



SmartRow™ 2 Infrastructure Solution

User Guide

NAM, 10kW (2 to 3 Racks) and 20kW (3 to 5 Racks), 60 Hz

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

TABLE OF CONTENTS

1 Important Safety Instructions	1
2 Getting Started	5
2.1 Product Overview	5
2.2 Features and Benefits	5
2.3 System Appearance and Components	6
2.3.1 Power Management Cabinet (PMC) layout	7
2.3.2 IT rack layout	8
2.4 System Configurations	10
2.4.1 10kW system	13
2.4.2 20kW system	15
2.5 Configuration Specifications	17
2.6 Model Nomenclature	19
2.6.1 SmartRow™ 2 solution	19
2.6.2 PMC	20
2.6.3 IT rack cabinet model	21
2.6.4 Top cable tray model	22
2.7 Technical Specifications	23
2.7.1 Smart cabinet system	23
2.7.2 Power distribution system	23
2.7.3 Cooling system	24
2.7.4 Monitoring system	24
2.7.5 Security system	28
3 Connecting the Power Cables	29
3.1 Main System Input Connection	29
4 Powering On/Off the System	31
4.1 Power-On Checklist	31
4.2 System Startup	32
4.3 System Shutdown	32
5 Configuring the Network Settings	35
5.1 Vertiv™ Liebert® RDU-THD Sensors	35
5.1.1 Setting the THD sensor address	35
5.2 Power Distribution Unit (PDU)	36
5.2.1 Setting the PDU IP address	38
5.2.2 Restoring account information	39
5.3 Intelligent Locks	39
5.3.1 Setting the communication address	39
5.3.2 Communication address example	40

5.4 Uninterruptible Power Supply (UPS)	41
5.4.1 Prerequisites	41
5.4.2 Setting the UPS IP address	41
5.5 Cooling Systems	45
5.5.1 Prerequisites	45
5.5.2 Setting the cooling system IP address	45
5.5.3 Setting up the Vertiv™ Liebert® CRD10	49
5.5.4 Setting up the Vertiv™ Liebert® CR019	51
5.6 (Optional) IP Camera	59
5.6.1 Installing on a Network	59
5.6.2 Identifying the dynamic IP address	59
5.6.3 Configuring the default IP address	59
5.6.4 Configuring the On-Screen Display (OSD)	60
5.6.5 Configuring the video parameters	60
5.7 (Optional) Network Video Recorder (NVR)	60
5.7.1 Installing on a Network	60
5.7.2 Identifying the dynamic IP address	60
5.7.3 Configuring the default IP address	61
5.7.4 Adding the IP camera to the NVR	61
5.7.5 Enabling Onvif	61
5.7.6 Formatting a hard disk	62
5.7.7 Configuring the recording schedule	62
6 Navigating the LCD Screen	63
6.1 Home	63
6.2 Thermal	65
6.2.1 Sampling	65
6.2.2 Settings	66
6.3 Power	68
6.3.1 UPS	68
6.3.2 PDU	70
6.4 Environment (ENV)	71
6.4.1 Sampling	71
6.4.2 Settings	72
6.5 Alarms	73
6.5.1 Active	73
6.5.2 History	74
6.6 Logs	75
6.7 Settings	76
6.7.1 Password	76
6.7.2 Network	77

6.7.3 System	79
6.7.4 Configuration	80
7 Navigating the Monitoring Unit Web User Interface (UI)	81
7.1 Login	81
7.2 Home	82
7.2.1 Facility overview	84
7.2.2 IT devices overview	84
7.3 Device	84
7.3.1 Device type	84
7.3.2 Overview	85
7.3.3 Sampling	86
7.3.4 Control	86
7.3.5 Setting	86
7.4 Safe Management (Mgmt)	87
7.4.1 Fire fighting	87
7.4.2 Door access management	87
7.4.3 (Optional) Video surveillance	90
7.5 Power Management (Mgmt)	92
7.5.1 Calculation setting	93
7.6 Device Options	94
7.6.1 Signal setting	94
7.6.2 Alarm actions	96
7.7 Additional Information	97
8 General Maintenance	99
8.1 Cabinet Inspection Checklist	100
8.2 Cooling System Maintenance Schedule	101
9 Troubleshooting	103
9.1 Monitoring Unit Common Issues and Solutions	103
9.2 SmartRow™ 2 Common Issues and Solutions	106
Appendices	109
Appendix A: Technical Support and Contacts	109

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1 Important Safety Instructions

This manual contains important safety instructions that should be followed during the installation and maintenance of the Vertiv SmartRow™ 2 Infrastructure Solution. Read this manual thoroughly before attempting to install or operate this cabinet. Retain this manual for the entire service life of the product.

Only skilled persons should move, install or service this equipment. Any operation that requires opening doors or equipment panels must be carried out only by the skilled persons.

Adhere to all warnings, cautions, notices and installation, operating and safety instructions on the cabinet and in this manual. Follow all installation, operation and maintenance instructions and all applicable national and local building, electrical and plumbing codes.

To identify the cabinet model and serial number for assistance or spare parts, locate the identification label on the cabinet.



WARNING! Risk of improper wiring, piping, moving, lifting, and handling. Can cause equipment damage, serious injury or death. Only skilled personnel wearing appropriate OSHA-approved personal protective equipment (PPE) should attempt to move, lift, remove packaging from or prepare the cabinet for installation.



WARNING! Some parts of the cabinet have high voltage. Special tools must be used when operating the cabinet. Direct or indirect contact with these parts through damp objects can cause injury or death.



WARNING! Before connecting cables, confirm whether the labels match site requirements. Ethernet cables should be bound separately from the cables with strong current or high voltage.



WARNING! The installation and routing of cables must comply with local and national codes and regulations. The cables with large leakage currents must be grounded before the cabinet is powered on.



WARNING! Risk of contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power-supply disconnect switches, verify with a voltmeter that the power is off, and verify that all fan blades have stopped rotating before working in the cabinet or on the fan assembly.



WARNING! Risk of hair, clothing and jewelry entanglement with high speed rotating fan blades. Can cause equipment damage, serious injury or death. Keep hair, jewelry and loose clothing secured and away from rotating fan blades during operation.



WARNING! Risk of contact with extremely hot and/or cold surfaces. Can cause injury. Verify that all components have reached a temperature that is safe for human contact or wear appropriate, OSHA-approved PPE before working within the electric connection cabinet. Perform maintenance only when the cabinet is de-energized and component temperatures have become safe for human contact.



WARNING! There is risk of electrical shock, which may lead to personal injury or death.



CAUTION: High touch current. The protective conductor current of the cabinet is 19 mA. The cabinet must be connected to the earth before connecting to a power supply.



CAUTION: Avoid touching or having skin contact with the residual gas and oils in the compressor. Wear long rubber gloves to handle contaminated parts. The air conditioning system contains refrigerant. The release of refrigerant is harmful to the environment.



CAUTION: Avoid placing tools and metal objects on the battery's surface.



CAUTION: Disconnect all power (including the product's breaker and all UPS power) before beginning any operations on the inner components of the product.



CAUTION: During installation, charging operations are prohibited.



CAUTION: The presence of sharp edges, objects, and bare hooks poses a risk of injury; therefore, use caution when handling any of the aforementioned items.



CAUTION: If the cable tray is self-configured by the user, use caution when separating the strong and weak cables to avoid signal interference.

NOTICE

- After an alarm sounds via the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit, it is critical to determine and treat the cause quickly to avoid further system damage.
- The unit control must be used exclusively for its intended purpose. This product is tailored for industrial, commercial, or other professional units (such as manufacturing, electrical, and instrumentation setups). It is not meant for purposes related wholly to individuals without the necessary credentials. Strict adherence to the norms and usage should be observed. The purpose of the design is well-defined; therefore, the manufacturers do not assume any responsibility for any incorrect usage. The warranty is void in the case of improper use or modifications.
- Professional maintenance personnel must be provided with a key to the product as needed when servicing the equipment.
- Read all provided instructions, including labels on the unit and components. While the warnings and cautionary notes within this document must be observed, they do not account for all safety points. Therefore, the information listed on the labels must be strictly considered before any operation.
- Ensure all appropriate parts and components are included.
- Check the nameplate to verify the voltage matches the available main breaker.
- Adhere to all local protocols and rules. These may vary by region.

- Disconnect the control box and remote power supplies.
- This product is only suitable for the TN-S type power grid; it does not apply to the IT type power grid.

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2 Getting Started

2.1 Product Overview

The SmartRow™ 2 solution is a fully enclosed, intelligent cabinet, integrated with an air conditioner, emergency fan, Uninterruptible Power Supply (UPS), Power Management Cabinet (PMC), and Power Distribution Unit (PDU). The PMC and air conditioner are positioned along the side panel, maximizing the amount of rack mounting space available for IT equipment. To ensure a clean environment for critical devices, the hot aisle and cold aisle are contained within the cabinet. The cabinet can be monitored and managed through a 9-inch LCD screen and web User Interface (UI), which provides access to the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit. The system design complies with industry requirements and standards (EIA-310-E) and allows for scalability with a total of 15 different system configurations to meet specific user needs.

The cabinet system is assembled and installed by Vertiv Services. This document provides instructions and information related to power cable connections, system startup, network configurations, basic operations and capabilities, and maintenance and troubleshooting.

NOTE: For more detailed information about operating the components of the cabinet system, please refer to the user documentation accompanying that specific component. Alternatively, user documentation can be found on the product pages at www.Vertiv.com.

2.2 Features and Benefits

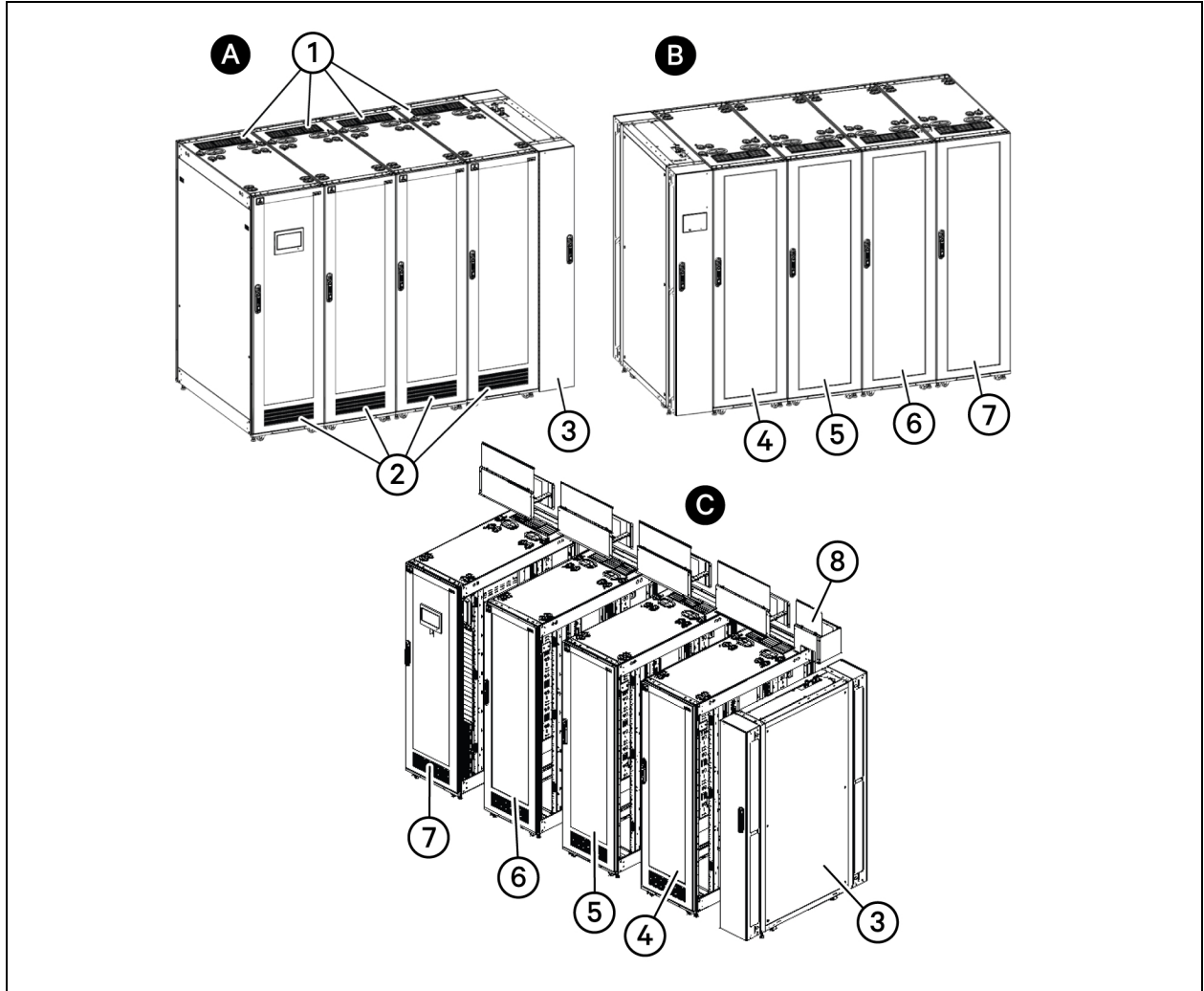
The SmartRow™ 2 solution provides the following features and benefits for your data center:

- Centralized power supply, refrigeration, and management
- Fully enclosed hot and cold aisles
- Configurable security systems, intelligent locks, and optional IP cameras to improve the security of the solution
- Internal circulation system that extends the life of IT equipment by ensuring the cabinet remains adequately clean and the temperature and humidity do not exceed their thresholds.
- Variable frequency precision air conditioning that improves the use of the system's electrical energy.
- Fully enclosed, double-layered top walkway groove that separates electricity lines and reduces electromagnetic interference.
- Rack-mounted UPS that supports single-machine/2N power supply modes and conforms to the national standard C, B, A three-stage room requirements.
- Rapid on-site deployment
- Ability to install the system directly on the floor, eliminating the need for supportive structures as needed with the construction of traditional engine rooms.
- Supports five large sub-systems and flexible upgrades for the HMI display and intelligent monitoring unit after operation. For more information, refer to [Technical Specifications](#).
- Short lead times.
- Centralized monitoring capabilities through the integrated environmental monitoring, power monitoring equipment, security monitoring, alarm linkage, and intelligent control functions. For more information, refer to [Navigating the Monitoring Unit Web User Interface \(UI\)](#) on page 81.
- Large, 9-inch wide-screen LCD provided with the PMC to monitor system operations and access system information anytime. Operations can also be monitored through the mobile app. For more information, refer to [Navigating the LCD Screen](#) on page 63.

2.3 System Appearance and Components

The following figure provides an overview of the SmartRow™ 2 solution. Based on your system configuration, the number of IT rack cabinets may vary. Refer to [System Configurations](#) on page 10 for more information.

Figure 2.1 Full Dimensional Solution View



Letter	Description	Number	Description
A	Front view	1	Hot aisle emergency fan
B	Rear view	2	Cold aisle emergency fan
C	Side view	3	Air conditioner
		4	IT rack cabinet 3
		5	IT rack cabinet 2

Letter	Description	Number	Description
		6	IT rack cabinet 1
		7	Power Management Cabinet (PMC)
		8	Top cable tray

2.3.1 Power Management Cabinet (PMC) layout

Figure 2.2 PMC Layout

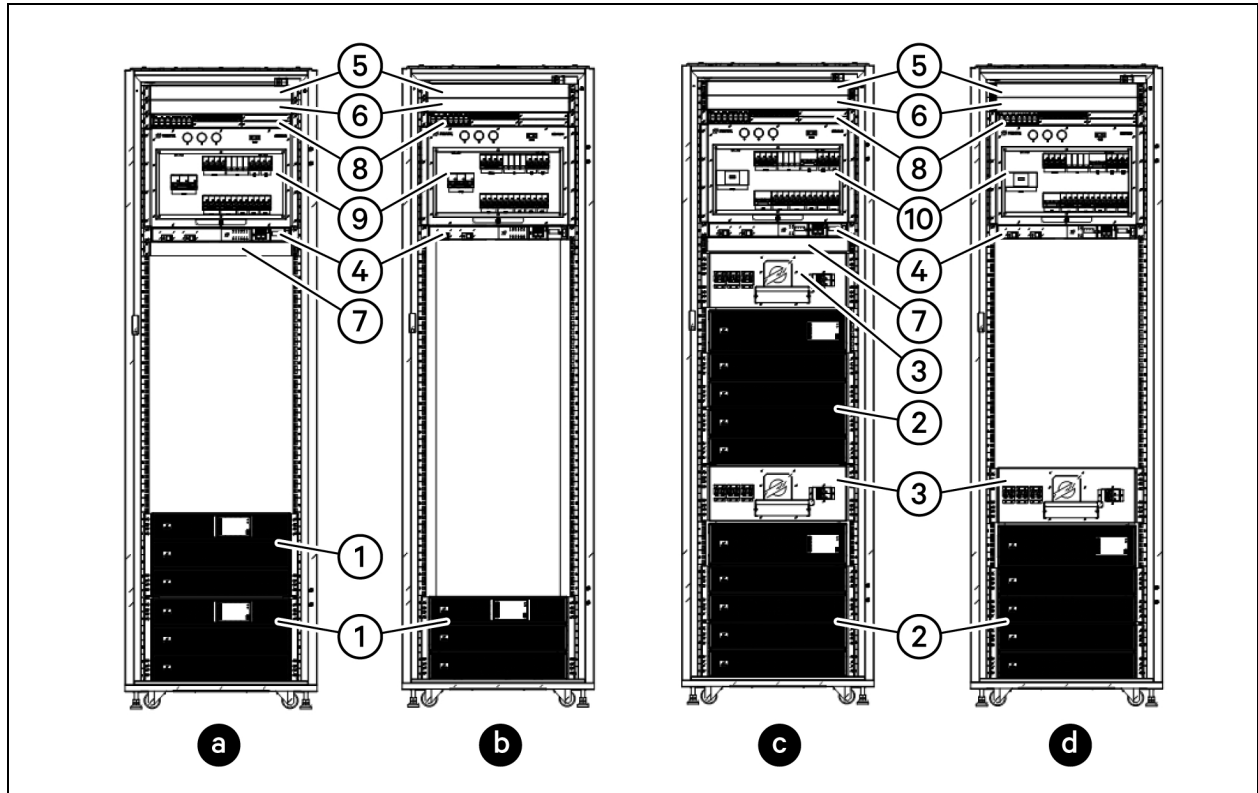


Table 2.1 PMC Layout

Letter	Description	Number	Description
a	PMC10 2N power supply	1	10kVA UPS
b	PMC10 single power supply	2	20kVA UPS
c	PMC20 2N power supply	3	Maintenance Bypass Cabinet (MBC)
d	PMC20 single power supply	4	Vertiv™ Geist™ Switched PDU - Fan Controller
		5	(Optional) NVR - put on rear side
		6	TRENDnet 24-Port Gigabit PoE+ Switch
		7	Vertiv™ Geist™ Rack Transfer Switch (RTS)

Table 2.1 PMC Layout (continued)

Letter	Description	Number	Description
		8	Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit
		9	10K PMU
		10	20K PMU

NOTE: Available U-space in the cabinet should not be used for customer IT devices. During PMC installation, cover the available U-space with supplied blanking panels.

Table 2.2 PMC Components

Serial Number	Description
1	Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit
2	Power Management Unit (PMU)
3	Vertiv™ Liebert® RDU-THD sensor
4	Emergency fan
5	LED lights and control components
6	HMI display
7	Intelligent locks

2.3.2 IT rack layout

Table 2.3 IT Rack Accessories

Model Number	Accessory
VRA1000	1U Horizontal Cable Manager w/D Rings
VRA1001	2U Horizontal Cable Manager w/D Rings
VRA1002	1Ux4" Horizontal Cable Manager with Cover
VRA1003	2Ux4" Horizontal Cable Manager with Cover
VRA1022	2Ux6" Horizontal Cable Manager with Cover
VRA1023	1Ux6" Horizontal Cable Manager with Cover
VRA2000	1U 19" Black Plastic Tool Less Airflow Blanking Panel (Qty. 10)
VRA2001	1U 19" Black Plastic Tool Less Airflow Blanking Panel (Qty. 200)
VRA2002	19" Blanking Panel Kit 1, 2, 4, 8U
VRA2003	19" Blanking Panels 1U
VRA2004	Air Recirculation Prevention Kit
VRA2013	2U 19" Black Plastic Tool Less Airflow Blanking Panel (Qty. 10)
VRA2014	2U 19" Black Plastic Tool Less Airflow Blanking Panel (Qty. 100)
VRA3000	1U Depth Adjustable Fixed Shelf 250 lbs.

Table 2.3 IT Rack Accessories (continued)

Model Number	Accessory
VRA3001	2U 19" Fixed Shelf 50 lbs.
VRA3002	1U Depth Adjustable Sliding Shelf 100 lbs.
VRA3003	1U Depth Adjustable
VRA3004	1U Depth Adjustable

2.4 System Configurations

The SmartRow™ 2 solution offers 15 total system configuration options.

Note the following information about system configurations:

- The environmental conditions of the system should be indoors with temperatures ranging from 32 °F to 104 °F (0 °C to 40 °C).
- The floor must be level and continuous with no breaks disrupting the surface. For example, expansions joints and raised floor tile gaps should be sealed, no floor drains should be present, and so on.
- Ensure there are no water sprinkler heads within 20 inches (0.5 m) of the system.
- Install the system in accordance with national and electrical codes.
- Refer to **Table 2.4** below for the system and component dimensions.
- Refer to **Table 2.5** on the facing page for the rack, cooling, and power capacity of each configuration.

Table 2.4 Dimensions of System Configurations

SKU	Row Dimensions, (L x H x D) in. (mm.) ¹	Row Weight, lbs. (kg.)	Minimum Staging Area, ft ² (m ²)	Rack Type, U x in. x in. (mm. x mm.)	Main Input Breaker Size ²	Condenser Breaker Size	Condenser Dry Weight, lbs. (kg.)
SR2N02010NAA1	82.7 x 107 x 55.2 (2100 x 2249 x 1400)	4651.8 (2110)	116.8 (10.85)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N02010PAA1	82.7 x 107 x 55.2 (2100 x 2249 x 1400)	4713.5 (2138)	123.1 (11.43)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N02010FAA1	94.5 x 107 x 55.2 (2400 x 2249 x 1400)	6089.2 (2762)	151.9 (14.11)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N03010NAA1	106.3 x 107 x 55.2 (2700 x 2249 x 1400)	5026.5 (2288)	131.4 (12.2)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N03010PAA1	106.3 x 107 x 55.2 (2700 x 2249 x 1400)	5136.8 (2330)	137.6 (12.78)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N03010FAA1	118.2 x 107 x 55.2 (3000 x 2249 x 1400)	6512.5 (2954)	166.5 (15.46)	42U x 23.6 x 55.1 (600 x 1400)	100A	N/A ³	132.3 (60)
SR2N03020NAA1	106.3 x 107 x 55.2 (2700 x 2249 x 1400)	6000.1 (2722)	137.6 (14.9)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N03020PAA1	106.3 x 107 x 55.2 (2700 x 2249 x 1400)	6093.6 (2764)	182.5 (16.95)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N03020FAA1	118.2 x 107 x 55.2 (3000 x 2249 x 1400)	7469.3 (3388)	224.6 (20.86)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)

Table 2.4 Dimensions of System Configurations (continued)

SKU	Row Dimensions, (L x H x D) in. (mm.) ¹	Row Weight, lbs. (kg.)	Minimum Staging Area, ft ² (m ²)	Rack Type, U x in. x in. (mm. x mm.)	Main Input Breaker Size ²	Condenser Breaker Size	Condenser Dry Weight, lbs. (kg.)
SR2N04020NAA1	130 x 107 x 55.2 (3300 x 2249 x 1400)	6393.4 (2900)	175 (16.25)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N04020PAA1	130 x 107 x 55.2 (3300 x 2249 x 1400)	6516.9 (2956)	197 (18.3)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N04020FAA1	141.8 x 107 x 55.2 (3600 x 2249 x 1400)	7890.3 (3579)	239.1 (22.21)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N05020NAA1	153.6 x 107 x 55.2 (3900 x 2249 x 1400)	6783.6 (3077)	189.5 (17.6)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N05020PAA1	153.6 x 107 x 55.2 (3900 x 2249 x 1400)	6937.9 (3147)	211.6 (19.65)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)
SR2N05020FAA1	165.4 x 107 x 55.2 (4200 x 2249 x 1400)	8313.6 (3771)	253.6 (23.56)	42U x 23.6 x 55.1 (600 x 1400)	175A	15A	260.2 (118)

Table 2.5 Rack, Cooling, and Power Capacity of System Configurations

SKU	IT Racks per Row	Capacity per Rack (kW)	Maximum Row Capacity (kW)	Cooling Units per Row	Redundancy Type	PDU's per Row	Distribution Type
SR2N02010NAA1	2	5	10	1	No redundancy	2	10kW PMC
SR2N02010PAA1	2	5		1	Power (PDU + UPS)	4	
SR2N02010FAA1	2	5		2	Power + Cooling	4	
SR2N03010NAA1	3	3.3		1	No redundancy	3	
SR2N03010PAA1	3	3.3		1	Power (PDU + UPS)	6	
SR2N03010FAA1	3	3.3		2	Power + Cooling	6	

Table 2.5 Rack, Cooling, and Power Capacity of System Configurations (continued)

SKU	IT Racks per Row	Capacity per Rack (kW)	Maximum Row Capacity (kW)	Cooling Units per Row	Redundancy Type	PDU per Row	Distribution Type
SR2N03020NAA1	3	6.6	20	1	No redundancy	3	20kW PMC
SR2N03020PAA1	3	6.6		1	Power (PDU + UPS)	6	
SR2N03020FAA1	3	6.6		2	Power + Cooling	6	
SR2N04020NAA1	4	5		1	No redundancy	4	
SR2N04020PAA1	4	5		1	Power (PDU + UPS)	8	
SR2N04020FAA1	4	5		2	Power + Cooling	8	
SR2N05020NAA1	5	4		1	No redundancy	5	
SR2N05020PAA1	5	4		1	Power (PDU + UPS)	10	
SR2N05020FAA1	5	4		2	Power + Cooling	10	

The following sections provide visuals of the various system configurations. Please reference **Table 2.4** on page 10 and **Table 2.5** on page 11 for descriptions of the each configuration.

2.4.1 10kW system

Figure 2.3 SR2N02010NAA1 and SR2N02010PAA1



Figure 2.4 SR2N02010FAA1



Figure 2.5 SR2N03010NAA1 and SR2N03010PAA1



Figure 2.6 SR2N03010FAA1



2.4.2 20kW system

Figure 2.7 SR2N03020NAA1 and SR2N03020PAA1



Figure 2.8 SR2N03020FAA1



Figure 2.9 SR2N04020NAA1 and SR2N04020PAA1



Figure 2.10 SR2N04020FAA1



Figure 2.11 SR2N05020NAA1 and SR2N05020PAA1



Figure 2.12 SR2N05020FAA1



2.5 Configuration Specifications

The following table describes the specifications of the standard system configurations. For more information, see [System Configurations](#) on page 10.

Parameter		Specification							
		1x Cooling 1x PMC 2x Racks	1x Cooling 1x PMC 3x Racks	2x Cooling 1x PMC 2x Racks	2x Cooling 1x PMC 3x Racks	1x Cooling 1x PMC 4x Racks	2x Cooling 1x PMC 4x Racks	1x Cooling 1x PMC 5x Racks	2x Cooling 1x PMC 5x Racks
Size (L x D x H)	System	82.7 in. x 55.1 in. x 88.6 in. (2100 mm. x 1400 mm. x 2250 mm.)	94.5 in. x 55.1 in. x 88.6 in. (2400 mm. x 1400 mm. x 2250 mm.)	106.3 in. x 55.1 in. x 88.6 in. (2700 mm. x 1400 mm. x 2250 mm.)	118.1 in. x 55.1 in. x 88.6 in. (3000 mm. x 1400 mm. x 2250 mm.)	129.9 in. x 55.1 in. x 88.6 in. (3300 mm. x 1400 mm. x 2250 mm.)	141.7 in. x 55.1 in. x 88.6 in. (3600 mm. x 1400 mm. x 2250 mm.)	153.5 in. x 55.1 in. x 88.6 in. (3900 mm. x 1400 mm. x 2250 mm.)	165.4 in. x 55.1 in. x 88.6 in. (4200 mm. x 1400 mm. x 2250 mm.)
	Air Conditioner (with frame)	118 in. x 55.1 in. x 88.6 in. (300 mm. x 1400 mm. x 2250 mm.)							
	600 mm. Wide IT Rack Cabinet	23.6 in. x 55.1 in. x 88.6 in. (600 mm. x 1400 mm. x 2250 mm.)							
	PMC	23.6 in. x 55.1 in. x 88.6 in. (600 mm. x 1400 mm. x 2250 mm.)							
Available Installation Height ² (U) (1U=44.45 mm.)		84	126	84	126	168	168	210	210
Normal Cooling Capacity (kW) (Return air 35 °C (95°F), 26% humidity)		10		20					
Maximum Installation Depth		28.9 in. (734 mm.)							
Cooling Capacity (kW)		(30% to 100%)							
PAC ³	CRD10 ACFM	1960							
	CR019 ACFM	2250							
Color		RAL7021							
System Environmental Conditions		Indoor, 0 °C to 40 °C.							

