# RDU501 Intelligent Monitoring Unit User Manual

Version V1.0

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# Contents

# Chapter 1   Product Introduction

RDU501 intelligent monitoring unit (referred to as "RDU501") features the Web access, digital input/output, analog input/output, sensor, UPS, air conditioner and PDU, and provide USB, DP, HDMI and other interfaces to meet TCP/IP, optical fiber, and RS232/485 networking requirements. It can be configured according to the specific requirements of various applications.

This chapter mainly introduces the RDU501 description of parts, main functions and technical specifications.

## 1.1   Description of Parts

RDU501 includes RDU501 main unit and optional EXP8COM card, EXP8DIAI card, EXP8DOAO card, EXP2DI6DO card, SFP optical module.

### 1.1.1   RDU501 Main Unit

Figure 1-1 shows the appearance and interface of the RDU501 main unit.



| | | | |
|---|---|---|---|
| 1. Relay output port | 2. Operation/alarm indicator | 3. Digital input port | 4.Smoke detector port |
| 5. Sensor port | 6.Serial port | 7. Expansion slot*4 | |

*Front view*



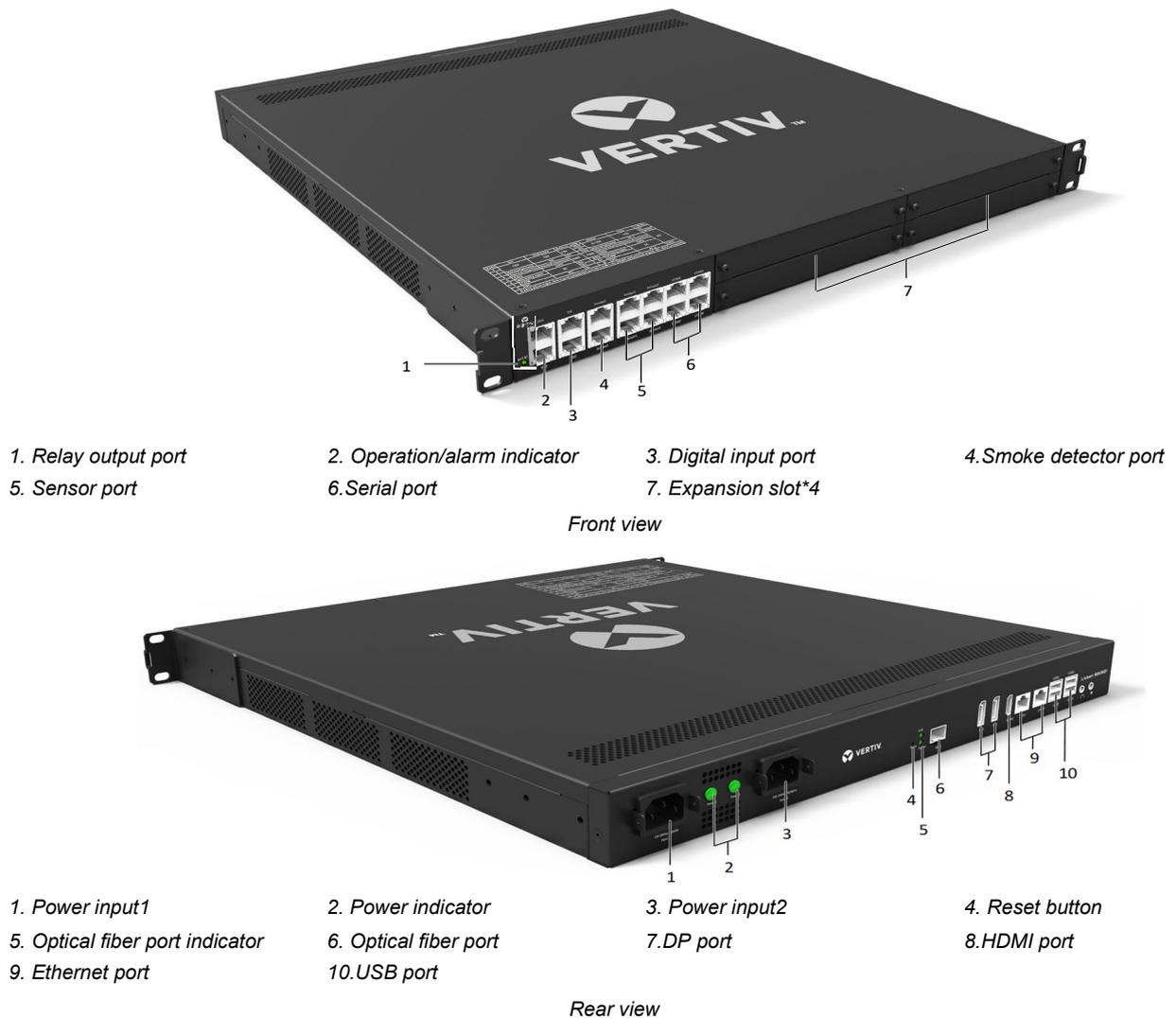| | | | |
|---|---|---|---|
| 1. Power input1 | 2. Power indicator | 3. Power input2 | 4. Reset button |
| 5. Optical fiber port indicator | 6. Optical fiber port | 7.DP port | 8.HDMI port |
| 9. Ethernet port | 10.USB port | | |

*Rear view*

*Figure 1-1 RDU501 appearance and interface diagram*

### Input power

There are two isolated power inputs on the rear panel of the RDU501 main unit. The location is shown in Figure 1-1. The power input parameters are shown in Table 1-1.

*Table 1-1 Power input parameters*

| Power | Input | Range | Interface |
|---|---|---|---|
| AC Input | Voltage | 100Vac to 240Vac | C14 with break-away prevention feature |
| | Current | <2A | |
| | Frequency | 50/60Hz | |

### Indicators

The rear panel of the RDU501 has four indicators. The location is shown in Figure 1-1. See Table 1-2 for definitions.

*Table 1-2   Definitions of rear panel indicator*

| Silk Screen Printing | Color | Status | Description |
|---|---|---|---|
| Power1 | Green | On | RDU501 power supply 1 is on |
| | | Off | RDU501 power supply 1 is off |
| Power2 | Green | On | RDU501 power supply 2 is on |
| | | Off | RDU501 power supply 2 is off |
| Link | Green | On | Correct connection |
| | | Off | Wrong connection or disconnected |
| Speed | Yellow | On | 1000Mbps rate |
| | | Off | No rate |

Figure 1-1 shows the positions of the indicators on the front panel of the RDU501 main unit. See Table 1-3 for definitions.

*Table 1-3   Definitions of front panel indicator*

| Silk Screen Printing | Color | Status | Description |
|---|---|---|---|
| Run/Alarm | Green /Red | Green | No alarm |
| | | Red | Alarm |
| COM/Sensor | Green | Blink | Receiving data |
| | | Off | No data received |
| | Yellow | Blink | Transmitting data |
| | | Off | No data transmitted |
| DI/AI/DO/AO/Smoke | Green | On | External device is connected |
| | | Off | No external device is connected or the port is short circuited |

### Reset button

Press and hold the reset button (Silk Screen Printing is "Reset") for more than 4 seconds. After the device emits a "beep" sound, the RDU501 will restore the IP address and password to the factory default after it is restarted. The default values are shown in Table 1-4.

### USB port

The RDU501 main unit provides four ports of USB-A socket type, which can be connected to the USB Modem of the specified model, as well as the keyboard and mouse. The location is shown in Figure 1-1.

### Ethernet port

The RDU501 main unit provides two network ports and one fiber port. The 10/100/1000M Ethernet port is used. Figure 1-1 shows the 1000M fiber. Table 1-4 lists the default network port configuration.

*Table 1-4 Network port default configuration parameters*

| Parameter / Network card number | IP address | Subnet code | Default gateway |
|---|---|---|---|
| Ethernet card1（eth0) | 192.168.0.254 | 255.255.255.0 | 192.168.0.1 |
| Ethernet card 2（eth1) | 192.168.1.254 | 255.255.255.0 | 192.168.0.1 |
| Optic fiber port | 192.168.2.254 | 255.255.255.0 | 192.168.0.1 |
| Note: The default password for terminal background and web browser login is "Vertiv" | | | |

**Relay output port**

The RDU501 main unit provides two relay output ports DO1 and DO2. The position is shown in Figure 1-1. The parameters are shown in Table 1-5.

*Table 1-5 Parameters of relay output ports*

| Relay output port | Output | Range | Port | Usage |
|---|---|---|---|---|
| DO1/DO2 | Voltage | 9V to 12.5V | RJ45 | 1. DO output, can be connected to the alarm indicator; |
| | Total current | ≤0.2A | | 2. The maximum total power of the two ports can support 2.4W; |
| | | | | 3. Support short circuit protection |

**DI port**

The RDU501 main unit provides four digital input ports, as shown in Figure 1-1. The parameters are shown in Table 1-6.

*Table 1-6 Electrical parameters of DI port*

| Silk Screen Printing | Definition | Rated Output Voltage | Output Current (Total) | Max Output Power (Total) | Port Overload Protection |
|---|---|---|---|---|---|
| DI1 | Port of magnetic door switch 1 | 9V~12.5V | <0.16A | 1.92W | Support overload protection |
| DI2 | Port of magnetic door switch 2 | | | | |
| Smoke1 | Port of smoke detector 1 | | | | |
| Smoke2 | Port of smoke detector 2 | | | | |

**Sensor port**

The RDU501 main unit provides two sensor ports, including four RJ45 interfaces. The location is shown in Figure 1-1. The parameters are shown in Table 1-7.

*Table 1-7 Electrical parameters of sensor port*

| Silk Screen Printing | Definition | Rated Output Voltage | Output Current (Total) | Max Output Power (Total) | Port Overload Protection |
|---|---|---|---|---|---|
| Sensor1 | Port of 1st sensor | 9V~12.5Vdc | <0.36A | 4.32W | Support overload protection |
| Sensor2 | Port of 2nd sensor | | | | |

The port adopts RS-485 communication mode for connecting Vertiv intelligent temperature and humidity sensor, intelligent temperature sensor and intelligent digital expansion sensor. The communication parameters are shown in Table 1-8.

*Table 1-8 Communication parameters of sensor port*

| Parameter | Baud rate | Data bit | Odd/even parity bit | Stop bit |
|---|---|---|---|---|
| Value | 9600bps | 8 bits | None | 1 bit |

**Serial port**

The RDU501 main unit provides four independent serial ports: serial port 1, serial port 2, serial port 3, and serial port 4. The location is shown in Figure 1-1. The interface adopts RS-485/232C (self adaptive) communication mode, and the communication parameters are shown in Table 1-9.

*Table 1-9 Serial port communication parameters*

| Parameter | Baud rate | Data bit | Odd/even parity bit | Stop bit |
|---|---|---|---|---|
| Value | 1200~115200 | 5 to 8 bits | Even/Odd/None/Mark/Space | 1 to 2 bits |
| Note: The combination of 5-bit word length and 2 stop bits is not supported. | | | | |

## 1.1.2  Expansion card

The four expansion slots of the RDU501 main unit support hot-swap connection of EXP8COM card, EXP8DIAI card, EXP8DOAO card and EXP2DI6DO card.

### EXP8COM card (optional)

The EXP8COM card provides 8 serial ports and supports RS232/RS485 communication to connect user device (RS232/RS485 line-sequence adaptive). Its appearance is shown in Figure 1-2.
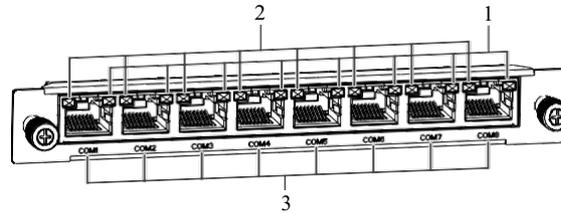


| 1. Data receiving indicator1-8 | 2. Data ransmission indicator1-8 | 3. Serial port 1-8 |

*Figure 1-2 EXP8COM card*

The indicators of the EXP8COM card are defined in Table 1-10.

*Table 1-10 Definitions of the indicators of the EXP8COM card*

| Silk Screen Printing | Color | Status | Description |
|---|---|---|---|
| COM1 to COM8 | Green | Blink | Receiving data |
|  |  | Off | No data received |
|  | Yellow | Blink | Transmitting data |
|  |  | Off | No data transmitted |

### EXP8DIAI card (optional)

The EXP8DIAI card provides eight digital or analog input interfaces (digital and analog adaptive) and supports digital/analog inputs. The appearance is shown in Figure 1-3.
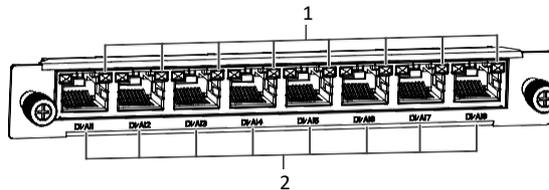


| 1. Break-away detection indicator 1-8 | 2. Digital / analog input 1-8 |

*Figure 1-3 EXP8DIAI card*

The port definition of the EXP8DIAI card is shown in Table 1-11.

*Table 1-11 Definitions of the ports of the EXP8DIAI card*

| Port name | Port type | Silk Screen Printing | Definition |
|---|---|---|---|
| Digital or analog input 1 to 8 | RJ45 port | DI/AI1 to DI/AI8 | Digital input potential-free dry contact; Analog input 0 to 10V or 4mA to 20mA |

### EXP8DOAO card (optional)

The EXP8DOAO card provides eight digital or analog output ports (digital and analog self adaptive) and supports digital/analog output, wherein the digital output is not energized. The appearance is shown in Figure 1-4.

*1. Break-away detection indicator 1-8*                    *2. Digital / analog input 1-8*

*Figure 1-4    EXP8DOAO card*

The port definition of the EXP8DOAO card is shown in Table 1-12.

*Table 1-12 Definitions of the ports of the EXP8DOAO card*

| Port name | Port type | Silk Screen Printing | Definition |
|---|---|---|---|
| Digital or analog output 1 to 8 | RJ45 port | DO/AO1 to DO/AO8 | Digital output: normally open contact + normally closed contact<br>Analog output: 0 to 10V |

### EXP2DI6DO card (optional)

The EXP2DI6DO card provides two digital inputs and six digital output ports. For the DI and DO line sequences, refer to the DI/Smoke and DO line sequences in Table 1-14, but the DO is not energized. Any one of the digital inputs can be linked to the 6-way digital output hardware. Its appearance is shown in Figure 1-5.



*1. Break-away detection indicator 1-8*          *2. Digital input 1-2*          *3. Digital output 1-6*

*Figure 1-5    EXP2DI6DO card*

The port definition of the EXP2DI6DO card is shown in Table 1-13.

*Table 1-13 Definitions of the ports of the EXP2DI6DO card*

| Port name | Port type | Silk Screen Printing | Definition |
|---|---|---|---|
| Digital input 1~2 | RJ45 port | DI1~DI2 | Digital input potential-free dry contact |
| Digital output 1~6 | RJ45 port | DO1~DO6 | Digital output potential-free dry contact |

### Line sequence definition of RDU501 and expansion card

The definition of RDU501 and expansion card line sequence is shown in Table 1-14.

*Table 1-14 Definitions of the RDU501 and expansion card line sequence*

| RJ45 | DO | DI/Smoke | Sensor | COM | DOAO card | DIAI card | 1-WIRE |
|---|---|---|---|---|---|---|---|
| 1 | 12V | 12V | 12V | RTS | 0 to 10V | 12V | 5V |
| 2 | | | | NC | | | 1-WIRE |
| 3 | normally closed | NC | NC | TXD | normally closed | AI_I | |
| 4 | Break-away detection | Break-away detection | GND | GND | Break-away detection | Break-away detection | NC |
| 5 | GND | GND | | | GND | GND | |
| 6 | normally open | DI | NC | RXD | normally open | DI | |
| 7 | COM | | D+ | D+ | COM | | |
| 8 | NC | NC | D− | D− | NC | AI_V | GND |

Note:
1. The line sequence of the RJ45 port is arranged as a notch downward, 1 to 8 from left to right;
2. D+ and D- are two levels of the RS485 differential signal;
3. NC: Not Connected;
4. The DI and DO line sequence of the EXP2DI6DO card refers to the line sequence of DI/Smoke and DO;
5. The close and open of the DO sampling signal in the RDU501 software uses the normally open contact 6 (normally open)

## 1.2  Main Functions

The main functions of RDU501 are given in Table 1-15.

*Table 1-15   RDU501 main functions*

| Main functions | | Descriptions |
|---|---|---|
| Device monitoring | | Realize video surveillance of the computer room environment, and the data acquisition and processing of different intelligent devices, and control smart devices through the intelligent interface |
| Safety management | Access control management | Realize local access control management, remote door opening, log recording, etc. |
| | Fire fighting management | Implement fire fighting signal connection in the SmartSolution |
| | Video management | Realize webcam video surveillance |
| IT management | IPMI device management | Monitoring and management of IT device through IPMI |
| | Console device management | Monitor console output of IT device |
| | Server shutdown management | Configure a certain strategy to achieve on-off management of the IT server |
| Thermal management | Teamwork control of air conditioners | According to certain rules, monitor and dispatch each air conditioner participating in the teamwork control to achieve the purpose of reducing air conditioning energy consumption, extending the overall life of the air conditioner, and avoiding competition between the air conditioners in one team. |
| Power management | Real-time energy consumption | Display PUE and load rate data |
| | History record | Display historical data of PUE and load rate |
| | Energy consumption setting | Set PUE statistics signal, support PUE of power mode and electric energy mode and statistics of system load percentage |
| Data management | Active alarm | Real-time alarm display, active alarm confirmation |
| | Historical alarm | Query historical alarms and view historical alarm reports in graph form. |
| | Device data | 1. Query device main data<br>2. Download device MIB file<br>3. Asset information data |
| | Historical data | 1. Query historical data;<br>2. Display historical data curve reports in the form of visualized charts |
| | Smart report | Display Smart Curve Reports in the form of a visualized chart |
| | Log data | Log data query |
| | Clear data | Clear historical data, historical alarms, and log data |
| Smart Solution modelling | Thermal management | Display the temperature field data of each cabinet in the module in 2D form |
| | Power management | Display the power supply capacity of each cabinet in the module in 2D format |
| | Asset management | Display the space capacity usage of each cabinet in the module in 2D format |
| | 2D modeling | Model the module based on the actual configuration of the module |
| | Assets on the shelves | Manage the assets in the module |
| Configuration management | Infrastructure Device Mgmt | 1. Add, modify, and delete devices dynamically<br>2. Device type that can be installed and uninstalled, support third-party device access |
| | Batch configuration | Upload and download configuration files and system files |
| | Device signal configuration | 1. Modify device name online<br>2. Modify the signal name, signal unit, storage period, storage threshold, and alarm level online.<br>3. Modify the status name online |
| | Notification mode configuration | 1. Alarm notification contents of power environment device, IT device and console device can be customized according to user requirements<br>2. The user can select the notification mode to receive different levels of alarm information of different devices.<br>3. Send system running status according to user configuration timing |
| | Email SMS configuration | 1. Realize the configuration of voice notification systems of email, SMS, phone and RDU multimedia<br>2. Email supports SSL function and supports HTML and plain text mail. |

| Main functions | | Descriptions | | | |
|---|---|---|---|---|---|
| | | 3. Provide an alarm test function to test whether the user receives thealarm reminder information. | | | |
| | | 4. Can check the balance of the SMS MODEM phone card | | | |
| | Alarm linkage | 1. Can be customized according to user requirements | | | |
| | | 2. DO1 alarm output | | | |
| | | 3. Can be combined with device signals, parameters and alarms to control the device | | | |
| | | 4. Interactive with photographing and video recording | | | |
| | | 5. Have the following logical components | | | |
| | | 1) AND means "and" | 2) OR means "or" | 3) NOT means "Not" | 4) XOR means "and/or" |
| | | 5) GT means ">" | 6) LT means "<" | 7) DS means "delay" | |
| System settings | Monitoring unit | Collect RDU501 system information | | | |
| | Network settings | 1. IP, subnet mask, gateway, DNS and other related network informationsettings | | | |
| | | 2. Authority settings for accessing RDU501 from the uppermanagement platform | | | |
| | | 3. SNMP settings | | | |
| | | 4. Security Settings | | | |
| | User management | Add, modify, and delete user information | | | |
| | System Upgrade | Upgrade the app online | | | |
| | Time calibration | Calibrate the RDU501 real-time clock | | | |
| | Restore defaults | Restart RDU501 and restore default configuration | | | |
| | Site information settings | Modify site information online | | | |
| | Authorization code management | Extend RDU501 function and access capability through authorization code | | | |
| | Title bar settings | Set the title above the web page | | | |
| | About RDU501 | Display product serial number, feature code and version information of RDU501, and provide download of user manual | | | |

## 1.3  Technical Specifications

### 1.3.1  Environmental Specifications

The environmental specifications of RDU501 are shown in Table 1-16.

*Table 1-16    Environmental conditions*

| Items | Requirements |
|---|---|
| Application site | Usually a data center or computer room, usually with an air conditioning environment |
| Operating temperature | 0°C to +60°C |
| Relative humidity | ≤95%RH, no condensation |
| Use environment | The dust meets the indoor standard of the GR-63 without corrosive gases, flammable gases, oil mist, water vapor, dripping or salt, etc. |
| Atmospheric pressure | 70kPa to 106kPa |
| Storage temperature | −20°C to +70°C |
| Cooling method | Convection cooling |
| Distribution network | TT/TN |
| Protection level | IP20 |

### 1.3.2  Mechanical Specifications

The mechanical specifications of RDU501 are shown in Table 1-17。

*Table 1-17 Mechanical specifications*

| External model | Measures | Values | Tolerance |
|---|---|---|---|
| RDU501 | height | 43.5mm | <±0.5 mm |
| | width | 440mm | <±1 mm |
| | depth | 445mm | <±1 mm |
| | weight | <10kg | |
| EXP8COM<br>EXP8DIAI<br>EXP8DOAO<br>EXP2DI6DO | height | 20mm | <±0.5 mm |
| | width | 152mm | <±1 mm |
| | depth | 210mm | <±1 mm |
| | weight | <0.5kg | |

## 1.3.3    Performance Specifications

The performance specifications of the RDU501 are shown in Table 1-18.

*Table 1-18 Performance specifications*

| Device type | Connected devices | Cable standard | Connecting length (Unit: m) | Max number of connections / connected point |
|---|---|---|---|---|
| Environment signals | SENSOR1 port connection contact | Standard Category 5 twisted pair | ≤100 | 16[1] |
| | SENSOR2 port connection contact | Standard Category 5 twisted pair | ≤100 | 16[2] |
| | DI port connection contact | Standard Category 5 twisted pair | ≤100 | 4[3] |
| | DO port connection contact | Standard Category 5 twisted pair | ≤100 | 2[4] |
| Power and environment intelligent devices | Number of device types supported by serial port networking<br>Support for the number of access console devices<br>Support access to the number of IT servers | / | / | 32[5] |
| | Number of device types supported by networking (TCP IP/SNMP) | / | / | 32[6] |
| Power and environment intelligent devices | Number of supported smart devices | Standard Category 5 twisted pair (serial port) | ≤100(serial port) | 64[7] |
| Video device | Video device | / | / | 4[8] |
| Cabinet door lock | Number of connected cabinet level door locks | Standard Category 5 twisted pair | ≤100 | 48[9] |
| Console device | Number of connected access console devices | Standard Category 5 twisted pair | ≤100 | 32[10] |
| IT server | Number of connected IT servers | / | / | 40[11] |

| Device type | Connected devices | Cable standard | Connecting length (Unit: m) | Max number of connections / connected point |
|---|---|---|---|---|

Note:

[1] : Sensor1 only supports temperature or temperature and humidity sensors with an address of 1 in the group;

[2] : Sensor2 supports temperature or temperature and humidity sensors or digital sensors with an address of 2 in the connected group. Among them: 1. Only digital sensors with 01 and 10 addresses are supported; 2. For the temperature sensor, temperature and humidity sensor, door magnetic switch, flooding sensor, 4DI itself, 4DO itself, DO device, etc. Each sensor or device is calculated according to 1 node. For the smoke detector and infrared sensor, each sensor is calculated according to 4 nodes;

[3] : DI includes four ports: DI1, DI2, Smoke1 and Smoke2. Can be extended by 8DIAI card or 2DI6DO card;

[4] : The audible and visual alrm indicators have two connection points DO1 and DO2. The two connection points can also be used as two-way digital output for other purposes. Can be extended by 8DOAO card or 2DI6DO card;

[5] : Networking through serial port, the standard supports the connection of 32 intelligent devices. Available serial ports include: 4 default serial ports + 8 (EXP8COM expansion card) * 4, a total of 36 COM ports, it is recommended that each COM port connects to the same device type;

[6] : Networking through the network (TCP IP/SNMP), the standard supports the connection of 32 intelligent devices. Expandable to 64 intelligent devices by purchasing an authorization code;

[7] : The RDU501 standard version supports the connection of 32 intelligent devices, excluding the default devices (monitoring unit / ENV_TH1/ENV_TH2 / ENV_DI / ENV_4DI), 8DIAI, 8DOAO, 2DI6DO and cabinet-level access control devices. Among them: 1. The number of intelligent devices connected to a single COM cascade does not exceed 4; 2. The serial port connected intelligent device and the network connected intelligent device are included. Expandable to 64 intelligent devices by purchasing an authorization code;

[8] : Support single-channel IPC (IP Camera) camera or support up to 4 channels of video when NVR is connected;

[9] : The RDU501 supports up to 48 cabinet-level access control devices, not counting the number of intelligent devices. Among them, the number of cabinet-level access control sytem cascaed by single COM is no more than six;

[10] : The RDU501 supports up to 32 console devices. There is no more than one console device cascaded with single COM. Note: COM connected to the console device cannot connect to other intelligent devices at the same time;

[11] : The RDU501 supports up to 40 IT server devices through the IPMI 2.0 protocol.

## 1.3.4   Product Certification

The RDU501 meets CE claims and is UL and FCC certified.

# Chapter 2   Hardware Installation

This chapter describes the hardware installation of the RDU501, including installation preparation, installation of the RDU501 main unit, installation of expansion cards and sensors and other accessories.

## 2.1   Installation Preparation

### 2.1.1   Cautions

When installing the RDU501, pay attention to the following items to avoid injury to people and device damage caused by accidents.

All installation operations on the RDU501 must be performed after disconnecting the power supply.

Ensure that the external device is connected to the correct RDU501 port.

The installer needs to wear an anti-static wrist during the installation process.

Properly route the cables to ensure that no heavy objects are pressed on the power cord. Do not step on the cable.

### 2.1.2   Environmental Requirements

**Running environment**

The RDU501 must be installed indoors. See Table 1-16 for specific requirements.

**Anti ESD**

In order to minimize the effects of static electricity, the following measures are required:

Maintain proper temperature and humidity in the device room (see Table 1-16)

Before the human body touches the circuit board, wear an anti-static wrist strap and wear anti-static clothes. If there is no anti-static wrist and anti-static overalls on site, rinse your hands with water and dry them.

**Anti disturbance**

For anti disturbance, the following measures are required:

Avoid using the RDU501 operating ground with the grounding device or lightning protection grounding device of the power device.

Keep away from strong power radio launchers, radar launchers, high frequency and high current devices.

Use electromagnetic shielding if necessary.

### 2.1.3   Space requirements

Place the RDU501 away from heat sources

It is recommended to install the RDU501 in a 19-inch standard cabinet. Leave at least 10 mm of space around the device to ensure sufficient space for heat dissipation.

### 2.1.4   Installation Tools

The installation tools are shown in Table 2-1.

*Table 2-1    Installation tool*

| Tool Name | Specification Model | Usages |
|---|---|---|
| Screwdriver (cross) | 100mm, 200mm | Install the RDU501 main unit mounting ears, expansion slot cover, etc. |
| Digital multimeter | 3-digit display | Detecting electrical connections |

## 2.2   Install RDU501 Main Unit

### 2.2.1   Mechanical installation

The RDU501 main unit is installed in a cabinet.

Installation procedures:

1. Make sure that the installation cabinet is fixed and there are no obstacles inside or outside the cabinet.

2. Fix the front mounting ears on both sides of the RDU501 main unit with the attached M4 screws, and then install the rear guide rails and mounting ears on both sides of the RDU501 main unit, as shown in Figure 2-1 and Figure 2-2.
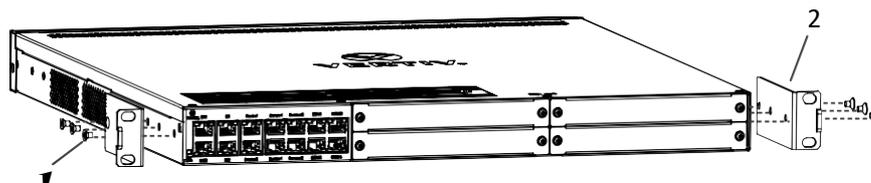


1. M4 countersunk screws (6 PCS)                    2. Mounting ears (2 PCS)

*Figure 2-1 Install the mounting ears in the front side*
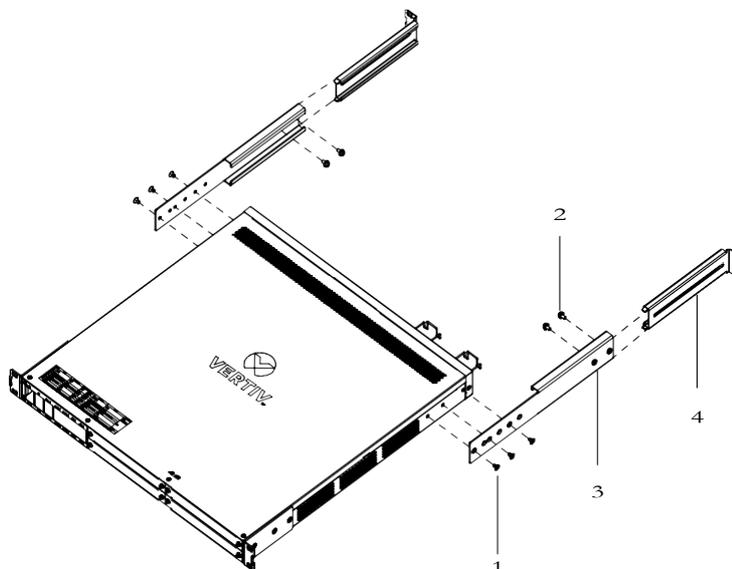


1.M4 countersunk screw (6pcs)      2.M4 pan head screw (4pcs)      3.Guide rails (2pcs)      4.Mounting ears (2pcs)

*Figure 2-2 Install the guide rails and mounting ears in the rear side*

3. Use the M6 floating nut and M6 screw to fix the RDU501 main unit to the rack through the mounting ears on both sides.

### 2.2.2   Electrical connection

Electrical connection procedures of RDU501 main unit:

1. Remove the power cable from the RDU501. Connect one end to the power input port of the RDU501 main unit and clip the anti-break-away kit shown in Figure 2-3.
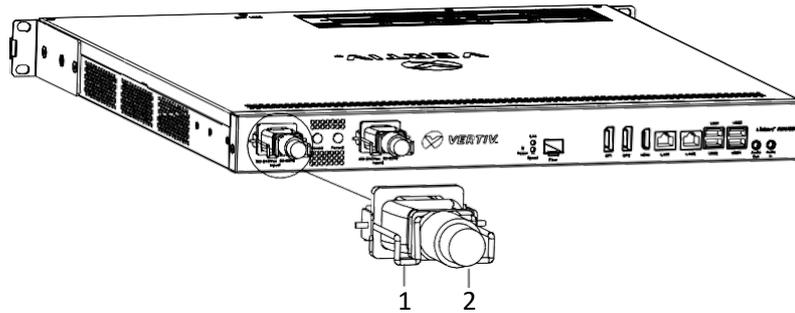
1. *Anti-breakaway kit*                    2. *One end of power cord*

*Figure 2-3 Anti-breakaway kit of power supply*

2. After ensuring that the connection is correct, plug the other end of the power cord into the power supply.

📖      **Note**

The RDU501 main unit provides dual backup power supply, which can be either one-way or two-way. Input voltage: 100Vac to 240Vac, frequency: 50/60Hz.

