidity sensor (ESC)

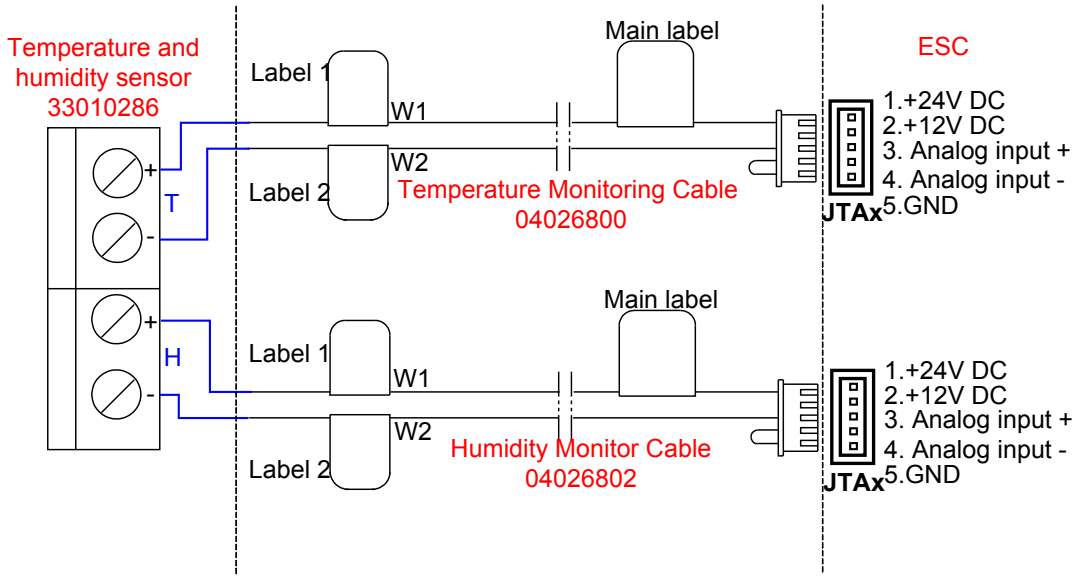
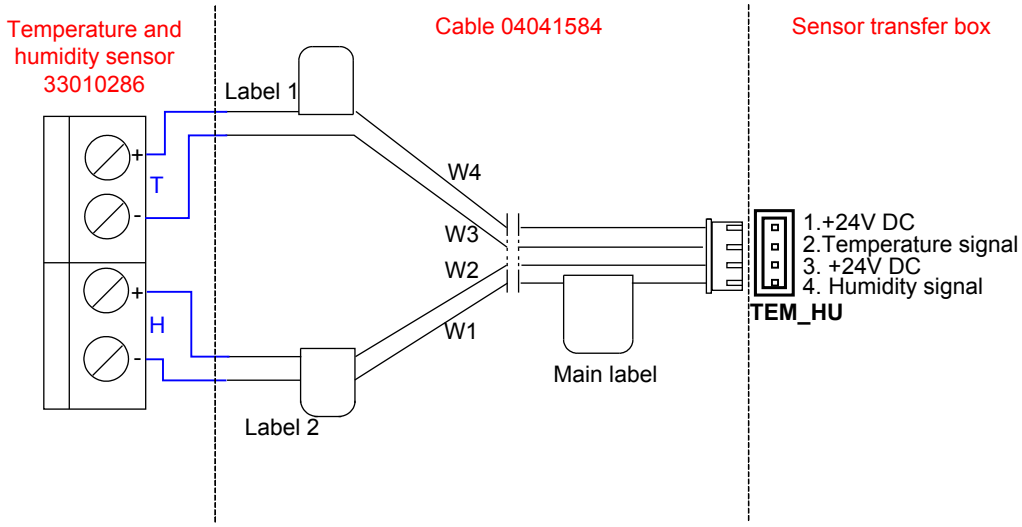


Figure 10-20 Connections of the temperature and humidity sensor (Sensor transfer box)



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10.3.4 Installing the Door Status Sensor

This section describes how to install the door status sensor.