Parameter		Specification							
		1x Cooling 1x PMC 2x Racks	1x Cooling 1x PMC 3x Racks	2x Cooling 1x PMC 2x Racks	2x Cooling 1x PMC 3x Racks	1x Cooling 1x PMC 4x Racks	2x Cooling 1x PMC 4x Racks	1x Cooling 1x PMC 5x Racks	2x Cooling 1x PMC 5x Racks
Condenser Temperature and Humidity	Indoor Unit	41°F to 113°F (5°C to 45°C)							
		5% - 80% (max dew point 82.4°F (28°C))							
	CCD10	5°F to 113°F (-15°C to 45°C)							
		5% - 95%							
	MCM	-30°F to 125°F (-34.4°C to 51.7°C)							
		5% - 95%							
<p>NOTE:</p> <p>1: The temperature for the Vertiv™ Liebert® CCD10 with a low ambient kit is -29.2°F -113°F (-34°C - 45°C). Total storage time of the units should not exceed 6 months, or its performance needs to be re-calibrated.</p> <p>2: In the calculations of the available installation height, please note that one rack has 42U space. If the system has an extender, the available rack U space will be used.</p> <p>3: If the configuration of multiple air-conditioning, in turn superimposed.</p>									

2.6 Model Nomenclature

This section explains the meaning of the model numbers for the system and its components. The Nomenclature tables associate each character of the model number with a numerical value. The Model Number Description tables provide descriptions for each numerical value (model number character).

For example, the model number for the PMC is MSR2-NP2DS2G22. **Table 2.8** on the next page attributes a number to each character in the model number. The attributed number can then be used to reference **Table 2.9** on the next page for an explanation of what each individual character represents.

2.6.1 SmartRow™ 2 solution

Table 2.6 Nomenclature

Model Number									
1	2	3	4	5	6	7	8	9	10
S	R	2	X	XX	XXX	X	X	X	X

Table 2.7 Model Number Description

Digit	Variable	Description
1-3	Containment	SmartRow™ 2 solution
4	Region	N: North America
5	Number of IT racks	02: 2 IT racks 03: 3 IT racks 04: 4 IT racks 05: 5 IT racks
6	Maximum row power at kW	010: 10 kW 020: 20 kW
7	Redundancy	N: No redundancy P: Power redundancy (redundant UPS + redundant rPDU) F: Power and thermal redundancy
8	Rack type	A: 42U x 600
9	UPS rating	A: 208 V, 2 ph, 60 Hz
10	Features	1: No fire suppression

2.6.2 PMC

Table 2.8 Nomenclature

Model Number													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
M	S	R	2	-	N	P	2	D	S	2	G	2	2

Table 2.9 Model Number Description

Digit	Variable	Description
1 - 4	Enterprise code	SmartRow™ 2 solution
5	-	-
6	Region	N: North America
7	Integrated power distribution	Power Management Cabinet (PMC)
8	UPS capacity	1: 10 kVA UPS (on-site) 2: 20 kVA UPS (on-site)
9	Power supply	S: Single D: 2N
10	Cabinet lock type	S: Intelligent door locks
11	Output capacity	1: 10kW 2: 20kW
12	PDU type	G: Vertiv™ Geist™ Monitored Rack PDU (on-site)
13	Number of air conditioners	1: 1 2: 2
14	Monitoring system	2: Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit

2.6.3 IT rack cabinet model

Table 2.10 Nomenclature

Model Number					
1	2	3	4	5	6
MSR2	-	N	R	6	S

Table 2.11 Model Number Description

Digit	Variable	Description
1	Enterprise code	SmartRow™ 2 solution
2	-	-
3	Region	N: North America
4	Cabinets	Rack
5	Cabinet type	6: 600 mm wide
6	Cabinet lock type	S: Intelligent door locks

2.6.4 Top cable tray model

Table 2.12 Nomenclature

Model Number						
1	2	3		4		
MSR2	-	C	T	3	0	0

Table 2.13 Model Number Description

Digit	Variable	Description
1	Enterprise code	SmartRow™ 2 solution
2	-	-
3	Cable tray	CT: Cable tray
4	Cable trough type	300: 300 mm wide (11.8 in) 600: 600 mm wide (23.6 in)

2.7 Technical Specifications

2.7.1 Smart cabinet system

The SmartRow™ 2 solution is a smart cabinet system that conforms to the industry-standard (EIA-310-E) of 19-inch cabinet hardware devices (IT rack cabinets and PMCs), which includes servers, voice, data, internet network equipment, and more for indoor environments, such as data centers or rooms.

The cabinet system includes the following parameters and components.

Table 2.14 IT Cabinet Configuration Specifications

Parameter/Component		Specification (Per Cabinet)
Dimensions (W x H x L)		23.6 in. x 55.1 in. x 78.7 in. (600 mm. x 2000 mm. x 1400 mm.)
Lock		Intelligent lock
Load		2866 lbs. (1300 kg.)
User Space		42U
Maximum Installation Depth		28.9 in. (734 mm.)
Smart Lighting	Front End	Three-color lights
	Rear Door	White light
Transportation		ISTA 3B

2.7.2 Power distribution system

The power distribution system includes a PDU module that is powered by either a Vertiv™ Liebert® GXT5 UPS 10kVA or a Vertiv™ Liebert® GXT5 UPS 20kVA. The 20kVA UPS contains internal battery modules.

The power distribution system includes the following parameters and components.

Table 2.15 PDU Configuration Specifications

Parameter/Component	Specification	
UPS Capacity	120/208 VAC	
Power Supply	Single or 2N power supply	
PDU Type	Vertiv™ Geist™ Monitored Rack PDU	
Capacity per PDU (to protect open space)	30A, 208V/30A, 120/208V	
Maximum Number of PDUs	10kVA System 6-way (2N)	20kVA System 10-way (2N)
Maximum Power per PDU	10kVA System Vertiv™ Geist™ VP4N30AS: 4.9kW PDU	20kVA System Vertiv™ Geist™ VP6N30AX: 5.7kW PDU
Power Distribution Modules	10kVA System An internal MBC is mounted to the UPS.	20kVA System An external VMBC and a rack PDU extender are used for the power connection.

2.7.3 Cooling system

The cooling system provides variable frequency precision air conditioning and emergency ventilation systems, as shown in the figures in [System Appearance and Components](#) on page 6 . Each cabinet contains one hot aisle and one cold aisle emergency fan. The emergency ventilation system is available for indoor environments, such as data centers and rooms. When the temperature of the cabinet exceeds its specified threshold, the ventilation system automatically turns on to combat the excessive heat and to allow time for maintenance personnel to troubleshoot the issue.

The cooling system includes the following parameters and components.

Table 2.16 Cooling System Configuration Specifications

Parameter/Component	Specification	
	CRD10	CR019
Dimensions (W x H x D)	11.8 in. x 78.7 in. x 56.7 in. (300 mm. x 2000 mm. x 1440 mm.)	
Load Dry	1232.4 lbs. (559 kg.)	1228 lbs. (557 kg.)
Cooling Power (kW)	10	20
Nominal Airflow (CFM)	1960	2250
Plenum Lock	Intelligent/one point	

2.7.4 Monitoring system

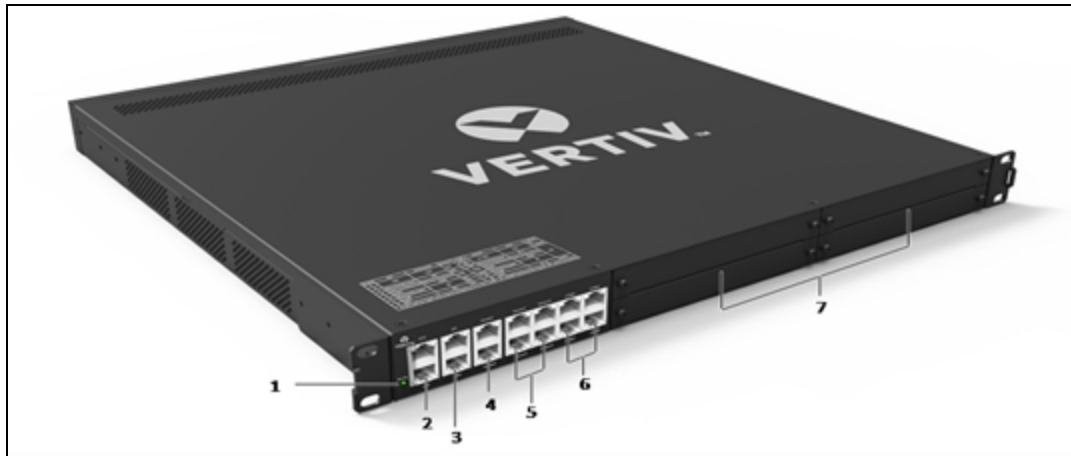
The monitoring system is comprised of the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit, which is located inside the PMC. The monitoring unit displays, manages, and controls information related to power device monitoring, environmental monitoring, and leak detection.

The monitoring system includes the following parameters and components.

Table 2.17 Monitoring System Configuration Specifications

Parameter/Component	Specification
HMI Display Screen	Human-machine interface (HMI) window where you can access, manage, and control key system information. The display is located on the front door of the PMC. NOTE: Use the DP1 port to connect the HMI display.
Temperature, Humidity, and Door (THD) Status Sensor	The THD sensor uploads the PMC's internal temperature, humidity, and door status detection data to the monitoring unit. Each THD sensor consists of four temperature probes located in the upper and lower parts of the front and rear cabinet door posts and two temperature and humidity probes located in the middle of the front and rear cabinet door posts.
Water Sensor	Water leakage monitoring and alarm.
Sound and Warning Light (strobe siren)	Emergency alarm device that can transmit signals for light and sound.
(Optional) EXP8COM Expansion Card	Hot swap connections are supported for the EXP8COM card for the SmartRow™ 2 solution via the four expansion slots on the monitoring unit. Refer to Figure 2.15 on page 27 and Table 2.18 on page 27 .

Figure 2.13 Monitoring Unit Front Panel



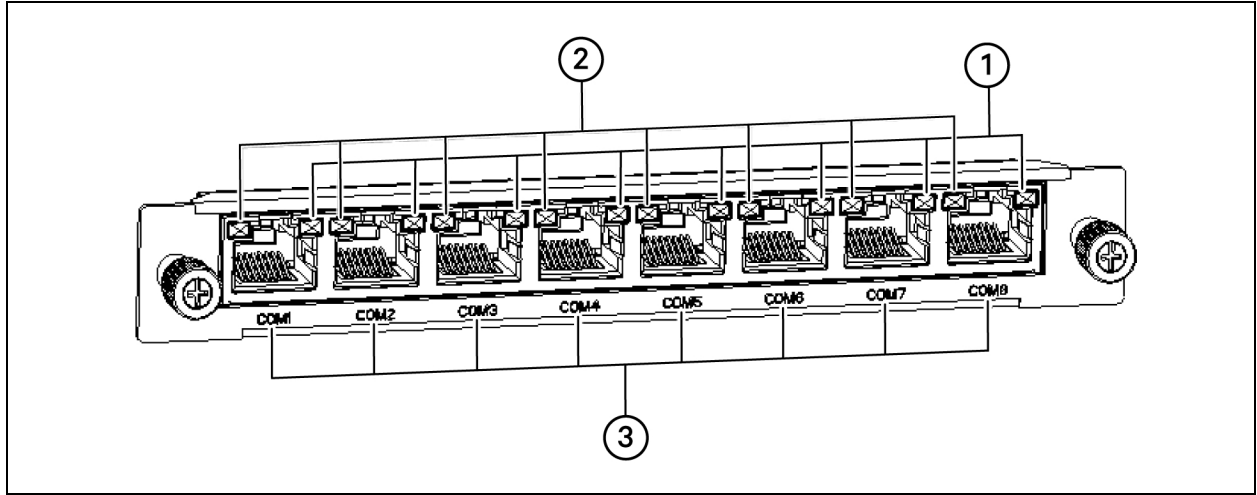
Number	Description
1	Status/alarm indicator
2	Digital Output (DO) port
3	Digital Input (DI) port
4	Smoke detector port
5	Sensor group 1 x 2 ports and sensor group 2 x 2 ports
6	COM/Serial ports
7	Four expansion slots

Figure 2.14 Monitoring Unit Rear Panel



Number	Description
1	Power input 1
2	Power indicator
3	Power input 2
4	Reset button
5	Optical fiber indicator
6	Optical SFP
7	Display Port (DP)
8	HDMI port
9	Ethernet (LAN) ports
10	USB ports

Figure 2.15 EXP8COM Card



Number	Description
1	Data receiving indicator 1-8
2	Data transmission indicator 1-8
3	Serial port 1-8

Table 2.18 EXP8COM Card Indicators

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

NOTE: For more detailed information about the intelligent monitoring unit, please see the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual shipped with the unit and located on www.Vertiv.com.

2.7.5 Security system

The security system consists of intelligent locks, optional IP cameras, and optional surveillance, enabling rack level security. The intelligent locks support local and remote door authorization, and an access log is recorded intelligently.

The security system includes the following parameters and components.

Table 2.19 Security System Configuration Specifications

Parameter/Component	Specification
Intelligent Door Lock	Allows five possible access methods: physical key, numerical code, remote control, opening card, or badge.
(Optional) Network Video Recorder (NVR)	Can transmit digital video streams via IP cameras, then store and manage the streams.
(Optional) IP Camera	A real-time, mountable monitoring device that enables live viewing from the web UI of the intelligent monitoring unit. A maximum of eight IP cameras can be supported by the NVR at once.

3 Connecting the Power Cables

3.1 Main System Input Connection



CAUTION: Before wiring, ensure the main MCB is open and disconnected.

To ground the main system power cable:

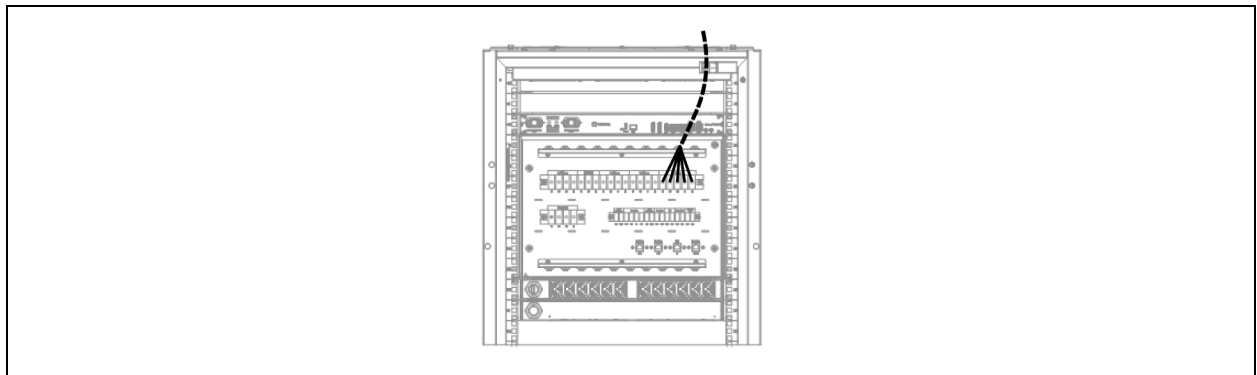
1. Cut the cable the appropriate length according to the specifications detailed in **Table 3.1** below .

Table 3.1 Cable Specifications

Input	Power Capacity	Minimum Cable Cross-Sectional Area (AWG) (Ambient Temperature: 25 °C/77 °F)	Open Space Minimum Size	Yellow-Green Ground Wire Cross-Sectional Area (mm ²) (Ambient Temperature: 25 °C/77 °F)
Into the server room to the distribution line products and open space	10 kVA	3	3P 100A	16
	20 kVA	2/0	3P 175A	35

2. Select the appropriate M6 terminal based on the wire diameter of the cable, then crimp the cable.
3. Ensure the rubber in the top hole on the right side of the PMC is installed correctly.
4. Pass the cut cable through the rubber hole , as shown in [PMC10/20 System Input Power Cabling Route](#) below
5. Follow the silk screen to the AC input terminal block and PMC (10kVA/20kVA UPS).

Figure 3.1 PMC10/20 System Input Power Cabling Route



6. After the wiring is completed, use the cable tie to fix the input cable to the side of the cable management board for strain relief.
7. Connect the system input ground wire to the main grounding bar. Please select the appropriate wire diameter according to [Cable Specifications](#) above .

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4 Powering On/Off the System

This chapter provides a list of tasks to complete prior to system startup and explains the commissioning process of powering on the system. Commissioning should only be carried out by trained and qualified personnel. Ensure all safety regulations are observed during the commissioning process.



CAUTION: Please remove rings, watches and other metal objects that may cause any short circuits. During operation, pay attention to high-pressure risks to avoid personal injury and property damage.

4.1 Power-On Checklist

Before powering on the SmartRow™ 2 solution, ensure all listed tasks have been completed.

Table 4.1 Power-On Checklist

Number	Task	Status
1	The horizontal and vertical cabinet installations are secure.	
2	All bolts are tightened, particularly for the electrical connections.	
3	The cabinet is clean, and all unnecessary material have been removed from the area.	
4	Vacant space has been used, and the U blanking panels are closed.	
5	The polarity of the battery is connected, and the cable connections are stable and accurate.	
6	If the bezel is installed, then the battery has been checked.	
7	All open space and cable model specifications are correct.	
8	Each power cable and single cable for the PMC and UPS is connected correctly to prevent short circuiting.	
9	The electrical system has been grounded.	
10	The ground connection is accessible and reliable.	
11	The communication line of the monitoring module, wire, and communication network has been checked, and the line sequence of all communication network cables is correct.	
12	All control switches are turned off.	
13	The wiring is neat, and cable ties meet process specifications.	
14	The door opening and closing is flexible, and the intelligent door locks work properly.	
15	The air conditioning piping system is connected properly with no leaks.	
16	The network addresses of each component have been configured properly. To verify, refer to the address setting table in Configuring the Network Settings on page 35	

4.2 System Startup

To start up the system:

1. Close the main input MCB (QF1) and surge protection MCB (QF2). For more details, refer to the schematic diagram placed on the PMU or submittal package document.
2. Close the UPS input circuit breaker on the PMU breaker panel (QF3 and QF4) and internal UPS input breaker.
3. Disconnect the UPS output, then turn on the UPS. For specific steps, refer to the manual shipped with the UPS.
4. Close the internal UPS output circuit breaker on the back of the UPS (QF11 and QF13 for 10kW; QF16 and QF22 for 20kW).
5. Close the AC/DC input (QF7) and DC power circuit breakers (QF8 and QF9 for 10kW; QF10 and QF11 for 20kW) on the PMU breaker panel.
6. For 10kW systems, close all connected output circuit breakers on the UPS PODs.

-or-

For 20kW systems, close all connected output circuit breakers on the MBCs and MBC PODs or extenders.

7. Close the circuit breakers (QF5 and QF6) for the air conditioning on the PMU breaker panel. For the condenser in the 20kW system, close the remote circuit breaker to the condenser.
8. Complete the address setting and debugging of each component. For specific steps, refer to [Configuring the Network Settings](#) on page 35.
9. Turn on the HMI screen and complete the scene configuration according to the system configuration status after logging in.
 - System Configuration AC (Quantity, Model) and Rack (Quantity)
 - PMC Configuration (UPS Model, UPS Redundance, Fire Suppression)
 - IT Cabinet Configuration (PDU Type, PDU Quantity, Cabinet Lock)

For further instructions, refer to [Navigating the LCD Screen](#) on page 63.

10. After the configuration is complete, the system is turned on. Turn on the user equipment to begin normal system operations.

4.3 System Shutdown

To shut down the system:

1. Power off all user IT equipment.
2. On the LCD screen, navigate to *Thermal – Settings* and enter the password.
3. Turn OFF the AC Power.
4. After the air conditioning stops, open the circuit breakers for the air conditioning (QF5 and QF6) on the PMU breaker panel. For the condenser in the 20kW systems, open the remote circuit breaker to the condenser.
5. For 10kW systems, open all output circuit breakers on the UPS PODs.

-or-

For 20kW systems, open all output circuit breakers on the MBCs and MBC PODs or extenders.

6. After disconnecting the fan controller and rPDUs, open the AC/DC input (QF7) on the PMU breaker panel.
7. Turn off the UPS, according to the user manual provided with the UPS model.

8. Open the UPS input circuit breaker (QF3 and QF4) on the PMU breaker panel. Ensure all electrical equipment is completely powered off.
9. Open the main Input breaker (QF1) and surge protection MCB (QF2). Ensure that the PMC equipment is disconnected (the power lights in PMU are off).
10. When finished, close all doors.

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5 Configuring the Network Settings

5.1 Vertiv™ Liebert® RDU-THD Sensors

A temperature and humidity string is installed on the front and rear doors of each cabinet in the system. The Temperature and Humidity Collector (THD) summarizes the temperature and humidity of each door. Setting the sensor address can be done only through the dialing code.

Before setting the THD sensor address, note the following information:

- The sensor address cannot be set as 00 as it is the broadcast address.
- DIP4 is the least significant. Address IT cabinet 1 has DIP4 at ON while others are OFF.
- DIP switch in the ON position means 1 or 0.

5.1.1 Setting the THD sensor address

To set the THD sensor address:

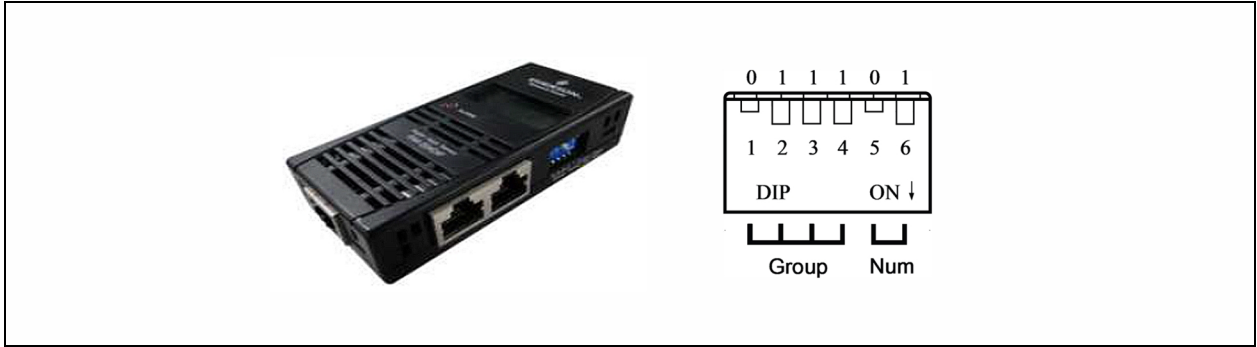
Refer to **Table 5.1** below and **Figure 5.1** on the next page .

Table 5.1 THD Sensor Address: Dial Code Settings

Cabinet	DIP1 - DIP4	Group Number	DIP5 - DIP6	Sequence Number
PMC (factory default)	1001	9	00	0
IT rack cabinet 1	0001	1	00	0
IT rack cabinet 2	0010	2	00	0
IT rack cabinet 3	0011	3	00	0
IT rack cabinet 4	0100	4	00	0
IT rack cabinet 5	0101	5	00	0

Group Number				Sequence Number		Address
DIP 1	DIP 2	DIP 3	DIP 4	DIP 5	DIP 6	
0	0	0	0	0	0	00
0	0	0	1	0	0	10
0	0	1	0	0	0	20
0	0	1	1	0	0	30
0	1	0	0	0	0	40
0	1	0	1	0	0	50
0	1	1	0	0	0	60
0	1	1	1	0	0	70
1	0	0	0	0	0	80
1	0	0	1	0	0	90

Figure 5.1 THD Sensor Address: Dial Code Settings



When the Group is 0001 and Num is 00, the temperature and humidity data collected by the sensor is displayed on the LCD screen and WEB as the environment volume of cabinet 1; the cut data of the temperature and humidity data of cabinet 1 is the same as that displayed on the LCD screen and WEB cabinet 1. There is one-to-one correspondence between temperature and humidity.

5.2 Power Distribution Unit (PDU)

NOTE: To ensure the accuracy of the PDU monitoring data, the PDU address settings must be completed in accordance with the [Single Cabinet, Dual PDU Cascade Address Settings](#) on page 39 .

All Vertiv™ Geist™ Switched Unit Level Monitoring, Outlet Level Monitoring and Switched Outlet Level Monitoring Vertiv™ Geist™ rPDUS are shipped with the IMD-03E-G module. The module provides the same features as the IMD-3E, with the addition of an RS-232 serial port via RJ-45.

Figure 5.2 PDU Operation Display Panel

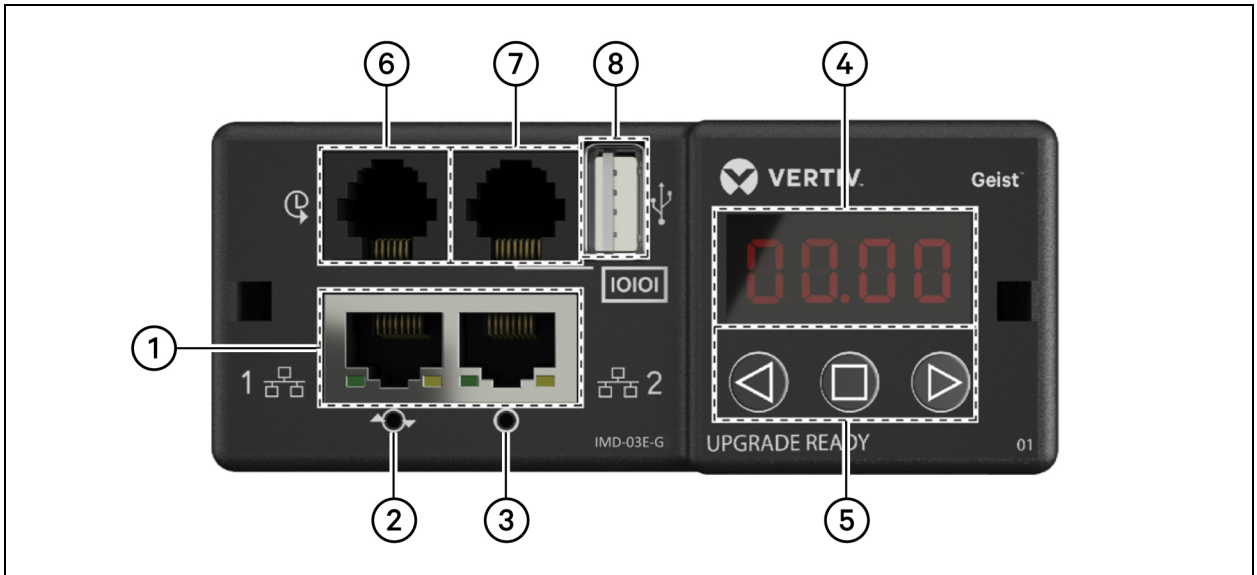


Table 5.2 PDU Operation Display Panel

Number	Name	Description
1	Dual Ethernet Ports	The dual Ethernet ports act as a two-port Ethernet switch, allowing for multiple devices to be daisy-chained. The ports can be independently configured for dual Ethernet network interfaces, allowing the rPDU to connect to two different networks.
2	Hard-Reboot Button	Pressing the <i>Hard-reboot</i> button reboots the IMD. This acts as a power cycle for the module and does not change or remove any user information.
3	Network Reset Button	Holding the <i>Network Reset</i> button for five seconds during normal operations restores the default IP address and resets the user accounts.
4	Local Display	The local display shows the phase, line and circuit current values (in amperes).
5	Display Buttons	There are three buttons near the IMD display: a Back button, a Forward button and a Center button.
6	Remote Sensor Port	The RJ-12 port is used for connecting a Vertiv™ plug-and-play remote digital sensor (sold separately). Each digital sensor has a unique serial number and is automatically discovered. GU2 PDUs support up to 16 sensors. The optional Vertiv™ A2D Converter can be added to support analog sensing. The optional SN-ADAPTER can be added to support Vertiv™ Integrated and Modular Sensors.
7	Serial Port	RS-232 via RJ-45 port.
8	USB Port	The USB port provides up to 1A power capacity for USB-connected devices. The port is used for: <ul style="list-style-type: none"> • Uploading firmware • Backing up/restoring device configurations • Expanding logging capacity via a USB storage device • Supporting TP-Link wireless USB adapters. The USB port must be enabled.

5.2.1 Setting the PDU IP address

From the PDU web page, click *System - Network*. The Network page allows you to configure the network manually or via DHCP. It is recommended to use a static IP or a reserved DHCP.

Figure 5.3 PDU Network Settings

The screenshot shows the Vertiv PDU web interface. The top navigation bar includes 'Sensors', 'System' (highlighted), and 'Help'. A dropdown menu is open under 'System', showing options like 'Users', 'Network' (highlighted), 'Web Server', 'Reports', 'Remote Authentication', 'Display', 'Time', 'SSH', 'USB', 'Serial Port', 'Email', 'SNMP', 'Syslog', 'Admin', 'Locale', and 'Utilities'. The main content area is divided into sections: 'Hostname', 'Protocol', and 'Interfaces'. The 'Interfaces' section contains a table with the following data:

Label	MAC Address	DHCP	Link state	Uptime
Bridge 0	00:19:85:14:b4:c3	Enabled	Up	1206467
IP Address		Prefix		
	192.168.1.7	24		
	fe80::219:85ff:fe14:b4c3	64		

The Upgradeable IMD-03E-G module has a default IP address for initial setup and access displayed on the front of the unit.