## 2.3   Install Accessories of Expansion Card and Sensor

📖      **Note**

The EXP8COM/EXP8DIAI/EXP8DOAO/EXP2DI6DO expansion card and SFP module are optional accessories, and users can choose whether to purchase or install.

### 2.3.1   Install expansion card

The expansion cards include EXP8COM, EXP8DIAI, EXP8DOAO and EXP2DI6DO. The installation procedures are as follows:

Remove the baffles of the expansion slots (Slot1, Slot2, Slot3, or Slot4) on the front panel of the RDU501. Insert the expansion card into the expansion slot of the RDU501 and tighten the screws on both sides, as shown in Figure 2-4.
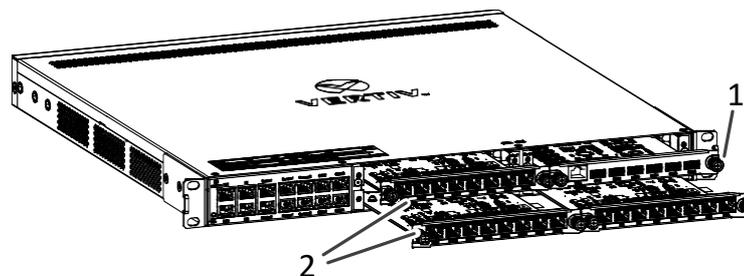


1. *expansion card*                    2. *screw*

*Figure 2-4 Installation of expansion card*

### 2.3.2   Install intelligent sensors

The intelligent sensors include: IRM-S01T intelligent temperature sensor (IRM-S01T), IRM-S02TH intelligent temperature and humidity sensor (IRM-S02TH), IRM- S04DI Phoenix Interface Intelligent Digital Input Sensor (IRM-S04DI for short), IRM-S04DIF RJ45 Interface Intelligent Digital Input Sensor (IRM-S04DIF) and IRM-S04DO Phoenix Interface Intelligent Digital Output Sensor (IRM-S04DO) , as shown in Figure 2-5.

*RM-S01T*

*IRM-S02TH*



*IRM-S04DI*

*IRM-S04DIF*



*IRM-S04DO*

Figure 2-5    Intelligent sensors

**Installation procedures**

The installation procedures for smart sensors can be found in the user manual for the corresponding intelligent sensor:

IRM-S01T can be found in the *IRM-S01T Intelligent Temperature Sensor User Manual*;

IRM-S02TH can be found in the *IRM-S02TH Intelligent Temperature and Humidity Sensor User Manual*;

IRM-S04DI can be found in the *IRM-S04DI Phoenix Interface Intelligent Digital Input Sensor User Manual*;

IRM-S04DIF can be found in the *IRM-S04DIF RJ45 Port Intelligent Digital Input Sensor User Manual*;

IRM-S04DO can be found in the *IRM-S04DO Phoenix Port Intelligent Digital Output Sensor User Manual*.

IRM-THD can be found in the *IRM-THD User Manual*.

### 2.3.3   Connect physics sensor

The physics sensors include: smoke detector, flood sensors, infrared sensors, and door magnetic switches.

There are two methods to connect the smoke detector, flood sensors, infrared sensors, and door magnetic switches:

Directly connect the DI port on the front panel of the RDU501 (Silk Screen Printing is DI1, DI2, Smoke1, and Smoke2, each port can be arbitrarily connected to one of smoke detector, flood sensors, infrared sensors, and door magnetic switches). The wiring sequence is shown in Table 1-14.

Connect the RDU501 through the IRM-S04DI or IRM-S04DIF: Connect the sensor to the IRM-S04DI or IRM-S04DIF Digital input port. For the wiring sequence, refer to the *IRM-S04DI Phoenix Port Intelligent Digital Input Sensor User Manual* or *IRM- S04DIF RJ45 Port Intelligent Digital Input Sensor User Manual*.

# Chapter 3   Web Interface of RDU501

This chapter describes how to log in to the RDU501 and RDU501 related functions through the Web, including login preparation, login to RDU501 and RDU501 home page, and menu items.

## 3.1   Login Preparation

To ensure the normal use of the RDU501 webpage function, please refer to the contents of this section to check and select the web browser.

### 3.1.1   Checking IP Address Connectivity

Prior to logging in to the RDU501 through the Web, first confirm the IP address of the RDU501 and test its connectivity. For the test method, see "Question 5" in section 4.2 Troubleshooting.

### 3.1.2   Checking web browser

Support mainstream web browsers such as Google Chrome, Firefox, Safari, Internet Explorer (11), Edge, etc.

## 3.2   Login RDU501

### 3.2.1   Authorized Startup

1. When logging in to the RDU501 for the first time, open the browser and enter the IP address of the RDU501 in the address bar (the default IP of LAN1 is 192.168.0.254; the default IP of LAN2 is 192.168.1.254). Open the authorized startup page, as shown in Figure 3-1. The authorization startup page does not appear. See "Question 5" in section *4.2 Troubleshooting*.
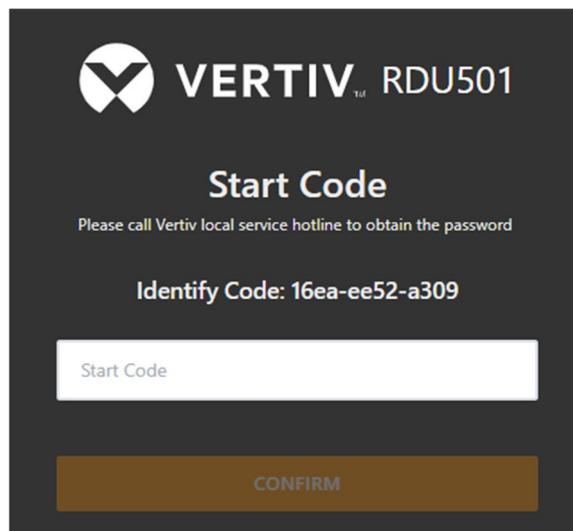


*Figure 3-1    Authorized startup page*

2. Please contact Vertiv Customer Service Center, provide the feature code, serial number and necessary customer information to the customer service staff to get the startup password.

3. Enter the obtained startup password in the power-on password text box and click the **OK** button. If the startup password is correct, the system automatically jumps to the login page (see Figure 3-2).

## 3.2.2  Login page

1. Open the browser and enter the IP address of the RDU501 in the address bar. The login page appears, as shown in Figure 3-2. If the login page does not appear, see "Question 5" in section *4.2 Troubleshooting*.
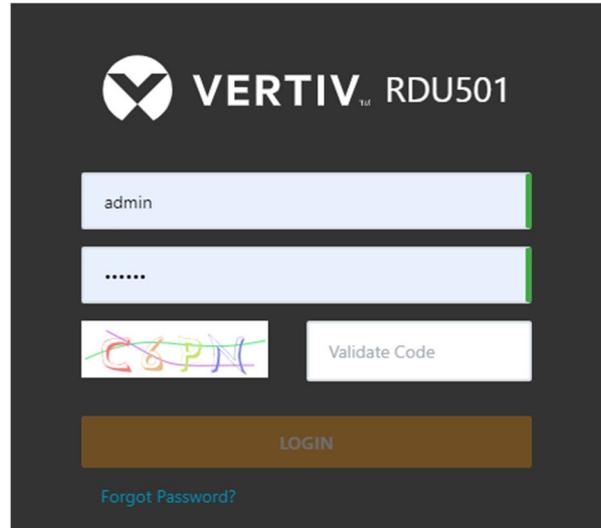


*Figure 3-2    RDU501 login page*

2. Enter the username and password (default username: admin, default password: Vertiv) and click the Login button, which will open the home page as shown in Figure 3-4.

---

**📖      Note**

---

1. After logging in to the system for the first time, it is recommended to change the default password of the system.

2. It is recommended to change the password periodically.

---

## 3.2.3  Retrieving the password

If you forget the user password, you can click the **Forgot Password** link on the login page to display the Retrieve Password page, as shown in Figure 3-3.
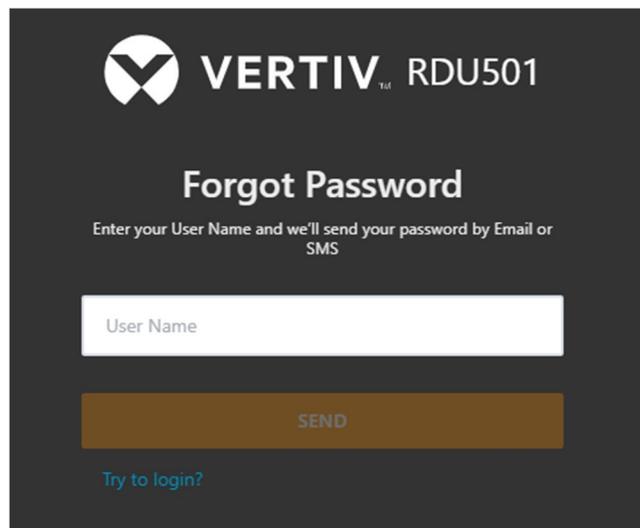


*Figure 3-3    Retrieve Password page*

Enter your username, click the **Send** button, your password will be sent to your previously set mailbox or phone; click the **Continue Login** link to return to the login page.

📖   **Note**

1. You can only receive the password sent by the system if you have set the email or SMS parameters correctly in the Email and SMS Configuration page. For details, see section *3.4.8      Email Configuration in Configuration Management*.

2. The retrieved password is a new password generated randomly by the system. Please modify it after you log in successfully.

## 3.3  RDU501 Main Page

In the RDU501 homepage, click on the left **Homepage** menu to see two submenus, including: Power and Environment Overview and IT Device Overview.

### 3.3.1  Power and Environment Overview

Click on the Power and Environment Overview menu to open the **Power and Environment Overview** page. You can customize a flat layout based on the physical location of the device room for centralized display. After configuration, the effect is shown in Figure 3-4.



| 1. System title | 2. Product name | 3. Room information area | 4. Alarm reminder sound settings |
| 5. Number of real-time alarms | 6. Controllable status | 7. User name | 8. Logout [current user] |
| 9. Fold submenu button | 10. Menu item | 11. System Time and time calibrating link | 12. Hot and cold aisle temperature |
| 13. Real-time power | 14. Power consumption | | |
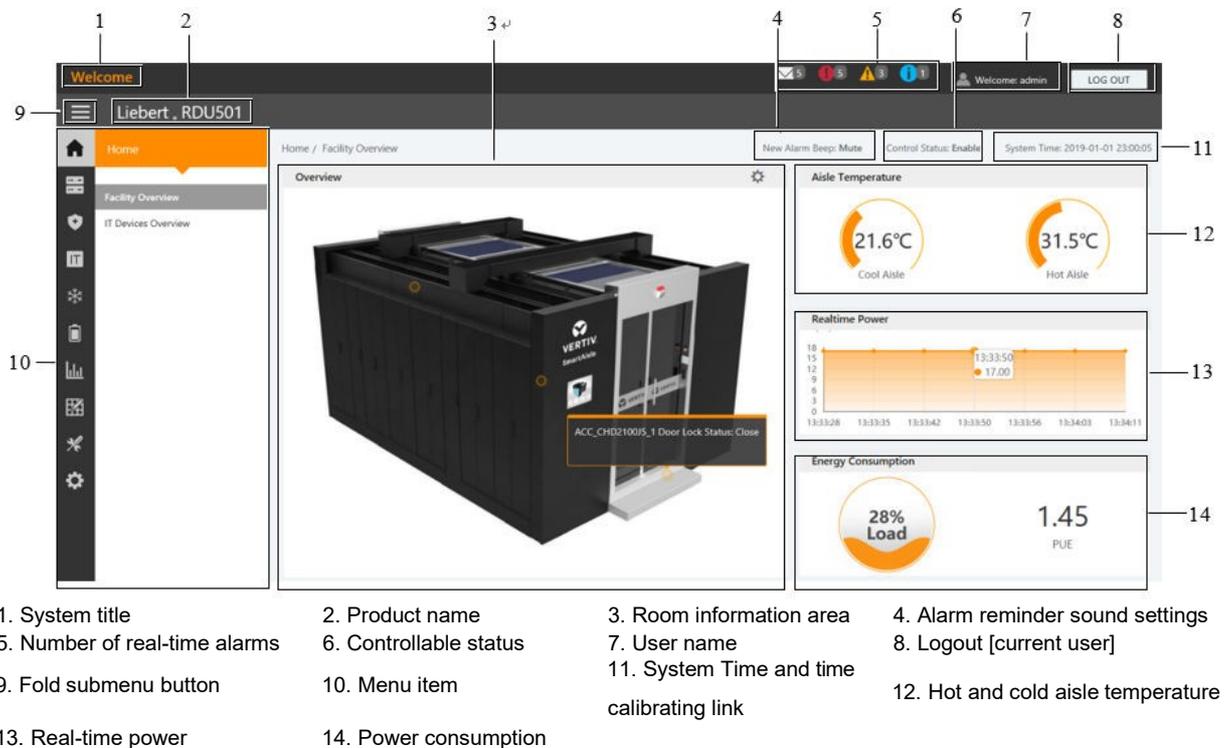
*Figure 3-4 RDU501 Homepage (Power and Environment Overview)*

The number of active alarm displays the number of IT device event/ alarm ✉, critical alarm 🔴, major alarm ⚠ and minor alarm ℹ.

The hot and cold aisle temperature displays the average temperature of cold and hot aisles in the module. For details about the temperature sensor of the rack in the module, see rack property settings for 2D Modeling in 3.4.7 Smart Solution Modeling.

Real-time power shows the current real-time power of the system. For details, see *Real-Time Power Settings in Energy Settings in 3.4.5 Power Management*.

The power consumption shows the current system load rate and PUE. For details, see *System Load Percentage Settings in Energy Settings in 3.4.5 Power Management*.

Click the **Mode** button ⚙ in the room information to enter the setting state. After entering the setup state, the setup method is as follows:

1. Device hotspot settings

Click the **Add Device Hotspot** button ➕, a hot spot will be added 🚩.

Press the left mouse button to drag the hotspot to move the hotspot location.

Click the hot spot, the **Edit** and **Delete** options will pop up, as shown in Figure 3-5.



*Figure 3-5    Setting page*

Click **Edit** to bring up the device signal setting page. After adding or deleting device signals, click the **OK** button to save.
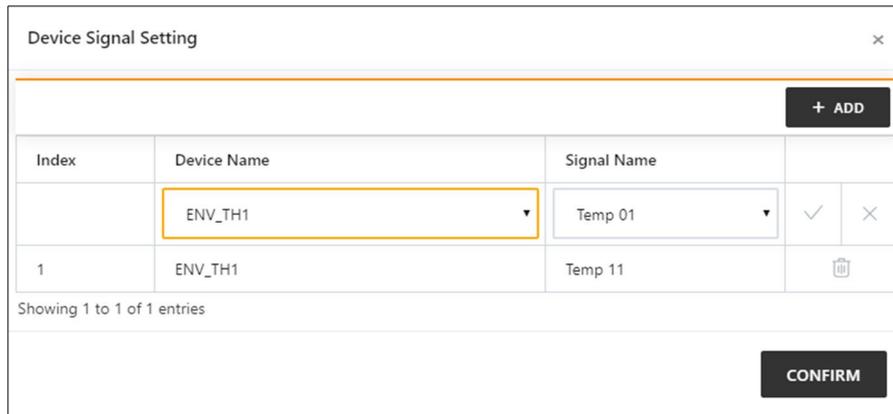


*Figure 3-6    Device signal setting*

📖    **Note**

Clicking the Add button in the device signal settings will add a new row to the table. Click the Cancel icon ✕ on the right side of the line to cancel the addition; after selecting the device name and signal name, click the OK icon ✓ on the right side of the line to complete the addition of the line. When the addition is completed, the delete icon 🗑 will appear on the right side of the line, and clicking the icon will delete the line. When you have finished modifying all the lines, you need to click the OK button to save.

The above operation mode is in-line editing. When such an operation occurs in the following text, it will not be explained one by one.

Click **Delete**. A confirmation box for deleting the hotspot will pop up. Click the **OK** button in the confirmation box to delete the hotspot.

2. Save

● Click the **Save** button 💾 to save all configurations and return to the browse state.

&#9634;    **Note**

After modifying the hotspot information, you need to click the Save button ⊟ to save, otherwise the hotspot configuration information will be lost.

3. Background setting

Click the **Change Background Image** button 🖼, the page shown in Figure 3-7 is displayed.

- Click on the image, a pop-up prompt box prompts "Are you sure to replace the current background image", click the **OK** button, the home page will display the background image.
- Click the **Browse** button to select the background image. After selecting the image file, click the **Upload** button and the image will be added to the background image list.
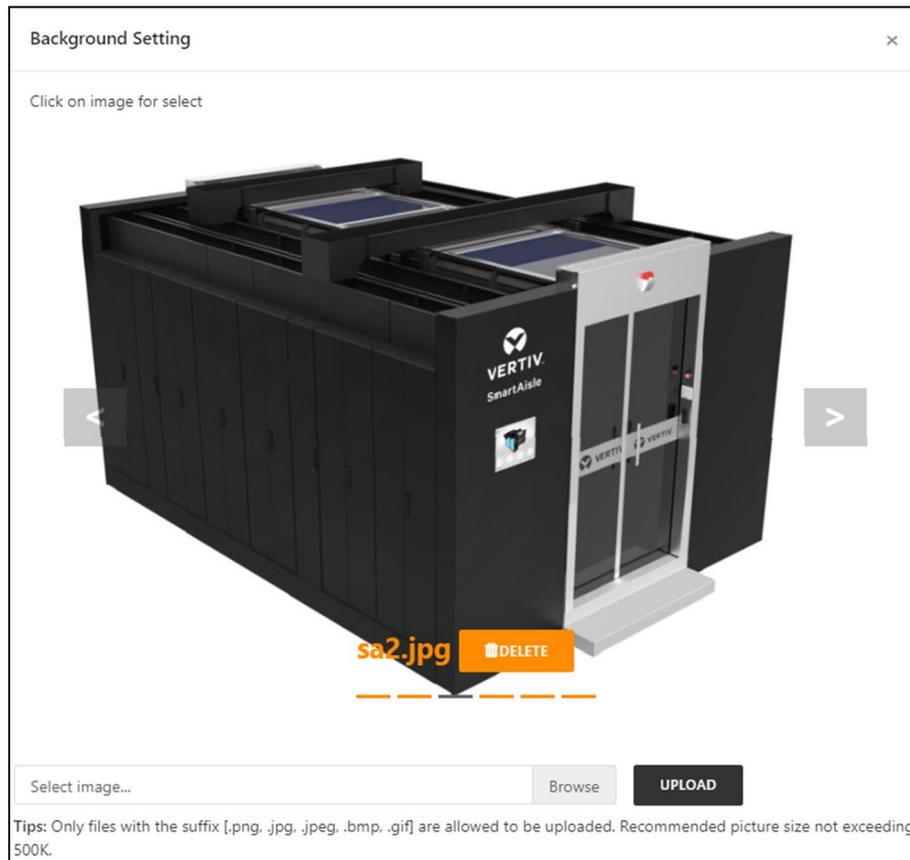


*Figure 3-7    Change background image*

&#9634;    **Note**

Only images of .png, .jpg, .jpeg, .bmp and .gif are allowed to be uploaded, the size is up to 10MB.

4. Signal display mode

Click **Signal Display Mode** button 🖥, and the page shown in Figure 3-8 pops up.

Select the signal display mode: mouse floating, always display or automatic inspection. If you select automatic inspection, you need to fill in the automatic inspection display time.
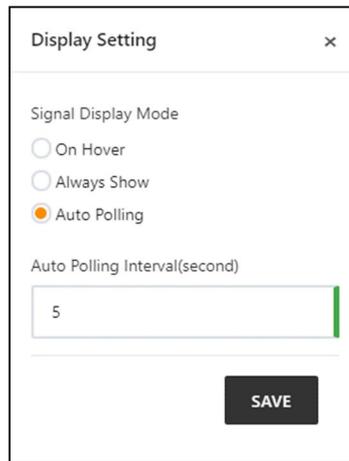
*Figure 3-8 Display setting*

5. Back to browse

Click to **Back to Browse** button ↻ to return to the browse state from the configuring status.

### 3.3.2 Overview of IT Device

As shown in Figure 3-4, click the IT device overview submenu. The IT device overview page will be displayed in the display area on the right. The page displays the corresponding information of the device, as shown in Figure 3-9.



| 1. U space availability | 2. IPMI device online rate | 3. IPMI alarm device number |
|---|---|---|
| 4. Number of console alarm devices | 5. The last 10 current alarms of IPMI | 6. The last 10 events of the console device |
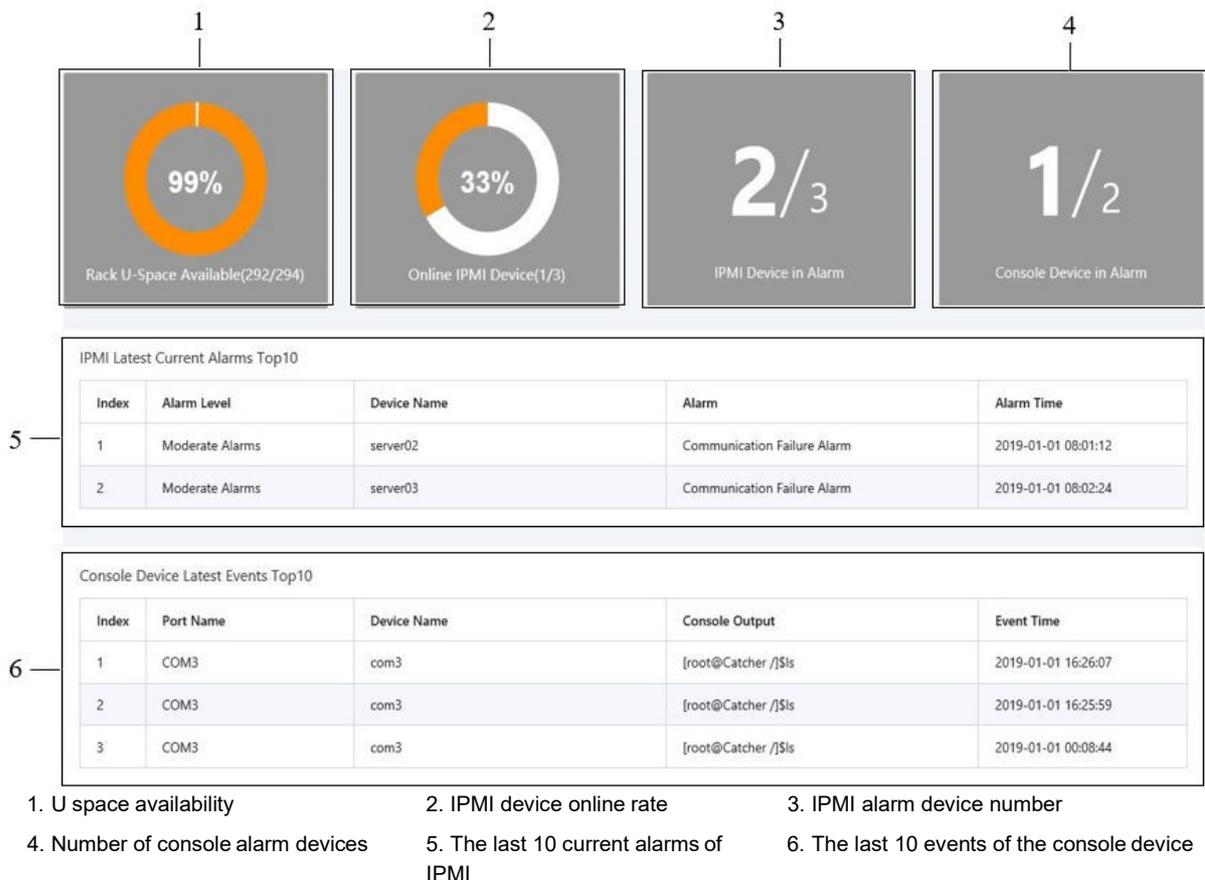
*Figure 3-9 RDU501 homepage (IT device overview)*

1. U space availability is the ratio of the number of available U spaces to the total number of U spaces.

2. The IPMI device online rate is the ratio of the number of online IPMI devices to the total number of IPMI devices.

3. The ratio of the number of devices with IPMI alarms to the total number of IPMI devices.

4. The ratio of the number of devices with alarms to the total number of console devices in the console device for the past 3 days.

5. Display the last 10 current alarms of IPMI.

6. Display the last 10 events of the console device.

### 3.3.3  Time calibrating link

The RDU501 system time is displayed at the top right of the page. Clicking on the system time will jump to the time calibration page. For details, see Time Calibration in section *3.4.9      System setting*.

### 3.3.4  Release timeout

When the page has not been operated for more than **15 minutes** or only browsing are performed, the page becomes uncontrollable and the controllable state becomes "disabled". At this point, the user can only browse and cannot modify or edit. Clicking the **Disable** link will bring up the input box shown in Figure 3-10. After entering the current user's login password and click the **Confirm** button, the controllable status will return to "Enable".
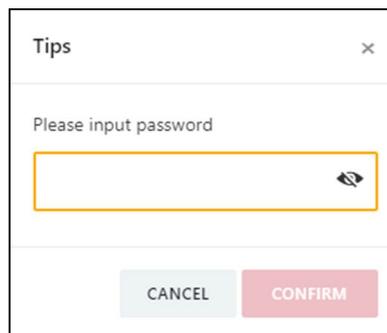


*Figure 3-10 User security verification dialog*

### 3.3.5  Logout

Click the **Logout** button in the upper right corner of the homepage, and the prompt "Are you sure you want to log out?" will pop up. Click the **OK** button to exit safely.

### 3.3.6  Real-time alarm reminder settings

The number of real-time alarms is displayed in the upper right corner of the system home page. You can perform the following operations as shown in Figure 3-4:

1. Click the **IT Event/Alarm** icon ✉ to display the number of events in the console for the last 3 days and the number of IPMI device alarms.

2. Click the **Critical Alarm** icon ❗ to display the critical alarm list.

3. Click the **Major Alarm** icon ⚠ to display a list of major alarms;

4. Click the **Minor Alarm** icon ℹ to display the minor alarm list.

5. The new alarm sound defaults to the "Mute" state. Click the "Mute" link to set the new alarm tone to "Open", when the system has a new alarm, it will play an alarm sound.

## 3.4  Menu Items

In RDU501, menu items include **Homepage**, **Device**, **Security Management**, **IT Management**, **Thermal Management**, **Power Management**, **Data Management**, **Smart Solution Modeling**, **Configuration Management**, and **System Settings**.

### 3.4.1  Device

Click on the first level menu **Device**, the second level menu will display all the currently installed device types, click on the device type, and the content area on the right side will display all devices of that type. The device is displayed

in the form of a card. The icon in the upper left corner of the card displays different colors according to the alarm status of the device. The right side of the card displays the attention signal, as shown in Figure 3-11.



*Figure 3-11　Device (ENV) card list*

📖　　**Note**

1. The ENV-TH device in the **Device** is a virtual device, indicating all temperature and temperature and humidity sensors connected to the RDU501 body and the name cannot be changed.

2. The attention signal can be set on the **Device - Acquisition Signal** page.

### Device overview

Click on the device in the device card list to go to the device details page. Select the **Device Overview** tab to open the device overview page, as shown in Figure 3-12.
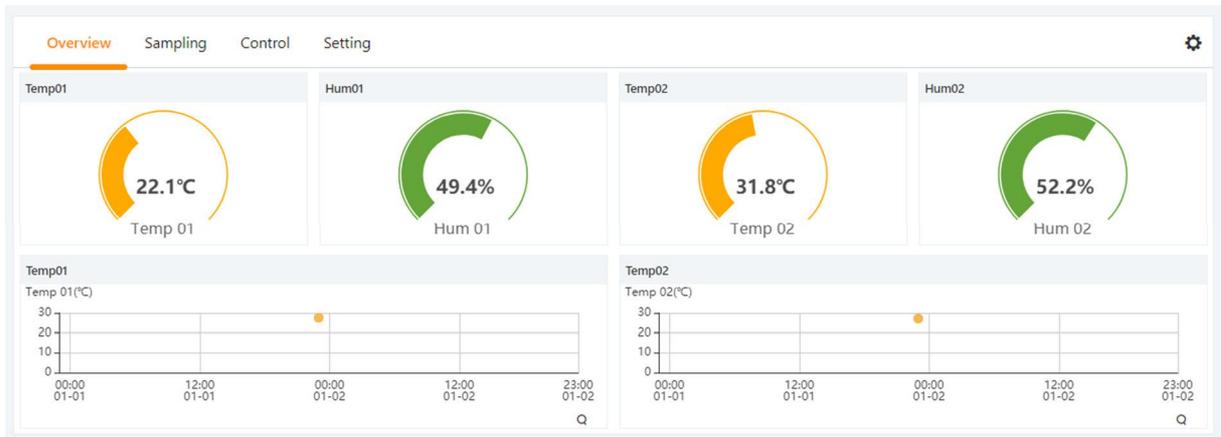


*Figure 3-12　Device Overview*

Click the **Edit** button ⚙ to enter the edit page, you can customize the overview page, as shown in Figure 3-13.
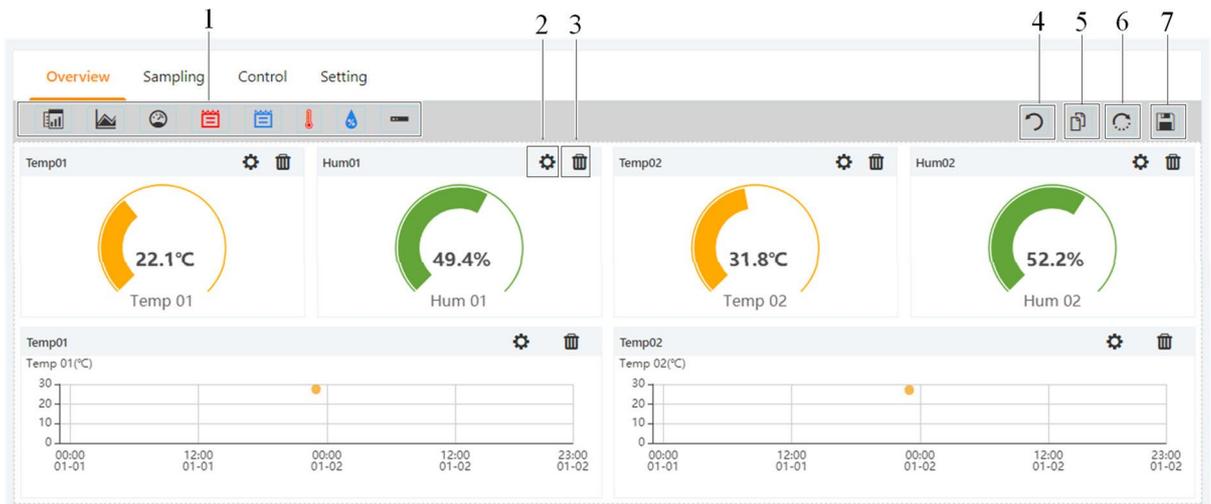
1. List of available controls           2. Configure controls           3. Delete controls           4. Back to browse
5. The same type of device is valid      6. Restore the default           7. Save the configuration

*Figure 3-13    Device Overview -Edit*

In the edit state, click the [icon] icon to batch configure other devices of the same type; click the [icon] icon to restore the default; click the icon [icon] to save; click the icon [icon] to convert the page back to the browse state.

📖    **Note**

1. The **device overview** page has different default control display modes according to different device types. Click the **restore default** icon [icon] to return to the default state.

2. Some types of devices have specific state diagrams that are not removable and not configurable. They can only update state map location information, such as air conditioners, UPS, and so on.

**Acquire signal**

Click the **Acquire Signal** tab to enter the acquisition signal page to display the acquisition signal of the selected device, as shown in Figure 3-14.