Context

The requirements for installing the door status sensor are as follows:

- The door gap shall be less than 5 mm when the doors are closed.

- If the gap is larger than or equal to 5 mm, you need to move the door status sensor slightly to ensure that the gap is less than 5 mm when the doors are closed.

Procedure

Step 1 Mark the installation position of the door status sensor.

Step 2 Use the percussion drill to drill holes according to the marks.

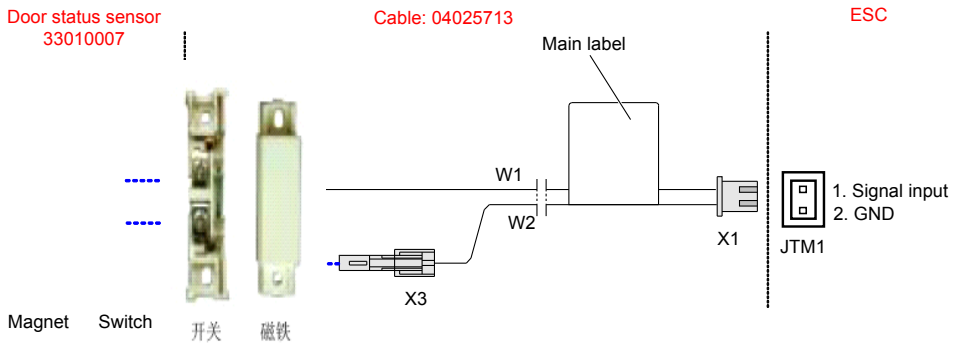
Step 3 Install and fasten the door status sensor.

Step 4 Connect the sensor cable. **Figure 10-21** shows the connections of the door status sensor.

NOTE

In the above figure, JTM1 refers to the digit parameter port on the ESC, which is determined by the main label on the monitoring cable. Insert the monitoring cable to the corresponding digit port.

Figure 10-21 Connections of the door status sensor



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10.3.5 Installing the Smoke Sensor

This section describes how to install the smoke sensor.

Context

The requirements for installing the smoke sensor are as follows:

- To install the smoke sensor at the middle of the cabinet top or of the ceiling, comply with the following requirements:
  - No blocking materials within 0.5 m around the sensor
  - Horizontal distance from the inhaling vent of the air condition > 1.5 m
  - Horizontal distance from the inhaling vent at the top > 0.5 m
  - Horizontal distance from the exhausting vent of the air condition > 1.5 m
- Install the smoke sensor in a place where smoldering happens and heavy smoke is generated at the preliminary stage. Do not install the smoke sensor in the following places:
  - Only black smoke is generated in burning, and no smoke or little smoke is generated.
  - The relative humidity is larger than 95% for a long period.

- The airflow speed is larger than 5 m/s.
- Heavy dust and spray are existing.
- Erosive gas may be generated.
- Smoke is stagnated even in normal conditions.
- Organic substances, such as alcohols, ether, and ketone, are generated.

- Before powering on the sensor, ensure the probe is connected correctly with the controller. The red LED blinks properly after the sensor is powered on for 30s, with the blinking period of 9s to 15s.
- Dust may be accumulated on the smoke sensor. Remove dust from the sensor periodically to avoid error alarming.