- IP Address - 192.168.123.123
- Subnet Mask - 255.255.255.0
- Gateway - 192.168.123.1

To access the unit for the first time:

1. Temporarily change your computer's network settings to match the 192.168.123.xxx subnet.
2. Connect the PDU to your computer's Ethernet port, then follow the instructions applicable to your computer's operating system as detailed in the manual shipped with the PDU.
3. Connect the network port 1 of the host PDU to an upper-layer device.
4. Navigate to the web page of the PDU.

To configure a static IP address:

1. From the PDU web page, go to *System - Network*.
2. Under the Interface section, ensure the DHCP function is disabled.
3. Add a static IP address by referring to **Table 5.3** on the facing page

Table 5.3 Single Cabinet, Dual PDU Cascade Address Settings

Cabinets	Web UI PDU Number	PDU Address	Remark
Cabinet 1	PDU 1A	192.168.1.7	Access switch port
	PDU 1B	192.168.1.8	
Cabinet 2	PDU 2A	192.168.1.9	
	PDU 2B	192.168.1.10	
Cabinet 3	PDU 3A	192.168.1.11	
	PDU 3B	192.168.1.12	
Cabinet 4	PDU 4A	192.168.1.13	
	PDU 4B	192.168.1.14	
Cabinet 5	PDU 5A	192.168.1.15	
	PDU 5B	192.168.1.16	
Fan controller (Vertiv™ Geist™ GU2.0)	Fan Controller	192.168.1.28	

5.2.2 Restoring account information

If the address or passwords have been lost or forgotten, perform one of the following steps.

- Press and hold the *Network Reset* button located below the Ethernet Port for 15 seconds.
- or-
- Press and hold the button in the center of the LED display for 10 seconds.

If the IP address of each PDU is set, check the IP on the display. Pressing both the *Play* and *Stop* buttons simultaneously displays the primary IPv4 address of the unit.

5.3 Intelligent Locks

The system can be equipped with an integrated IC card access control cabinet lock, which allows five possible access methods: physical key, numerical code, remote control, opening card or badge.

These access methods realize the network control function of intelligent door locks for each front and rear cabinet door. By default, all communication addresses for IT cabinets with intelligent locks are set to 0. The IT rack cabinet addresses need to be re-adjusted according to the placement of the cabinet on-site.

NOTE: The communication address of the PMC does not need to be adjusted.

5.3.1 Setting the communication address

To set the communication address for intelligent locks on IT rack cabinets:

The address setting can be done through the intelligent lock debugging program or through the web UI of the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit. The following table shows the DIP switch numbers (on the back of the lock) and the corresponding communication addresses.

Table 5.4 Intelligent Lock DIP Switch Communication Address

DIP Switch Number	Communication Address
1	1
2	2
3	4
4	8
5	16

The following figure describes the setup of the intelligent door lock IDs.

Table 5.5 Intelligent Lock ID Settings

Product	Cabinet Front Door Smart Lock Address	Connect to Intelligent Monitoring Unit	Cabinet Rear Door Smart Lock Address	Connect to Intelligent Monitoring Unit
IT rack cabinet 1	1	8COM Card/COM 1	1	8COM Card/COM 2
IT rack cabinet 2	2		2	
IT rack cabinet 3	3		3	
IT rack cabinet 4	4	8COM Card/COM 3	5	8COM Card/COM 4
IT rack cabinet 5	5		6	
PMC	9	8COM Card/COM 1	9	8COM Card/COM 2
CRV cooling system 1	10		10	
CRV cooling system 2	11		11	

5.3.2 Communication address example

Figure 5.4 Intelligent Lock Address Number

For example, since the numbers 1, 3, and 4 are ON in **Figure 5.4** above, refer to **Table 5.4** above to determine the communication addresses associated with each of those three numbers. The communication address numbers are 1, 4, and 8. To determine the communication address, add together those three values (1+4+8). The communication address for the intelligent door lock is 13.

NOTE: Perform the procedure described above for each IT rack cabinet until all communication addresses have been successfully changed.

5.4 Uninterruptible Power Supply (UPS)

5.4.1 Prerequisites

Before setting the UPS address, perform the following steps:

1. Connect the computer network port directly to the Vertiv™ Liebert® IntelliSlot™ RDU101 communications card using a network cable.
2. Set the IP address of the computer's corresponding interface to the same network segment as the default IP of the communications card (169.254.24.7).

Proceed to the next section to complete the network configurations for the UPS.

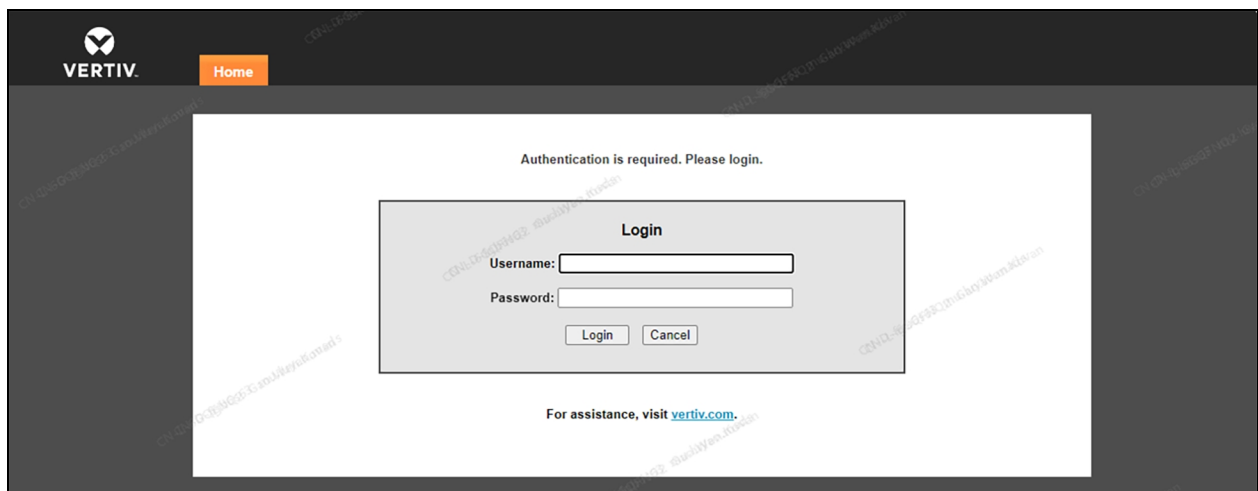
5.4.2 Setting the UPS IP address

To set the UPS IP address:

1. Log into the communications card web UI using the default credentials: **admin/Vertiv@123**.

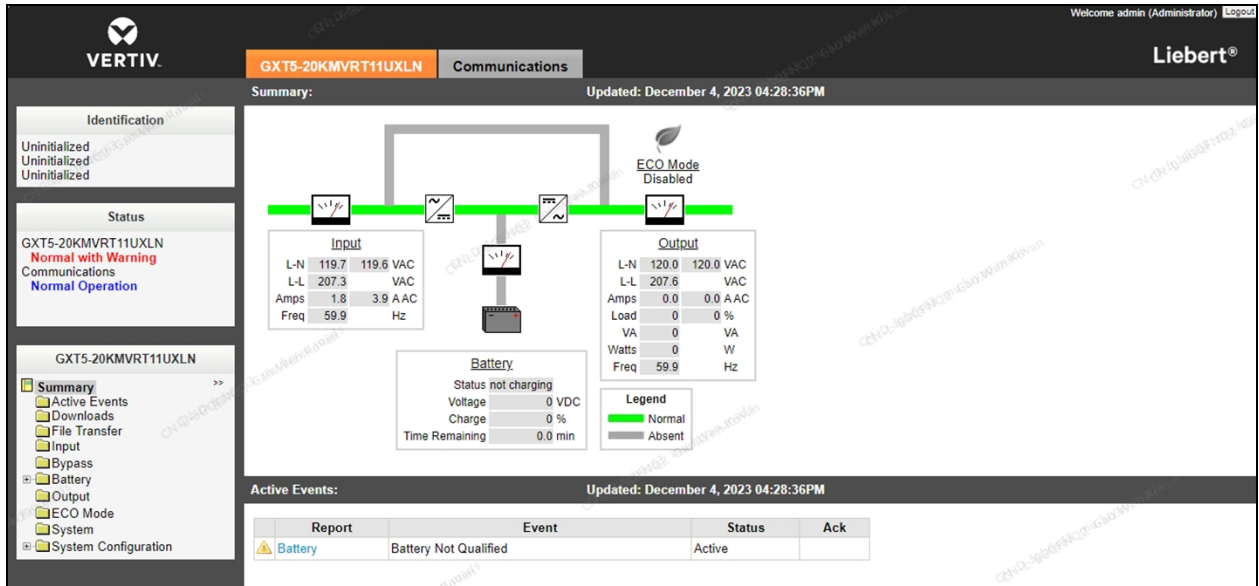
NOTE: This step depends on the firmware version and may vary. Upon login, the system may ask for a custom username and password rather than the default credentials.

Figure 5.5 Communication Card Log In



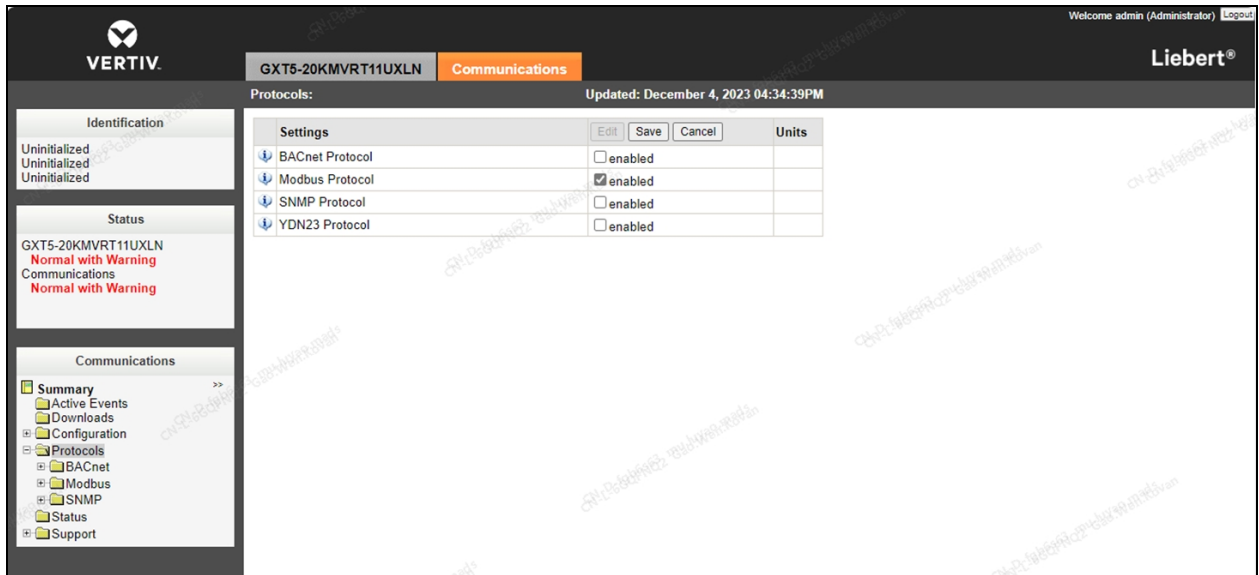
2. From the top of the Summary page, click the *Communications* tab, then click the *Edit* button.

Figure 5.6 UPS Summary Page



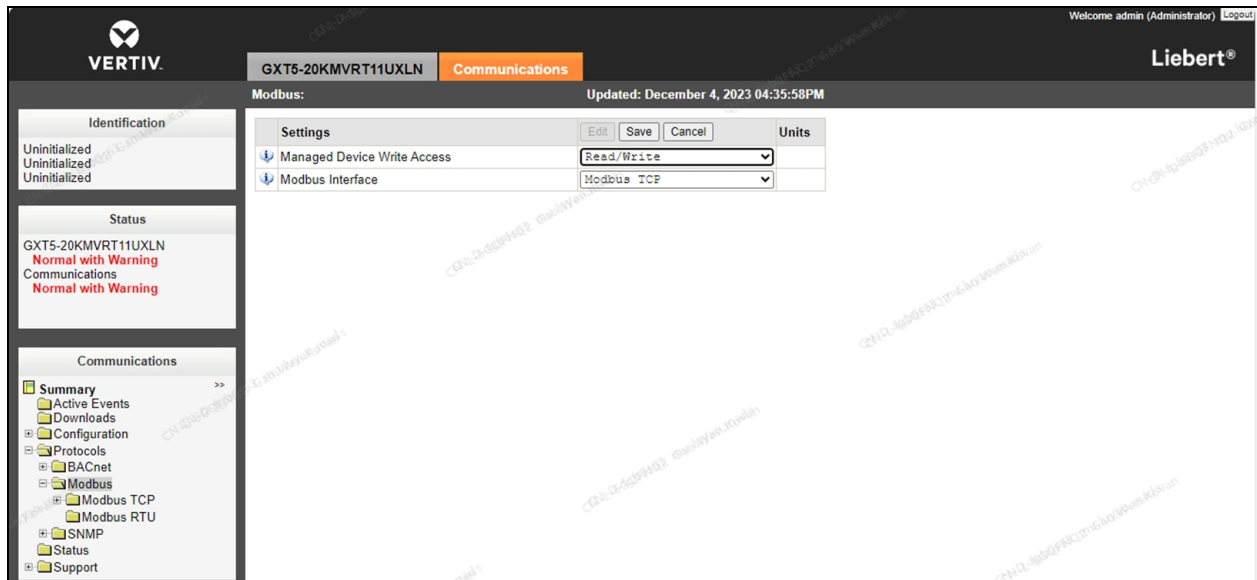
3. Check the Enabled box for Modbus Protocol, then click the Save button.

Figure 5.7 Communication Protocol Settings - Modbus Protocol



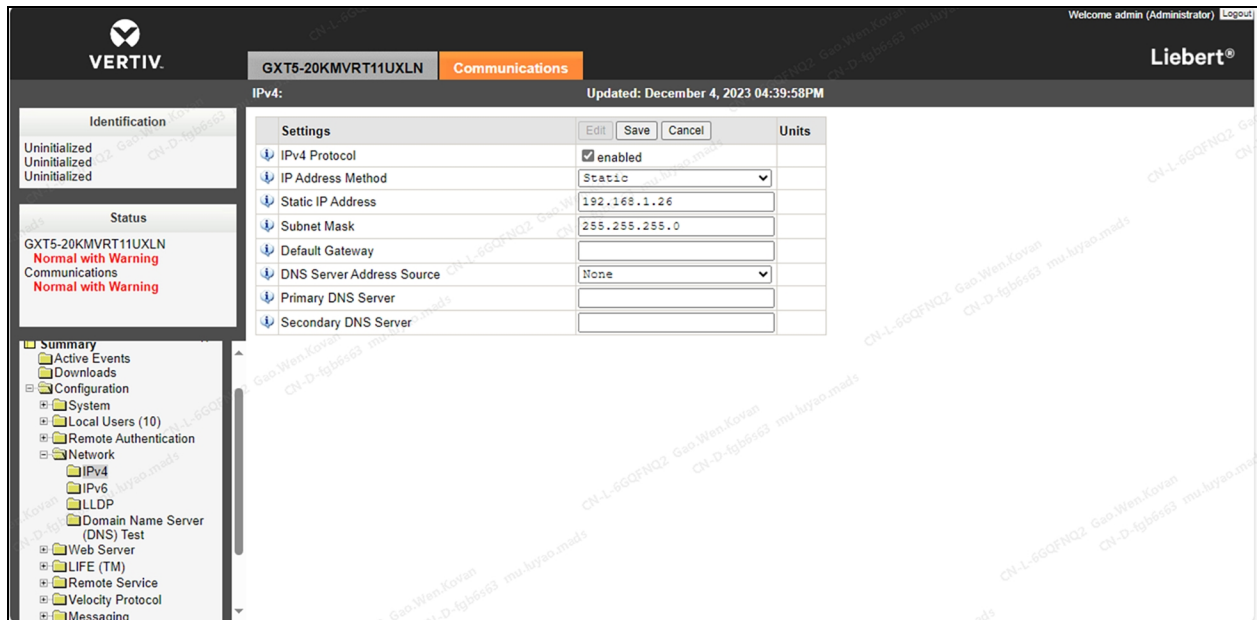
4. From the Modbus settings screen, set the Managed Device Write Access setting to Read/Write using the drop-down menu.

Figure 5.8 Communication Protocol Setting - Read/Write Access



5. From the IPv4 screen, set the IP address mode of the UPS to *Static*.
6. Enter the following static addresses, as needed:
 - Static IP Address (UPS1) - **192.168.1.26**
 - Static IP Address (UPS2) - **192.168.1.27**
 - Subnet Mask - **255.255.255.0**
 - Default Gateway - **192.168.1.1**

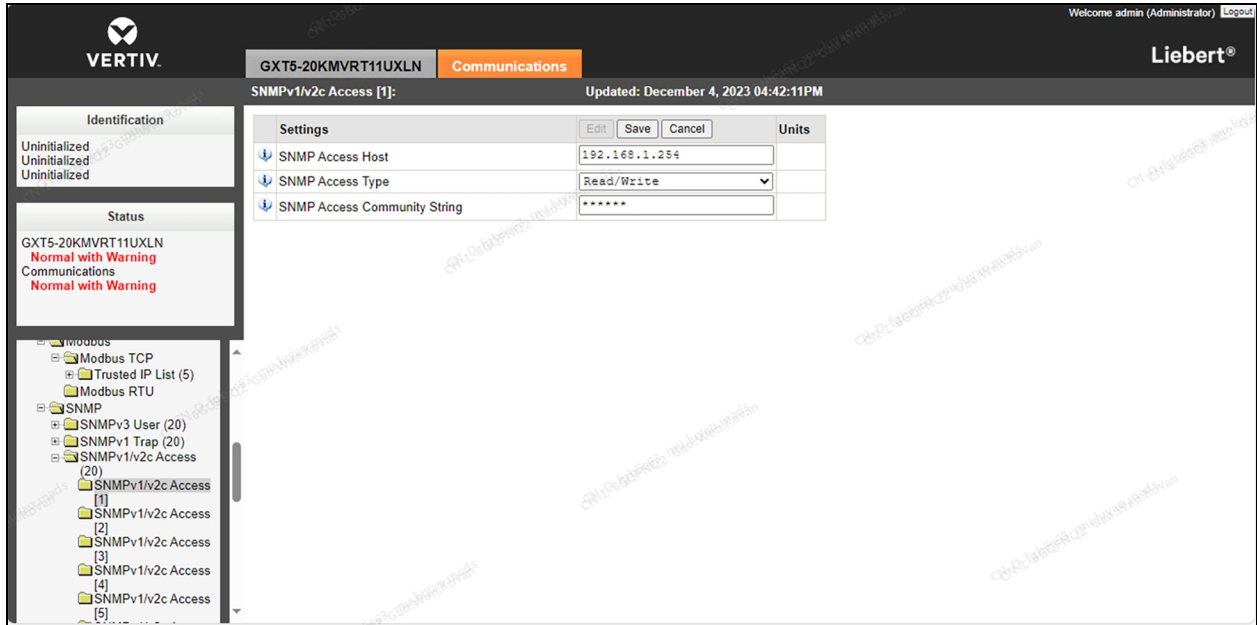
Figure 5.9 UPS IP Address Mode



7. From the SNMP screen, enter the IP address of Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit (**192.168.1.254**) into the SNMP Access Host field.

8. Set the SNMP Access Type setting to *Read/Write* using the drop-down menu.
9. Enter **Public** into the SNMP Access Community String field.

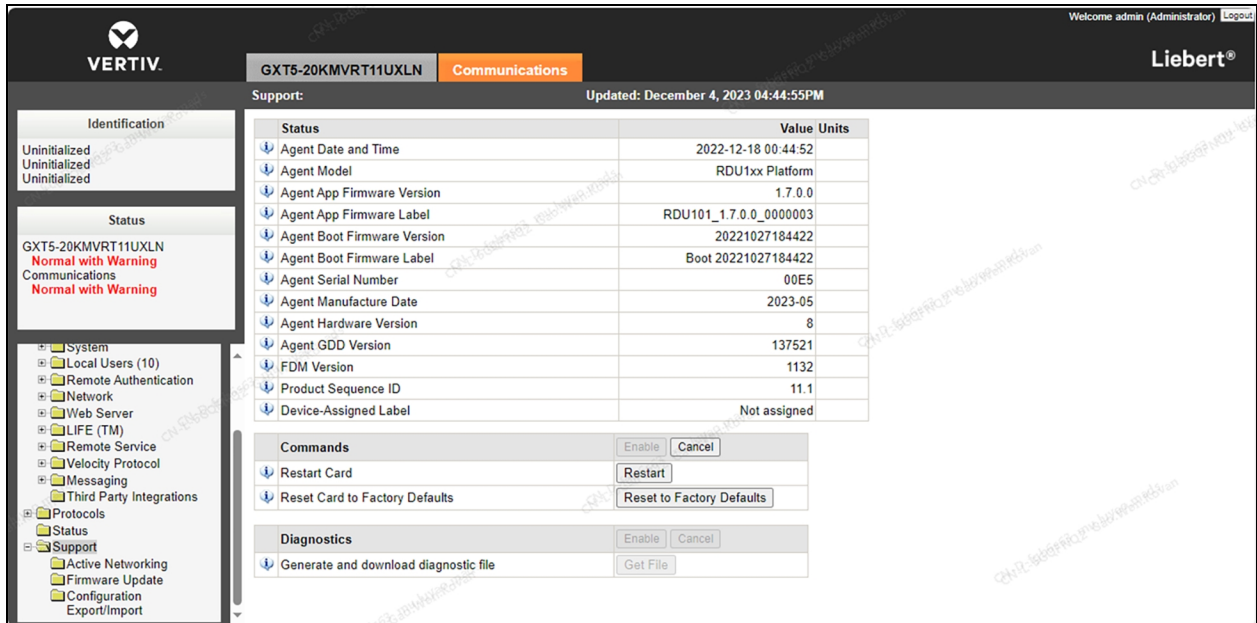
Figure 5.10 Intelligent Monitoring Unit IP Address



10. Navigate to the *Support* screen.
11. Under the *Commands* section, click the *Restart* button to restart the Vertiv™ Liebert® IntelliSlot™ RDU101 communications card.

Upon reboot, the UPS's IP address is now set.

Figure 5.11 Communications Card Restart



5.5 Cooling Systems

5.5.1 Prerequisites

Before setting the IP address, complete the following:

1. Connect the computer network port directly to the Vertiv™ Liebert® IntelliSlot™ Unity communications card using a network cable.
2. Set the IP address of the computer's corresponding interface to the same network segment as the default IP of the Vertiv™ Liebert® IntelliSlot™ Unity communications card (**169.254.24.7**).

Proceed to the next section to complete the network configurations for the cooling systems.

Figure 5.12 Vertiv™ Liebert® IntelliSlot™ Unity Communications Card

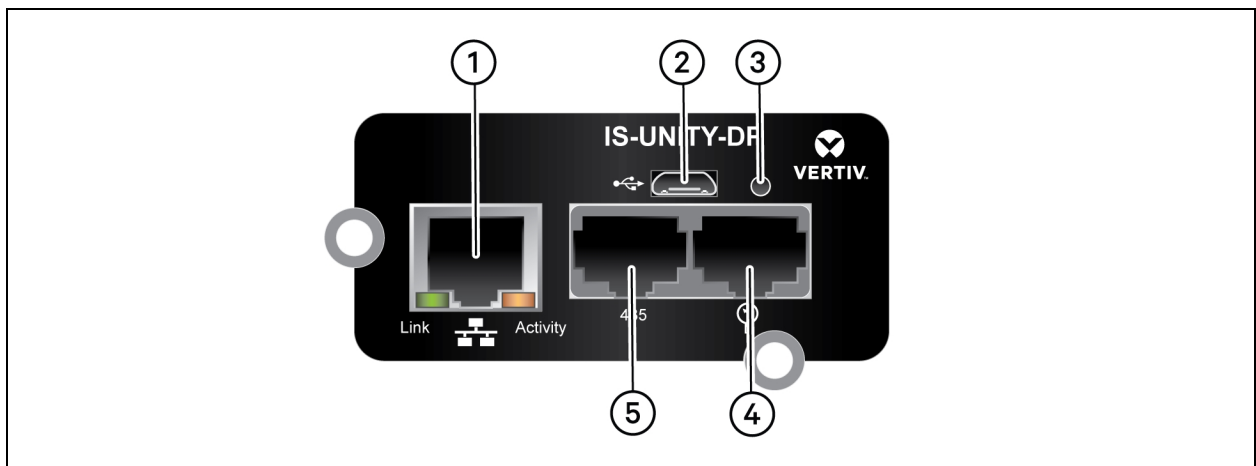


Table 5.6 Vertiv™ Liebert® IntelliSlot™ Unity Communications Card

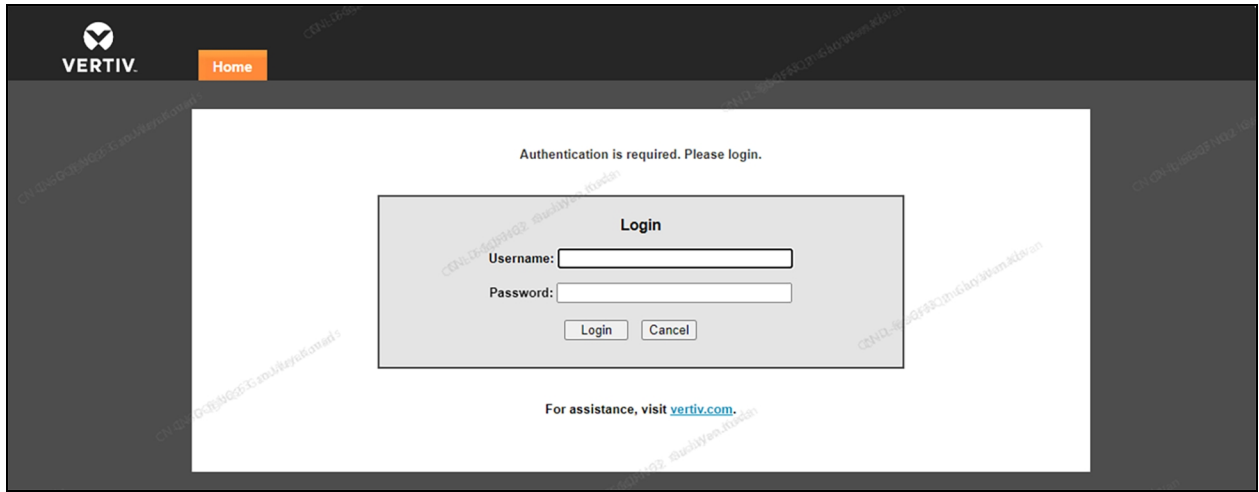
Number	Description
1	RJ-45 Ethernet port
2	Micro-USB port
3	Reset button
4	Liebert™ sensor-network ports (SN sensors only)
5	RS-485 port (BACnet/MSTP, Modbus RTU or YDN23. Only one may be used)

5.5.2 Setting the cooling system IP address

To set the cooling system IP address:

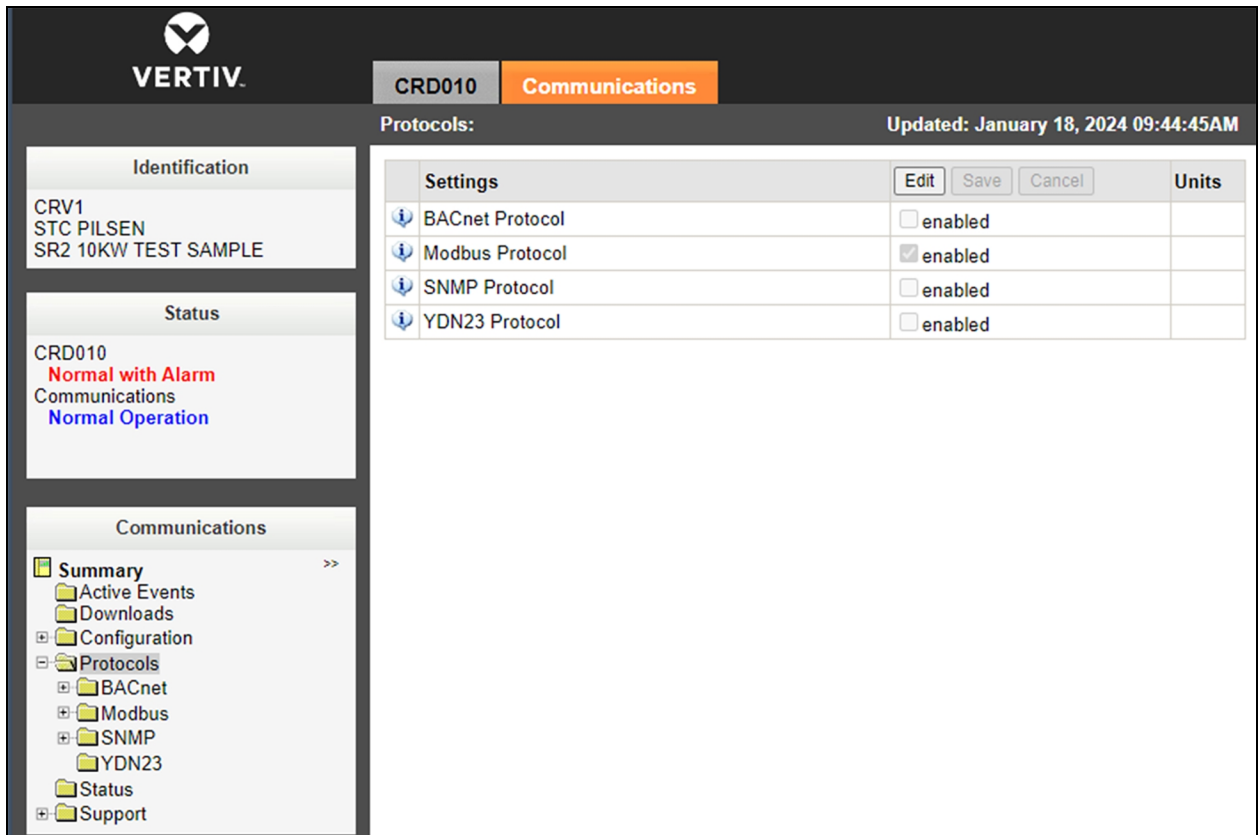
1. Log into the communications card web UI using the default credentials: **Liebert/Liebert**.