The yellow asterisk in the last column indicates that the current signal is the attention signal and the attention signal will appear in the device card list. When you click on the asterisk in the column, the "Confirm the change of attention signal? This will be applied to all devices of the same type." prompt information will be displayed, click the **OK** button, the current signal will be set as the attention signal, and the asterisk will turn yellow.



| Index | Signal Name | Signal Value | Sampling Time | Favorite on Card |
|---|---|---|---|---|
| 1 | Temp 01 | 22.1°C | 2019-01-01 00:48:22 | ☆ |
| 2 | Hum 01 | 49.8% | 2019-01-01 00:48:22 | ☆ |
| 3 | Temp 11 | 21.0°C | 2019-01-01 00:48:22 | ☆ |
| 4 | Hum 11 | 50.4% | 2019-01-01 00:48:22 | ☆ |
| 5 | Temp 21 | 31.2°C | 2019-01-01 00:48:22 | ☆ |
| 6 | Temp 02 | 31.8°C | 2019-01-01 00:48:27 | ★ |
| 7 | Hum 02 | 53.2% | 2019-01-01 00:48:27 | ☆ |

Showing 1 to 7 of 7 entries

*Figure 3-14    Acquire Signal*

📖    **Note**

If a signal is in an alarm state, the line of the signal is displayed in red.

**Control signal**

Click the **Control Signal** tab to enter the Control Signal page to display the control signals for the selected device. Click the **Control** button to control the device, as shown in Figure 3-15.

| Overview | Sampling | Control | Setting | | | |
|---|---|---|---|---|---|---|

| Index | Signal Name | Signal Value | Value Setting | Refresh Date/Time | Set |
|---|---|---|---|---|---|
| 1 | Clear Sensor Comm Fail Alarm | Clear | Clear ▾ | | CONTROL |

Showing 1 to 1 of 1 entries
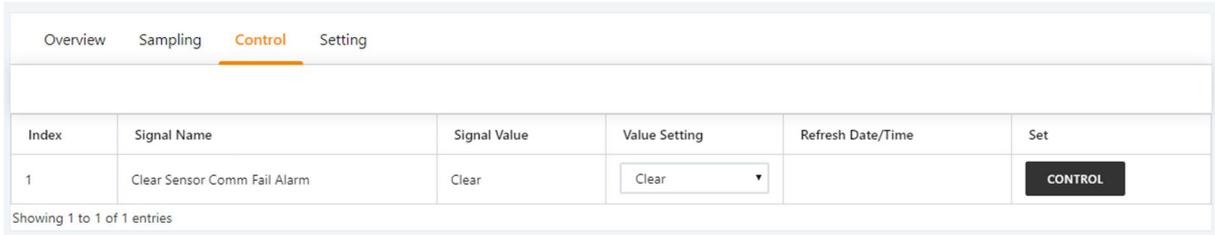
*Figure 3-15    Control signal*

**Set signal**

Click the **Set Signal** tab to enter the signal setup page to display the setup signal for the selected device, as shown in Figure 3-16.

| Overview | Sampling | Control | Setting | | |
|---|---|---|---|---|---|

| | Index | Signal Name | Signal Value | Value Setting | Refresh Date/Time |
|---|---|---|---|---|---|
| ☐ | 1 | All High Temp Alarm limit | 35.0℃ | -10-60 | |
| ☐ | 2 | All Low Temp Alarm limit | 0.0℃ | -10-60 | |
| ☐ | 3 | All High Hum Alarm limit | 80.0% | 0-95 | |
| ☐ | 4 | All Low Hum Alarm limit | 10.0% | 0-95 | |
| ☐ | 5 | Temp 01 Alarm hystersis | 1.0℃ | 0.5-5 | |
| ☐ | 6 | High Temp 01 Alarm limit | 29.0℃ | -10-60 | |
| ☐ | 7 | Low Temp 01 Alarm limit | 0.0℃ | -10-60 | |
| ☐ | 8 | Hum 01 Alarm hystersis | 5.0% | 1-10 | |
| ☐ | 9 | High Hum 01 Alarm limit | 20.0% | 0-95 | |
| ☐ | 10 | Low Hum 01 Alarm limit | 10.0% | 0-95 | |
| ☐ | 11 | Temp 11 Alarm hystersis | 1.0℃ | 0.5-5 | |
| ☐ | 12 | High Temp 11 Alarm limit | 20.0℃ | -10-60 | |
| ☐ | 13 | Low Temp 11 Alarm limit | 0.0℃ | -10-60 | |
| ☐ | 14 | Hum 11 Alarm hystersis | 5.0% | 1-10 | |
| ☐ | 15 | High Hum 11 Alarm limit | 80.0% | 0-95 | |
| ☐ | 16 | Low Hum 11 Alarm limit | 10.0% | 0-95 | |

Showing 1 to 16 of 25 entries          « < **1** 2 > »

*Figure 3-16    Set signal*

📖    **Note**

Batch settings can be made for signals by checking multiple check boxes, and 16 signals can be set in maximum batch size at a time.

## 3.4.2  Security Management

Security Management monitors and manages the security of the cabinet through video surveillance, access control, and fire fighting management functions.

In the RDU501 homepage, click on the Security Management menu to see three submenus, including: **Access Control, Fire Fighting Management, and Video Management**.

**Access control management**

Click the **Access Control Management** submenu under the **Security Management** menu to display the page shown in Figure 3-17.
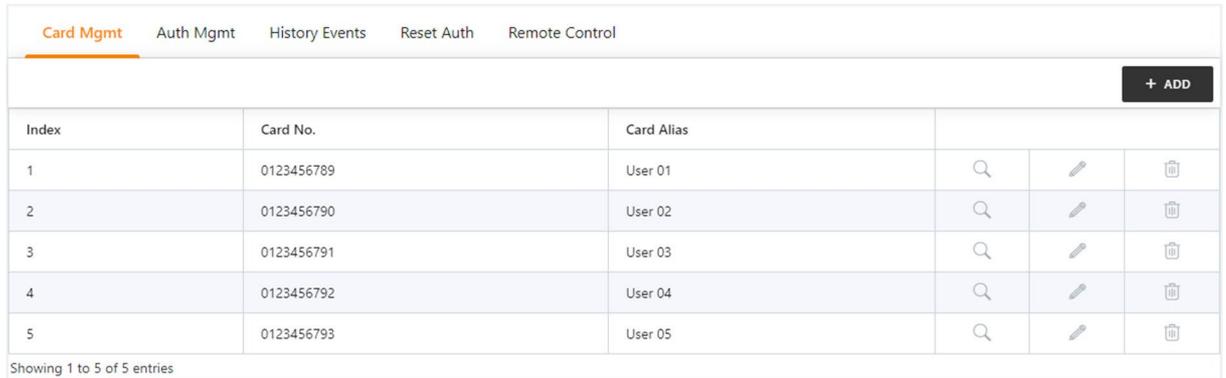


*Figure 3-17 Access control card management*

1. Access card management

Click the **Add** button to open the page for adding the access control card, enter the access control card number and alias (alias as optional), click the **Save** button to complete the addition. As shown in Figure 3-18.
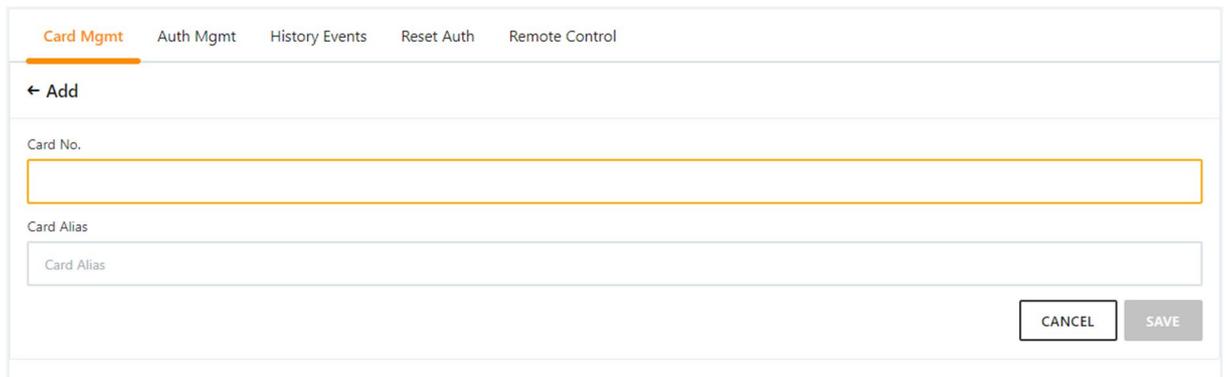


*Figure 3-18    Add access control card*

Select an access control card to **modify or delete** the access control card information. When modifying the access control card information, you cannot modify the access control card number.

Click the authorization information query button 🔍 to query the authorization information of the access control card.

📖     **Note**

1. The user can set the display or hide access control management module in **System Settings -> Monitoring Unit -> Settings Signal**, as shown in Figure 3-19.

2. After the RDU501 is connected to the higher level management platform, the access management function can be implemented through the higher level management platform.

3. Maximum number of access controllers: 2 aisle door controllers + 2 x 24 cabinet door lock controllers.

4. When adding an access control card, you can not only manually enter the access card number, but also click the card number link from the access control history to add.

*Figure 3-19 Show or hide the access control module*

2. Authority management

Click the **Authority Management** tab under the **Access Control Management** menu to display the page shown in Figure 3-20.



*Figure 3-20    Authority management*

After the user selects the **Access Control Device** and the **Door Lock**, check or uncheck the access control card and click the **Save** button to authorize or deauthorize the access control card.

3. Historical query

Click the **Historical Query** tab under the **Access Control Management** menu to display the page shown in Figure 3-21.

*Figure 3-21    Historical query*

The user can select the access control device and click the **Query** button to query the history of the event. Click the **Download** button to download.

Clicking on the invalid card swiping event in the history log to add this card, you can jump to the access control card management tab to add the card.

4. Reset authority

Click the **Authority Reset** tab under the **Access Control Management** menu to display the page shown in      Reset authority.



*Figure 3-22    Reset authority*

The user can select the **Access Control Device** and click the **Clear Authorization Information** button to clear the authorization information of all the access cards on the access control device.

5. Remote control

Click the **Remote Control** tab under the **Access Control Management** menu to display the page shown in Remote control.



*Figure 3-23    Remote control*

The user can perform operations such as "remote opening" on the access control device.

 **Video management**

Click the **Video Management** submenu under the **Security Management** menu to display the page shown in Figure 3-24.
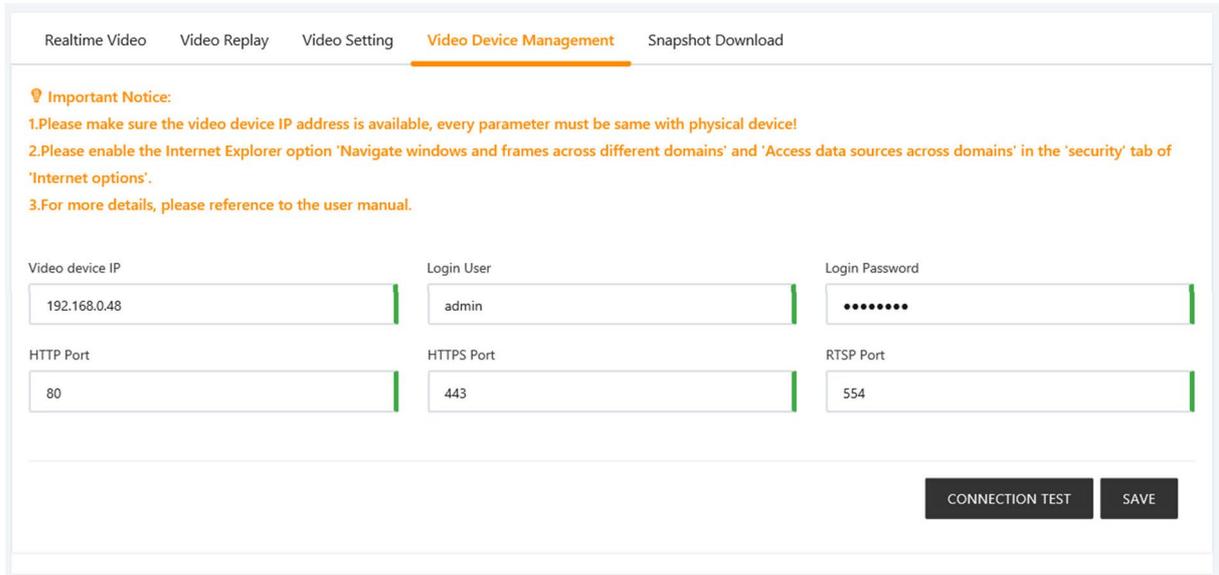
*Figure 3-24 Video device management*

1. Video device management

Enter the **IP address** of the video device, **Login user name** and **Password, HTTP port, HTTPS port, RTSP port**, and click the **Test** connection button to test whether the video device is successfully connected. If the prompt message "Video device connection test is successful!" is displayed, the connection is successful, otherwise the connection fails. Please check whether the input video device information is correct and the video device connection is correct. Click the **Save** button to save the entered video device information.

📖    **Note**

1. Please ensure that the input video device IP address is available, and each parameter must be consistent with the actual device!

2. Please enable "Cross-domain browsing window and framework" and "Access data source through domain" of "Trusted Site" under "Security" tab in Internet Explorer "Internet Options", as shown in Figure 3-25 and Figure 3-26.

3. Support single IPC (IP Camera) camera or one NVR (Network Video Recorder).

4. Supports up to 4 channels of video when NVR is connected.

5. Video management only supports IE11 browser.

6. The web authentication mode (configuration--system--security management--authentication mode) of the video device needs to be set to digest/basic.
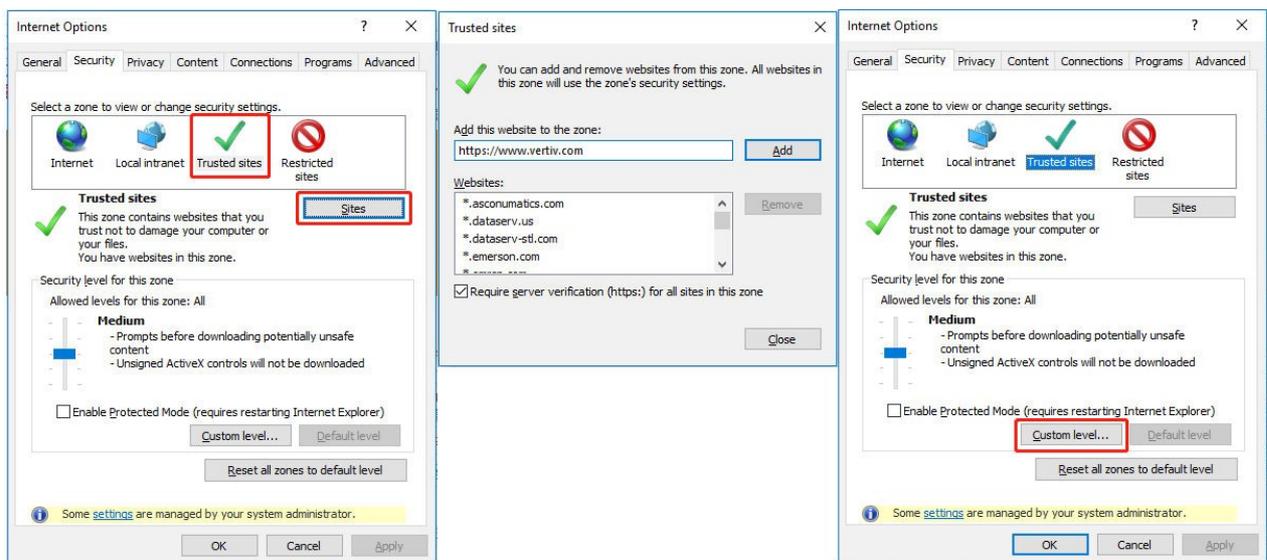


*Figure 3-25    Security setting 1*
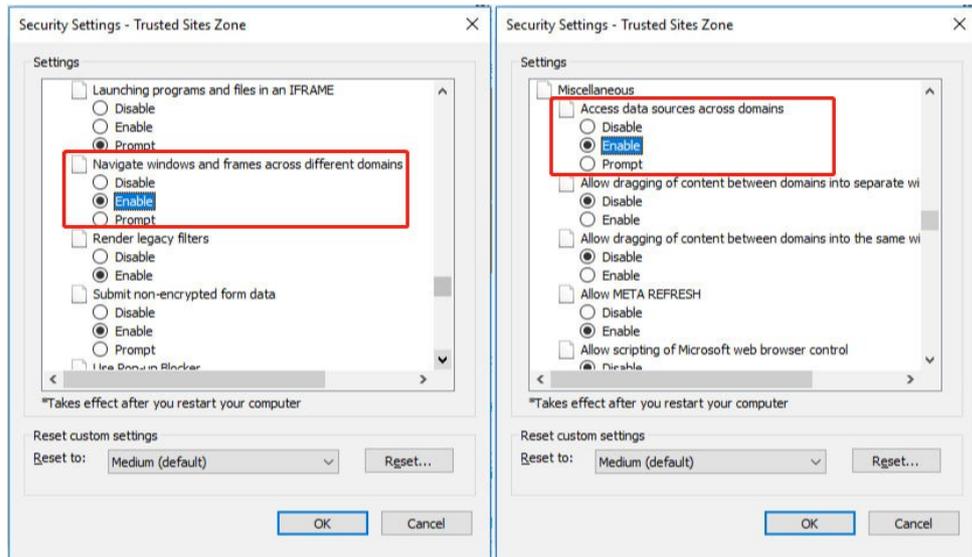
*Figure 3-26 Security setting 2*

2. Live video

Click the **Live Video** tab under the **Video Management** menu to display the page shown in Figure 3-27.
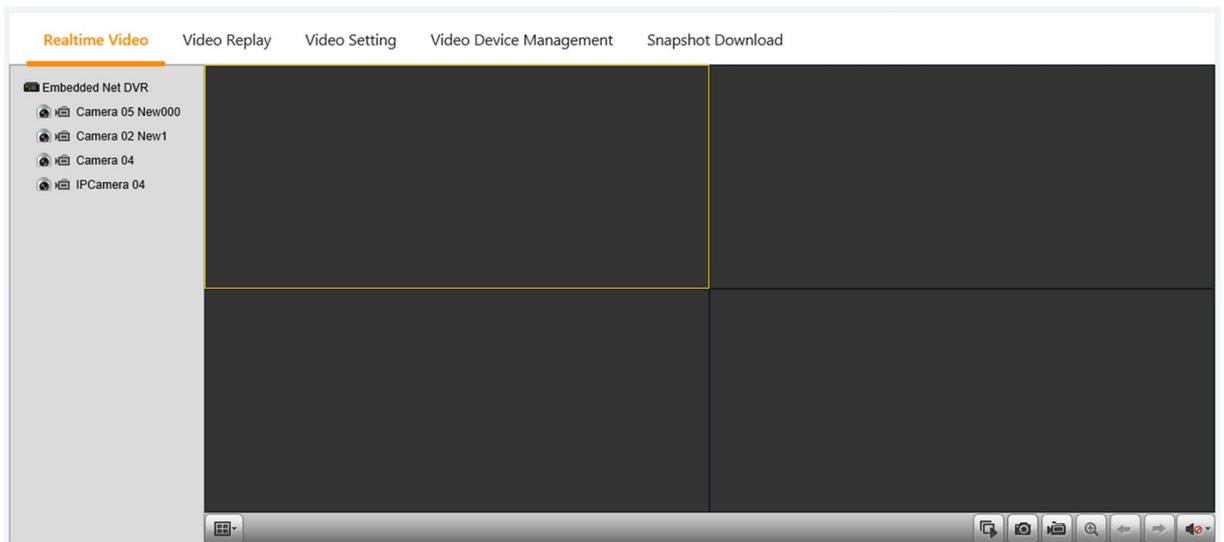


*Figure 3-27    Live Video*

*Table 3-1    Live video page icon description*

| Icon | Descriptions |
|---|---|
| | Single device start/stop real-time browsing |
| | Set the current page to browse in 1*1 or 2*2 mode |
| | Start/stop real-time browsing of all devices |
| | Capture |
| | Video recording |
| | Zoom in on the video image of the selected area |
| | When browsing the current page in 1*1 mode, switch to browse video monitoring of different devices. |
| | Set the sound size |

📖   **Note**

After the capture and video recording operations, the file is saved in the **Save Path** of the **Parameter settings\local configuration\corresponding operation**.

3. Video playback

Click the **Video Playback** tab under the **Video Management** menu to display the page shown in Figure 3-28.
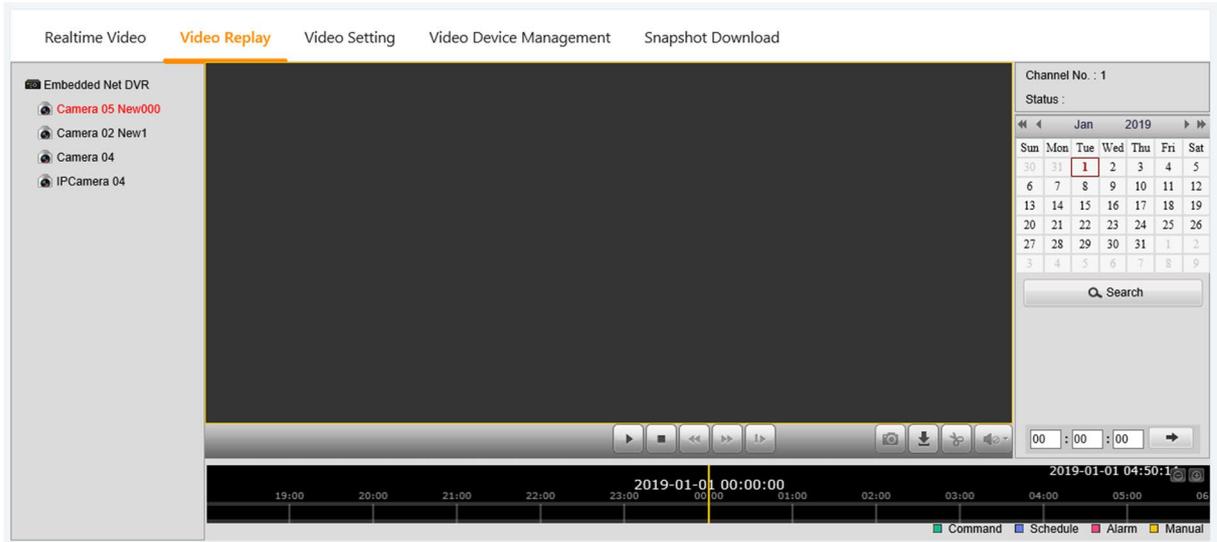


*Figure 3-28 Video playback*

*Table 3-2 Video playback page icon description*

| Icon | Descriptions |
|---|---|
| Device column on the left side | Select playback device |
| Q 查找 | Select the date of playback to find |
| → | Playback time point positioning |
| ► | Play |
| ■ | Stop |
| ◄◄ | Slow playback |
| ►► | Fast play |
| I► | Single frame playback |
| ⓞ | Capture |
| ↓ | Download playback video file |
| ◄»- | Set the sound volume |

4. Parameter settings

Click the **Parameter Settings** tab under the **Video Management** menu to display the page shown in Figure 3-29.
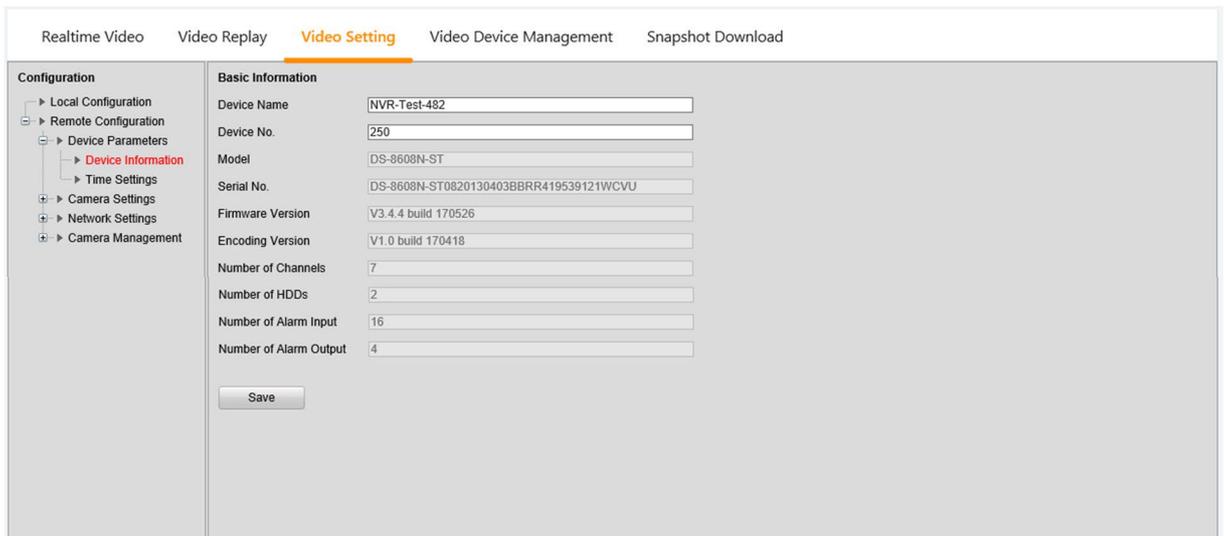
*Figure 3-29    Parameter settings*

The parameter setting tab provides settings for various parameters of the camera. For details of the parameters, please refer to the *Network Camera Operation Manual* provided with the NVR. Among them, the channel management is only for the NVR setting, and the IPC camera does not involve this function.

5. Download linkage photographs

Click the **Alarm Linkage** submenu under the **Configuration Management** menu to add the alarm linkage configuration. See section 3.4.8.

After the configured alarm condition is triggered, the video device will capture or record the captured image. The captured image can only be downloaded by clicking the **Download linkage photographs** in the **Video management menu** to view and delete the photos. As shown in Figure 3-30. The system can save up to 50 latest photos. The captured video can be viewed through the **Video Playback** tab under the **Video Management** menu.
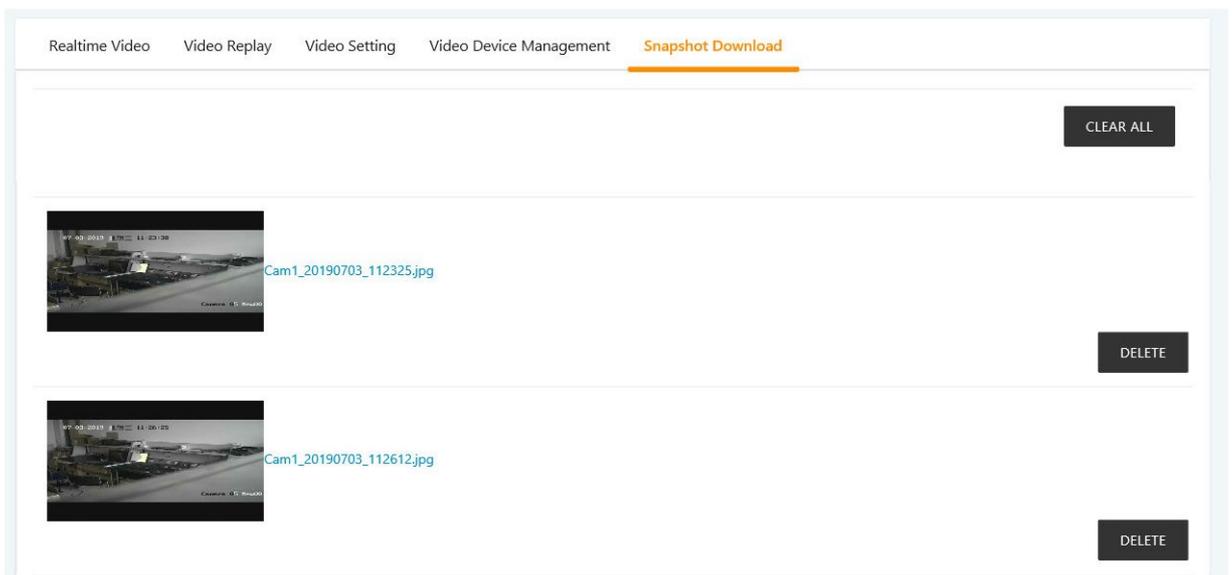


*Figure 3-30    Download linkage photographs*

    📖    **Note**

The video triggered can be displayed as yellow manual video recording when it is played back.

### Fire fighting management

With the fire fighting device (ENP_ENV_FIREFIGHTING[SENSOR]) configured, click the **Fire Fighting Management** submenu under the **Security Management** menu. The page shown in Figure 3-31 is displayed.

| | **Fire Fighting Status** | | | |
|---|---|---|---|---|
| Index | Signal Name | Value | Sampling Time | |
| 1 | Power Status | Normal | 2019-01-01 13:09:25 | |
| 2 | Fault Status | Leave | 2019-01-01 13:09:25 | |
| 3 | Alarm Status | Leave | 2019-01-01 13:09:25 | |
| 4 | Sprayed Status | Leave | 2019-01-01 13:09:25 | |

Showing 1 to 4 of 4 entries

*Figure 3-31    Fire fighting management*

Each fire fighting device has up to 4 DI signals, and the four DI signals are: power failure signal, internal fault signal, fire alarm signal, gas discharge signal, and they are all connected through an IRM-4DI sensor, the address of the 4DI sensor is F1 (User mode). Fire fighting access is achieved by adding a firefighting device (ENP_ENV_FIREFIGHTING[SENSOR]) in the Power and Environment Device Management page.

### 3.4.3  IT Management

IT management monitors and manages IT equipment through IPMI device management, console device management, and server shutdown management.

In the RDU501 homepage, click on the IT Management menu to see seven submenus, including: **IPMI Device List, IPMI Device Management, IPMI Device Alarms, Console Device List, Console Device Management, Console Log Data,** and **Server Shutdown Management**.

IPMI Device Management

Click the **IPMI Device List** submenu under the **IT Management** menu to open the page shown in Figure 3-32. The icon color in the device card indicates the status of the device. When the communication is normal, it is displayed in green. When the communication fails, it is grayed out. When the device has an alarm, it is displayed in red.



*Figure 3-32 IPMI Device List*

1. IPMI device detailed information

Click on the card in the IPMI device list to enter the device detailed information page, which displays the device **Overview** page by default. The device **Overview** page displays basic information, shortcut menus, version information, and the latest event log of the IPMI device, as shown in Figure 3-33.

The running status is divided into normal and alarm. The icon ✅ is displayed in the normal state and the icon ❗ is displayed in the alarm status.

*Figure 3-33    IPMI device overview*

Click the **Time Setting** tab in the device detailed information page to enter the time setting page. After selecting the time to be set, click the **Save** button to complete the modification of the BMC time of the device. As shown in Figure 3-34.



*Figure 3-34    BMC Time Setting*

&#x1F4D6;      **Note**

The BMC needs to be set to the 0 time zone, otherwise the time setting will be disordered due to the time zone problem.

Click the **On/Off Control** tab in the device detailed information page to enter the On/Off Control page. After selecting the control option (Power On, Power Off, or Soft Shutdown), click the Perform Action button to complete the power on/off control of the device. As shown in Figure 3-35.