Precautions

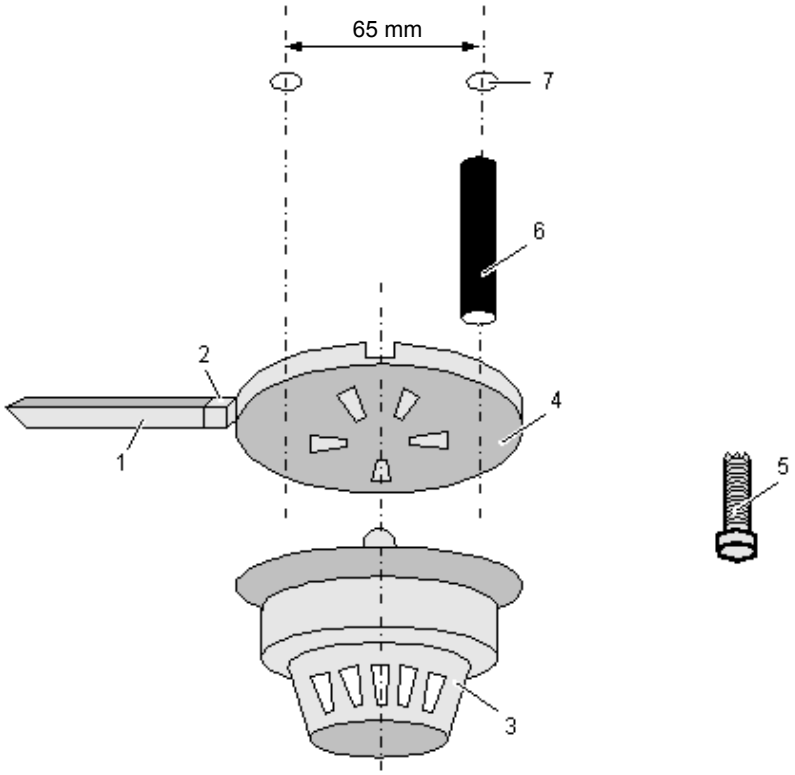
Before applying the probe, to protect it from being polluted, do not remove the dust-proof cover on the probe.

Procedure

Step 1 Installing the smoke sensor.

Use a PVC terminal end to joint the wiring trough end and the sensor base. To ensure that the wiring trough is installed on one axes, install the sensor base before the wiring trough. **Figure 10-22** shows the connections of the smoke sensor.

Figure 10-22 Installing the smoke sensor



1 Wiring trough 2 PVC terminal end 3 Alarming indicator

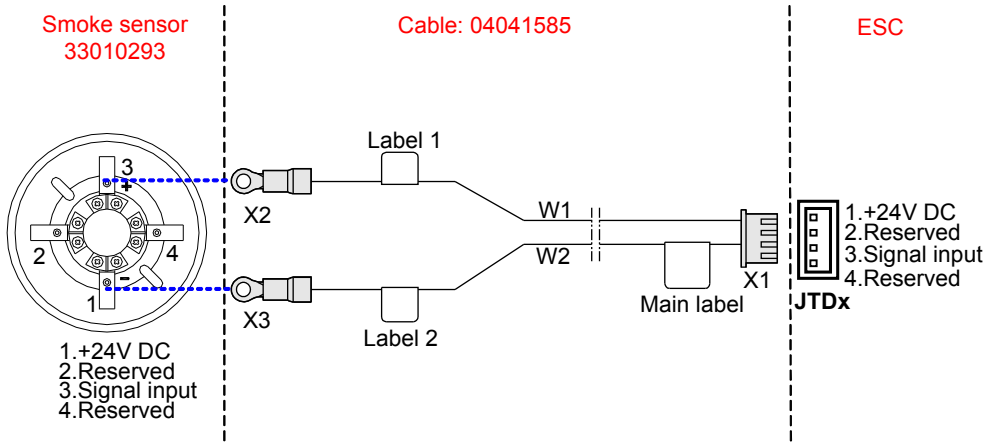
4 Base	5 Tapping screw	6 Plastic expansion tube
7 Drilled hole		

Step 2 Connect the sensor cable. **Figure 10-23** shows the connections of the smoke sensor.

NOTE

In the above figures, JTDx refers to the digit parameter port on the ESC, which is determined by the main label on the monitoring cable. Insert the monitoring cable to the corresponding digit port.

Figure 10-23 Connections of the smoke sensor



----End

10.3.6 Installing the Water Sensor

This section describes how to install the water sensor.

Context

The water sensor can be installed in both the indoor cabinet and outdoor cabinet.

- For the indoor cabinet: The indoor cabinet is installed in the equipment room. Install the water sensor also on the floor of the equipment room, near the cabinet.
- For the outdoor cabinet: Install the water sensor at the bottom of the equipment compartment in the cabinet.

