VANTAGEO 2230-RE

Rack Server

Routine Maintenance

Version: R1.1

VANTAGEO PRIVATE LIMITED
Corporate Address: 617, Lodha Supremus II,
Road No. 22, Wagle Estate,
Thane - 400604
URL: https://vantageo.com
E-mail: support@vantageo.com
Helpdesk - +91 18002669898

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Revision History

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R1.1	2022-08-20	Updated "4.3 Checking Spare Parts"
R1.0	2022-04-29	First edition

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Contents

About This Manual

Purpose

This manual describes the items that need to be checked periodically during the routine maintenance of the 2230-RE, detailed check methods, and expected results to guide you on routine maintenance of the 2230-RE and ensure the smooth operation of the 2230-RE.

Intended Audience

This manual is intended for:

- Network management engineers
- Maintenance engineers

What Is in This Manual

This manual contains the following chapters.

Chapter 1, Routine Maintenance Overview	Describes purposes, precautions, requirements for maintenance personnel, and common tools for the routine maintenance of the 2230-RE.
Chapter 2, Daily Maintenance	Describes the daily maintenance items of the 2230-RE.
Chapter 3, Weekly Maintenance	Describes the weekly maintenance items of the 2230-RE.
Chapter 4, Monthly Maintenance	Describes the quarterly maintenance items of the 2230-RE.
Chapter 5, Reference	Describes how to export the data of the 2230-RE system and the frequently-used maintenance forms.

Related Documentation

The following documentation is related to this manual:

- 2230-RE Rack Server Configuration Guide
- VANTAGEO Server BMC Operation Guide

Conventions

This manual uses the following conventions.

Italics	Variables in commands. It may also refer to other related manuals and documents.

Bold	Menus, menu options, function names, input fields, option button names, check boxes, drop-down lists, dialog box names, window names, parameters, and commands.
Constant width	Text that you type, program codes, filenames, directory names, and function names.
[ ]	Optional parameters.
{ }	Mandatory parameters.
|	Separates individual parameters in a series of parameters.
	Notice: indicates equipment or environment safety information. Failure to comply can result in equipment damage, data loss, equipment performance degradation, environmental contamination, or other unpredictable results.
	Note: provides additional information about a topic.

Chapter 1
Routine Maintenance Overview

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1.1 Purposes of Routine Maintenance

Routine maintenance falls into two categories: daily maintenance and regular maintenance. For a description of the purposes of each category, refer to Table 1-1.

Table 1-1 Descriptions of the Purposes of Routine Maintenance

Routine Maintenance Classification	Category Description	Purposes of Routine Maintenance
Daily Maintenance	Refers to the maintenance tasks that must be performed every day. These tasks are easy and can be performed by general maintenance engineers.	● Immediately discover device alarms or existing faults, and take appropriate measures to clear the alarms or eliminate the faults. In this way, device health can be maintained and device faults can be reduced. ● Immediately discover link or connection faults when services are operating, and take appropriate measures to eliminate these faults to ensure proper service operations. ● Learn the operational status of devices and networks in real time, learn the device and network operation trends, and improve efficiency in handling unexpected events.

Routine Maintenance Classification	Category Description	Purposes of Routine Maintenance
Regular maintenance	Refers to the maintenance tasks that must be performed at regular intervals, for example, every week or every month. These tasks are complicated and must be performed by maintenance engineers that have received special training in most cases. Such tasks include the hardware check and operating system check.	● Ensure that the system operates in a secure, stable and reliable manner. ● Discover device faults, including aging, malfunctions, and degraded performance during the device operation through periodic check, backup, and tests, and take appropriate measures to eliminate potential problems and avoid failures.

1.2 Precautions of Routine Maintenance

Routine maintenance precautions are described as follows:

- Establish complete maintenance regulations to standardize maintenance engineers' routine operations in the equipment room. Create a detailed logbook to record information, such as the operational status of the system, software versions, data changes, upgrade details, and troubleshooting details for analyzing and resolving faults. Record shift handover to ensure clear accountability.
- Record all major operations (such as board switchover, system reboot, and software loading). Before performing such operations, maintenance engineers must carefully verify the operation feasibility, back up related data and files, and prepare emergency response and security measures. Only qualified and authorized engineers can perform such operations. Back up data before changing the data. You can delete the backup data only after verifying that the device operates properly with the changed data within a period of time (one week in most cases).
- Do not play games or access the Internet on the computer. Do not install, run, or copy any software irrelevant to the system on the computer. Do not use the computer for other purposes without official approval or permission.
- Configure passwords of different levels for the EMS. Manage the passwords strictly and change them regularly. Assign the passwords to maintenance engineers only.
- Frequently check commonly-used spare parts to ensure that they are sufficient and in good condition. Take measures to prevent them from becoming wet or mildewed.