*Figure 3-35    On/off control*

Click the **Event Log** tab in the device detailed information page to enter the event log page. The latest 100 log data is displayed on the page. You can download all event logs by clicking the **Download Log** button. Click the **Clear Log** button to clear all event logs for this device. As shown in Figure 3-36.

| Overview | Time Setting | Power Control | Event Log | FRU Information | Sensor Information |

Log Capacity: 0%

CLEAR LOG    EXPORT LOG

| Index | Sensor Name | Sensor Type | Description | Time |
|---|---|---|---|---|
| 7 | Power Status | System ACPI Power State | Legacy ON State - Asserted | 2019-01-01 08:01:02 |
| 6 | OS Status | OS Stop / Shutdown | OS Graceful Shutdown - Asserted | 2019-01-01 08:00:45 |
| 5 | Power Status | System ACPI Power State | Legacy ON State - Asserted | 2019-01-01 08:00:20 |
| 4 | OS Status | OS Stop / Shutdown | OS Graceful Shutdown - Asserted | 2019-01-01 08:00:18 |
| 3 | EventLog | Event Logging disabled | Event Logging disabled | 2019-01-01 08:00:12 |
| 2 | OS Status | OS Stop / Shutdown | Legacy ON State - Asserted | 2019-01-01 08:00:08 |
| 1 | Power Status | System ACPI Power State | Legacy ON State - Asserted | 2019-01-01 08:00:02 |

Showing 1 to 7 of 7 entries

*Figure 3-36    Event Log*

Click the **FRU Information** tab on the device detailed information page to enter the FRU information page, which displays the FRU System Board's properties and values. As shown in Figure 3-37.

| Overview | Time Setting | Power Control | Event Log | FRU Information | Sensor Information |

| Index | Attribute | Value |
|---|---|---|
| 1 | FRU Device ID | 0 |
| 2 | FRU Device Name | BMC_FRU |
| 3 | Chassis Information Area Format Version | 1 |
| 4 | Chassis Type | Rack Mount Chassis |
| 5 | Board Manufacturer | Inspur |
| 6 | Board Product Name | YZMB-00370-104 |
| 7 | Board Serial Number | MBH804S20491B10 |
| 8 | Board Part Number | NF5170M4 |
| 9 | Product Name | NF5170M4 |
| 10 | Product Version | 01 |

Showing 1 to 10 of 12 entries                    «    <    1    2    >    »

*Figure 3-37    FRU information*

Click the **Sensor Info** tab on the device detailed information to enter the Sensor Information page. By default, all categories are selected. You can click on **Temperature, Voltage, Fan or Other** category to display the information of the corresponding category of the sensor. As shown in Figure 3-38.

The status is divided into normal, alarm, and unknown. The icon ✅ is displayed in the normal state, the icon ❗ is displayed in the alarm state, and the icon ⚪ is displayed in the unknown state.

*Figure 3-38 Sensor information*

2. IPMI device management

Click the **IPMI Device Management** submenu under the **IT Management** menu. You can modify or delete the information of an IPMI device, as shown in Figure 3-39.



*Figure 3-39    IPMI device management*

Click the **Add** button to open the page for adding devices. After entering the device information, click the **Save** button, as shown in Figure 3-40.



*Figure 3-40    Add IPMI device*

After modifying the device information, you need to click the **Save Configuration** button to make the configuration take effect. After clicking **Save Configuration**, the User Security Verification dialog box pops up, prompting you to enter the current user's login password. After entering the correct password, click the **OK** button to complete the save operation.

📖      **Note**

1. The IPMI device specifically refers to an IT device accessed through the IPMI 2.0 protocol, and its accessibility and communication stability are related to the support capabilities of the IT device itself.

2. The device IP address is not allowed to be duplicated. When modifying device information, you cannot modify the IP address.

3. If you have not modified any device information, you cannot click the **Save Configuration** button.

4. After modifying the device information, if you leave the page without clicking the **Save Configuration** button, a prompt box as shown in Figure 3-41 will pop up asking if you want to confirm leaving the page. Clicking the **Cancel** button will leave the current page, and clicking the **OK** button will leave the page and ignore the modification information.

3. IPMI device alarm
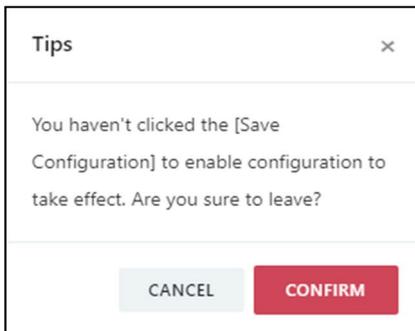


*Figure 3-41 Prompt box for not saving configuration*

Click the **IPMI Device Alarm** submenu under the **IT Management** menu. The IPMI device alarm page contains three tabs: active alarm, historical alarm, and alarm notification log, as shown in Figure 3-42.

Click the **Alarm Confirmation** button to confirm the alarm. After the alarm is confirmed, the alarm notification will not be sent. When the mouse cursor is hovering over the **Confirmed** text, the alarm confirmation message will be displayed in a floating manner, and the mouse cursor will disappear automatically after being removed.



*Figure 3-42    IPMI active alarm*

Click the **Historical Alarms** tab to display the page shown in Figure 3-43. Select the device name, start time, and end time. Click the **Query** button to query the historical alarm of the selected device.

*Figure 3-43    IPMI historical alarm*

Click the **Alarm Notification Log** tab to display the page shown in Figure 3-44. Select the start time and end time, and click the **Query** button to query the historical alarm of the IPMI device. Click the **Download Query Result** button to download the corresponding alarm notification log list.



*Figure 3-44    IPMI Alarm Notification Log*

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📖　　**Note**

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The alarm notification log page and the historical alarm page display up to 500 query results. If there are more than 500 PCS, you need to download through "**Download query results**" to download all query results.

---

**Console device management**

Click the **Console Device List** submenu under the IT Management menu to open the page shown in Figure 3-45. When a user accesses the device through RDU501, the device is defined as idle and the card is displayed in green. When the device is being accessed by the user through RDU501, the device is defined as being in use and the card is displayed in red.



*Figure 3-45 Console Device List*

1. Console device details

You can open the terminal viewer by clicking the card in the console device list. If the device status is in use, you cannot open the terminal viewer for access. Open the terminal viewer window as shown in Figure 3-46, which simulates the terminal display. You can directly input commands to operate the serial port target device in the window.

*Figure 3-46    Console window*

📖    **Note**

1. A serial port device can only be accessed by one user at a time, so multiple web users can only access their own serial port devices at the same time.

2. After opening the serial port device, if you leave the **Console device list** page, a prompt box as shown in Figure 3-47 will pop up asking if you want to close the open terminal viewer. Clicking the **No** button will not close the opened window, clicking the **Yes** button will close the opened window.
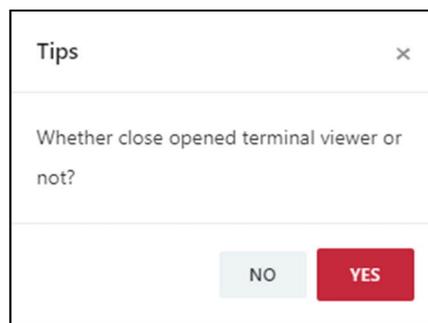


*Figure 3-47 Leave the page of console device list*

2. Console device management

Click the **Console Device Management** submenu under the **IT Management** menu. Select a console device to modify, add, or delete the device's keywords. You can also modify or delete the device information, as shown in Figure 3-48.



| Index | Device Name | Port Name | Baud Rate | Word Size | Parity | Stop Bits | Flow Control | | | |
|-------|-------------|-----------|-----------|-----------|--------|-----------|--------------|---|---|---|
| 1 | com3 | COM3 | 115200 | 8 | NONE | 1 | NONE | ▽ | ✎ | 🗑 |
| 2 | com4 | COM4 | 9600 | 8 | NONE | 1 | NONE | ▽ | ✎ | 🗑 |

Showing 1 to 2 of 2 entries

*Figure 3-48    Console Device Management*

Click the **default keyword management** button to open the default keyword management page, click the **Add** button, enter the keyword you want to add, click the **OK** button, as shown in Figure 3-49. When you add a keyword to a specific device, you can directly select the keywords that have been added in the default keyword. The RDU501 can filter the input/output information of the serial port target device through user-defined keywords and generate an event when the keyword matches.

*Figure 3-49    Add default keywords*

Click the **Add** button to open the page for adding devices. After entering the device information, click the **Save** button, as shown in Figure 3-50.



*Figure 3-50    Add a console device*

After modifying the device information, you need to click the **Save Configuration** button to make the configuration take effect. After clicking Save Configuration, the User Security Verification dialog box pops up, prompting you to enter the current user's login password. After entering the correct password, click the **OK** button to complete the save operation.

📖    **Note**

1. Users can define keywords for each serial port target device, up to a maximum of 20.

2. If you have not modified any device information, you cannot click the **Save Configuration** button.

3. After modifying the device information, if you leave the page without clicking the **Save Configuration** button, a prompt box as shown in Figure 3-41 will pop up asking if you want to confirm leaving the page. Clicking the **Cancel** button will stay in the current page, and clicking the **OK** button will leave the page and ignore the modification information.

3. Console log data

Click the **Console Log Data** submenu under the **IT Management** menu. The console log data page contains two tabs, the log query and the event notification log, as shown in Figure 3-51.

Select the query type, device name, start time, and deadline. Click the **Query** button to query the event log that meets the filter criteria. Click the Download Query Results button to download the corresponding event log list. The historical log can only be viewed after downloading, and cannot be directly queried.
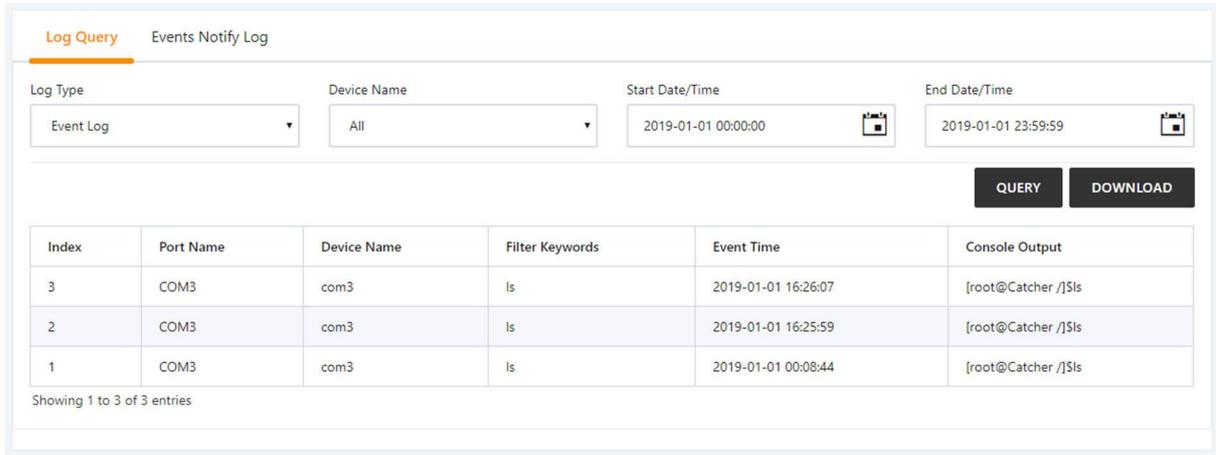


*Figure 3-51    Console log query*

Click the **Event Notification Log** tab to display the page shown in Figure 3-52. Select the start time and the end time, click the **Query** button to query the event notification log within the selected time period. Click the **Download Query Results** button to download a log that matches the filter criteria.
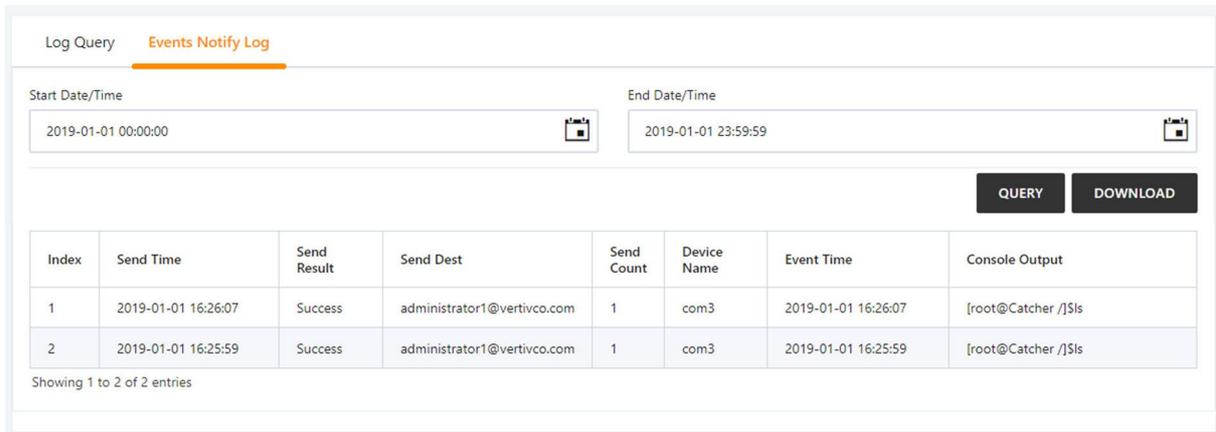


*Figure 3-52    Console event notification log*

📖     **Note**

The log query page and event notification log page display up to 500 query results. If there are more than 500 PCS, you need to download through "**Download query results**" to download all query results.

 **Server shutdown management**

This function controls the IT server switch with the power and environment monitoring device signal or time schedule as input.

📖     **Note**

In the RDU501 standard product, this module only provides relatively basic functions. If you have more functional requirements, please contact us.

Click the **Server Shutdown Management** submenu under the **IT Management** menu to open the **Server Shutdown Management** page and display the strategy list, as shown in Figure 3-53.

*Figure 3-53 Server shutdown management*

- Enable strategy

The icon 🔘 in the strategy list indicates that the current strategy is disabled. Clicking on the icon will bring up the prompt "Are you sure to enable the strategy?", click the OK button to enable the strategy.

- Disable strategy

The icon 🔘 in the strategy list indicates that the current strategy is enabled. Clicking on the icon will bring up the prompt "Are you sure to disable the strategy?", click the OK button to disable the strategy.

- Delete strategy

Select the strategy you want to delete in the strategy list, click the **Delete** icon, the confirmation delete dialog box will pop up, click the **OK** button to delete the selected strategy.

- Add/modify strategy

1. Conditional strategy

When you click the **Add Condition** button or modify a conditional strategy, you can open the detailed information page for the conditional strategy. The page includes basic information about the conditional strategy (name, description, priority, etc.) and a list of input conditions, as shown in Figure 3-54.



*Figure 3-54 Detailed information of the conditional strategy*

Click the **Add** button in the input condition list to open a page that adds input criteria. Fill in the device, signal type (acquisition or alarm signal) signal name and other information, click the **Save** button, as shown in Figure 3-55.

*Figure 3-55    Add input conditions*

After filling in the basic information and input conditions of the conditional strategy, click the **Save** button in the lower right corner of the page. After saving successfully, it will automatically return to the strategy list page.

📖     **Note**

1. When the signal type of the input condition selects the acquisition signal, both the operator and value need to be selected. When the alarm signal is selected, only the value needs to be selected, and the value includes the alarm generation and the alarm disappearing values.

2. Supports up to 16 input conditions.

2. Plan strategy

When you click the **Add Plan** button or modify a plan strategy, you can open the detailed information page for the plan strategy. The page includes information such as the name, description, and priority of the plan strategy, as shown in Figure 3-56.



*Figure 3-56    Plan strategy detailed information*

The modes of the planning strategies fall into three categories: once, daily, and weekly. When the mode is "once", you need to select the year, month, day, and hour, minute, and second. When the mode is "daily", you only need to select the hour, minute, and second. When the mode is "weekly", you need to select Week (Monday to Sunday) and time (hour, minute, second).

After entering the planning strategy information, click the **Save** button in the lower right corner of the page. After saving successfully, it will automatically return to the strategy list page.

3.4.4   Thermal management

Teamwork control of air conditioner

The air-conditioning teamwork control function monitors and dispatches each air conditioner participating in the teamwork control according to certain rules to achieve the purpose of reducing air conditioning energy consumption, extending the overall life of the air conditioner, and avoiding competition between air conditioners in one team.

In the RDU501 homepage, click on the air-conditioning teamwork control menu on the left side, you can see two sub-menus, including: running status and teamwork control settings.

1. Running status

Click the **Running status** tab under the **Air conditioner teamwork control** menu to pop up the page shown in Figure 3-57.
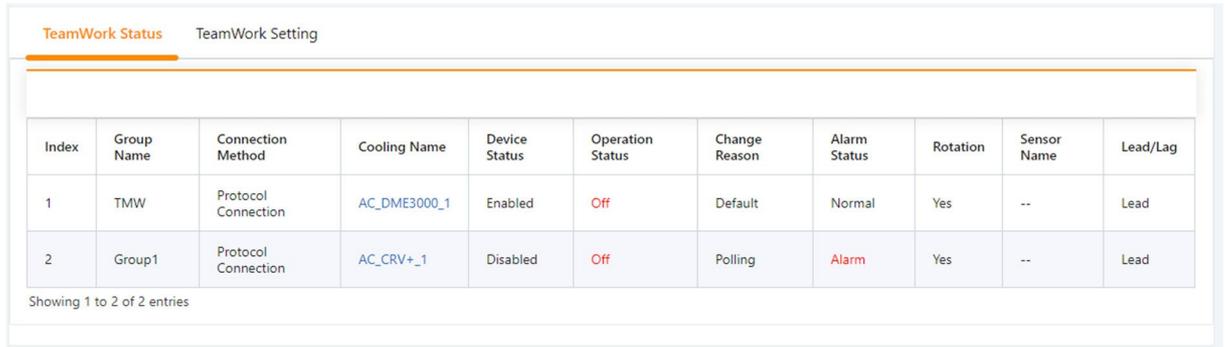
| Index | Group Name | Connection Method | Cooling Name | Device Status | Operation Status | Change Reason | Alarm Status | Rotation | Sensor Name | Lead/Lag |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TMW | Protocol Connection | AC_DME3000_1 | Enabled | Off | Default | Normal | Yes | -- | Lead |
| 2 | Group1 | Protocol Connection | AC_CRV+_1 | Disabled | Off | Polling | Alarm | Yes | -- | Lead |

Showing 1 to 2 of 2 entries

*Figure 3-57    Running status page*

The Running status page shows the main operating parameters of the air conditioner in all air conditioner groups.

2. Teamwork control settings

📖 **Note**

The air conditioner teamwork control function of the RDU501 is divided into two versions: standard version and authorized version. The standard version has the air conditioner teamwork control function configured by the RDU501 standard software; the authorized version is the software version after the user separately purchases and installs the authorization code.

1) Teamwork control parameter setting

Click the **Teamwork Control Settings** tab under the air conditioner teamwork control menu to pop up the teamwork control parameter setting page. The standard version is shown in Figure 3-58, and the authorized version is shown in Figure 3-59.

AC Teamwork Settings[Standard Version]

| Index | Group Name | Work Mode | Polling | Main/Spare | Stack | Competition | Related Sensor | Minimum Number of Operating AC | AC minimum operating runtime | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TMW | NO Teamwork | ✓ | ✓ | ✓ | ✓ | ✓ | 1 | 30Minutes | |

*Figure 3-58 Teamwork control parameter setting page (standard version)*

AC Teamwork Settings[Authorized Version, 4 units of AC can be connected]

| Index | Group Name | Work Mode | Polling | Main/Spare | Stack | Competition | Related Sensor | Minimum Number of Operating AC | AC minimum operating runtime | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TMW | NO Teamwork | ✓ | ✓ | ✓ | ✓ | ✓ | 1 | 30Minutes | |
| 2 | Group1 | Teamwork | ✓ | ✓ | ✓ | ✓ | ✓ | 1 | 5Minutes | |

*Figure 3-59 Teamwork control parameter setting page (authorized version)*

The description of the RDU501 teamwork control function is as follows:

The standard version only supports 1 air conditioning group. The default is **[1] TMW**. The addition and deletion teamwork functions are not provided and the group name cannot be changed. The authorized version is not subject to this restriction.

In the authorized version, click the **Add** button to add a new air conditioning group. After completing the group parameter configuration, click the **Save** button to save the settings. At this time, the added group will appear in the air conditioning group list on the parent page. The standard revision editing interface is shown in Figure 3-60. The editing interface is shown in Figure 3-61.



*Figure 3-60 Teamwork control parameter setting page (modified standard version)*

*Figure 3-61 Teamwork control parameter setting page (added)*

The parameter description of the group parameter setting page is shown in the table below.

Add, modify or delete the air conditioner in the group on the air conditioner parameter setting page, please refer to *2) air conditioner parameter setting* in this section;

In the authorized version, selecting the **Air Conditioner Group** that needs to be modified in the air conditioner group list is similar to the step of adding a group, modify the teamwork parameters on the teamwork parameter setting page, set the air conditioner parameters in the group on the air conditioner parameter setting page, and complete the modification. After that, click the **Save** button to save the settings;

In the authorized version, select the **Air Conditioner Group** that needs to be deleted in the air conditioner group list, click the **Delete** button to save the settings.

*Table 3-3 Teamwork control parameter settings*

| Teamwork parameters | Default value | Low limit | High limit | Remark | Standard version | Authorized version |
|---|---|---|---|---|---|---|
| Teamwork mode | Single unit | Single unit(0) | Teamwork control mode(1) | Single unit(0) : The air conditioners in the group operate separately;<br>Teamwork control mode(1) : The air conditioners in the group participate in teamwork logic operations | √ | √ |
| Minimum number of running air conditioners | 1 | 1 | Number of teamwork air conditioners | / | | √ |
| Shortest running time of air conditioner | 30 | 5 | 180 | Unit: Min | | √ |
| Return air temperature set point | 20 | 15 | 40 | Unit: ˚C | √ | √ |
| Return air temperature deviation setting | 5 | 1 | 5 | Unit: ˚C | √ | √ |

| Teamwork parameters | Default value | Low limit | High limit | Remark | Standard version | Authorized version |
|---|---|---|---|---|---|---|
| Number of rotations | 1 | 1 | Number of teamwork air conditioners | Smaller value between the number of running units and the number of standby units | | √ |
| Rotating cycle mode | By day | By day, by week | | / | √ | √ |
| Cycle interval | 1 | 1 | 99 | By day | √ | √ |
| Rotating time span | 1 | 1 | 7 | by week Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday | √ | √ |
| Rotating time | 00:00 | 00:00 | 23:00 | / | √ | √ |
| One time manual rotation | No | No | Yes | Used for commissioning | √ | √ |
| Reset air conditioner status | No | No | Yes | Initialize air conditioner status | √ | √ |
| Air conditioner on temperature | 25 | 15 | 40 | | √ | √ |
| Air conditioner off temperature | 17 | 15 | 40 | | √ | √ |

Note: "√" means the version selected can be configured; button for "One time manual rotation" is ⟳, button for "Reset air conditioner status" is ❋, see Figure 3-58 and Figure 3-59 for the teamwork control setting page.

📖    **Note**

1. If you need an authorized version of RDU501, please contact Vertiv Customer Service Center for purchase.

2. The standard version only supports 4 air conditioners by default, including Vertiv DME series air conditioner and SmartRow V2 built-in air conditioner.

3. The RDU501 supports up to 8 groups.

2) Air conditioner parameter setting

In the air conditioner parameter setting page, the user can add, modify and delete the air conditioner in the group. Click the **Add/Modify In Row** button in the air conditioner list to pop up the **Edit Air Conditioner Parameters** page. The protocol connection interface is shown in Figure 3-62. The DI connection interface is shown in Figure 3-63.
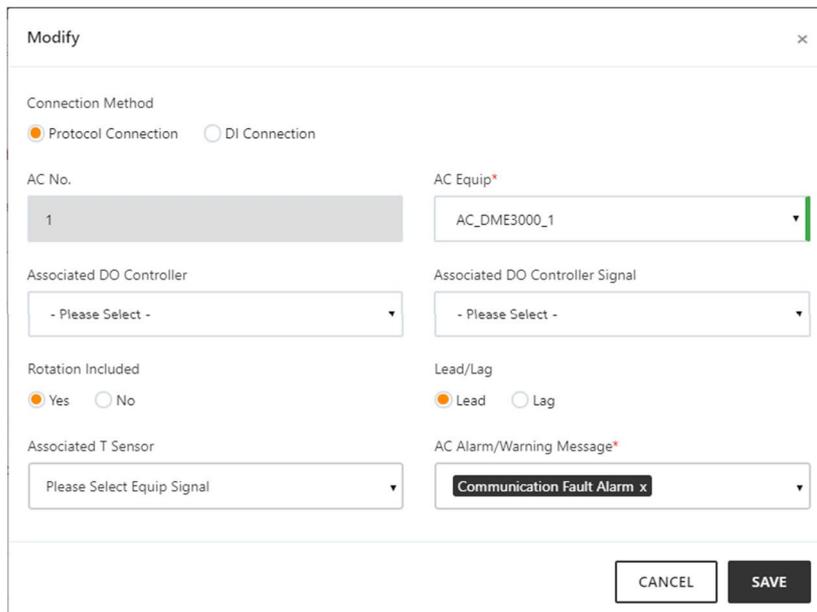


*Figure 3-62 Add / modify air conditioner page (protocol connection)*

*Figure 3-63 Add / modify air conditioner page (DI connection)*

● Procedures for adding air conditioner:

1) In the **Air conditioner index** bar, enter the index of the air conditioner in the group (the default index will be increased from 1);

2) Select the air conditioner that needs teamwork control from the air conditioner drop-down box, and fill it only in the protocol connection;

3) Check whether to participate in the rotation schedule;

4) Select the device with DO from the **Associated DO controller** (optional);

5) Select the signal corresponding to the DO device from the **Associated DO controller signal** drop-down box (optional);

6) Select the active and standby properties to specify the current active and standby properties of the air conditioner. This attribute will change. For example, if the A air conditioner is currently set as the host, when the rotating time is reached, the attribute of the air conditioner A will become the standby unit.

7) Set the **Associated temperature sensor**, each air conditioner can be connected with up to 5 temperature sensors. When the highest temperature in the associated sensor is higher than the air conditioner startup temperature, if the current running state of the air conditioner is off, the air conditioner will be started. When the maximum temperature is lower than the air conditioner shutdown temperature, if the current running state of the air conditioner is running, the air conditioner will be turned off.

8) Set the air conditioner fault alarm signal which are generated if the air conditioner is faulty or unavailable. A maximum of 15 fault alarm signals are allowed for each air conditioner.

9) In the **Air Conditioner Name** field, enter the name of the air conditioner in the teamwork control and fill it only in the DI connection;

10) Select the switch device to be associated in the drop-down box of the **Associated Switch Device**, and select only in the DI access;

11) Select the signal of the associated switch device in the **Associated Switch Device Signal** drop-down box, and select only in the DI access;

12) Select the fault status device to be associated in the **Associated Fault Status Device** drop-down box and select only in the DI access;

13) Select the signal of the associated fault state device in the **Associated Fault Status Device Signal** drop-down box and select only in the DI access;

14) Click the **Save** button to add air conditioner to complete the air conditioner operation. The basic information of the air conditioner will also be displayed in the parent page list.

📖   **Note**

1. The set air conditioner index cannot be greater than the number of air conditioners in the group.

2. The standard version will only display DME air conditioners, SmartRow V2 built-in air conditioners, and other models of air conditioners cannot be displayed.

● The procedures to modify the air conditioner are as follows:

1) Select the air conditioner to be modified in the air conditioner list, and modify the air conditioner index, temperature sensor correlation and air conditioner fault alarm signal.

2) After the modification is completed, click the **Save** button to complete the modification of the air conditioning operation. The basic information of the air conditioner will also be displayed in the parent page list.

The procedures to delete the air conditioner are as follows:

Select the air conditioner to be deleted in the air conditioner list, click the Delete button on the right to delete the air conditioner, and the basic information of the air conditioner will be deleted from the page list.

📖   **Note**

After modifying the air conditioner parameters, you need to click the save button at the bottom of the group parameter settings to make it effective, otherwise the data will be lost after switching pages.

## 3.4.5  Power Management

The **Power Management** function displays real-time and historical energy consumption data in accordance with user-defined rules to help users analyze the overall energy consumption of the equipment room.

In the RDU501 home page, click on the **Power Management** menu on the left to see three submenus, including: real-time energy consumption, history, and energy consumption settings.

 **Real-time energy consumption**

Click the **Real-time energy consumption** sub-menu under the **Power Management** menu to display the real-time PUE and real-time system load rate according to the user-defined energy consumption settings (see the energy consumption settings in this section), as shown in Figure 3-64.
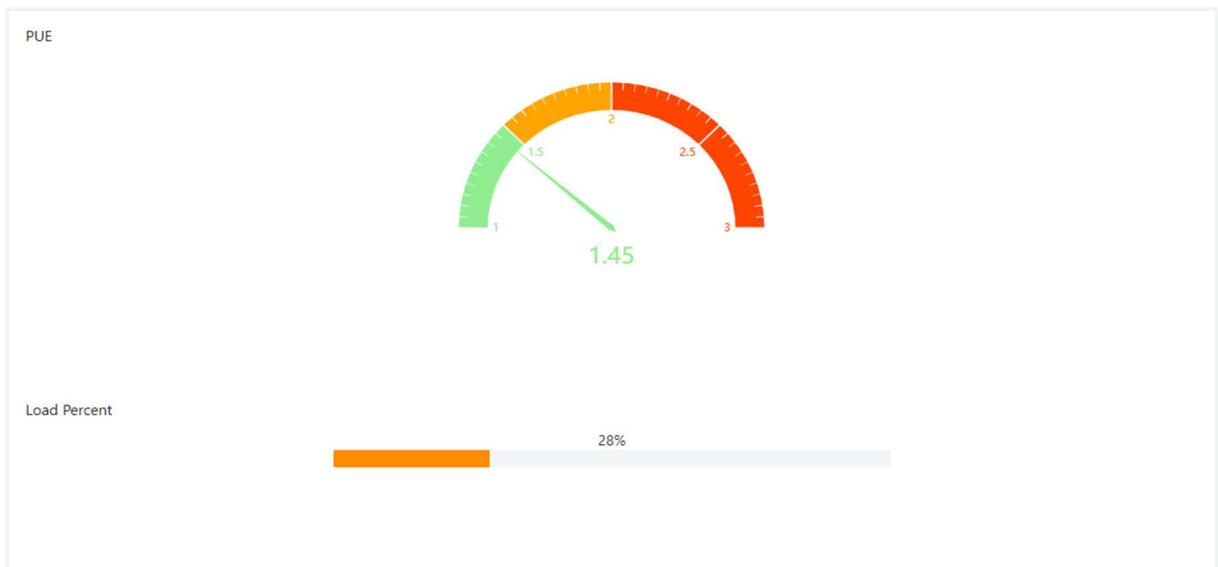


*Figure 3-64 Real-time energy consumption*

● History record

Click the **History** submenu under the **Power Management** menu to display the historical data recorded in the system, as shown in Figure 3-65.

| Index | PUE | Load Percent | Time | Acquisition Mode |
|---|---|---|---|---|
| 1 | 1.45 | 18% | 2019-01-01 00:07:37 | Power Mode |
| 2 | 1.43 | 28% | 2019-01-01 00:02:40 | Power Mode |
| 3 | 1.43 | 20% | 2019-01-02 13:17:28 | Power Mode |
| 4 | 1.47 | 24% | 2019-01-02 09:30:13 | Power Consumption Mode |

Showing 1 to 4 of 4 entries

*Figure 3-65 Power management history record*

📖    **Note**

1. The RDU501 records and displays up to 1000 energy consumption history records.

2. After the user has set the energy consumption, the system will save the record every 24 hours according to the user's configuration.

3. When the user does not perform any energy consumption statistics setting, the system does not save the energy consumption record.

4. When the user has set the energy consumption statistics without setting the system load percentage, the system will still save the energy consumption record, but the load rate will always be 0.

### Energy consumption setting

Click the **Energy Consumption** submenu under the **Power Management** menu to display the page shown in Figure 3-66.

PUE Caculate Mode  ● Power Mode   ○ Power Consumption Mode

☑ IT Load

+ ADD

| Index | Operator | Device Name | Signal Name | |
|---|---|---|---|---|
| 1 | + | AMM_YD2022_1 | A phase active power | 🗑 |
| 2 | + | AMM_YD2022_1 | B phase active power | 🗑 |

☐ Infrastructure Load

☑ All Devices

+ ADD

| Index | Operator | Device Name | Signal Name | |
|---|---|---|---|---|
| 1 | + | AMM_YD2022_1 | The total power | 🗑 |

SAVE

System Load Percent Setting

Rated Power（kw）

100

Actual Power

+ ADD

| Index | Device Name | Signal Name | |
|---|---|---|---|
| 1 | AMM_YD2022_1 | The total power | 🗑 |

SAVE

*Figure 3-66    Energy consumption setting*

1. Energy consumption statistics setting

1) The user needs to select two energy consumption types to complete the energy consumption statistics. For the convenience of description, define A=IT equipment energy consumption, B=power environment equipment energy consumption, C=all equipment energy consumption, the rules are as follows:

If statistics A and B are configured, then PUE=(A+B)/A;

If statistics A and C are configured, then PUE=C/A;

If statistics B and C are configured, then PUE=C/(C-B);

Wherein, each energy type can be configured with up to 16 signals, and each signal can be selected with an addition and subtraction operator. The values of A, B, and C are the arithmetic sums of the signal values they configure, respectively.