Precautions

- Do not supply power reversely.
- Do not measure acetone, chloride solvent.
- Do not open the cover of the water sensor to avoid damages.
- During the application, it is recommended to maintain the water sensor every one to six months, keep the surface of the solid-state liquid-level sensing head free from dust, and

check whether the sensor cover is damaged or has any other abnormality (If yes, replace the water sensor immediately).

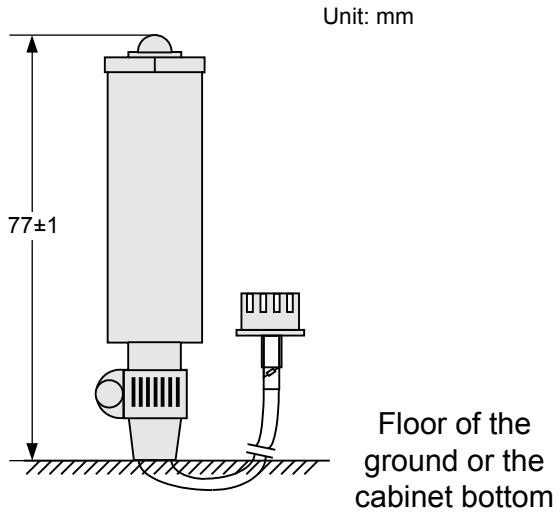
Procedure

Step 1 Install the water sensor.

- For the indoor cabinet: Find a fixed object, such as vertical wooden stick, in the equipment room, install the water sensor on the floor, and use a cord to bundle the water sensor on the fixed object. Ensure that the solid-state liquid-level sensing head faces upward.
- For the outdoor cabinet: Install the water sensor vertically at the bottom of the equipment compartment in the cabinet, and use a cord to bundle the water sensor in the cabinet. Ensure that the solid-state liquid-level sensing head faces upward.

Figure 10-24 shows how to install the water sensor.

Figure 10-24 Installation of the water sensor



NOTE

To prevent error alarming or delay caused by liquid drop, keep the solid-state liquid-level sensing head facing upward.

Step 2 Connect the sensor cable. **Figure 10-25** shows the connections of the water sensor when it connects to the esc. **Figure 10-26** shows the connections of the water sensor when it connects to the ESCM.**Figure 10-27** shows the connections of the water sensor when it connects to the sensor transfer box.