Figure 5.13 Communication Card Log In



2. At the top of the screen, click the *Communications* tab, then click the *Edit* button.
3. Check the Enabled box for Modbus Protocol, then click the *Save* button.

Figure 5.14 Communication Protocol Settings - Modbus Protocol



4. From the Modbus settings screen, set the Managed Device Write Access setting to *Read/Write* using the drop-down menu.

Figure 5.15 Communication Protocol Setting - Read/Write Access

The screenshot displays the Vertiv web interface for device CRD010, specifically the Communications settings page. The interface is divided into several sections:

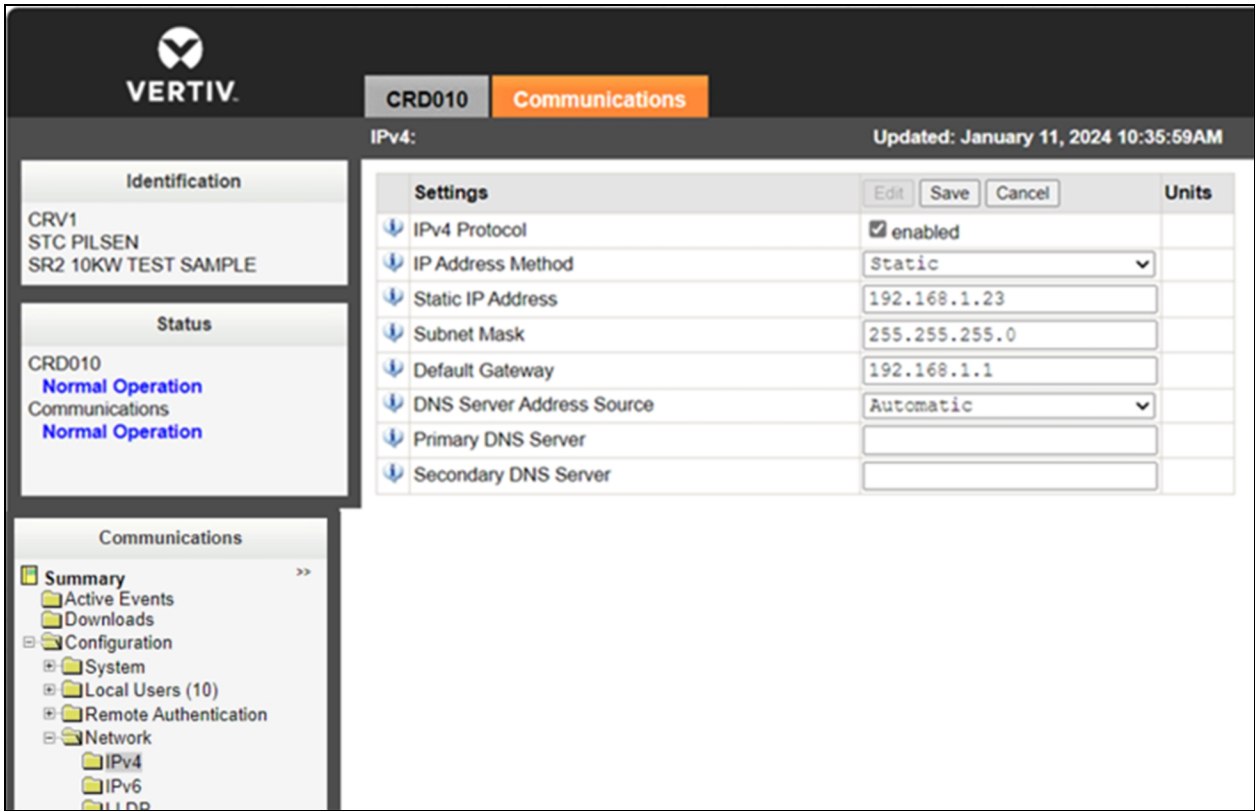
- Identification:** CRV1, STC PILSEN, SR2 10KW TEST SAMPLE
- Status:** CRD010, Normal with Alarm, Communications, Normal Operation
- Communications:** A tree view showing the following structure:
 - Summary >>
 - Active Events
 - Downloads
 - Configuration
 - Protocols
 - BACnet
 - Modbus
 - Modbus TCP
 - Modbus RTU
 - SNMP
 - YDN23
 - Status
 - Support

- Modbus Settings Table:**

Settings	Edit	Save	Cancel	Units
Managed Device Write Access				Read/Write
Modbus Interface				Modbus TCP

5. From the IPv4 screen, set the IP address mode of the cooling system to *Static*.
6. Enter the following static addresses, as needed:
 - Static IP Address (CRV1): **192.168.1.23**
 - Static IP Address (CRV2): **192.168.1.24**
 - Subnet Mask: **255.255.255.0**
 - Default Gateway: **192.168.1.1**

Figure 5.16 Cooling System IP Address Mode



7. Navigate to the *Support* screen.
8. Under the *Commands* section, click the *Restart* button to restart the communications card.

Upon reboot, the cooling system's IP address is now set.

Figure 5.17 Card Restart

The screenshot shows the web interface for a Vertiv Liebert CRD010 unit. The top navigation bar includes the Vertiv logo, the unit ID 'CRD010', and the 'Communications' tab. The main content area is divided into three sections: Identification, Status, and Communications. The Status section contains a table of system parameters. The Communications section includes a 'Commands' area with a 'Restart Card' button.

Status	Value	Units
Agent Date and Time	1970-02-16 08:24:10	
Agent Model	IS-UNITY-DP	
Agent App Firmware Version	8.2.0.0	
Agent App Firmware Label	IS-UNITY_8.2.0.0_00125	
Agent Boot Firmware Version	8.1.0.0	
Agent Boot Firmware Label	IS-UNITY_8.1.0.0_00119	
Agent Serial Number	420151G105J2023FEB140291	
Agent Manufacture Date	FEB 14 2023	
Agent Hardware Version	1	
Agent GDD Version	135537	
FDM Version	1102	
Product Sequence ID	11.1	
Device-Assigned Label	Not assigned	

5.5.3 Setting up the Vertiv™ Liebert® CRD10

To power the unit on/off:

Press and hold the ON/OFF button for three seconds.

To set up the unit:

1. Power ON the HMI display for one minute.
2. Press *Unlock* and enter the appropriate password:
 - Maintenance Engineers: **2210**
 - Users (default): **1490**.

NOTE: Both passwords can be changed at the maintenance level.

The Home page appears. For more information about this page, refer to [Home Page](#) on the next page .

3. Click *Setting* from the top navigation bar, then configure the system control settings according to the following table.

Table 5.7 CRD10 System Control Configurations

Setting	Configuration
Cond Pump Enable	Yes
Heating Enable	No
Dehum Enable	Yes
Comp Control Mode	Supply AVG Temp

Table 5.7 CRD10 System Control Configurations (continued)

Setting	Configuration
Fan Control Mode	Remote Max Temp
Return Sensor Quantity	1
Supply Sensor Quantity	2
Remote Sensor Quantity	1
RSD Alarm Polarity	NC

Home Page

Figure 5.18 CRD10 Display Screen

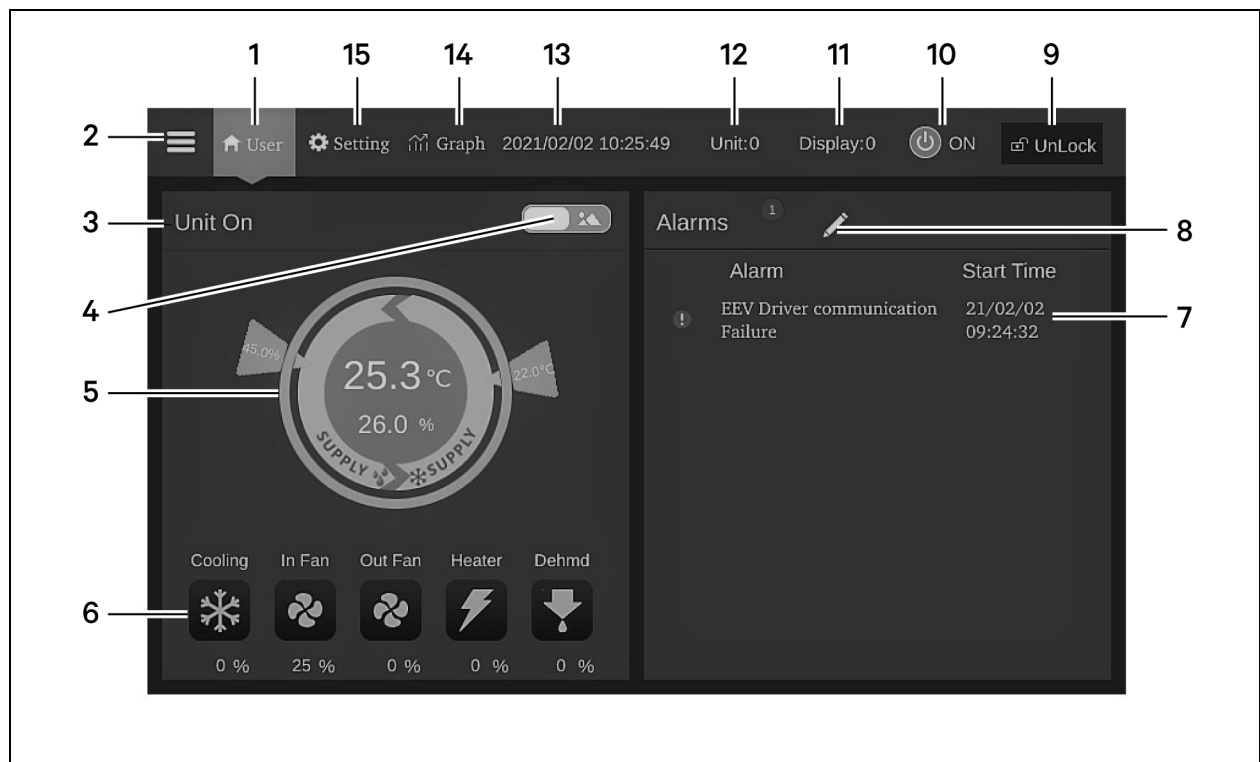


Table 5.8 CRD10 Display Screen

Number	Touch Key	Functional Description
1	Home button	Return to the home page.
2	Menu button	Check or configure the operation status, alarm information, temperature and humidity settings, parameter settings, temperature and humidity graph, and check version information and service information.
3	Operating status	Display the current state of the unit: unit run, remote off, display off, monitor off, standby.
4	Toggle button 1	Switch between graphical display mode and list display mode.

Table 5.8 CRD10 Display Screen (continued)

Number	Touch Key	Functional Description
5	Control mode	Show unit settings and temperature and humidity data.
6	Status display	Show the data of cooling, fan, electric heater, humidifier, dehumidifier, fan speed, heating status, and humidifier status.
7	Alarm list	Show current alarms and the time when they are generated.
8	Toggle button 2	Switch between the sensor data page and the alarm page.
9	Unlock button	Unlock the HMI display.
10	ON/OFF button	Press the button for three second to start or stop the unit.
11	Display address	Show HMI address and set the HMI address.
12	Unit address	Show unit address.
13	Time display	Show current time and date.
14	Graph button	Show the graphs of average return air temperature, average return air humidity, average supply air temperature, and average remote temperature.
15	Setting button	Set the temperature and humidity.

5.5.4 Setting up the Vertiv™ Liebert® CR019

To power the unit on/off:

Press and hold the ON/OFF button for three seconds.

To set up the unit:

1. Power on the HMI display for one minutes.
2. Press the *Unlock* button and enter the appropriate password.
 - Maintenance Engineers: **5010**
 - Users (default): **1490**.

The Home page appears. For more information about this page, refer to [Home Page](#) on page 54 .

3. Click *Service* from the top navigation bar.
4. Click *Setpoints - Temperature Control* and configure the settings according to **Table 5.9** below . Refer to [Temperature Control](#) on page 55 .

Table 5.9 Temperature Control Configurations

Setting	Configuration
Temperature Control Sensor	Remote
Temperature Setpoint Act	68 °F (20°C)
Temperature Setpoint	68 °F (20°C)

Table 5.9 Temperature Control Configurations (continued)

Setting	Configuration
Temperature Control Type	PI
Temperature Proportional Band	9°F (5.0K)
Temperature Integration Time	5 minutes
Temperature Deadband	2 °F (1.1K)

- Click *Fan Control* and configure the settings according to **Table 5.10** below. Refer to [Fan Control](#) on page 56

Table 5.10 Fan Control Configurations

Setting	Configuration
Fan Control Type	Auto
Fan Control Sensor	Remote
Minimum Fan Speed	55%
Maximum Fan Speed	75%

- Return to the main Service page and click *Sensors*.
- Click *Wired Remote Sensors* to expand the drop-down menu and select *Setup*.
- Configure the sensor properties settings according to **Table 5.11** below. Refer to [Sensor Properties](#) on page 56.

Table 5.11 Sensor Properties Configurations

Setting	Configuration
Individual Remote Sensors Mode	Maximum
Unit Remote Sensors Mode	Maximum
Unit Remote Sensors Included in AVG	4 (depending on the number of 2T sensors used)

- Return to the main Service page and click *U2U Network Settings*.
- Configure the U2U network settings for CRV1 according to **Table 5.12** below. Refer to [U2U Network Configurations - CRV1](#) below.

NOTE: Following Unit-to-Unit (U2U) networking setup is valid only for cooling redundant configurations.

Table 5.12 U2U Network Configurations - CRV1

Setting	Display Value	Control Board Value
Name	-	CRV1
IP Address	192.168.254.33	192.168.254.11
Net Mask	255.255.255.0	255.255.255.0
Gateway	192.168.254.1	192.168.254.1
Broadcast	192.168.254.255	-
U2U Group	1	1

Table 5.12 U2U Network Configurations - CRV1 (continued)

Setting	Display Value	Control Board Value
U2U Address	33	1
U2U Target Address	1	-
CB Firmware Version	CR	-

11. Configure the U2U network settings for CRV2 according to **Table 5.13** below . Refer to [U2U Network Settings - CRV2](#) on page 58 .

Table 5.13 U2U Network Configurations - CRV2

Setting	Display Value	Control Board Value
Name	-	CRV2
IP Address	192.168.254.34	192.168.254.12
Net Mask	255.255.255.0	255.255.255.0
Gateway	192.168.254.1	192.168.254.1
Broadcast	192.168.254.255	-
U2U Group	1	1
U2U Address	34	2
U2U Target Address	2	-
CB Firmware Version	CR	-

Home Page

Figure 5.19 CR019 Display Screen

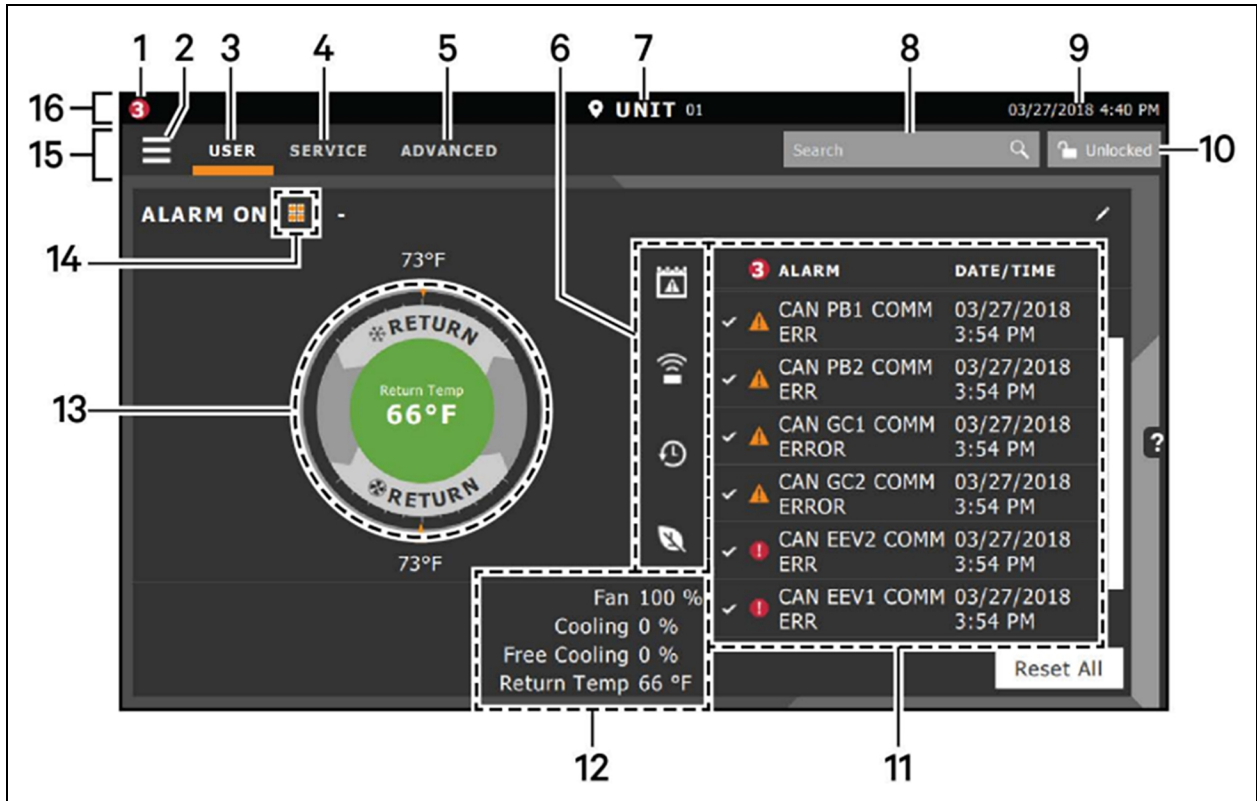


Table 5.14 CR019 Display Screen

Number	Touch Key	Functional Description
1	Alarms Present	Shows the number of active alarms.
2	Menu Icon	Shows a menu for user or service options, depending on which icon is selected.
3	User Icon	Shows user options on the main display and menu. NOTE: You must unlock the display with the User PIN to access the menu and options.
4	Service Icon	Shows service options on the main display and menu. NOTE: You must unlock the display with the Service PIN to access the menu and options.
5	Advanced Icon	Shows advanced options on the main display and menu. NOTE: You must unlock the display with the Service PIN to access the menu and read-only options.
6	Cooling Unit Parameters	Shows the status of selected system parameter settings.
7	Unit Identification	Allows you to customize the unit name up to six characters/numbers.
8	Search Icon	Open the keyboard to search for controls and setting locations.
9	Date/Time	Shows the current date and time.
10	Lock/Unlock Icon	Indicates whether or not the user and service options are accessible.

Table 5.14 CR019 Display Screen (continued)

Number	Touch Key	Functional Description
		<ul style="list-style-type: none"> Locked icon: display is read-only Unlocked icon: user or service is logged-in and options are accessible
11	Secondary Content Panel	When accessing settings/configuration via the menus, the settings display in the right, secondary panel.
12	Summary of Current Unit Function	Customize to show fan speed, cooling, percentages from any installed device, and any physical (sensor) values.
13	Status Dial	Circular display of setpoints and environmental conditions of the unit.
14	Teamwork Mode Icon	In a panel with "Status" content, the Teamwork Mode icon indicates the mode selected.
15	Control Header	Controls to access the user and service menus.
16	Status Header	Displays the alarm status, unit identification, and the current date and time.

Temperature Control



Fan Control



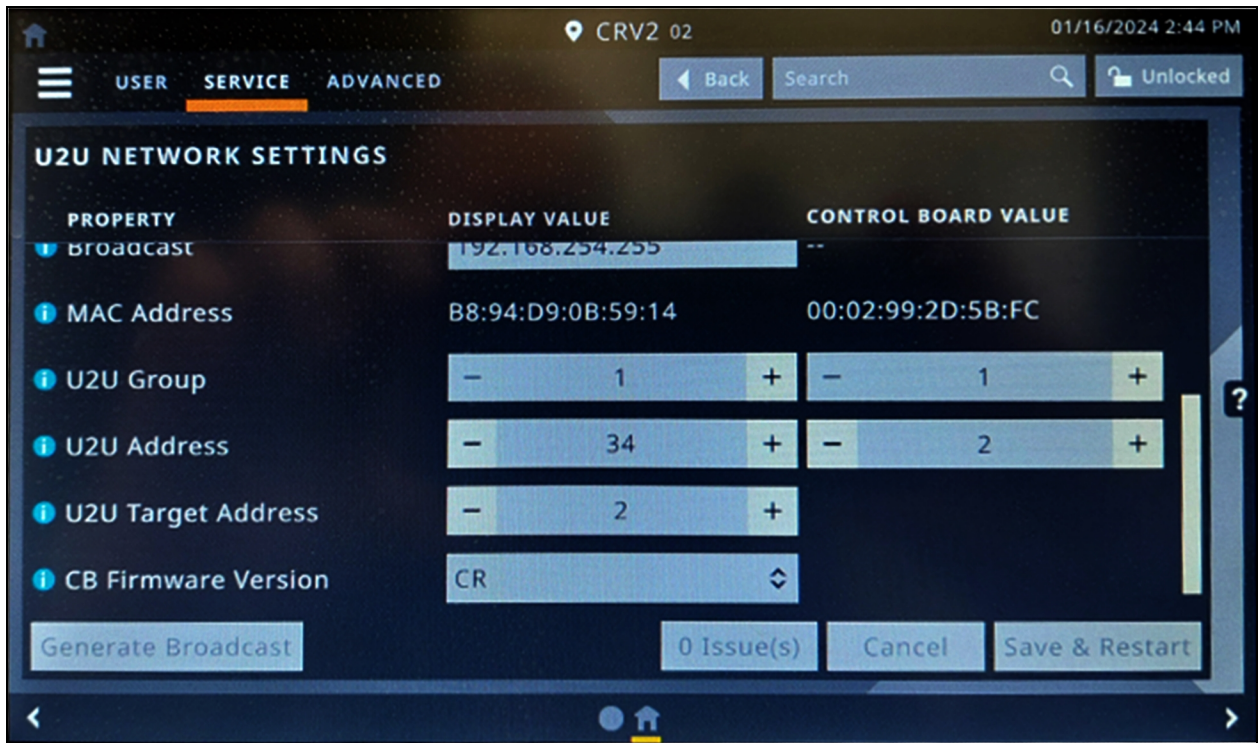
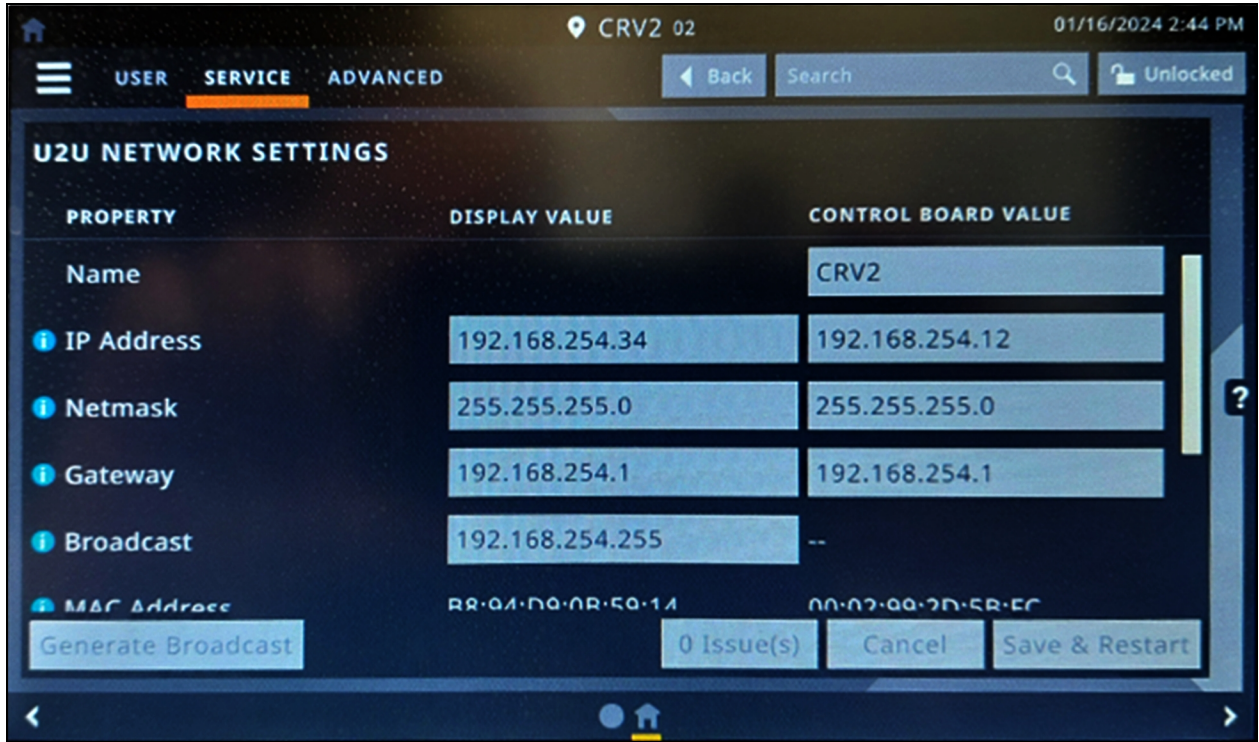
Sensor Properties



U2U Network Settings - CRV1



U2U Network Settings - CRV2



5.6 (Optional) IP Camera

5.6.1 Installing on a Network

To install the IPC on a network:

1. Using a standard network cable, connect the camera to your network.
2. Connect to power using one of the following methods:
 - Use the optional power adapter to connect to power.

-or-

- Use the Power over Ethernet (PoE) function in which power is supplied over the network cable.

The camera is now installed on the network, and the web UI of the camera is accessible. To access the web UI:

- If the camera is installed on a LAN with a DHCP server, refer to [Identifying the dynamic IP address](#) below .

-or-

- If the camera is installed on a LAN without a DHCP server, refer to [Configuring the default IP address](#) below .

5.6.2 Identifying the dynamic IP address

By default, when the device is connected to LAN with a DHCP server, it is automatically assigned with a dynamic IP address.

To identify the dynamic IP address and log into the web UI:

1. Download and install GV-IP Device Utility from the company website:
<https://www.geovision.com.tw/download/product/>

NOTE: The PC installed with GV-IP Device Utility must be under the same LAN as the camera to be configured.

NOTE: By default, the administrator's username is admin and cannot be modified.

2. On the GV-IP Device Utility window, click the Search icon (a magnifying glass) to search for the IP devices connected on the same LAN. Click the *Name* or *Mac Address* column to sort the entries.
3. Find the camera with its mac address, then click on its IP address.
4. First-time users are prompted to set up a password. Enter a new password, then click *OK*. You are redirected to the Login page.
5. Enter your username and password on the login page and click *Login*.

5.6.3 Configuring the default IP address

By default, when the device is connected to LAN without a DHCP server, it is assigned with a default static IP address of 192.168.0.10. A new IP address should be assigned to avoid conflicts with other devices.

To configure a static IP address:

1. Open a web browser and enter the default IP address **192.168.0.10**.
2. Enter your username and password, then click *Login*.
3. Click *Setup*.
4. Select *Common* in the left menu and select *Network*.

5. Select *Static IP* from the Obtain IP Address drop-down menu.
6. Enter the IP address, subnet mask, and default gateway address. Make sure the camera IP address is unique.
7. Click *Save*.