Separately store the spare parts and the faulty parts that are replaced during maintenance. Immediately return faulty boards for repair, and ensure sufficient spare parts for main boards.

- Ensure that common tools and instruments are available, such as a flat head screwdriver, crosshead screwdriver, signaling analyzer, network cable pliers, a multimeter, AC power supply for maintenance, telephone cables, and network cables. Check instruments periodically to ensure their accuracy.
- Maintain proper temperature and humidity in the equipment room. Keep the equipment room tidy. Take preventive measures to avoid dust, dampness, rodents and insects.
- Keep software and materials that may be used during maintenance at hand so that they can be obtained immediately when necessary.
- Handle faults in a timely manner. If you encounter a difficult problem, record all original details and contact the local VANTAGEO office or the Customer Service Center.
- Place the contact information of VANTAGEO personnel in a noticeable position, notify the maintenance personnel of this information and keep the information up-to-date.

1.3 Requirements for Maintenance Engineers

- The maintenance engineers must:
  → Have the basic knowledge of the computer network such as Ethernet and TCP/IP .
  → Be familiar with the basic operations on servers and disk arrays.
  → Be familiar with the service flows related to this product.
- The maintenance engineers must:
  → Be familiar with the hardware architecture and performance indicators of the system.
  → Be familiar with the position of the system in the network.
- To guarantee troubleshooting efficiency and prevent misoperations, the maintenance engineers must:
  → Receive relevant training before work.
  → Be familiar with the operational procedures of this product.
  → Strictly comply with operational rules and industry safety regulations to ensure personal safety and device security.

1.4 Common Tools

Software Maintenance Tools

The following software tools are commonly used in routine maintenance: SSH, TELNET, serial port debugging tool, and logtool for log collecting.

Hardware Maintenance Tools

In the equipment room, the following maintenance tools are necessary:

- Screwdriver: PH2 cross-head screwdriver and flathead screwdriver
- Pliers
- Wrench
- Nippers
- Anti-static wrist strap
- Anti-static brush

Chapter 2
Daily Maintenance

Table of Contents

For a description of the maintenance tasks and expected results for daily maintenance, refer to Table 2-1.

Table 2-1 Daily Maintenance Tasks

Maintenance Task	Item	Expected Result
Maintaining the equipment room environment	Equipment room temperature	● Working temperature: 5 °C~45 °C (meeting ASHRAE Class A2/A3 requirements) Note: For details, refer to “5.1 Physical Specifications" in the *2230-RE Rack Server Product Description*. ● Storage temperature: –40 °C to +65 °C ● Maximum temperature change rate: 20 °C/hour
	Equipment room humidity	● Working environment: 8%–90% without condensation ● Non-working environment: 5%–95% without condensation
	Equipment room power indicators	● Rated voltage of the AC power module: 100 V~240 V ● Rated voltage of the –48 V DC power module: –48 V ● Rated voltage of the HVDC power module: 240 V or 336 V For the standard rated voltage range of the HVDC power module, refer to the technical parameters of HVDC power module.
Checking the indicators of the server	Indicators on the front panel	The health and hard disk indicators are operating properly.
	Indicators on the rear panel	The hard disk, network, and power indicators are operating properly.

2.1 Checking Equipment Room Environment

Abstract

To ensure that the device can operate securely, stably and reliably for a long time, reduce its fault ratio caused by poor environment, and extend its lifespan, you should take effective measures to improve the equipment room environment and verify that the following requirements are met.

You need to check the following items related to the equipment room environment:

- Equipment room temperature
- Equipment room humidity
- Equipment room power indicators

Steps

1. Read the thermometer in the equipment room to check the equipment room temperature.

   Under normal conditions, the temperature of the equipment room should be:

   - Working temperature: 5 °C~45 °C (meeting ASHRAE Class A2/A3 requirements)
   - Storage temperature: –40 °C to +65 °C
   - Maximum temperature change rate: 20 °C/hour
2. Read the hygrometer in the equipment room to check the equipment room humidity.

   Under normal conditions, the humidity of the equipment room should be:

   - Working environment: 8%~90% without condensation
   - Non-working environment: 5%~95% without condensation
3. Check the power supplies in the equipment room.

   Under normal conditions, the power supplies in the equipment room should be:

   - Rated voltage of the AC power module: 100 V~240 V
   - Rated voltage of the –48 V DC power module: –48 V
   - Rated voltage of the HVDC power module: 240 V or 336 V

2.2 Checking Indicators of the 2230-RE Rack Server

Abstract

Indicators reflect the operating status of the device in real time. By observing these indicators, you can determine whether all components of the device are operating properly.