Figure 10-25 Connections of the water sensor

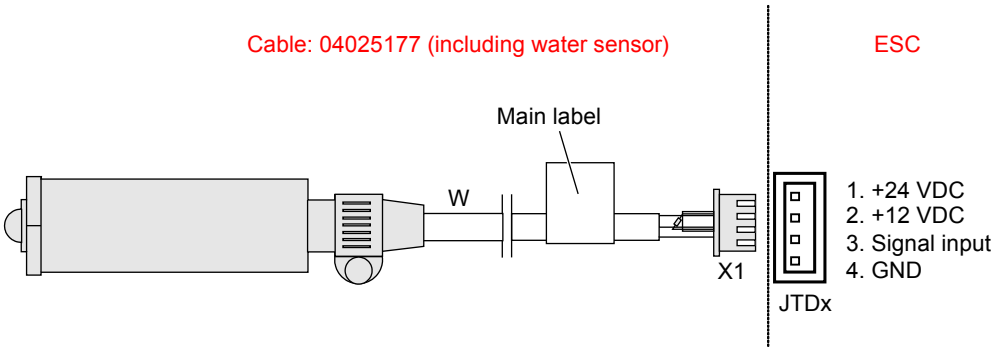


Figure 10-26 Connections of the water sensor

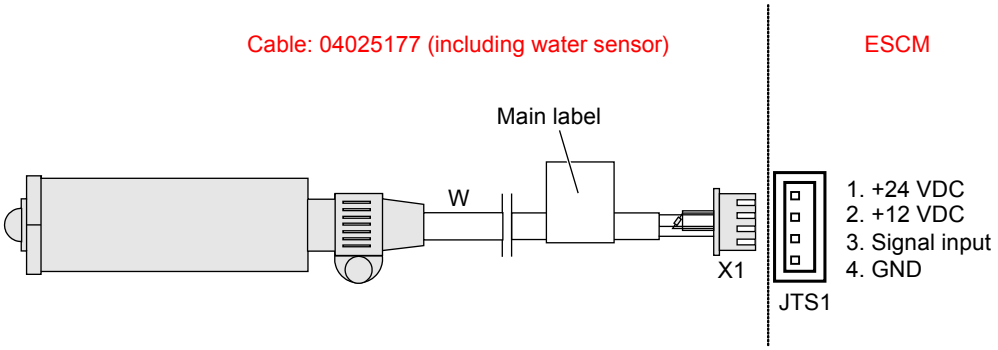
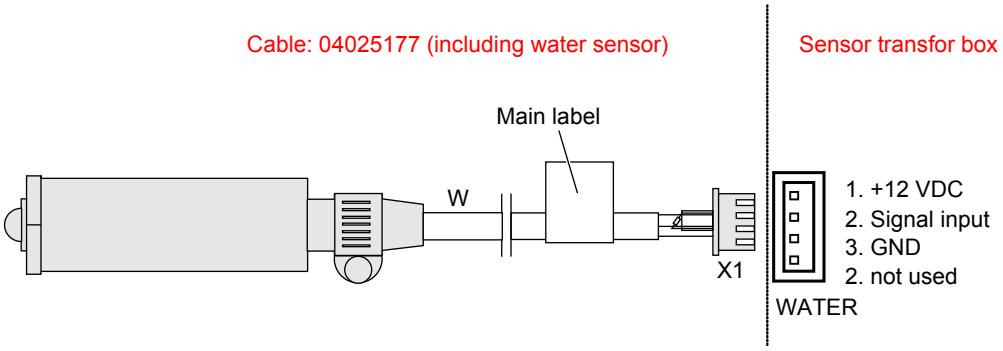


Figure 10-27 Connections of the water sensor



----End

10.3.7 Installing the MDF Sensor

This section describes how to install the MDF sensor.

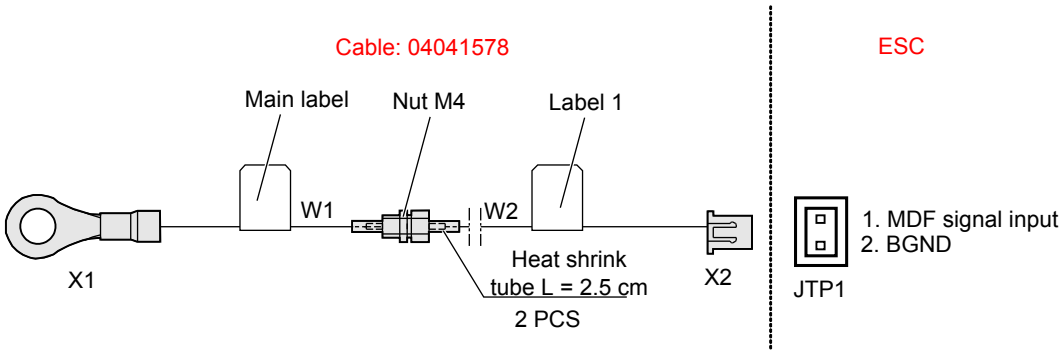
Context

The MDF contains the cable side terminal blocks, exchange side terminal blocks, and protective units. To detect the MDF status is to detect the status of the protective units.

Procedure

Step 1 Connect the sensor cable. **Figure 10-28** shows the connections of the MDF.

Figure 10-28 Connections of the MDF



----End

10.3.8 Installing the Lightning Arrester Sensor

This topic describes how to install the lightning arrester sensor.