5.6.4 Configuring the On-Screen Display (OSD)

1. From the camera's web UI, click *Setup*.
2. Select *Common* in the left menu and select *OSD*.
3. Enable a number to select an area #, and click *Overlay OSD Content* to select the content to display on the screen.
4. Adjust the position of the Area # boxes either by dragging them directly on the live view or by specifying the coordinates under X-Axis / Y-Axis column.

NOTE: An OSD of type *custom* must be set, responsible for the IP camera name not being displayed in the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit.

5.6.5 Configuring the video parameters

NOTE: Since the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit currently only supports H.264 compression video, the video compression must be set to H.264.

To configure the video parameters:

1. From the camera's web UI, click *Setup*.
2. Select *Video & Audio* in the left menu and select *Video*.
3. Set the Video Compression setting to **H.264**. The recommended Resolution setting is 1280 x 720 (720P).
4. Leave all other settings as their default values.

5.7 (Optional) Network Video Recorder (NVR)

5.7.1 Installing on a Network

To install the NVR on a network:

1. Using a standard network cable, connect the NVR to your network.
2. Use the optional power adapter to connect to power.

The NVR is now installed on the network, and the web UI of the NVR is accessible. To access the web UI:

- If the camera is installed on a LAN with a DHCP server, refer to [Identifying the dynamic IP address](#) below.
- or-
- If the camera is installed on a LAN without a DHCP server, refer to [Configuring the default IP address](#) on the facing page.

5.7.2 Identifying the dynamic IP address

By default, when the device is connected to LAN with a DHCP server, it is automatically assigned with a dynamic IP address.

To identify the dynamic IP address and log into the web UI:

1. Download and install UVS Device Utility from the company website:
<https://www.geovision.com.tw/us/download/product/UA-SNVRL810-P>
2. On the UVS Device Utility window, click the button to search for the IP devices connected in the same LAN.

5.7.3 Configuring the default IP address

By default, when the device is connected to LAN without a DHCP server, it is assigned with a default static IP address of 192.168.1.100. A new IP address should be assigned to avoid conflicts with other devices.

To configure a static IP address:

1. Open a web browser and enter the default IP address **192.168.1.100**.
1. First-time users are prompted to set up a password. Enter a new password, then click *OK*. You are redirected to the Login page.
2. Enter your username and password on the login page and click *Login*.
3. Click *Remote Setting*.
4. Select *Network* in the left menu and select *General*.
5. Disable DHCP using the toggle button.
6. Enter the IP address, subnet mask, and default gateway address. Make sure the NVR IP address is unique.
7. Click *Save* and log in again.

5.7.4 Adding the IP camera to the NVR**To add the IP camera to the NVR:**

1. From the NVR web UI, click *Remote Setting*.
2. Select *Channel* in the left menu and select *IP Channels*.
3. Click the Edit icon (the pencil) and select *Manual mode* from the Mode drop-down menu.
4. Click *OK*.
5. Click the Add icon (the plus (+) symbol).
6. Enter the IP address, username, and password of the IP camera.
7. Select *Onvif* for the protocol using the Protocol drop-down menu.
8. Click *OK*.

5.7.5 Enabling Onvif**To enable the Onvif protocol:**

1. From the NVR web UI, click *Remote Setting*.
2. Select *Network* in the left menu and select *Platform Access*.
3. From the Onvif tab, enable Onvif by clicking the Enable toggle button.
4. Select *Digest/WSSE* from the Authentication Type drop-down menu.
5. Select *HTTP/HTTPS* from the Protocol drop-down menu.
6. Enter the administrator's username and password.
7. Click *OK*.

5.7.6 Formatting a hard disk

To format a hard disk:

1. From the NVR web UI, click *Remote Setting*.
2. Select *Storage* in the left menu and select *Disk*.
3. Select the hard disk to be formatted.
4. Click the Format Hard Disk radio button.
5. Select the button for Format the entire hard disk and all data will be erased, then click *OK*.

5.7.7 Configuring the recording schedule

To configure the recording schedule:

1. From the NVR web UI, click *Remote Setting*.
2. Select *Record* in the left menu and select *Record*.
3. Select *Channel* from the Channel drop-down menu.
4. Select *MainStream* from the Stream Mode drop-down menu.
5. Click *Save*.
6. Click *Schedule* and set the recording time.

6 Navigating the LCD Screen

After initially powering on the system, users must configure the various system parameters through the LCD screen. From the system's LCD screen, users can access the following pages:

- Home
- Thermal Management
- Power
- Environment
- Alarms
- Logs
- Settings

Refer to the subsequent sections for more information on the functionality and configuration procedures of the LCD screen.

6.1 Home

Upon logging into the LCD screen, the Home page displays the front door temperature, rear door temperature, and critical system and performance parameters.

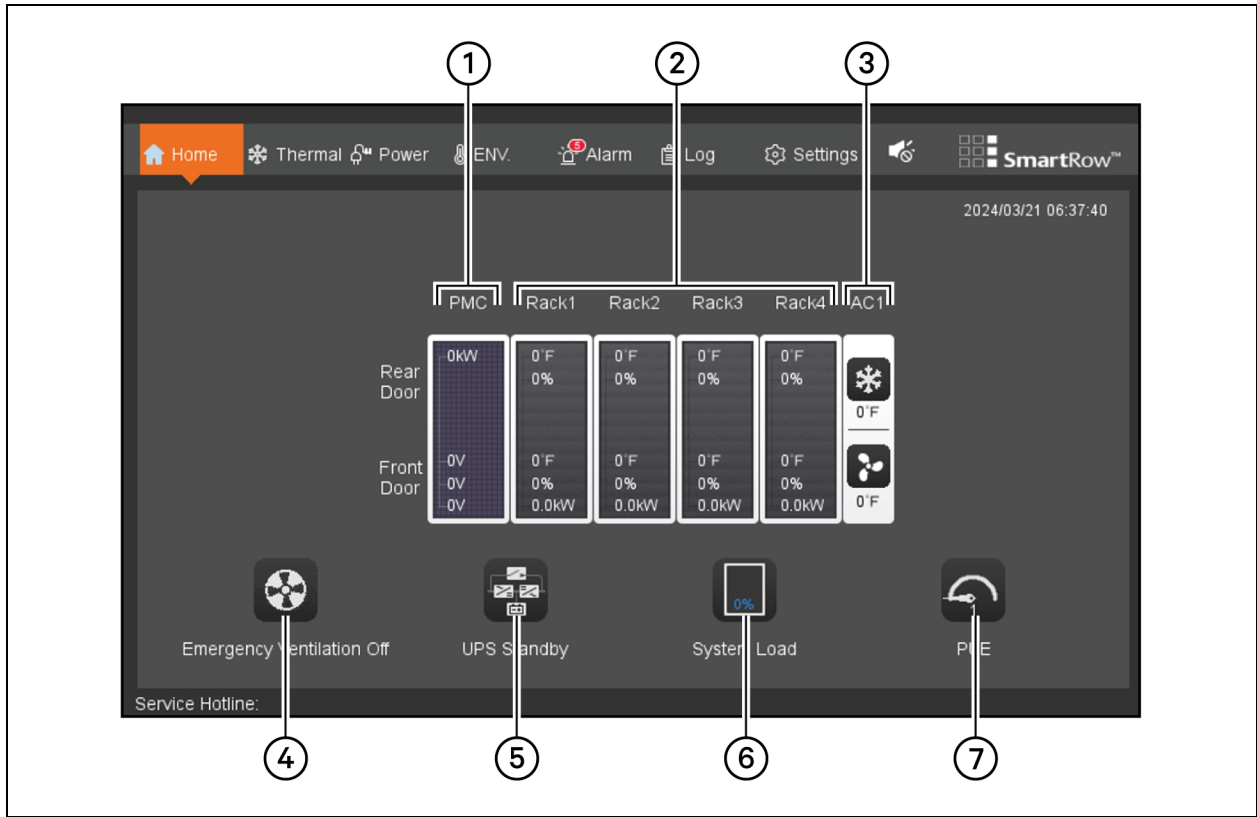
After powering on or restarting the system, it takes 10 minutes for the alarm linkage to take effect. After this time, the alarms are linked, and the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit can control the emergency fans, sound and warning light, and the three LED lights on the front door. For descriptions of the LED light indicators, refer to **Table 7.4** on page 96.

The THD sensors monitor the status of the PMC's internal temperature, humidity, and door status. If the temperature or humidity exceeds the threshold values, the excessive values are highlighted orange on the Home page of the LCD screen. When the parameters return to within their set range, they revert back to white.

From the Home page, the following operations can be performed:

- Turn on the Hot Aisle and Cold Aisle dynamic air flow map to view the operations of the air conditioner fan or emergency fan.
- View the date and time from the top right corner. Calibration can be completed via the Time Calibration bar under the web page. This information displays on each sub-page of the LCD screen.

Figure 6.1 Home Page



Number	Description
1	PMC - Displays the amount of live power fed by the electrified input and the input phase voltage (L1/L2/L3). Click anywhere in the PMC box to switch to the Power page. See Power on page 68 .
2	Rack - Displays the average temperature and humidity of the hot and cold channels for each IT rack cabinet. Click anywhere in the Rack box to switch to the Environment (ENV) page for that specific cabinet. See Environment (ENV) on page 71
3	AC - Displays the return air temperature and air delivery temperature from the cooling units. Click anywhere in the CRAC (AC1) box to switch to the Thermal page. See Thermal on the facing page .
4	Emergency Ventilation - On / Off.
5	UPS Operating Status - Power mode / Bypass mode / Battery mode / Standby mode.
6	System Load Rate - The percentage automatically adjusts based on the system state.
7	Power Usage Effectiveness (PUE)

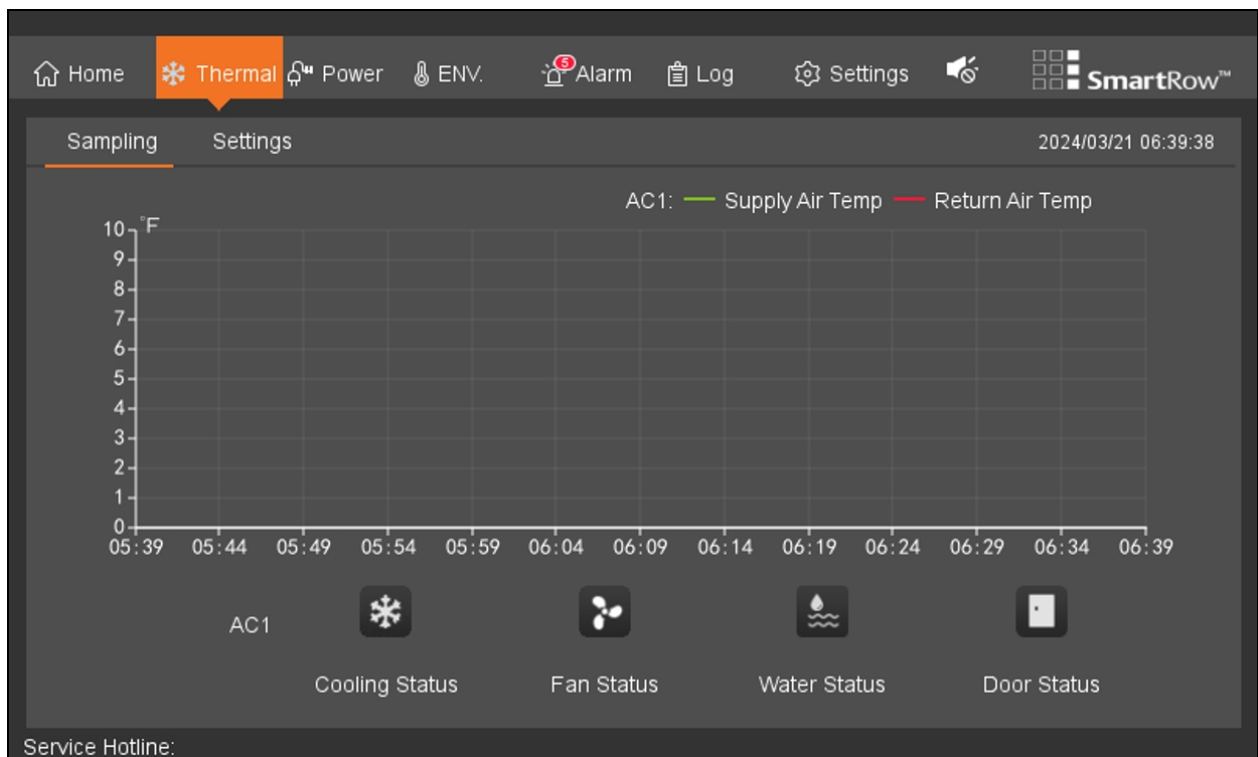
6.2 Thermal

6.2.1 Sampling

Click *Thermal - Sampling*. On the Sampling page, the supply and return air temperatures are displayed in a line curve. The line curve automatically refreshes every five seconds, and the grid displays one hour of temperature data. The temperature axis adapts as needed, based on measured values. The status icons located at the bottom of the screen become animated or change when in operating state or an alarm is triggered.

NOTE: The temperature profile and status icons adjust depending on if the system uses a single or double air conditioning configuration.

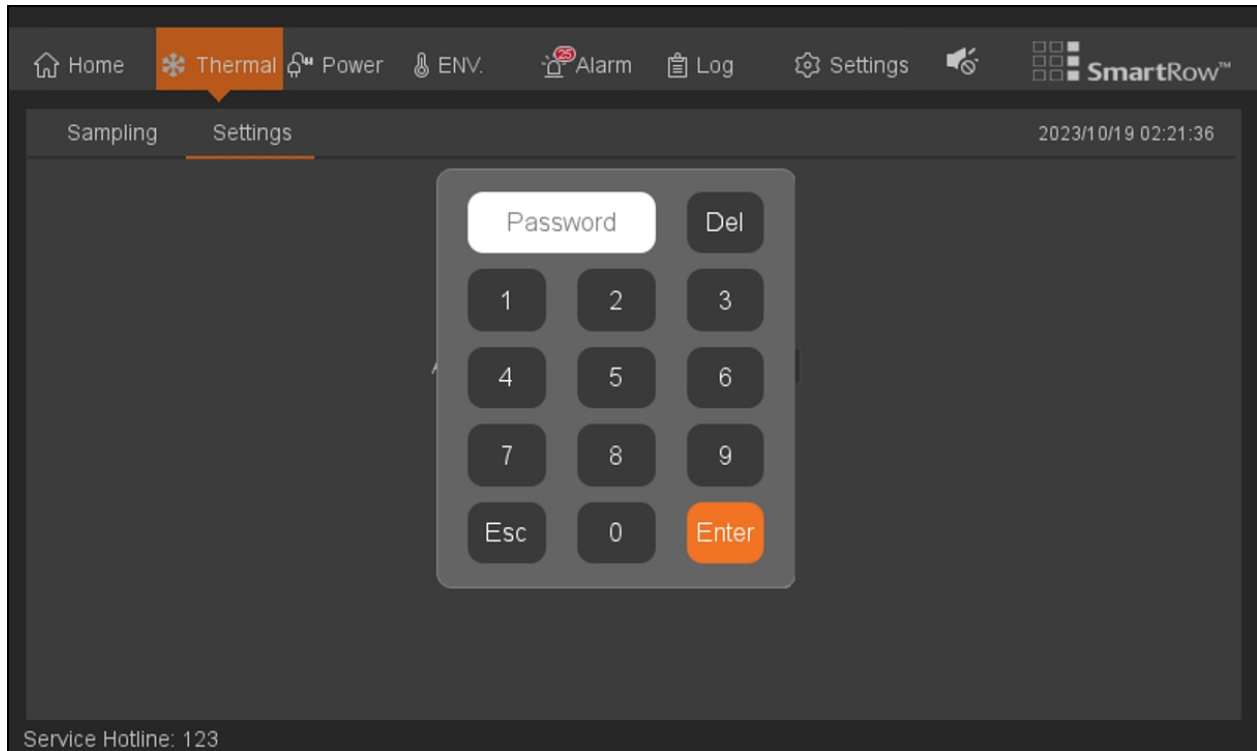
Figure 6.2 Thermal Sampling Page



6.2.2 Settings

Click *Thermal - Settings*. You must enter a password to access the Settings page.

Figure 6.3 Thermal Settings: Password Page



To access and configure the Settings page:

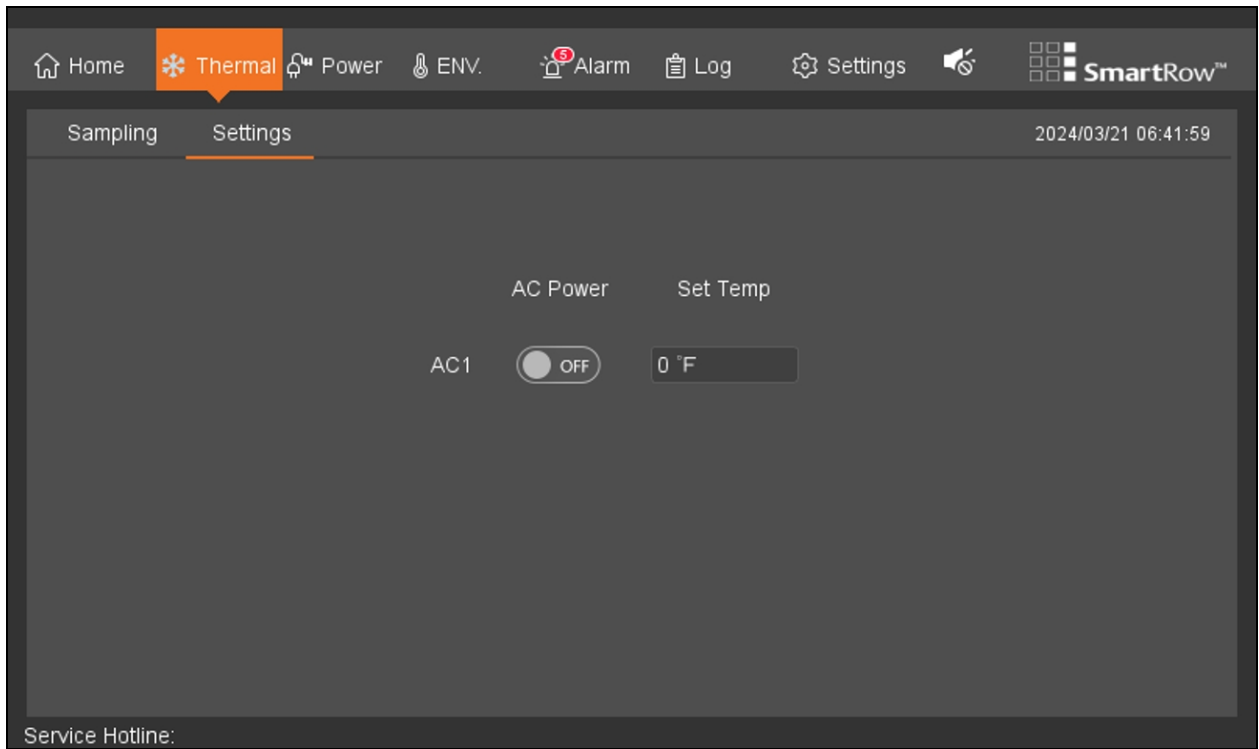
1. Input the default password of **1234**, then click *Enter*.

NOTE: Click *Esc* to exit the password screen if you do not wish to configure the thermal settings.

2. Reset the password on the next page.
3. After resetting the password, the the Setting page opens and displays the air conditioner power and setpoint temperature, as shown in the following figure.

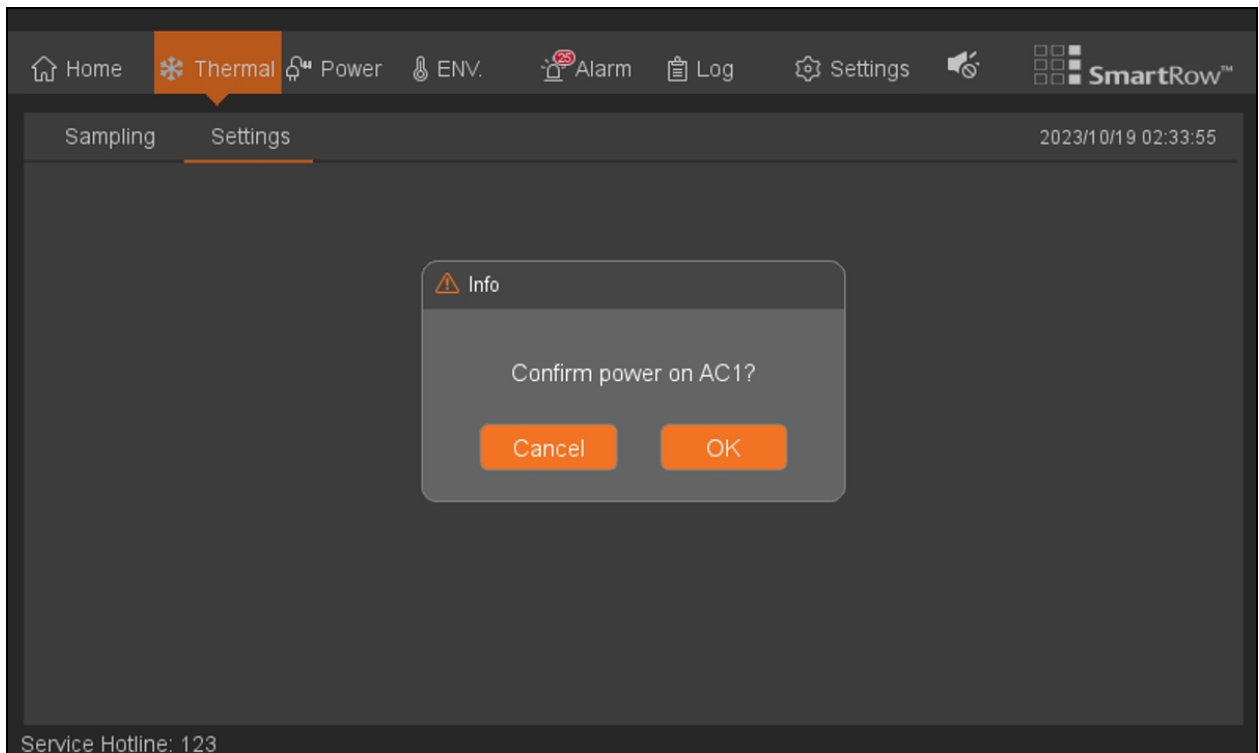
NOTE: The default setpoint temperature is 68 °F. The temperature can be readjusted to a value between 59 °F and 90 °F.

Figure 6.4 Thermal Settings: AC and Temperature Page



- 4. Save any new settings, then click *OK* on the confirmation screen.

Figure 6.5 Thermal Settings: Confirmation Page



6.3 Power

The Power screen provides access to information related to the system's UPS and PDU.

6.3.1 UPS

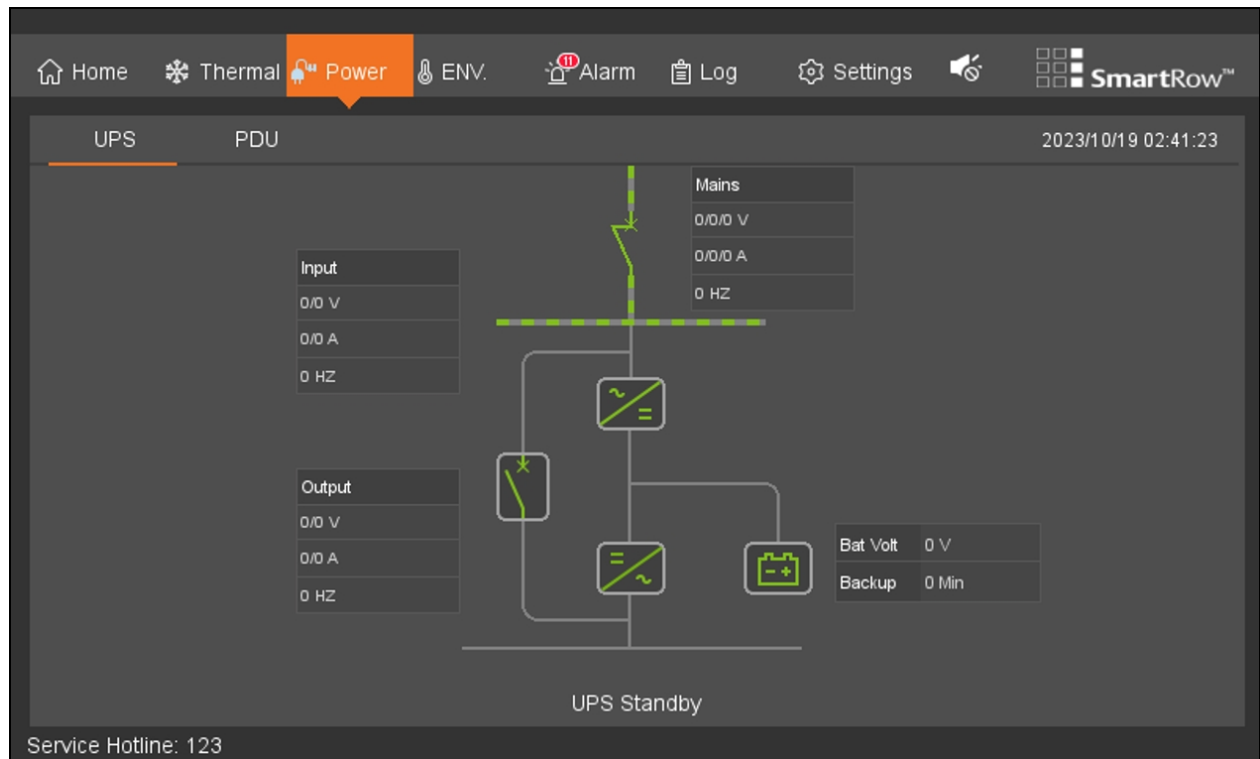
Click *Power - UPS*. The UPS page displays the distribution parameters and the real-time power system operating mode, as shown in the following figure. The page adjusts automatically depending on the operating state of the UPS and the SmartRow™ 2 solution.

Table 6.1 System Operating States

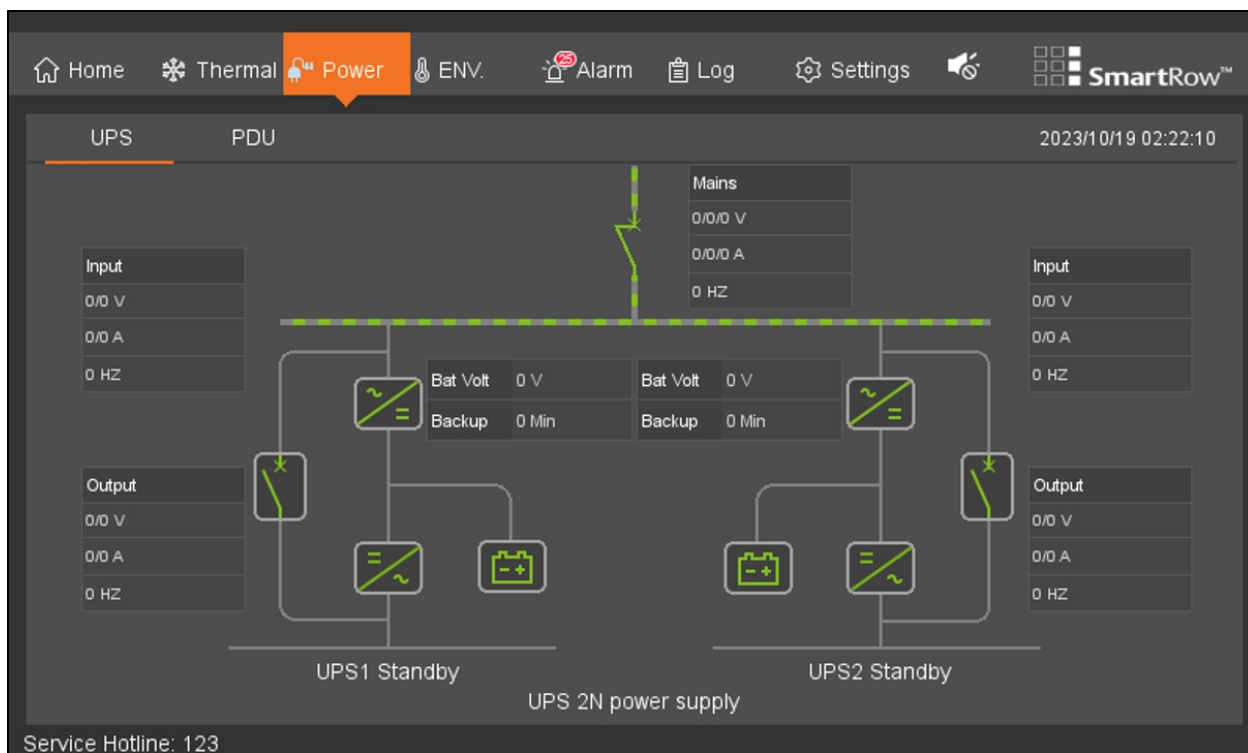
Component	Operating States
UPS	Power mode
	Standby mode
	Battery mode
	Bypass mode
SmartRow™ 2 solution	Single power supply
	2N power supply

NOTE: It is critical for the cabinet system to be configured correctly. Otherwise, the UPS tab may display inaccurate information.