2) Power mode or electric energy mode.

Power mode

In the power mode, useing real-time PUE, the system will calculate the instantaneous value of the device power in real time and calculate the PUE value. E.g:

The statistical IT equipment power is 8kW, and the total power of all equipment is 10kW. Then the PUE is: 10 / 8 = 1.25

Electric energy mode

In the electric energy mode, the system will count the energy value used by the device during the time interval at 04:00/12:00/20:00 on the current day, and calculate the PUE value during the time period, for example:

The energy value at 04:00 is: IT equipment power is 28kWh, and the total power of all equipment is 62kWh;

The energy value at 12:00 is: IT equipment power is 36kWh, and the total power of all equipment is 72kWh;

The PUE for the period 04:00 to 12:00 is: (72 - 62) / (36 - 28) = 10 / 8 = 1.25.

⚌ **Note**

1. On the day when the user performs energy consumption statistics configuration, the system calculates the number of times and statistic value from the time of configuration to 00:00:00 on the next day, and uses the average value as the PUE value of the configuration day.

2. If the **Power Mode** is selected, the power signal needs to be selected. If the **Electric Energy Mode** is selected, the electric energy signal needs to be selected for the electric energy consumption of the device.

2. System load percentage setting

The user can configure the real-time power data signal and the rated power calculation system load percentage. The rules are as follows:

System load percentage = real-time power / rated power

Wherein: Real-time power is the sum of all power signals in the list of real-time power data signals on the page.

⚌        **Note**

Up to 16 real-time power signals can be configured in the real-time power setting.

### 3.4.6  Data Management

The Data Management function provides users with various types of historical data and log data query services.

In the RDU501 home page, click the **Data Management** menu on the left to display 7 submenus, including: **active alarm, historical alarm, device data, historical data, Smart report, log data,** and **clear data**.

#### Active alarm

Click the **Active alarm** submenu under the **Data management** menu to pop up the current alarm display list, as shown in Figure 3-67.

*Figure 3-67    Active alarm*

1. The **Active alarm** can display the current alarm of the system by clicking the alarm level on the tab of the **Active alarm** page.

2. Click the **Alarm confirmation** button to confirm the alarm. The confirmed alarm will no longer participate in the alarm linkage, and the alarm notification will be sent only once.

3. When the mouse cursor is on the confirmed link, the alarm confirmation message will be displayed in floating position, and the mouse cursor will disappear automatically after being removed, as shown in Figure 3-68.



*Figure 3-68    Alarm confirmation information*

**Historical alarm**

Click the **Historical alarm** submenu under the **Alarm management** menu. The page shown in Figure 3-69 is displayed. There are two sub-tabs: **Historical alarm query** and **Alarm report.**

| History Alarm Query | Alarm Report | | | | | | | |
|---|---|---|---|---|---|---|---|---|

Device Name: All Devices
Start Time: 2019-01-01 00:00:00
End Time: 2019-01-02 23:59:59

QUERY    DOWNLOAD

| Index | Device Name | Signal Name | Alarm Level | Trigger Value/Ref. Video | Start Time | Confirmed by | Confirmed at | End Time |
|---|---|---|---|---|---|---|---|---|
| 1 | ENV_TH1 | High Temp 11 Alarm | Critical Alarms | 35.00℃ | 2019-01-01 18:38:27 | -- | -- | 2019-01-02 07:53:33 |
| 2 | ENV_TH1 | High Temp 01 Alarm | Critical Alarms | 26.60℃ | 2019-01-01 16:51:14 | -- | -- | 2019-01-01 16:51:52 |
| 3 | ENV_TH1 | High Temp 11 Alarm | Critical Alarms | 26.00℃ | 2019-01-01 16:51:14 | -- | -- | 2019-01-01 16:51:52 |
| 4 | ENV_TH1 | High Temp 21 Alarm | Critical Alarms | 25.70℃ | 2019-01-01 16:51:14 | -- | -- | 2019-01-01 16:51:52 |
| 5 | ENV_TH2 | Temp 02 Comm Fail Alarm | Moderate Alarms | -- | 2019-01-01 00:33:26 | -- | -- | 2019-01-01 00:34:15 |
| 6 | UPS_ITA5_1 | Communication Failure Alarm | Moderate Alarms | -- | 2019-01-01 14:41:10 | -- | -- | 2019-01-01 09:30:11 |
| 7 | UPS_ITA5_1 | UPS On Bypass | Moderate Alarms | -- | 2019-01-01 14:10:52 | -- | -- | 2019-01-01 14:12:13 |
| 8 | UPS_ITA5_1 | UPS Turned Off | Moderate Alarms | -- | 2019-01-01 14:10:52 | -- | -- | 2019-01-01 14:12:13 |
| 9 | UPS_ITA30_1 | Communication Failure Alarm | Moderate Alarms | -- | 2019-01-01 14:10:44 | -- | -- | 2019-01-01 09:36:45 |

Showing 1 to 9 of 9 entries

*Figure 3-69 Historical alarm query*

1. Historical alarm query

Click the **Historical alarm query** submenu to view historical alarm records. Select a device (such as "All Devices") and set the start time (for example "2019-01-01 00:00:00") and the end time (for example "2019-01-02 23:59:59"). Then click the **Query** button to list all the alarm records from the start time to the end time, including: **serial number, device name, signal name, alarm level, trigger value/linkage recording, start time, confirmer, confirmation time** and **end time** as shown in Figure 3-69.

Click the **Download** button to download the query results.

&#x1F4D6;    **Note**

The page displays up to 500 results, and more than 500 items need to be downloaded through the **Download** button.

2. Alarm statistics report



| History Alarm Query | **Alarm Report** |
|---|---|

Report Type: Statistic by Alarm Level

Start Time: 2019-01-01 00:00:00
End Time: 2019-01-01 23:59:59

Device Type: ENP_RDU-A[DUMMY]
Alarm level: Low Alarms

Device: - Please Select -

SHOW STATISTICS REPORT

*Figure 3-70    Alarm statistics report configuration*

Click the **Alarm statistics report** submenu to view alarm statistics. Select the report type (for example, "Statistic by device alarm level"), set the query period (for example, "2019-01-01 00:00:00" and "2019-01-01 23:59:59"), and then select the device type. (eg "ENP_ENV_TH1[SENSOR]"), select an alarm level (eg "Low Alarms") and finally select one or more devices (eg "ENV_TH1") in the device list. As shown in Figure 3-70. Then click the **Generate Statistics** button. A statistical report will be generated graphically, as shown in Figure 3-71.

When the mouse is hovered over   ⬇  , it will be saved as a picture, click on the icon, and the statistics will generate a .png format file, which will be downloaded and saved.
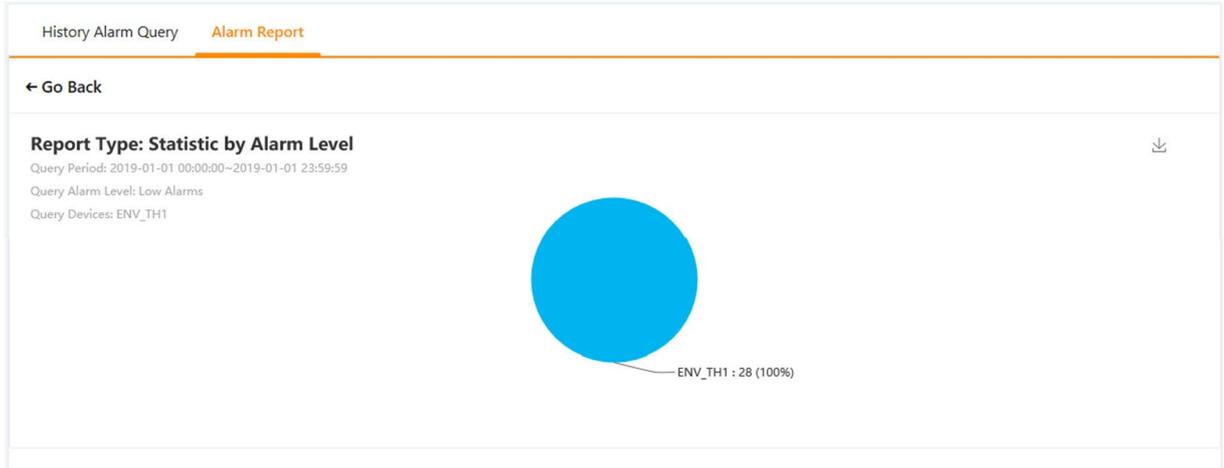


*Figure 3-71 Statistics by device alarm level*

Clicking the **Back** button will return to the alarm statistics report configuration page shown in Figure 3-70 to query other types of alarm statistics.

The alarm statistics report provides the following three statistical dimensions to view alarm information:

Statistics by the alarm level of the device: The number of alarms of a certain alarm level of multiple devices that belong to the same device type in a certain period of time is displayed in a pie chart.

Statistics by the alarm signal: the number of alarms of a certain alarm signal of multiple devices that belong to the same device type in a certain period of time.

Statistics by site: Simultaneously generate a pie chart of the proportion of each alarm level in the selected time period, a histogram of the number of alarms by month, and the number of occurrence times of the five alarms with the most occurrences. As shown in Figure 3-72.
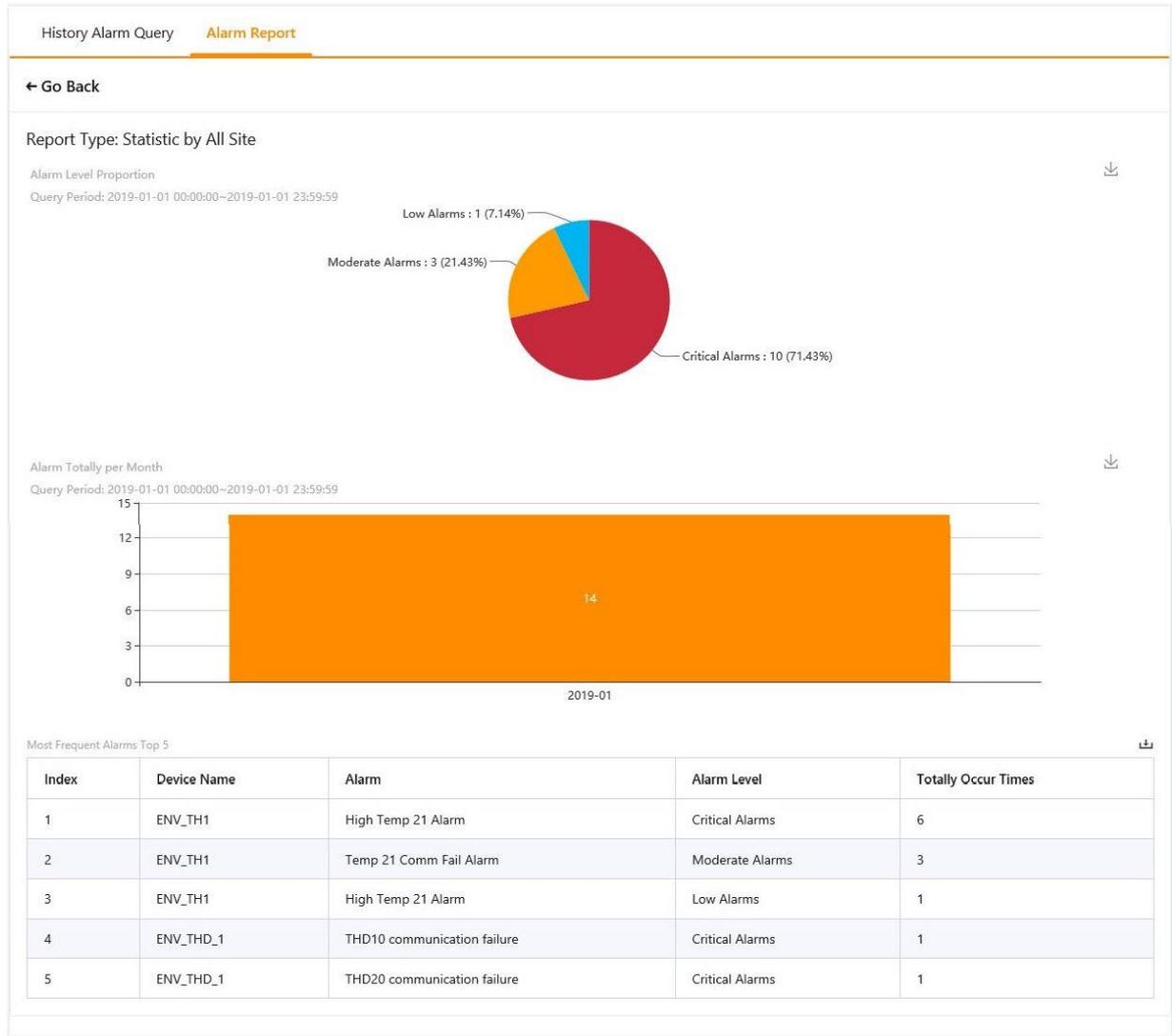
*Figure 3-72    Statistics by site*

**Device data**

Click the **Device Data** submenu under the **Data Management** menu to pop up the page shown in Figure 3-73, which contains four sub-pages: **Device Information List, SNMP MIB Export, Asset Information,** and **Asset Batch Configuration**.

1. Device information list

The main information of all devices is listed on the page shown in Figure 3-73. Click the **Download** button to download the query results.

*Figure 3-73 Device information list*

2. SNMP MIB export

As shown in Figure 3-74, you can choose to export all device MIB information or export MIB information according to the device type. After selecting it, click the **Download Device Information** button to complete the MIB information export.
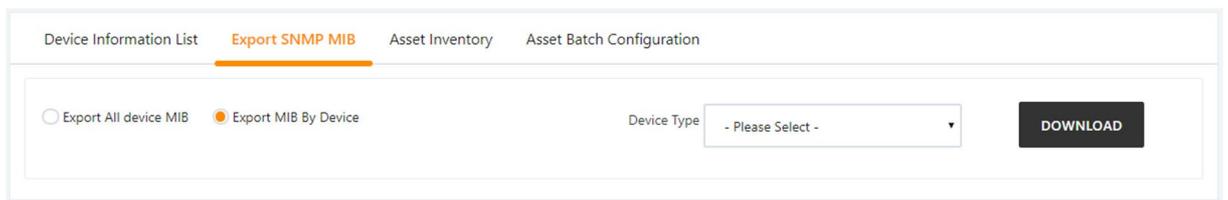


*Figure 3-74    SNMP MIB export*

📖    **Note**

If the SNMP service authorization is not obtained, the SNMP MIB export page will not be displayed. To obtain the SNMP service authorization, please contact the Vertiv Customer Service Center to purchase.

3. Asset information

Click the **Device Data** submenu under the **Data Management** menu, and then click the **Asset Information** tab to bring up the page shown in Figure 3-75.

You can view all asset information under the current RDU501, select the query type, and enter the query conditions to view all eligible asset information.

*Figure 3-75 Asset information*

1) Asset information inquiry

The asset information provides 4 ways to query:

Query by name: Enter a non-null string to return the asset information containing the string in the asset name;



*Figure 3-76    Query by name*

Query by code: Enter a non-null string to return the asset information containing the string in the asset code;



*Figure 3-77    Query by code*

Query by ID range: Enter two integer numbers M and N, where M < N, return the asset information whose asset ID is greater than or equal to M and less than or equal to N;

*Figure 3-78    Query by ID range*

Query by warranty date: Select a date and return the asset information with warranty period within 3 months before and after the date.



*Figure 3-79    Query by warranty date*

The queried asset information is displayed in a tabular form, as shown in Figure 3-80. The deletion and modification of asset information can be performed in Figure 3-80 by clicking the corresponding button on the left. Add asset information by clicking the Add button in the upper right corner.

| Option | ID | Asset Number | Asset Name | Specification | Asset Status | Manufacturer | Contact Information | Asset Price | Purchas Date |
|--------|----|--------------|------------|---------------|--------------|--------------|---------------------|-------------|--------------|
| ✏ 🗑 | 1 | (10.163.236.157)device_157 | (10.163.236.157)device_157 | device_157 | | device_157 | | | 2018-12 31 |
| ✏ 🗑 | 2 | ENV_TH1 | ENV_TH1 | ENV_TH1 | | ENV_TH1 | | | 2018-12 31 |
| ✏ 🗑 | 3 | ENV_TH2 | ENV_TH2 | ENV_TH2 | | ENV_TH2 | | | 2018-12 31 |

*Figure 3-80 Asset information list*

2) Asset information editing

Figure 3-81 shows the interface for adding and modifying asset information.



*Figure 3-81    Asset information editing*

📖      **Note**

1. When the RDU501 is started for the first time, there is no asset data on the asset information page. You need to manually add common assets by adding the device asset or asset information page through the Save Configuration button on the **Configuration Management -> Power and Environment Device Management** -> Device Management page.

2. In order to meet the needs of asset management of the high level management platform, an asset type attribute is added to distinguish between device assets and common assets, so a distinction is made when importing assets. RDU501 does not care about asset types, so it does not distinguish between web page displays.

3. Device assets: Corresponding with the devices on the RDU501 device management, and the asset information is automatically imported through the "Save Configuration" button on the device management page.

4. Ordinary assets: Assets that are not in the scope of monitoring of RDU501, and are manually added through the asset information page.

4. Asset batch configuration

Click the **Device Data** submenu under the **Data Management** menu, and then click the **Asset Batch Configuration** button to bring up the page shown in Figure 3-82.

The RDU501 provides an asset out-of-warranty alert reminder for asset information. Users can click **Enable** to enable the asset out-of-warranty alert feature. Click the **Download** button to export current asset information to your local computer, and the file is stored in the .xls file format. Use the file as a template, after editing the added asset information, click the **Upload** button to import the asset information in the local computer to the RDU501 in batches.
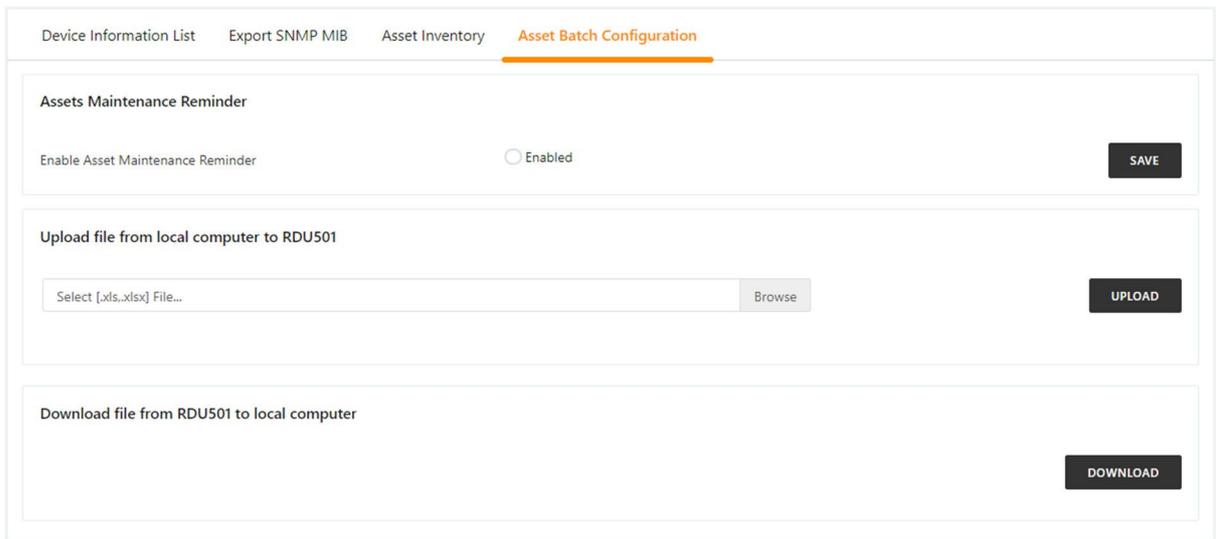


*Figure 3-82 Asset batch configuration*

Asset out-of-warranty alert

| Option | ID | Asset Number | Asset Name | Specification | Asset Status | Manufacturer | Contact Information | Asset Price | Purchased Date | Expired Date | Keeper | Room | Rack |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 🖊 🗑 | 3 | ENV_TH1 | ENV_TH1 | ENV_TH1 | | ENV_TH1 | | | 2018-10-24 | 2019-01-01 | | | |
| 🖊 🗑 | 4 | ENV_TH2 | ENV_TH2 | ENV_TH2 | | ENV_TH2 | | | 2019-01-01 | 2021-07-23 | | | |
| 🖊 🗑 | 5 | ENV_DI | ENV_DI | ENV_DI | | ENV_DI | | | 2018-12-17 | 2019-01-01 | | | |
| 🖊 🗑 | 6 | ENV_4DI | ENV_4DI | ENV_4DI | | ENV_4DI | | | 2018-12-24 | 2021-12-23 | | | |

*Figure 3-83    Asset out-of-warranty alert icon*

When the user enable the asset out-of-warranty alert reminder function, if an asset will be out of warranty within 3 months, it is counted as an out-of-warranty device, and the date of the out-of-warranty is marked with a red background in the asset information list, as shown in Figure 3-83. When the RDU501 WEB page is refreshed or the RDU501 WEB page is logged in, the user is reminded of the out-of-warranty of the device in the form of a pop-up reminder. The user can manually close the pop-up reminder. If it is not manually closed, the pop-up reminder will be automatically closed after 5 minutes.

The system will detect on the 1st day of every month. If the device in the asset information is in the out-of-warranty state, and the admin user of the RDU501 is configured with the phone or email contact, it will send a text message or email reminder. If the user purchases the maintenance and updates the warranty date after receiving the email reminder, the reminder will not be sent.

📖    **Note**

1. If the asset code in the file is different from the existing asset code in RDU501, a new common asset is added.

2. If the asset code in the file is the same as the existing asset code in RDU501, the current information of RDU501 is overwritten with the asset information in the file. If the original asset is a device asset, it is still the device asset; otherwise it is a common asset.

3. When importing asset information, it will check whether each information field is valid. If it contains invalid information, a prompt box will pop up, indicating which cell information is incorrect.

### Historical data

Click the **Historical data** submenu under the **Data management** menu to pop up the page shown in Figure 3-84. There are three sub-tabs for **data report, curve report** and **curve report setting**.
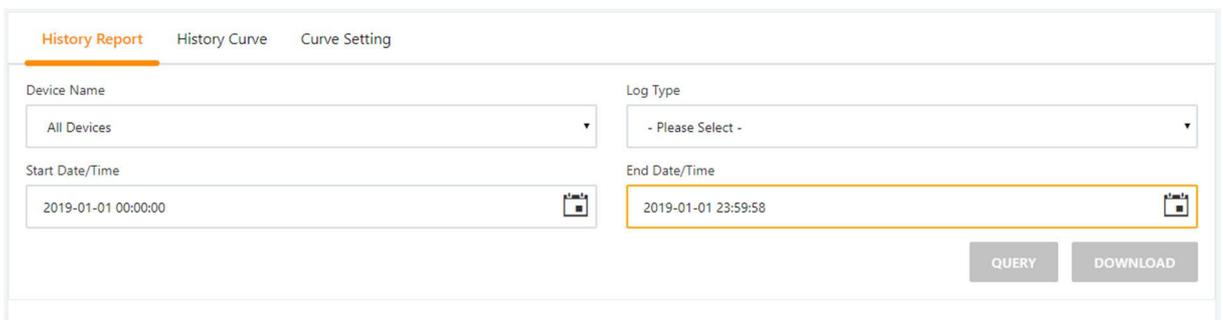


*Figure 3-84 Historical data*

1. Data report

As shown in Figure 3-85, select a device name (for example, "All Devices"), select the query type (for example, "Historical Data") and set the start time and the end time (for example, from 2019-01-01 00: 00:00 to 2019-01-01 23:59:59), then click the **Query** button to list all historical data from the start time to the end time. Click the **Download Query Results** button to download all the query results.
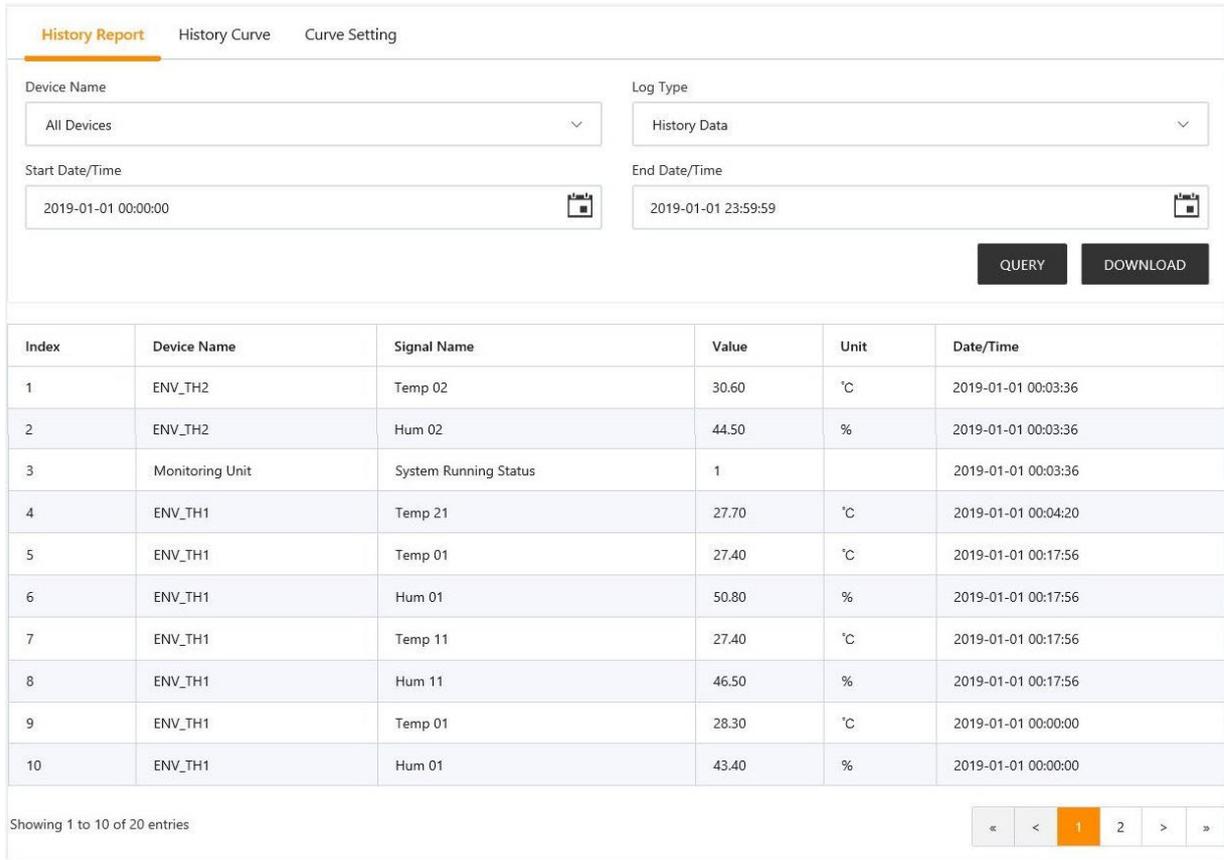
*Figure 3-85    Data report*

📖    **Note**

The page displays up to 500 query results. If there are more than 500 PCS, you need to download using "**Download**" to download all query results.

2. Curve report

As shown in Figure 3-86, select a report name (for example, "TH Temperature Cure") and set the query period (for example, from 2019-01-01 00:00:00 to 2019-01-01 23:59:59) , and then click the **Generate Curve** button. If the historical data is queried, the historical curve will be generated by signal.
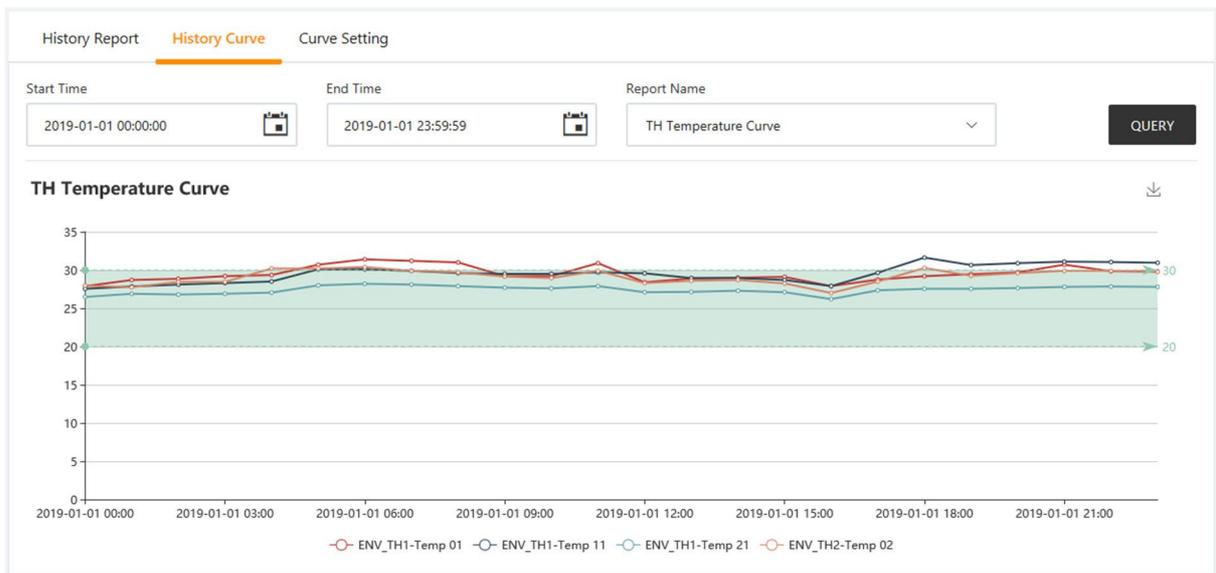


*Figure 3-86    Curve report*

&#x1F4D6;   **Note**

Report Name: For the name of the report added on the Curve Report Settings page, please refer to the next section.

3. Curve report settings

As shown in Figure 3-87, all the curve report configurations that have been added are displayed. Click the delete button on the right to delete the corresponding report configuration.
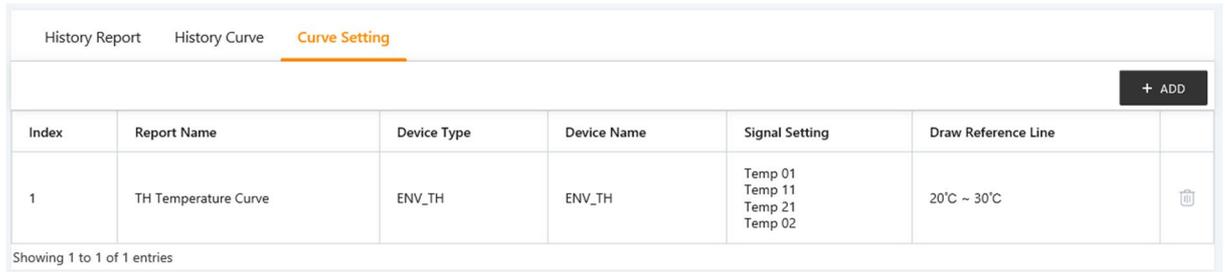
| Index | Report Name | Device Type | Device Name | Signal Setting | Draw Reference Line | |
|---|---|---|---|---|---|---|
| 1 | TH Temperature Curve | ENV_TH | ENV_TH | Temp 01<br>Temp 11<br>Temp 21<br>Temp 02 | 20℃ ~ 30℃ | &#x1F5D1; |

Showing 1 to 1 of 1 entries

*Figure 3-87   Curve report settings*

Enter the report name (for example, "TH23"), select the device type (for example: "ENV_TH"), select the device (for example: "ENV_TH"), select the signal (for example: "Temp 21"), and enter the reference line value (for example: The minimum interval is "20" and the maximum is "30". Click the **SAVE** button to add a curve report, as shown in Figure 3-88. You can add up to 16 reports.