You need to check the following indicators:

- Indicators on the front panel of the server
- Indicators on the rear panel of the server

Related Information

- In accordance with the installation mode and number of hard disks, the front panel of the 2230-RE has the following types of configurations:

  → **Twelve Hard Disks Installed Horizontally**

  The front panel provides twelve 3.5-inch (compatible with 2.5-inch disks) SAS/SATA disk slots that support NVMe SSDs, see Figure 2-1.

  Figure 2-1 Front Panel with Twelve Horizontal Disk Slots

  → **Eight Hard Disks Installed Vertically**

  The front panel provides eight 2.5-inch SAS/SATA disk slots that support NVMe SSDs, see Figure 2-2.

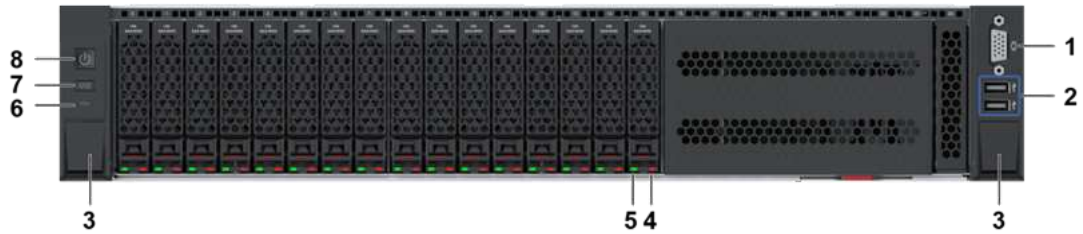
  Figure 2-2 Front Panel with Eight Vertical Disk Slots

  → **Sixteen Hard Disks Installed Vertically**

  The front panel provides sixteen 2.5-inch SAS/SATA disk slots that support NVMe SSDs, see Figure 2-3.

  Figure 2-3 Front Panel with Sixteen Vertical Disk Slots

  → **Twenty-Four Hard Disks Installed Vertically**

  The front panel provides twenty-four 2.5-inch SAS/SATA disk slots that support NVMe SSDs, see Figure 2-4.

Figure 2-4 Front Panel with Twenty-Four Vertical Disk Slots

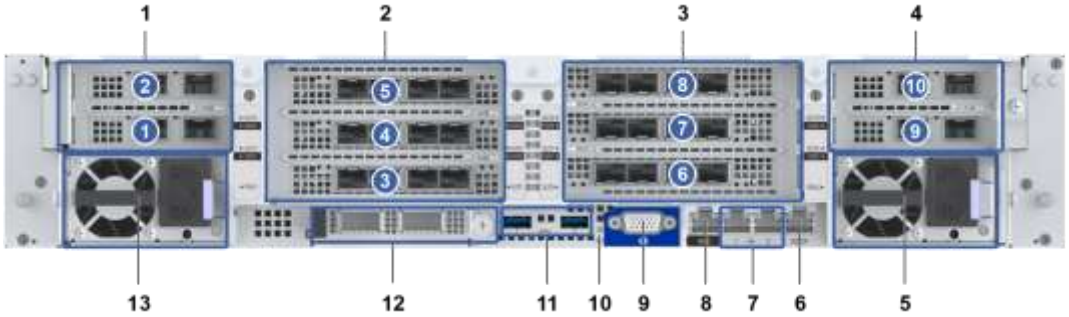
→ **Twenty-Five Hard Disks Installed Vertically**

The front panel provides twenty-five 2.5-inch SAS/SATA disk slots that support NVMe SSDs, see Figure 2-5.

Figure 2-5 Front Panel with Twenty-Five Vertical Disk Slots

- The I/O modules on the rear panel of the 2230-RE can be configured as PCIe 4.0 standard card expansion slots, hard disk expansion slots, or both. Figure 2-6 and Figure 2-7 shows two types of rear panels of the 2230-RE.

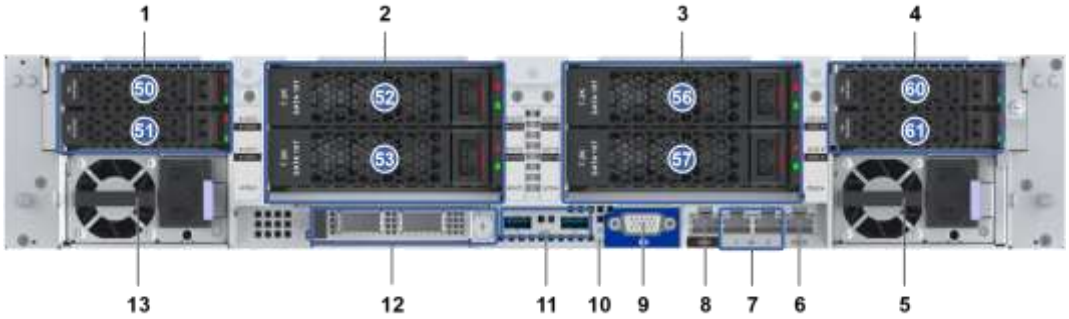
Figure 2-6 Rear Panel with PCIe Slots Only



Note

Numbers ① - ⑩ in Figure 2-6 indicate the PCIe slot numbers.