Figure 6.6 UPS Page: Single Power Supply



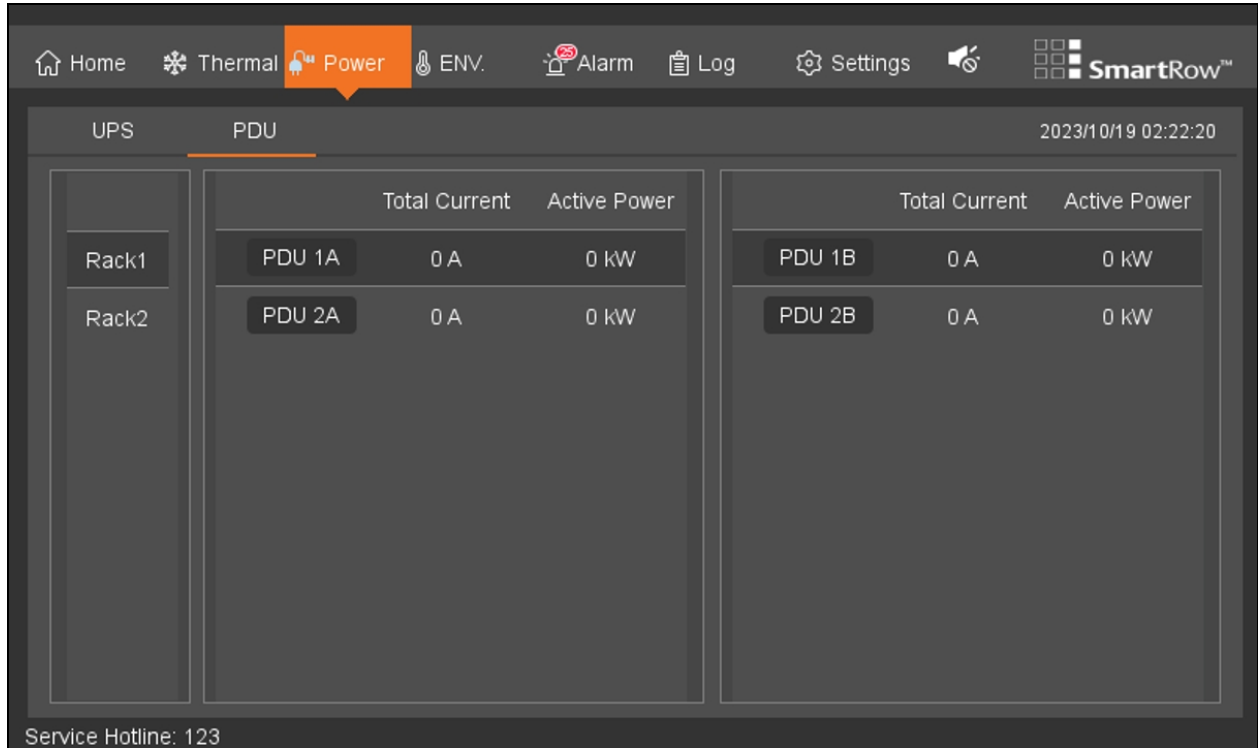
UPS Page: 2N Power Supply



6.3.2 PDU

Click *Power - PDU*. The PDU page displays the total current and active power of each PDU distribution, as shown in the following figure.

Figure 6.7 PDU Page



6.4 Environment (ENV)

The ENV tab displays the current environmental data of the rack, including real-time values of the respective collection point temperature and humidity sensors, the front and rear door status, and the average temperature curve and humidity curve of the hot and cold aisles.

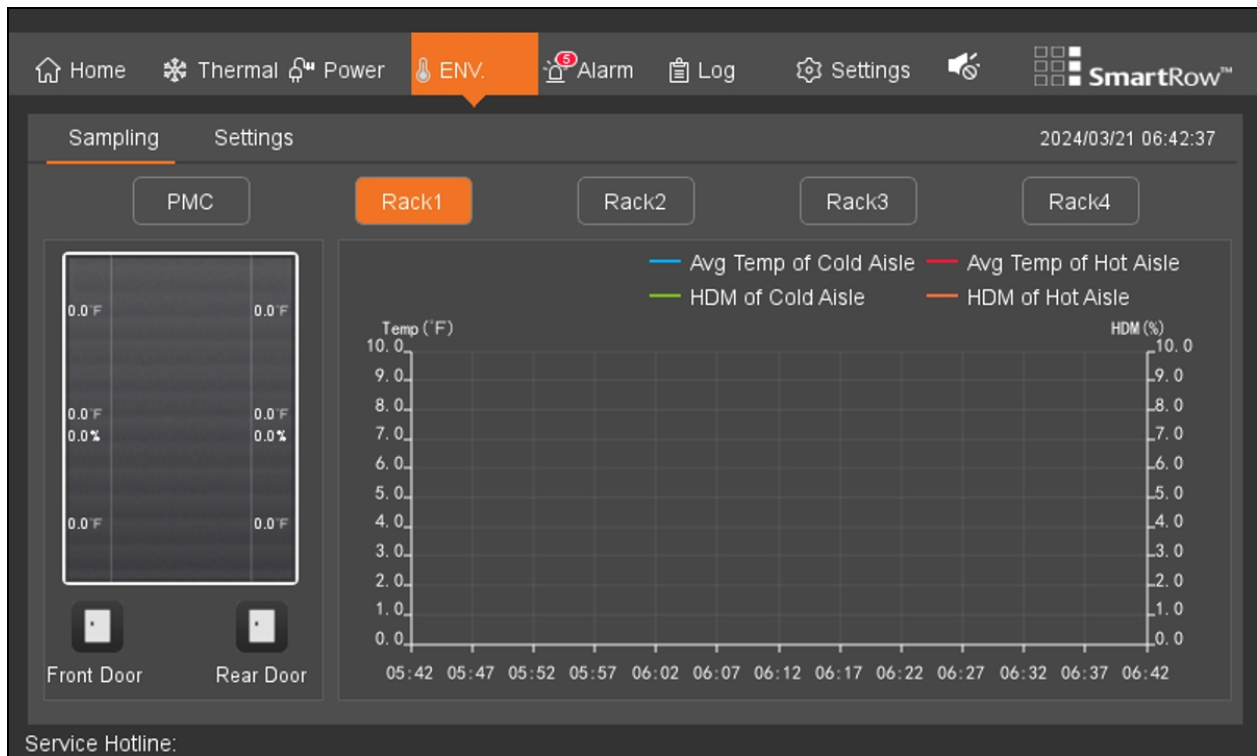
6.4.1 Sampling

Click *ENV - Sampling*. The Sampling page defaults to the environmental page for IT rack cabinet 1. The number of cabinet pages depends on the system configuration. You can navigate between each cabinet page by clicking the appropriate button for the cabinet. The button turns orange when the cabinet's page is open. Each page displays the average temperature and humidity curves of the hot and cold aisle in a line graph. The line graph automatically refreshes every five seconds, and the grid display one hour of environmental data.

When the air conditioner or emergency fan is operating normally, the dynamic airflow diagram of the hot and cold aisles turns on. The diagram disappears when the air conditioner or emergency fan is not working.

The Front Door and Rear Door static icons display the current status of the doors. The icon changes depending on if the door is opened or closed.

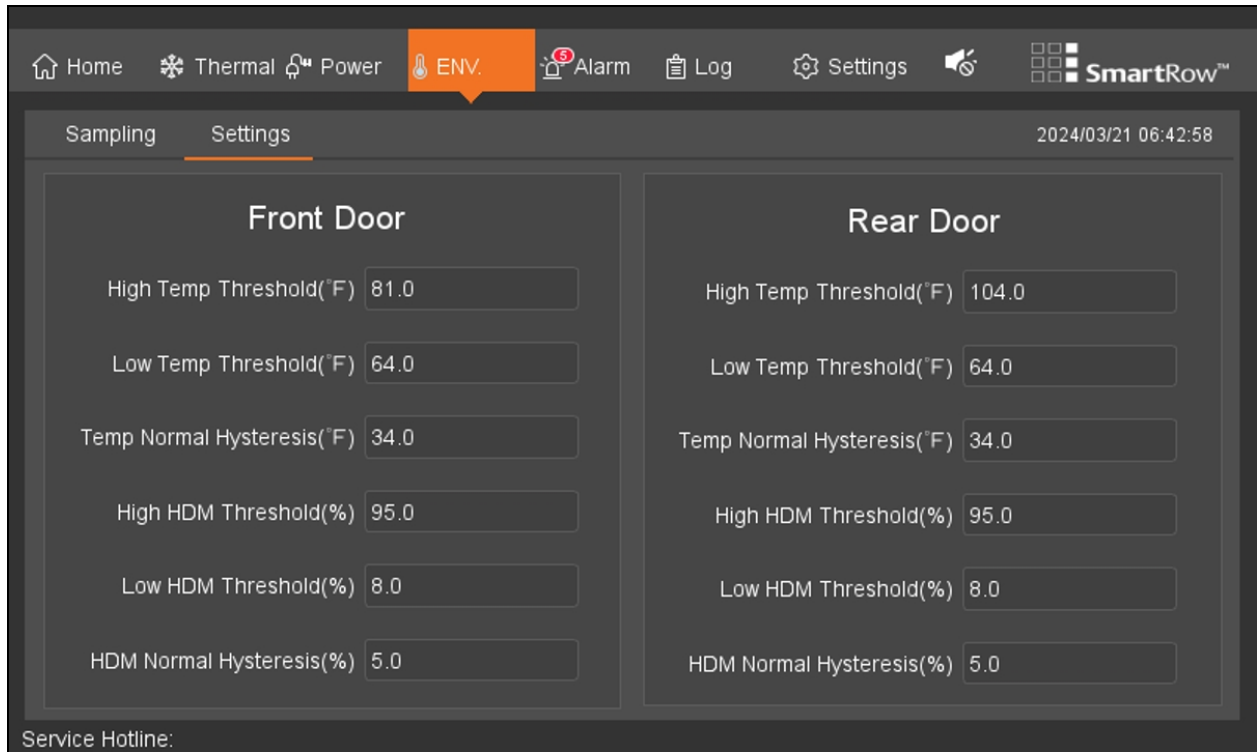
Figure 6.8 Environmental Sampling



6.4.2 Settings

Click *ENV - Settings*. The Settings page allows you to view and configure the environmental settings for the hot and cold aisles.

Figure 6.9 Environmental Settings



The fields in the Front Door and Rear Door sections are automatically set to their factory default values. The following table details the default environmental settings.

Table 6.2 Environmental Default Settings

Parameter	Front Cold Aisle	Rear Hot Aisle
High Temperature Threshold	27.0 °C (81 °F)	40 °C (104 °F)
Low Temperature Threshold	18 °C (65 °F)	18 °C (65 °F)
Temperature Normal Cut Off	1.0 °C (34 °F)	1.0 °C (34 °F)
High Humidity Threshold	95%	95%
Low Humidity Threshold	8%	8%
Humidity Normal Cut Off	5%	5%

Once configured, the system will generate an alarm when the hot and cold aisle temperature and humidity sensor exceeds the specified value. The alarm will deactivate when the system returns to an appropriate temperature and humidity range.

6.5 Alarms

The Alarms page contains two sub-sections: Active and History. These sub-sections contain information related to the system's existing alarms and historical alarms that are no longer in use.

NOTE: No user-defined alarms are available through the SmartRow™ 2 Infrastructure Solution web UI.

6.5.1 Active

Click *Alarm - Active*. The Active page provides an organized log of the current alarms, including their index number, name, level, and the time the alarm generated. Existing alarms are divided into three levels: emergency, major, and general. From this page, you can configure the sound of the alarm.

Figure 6.10 Active Tab

Index	Alarm Info	Alarm Level	Alarm Time
1	RACK1 Cool Aisle High Temp Alarm On Middle	▲Moderate	2023-10-18 23:48:51
2	FAN Communication Failure	▲Moderate	2023-10-12 06:24:58
3	RACK_1 Rear Door Communication Failure Alarm	▲Moderate	2023-10-12 06:24:19
4	RACK_1 Front Door Communication Failure Alarm	▲Moderate	2023-10-12 06:24:19
5	RACK_PMC Rear Door Communication Failure Alarm	▲Moderate	2023-10-12 06:23:21
6	RACK_PMC Front Door Communication Failure Alarm	▲Moderate	2023-10-12 06:23:21
7	RACK_2 Rear Door Communication Failure Alarm	▲Moderate	2023-10-12 06:22:52
8	RACK_2 Front Door Communication Failure Alarm	▲Moderate	2023-10-12 06:22:52
9	CRAC1 Rear Door Communication Failure Alarm	▲Moderate	2023-10-12 06:21:54
10	CRAC1 Front Door Communication Failure Alarm	▲Moderate	2023-10-12 06:21:54




Active Alarms: 25 First Page Previous Page 1/3 Next Page Last Page

Service Hotline: 123

To configure the alarm sound:

When activated, alarms will sound a buzzer to notify the user. The buzzer is located in the top right-hand corner of the Alarms page. Refer to the following table for descriptions of the various buzzer icons.

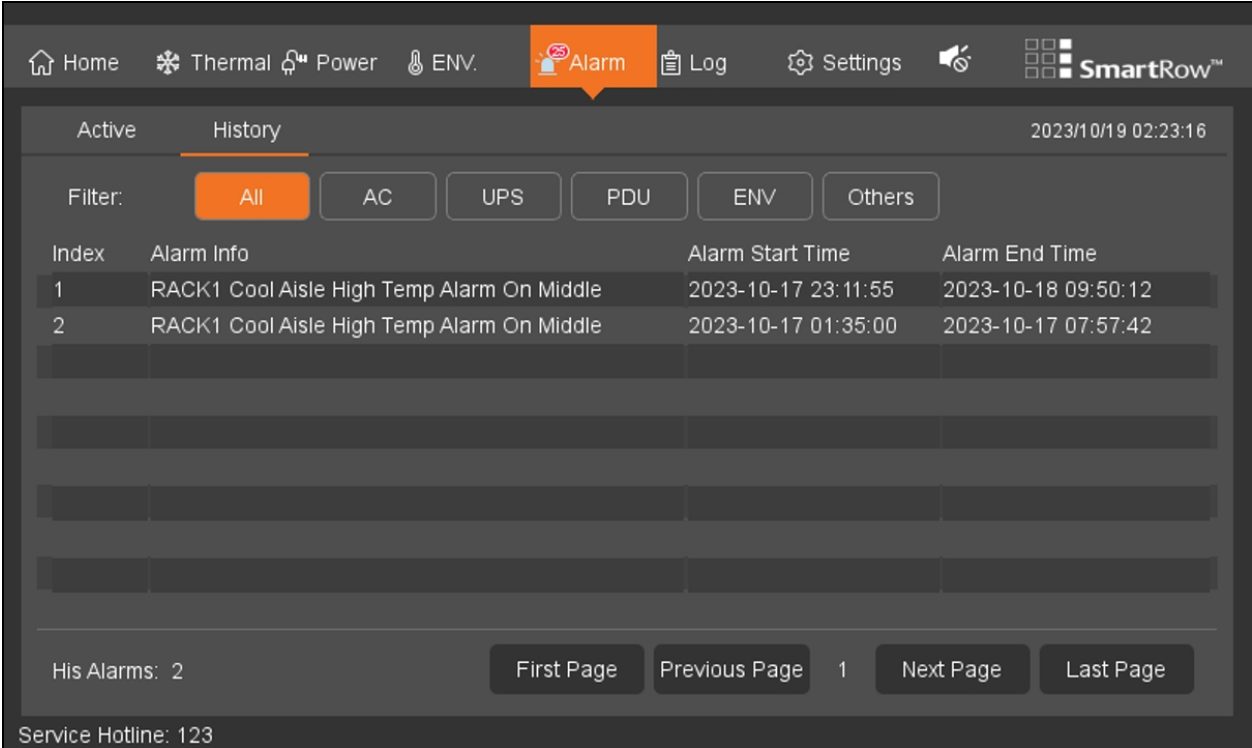
Table 6.3 Buzzer Icons


Icon	Function	Description
	Normal Mode	When set to normal mode, the buzzer sounds an alarms for five minutes or until silenced.
	Maintenance Mode	When set to maintenance mode, the buzzer does not sound.
	Silencer	When an alarm is sounding, click the Silencer icon to mute the buzzer. NOTE: The Silencer only mutes the current alarm; when a new alarm generates, the buzzer will sound again.

6.5.2 History

Click *Alarm - History*. The History page provides a display system and screening of past alarms. Use the Filter option to narrow down your search for past alarms.

NOTE: The LCD screen provides the past 100 alarm entries for one week. For additional alarm history, view the web pages in Alarm Management.

Figure 6.11 History Tab


Home Thermal Power ENV. Alarm Log Settings  SmartRow™

Active History 2023/10/19 02:23:16

Filter: All AC UPS PDU ENV Others

Index	Alarm Info	Alarm Start Time	Alarm End Time
1	RACK1 Cool Aisle High Temp Alarm On Middle	2023-10-17 23:11:55	2023-10-18 09:50:12
2	RACK1 Cool Aisle High Temp Alarm On Middle	2023-10-17 01:35:00	2023-10-17 07:57:42

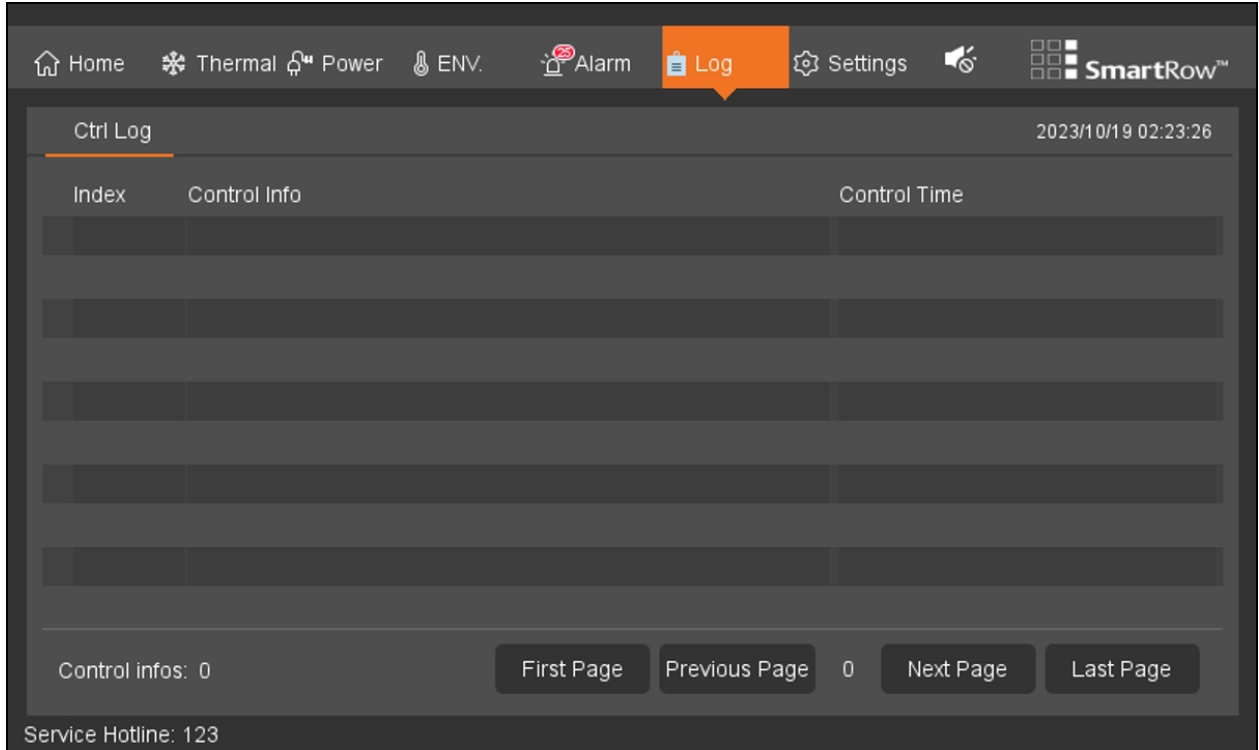
His Alarms: 2 First Page Previous Page 1 Next Page Last Page

Service Hotline: 123

6.6 Logs

Click *Log*. The Log page is only available on the LCD screen and displays control information.

Figure 6.12 Log Tab



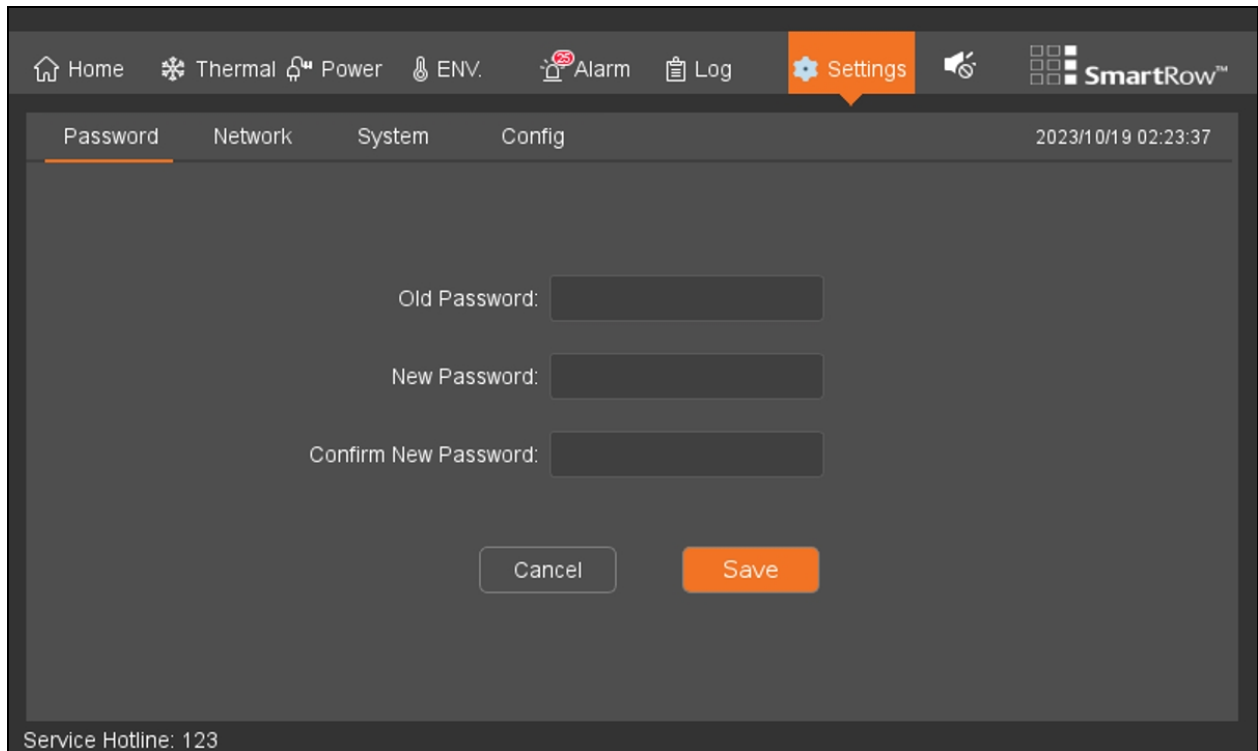
6.7 Settings

6.7.1 Password

Click *Settings - Password*. The Password page allows you to modify the password through the LCD screen. By default, the password is 1234.

NOTE: Web pages can be restored in the LCD.

Figure 6.13 Password Settings



6.7.2 Network

Click *Settings - Network*. The Network page allows you to modify network parameters, such as the IP address, subnet mask, and default gateway.

NOTE: A network interface requires an active connection in order to be set.

Figure 6.14 Network Settings

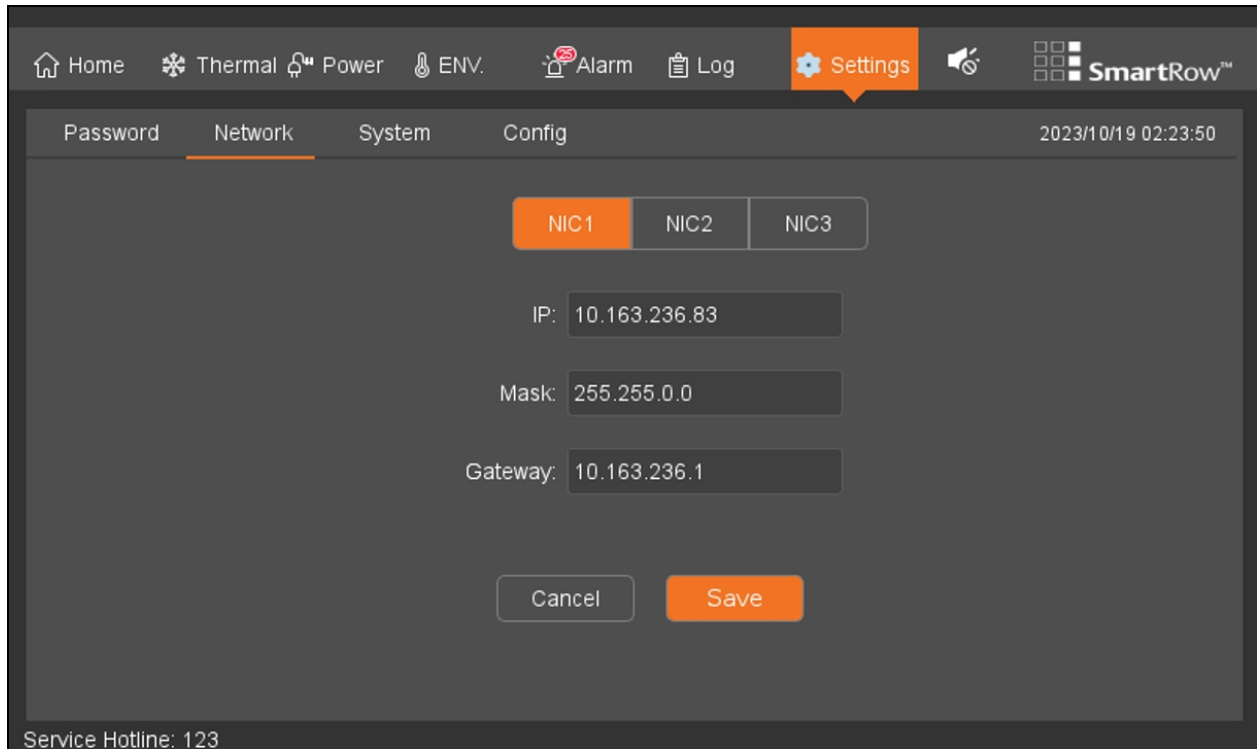
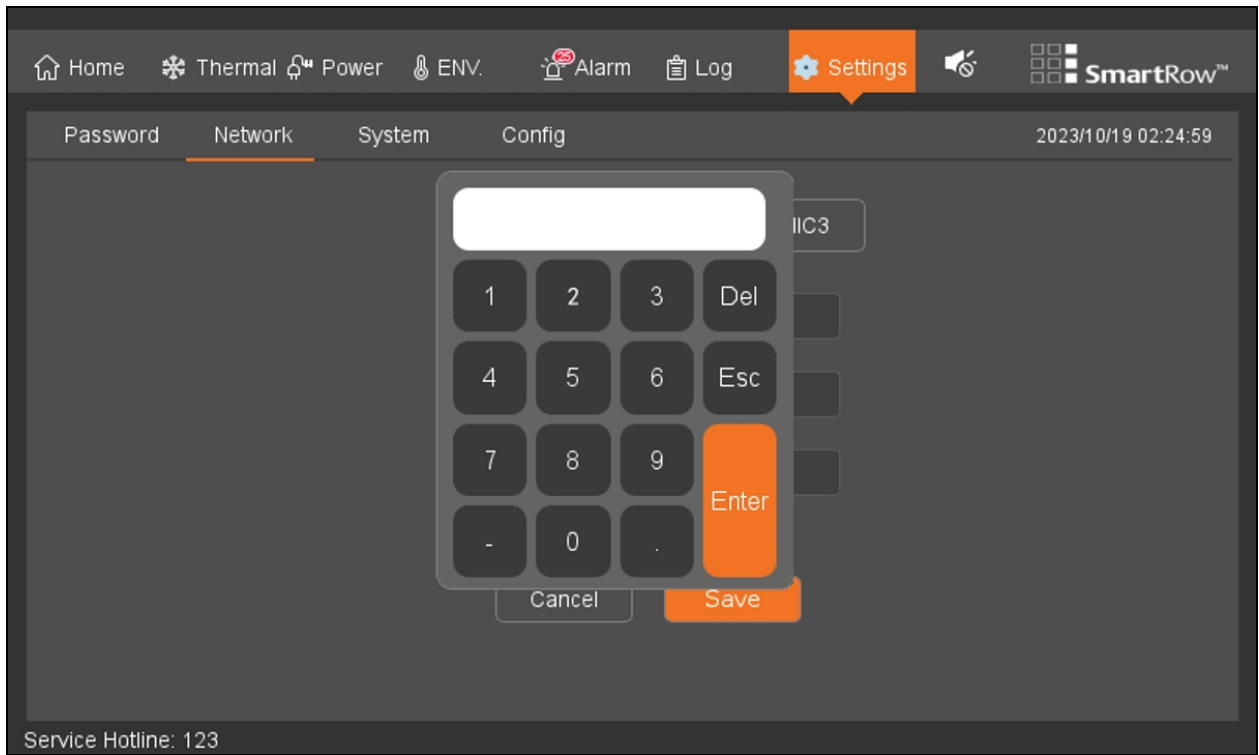


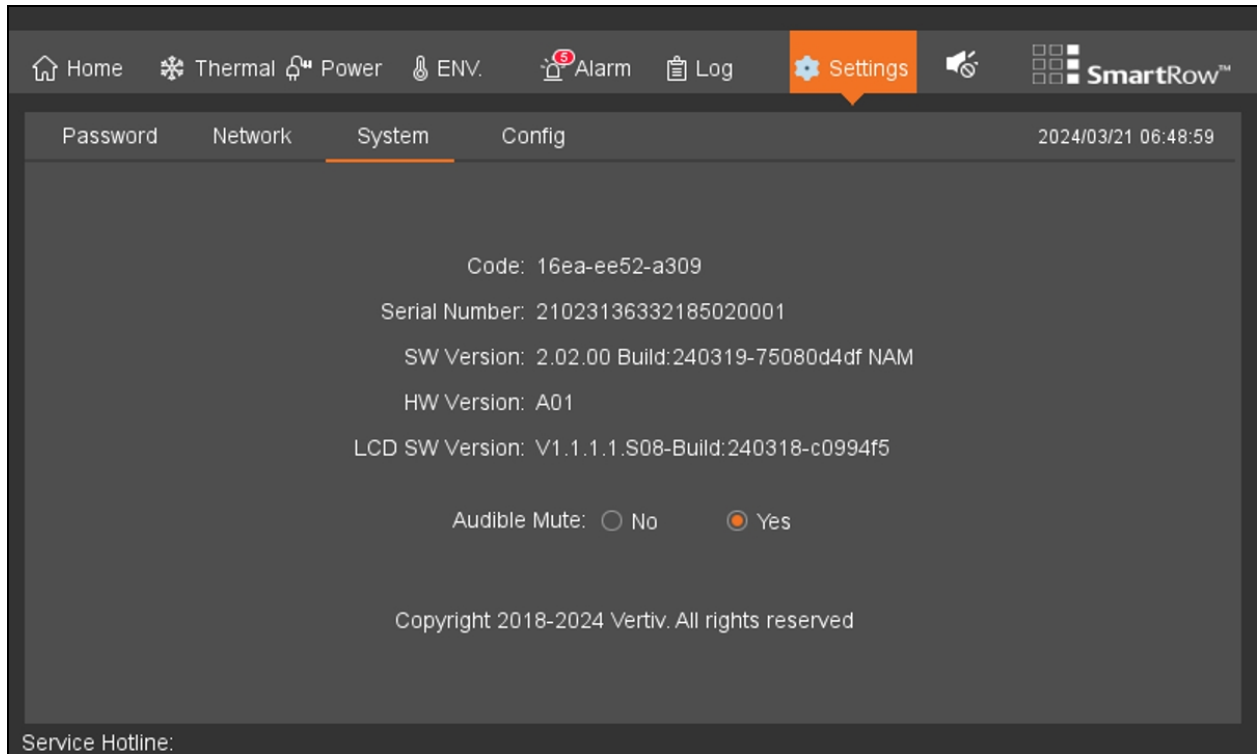
Figure 6.15 Network Settings Keypad



6.7.3 System

Click *Settings - System*. The System page provides information related to the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit's firmware and hardware version, the LCD's firmware version, and allows you to configure the system's mode.