&#x1F4D6;   **Note**

Up to 8 curves can be displayed in the same icon system, ie 1 <= m*n <= 8 (m: number of devices selected, n: number of selected signals). For reporting requirements with more than 8 curves, please export historical data processing manually.
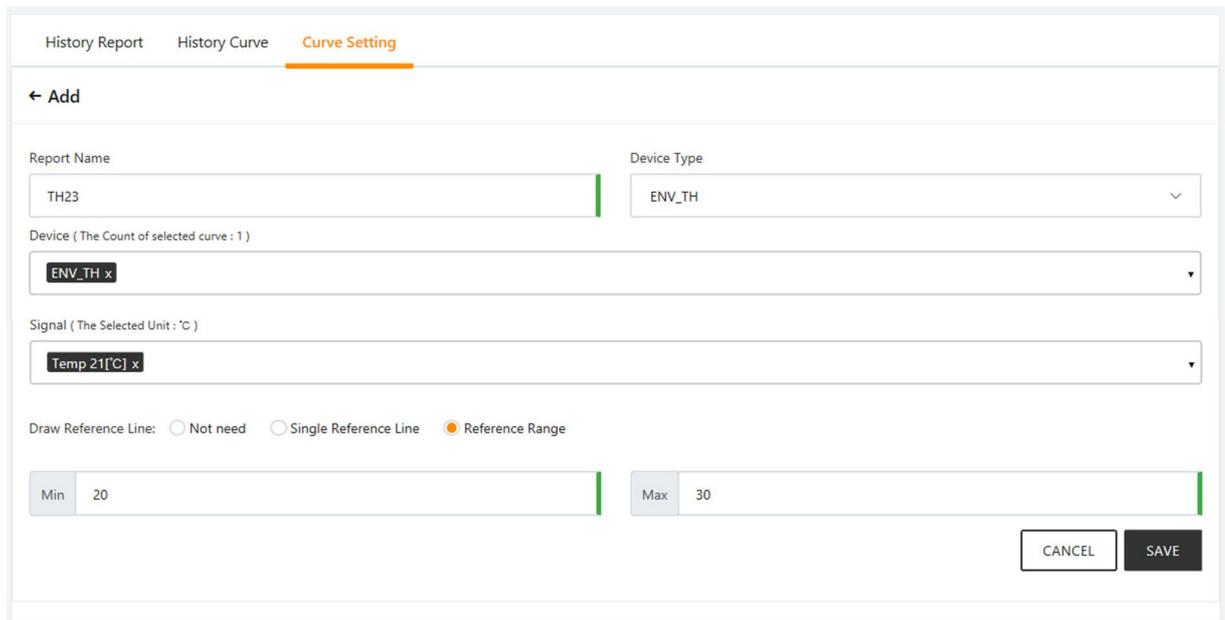
*Figure 3-88 Curve Report Settings - Add Report*

**Smart report**

Click the **Smart Report** submenu under the **Data Management** menu to pop up the page shown in Figure 3-89. There are two tabs for **Smart Report View** and **Smart Report Settings**.
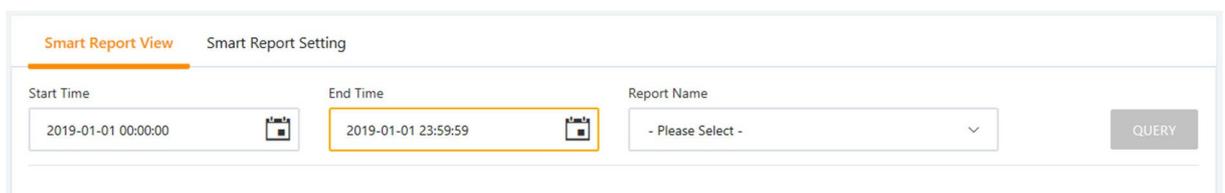
*Figure 3-89    Smart Report View 1*

1. Smart Report View

In the page shown in Figure 3-90, select a report name (for example, "Cold Aisle Temperature Curve Report") and set the query period (for example, from 2019-01-01 00:00:00 to 2019-01-01 23:59:59), and then click the **Query** button. If the historical data is queried, the historical curve will be generated according to the signal, as shown in Figure 3-90.
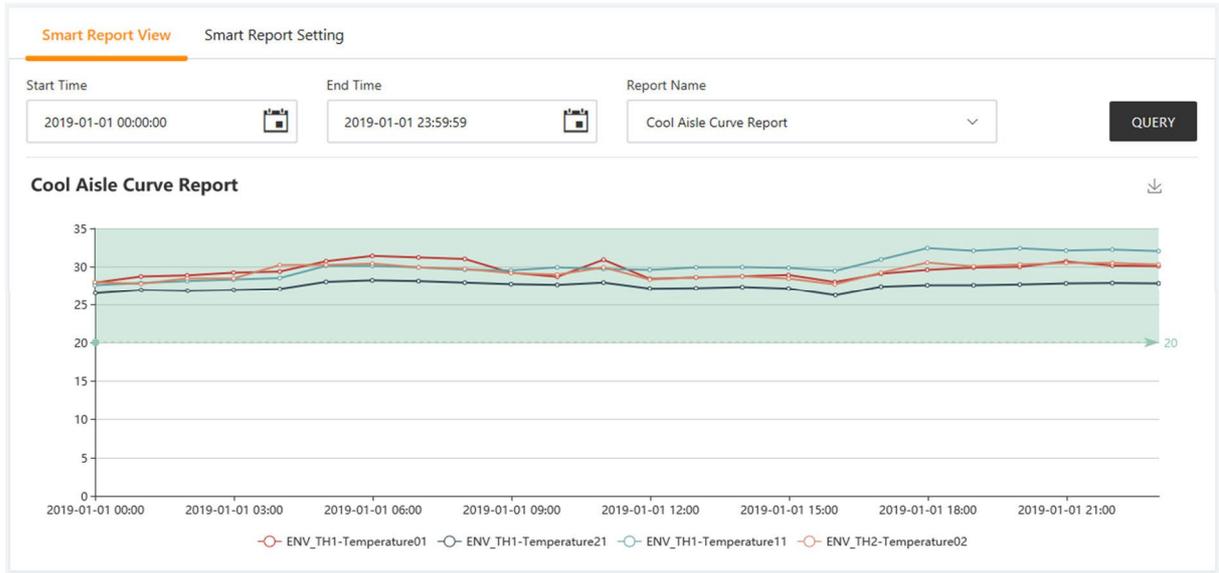


*Figure 3-90    Smart Report View 2*

📖    **Note**

Report Name: One of the three reports provided on the Smart Report Settings page, please refer to section 2.

2. Smart Report Settings

As shown in Figure 3-91, the Smart Report only provides three reports: Cold Aisle Temperature Curve Report, Hot Aisle Temperature Curve Report, and UPS Output Power Curve Report.

Select the report type (for example, "Cold Aisle Temperature Curve Report"), select the device type (for example: "ENV_TH"), select the device (for example: "ENV_TH"), select the signal (for example: "Temperature 21"), enter the reference standard Interval (for example: "26", "32"), click the **Save** button to save the curve report settings.
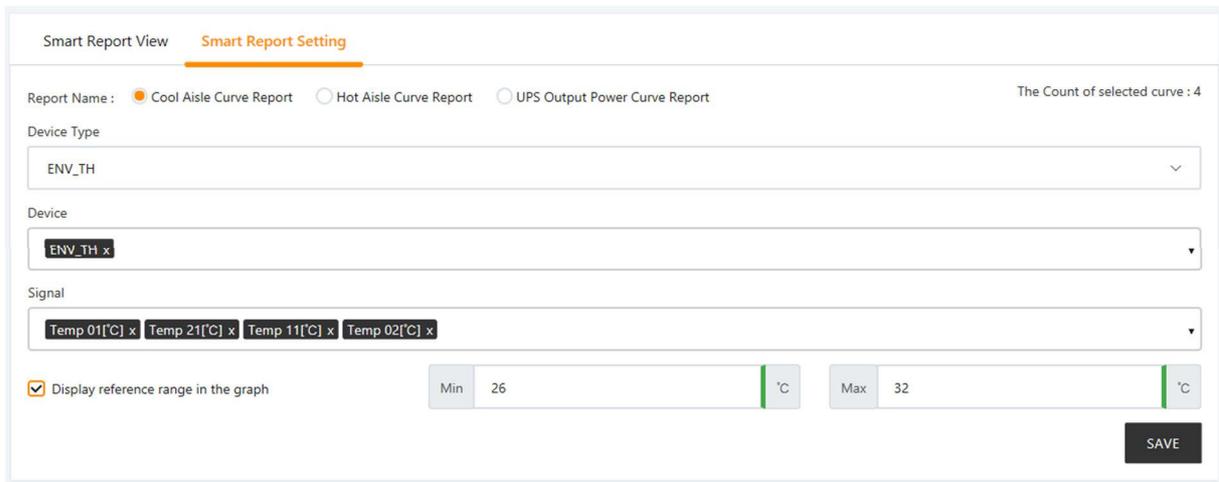


*Figure 3-91    Smart Report Settings*

📖    **Note**

Up to 24 curves can be displayed in the same icon system. That is $1 <= m*n <= 24$ (m: number of devices selected, n: number of selected signals). For reporting requirements with more than 24 curves, please export historical data processing manually.

**Log data**

Click the **Log Data** submenu under the **Data Management** menu to bring up the page shown in Figure 3-92.



*Figure 3-92    Log data*

In the page shown in Figure 3-92, select the query type (for example, "Control Log") and set the start time and the end time (for example, from 2019-01-01 00:00:00 to 2019-01-01 23: 59:59), then click on the **Query** button to list all control logs from the start time to the end time. Click the **Download Query Results** button to download all the query results.

📖　　**Note**

1. When the query type is "System Log" or "Drive Log", the query result will not be displayed on the page after clicking the **Query** button, but will be downloaded directly as a compressed package.

2. The page displays up to 500 query results. If there are more than 500 PCS, click "**Download**" button to download all query results.

3. It is recommended to check the history log periodically to find out the abnormal operation record in time.

**Clear data**

Click the **Clear Data** submenu under the **Data Management** menu to bring up the page shown in Figure 3-93.



*Figure 3-93    Clear data*

In the page shown in Figure 3-93, the user can select "Historical Data" and then click the **Clear** button to clear all historical data. Similarly, the user can clear any other available data in the drop down box.

### 3.4.7　Smart Solution Modeling

In the RDU501 home page, click on the **Smart Solution modeling** menu on the left to see five sub-menus, including: **Thermal Management**, **Power Management**, **Asset Management**, **2D Modeling**, and **Assets on Shelf**.

**Thermal Management**

Click the **Thermal Management** submenu under the **Smart Solution Modeling** menu to open the page shown in Figure 3-94.
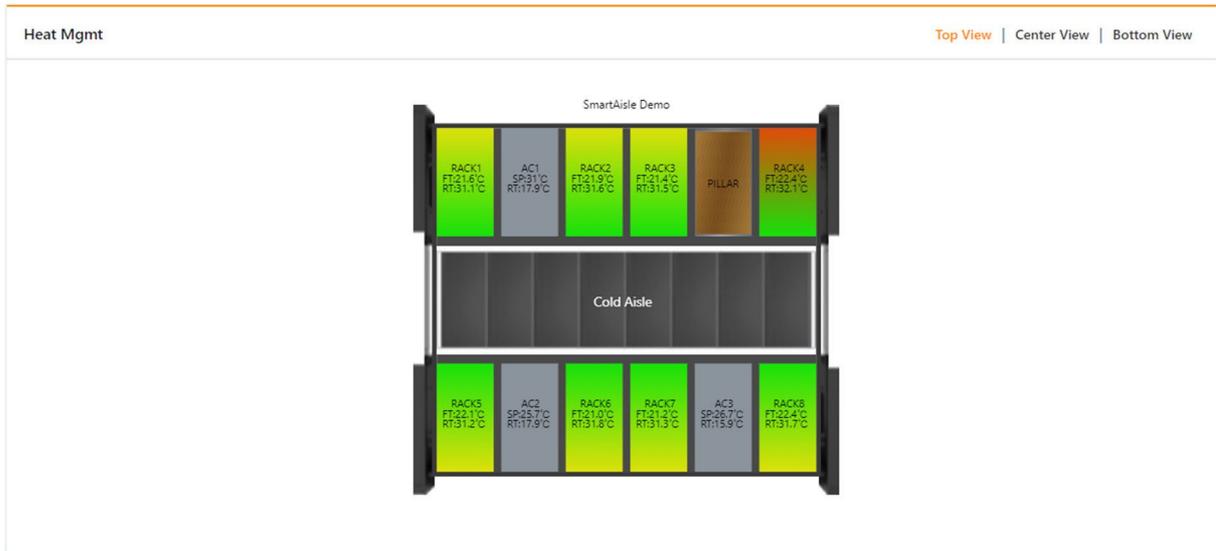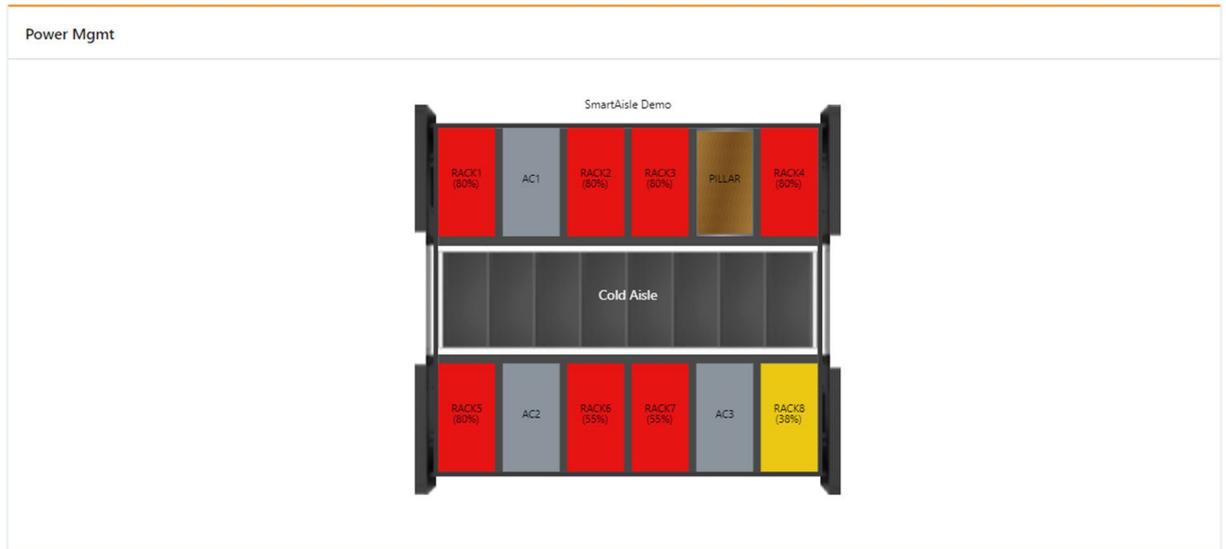


*Figure 3-94    Thermal Management*

The thermal management page displays the temperature field data of each rack in the module in 2D. Wherein FT represents the front door temperature and RT represents the rear door temperature. The color of the rack reflects the temperature distribution of the rack.

The thermal management page displays the **Top View** by default, and the **Top View** shows the front door (top) and rear door (top) configuration sensor temperature data. Click on the **Middle and Bottom Views** in the upper right to view the temperature data of the front door (middle), rear door (middle) and front door (bottom) and rear door (bottom).

Clicking on a single rack will open the temperature field page of the rack, as shown in Figure 3-95.



*Figure 3-95    Thermal management -single rack*

The thermal management page for a single rack displays the **Front Door** view by default, and the **Front Door** view shows the temperature distribution of the sensors respectively on the front door (top), front door (middle), and front door (bottom).

You can switch to the **Rear Door** view and the **IT Device** view by clicking the **Rear Door** and **IT Device** at the top right of the page. The rear door view shows the temperature distribution of the sensors respectively on the rear door (top), rear door (middle), and rear door (bottom). The **IT Device** view shows the temperature distribution of the **IT Device** on the rack.

&#x1F4D6;     **Note**

1. If 2D modeling is not completed, when accessing the thermal management page, prompt "Please configure 2D modeling".
Click on "Please configure 2D modeling" and you will be taken to the 2D modeling page.

2. To view the temperature field of the IT equipment in a single rack, you need to configure the temperature signal of the IT
equipment. Select the temperature signal in the **Smart Solution Modeling** -> **Assets on Shelf** -> **Shelf Device Asset Properties**.

3. When the sensor is not configured, the color in the rack is grayed out. The range and color of the module's temperature field
level can be modified in the module temperature field color of the **Smart Solution Modeling** -> **2D Modeling** -> **Temperature
Field Color setting**.

### Power management

Click the **Power Management** submenu under the **Smart Solution modeling** menu to open the page shown in
Figure 3-96.



*Figure 3-96     Power management*

The power management page displays the power supply capacity of each rack in the module in 2D mode. If the
power distribution signal of the rack is configured, the power supply capacity = the sum of the power consumption of
the rack (power distribution signal) / the rated power of the rack; if the power distribution signal is not configured, the
power supply capacity = the sum of the rated power of the equipment in the rack of the rack / rack rated power.

&#x1F4D6;     **Note**

1. If 2D modeling is not completed, when accessing the power management page, prompt "Please configure 2D modeling". Click
on "Please configure 2D modeling" and you will be taken to the 2D modeling page.

2. The range and color of the power supply capacity level can be modified in the power supply capacity color of the **Smart
Solution Modeling** -> **2D Modeling** -> **Capacity Color setting**.

### Asset Management

Click the **Asset Management** submenu under the **Smart Solution Modeling** menu to open the page shown in
Figure 3-97.
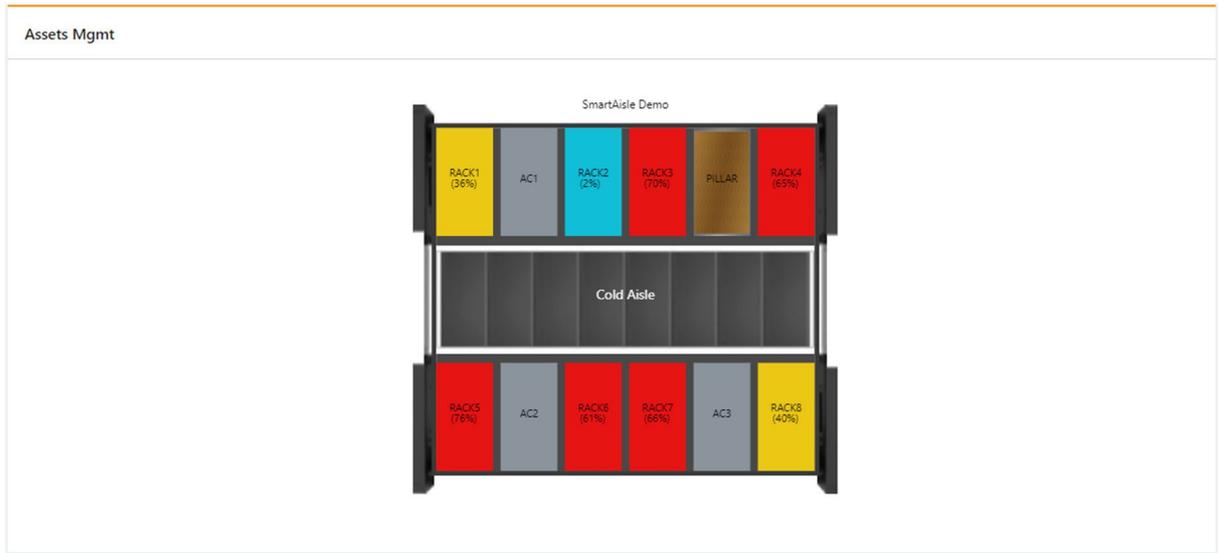
*Figure 3-97    Asset Management*

The asset management page displays the space capacity usage of each rack in the module in 2D mode. The space capacity of the rack = the U-number occupied by the assets on shelf/ the total U-digit number of the rack.

Clicking on a single rack will open the asset page of the rack, as shown in Figure 3-98.



*Figure 3-98    Asset Management - Single Rack*

The asset management page of a single rack displays specific information about the shelves in the rack. When the mouse is hovering over the device, basic information about the device is displayed, including the asset name, asset type, location, and U-digit number.

  📖      **Note**

1. If 2D modeling is not completed, when accessing the asset management page, prompt "Please configure 2D modeling". Click on "Please configure 2D modeling" and you will be taken to the 2D modeling page.

**2.** The range and color of the space capacity level can be modified in the Space Capacity Color of the **Smart Solution Modeling -> 2D Modeling -> Capacity Color Setting**.


 **2D modeling**

Click the **2D Modeling** submenu under the **Smart Solution Modeling** menu to open the page shown in Figure 3-99.

1. Add SmartRow                    2. Add SmartAisle                    3. Temperature field color setting
4. Capacity color setting          5. Save                             6. Clear
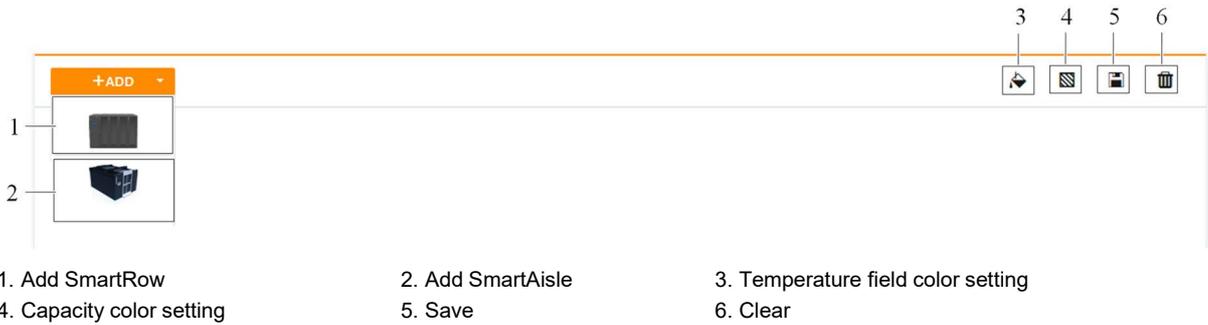
*Figure 3-99 2D modeling*

1. Add/modify/delete model

Click the Add Model icon (including SmartRow and SmartAisle) on the 2D Modeling page to create a model of the corresponding type on the right side. Here, SmartAisle is used as an example. After clicking the Add SmartAisle icon, create a model as shown in Figure 3-100.
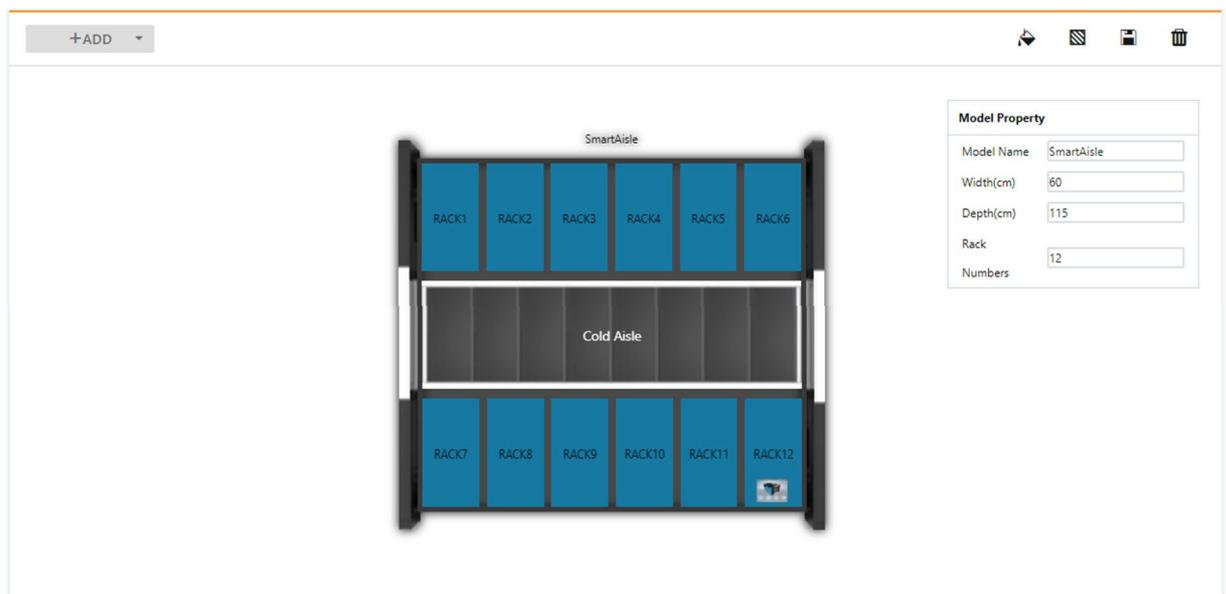


*Figure 3-100 Create SmartAisle*

● Module properties

Click on the background area in the model to display the module properties area. The module properties include module name, width, depth, and number of enclosures.

● Rack properties

Click on the rack in the model to display the rack properties area. The rack properties include name, rack type, width, depth, total U-digit number, and rated power, as well as sensor and power distribution branch information, as shown in Figure 3-101.
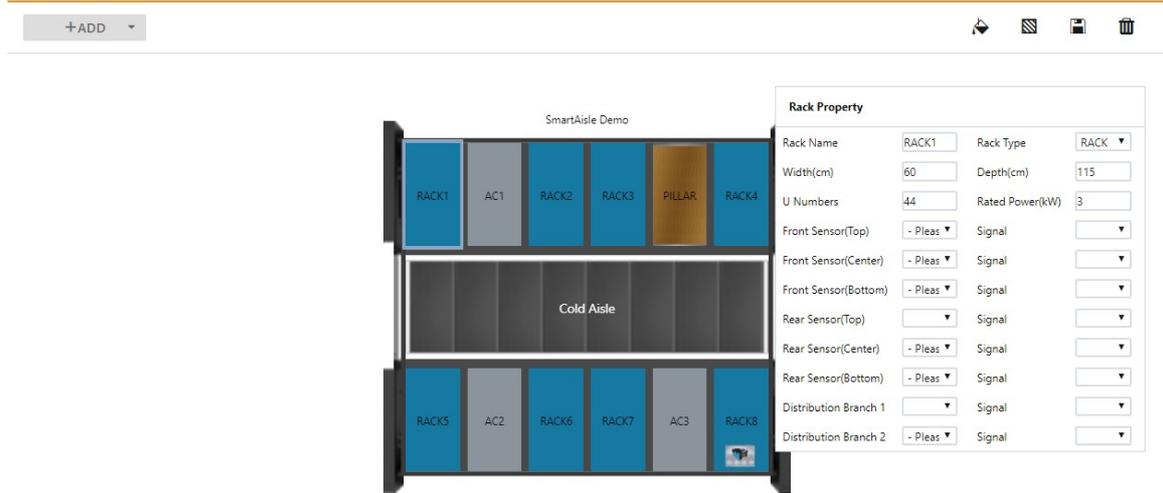
*Figure 3-101    SmartAisle rack properties*

After adding or modifying module properties and rack properties, you need to save by clicking the Save icon at the top right of the page.

When deleting the model, click the Clear icon 🗑 at the top right of the page, a prompt box will pop up, prompting the modeling information to be deleted, and clear the relevant asset binding information. After clicking the **Confirm** button, the current model will be deleted.

📖      **Note**

1. The width of the rack in the module is 60cm by default and the default depth is 115cm. The default number of SmartRow rack is 7. The default number of SmartAisle rack is 12.

2. After modifying the model or rack information, if you leave the page without clicking the **Save** button, a prompt box as shown in Figure 3-41 will pop up asking if you want to confirm leaving the page. Clicking the **Cancel** button will stay the current page, and clicking the **Confirm** button will leave the page and ignore the modification information.

2. Temperature field color setting

Click the **Temperature field color setting** icon at the top right of the page to open the settings page shown in Figure 3-102.

*Figure 3-102    Temperature field color setting*

The level range of the temperature field of the module and the temperature field of the IT equipment can be set in the temperature field color setting page. Drag ⬤ in the level range, change the level range and click Save to complete the setting.

3. Capacity color setting

Click the **capacity color setting** icon at the top right of the page to open the settings page shown in Figure 3-103.



*Figure 3-103    Capacity color setting*

The level range of the power supply capacity and the space capacity color can be set in the capacity color setting page. Drag⬤ in the level range, change the level range and click Save to complete the setting.

Assets on the shelves

Click the **Assets on Shelf** menu under the **Smart Solution Modeling** menu to open the **Assets on Shelf** page. The **Assets on Shelf** page displays the space capacity of each rack in the module in 2D by default.

Clicking on a single rack will open the asset management page of the rack. The left side of the page is the list of devices to be put in shelf, and the right side is the rack and devices in shelf, as shown in Figure 3-104.
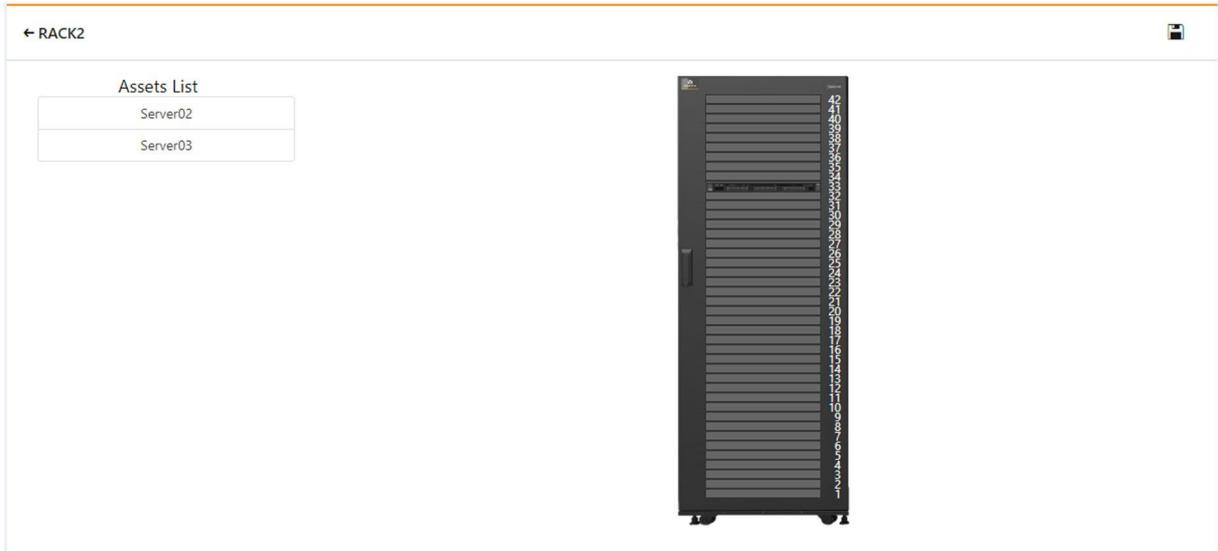


*Figure 3-104    Assets on the shelves*

When putting the asset on the shelf, use the mouse to select the device to be mounted. Hold down the left mouse button and drag the device to the U position corresponding to the right rack, as shown in Figure 3-105.
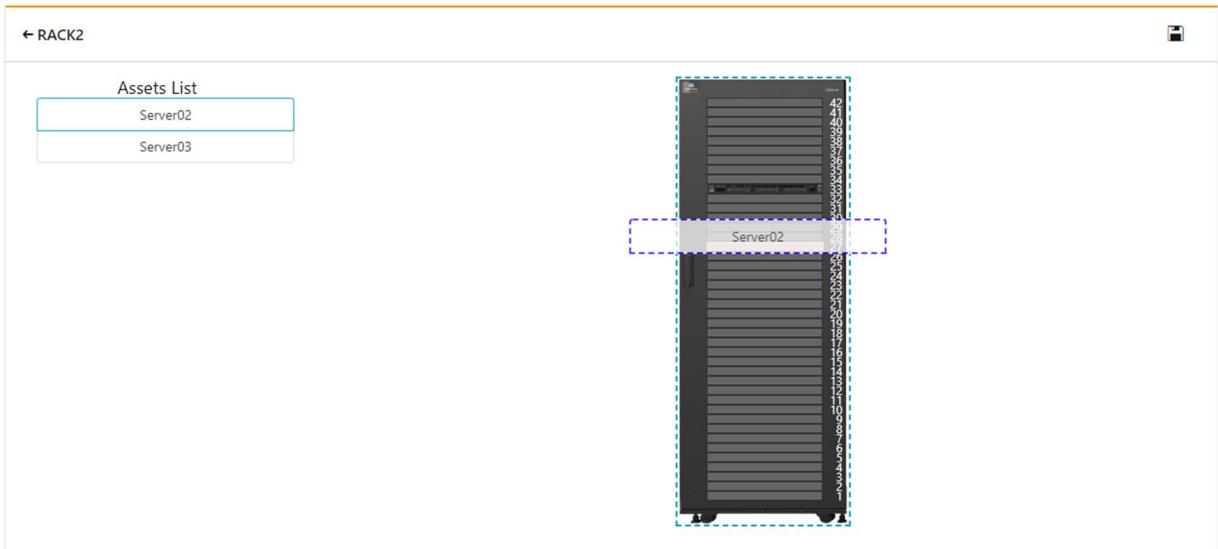


*Figure 3-105    Put asset on shelf-drag*

After the assets are put in the shelf, you can display the asset properties area by selecting the device that has been put in shelf. The asset properties include asset name, asset type, location, U-digit number, and temperature signal, as shown in Figure 3-106. After modifying the temperature signal of the asset, you can view the IT equipment temperature field in the **Thermal management** single rack IT equipment temperature field.
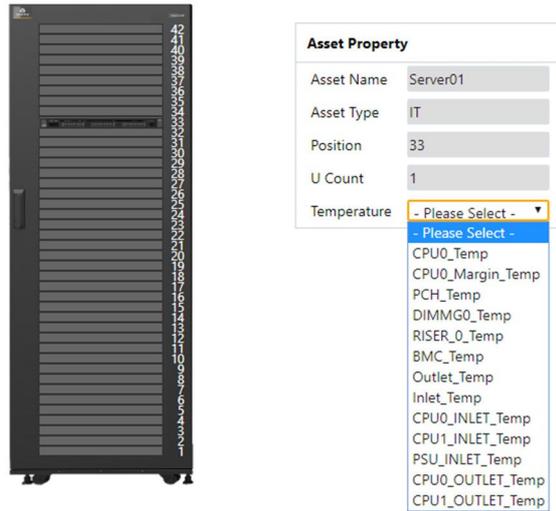
*Figure 3-106 Put asset in shelf- asset properties*

When you remove an asset, drag the device from the rack to the asset list on the left.