Figure 2-7 Rear Panel with Hard Disk Slots Only



Note

Numbers 50–53, 56, 57, 60 and 61 in Figure 2-7 indicate the hard disk slot numbers.

步骤

1. Check the indicators on the front panel of the server.

   For a description of the front panel of the 2230-RE, refer to Table 2-2.

Table 2-2 Front Panel Descriptions

No.	Name	Description
1	VGA interface	Connected to a display.
2	USB 2.0 interfaces	Connected to a USB mouse, a USB keyboard, or a peripheral storage device (for example, a USB flash drive for booting the system).
3	Chassis installation screw shield	Shields a screw installed on the chassis.
4	Hard Disk operation indicator (Status)	This indicator can be in the following states: ● Off: The hard disk is operating properly or the hard disk in the RAID array is not present. ● Flashing red at 4 Hz: The hard disk is being located. ● Flashing red at 1 Hz: The RAID array that the hard disk is in is being rebuilt. ● Steady red: The hard disk cannot be detected, the hard disk is faulty, or the RAID array that the hard disk is in is not operating properly.
5	Hard disk location or presence indicator (Activity)	This indicator can be in the following states: ● Off: The hard disk is not present or is faulty. ● Flashing green: Data is being read from or written to the hard disk, or synchronized between hard disks. ● Steady green: The hard disk is present and inactive.

No.	Name	Description
6	Health status indicator	This indicator can be in the following states: ● Steady green: The server is operating properly. ● Flashing red at 1 Hz: The server has a minor alarm. ● Flashing red at 4 Hz: The server has a critical alarm. ● Off: The server is not operating properly.
7	UID button/indicator	The button is also used as an indicator. This indicator can be in the following states: ● Flashing at 1 Hz: The server is being remotely maintained or the firmware is being upgraded through a PC. ● Flashing at 4 Hz: The server is in debugging mode. The serial port on the panel serves as the BMC debugging serial port. ● Solid on/off: The UID indicator is manually turned on or off through the Web portal of the BMC. The UID button supports the following operations: ● Press and hold for less than 4 seconds: Perform server positioning or cancel the current function (cancel positioning or the BMC debugging status of the serial port). ● Press and hold for 4 through 10 seconds: Switch the serial port on the panel to BMC debugging status. ● Press and hold for more than 10 seconds: Reset the BMC. ● Press and hold for 4 through 10 seconds and then press and hold for 10 seconds: Reset the BMC and keep the serial port on the panel in BMC debugging status.
8	Power button/indicator	The power button is also used as the power indicator. This indicator can be in the following states: ● Steady yellow: The server is powered on in standby mode (the host is not powered on). ● Steady green: The server is powered on in payload mode (the host is powered on). ● Off: The server is not powered on or the power supply module is not operating properly. Press the power button to power on the server. The power button supports the following operations: ● Press and hold for less than 4 seconds: Power on/off the server. ● Press and hold for 4 through 10 seconds: Shut down the server forcibly.

2. Check the indicators on the rear panel of the server.

   For a description of the rear panel of the 2230-RE, refer to Table 2-3.

Table 2-3 Rear Panel Descriptions

No.	Name	Description
1	I/O module 1	Either of the following configurations is supported: ● Two half-height half-length PCIe 4.0 x8 standard cards. One of the two slots can be extended to the PCIe 4.0 x16 card slot. ● Two 2.5-inch SAS/SATA hard disks. The NVMe SSD is supported.
2	I/O module 2	Either of the following configurations is supported: ● A full-height full-length PCIe 4.0 x16 standard card, a full-height full-length PCIe 4.0 x8 standard card, and a full-height half-length PCIe 4.0 x8 standard card. ● A full-height full-length PCIe 4.0 x16 standard card and a full-height half-length PCIe 4.0 x16 standard card. ● Two 3.5/2.5-inch SAS/SATA hard disks.
3	I/O module 3	Either of the following configurations is supported: ● A full-height full-length PCIe 4.0 x16 standard card, a full-height full-length PCIe 4.0 x8 standard card, and a full-height half-length PCIe 4.0 x8 standard card. ● A full-height full-length PCIe 4.0 x16 standard card and a full-height half-length PCIe 4.0 x16 standard card. ● Two 3.5/2.5-inch SAS/SATA hard disks.
4	I/O module 4	Either of the following configurations is supported: ● Two half-height half-length PCIe 4.0 x8 standard cards. One of the two slots can be extended to the PCIe 4.0 x16 card slot. ● Two 2.5-inch SAS/SATA hard disks. The NVMe SSD is supported.
5	Power supply module 2	Three types of power supply modules (550 W, 800 W, and 1,200 W) are supported. The Platinum power supply module is provided. ● Supports power input of 100 V AC–127 V AC and 200 V AC–240 V AC (50 Hz to 60 Hz). ● Supports 240 V DC and 336 V DC high-voltage power input. ● Supports -48 V DC low-voltage power input. ● Supports 1+1 redundancy and hot swapping.
6	Serial port	An RJ45 serial cable is used to connect the serial port to the debugging PC. The server can be configured on the HyperTerminal of the PC.
7	Onboard NIC interface	Used for data communication between the server and external devices. Connected to an Intel I210 NIC that provides