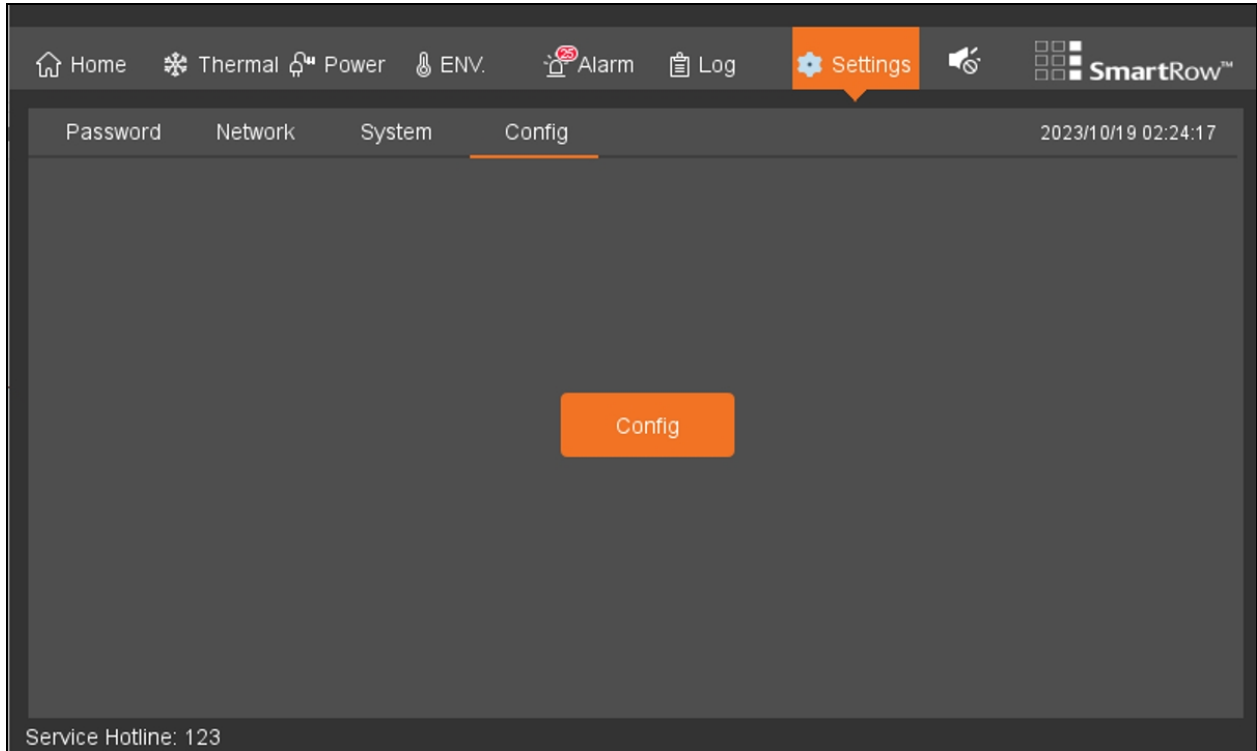
Figure 6.16 System Tab



6.7.4 Configuration

To reconfigure the system, contact Vertiv Technical Support.

Figure 6.17 Configuration Settings



7 Navigating the Monitoring Unit Web User Interface (UI)

This chapter provides detailed information about using the Vertiv™ Liebert® RDU501 intelligent monitoring unit. After connecting the unit to a network and completing the initial installation setup procedures, you can access the unit directly via its web UI. For more detailed information and instructions, please refer to the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual shipped with the unit and located on www.Vertiv.com.

Verifying Network Connectivity

Prior to logging into the monitoring unit's web UI, confirm the IP address of the unit and test its connectivity. Refer to the following procedures.

To verify the IP address is accurate:

1. The monitoring unit has two network cards. Verify that the Ethernet cable is plugged into the correct interface.
2. If the IP address is static, the unit's default IP address may be found on the Ethernet port in the area dedicated to the monitoring unit.

To test the IP address connection:

1. Open the Windows operating system command prompt.
2. On the command line, enter **ping** and the IP address (for example, ping 192.168.0.254) to see if the transmission is successful.
3. If the network connection is not successful after the above two steps, press the Reset button on the device to restore the default IP address.

Supported Web Browsers

The monitoring unit web UI supports the latest versions of the following web browsers:

- Google Chrome (recommended)
- Mozilla Firefox
- Apple Safari
- Microsoft Edge

7.1 Login

To log into the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit web UI:

1. Open a web browser, then enter the monitoring unit's IP address. The Login page appears.

NOTE: If the Login page does not appear, refer to the appropriate troubleshooting procedure in this section: [Authorization](#) on page 103 .

NOTE: To download the app version of the web UI, click [Download APP](#). Scan the QR code that appears on the screen and download the app.

Figure 7.1 Web UI Login Page

2. Enter the default username and password: **admin/Vertiv**
3. Click *Login*. After logging into the system for the first time, you must change the default password.

To change the default password:

1. The home page of the General Scenario opens and displays the following prompt: *Modify the default password confirmation interface*. Click *Confirm*.
2. Enter a new password.
3. Log into the monitoring unit's web UI with the default username and your new password.

NOTE: It is recommended to change the password periodically.

7.2 Home

From the left-hand sidebar, click the Home icon. The Home page displays two sub-menus: Facility Overview (includes Power and Environment overview) and IT Devices Overview.

Figure 7.2 Home Page Overview

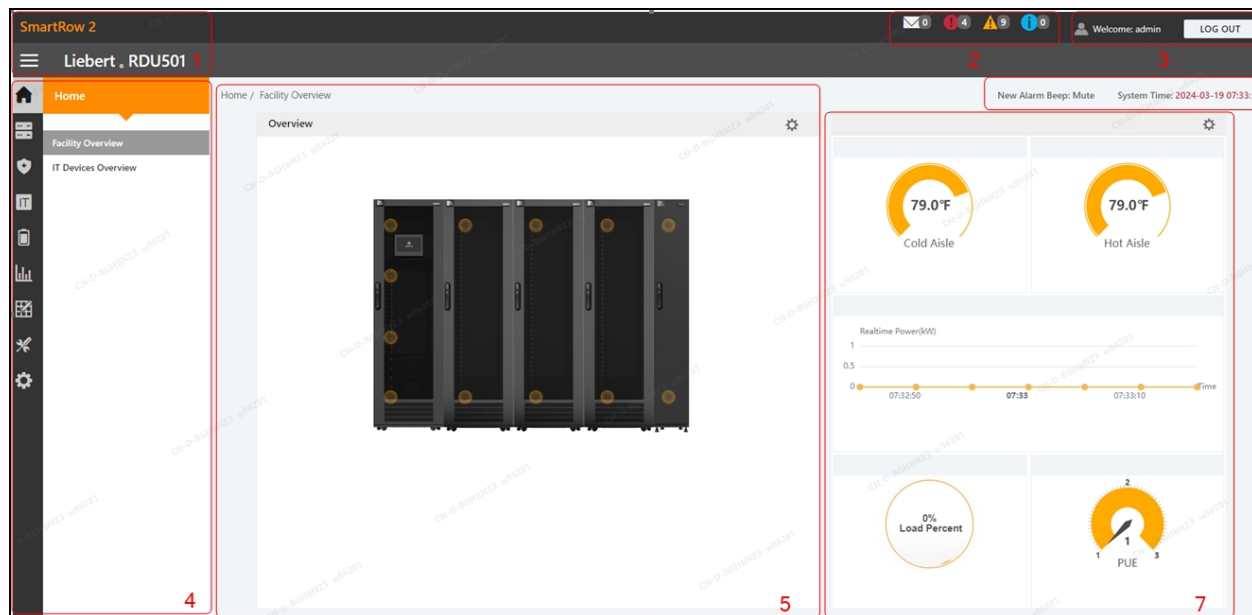


Table 7.1 Home Page Overview

Number	Description
1	Product name
2	Real-time number of alerts for all levels, including IT Events/Alarms, Critical Alarms, Moderate Alarms, and Low Alarms.
3	Current user information
4	Menu item
5	Overview of room information
6	Alarm alert and system time
7	<p>Critical system information, including the following:</p> <ul style="list-style-type: none"> Aisle Temperature: the average temperature of the cold and hot aisles in the module. For details about the temperature sensor of the rack in the module, see the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual shipped with the unit and located on www.Vertiv.com. Real-time Power: the current power levels of the system. For details, see Power Management (Mgmt) on page 92. Energy Consumption: the current system load rate and PUE. For details, see Power Management (Mgmt) on page 92.

To navigate through the Home page:

- Access the Time Calibration page by clicking the system time in the top right corner.
- Log out of the web UI by clicking the *Log Out* button in the top right corner.
- View the number of events in the console and in the U-level from the past three days and the number of IPMI device alarms by clicking the IT Events/Alarms icon.
- View the critical, moderate, and low alarms by clicking the appropriate icon.

- Configure the alarm sound by clicking the *Mute* link to set the new alarm tone to Open. When an alarm is generated, a sound will play.

7.2.1 Facility overview

From the Home page, click *Facility Overview*. The Facility Overview page contains information related to site/room floor plans, average aisle temperature, real-time power, and energy management.

Overview

The Overview section allows you to configure to Signal Display Mode.

NOTE: Device hotspots and background images are pre-configured for the SmartRow™ 2 solution and should not be modified.

To configure the Signal Display Mode:

1. Click the enter setup mode icon on the right-hand side of the Overview section to enter the setup state.
2. Click the Signal Display Mode icon.
3. Select the appropriate Signal Display Mode: On Hover, Always Show, or Auto Polling

NOTE: If selecting Auto Polling, you must enter the auto polling interval time in seconds.

4. Click *Save*.

To return to the browser state:

1. Click the enter setup mode icon on the right-hand side of the Overview section to enter the setup state.
2. Click the Back to Browser icon to return to the browse state.

7.2.2 IT devices overview

From the Home page, click *IT Device Overview*. The IT Devices Overview page contains corresponding information related to the devices.

7.3 Device

From the left-hand sidebar, click the Device icon. The Device page contains one sub-menu: Device Type.

7.3.1 Device type

From the Device page, click *Device Type*. The Device Type page displays all currently installed device types.

To navigate through the Device Type page:

- View devices of a certain type by clicking on the device type. The content area on the right side displays all devices of that type in a card format. The icon in the top left corner of the card displays different colors based on the alarm status of the device. The right side of the card displays the attention signal. The bottom of the card displays the device name is displayed.
- Modify the device name.
- View and configure device details, including general information, sampling signals, control signals, and settings.

NOTE: The ENV-TH device type is a virtual device. Therefore, the temperature and humidity sensors connected to the monitoring unit and the device name cannot be changed.

7.3.2 Overview

Click *Device Type - ENV*, then select a device and click *Overview*. The Overview page displays the different default control modes, according to the different device types.

NOTE: Some device types have specific state diagrams that cannot be removed nor configured. The diagrams can only be update with state map location information, such as air conditioners (CRACs), UPSes, and so on.

Figure 7.3 Device Overview Page



Number	Icon
1	List of available controls
2	Configure controls
3	Delete controls
4	Back to Browser
5	Same Type of Equipment Effectively
6	Restore the default settings
7	Save the configuration

To configure the Overview page for a device:

Click the *Edit* button in the top right corner to customize the page display. In the edit state, you can perform the following functions:

- Drag and drop the overview controls, as desired.
- Click the Back to Browser icon to exit the edit state.
- Click the Same Type of Equipment Effectively icon to batch configure other devices of the same type.
- Click the Restore System icon to restore the default configurations.
- Click the Save icon to save all configurations.

7.3.3 Sampling

Click *Device Type - ENV*, then select a device and click *Sampling*. The Sampling page contains a table that displays the sampling signal of the selected device.

NOTE: If a signal is in an alarm state, then the signal's row is highlighted red.

NOTE: If a yellow asterisk is present in the Favorite on Card column, then that specific signal is the default signal value that will appear in the device card list.

To configure the Sampling page for a device:

- Click the Modify icon on the right side of the Signal Name column to modify the signal name.
- Click the Restore Default icon on the right side of the Signal Name column to restore the default signal name.
- Click the *SEARCH* button to find or filter the signal by name.
- Click on the asterisk in the Favorite on Card column to change the default signal that appears in the device card list, then confirm your selection.

7.3.4 Control

Click *Device Type - ENV*, then select a device and click *Control*. The Control page displays the control signals of the selected device. The availability of control signals is dependent on the device protocol documentation and the accessible controls.

To configure the Control page for a device:

- Control the device by clicking the *CONTROL* button from the left side of the desired device's row. On the confirmation screen, click *Confirm*.
- Click the *SEARCH* button to find or filter the signal by name.
- Click the Modify icon on the right side of the Signal Name column to modify the signal name.
- Click the Restore Default icon on the right side of the Signal Name column to restore the default signal name.

7.3.5 Setting

Click *Device Type - ENV*, then select a device and click *Setting*. The Setting page displays the signal setup for the selected device and allows you to configure various signal settings, such as threshold limits or time delays. The accessible signals are identified on the device protocol documentation.

To configure the Setting page for a device:

- Modify the signal records by typing or using the arrow to set the value in the Value Setting column. Then, click the *SET* button and confirm your selection. The modified date and time are displayed in the Refresh Date/Time column.

NOTE: It is critical to modify signal records when you want to report driver issues by attaching the driver data into the monitoring system's log.

- Check the box(es) next to the Index column to configure multiple signals simultaneously.

NOTE: A maximum of 16 signals can be set at once.

- Click the *SEARCH* button to find or filter the signal by name.
- Click the Modify icon on the right side of the Signal Name column to modify the signal name.
- Click the Restore Default icon on the right side of the Signal Name column to restore the default signal name.

7.4 Safe Management (Mgmt)

From the left-hand sidebar, click the Safe Mgmt icon (the shield). The Safe Mgmt page monitors and manages the security of the cabinet through video surveillance, access control, and fire fighting management functions. This page has three sub-menus: Fire Fighting, Door Access Management (Mgmt), and Video Surveillance.

7.4.1 Fire fighting

This feature is not available for the SmartRow™ 2 solution in North America.

7.4.2 Door access management

From the Safe Mgmt page, click *Door Access Mgmt*. The Door Access Mgmt page allows you to configure and view information related to card management, authorization management, historical events, resetting authorization, and remote control capabilities.

Card management

Click *Door Access Mgmt - Card Mgmt*. The Card Mgmt page allows you to add, modify and delete an access control card. You can also view the authorization information for each card. The Card Mgmt page can be hidden from the *System Settings - Monitoring Unit - Settings Signal* page.

Figure 7.4 Card Management

The screenshot shows the 'Card Mgmt' page in the SmartRow 2 interface. The page title is 'Safe Mgmt / Door Access Mgmt'. The sub-menu 'Card Mgmt' is active, and the 'Add' button is highlighted. The form contains the following fields and values:

- Card No.: 3090689658
- Password: 1234
- Sex: Male
- Department: (empty)
- Card Alias: (empty)
- Expiry Date: 2099-12-31
- Mobile Phone: (empty)

There is a red error message: 'Serial port connection failed'. Below the form are buttons for 'FINGER1', 'FINGER2', and 'DEL FINGER'. At the bottom, there is a table with the following structure:

Index	Type	Length	Register Time
No data found			

To add an access control card:

1. Click the *Add* button.
2. Manually enter the access card number.

-or-

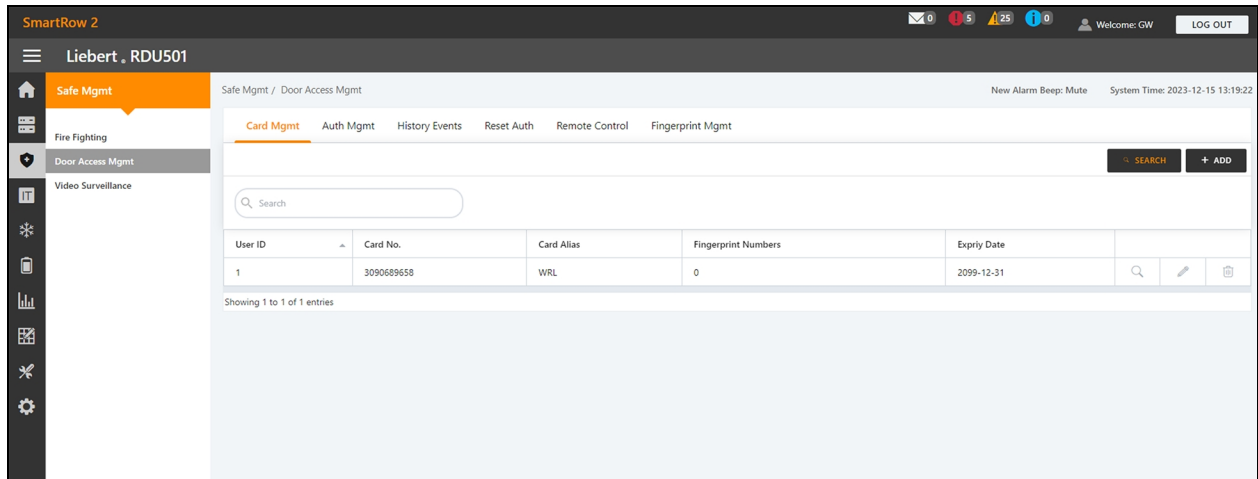
Swipe an unknown card at a door lock then follow the steps described in the procedure [To add an invalid card from the history log](#): on page 90 .

-or-

Install a card reader to automatically read the card number. Click the Download icon to download the card reader plug-in. Click the question mark icon to view the plug-in help details.

3. Enter the name of the cardholder.
4. Enter the numeric password. The password must be at least four digits long.
5. Enter the desired period of validity for the access card.
6. Enter Male or Female for the gender of the cardholder.
7. (Optional) Enter the cardholder's telephone number in the following format: [+]
+ [country code] + [phone number]
8. (Optional) Enter the cardholder's department.
9. Click SAVE. The access control card appears in the Card Mgmt tab. Refer to [Access Control Card Added](#) below .

Figure 7.5 Access Control Card Added



To modify an access control card:

Click the Edit icon (the pencil) on the right side of the card entry.

NOTE: The access control card number cannot be modified.

To delete an access control card:

Click the Remove icon (the trash can) on the right side of the card entry.

To change the password:

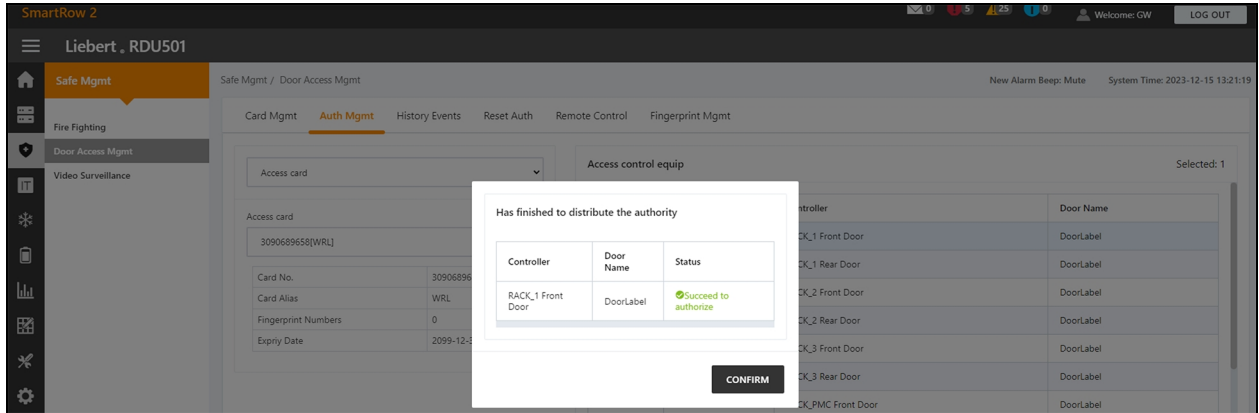
Change the password, then click Save. You can now use your new password to unlock RACK_1 Front Door lock. Alternatively, you can use the password ID, which follows this format: [four digit ID number][access card password]. For example, if the ID is 1 and the password is 4321, then the password ID is 00014321.

Authority management

Click *Door Access Mgmt - Auth Mgmt*. The Auth Mgmt page allows you to configure the authorization settings of the access control cards.

NOTE: The maximum number of users for a single operation is 4. The maximum number of locks for a single operation is 100.

Figure 7.6 Authorization Management



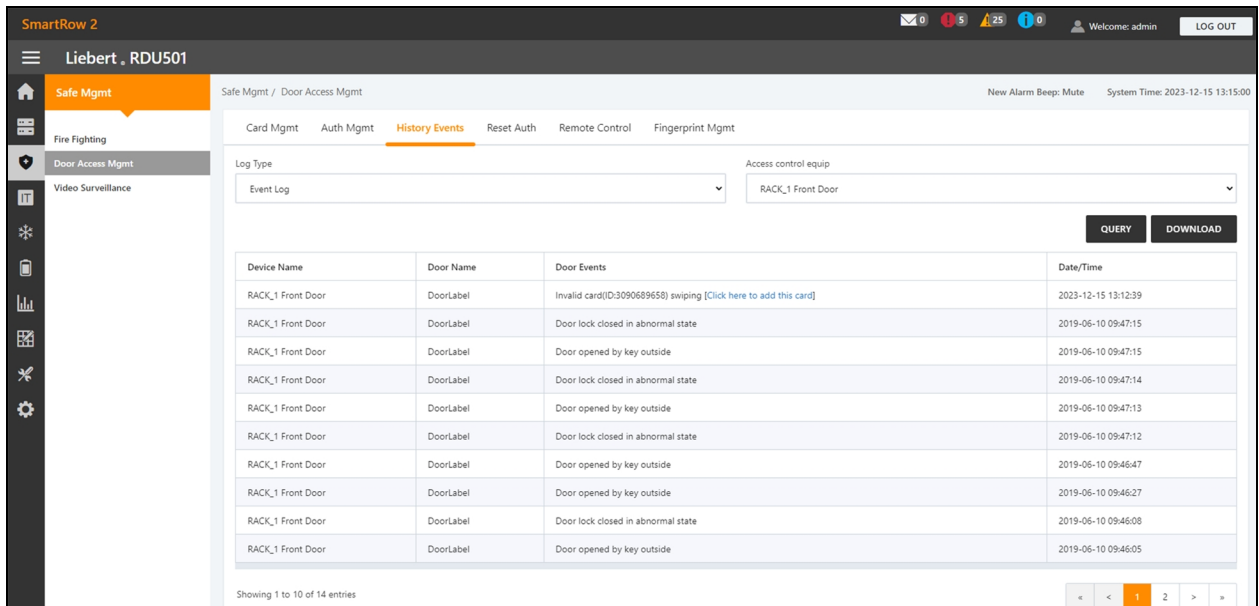
To configure authorization settings:

1. Select the desired controller/lock using the drop-down menu.
2. Check or uncheck the access control card.
3. Click Save to authorize or deauthorize the access control card.

History events

Click *Door Access Mgmt - History Events*. The History Events page allows you to query the historical records of events and door openings for the access control devices.

Figure 7.7 History Events



To view the historical records of the access control device:

1. Select the type of query: *Event record* or *Door opening record*.
2. Select the access control device.
3. Click the *QUERY* button. The historical record of the device appears.
4. (Optional) Click the *DOWNLOAD* button to download the historical records.

NOTE: If the access control card number is empty when querying door opening records, you should query the door opening records of all card numbers. Enter the access control card number to query the door opening records of the specified card number.

NOTE: If the cardholder's name in the door opening record displays "--", it means that the user has been deleted.

To add an invalid card from the history log:

Locate the invalid card swiping event in the history log, then select it to be redirected to the Card Mgmt tab where you can add the card.

Reset authorization**To remove the authorization information from all access cards on a device:**

1. Click *Door Access Mgmt - Reset Auth*.
2. Select the access control device.
3. Click *CLEAR AUTHORIZATION*.

Remote control

Click *Door Access Mgmt - Remote Control*. You can perform functions such as remote opening on the access control device.

Fingerprint management

This feature is not available for the SmartRow™ 2 solution in North America.

7.4.3 (Optional) Video surveillance

From the Safe Mgmt page, click *Video Surveillance*. The Video Surveillance page allows you to view and customize live video, configure video devices, and manage recorded images and videos.

Realtime video

Click *Video Surveillance - Realtime Video* to view the live video of the device.







To play live video:

Click the Play icon next to the Device column to play the live video.

To customize the video display:

Select the icons on the Realtime Video screen to customize the video display. Refer to **Table 7.2** on the facing page for icon descriptions.

Table 7.2 Live Video Icon Descriptions

Icon	Description	Function
	Play	Start /stop real-time browsing of a single device.
	Video Monitoring	Set the current page to browse in 1x1, 2x2, or 3x3 mode. When browsing the current page in 1x1 mode, switch to browse video monitoring of different devices.
	Start All Play	Start/stop real-time browsing of all devices.
	Snapshot	Capture a snapshot of the live video. The image is saved to this file path: settings\local configuration\corresponding operation.
	Electronic Zoom	Turn on the video image magnification.
	Electronic Zoom	Turn off the video image magnification.

Video replay

Click *Video Surveillance - Video Replay* to playback the video of the device.






To replay a recorded video:

1. Select the device from the Device column on the left-hand side.
2. Select the date of the playback to find, then click the Play icon.

To customize the video replay display:

Select the icons on the Video Replay screen to customize the video display. Refer to **Table 7.3** below for icon descriptions.

Table 7.3 Video Replay Icon Descriptions

Icon	Description	Function
	Play	Play the video.
	Stop	Stop the video.
	Snapshot	Capture a snapshot of the live video. The image is saved to this file path: settings\local configuration\corresponding operation.
	Electronic Zoom	Turn on the video image magnification.
	Electronic Zoom	Turn off the video image magnification.