After completing the operation of removing an asset, you need to click the save button 🖫 at the top right of the page to save.

---

📖     **Note**

1. If 2D modeling is not completed, when accessing the "Put asset in shelf" page, the message "Please configure 2D modeling". Click on "Please configure 2D modeling" and you will be taken to the 2D modeling page.

**2.** The range and color of the space capacity level can be modified in the Space Capacity Color of the **Smart Solution Modeling -> 2D Modeling -> Capacity Color Setting**.

---

### 3.4.8  Configuration Management

In the RDU501 homepage, click the **Configuration Management** menu on the left to view six submenus, including: **Infrastructure Device Mgmt**, **Batch Configuration**, **Device Signal Configuration**, **Notification Mode Configuration**, **Email SMS Configuration**, and **Alarm Linkage**.

Infrastructure Device Mgmt

1. Device management

Click the **Infrastructure Device Mgmt** submenu under the **Configuration Management** menu to bring up the page shown in Figure 3-107.

*Figure 3-107 Device management*

In the page shown in Figure 3-107, users can add/modify/delete device information as follows:

Add equipment

Click the **Add** button, the interface shown in Figure 3-108 will pop up, and the corresponding device will be added.



*Figure 3-108 Device edit box*

1) Select the device type;

2) Enter the **Device Name** in the text box of the device name, or use the default device name;

3) After selecting the device type, the default port number of this device type will be automatically listed in the drop-down box of the **Port Number**; if the device type is not selected, the port number cannot be selected;

4) Enter the **Device Address** in the text box of the device address. The device address must be a positive integer from 1 to 100000, and the device address under the same port number is not allowed to be duplicated. Some device types do not require entering device address, in which case the text box for the **Device Address** will be grayed out and cannot be edited. When a device has multiple modules, you need to add a module address. The module address must be an integer from 0 to 30000, and the module address under one device is not allowed to be repetitive.

5) Enter the communication parameter in the text box of the **Communication Parameter**. When the device type is determined, the message box of the **Communication Parameter** will display the prompt of the communication parameter, including the device type communication parameter format and the default communication parameter.

6) Click the **Save** button and a message will pop up "Save successfully, please click the [Save Configuration] button to make the configuration take effect" and add a device information to the device list.

7) Click the **Save Configuration** button to bring up the second confirmation password dialog box as shown in Figure 3-109.
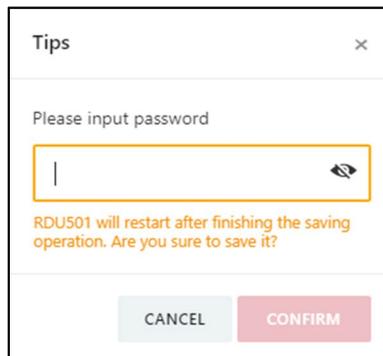


*Figure 3-109    Confirming password dialog box*

If you click the **Cancel** button, the unsaved configuration will be discarded. If you enter the current user's login password, click the **OK** button. After the password verification is passed, the system will jump to the system restart interface, as shown in Figure 3-110.



*Figure 3-110    System restart page*

8) Re-login to the RDU501 system and the newly added device will be displayed in the list on the device management page.

&#x1F4D6;     **Note**

1. By default, the system can add 32 intelligent devices, including RDU501 itself, ENV-TH, ENV-4DI, 8DIAI card, 8DOAO card and cabinet-level access control devices. If you need to expand your connecting capabilities, please contact the Vertiv Customer Service Center for purchase.

2. If the device is configured on the EXP8COM expansion card, after remove the card and then re-inserting, you need to manually click the **Enable** icon ✓ to enable the device again, as shown in Figure 3-107.

● Delete the device:

1) Select the device to be deleted in the device list;

2) Click the **Delete** button to delete the device;

3) Click the **Save Configuration** button to make the device-deleting operation take effect, the same as adding a new device.

&#x1F4D6;     **Note**

Only administrators or engineer users can delete devices.

● Modify the device:

1) Select the device to be modified in the device list;

2) Modify device information;

3) Click the **Modify** button to modify the device information;

4) Click the Save Configuration button to make the device-modification take effect, the same as adding a new device.

📖    **Note**

1. The "**Save Configuration**" button can be clicked to save all operation results at once.

2. After adding, modifying, or deleting in the device management page, if you leave the page without clicking the **Save Configuration** button, a prompt box as shown in Figure 3-41 will pop up asking if you want to confirm leaving the page. Clicking the **Cancel** button will stay the current page, and clicking the **OK** button will leave the page and ignore the modification information.

2. Device Type Management

Click the **Power and Environment Device Management** submenu under the **Configuration Management** menu, and then click the **Device Type Management** tab. The page shown in Figure 3-111 is displayed.



| Device Management | Device Type Management | | |
|---|---|---|---|

| Select Installation Package... | Browse | (Show Help) | INSTALL |

| Index | Device Type | Version | |
|---|---|---|---|
| 2 | ENP_PDU_STS[COM] | 2 | USING |
| 3 | ENP_PDU_STS[SNMP] | 2 | UNINSTALL |
| 4 | ENP_PDU_SPM[COM] | 3 | UNINSTALL |
| 5 | ENP_PDU_SPM[SNMP] | 2 | UNINSTALL |
| 6 | ENP_MPDU_MPS[COM] | 3 | UNINSTALL |
| 7 | ENP_PDU_MSR_FC[COM] | 2 | UNINSTALL |
| 8 | ENP_PDU_SPM_M90[COM] | 2 | UNINSTALL |
| 9 | ENP_MPDU_MPI[COM] | 2 | UNINSTALL |
| 10 | ENP_PDU_SPM90SIC[SNMP] | 2 | UNINSTALL |
| 11 | ENP_MPDU_MPI[SNMP] | 2 | UNINSTALL |

Showing 1 to 10 of 54 entries    « < **1** 2 3 4 > »

*Figure 3-111    Device type management*

Click the **Browse** button to upload the driver configuration package (.iru file format) from the local directory and click the **Install** button to install the new device type.

📖    **Note**

The number of device types supported by the system depends on the remaining space of the system and the size of the driver configuration package itself, but no more than 64.

The page displays the device type information of the installed device. Click the **Uninstall** button to pop up the **Confirm Uninstall** dialog box and click the **OK** button to uninstall the corresponding device type.

📖    **Note**

1. During installation, if the device type exists and the device driver version is higher than the driver to be installed, the device type cannot be installed repeatedly.

2. If the installation package does not have version information or the version information does not match the software version, the device type cannot be installed.

3. If a device uses this device type, the **Uninstall** button will be grayed out, indicating that it is in use and cannot be uninstalled.

 **Batch configuration**

Click the **Batch Configuration** submenu under the **Configuration Management** menu to open the page shown in Figure 3-112.

*Figure 3-112    Batch configuration*

Users can perform **Upload** and **Download** operations to complete system batch configuration.

    📖    **Note**

1. Only the admin user has the authority to perform batch configuration. If batch configuration cannot be performed, click **View Help** for help.

2. The batch configuration files are encrypted after being downloaded to the local.

### Device signal configuration

1. Modify the device name

Click the **Device Signal Configuration** submenu under the **Configuration Management** menu to bring up the page shown in Figure 3-113.



*Figure 3-113    Modify device name*

In the page shown in Figure 3-113, the user can modify the device name. After entering the new device name, the **Settings** button will appear in the upper right corner of the list, and click the Settings button to make the batch settings.

    📖    **Note**

The device name and signal name characters can be Chinese, English letters, numbers, spaces, and underscores, and other characters are invalid.

2. Modify signal

Click **Modify Signal** to pop up the page shown in Figure 3-114.



*Figure 3-114    Modify signal*

In the page shown in Figure 3-114, the user can modify the signal name, the storage period of the acquisition signal, the storage threshold of the acquisition signal, the signal unit of the set signal, and the alarm level of the alarm signal according to the device type or device name. Select the **Device Type/Device** and **Signal Type**, enter the new signal information, and click the Settings button to make the batch settings.

1) Modify the signal name

Select the **Device Type/Device Name** check box, select a device type/device in the drop-down box, select a signal in the signal type, a corresponding signal list will appear, enter a new signal name in the input box, and the upper right corner will appear, as shown in Figure 3-115. After clicking the **Set** button, the signal name is updated successfully.



*Figure 3-115    Modify signal name*

2) Modify the storage cycle/storage threshold

Select the **Device Type** check box, select a device type in the drop-down box, and then select the acquisition signal in the signal type drop-down box, the signal list shown in Figure 3-116 appears, you can enter the storage cycle/storage threshold in a row. Click the **Set** button to make one or more changes.

*Figure 3-116 Modify the storage cycle/storage threshold*

Click on the table title of "**New Storage Cycle**", the storage cycle input box will pop up, enter a new storage cycle (for example: 3600), click the **OK** button, and all non-zero storage cycles in the device type acquisition signal will be updated to 3600.

Click the row header **New Storage Threshold**, pop-up the storage threshold input box, enter a new storage threshold (for example: 5), click the **OK** button, and all storage thresholds that are not 0 in the device type acquisition signal will be updated to 5.

3) Modify the alarm level

Select the **Device Type/Device Name** check box, select a device type/device from the drop-down box, and then select the alarm signal in the signal type drop-down box. The signal list shown in Figure 3-117 appears. You can select an alarm level in a row, and click the **Set** button to make one or more changes.



*Figure 3-117 Modify the alarm level*

4) Modify the signal unit

Select the **Device Name** check box, select the THD/8DIAI device in the drop-down box, and then select the setting signal in the signal type drop-down box. The signal list shown in Figure 3-118 appears. You can enter a new signal unit in a row and click **Set** to make one or more changes.

*Figure 3-118 Modify the signal unit*

5) Restore the default name

Select the **Device name** check box, select any device in the drop-down box, and then select a signal type in the signal type drop-down box, the signal list shown in Figure 3-119 appears, you can click the **Restore default name** button       on the right side of the device. The initial signal name of the current signal can be restored.

*Figure 3-119    Restore the default name*

📖    **Note**

1. For ENV-TH, ENV-THD and ENV-4DI, the system has the function of linkage modification of the signal name, that is, if the name of the acquisition signal is modified, and the corresponding control signal, setting signal and alarm signal name will be modified accordingly, so the page only provides the function to modify the acquisition signal name.

2. The signal name modified here will be used as the default signal name for the device.

3. When modifying by device, for the analog signal of ENV-THD and 8DIAI devices, modifying the signal unit is supported.

4. When modifying by device, the function of restoring the default signal name is supported.

5. You can set the signal in batches by checking multiple leftmost check boxes, and set up 16 signals at the maximum batch size.

3. Modify signal status

Click **Modify Signal Status** to open the Modify Signal Status page. Selecting the device type will display all status signals under the device type, as shown in Figure 3-120. Click the **Modify** button on the right side of the list to modify the signal status.



*Figure 3-120    Modify signal status 1*

Click the **Modify** button to open the Modify Signal Status page, as shown in Figure 3-121. Enter the new status name and click the **Save** button to complete the modification of the status name of the signal.

*Figure 3-121    Modify signal status 2*

### Notification mode configuration

1. Power and environment device alarm notification settings

Click the **Notification Mode Configuration** submenu under the **Configuration Management** menu, and then click the **Power and Environment Device Alarm Notification Settings** tab. The page shown in Figure 3-122 is displayed.



*Figure 3-122    Notification mode configuration*

As shown in Figure 3-122, the user can choose which notification mode is used to receive which level of alarm notifications for the power and environment device. The user can select the language type of the alarm notification information and customize the alarm contents (the device name, alarm description, alarm time and alarm status are included by default).

Click the Save button to complete the alarm configuration. When the alarm is generated, the user will be notified by the configured notification method.

📖     **Note**

1. The user must first select the notification mode before the **Alarm Notification Configuration Table** at the bottom of the page can be edited;

2. When you select a device name, all devices are configured with the same alarm level.

3. When you select a low-level alarm, all alarms above this level will be selected.

4. When you select a device, the **Critical alarm** of the highest level is selected by default.

5. When the alarm is not confirmed or not completed, the system will send an alarm notification every 4 hours, up to 3 times.

2. IT device alarm notification settings

Click the **Notification Mode Configuration** submenu under the **Configuration Management** menu, and then click the **IT Device Alarm Notification Settings** tab to bring up the page shown in Figure 3-123. The user can choose to receive the alarms of which IPMI device by email notification.



*Figure 3-123 IT device alarm notification settings*

📖     **Note**

1. The user must first select the **Notification Mode**, and the **Alarm Notification Configuration Table** at the bottom of the page can be edited;

2. When the device name is selected, all devices are configured with alarm notifications at the same time.

3. The notification language cannot be modified here, and it is consistent with the setting of the **Power and Environment Device Alarm Notification**;

4. When the alarm is not confirmed or not completed, the system will send an alarm notification every 4 hours, up to 3 times.

3. Console device event notification settings

Click the **Notification Mode Configuration** submenu under the **Configuration Management** menu, and then click the **Console Device Event Notification Settings** tab to bring up the page shown in Figure 3-124. Users can choose which console devices to receive alarm notifications by email notification. The user can choose to receive the alarms of which console device by email notification.

*Figure 3-124 Console device event notification settings*

📖    **Note**

1. The user must first select the **Notification mode**, and the **Alarm notification configuration table** at the bottom of the page can be edited;

2. When the device name is selected, all devices are configured with alarm notifications at the same time.

3. The notification language cannot be modified here, and it is consistent with the setting of the power and environment alarm notification.

4. System status timed notification configuration

Click the **Notification Mode Configuration** submenu under the **Configuration Management** menu, and then click the **System Status Timed Notification Configuration** tab. The page shown in Figure 3-125 is displayed.

*Figure 3-125 System status timed notification configuration*

📖    **Note**

1. The system **Status Timed Notification Configuration** must be used in conjunction with the **Power and Environment Device Alarm Notification Setting**. Otherwise, the **User Name**, **Notification Mode**, and **Notification Language** cannot be selected.

2. For system status timed notification, the telephone notification method is not supported;

3. The system status timed notification refers to sending the current running status of the entire system of the current RDU 501 to the user, that is, normal or alarm status.

1) Complete and save the settings of the sending user, notification mode, and notification language on the **User Alarm Notification Configuration** page;

**2)** Select whether to enable system status notification on the **System Status Timed Notification Configuration** page;

3) When **Enable System Status Notification** is enabled, set the sending period mode (default: day), sending interval setting (default: 1 day) and sending time setting in the **System Status Timed Notification Configuration** page (default: 11:00).

4) Click the **Save** button to save the system status notification configuration.

 **Email SMS configuration**

Click the **Email SMS Configuration** submenu under the **Configuration Management** menu to bring up the page shown in Figure 3-126.

*Figure 3-126    Email SMS configuration*

1. SMS module and mail server configuration

In the page shown in Figure 3-126, the user can perform **SMS module configuration** or **RDU alarm voice system settings** for SMS or phone alarm notification reminder, or configure the **Email server** to enable the system to notify the alarm by email. Modify the product service information through the **Alarm email information configuration**. The configuration procedures are as follows:

● SMS module configuration

1) Connect the SMS MODEM through the USB port (USB1~USB4 port on RDU501 panel) according to the need (only 1 SMS MODEM can be connected), and then select the **Port type**;

2) Select the type of **SMS module** (GSM/CDMA) according to the model of the incoming SMS MODEM;

3) Set the communication parameters of the short message MODEM;

4) Click the **Save** button to save the current user's SMS module configuration.

● RDU multimedia voice notification system settings

1) Enter the server IP address at the **Server IP** address;

2) Enter the port number in the **Port number** field, the default is 13393;

3) Click the **Save** button to save the multimedia voice notification system configuration.

● Mail server configuration

1) Enter the server IP address or domain name in the **Mail server field**;

2) Enter the **port number, mail user name, email password** and **outbox address** in the corresponding fields;

3) Click the **Save** button to save the current user's mail server configuration.

📖     **Note**

1. The port number defaults to 25. When you select **Enable SSL**, the port number automatically changes to 465. When TLS is enabled, the port number automatically changes to 587.

2. When using SSL/TLS, make sure the mail server supports SSL/TLS function.

3. The mail encoding format defaults to HTML format, and you can select plain text format.

● Alarm email information configuration

1) Enter the email address of the service center in the **Contact information field**;

2) Enter the phone number of the service center in the **Service phone** field.

3) Click the **Save** button to save the modified alarm email information configuration.

2. SMS balance inquiry

Click the **Email SMS Configuration** submenu under the **Configuration Management** menu, and then click the **SMS Balance Inquiry** tab to pop up the page shown in Figure 3-127.
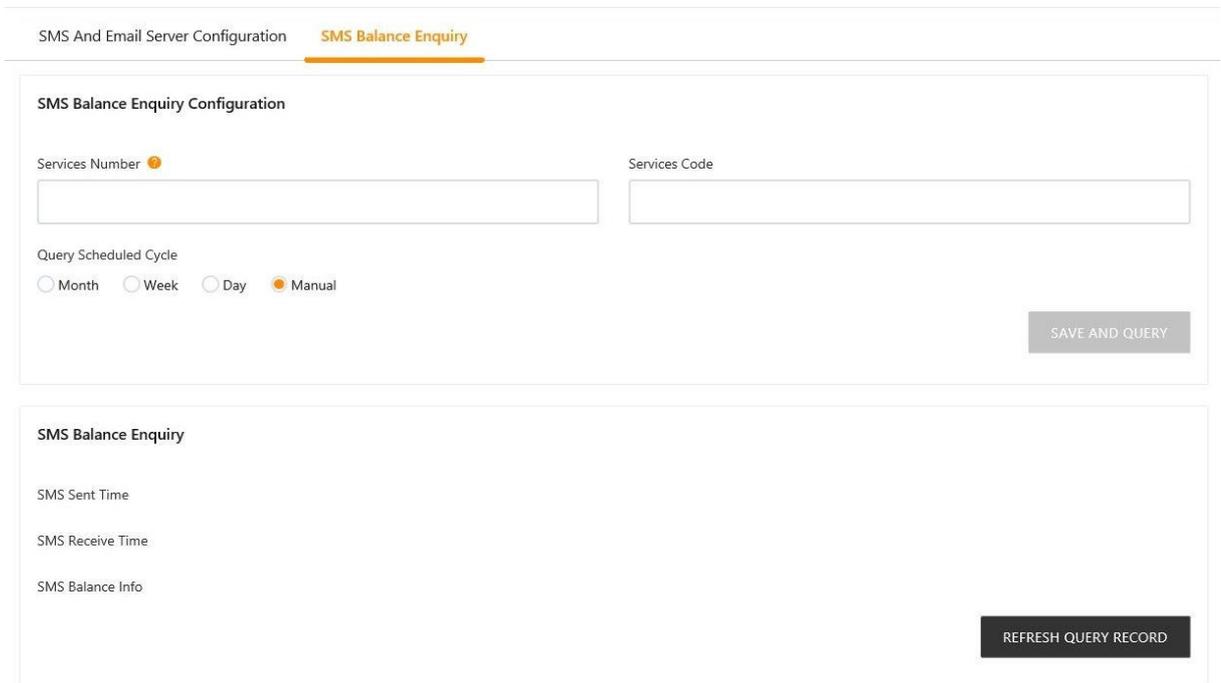


*Figure 3-127    SMS balance inquiry*

The SMS balance query provides periodic query and manual query. According to Figure 3-127, fill in the carrier number, service code and query period. Click the **Save and Query** button to complete the configuration saving and send the query SMS. The system receives the balance SMS sent by the carrier and saves it to the database and forwards it to the admin user's mobile phone. You can view the balance SMS on the web page by manually clicking the **Refresh query record** button.

📖    **Note**

1. The SMS balance information is forwarded to the admin user's mobile phone. The admin user is required to configure the mobile phone number.

2. Since there is a certain delay in the balance message sent by the carrier, please check the receiving time of the SMS to judge whether the queried SMS information has been updated.

**Alarm linkage**

Click the **Alarm Linkage** submenu under the **Alarm Management** menu to open the Alarm Linkage page, as shown in Figure 3-128.



Figure 3-128    Alarm linkage configuration1

**DO1 alarm output function**

If the **DO1 alarm output** is enabled, the relay will separately control the output of the DO1 port. If the system has an alarm and the alarm is not confirmed, the relay is closed. If the system has no alarm or all alarms have been confirmed, the relay is disconnected. At this time, DO1 no longer participates in linkage alarms.

● Alarm linkage function

As shown in Figure 3-128, the **Symbolic Meaning List** shows all the commands and their uses. Click the **Add** button to add a new alarm linkage expression, as shown in Figure 3-129.

*Figure 3-129 Alarm linkage configuration 2*

First, select an operator, for example, "OR", the expression is "Signal 1 [Input 1 Register] or Signal 2 [Input 2 Register] = Output Signal [Output Register, Video Device]".

Second, when the input or output parameter in the expression is selected as the signal, first select the device name in the **Device Name** drop-down list, then select the signal type in the **Signal Type** drop-down list, and finally select the signal name in the **Signal Name** drop-down list. Input 1, output 2, and output signals may be any of the signals available in RDU 501.

Finally, when the parameter in the expression is selected as a **Register**, you need to select the name of the corresponding register, such as R(0), R(1), and so on.

Click the **Save** button to add a new alarm linkage expression, otherwise click the **Cancel** button.

If you click the Save button, as shown in Figure 3-130, the alarm linkage expression has been added, click the **Saving effective** button to make it effective. Click the **Delete** button 🗑 to delete the alarm linkage expression and click the **Saving effective** button to make it effective.



| | Operator | Input1 | | | Input2 | | | Parm1 | Parm2 | Output | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Device/ Register | Signal Type | Signal Name | Device/ Register | Signal Type | Signal Name | | | Device/ Register | Signal Type | Signal Name | Signal Value |
| 🗑 | OR | ENV_DI | Alarm Signal | DI 1 Alarm | ENV_DI | Alarm Signal | DI 2 Alarm | _ | _ | ENV_DI | Control | DO2 OutPut State | Close |

Key to Operator/Symbol ⌄

Limitation ⌄

*Figure 3-130 Alarm linkage configuration 3*

For the usage of each operator in alarm linkage, see Table 3-4.

*Table 3-4    Alarm linkage operator usage*

| Operator | Input1 | Input 2 | Parameter1 | Parameter 2 | Output | Expression |
|---|---|---|---|---|---|---|
| AND | Sin1 /Rin1 | Sin2 /Rin2 | / | / | Sout/Rout | Sin1 [Rin1] AND Sin2 [Rin2]＝Sout [Rout] |
| OR | Sin1 /Rin1 | Sin2 /Rin2 | / | / | Sout/Rout | Sin1 [Rin1] OR Sin2[Rin2]＝Sout [Rout] |
| NOT | Sin1 /Rin1 | / | / | / | Sout/Rout | Sin1 [Rin1] NOT＝Sout [Rout] |
| XOR | Sin1 /Rin1 | Sin2 /Rin2 | / | / | Sout/Rout | Sin1 [Rin1] XOR Sin2[Rin2]＝Sout [Rout] |
| GT | Sin1 /Rin1 | / | P1 | P2 | Sout/Rout | Sin1 [Rin1]>P1, Sout [Rout]＝1; Sin1 [Rin1]<P1－P2, Sout [Rout]＝0 |
| LT | Sin1 /Rin1 | / | P1 | P2 | Sout/Rout | Sin1 [Rin1]<P1, Sout [Rout]＝1; Sin1 [Rin1]>P1＋P2, Sout [Rout]＝0 |
| DS | Sin1 /Rin1 | / | P1 | / | Sout/Rout | Sin1 [Rin1] DS P1 output to Sout [Rout] |

Note:

1. Sin1, Rin1, Sin2, Rin2, P1, P2, Sout, Rout respectively refer to signal 1, input 1 register, signal 2, input 2 register, parameter 1, parameter 2, signal 3, output register;

2. The input signal of the logical operator AND/OR/NOT/XOR/DS can only select the alarm signal;

3. The input signal value of the arithmetic operator GT/LT can only be floating point, integer or long integer;

4. The output signal can be a control signal or a set signal

The following is an application example of alarm linkage.

Example 1:

If the temperature and humidity sensor 01 of the RDU501 system needs to be connected to the temperature and humidity sensor of the RDU501 system, the alarm indicator will be illuminated. If the alarm indicator is installed on the DO1 interface, you can complete the alarm linkage function through the following configurations.

Expression: [Temperature 01 High Temperature Alarm] DS P(3) [DO1][Closed]

Figure 3-131 shows the configuration method. The meaning is that when the temperature 01 generates a high temperature alarm, the DO1 is turned off after a delay of 3 seconds, thereby lighting the alarm indicator.



*Figure 3-131 Configuration example of alarm linkage 1*

Example 2:

If the front or rear door of the cabinet is open, the alarm indicator is illuminated. Assume that the DI1 and DI2 interfaces of the RDU501 are connected to the front and rear door magnetic sensors of the cabinet. The alarm indicator are installed on the DO1 interface. You can use following method to complete the configuration:

Expression: [DI1 Alarm] OR [DI2 Alarm] = [DO1] [Closed]

Figure 3-132 shows the configuration method. The meaning is that when the alarm signal RDU501 DI1 is turned on or the RDU501 DI2 is turned on to generate an alarm, the RDU501 DO1 is triggered to be closed, thereby lighting the alarm indicator.



*Figure 3-132 Configuration example of alarm linkage 2*

## 3.4.9  System setting

In the RDU501 home page, click on the system settings menu on the left, and you can see 10 submenus, including: **monitoring unit**, **network settings**, **user management**, **system upgradetime**, **calibration**, **restore default**, **site information settings**, **authorization code management**, **title bar settings** and **about RDU501**.

### Monitoring unit

The **Monitoring unit** submenu is set for the signal of the RDU501 system itself, including the **acquisition signal** and **the setting signal**, as shown in Figure 3-133.



*Figure 3-133  Monitoring unit (acquisition signal)*

For the method of operating the **acquisition signal** and the **setting signal** tabs in the monitoring unit, see *3.4.1 Device*.

Click the **Set Signal** tab to enter the signal setup page and display the signal settings of the monitor unit, as shown in Figure 3-134.

| | Index | Signal Name | Signal Value | Value Setting | Refresh Date/Time |
|---|---|---|---|---|---|
| ☐ | 1 | Auto/Man State | Auto | Auto ▾ | |
| ☐ | 2 | Outgoing Alarm Blocked | Normal | Normal ▾ | |
| ☐ | 3 | Data stat start oclock | 0oclock | 0-23 | |
| ☐ | 4 | Data stat period | 24h | 1-24 | |
| ☐ | 5 | Whether Save Equip Data When Alarm | Do Not Save | Do Not Save ▾ | |
| ☐ | 6 | Whether Save Equip Data When State Changes | Do Not Save | Do Not Save ▾ | |
| ☐ | 7 | Door Access Control | Display | Display ▾ | |
| ☐ | 8 | PLC Ctrl Mode | Set When Diff | Set When Diff ▾ | |

Showing 1 to 8 of 8 entries

Tabs: Sampling | Setting

*Figure 3-134　Monitoring unit (setting signal)*

📖 **Note**

If the **Current alarm block** is set to "Yes" in the **Setting Signal** tab, the current alarm will be blocked. In this case:

1. Except for the current alarm that is blocked, all others are terminated.

2. The "Yes" setting of the **Current alarm block** is automatically released after 24 hours.

**Network settings**

1. IP settings

Click the **Network Settings** submenu under the **System Settings** menu to bring up the page shown in Figure 3-135.

*Figure 3-135    IP setting*

 The RDU501 provides two IP setting modes: DHCP dynamic acquisition and manual static setting. It also supports DNS domain name resolution **.**

On the page shown in Figure 3-135, the network parameters that users can configure are as follows: **IP acquisition mode** and **address , subnet mask, default gateway, DNS1 (preferred DNS server), and DNS2 (alternate DNS server)**. After modifying the network parameters, click the **Save** button to make the parameters take effect.

 📖     **Note**

1. If the NIC chooses to use a static IP address, the DNS address cannot be obtained automatically.

2. After modifying the IP address, the user needs to log in to the RDU501 again with the new network address. By default, will redirect to the IP address of the network card 1.

2. Access control

Click the **Network Settings** submenu under the **System Settings** menu, then click the **Access Control** tab to bring up the page shown in Figure 3-136.

*Figure 3-136    Access control*

When adding a visitor, enter the new IP address in the **upper system IP** text box, and click the **Set** button to complete the configuration.

📖 **Note**

The system can add up to 3 higher level management platform IP addresses.

3. SNMP setting

Click the **Network Settings** submenu under the **System Settings** menu, then click the **SNMP Settings** tab to configure the SNMP agent. The SNMP agent of the RDU501 system supports both V2 and V3 versions:

As shown in Figure 3-137, the SNMP V2 can be set as follows:

1) Set the NMS IP (host IP address of the SNMP agent data receiving end);

2) Set whether to send Trap: "Enable" or "Disable";

3) Other parameters remain at their default values.