No.	Name	Description
		two GE electrical interfaces and supports the adaptive rate of 10/100/1000 Mbps. The onboard NIC interface indicators can be in the following states: ● Link indicator (green): → On: A physical link is established. → Off: No physical link is established. ● ACT indicator (yellow): → On: Data is being transmitted. → Off: No data is being transmitted.
8	iSAC management interface	A network cable is used to connect the iSAC management interface to a debugging PC, so that the user can log in to the iSAC Web portal through a browser on the PC and configure the device.
9	VGA interface	Connected to a display.
10	UID indicator	The UID indicator can be in the following states: ● Steady on: The server is being located or the EPLD is being upgraded. ● Flashing at 1 Hz: The server is being remotely maintained or the system firmware is being upgraded. ● Flashing at 4 Hz: The server is in debugging mode. The serial port on the panel serves as the BMC debugging serial port. ● Off: The server does not trigger any locating operation.
11	USB 3.0 interface	Connected to a USB mouse, a USB keyboard, or a peripheral storage device (for example, a USB flash drive for booting the system).
12	OCP card	Various OCP NIC 3.0 cards with the interface rate of 1, 10 or 25 Gbps can be installed in the OCP card slot.
13	Power module 1	Three types of power supply modules (550 W, 800 W, and 1,200 W) are supported. The Platinum power supply module is provided. ● Supports power input of 100 V AC~127 V AC and 200 V AC–240 V AC (50 Hz to 60 Hz). ● Supports 240 V DC and 336 V DC high-voltage power input. ● Supports -48 V DC low-voltage power input. ● Supports 1+1 redundancy and hot swapping.

Chapter 3
Weekly Maintenance

Table of Contents

For a description of the maintenance tasks and expected results for weekly maintenance, refer to Table 3-1.

Table 3-1 Weekly Maintenance Tasks

Maintenance Task	Item	Expected Result
Checking guide rails	Check the model and installation of guide rails.	The installation of guide rails meets the requirements.
Checking the health status of the device	Query the device information.	For detailed query operations, refer to "Chapter 4 Query Operations" in the *VANTAGEO 2230-RE Rack Server Configuration Guide*.
Checking the operating environment of the device	Check the air condition of the operating environment.	There is no air pollutant (including suspended particulate pollutants and corrosive gases) in the operating environment of the server.

3.1 Checking Guide Rails

Abstract

When the 2230-RE server uses the Accuride guide rails, if the left and right inner rails are installed reversely, the latches on the guide rails cannot work when the server is pulled out of the cabinet. Instead, the server can be pulled out of the guide rails directly, causing device drop and potential personnel safety risks. Check the installation of the guide rails to ensure that the latches on the guide rails are effective.