Video device management

Click *Video Surveillance - Video Device Management* to connect a video device. The monitoring unit supports four channels of video access via one Network Video Recorder (NVR), to which a maximum of four IP cameras can be connected. The NVR and IP cameras must support both the onvif protocol and the RTSP protocol. To enable these protocols, refer to [Enabling Onvif](#) on page 61.

Video management supports the latest versions of these browsers:

- Google Chrome (recommended)
- Microsoft Edge

To connect a video device:

1. Click the *CLEAR* button to remove any existing video device information, if applicable.
2. Enter the IP address of the video device in the Video device IP field.

NOTE: Ensure the IP address is available and all parameters are consistent with the device.

3. Enter the username and password.
4. Select either *NVR* or *IPC* from the Device Type drop-down menu.
5. Click the *Connection Test* button to test whether the video device is successfully connected. A prompt message appears if the connection was successful.
6. Click the *SAVE* button.

To set video parameters:

Refer to [Configuring the video parameters](#) on page 60.

Snapshot download

Click *Video Surveillance - Snapshot Download* to save up to 50 photos and to download a maximum of five historical videos at once. Captured videos can be viewed from the Video Replay tab under the Video Surveillance menu. The video triggered can be displayed as yellow manual video recording when it is played back.

To capture or record the captured image by video device:

You must first add the alarm linkage configuration. For more information, see [Alarm actions](#) on page 96. When the configured alarm condition is triggered, the captured image can be downloaded and deleted only through the Snapshot Download tab.

To download the image:

Click on the photograph linkage on the Snapshot Download page.

To delete the image:

Click the *DELETE* button on the right side of the Snapshot Download page.

7.5 Power Management (Mgmt)

From the left-hand sidebar, click the Power Mgmt icon (the battery). The Power Mgmt page displays the current and historical record of energy consumption data in accordance with user-defined rules to help users analyze the overall energy consumption of the equipment room. This page has three sub-menus: Current PUE, History PUE, and Calculation Setting.

NOTE: If the PDU in the SmartRow™ 2 solution has been configured, then the energy consumption statistics settings and system load percentage settings were automatically configured.

7.5.1 Calculation setting

From the Power Mgmt page, click *Calculation Setting*. The Calculation Setting page allows you to view the system load percent settings and the Power Utilization Efficiency (PUE) modes. You can also clean up the configuration information on the page.

To switch PUE modes:

Click the Power Mode or Power Consumption Mode radio button at the top of the screen.

To clean configuration information:

1. Click the *CLEAN UP* button to clean the configuration information.
2. At the confirmation window, click the *CONFIRM* button.
3. Click *SAVE*, then click *CONFIRM*.

Figure 7.8 Power Mode Tab

SmartRow 2
Liebert , RDU501
Power Mgmt / Calculation Setting
New Alarm Beep: Mute System Time: 2021-06-02 18:34:28

PUE Caculate Mode Power Mode Power Consumption Mode

IT Load + ADD

Index	Operator	Device Name	Signal Name	
1	+	PDU1A	Active Power	
2	+	PDU1B	Active Power	
3	+	PDU2A	Active Power	
4	+	PDU2B	Active Power	
5	+	PDU3A	Active Power	
6	+	PDU3B	Active Power	

Infrastructure Load

All Devices + ADD

Index	Operator	Device Name	Signal Name	

Figure 7.9 System Load Percent Setting Tab

The screenshot displays the 'System Load Percent Setting' configuration page in the SmartRow 2 web interface. The page title is 'Liebert, RDU501'. The sidebar on the left shows the 'Power Mgmt' menu with sub-items: 'Current PUE', 'History PUE', and 'Calculation Setting'. The main content area features a 'System Load Percent Setting' section with a 'Rated Power (kw)' input field containing the value '9'. Below this is an 'Actual Power' section containing a table with the following data:

Index	Device Name	Signal Name	
1	PDU1A	Active Power	
2	PDU1B	Active Power	
3	PDU2A	Active Power	
4	PDU2B	Active Power	
5	PDU3A	Active Power	
6	PDU3B	Active Power	

Buttons for '+ ADD', 'SAVE', and 'LOG OUT' are visible in the interface.

7.6 Device Options

From the left-hand sidebar, click the Device Options icon (the tools). The Device Options page allows you to configure and add device information, perform batch configurations, modify the device and signal name, modify the signal status, configure alarm notifications and actions, define the SMS and email information. This page has six sub-menus: Infrastructure Device Mgmt, Batch Configuration, Signal Setting, Notify Type Configuration, Email&SMS Configuration, and Alarm Actions.

7.6.1 Signal setting

To modify the device name:

From the Modify Device Name page, you can change the device name. Enter the new device name in the provided field. Upon entry, the Settings button appears in the top right corner of the list. Use the Settings button to configure the batch settings.

NOTE: The device name or signal name may contain up to 32 characters. It cannot consist of all spaces nor contain invalid characters.

Signal modifications

You can modify the signal name, the storage period of the sampling signal, the storage threshold of the sampling 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 configure the batch settings.

NOTE: You can set the signal in batches by checking multiple check boxes on the left-hand side and setting up 16 signals at the maximum batch size.

NOTE: For ENV-TH, ENV-THD and ENV-4DI, the system offers the linkage modification function of the signal name. Linkage modification refer to the modification of the sampling signal name resulting in the subsequent modification of the corresponding control signal, setting signal, and alarm signal name. Since all other signal names are updated accordingly, the page only allows the sampling signal name to be modified.

To modify the signal name:

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

1. Select the Device Type/Device Name check box.
2. Select a device type/device in the drop-down menu.
3. Select a signal in the Signal Type drop-down menu. A corresponding signal list appears.
4. Enter a new signal name in the input box. A SET button appears in the top right corner.
5. Click the *SET* button. Upon selection, the signal name updates successfully.

To modify Storage Cycle/Storage Threshold:

1. Select the Device Type check box.
2. Select a device type in the drop-down menu.
3. Select the sampling signal in the Signal Type drop-down menu. The signal list appears.
4. Enter the storage cycle/storage threshold in a row.
5. Click the *SET* button to make one or more changes.
6. Click on the *Store Threshold* table title. The storage cycle input box pops up.
7. Enter a new storage cycle (for example: 3600), then click the *OK* button. All non-zero storage cycles in the device type sampling signal update to the new specified cycle.
8. Click the *New Store Threshold* header row. The storage threshold input box appears.
9. Enter a new storage threshold (for example: 5), then click the *OK* button. All storage thresholds that are not 0 in the device type sampling signal update to the new specified threshold.

To modify the alarm level:

1. Select the Device Type/Device Name check box.
2. Select a Device Type/Device from the drop-down menu, then select the alarm signal in the Signal Type drop-down menu. The signal list appears.
3. Select an alarm level in a row and click the *SET* button to make one or more changes.

To modify the signal unit:

NOTE: Modifying the signal unit is only supported when the analog signal of ENV-THD and 8DIAI devices is being modified by device.

1. Select the Device Name check box.
2. Select the THD/8DIAI device in the drop-down menu, then select the setting signal in the Signal Type drop-down box. The signal list appears.
3. Enter a new signal unit in a row and click *SET* to make one or more changes.

To restore the default name:

NOTE: Restoring the default signal name is only supported when modifying by device.

1. Select the Device Name check box.

2. Select any device in the drop-down menu, then select a signal type in the Signal Type drop-down menu. The signal list appears.
3. Click the Restore System Name icon on the right side of the device to restore the initial signal name of the selected signal.

7.6.2 Alarm actions

From the Device Options page, click *Alarm Actions*. The Alarm Actions page allows you to add new alarm actions. The monitoring system generates a cabinet high-temperature alarm when at least two temperature collection points at front door have exceeded the thresholds. This alarm disappears when the collection points fall below two. When the cabinet high-temperature number is greater than 1 and the fire protection is not discharged, the monitoring system turns on all emergency fans.

Additionally, this page contains the information for the fan controller (FC) and three LED indicator lights. The back door of the cabinet is equipped with monochromatic lights. The PMC and front door of the cabinet are equipped with three colored lights. Refer to **Table 7.4** below for the meaning of each color.

Figure 7.10 Alarm Actions Page

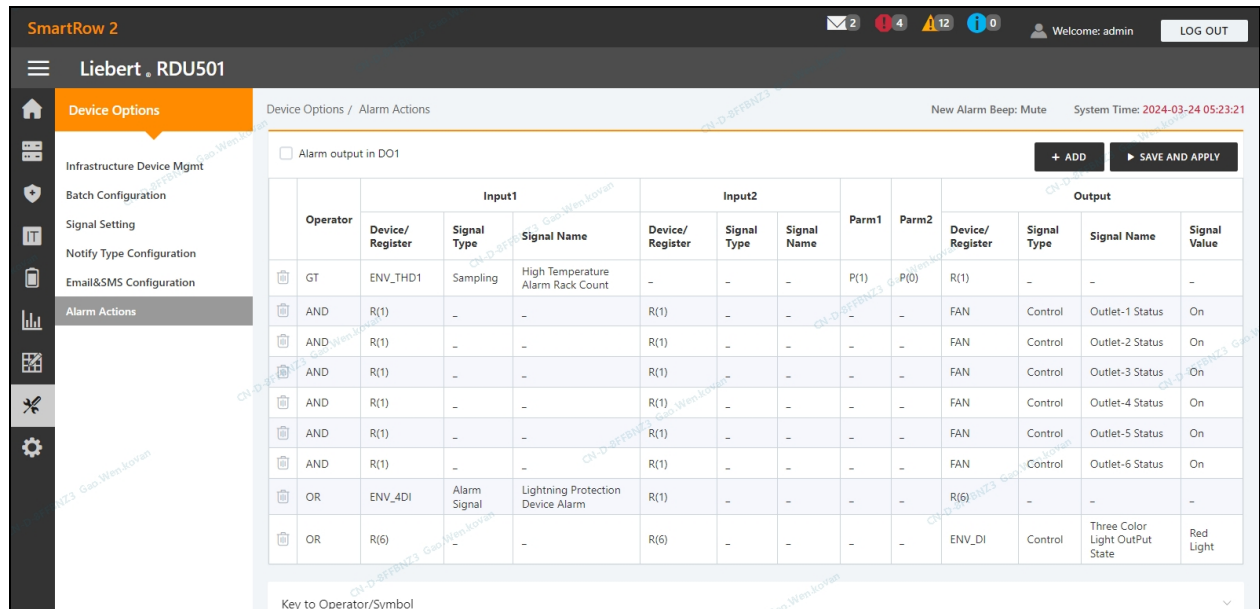


Table 7.4 LED Indicator Descriptions

Color	Description	Function
White	Maintenance	Indicates a cabinet door is open.
Blue	Normal	Indicates all doors are closed, and no alarms are triggered.
Red	Alarm	Indicates all doors are closed, but an alarm has been triggered.

To navigate through the Alarm Actions page:

From the Device Options tab, click the Alarm Actions tab to perform the following functions:

- Enable the DO1 alarm output by checking the Alarm output in DO1 box and clicking *Confirm*.
- View the operator name and information for Input1-2, Parm1-2, and Output.

- View the specification of the symbol under the Key to Operator/Symbol.
- Add a new alarm linkage expression.

To set the fire alarm strategy:

The default alarm configuration of the front door 3-color red light is as follows: surge protector alarm, cabinet high temperature ≥ 2 , alarm (fire-fighting alarm). The fire alarm strategy can be configured from the Safe Mgmt - Fire Fighting - Fire Alarm Strategy page.

NOTE: If the fire-fighting spray is activated, the monitoring unit turns off all emergency fans by default.

To extinguish the front door 3-color light-blue light:

Use the rocker switch located on the front panel of the PMC to turn off the light.

7.7 Additional Information

For more information on the functionality and usage of the Vertiv™ Liebert® RDU501 intelligent monitoring unit, please refer to the user manual. The user manual is shipped with the unit and can be also located according to the following procedures.

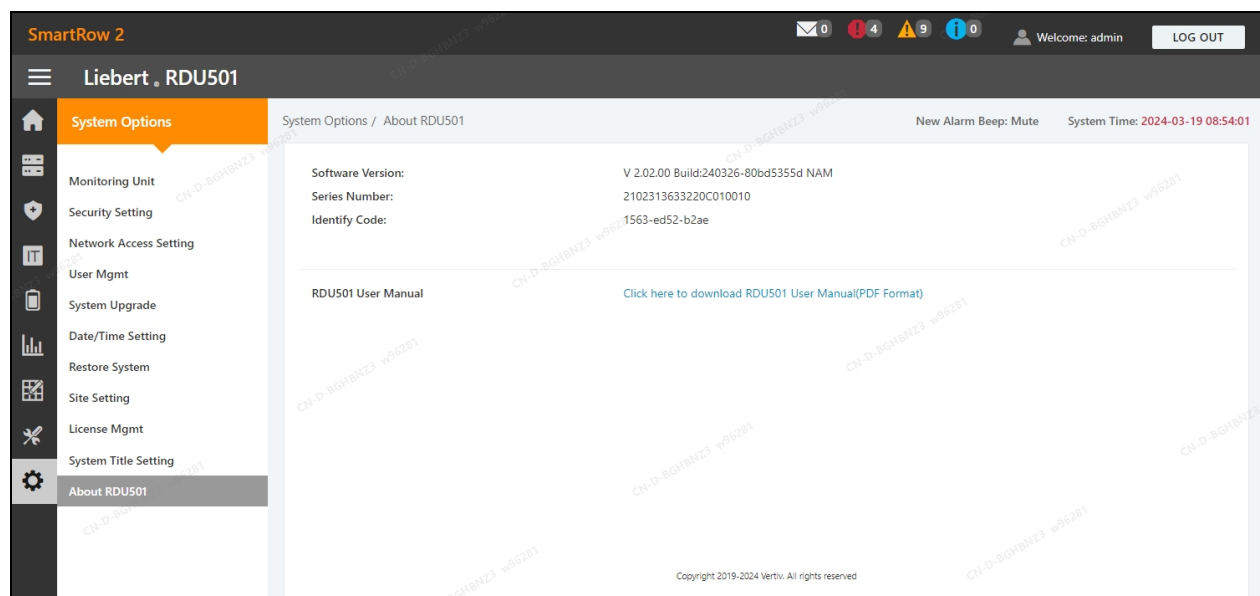
To locate the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual on the product page:

1. Go to www.Vertiv.com.
2. Navigate to the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit product page.
3. Scroll down and click *Documents & Downloads*.
4. Click the *Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual* link to open the document.

To locate the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual in the web UI:

1. From the left-hand sidebar of the monitoring unit's web UI, click the Settings icon.
2. Click the *About RDU501* tab.
3. Select the *Click here to download RDU501 User Manual (PDF Format)* link to download the document.

Figure 7.11 Monitoring Unit User Manual



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8 General Maintenance

This chapter provides a general maintenance checklist for the SmartRow™ 2 infrastructure solution and a maintenance schedule for the cooling system to ensure system operations are being properly maintained.



WARNING! Maintenance operations must be done by professional personnel authorized by Vertiv Technical Training.



WARNING! To ensure personal safety, professional maintenance personnel must determine if it is necessary to cut off the total input power to the SmartRow™ 2 solution based on the system's usage status and maintenance content.

NOTICE

- It is recommended to select the original parts produced by Vertiv™ to ensure the economics, stability, and maintainability of the system operation.
- Ensure proper use of the SmartRow™ 2 solution and follow daily inspection strictly accordance with the relevant descriptions in the user manual.
- The external installation of the infrastructure solution (including external power wiring, line installation, and related engineering installation) is subject to strict compliance with user manual requirements and local regulations, especially for power, refrigeration, and production.
- To ensure the normal operation of the equipment, routine inspections must be carried out on a regular basis. Monthly inspections are recommended.

8.1 Cabinet Inspection Checklist

Daily inspections include power distribution systems, thermal management systems, monitoring systems, and security systems, and are recommended to perform daily inspections in accordance with the table below.

Table 8.1 Cabinet Inspections Checklist

Date:		Inspector:	
Device Model:		Body Number:	
Serial Number	Area	Checkpoint	Is inspection needed?
1	Structure	Screw tightening condition (screw installation is firm, no screws are lost)	
		Silkprint condition (no wear).	
2	Cable	Cable operation (normal heat, good insulation).	
		Cable strapping situation (line neat, label complete).	
3	Monitoring system	RDU health (no alarm, good wiring, normal power, communication indicator flashing).	
		Smart door lock health (no alarm, no wear on the lock body, key/swipe/remote unlockable).	
		LED Lights Health (well wired, logically controlled, lighting pure).	
		The microswitch is operating in condition (good wiring, normal signal, no damage, moderate stress).	
		wire preventer operation condition (good wiring, no alarm, protection switch closed).	
		Smart meter operation status (wiring well, no alarm, communication light and data light flashing normally)	
		PDU is healthy (well wired, alarm-free, communication is normal, logic is controllable).	
		Emergency fan operation condition (good wiring, no blocking, no damage, logic controllable).	
4	UPS	Routine inspection (good wiring, complete structure)	
		Observe the alarm indicator (no alarm).	
		The fan is turning normally (no blocking, no damage).	
5	Battery unit	Structure (screw fastening, silk screen complete, no leakage, no damage).	
		Electric gas (good wiring, good electrical insulation).	
		The fan is turning normally (no blocking, no damage).	
6	Air conditioning	Indoor fan (blade rotates freely without debris, bearing runs freely)	
		Drainage system (drain pipe, condensate pipe OK).	

8.2 Cooling System Maintenance Schedule

Conduct monthly, quarterly, biannual and annual checks for the cooling system, according to the following guidelines. Refer to **Table 8.2** below

All tasks and time periods listed here are the manufacturers' regulations and must be documented in an inspection report.

Table 8.2 Maintenance Schedule

Component		Maintenance Period			
		Monthly By User	Every 3 Months	Every 6 Months	Annually
General	Check unit display for clogged-filter warning	X			
	Check for irregular noise from unit fans	X			
	Check for irregular noise from compressor (if applicable)	X			
	Check for irregular noise from remote condenser fan(s) (if applicable)	X			
Filters	Check state of filters		X		
	Replace air filter if necessary		X		
	Check filter switch functionality			X	
Blowers	Verify impellers move freely		X		
	Check bearings			X	
	Check motor mounts for tightness			X	
	Check fan safety switch				X
Electrical/Electronics	Check condition of contacts			X	
	Check electrical connections				X
	Check operation of controller			X	
	Check unit operation sequence			X	
Steam-Generating Humidifier	Check cylinder and pan		X		
	Check condition of steam hoses			X	
	Verify filling solenoid valve is operating properly			X	
Cooling Water Circuit (Water/Glycol and Chilled Water Units)	Check circuit for leakage/general condition		X		
	Check water (glycol) inlet temperature			X	
	Check water regulating valve operation			X	
	Check in/out water (glycol) Dt			X	
	Check mixture glycol level (if applicable)				X

Table 8.2 Maintenance Schedule (continued)

Component		Maintenance Period			
		Monthly By User	Every 3 Months	Every 6 Months	Annually
Refrigerating Circuit	Check compressor noise/vibrations		X		
	Check oil level through compressor sight glass			X	
	Adjust/tighten compressor/functional elements			X	
	Check sight glass for problem detection			X	
	Check starting/running amps			X	
	Check refrigerating circuit main pressures			X	
	Check compressor suction superheat			X	
	Check discharge temperature			X	
	Check subcooling				X
Air Cooled Condenser/Drycooler (if applicable)	Check fan bearings		X		
	Check fan motor mounts for tightness			X	
	Check coil condition			X	
	Check pipeline supports			X	
	Check fan speed controller operation				X
Water/Glycol Pump	See manual for the pump				

9 Troubleshooting

This chapter details troubleshooting procedures for the SmartRow™ 2 infrastructure solution and the Vertiv™ Liebert® RDU501 intelligent monitoring unit.

9.1 Monitoring Unit Common Issues and Solutions

For troubleshooting the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit, please refer to the following table for common issues, causes, and solutions. If your specific issue is not addressed in the table below, refer to the Vertiv™ Liebert® RDU501 Intelligent Monitoring Unit User Manual shipped with the unit and located on www.Vertiv.com.

Table 9.1 Monitoring Unit Troubleshooting

Category	Issue	Possible Causes	Solutions
Alarm	There are intelligent communication failure alarms in the monitoring unit's Alarms - History page.	Improper cabling.	Check the cable clamp to ensure it's intact, and check if the cable connection has been loosened.
	After an alarm generates, the notification system does not respond properly. I'm receiving less than three email or SMS notification (or none at all).	Incorrect SMS module and mail server configurations.	Verify that the notification configurations are correct.
		Blocked SMS function.	Contact the operator to confirm if the SMS function is blocked and possible workarounds.
		Suspended telephone card.	Confirm if the telephone card has been suspended.
		If the above solutions do not resolve the issue, click <i>Data & History - History Log</i> . Check the log for a record of failed mail delivery. If there is a record of such, then the network or mail server communication is busy.	
When the first login system has an alarm or a new alarm generates, no alarm sounds.	Device volume is muted.	Unmute the device.	
	Browser prohibits sounds.	Based on your browser, refer to the appropriate setting configurations: <ul style="list-style-type: none"> Chrome: Go to <i>Settings - Advanced - Website Settings - Sounds</i>. Check if there is a current system address under the Mute section. If so, delete it. Internet Explorer: Go to <i>Internet Options - Advanced - Multimedia</i>. Check the box for Play sounds in web pages, then click <i>Apply</i>. Safari: Go to <i>Preferences - Website - Auto Play</i>. Set the current system address to Allow all auto play. <p>NOTE: Due to continuous browser development, the above settings may change or fail.</p>	
Authorization	Despite the monitoring unit's communication being normal, the login page is not appearing.	Incorrect IP address.	Confirm the IP address is correct. As the unit uses two network cards, ensure the Ethernet cable is plugged into the proper interface. If the address is static, refer to the Ethernet port in the monitoring unit section for the default IP value.
		Poor connection	Open a Windows command prompt, then enter the

Table 9.1 Monitoring Unit Troubleshooting (continued)

Category	Issue	Possible Causes	Solutions
			following ping command to confirm the IP address connectivity: ping [IP address]. The ping statistics should inform you if there has been a loss of connection.
		If the above solutions do not resolve the issue, reset the device to restore the default IP address.	
	A new access card needs to be added to record the authorized user's information in the monitoring unit system. See Access Card Troubleshooting on the facing page for reference.	The access control has been connected to the monitoring unit for management. It is damaged during use and needs to be replaced.	Perform a permission reset for the access control device.
		The fingerprint card reader has been connected to the monitoring unit for management through a certain access control device. It is damaged during use and needs to be replaced.	
		The monitoring unit data collector is damaged during use and needs to be replaced.	
		Access control is connected to the monitoring unit A for management. Among them, authorization information already exists for the access control. It is not allowed to switch to monitoring unit B for management.	
		The fingerprint card reader is connected through the access control A for management. Among them, the fingerprint card reader already has authorization information, and it is not allowed to switch to access control B for management.	
Sensor	The intelligent sensor has no display and cannot be displayed on the monitoring unit page.	Disconnected from the unit's sensor port.	Connect the intelligent sensor to the monitoring unit's SENSOR port.
		Connected to the wrong sensor port.	Ensure address "1" is connected to SENSOR 1 and address "2" is connected to SENSOR2.
		Incorrect sensor address.	Ensure the address is not set to 00.
		Improper cabling.	The connection cable must be a direct-through and intact.
	The alarm indicator of the intelligent sensor is always on.	Device malfunctioning.	Return the intelligent sensor to the service center of the Vertiv office.
Server	IT equipment accessed through the IPMI2.0 protocol is experiencing communication failure.	Server does not support IPMI2.0 protocol.	Refer to the user manual provided by the server manufacturer to determine if the server support the protocol.
		Poor connection.	Open a Windows command prompt, then enter the following ping command to confirm the IP address connectivity: ping [IP address]. The ping statistics should inform you if there has been a loss of connection.

Table 9.1 Monitoring Unit Troubleshooting (continued)

Category	Issue	Possible Causes	Solutions
		Incorrect parameters for the IPMI device management page.	Verify that the correct parameters for the IP address, port, username, and password have been entered.
		If the above solutions do not resolve the issue, the server may be rejecting the session request from the monitoring unit. Please contact Vertiv Technical Support for additional assistance.	
Video	The video device connection test is normal, but the real-time video and historical video cannot be previewed.	The upgrade of the video device plug-in and the local video plug-in does not meet the device requirements.	Uninstall the browser playback plug-in "webcomponent.exe" that's installed on the local computer. Then, access the video device directly, reference the instructions on the video device webpage to install the new version of playback plug-in. Verify that the video can now be previewed on the webpage of the video device.
Web UI	I'm receiving a 404 error page when I try to access the web page through http.	IP address has been cached.	Clear the browser cache, then try to access the browser with http again.

Figure 9.1 Access Card Troubleshooting

Access control equip

Controller
ACC_CHD806_1

Lock
DoorLabel1

Access card Selected: 2

<input type="checkbox"/>	Index	Card No.	Card Alias	Expiry Date	Has Finger
<input checked="" type="checkbox"/>	None identification card	000000011 [Click here to add this card]	--		
<input checked="" type="checkbox"/>	None identification card	000000022 [Click here to add this card]	--		

SAVE

9.2 SmartRow™ 2 Common Issues and Solutions

For troubleshooting the SmartRow™ 2 infrastructure solution, please refer to the following table for common issues, causes, and solutions. If your specific issue is not addressed in the below table, contact Vertiv Technical Support.

Table 9.2 SmartRow™ 2 Troubleshooting

Category	Issue	Possible Cause	Solution
Temperature	The amount of ambient heat alert.	Unreasonable value for the high temperature alarm value.	Check the high temperature warning values of the temperature and humidity sensors at the adjustment front door.
		Overloaded use.	Check if the maximum thermal load exceeds the rating.
		Fan operating improperly.	Check to see if the fan is open or closed.
		Fan failure.	Contact Vertiv Technical Support.
		Faulty air conditioning cooling output.	Contact Vertiv Technical Support.
		Door not fully closed.	Close all unit doors.
	The High Temperature Threshold has been exceeded, and the alarm is sounding.	Unreasonable value for the high temperature alarm threshold setting.	Reset the value.
		Indoor load exceeds design capability of the equipment.	Check the room seal or further expand the capacity.
		The temperature is imbalanced.	Closed channel area is obstructed.
	User device not installed uniformly.		Adjust the individual cabinet loads to equilibrium as required by the user manual.
Load fluctuates sharply in the short term.	Check for large fluctuations in the actual load.		
Humidity	The humidity sent from the air conditioning is too high.	Faulty drainage pump.	Check the condensate pump interface status and condensate pump function
	The High Humidity Threshold has been exceeded, and the alarm is sounding.	Unreasonable value for the High Humidity Threshold setting.	Reset the value.
	The Low Humidity Threshold has been exceeded, and the alarm is sounding.	Unreasonable value for the Low Humidity Threshold setting.	Reset the value.
Sensor	The door status sensor is sending alerts.	Unit doors are not fully closed.	Close all unit doors.
		Poorly installed or damaged door state microswitch.	Contact Vertiv Technical Support.
	The belt flood sensor is sending alerts.	Water enters the detection zone area.	Check the engine room for leaks
		Air conditioning condensate leaks.	Check that the condensate pipe connection is reliable

Table 9.2 SmartRow™ 2 Troubleshooting (continued)

Category	Issue	Possible Cause	Solution
Cooling	The air conditioning equipment does not start.	Device is unplugged.	Check the input voltage of the device.
		Circuit breaker controlling the voltage is open (on the transformer).	Look for a short circuit and reset the open switch.
		Excessively high water level for the condensate pump and disconnected water level switch relay.	Check that the drains and lines are blocked or that the condensate pump is damaged
		Jumper cable is in the wrong position.	Check the interface board jumper cable
	The air conditioning is not cooled.	The contactor of the compressor is in poor contact	Check that the interface board J74 port voltage is 24 Vac \pm 2 Vac. If so, check the contactor body
		Excessively high exhaust pressure from the compressor.	Refer to the inspection and repair instructions for the "High Voltage Alarm" item below
		Blocked filter.	Clean or replace the filter
		Low refrigerant charge.	Check the pressure with a composite pressure gauge to see if there are obvious bubbles in the mirror
Pressure	Air conditioning high-pressure alarm.	Limited condensation air.	Remove impurities from the surface of the coil or near the air entrance
		Condenser is not turning.	Check that the fan speed controller wiring is loose, outdoor machine wiring is loose, fan speed control controller L1 has an output, and condensation pressure sensor is OK
	Air conditioning low pressure alarm.	Refrigerant leak.	Find the leak point and replenish the refrigerant
		Low ambient temperature outside.	Contact your local service engineer for processing
		Outdoor fan operates at full speed at low outdoor ambient temperatures.	Check that the L1 of the fan speed controller is on with L and that the connection between the condensation pressure sensor and the fan speed controller is loose

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Appendices

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Channel Products

1-800-222-5877

A.2 Locations

United States

Vertiv Headquarters

505 N Cleveland Ave

Westerville, OH 43082

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road, Wanchai

Hong Kong

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