*Figure 3-137    SNMP (V2) settings*

As shown in Figure 3-138, the SNMP V3 can be set as follows:

1) Set the **NMS IP** (host IP address of the SNMP agent data receiving end);

2) Select whether to send Trap: "Enable" or "Disable";

3) Set the **Username**;

4) Select the **User type**: "Authentication and Encryption";

5) Select the **Authentication type**: "MD5", "SHA";

6) Select the **Encryption type**: "DES";

7) Customize the password for the authentication algorithm and encryption algorithm.
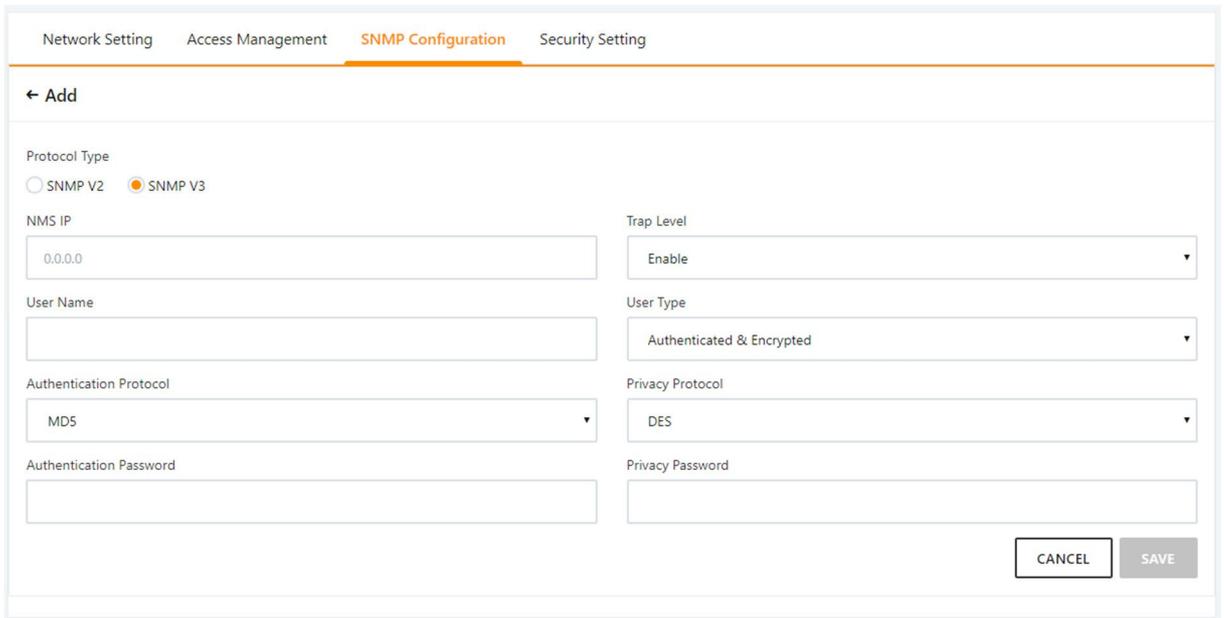
📖    **Note**

1. Based on SNMP V2, SNMP V3 adds user authentication and encryption strategies.

2. If the "Do not authenticate without encryption" strategy is selected for the **User type**, the **Authentication type and encryption type** drop-down box is grayed out and cannot be set.

3. The current **encryption type** only supports "DES";

4. The user needs to customize the authentication and encryption passwords of more than 8 characters, and the password must be the same as the password set by the host of the SNMP agent data receiving end. Otherwise, the password cannot be decrypted and received.

After completing the parameter settings, click the **Add** button to add the NMS;

To modify the NMS settings, select the NMS you want to modify, modify the settings, and then click the **Modify** button to save the settings.

To delete the NMS, select the NMS you want to delete and click the **Delete** button to delete the NMS.



*Figure 3-138    SNMP (V3) setting*

📖    **Note**

RDU501 does not provide SNMP proxy service by default. If SNMP service authorization is required, please contact Vertiv Customer Service Center for purchase.

4. Security settings

Only administrators can browse and configure **Security settings**.

Click the **Network Settings** submenu under the **System Settings** menu, and then click the **Security Settings** tab. The page shown in Figure 3-139 pops up.

*Figure 3-139    Security settings*

The security settings include the **Web Access Port Settings** and **the Web Access Security Strategy**.

1. Web access port settings: The protocol that can be used to access the web page is HTTP or HTTPS. The default is the HTTP protocol.

After selecting, click the **Save** button and the browser prompts the user to wait, as shown in Figure 3-140.
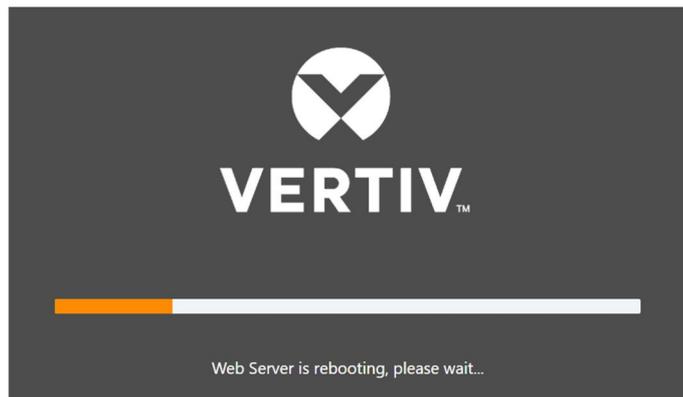


*Figure 3-140    System restart web server*

When the waiting time is out, the browser displays the new access hyperlink, as shown inFigure 3-141. Click on the hyperlink to display the user login interface launched with the new web access method.
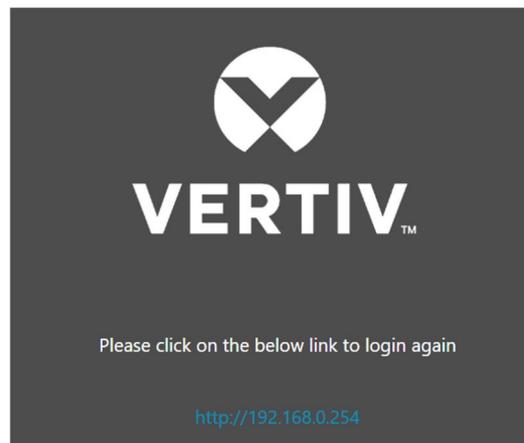


*Figure 3-141    Show new web access connection*

2. Web Access Security Strategy: Select whether to enable the web access security strategy. The default is enabled.

The Web access security Strategy consists of four parts: account lockout strategy, login verification code, password complexity strategy, and password expiration strategy.

1) Account lockout strategy:

After the same valid user fails to log in five times in succession, he cannot enter the password to log in. He can continue to log in only after the specified time has elapsed. The admin account will not be locked.

The administrator can reset and unlock the account that is currently locked. For details, see the **Unlocking** in the next section of **User Management**.

The length of the lock time can be configured in the **account lock time** edit box in Figure 3-139. The default is 5 minutes.

2) Login verification code:

When the user logs in, once the wrong username or password is entered, the system immediately displays a verification code, which is required to be entered the next time, as shown in Figure 3-142.
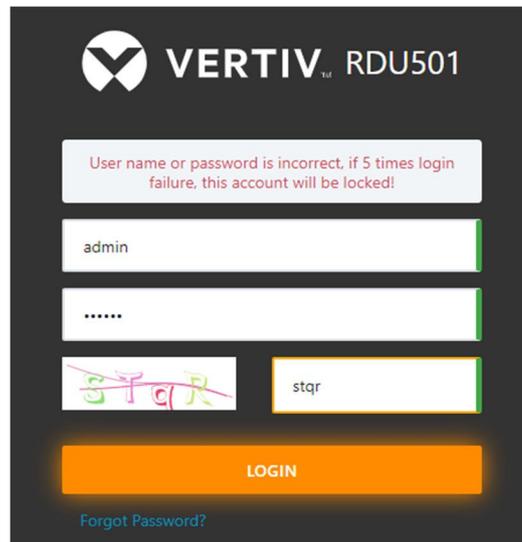


*Figure 3-142 Login requires a verification code*

3) Password complexity:

The user password must be at least 6 characters long; the password contains at least two of the following characters: uppercase English characters (A~Z), lowercase English characters (a~z), numbers (0~9), and non-alphabetic characters (!, $, #, %, etc.).

4) Password expiration strategy:

The user account password is valid from the moment it is created or modified and is within the specified time. The effective time length can be configured in the **user password validity period** edit box in Figure 3-139. The range is 0 to 999 days, and the default is 90 days. 0 day means the password never expires.

The length of the password valid time applies to all accounts except admin, and the admin account password never expires.

The administrator can refresh the validity period of an account, and the new validity period starts from the set time until the effective time is reached. For details, see the **refresh validity period** in the next section of **User Management**.

 **User Management**

Click the **User Management** submenu under the **System Settings** menu to open the page shown in Figure 3-143.

*Figure 3-143 User Management*

● Refresh expiration date

If the web access security strategy is enabled, the account expiration time for the selected user is displayed on the interface. The administrator clicks the refresh expiration icon ↻ to refresh the new password expiration date for the selected user. For the new expiration date, see the **Password expiration strategy** in the **Web Access Security Strategy** section of the **Network Settings** section.

● Unlock

If the web access security strategy is enabled, for locked accounts, the administrator can unlock it by clicking the unlock icon 🔓. See the **Account Lockout Strategy** in the **Network Settings Security Strategy** section of the **Network Settings** section.

● Add users

Click the Add button at the top right of the user list to open the Add User page, as shown in Figure 3-144.

1. Enter the username in the text box of the username;

2. Select the user's authorities

3. Configure the user password. The password cannot be empty and should have at least 6 digits.

4. Repeat the password in the Confirm Password text box;

5. (Optional) Enter the user's phone number. The phone number can use the following numbers and characters: 0123456789, +;

6. (Optional) Enter the email address;

7. (Optional) Enter the serial number of the mobile terminal that allows access to the RDU 501 through the mobile terminal APP;

8. Click the **Save** button to complete the addition of the new user.
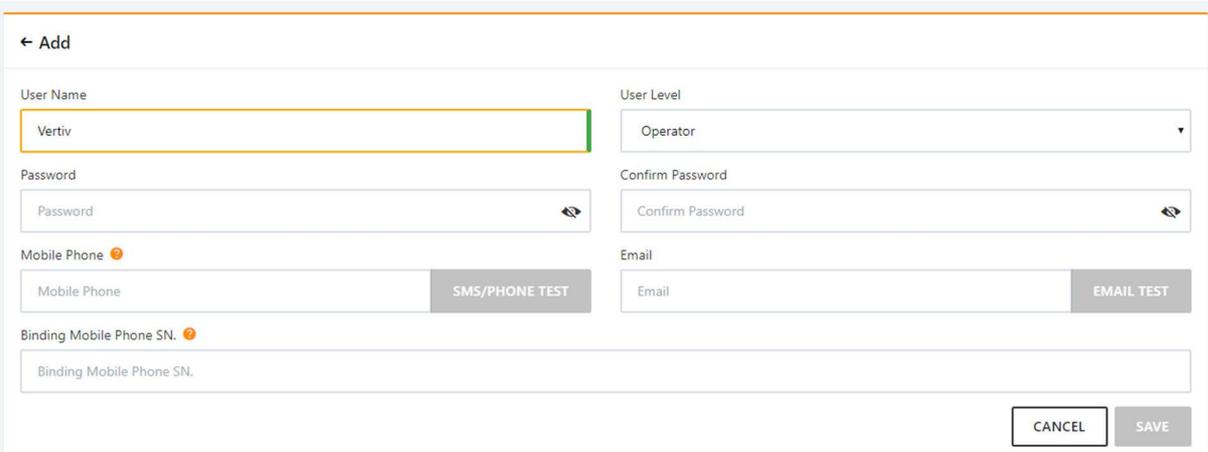


*Figure 3-144    Add user*

📖      **Note**

1. User names can only use English letters, numbers, and - and _, and the first character must be a letter.

2. Allow up to two bind phone serial numbers, separated by commas.

3. If the binding sequence number is not entered, the system will bind the serial number of the first two mobile devices logged in from the APP.

4. After binding, the system only allows the bound mobile terminal to access the RDU501 from the APP. If you want to re-bind, just modify or delete the binding serial number.

5. The phone number and email address cannot be empty at the same time.

- Delete user

Click the delete icon on the right side of the user list, the dialog box for confirming the deletion will pop up, click the **OK** button to delete the selected user.

   📖   **Note**

Admin user cannot be deleted.

- Modify users

1. Click the edit icon to the right of the user list to open the modify user page.

2. Modify user information;

3. Click the **Save** button to save the modified user information.

Users who log in to the RDU501 can be divided into four user groups. They have different security levels and user authorities. For details, see Table 3-5.

*Table 3-5    User security level*

| Security levels | User group | User authorities |
|---|---|---|
| Level A | Administrator | The administrator has full rights: send control commands to the intelligent device; browse, control, modify parameters; upload and download files; modify, add, and delete user information; air conditioner teamwork control parameter settings; system firmware upgrade; modify account validity period; unlock locked User account |
| Level B | Engineer | The engineer has the following rights: Send control commands to the intelligent device; Browse, control, modify parameters; download files; modify own user information (except account validity period and lock status) |
| Level C | Operator | The operator can send control commands to the intelligent device |
| Level D | Viewer | All users can view device information |

The **SMS/Telephone Alarm Notification** Test and the **Email Alert Notification** Test can be performed on the Modify User Information page.

Before using this test function, you need to configure the SMS module and mail server for the current user. For details, see *Configuration Management* in *3.4.8* .

- SMS/telephone alarm notification test

Enter the phone number and click the **SMS/Telephone Alert Notification Test** button to test if the current user's phone number is connected. If the user receives a test message and a phone call, the test is successful. Otherwise, the test fails. Please check if the current user's phone number is correct and the SMS MODEM connection is correct.

- Email alert notification test

Enter the **Email address** and click the **Email Alert Notification Test** button to test if the current user's email address is correct. If you receive a test email, the test is successful, otherwise the test has failed. Please check if the above information is entered correctly.

   📖   **Note**

When adding or modifying users, you must enter a phone number or email address, otherwise the settings cannot be completed.

**System Upgrade**

Click the **System Upgrade** submenu under the **System Settings** menu to bring up the page shown in Figure 3-145.

*Figure 3-145    System Upgrade*

Figure 3-145 on the page shown, click the **Browse** button to choose the upgrade package (.rdu file format) from the local directory, and then click the **Install** button to perform the firmware upgrade.

  📖      **Note**

1. The RDU501 supports the incremental upgrade function.

2. It is recommended to contact customer service personnel to perform regular system upgrades to ensure safe and stable operation of the system.

### Time Calibration

The clock can be calibrated by clicking the **Time Calibration** submenu under the **System Setup** menu. The RDU501 can automatically obtain time from the time server. Enter the **IP addresses** of the **primary and secondary servers** in turn, enter the **calibration interval**, select the **time zone**, and the **timing protocol type**, then click the **Settings** button to make the settings take effect, as shown in Figure 3-146.
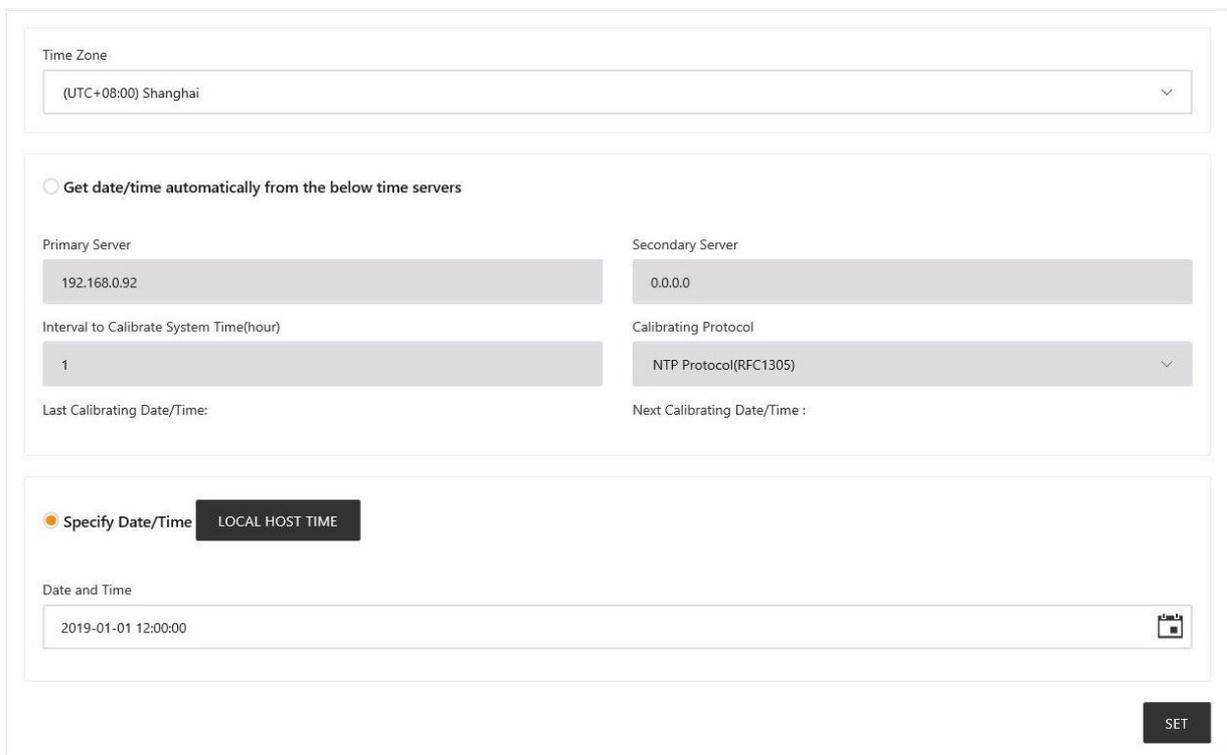


*Figure 3-146    Time calibration*

The RDU501 can also acquire the local time, select the **current calibration time** and click the **Get Local Time** button to get the local time, then click the **Setting** button to make the new time take effect.

  📖      **Note**

Time calibration defaults to Use the **current time calibration**.

### Restore default

Click the **Restore Default** submenu under the **System Settings** menu to bring up the page shown in Figure 3-147.

*Figure 3-147    Restore default*

Click the **Restart RDU501** button to restart the system.

Click the **Restore Default** button to restore the RDU501 to the default settings.

📖     **Note**

If the user uses the recovery function, the RDU501 will restore the original configuration scheme. After the recovery operation, please confirm to wait for 1 minute and then re-enter the RDU501 through the network to make it complete initialization.

### Site information settings

Click the Site Information Settings submenu under the System Settings menu to bring up the page shown in Figure 3-148.



*Figure 3-148    Site information settings*

User can modify the site information of the RDU501, including the **site name, site location,** and **site description**.

### Authorization code management

Click the **Authorization Code Management** submenu under the **System Settings** menu to bring up the page shown in Figure 3-149.



*Figure 3-149    Authorization code management*

On the **authorization code management** page, the user can complete the authorization of the restricted function (such as SNMP service) and the existing authorized function. When the user obtains the authorization code, enter the legal authorization code in the authorization code input box, and click the **Save** button to complete the installation. The licensable functions of the RDU501 are shown in Table 3-6.

*Table 3-6 Overview of RDU501 authorization functions*

| Authorization function | Description |
|---|---|
| Air conditioner teamwork control | Authorized air conditioner teamwork control version and number of air conditioners participating in teamwork control, authorized to connect up to 32 air conditioners to participate in teamwork control |
| SNMP service | Authorized to open SNMP agent service |

| Authorization function | Description |
|---|---|
| Maximum number of devices connected | Max number of connected power and environment monitoring devices authorized to expand, can be expanded to 64 intelligent power and environment monitoring devices |
| SmartAisle air conditioner teamwork control | Authorized to open SmartAisle air conditioner teamwork control, while turning off standard air conditioner teamwork control function |

📖     **Note**

The authorization code of some functions will not take effect until the system is successfully installed.

### System title setting

Click the **System Title Settings** submenu under the **System Settings** menu to bring up the page shown in Figure 3-150.



*Figure 3-150    System title setting*

In the page shown in Figure 3-150, the user can modify the system title directly above the page. Enter the self-defined system title in the **System Title** text box and click the **CONFIRM** button to make it effective.

### About RDU501

In the RDU501 homepage, click the **About RDU501** submenu under the **System Settings** menu. The page shown in Figure 3-151 is displayed. The RDU501 page displays the **software version, serial number**, and **feature code** of the RDU501 and provides the user manual download link.



| | |
|---|---|
| Software Version: | V 1.00 Build:270f457 |
| Series Number: | 21023123402185020001 |
| Identify Code: | 16ea-ee52-a309 |
| RDU501 User Manual | Click here to download RDU501 User Manual(PDF Format) |

*Figure 3-151    About RDU501*

# Chapter 4   Maintenance

This chapter describes the maintenance of RDU501, including restoring default settings and troubleshooting.

## 4.1   Restore Default Settings

Restoring the default settings can be done in both software and hardware.

For software recovery, see Restoring Defaults in section *3.4.9      System setting.*

Hardware recovery includes restoring the RDU501 administrator password (default username: admin, password: Vertiv) and the IP address of the RDU501 (for the default IP address, see *1.1.1 Network Ports in the RDU501 main unit section*). The method is as follows: Press and hold the reset button (see Figure 4-1) for 4 seconds. After the running/alarm light is off, the RDU501 will restore the IP address and password after the system restarts.



Reset button

*Figure 4-1    Reset button*

## 4.2   Troubleshooting

**Issue 1**: Why does the RDU501 login page not appear when the RDU501 communication is normal?

Answer: There are three solutions to the above Issue:

Step 1: Please confirm the correctness of the IP address.

The RDU501 has two network cards. Please confirm whether the Ethernet cable is plugged into the wrong interface.

If it is a static IP address, refer to the Ethernet port in the RDU501 main unit section for the default IP value of the RDU501. If you have set the DHCP mode to obtain the IP address, see **Issue 2** to view the current IP address.

Step 2: Please confirm the connectivity of the IP address.

To confirm the IP address connectivity, use the ping command as follows:

1) Open a command prompt for the Windows operating system.

2) Enter "ping" and IP address on the command line (for example, ping 192.168.0.254) to see if the communication is successful, as shown in Figure 4-2.
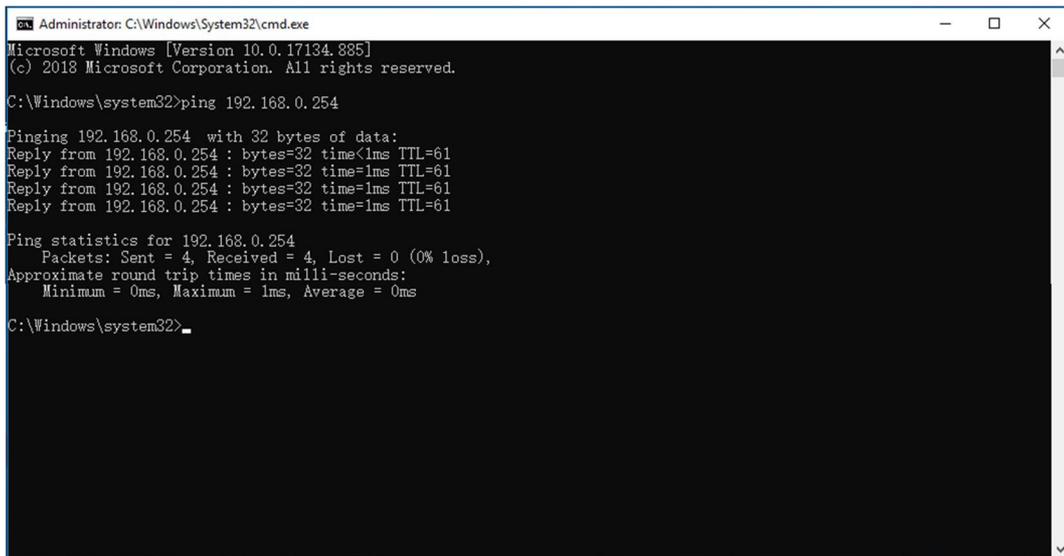
*Figure 4-2    Communication test*

Step 3: If the network connection is not completed after the above two steps, please use the reset button on the device body to restore the default IP.

Step 4: Refer to *3.1 Login Preparation* to complete the related operations.

**Issue 2**: How do I view the current IP address after setting up DHCP?

Answer: After setting up DHCP, you can check the current IP address by referring to the following steps:

Step 1: Connect a monitor through the DP1 port or HDMI port on the RDU501 host, and then insert a keyboard through the USB port on the RDU501 host.

Step 2: Press Ctrl + Alt + F1 at the same time to switch to the command line interface of RDU501, as shown in Figure 4-4.



*Figure 4-3    View network parameters*

Step 3: Enter the user name "admin" and the password "Vertiv" to log in to the RDU501 system, enter the command **1** and type Enter, continue to enter the command **2** and type Enter to view the IP address, subnet mask and gateway of the network card 1, as shown in Figure 4-4.

The network parameter viewing method of network card 2 is similar to that of network card 1: Enter command **1** and type Enter, continue to enter command **3** and type Enter.

```
Available Options:
 1) Ethernet Interfaces Information
 2) Network Ping Test
 3) Set RDU Time
 4) Stop RDU acu
 5) Download File into RDU
 6) Show Produce Information
 7) RDU version information
 8) Reboot the device system
Please select an option by # (or 0 to exit): 1
Available Options:
 1) enp0s20u5u2u1u1
 2) enp2s0
 3) enp3s0
Please select an option by # (or .. to navigate up a level or 0 to return to root menu): 2

*******************************************************************************************
ETHERNET INTERFACE INFORMATION
*******************************************************************************************
Name: enp2s0(LAN1)
Host Name: RDU-AF0447BD-593C-0E64-DC80-00045F4506A9
-----------------------------------------------------------------------------------------
Interface Enabled? true
MAC Address: 00:04:5f:45:06:a9
-----------------------------------------------------------------------------------------
Identified Speed in MBPS: 100
Full Duplex? true
Speed/Duplex Auto-Negotiated? true
Maximum Transmission Unit (MTU) Size: 1500
-----------------------------------------------------------------------------------------
Name Servers:

    Name Server #1 - 8.8.8.8
    Name Server #2 - 8.8.4.4
    Name Server #3 - 2001:4860:4860::8888
    Name Server #4 - 2001:4860:4860::8844
-----------------------------------------------------------------------------------------
IPv6 Addresses:

    Address #1
    ----------------
    Address: fe80::204:5fff:fe45:6a9
    Prefix Length: 64
    Origin: DHCPv6
    State: Preferred

-----------------------------------------------------------------------------------------
IPv4 Addresses:

    Address #1
    ----------------
    Address: 192.168.0.254
    Subnet Mask: 255.255.255.0
    Origin: Static
    Gateway: 192.168.0.1

-----------------------------------------------------------------------------------------
Available Options:
 1) UPDATE Name Servers
 2) UPDATE IPv4 Static
 3) UPDATE IPv4 Dhcp
 4) UPDATE IPv6 Dhcp
 5) UPDATE IPv6 Static
Please select an option by # (or .. to navigate up a level or 0 to return to root menu): █
```

*Figure 4-4 RDU501 command line interface*

**Issue 3**: How do I troubleshoot a sensor?

**Fault phenomenon 1**: The intelligent sensor has no display and cannot be displayed on the RDU501 web page.

Answer: Take following steps below to troubleshoot:

1) Confirm whether the intelligent sensor is connected to the SENSOR port of the RDU501. At the same time, the address "1" within the group can only be connected to SENSOR1, and the address "2" within the group can only be connected to SENSOR2.

2) Check if the connecting cable is intact, the connector crimping wire is intact, and whether it is a direct-through cable;

3) Check if the intelligent sensor is normal;

4) Make sure the sensor address is not 00;

5) If multiple intelligent sensors are connected, make sure the sensor addresses are not duplicated and follow the steps 2 and 3 one by one.

**Fault phenomenon 2**: The alarm indicator of the intelligent sensor is always on.

Answer: Return the intelligent sensor to the service center of the Vertiv office.

**Fault phenomenon 3**: There are intelligent communication failure alarms in the RDU501 historical alarm.

Answer: Check that the cable clamp is intact. Check if the cable connection is loosened.

**Issue 4**: After the alarm is generated, no email or SMS notification is received, or if the alarm is not ceased, the number of email or SMS notifications is less than 3. How to deal with it?

Answer: Take following steps below to troubleshoot:

1) Please check whether the SMS module and mail server configuration are correct. For details, see *3.4.8 Configuration Management*.

2) If you have not received the SMS notification:

● Please confirm whether the telephone card has been suspended and is in arrears;

● Please contact the operator to confirm whether the SMS function is blocked;

● If you are using the TD8311 SMS MODEM, the TD8311 SMS MODEM does not support China Telecom card. If you use China Mobile or China Unicom card, please contact the operator to confirm whether the 2G network has been shut down.

3) If you have not received the email notification, please click menu **Data Management** -> **Log Data** to check whether the alarm notification sending log has a record of failed mail delivery. If there is, it means the network is busy or the mail server communication is busy.

**Issue 5:** When the first login system has an alarm or a new alarm is generated, there is no alarm sound. How to deal with it?

Answer: Take following steps below to troubleshoot:

1) Please check if the current computer is muted and can play other sounds normally;

2) Please check if the browser allows the website to play sounds;

This document uses the settings of Chrome, IE, and Safari as an example for brief description. For other browser settings, please refer to the following descriptions in implementation.

Chrome: Settings - Advanced - Website Settings - Sounds, check if there is a current system address under the "Mute" item, if it exists, please delete it;

IE: Internet Options - Advanced - Multimedia, check the "Play sounds in web pages" item, click the Apply button;

Safari: Preferences - Website - Auto Play, set the current system address to "Allow all auto play";

Note, due to the continuous development of the browser, the above settings may change or fail.

**Issue 6:** Set the web access mode to https, and successfully access it, and then modify it to http access. When prompted 404, how to deal with it?

Answer: Please clear the browser cache and access it again with http.

**Issue 7:** How to deal with the communication failure of IT equipment accessed through IPMI2.0 protocol?

Answer: Take following steps below to troubleshoot:

1) Please check the user manual provided by the server manufacturer to confirm whether the server supports the IPMI2.0 protocol. If it is supported, go to step 2;

2) Please refer to the ping command usage method in **Issue 1** to check the connectivity of the server's IP address. If the network connection is normal, go to step 3.

3) Please check whether the relevant parameters of the IPMI device management page are correct, including: IP address, port, username and password. If it is correct, go to step 4;

4) If the above check results are normal, it may be that the server side rejects the session request of the RDU501. Please contact Vertiv technical service personnel.

**Issue 8:** The video device connection test is normal, but the real time video and historical video cannot be previewed, how to deal with it?

Answer: The problem may be caused by the upgrade of the video device plug-in and the local video plug-in does not meet the device requirements. Take following steps below to troubleshoot:

1) First uninstall the browser playback plug-in "webcomponent.exe" installed on the local computer;

2) Access the video device directly, install the new version of webcomponent.exe according to the instructions on the video device webpage, and confirm that the video can be previewed normally on the webpage of the video device;

3) Check whether the video can be previewed normally on RDU501.

# Appendix 1   Abbreviations

| AC | Alternating Current |
|------|-------------------------------------------------------------|
| DI | Digital Input |
| IE | Internet Explorer, a Web browser developed by Microsoft@ |
| FAQ | Frequently Asked Questions |
| IPMI | Intelligent Platform Management Interface |
| BMC | Baseboard Management Controller |
| FRU | Field Replaceable Unit |
| PUE | Power Usage Effectiveness |

# Appendix 2   Standard Configuration List

| No. | Description | Quantity | Unit |
|---|---|---|---|
| 1 | RDU501 intelligent monitoring unit | 1 | EA |
| 2 | RDU501 intelligent monitoring unit installation and commissioning manual | 1 | EA |
| 3 | Small hardware - 21-inch mounting ears | 2 | EA |
| 4 | Small hardware--RDU line card | 2 | EA |
| 5 | Wire and Cable-IEC60320 C13 Plug-IEC60320 C14 Plug-H05VV-F-3C-1mm^2-Black-2000mm-EU | 2 | EA |
| 6 | Small hardware -mounting ears | 2 | EA |
| 7 | Purchased complete set of cables -UH52SA1SL2-UH52SA1Z UPS Power USB Cable   ROHS | 1 | EA |
| 8 | M4×10 Standard parts-GB819.1-2000-cross recessed countersunk head screw M4×10 | 6 | EA |
| 9 | Complete sets or other labels - certificate label | 1 | EA |

# Appendix 3   FCC Certification Description

📖      **Note**

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the device is operated in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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