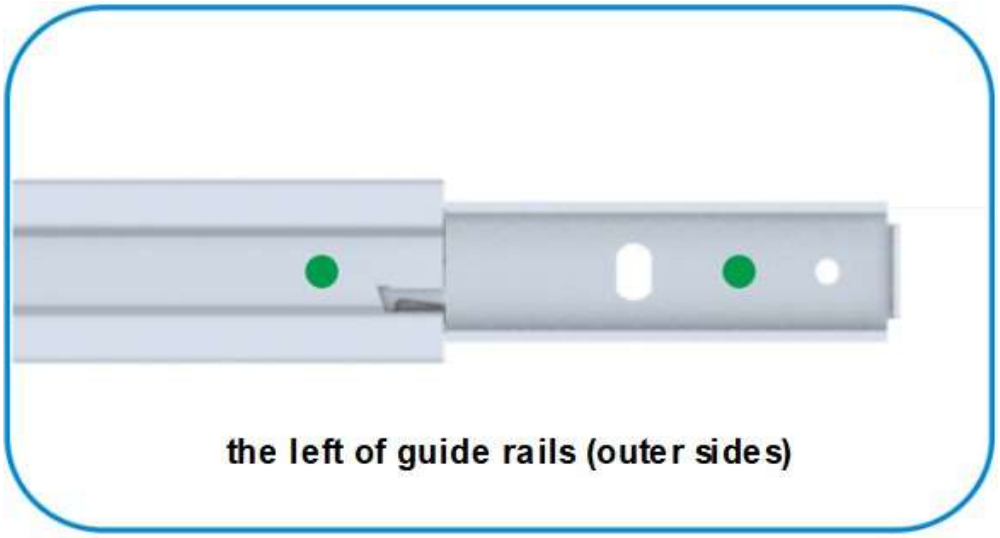
Note

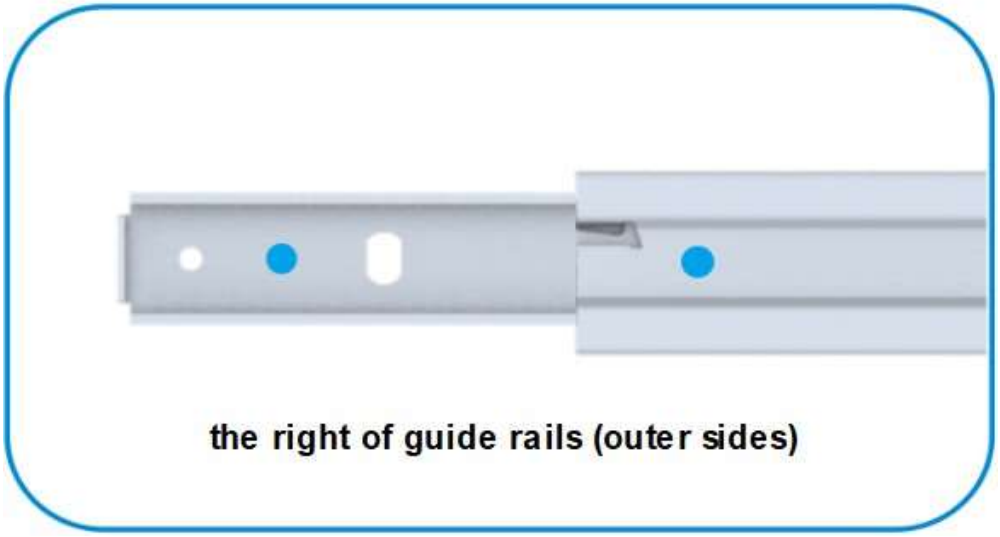
You do not need to check whether the left and right inner rails are installed reversely for an up and running server. If a server experiences a hardware failure and needs to be removed from the cabinet, check that the inner rails are installed properly first.

Steps

1. Check whether the installation position of the server in the rack meets user requirements.
   The server is installed in the rack as planned.
2. Check whether the front and rear ends of the guide rails are at the same height in the cabinet.
   The front and rear ends of the guide rails are at the same height.
3. Check whether the guide rails on both sides of the server are at the same height in the cabinet.
   The guide rails on both sides of the server are at the same height.
4. Check whether the guide rails are of the Accuride brand.
   - Checking guide rails not installed in cabinet
     → King Slide: square head.
     → Accuride: round head.
   - Checking guide rails installed in cabinet
     → King Slide: The rear ends of the guide rails are square when viewed from the rear side of the server.
     → Accuride: The rear ends of the guide rails are round when viewed from the rear side of the server.
5. Check whether the front and rear brackets of the guide rails are installed properly.
   The cabinet posts supporting the front and rear brackets of the guide rails protrude from the cabinet post holes.
6. Check whether the inner rails of the Accuride guide rails are installed reversely.
   a. Check the colors of the labels on the inner and middle rails.
      After the server is powered off, slowly pull out the server until the inner rails are pulled out for about 20cm. If there are round labels on the outer sides of the rails, check whether the labels on the same side are of the same color. If they are of the same color, the guide rails are installed correctly. Otherwise, the installation is incorrect.
      Figure 3-1 shows the outer sides of the left and right guide rails.

Figure 3-1 Outer Sides of the Guide Rails





b. Check the latches.

   If there is no round label, pull out the server slowly until the latches on the inner rails are exposed. If the rails are locked automatically, and the server cannot be pulled out, the installation is correct. If the notch on the latch is completely exposed (upwards or downwards), the installation is incorrect.

7. Check whether the server can be pulled smoothly.

   Loosen the fastening screws on the sides, and pull the server back and forth to verify that the server can be pulled smoothly.

8. Check whether the server is in good condition.

   The server is intact without deformation or scratch.

9. Check whether the power cable of the server is connected properly.
   The ends of the power cable are connected firmly.