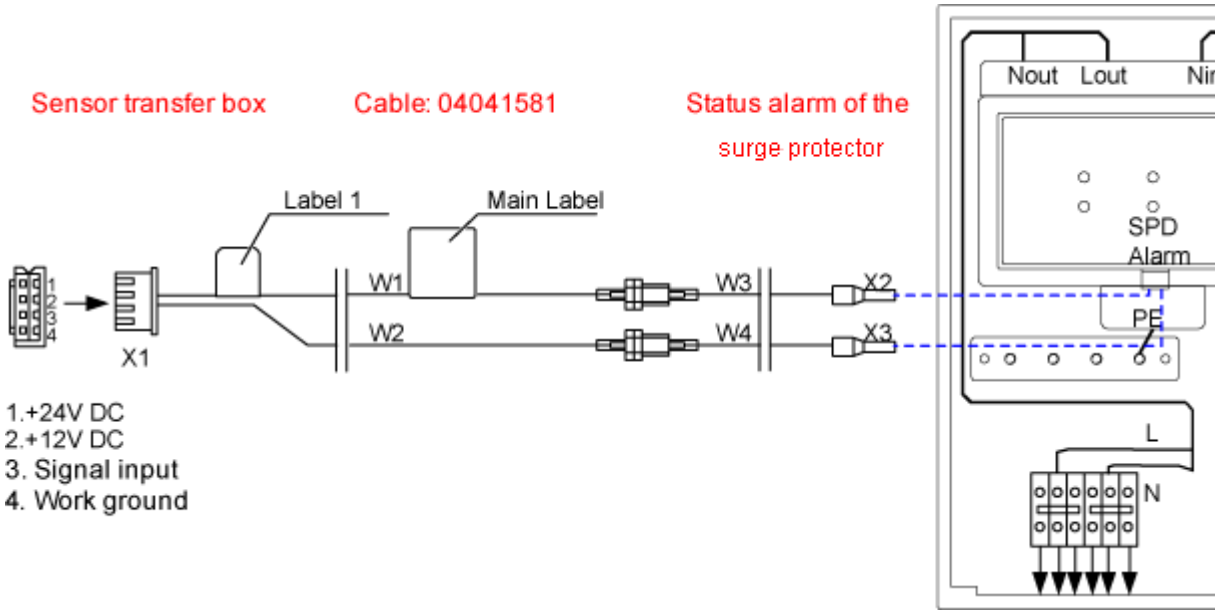
Context

The lightning arrester is mainly used before the single phase AC power system. It provides class B+C lightning proof protection for the integrated access devices at the remote end and the air-conditioners. It has the function of breaking off relation by heating. Besides, it has a remote failure alarm port.

Procedure

Step 1 Connect the sensor cable. **Figure 10-29** shows the connections for the status monitoring of the SPD27SZ lightning arrester.

Figure 10-29 Connections of the SPD27SZ lightning arrester



----End

10.3.9 Installing the Battery Temperature Sensor

This topic describes how to install the battery temperature sensor.

Context

- The battery temperature sensor is used to sample the ambient temperature of the battery set.
- Install the temperature probe at a position that best represents the temperature in the battery compartment, and do not connect the temperature probe to other heating devices.

Precaution

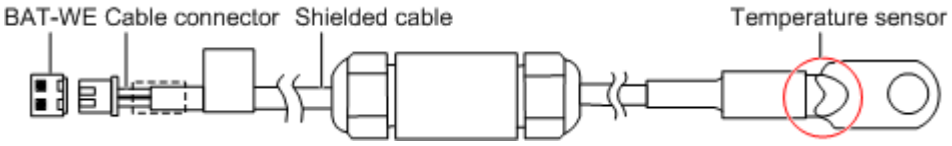
Install the temperature probe at a position that best represents the temperature in the battery compartment, and do not connect the temperature probe to other heating devices.

Procedure

Step 1 Connect the connector of the cable to the BAT-WE port of the sensor transfer box, as shown in **Figure 10-30**.

Step 2 The other end is the temperature probe with a ring terminal, which is bundled with the negative lead of a single battery, as shown in **Figure 10-30**.

Figure 10-30 Connection of the battery temperature sensor



----End