3.2 Checking the Health Status of the Server

Abstract

Thes procedure describes how to verify that the device is healthy and can operate properly.

Steps

1. Log in to the BMC Web portal.

   Note

   For detailed login operations, refer to "Chapter 2 Logging In to the Web Portal of the BMC" in the *2230-RE Rack Server Configuration Guide*.

2. Query the alarms to determine the health status of the device.

   Note

   - If an alarm is raised, it indicates that the device has a fault.
     For how to handle alarms, refer to the *2230-RE Rack Server Alarm Handling*.

3.3 Checking the Operating Environment of the Device

Abstract

This procedure describes how to check the operating environment of the server to ensure that there is no airborne contaminant (including suspended particulate contaminants and corrosive gases) in the operating environment of the server.

Context

Suspended particles in the air may cause short circuits inside the electronic information equipment. At the same time, some corrosive gases may attach to suspended particles to form corrosive dust, which corrodes and pollutes the equipment. To ensure the oper-

ation security of the electronic information systems, the dust concentration in the data center under static or dynamic conditions must be specified.

- Air suspended particles

  There is no explosive, electrically and magnetically conductive, and corrosive dust in the data center. The maximum particle concentration meets the requirements of ISO14644-1 Class 8. The number of particles equal to and larger than 0.5um should not exceed 3520000/m³. In addition, the data center should be free of zinc oxide whiskers or other electrically conductive particles.

  The air cleanliness levels and the corresponding maximum particle concentrations at various particle sizes specified by ISO14644-1 are refer to Table 3-2.

Table 3-2 Air Cleanliness Levels and Maximum Particle Concentrations

ISO Class Number	Maximum Concentrations (particles/m³) for Particles Equal to and Greater than the Specified Sizes					
	Particle Size					
	>0.1 μm	>0.2 μm	>0.3 μm	>0.5 μm	>1 μm	>5 μm
ISO Class 1	10	2	-	-	-	-
ISO Class 2	100	24	10	4	-	-
ISO Class 3	1000	237	102	35	8	-
ISO Class 4	10000	2370	1020	352	83	-
ISO Class 5	100000	23700	10200	3520	832	29
ISO Class 6	1000000	237000	102000	35200	8320	293
ISO Class 7	-	-	-	352000	83200	2930
ISO Class 8	-	-	-	3520000	832000	29300
ISO Class 9	-	-	-	-	-	293000
Note: Due to the uncertainty of the measurement process, data with no more than three significant figures are used in determining cleanliness levels.						

- Corrosive gases

  Interactions between corrosive airborne contaminants and other environmental factors (such as temperature or relative humidity) and dust may expose IT equipment to higher risks of corrosion failure. This section specifies the limitation on corrosive airborne contaminants with an aim to avoid such risks.

  For a description of the types and sources of common corrosive gases, refer to Table 3-3.

Table 3-3 Common Corrosive Gases and Their Sources

Symbol	Source
H_2S	Geothermal emissions, microbiological activities, fossil fuel processing, wood rot, sewage treatment
SO_2, SO_3	Coal combustion, petroleum products, automobile emissions, ore smelting, sulfuric acid manufacture
S	Foundries, sulfur manufacture, volcanoes
HF	Fertilizer manufacture, aluminum manufacture, ceramics manufacture, steel manufacture, electronics device manufacture
NOx	Automobile emissions, fossil fuel combustion, chemical industry
NH_3	Microbiological activities, sewage, fertilizer manufacture, geothermal emissions, refrigeration equipment
C	Incomplete combustion (suspended particle compounds) , foundry
CO	Combustion, automobile emissions, microbiological activities, tree rot
Cl_2, ClO_2	Chlorine manufacture, aluminum manufacture, zinc manufacture, refuse decomposition
HCl	Automobile emissions, combustion, forest fire, oceanic processes, polymer combustion
HBr, HI	Automobile emissions
O_3	Atmospheric photochemical processes mainly involving nitrogen oxides and oxygenated hydrocarbons
C_nH_n	Automobile emissions, animal waste, sewage, tree rot

The concentration level of corrosive airborne contaminants in a data center shall meet the requirements listed in the white paper entitled *Gaseous and Particulate Contamination Guidelines for Data Centers published in 2011* by American Society of Heating Refrigerating and Air-conditioning Engineers (ASHRAE) Technical Committee (TC) 9.9.

In accordance with the white paper, corrosive airborne contaminants in a data center shall meet the following requirements:

→ Copper corrosion rate

The thickness growth rate of the corrosion products on the copper sheet is less than 300 Å/month, which meets the requirements defined by ANSI/ISA -71.04-2013 severity level G1

→ Silver corrosion rate

The thickness growth rate of the corrosion products on the silver sheet is less than 200 Å/month

Note

Note: Å is a unit of length. One Å is equal to 1/10,000,000,000 meter.

In accordance with the *ANSI/ISA-71.04-2013 Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants*, there are four gaseous corrosivity levels. For details, refer to Table 3-4.

Table 3-4 ANSI/ISA-71.04-2013 Gaseous Corrosivity Levels

Severity Level	Copper Reactivity Level	Silver Reactivity Level	Description
G1 (mild)	< 300 Å/month	< 200 Å/month	A well-controlled environment in which corrosion is not a factor affecting equipment reliability.
G2 (moderate)	< 1000 Å/month	< 1000 Å/month	An environment in which the effects of corrosion are measurable and may be a factor affecting equipment reliability.
G3 (harsh)	< 2000 Å/month	< 2000 Å/month	An environment in which corrosion is very likely to occur.
GX (severe)	≥ 2000 Å/month	≥ 2000 Å/month	An environment in which only specially designed and packaged equipment can be put into use.

To meet requirements on the copper and silver corrosion rates, the concentration of corrosive airborne contaminants in a data center must be controlled within specified ranges. For concentration limitations, refer to Table 3-5.

Table 3-5 Concentration Limitations on Corrosive Airborne Contaminants in a Data Center

Group	Symbol	Unit	Concentration
Group A	H_2S	ppb	<3
	SO_2	ppb	<10
	Cl_2	ppb	<1
	NO_2	ppb	<50
Group B	HF	ppb	<1
	NH_3	ppb	<500
	O_3	ppb	<2
ppb is a unit of concentration. One ppb indicates one part of contaminant per one billion parts of gases.			

Group A and group B are common gas groups in a data center. Group A's or group B's concentration limitation values that correspond to copper reactivity level G1 are calculated based on the condition that relative humidity in a data center is lower than 50% and that the gases in the group interact. A 10% of increase in the relative humidity will heighten the gaseous corrosivity level by 1.

Note

Corrosion is not determined by a single factor, but by comprehensive environmental factors such as temperature, relative humidity, corrosive airborne contaminants, and ventilation. Any of the environmental factors may affect the gaseous corrosivity level. Therefore, the concentration limitation values specified in the previous table are for reference only.

Steps

1. In accordance with the recommendations of ASHRAE TC 9.9, take the following measures to check whether there is any airborne contaminants in the operating environment of the data center.
   - Deploy MERV 8 or above air purifiers at multiple points in the data center room for continuous air filtering.
   - For the air entering the data center room, Use MERV 11 air filters for air filtration. MERV 13 air filters are better. Use activated carbon filters for filtering the polluted harmful gases.

- Maintain the humidity of the data equipment room to be lower than 60% to prevent the deliquescence of airborne contaminants.
- Use dust-proof materials on the ground, walls, and ceiling of the data center.
- Reduce the galvanized materials used by the lower surface of raised floor, pipe fittings, and support brackets inside the cabinets.
- Install screens for outdoor doors and windows, and use dust-proof materials for outer windows.
- Clean the data center room regularly (at least once every three months). In areas with heavy dust, you are advised to clean the equipment once a year. (Be sure to ask professional companies to do so.)
- Wear shoe covers and ESD clothing before entering the data center room.

In normal cases, there is no air pollution in the operating environment of the data center room.

Chapter 4
Monthly Maintenance

Table of Contents

For a description of the maintenance tasks and expected results for monthly maintenance, refer to Table 4-1.

Table 4-1 Monthly Maintenance Tasks

Maintenance Task	Item	Expected Result
Cleaning the device	Clean the server.	The device is not rusty and no foreign object is left in it.
Checking cable connections	Check power cable connections.	Well connected.
	Check signal cable connections.	Well connected.
	Check ground cable connections.	Well connected.
Checking spare parts	Check the status of spare parts.	Safe and Reliable.

4.1 Cleaning the Device

Abstract

This procedure describes how to clean the device periodically to ensure that the surface is clean without scratches and no foreign object is left in the cabinet.

Steps

1. Clean the surface of the device and the air filters at the top and bottom of it.
2. Verify that the device is not rusty and no foreign object is left in it.

4.2 Checking Cable Connections

Abstract

This procedure describes how to check the cable connections on a regular basis, in order to ensure that all cables are properly connected.

Cables include:

- Power cables
- Signal cables
- Grounding wires

Notice

If you need to unplug and then re-plug a cable during maintenance, you must obtain permission from the operation and maintenance staff.

Steps

Checking Power Cable Connections

1. Check whether the ends of a power cable are connected firmly.
2. Check whether the distance between a power cable and a signal cable is more than 5 cm.
3. Check whether the labels on a power cable are clear, correct and complete.
4. Check whether the labels on a signal cable are clear, correct and complete.

Checking Signal Cable Connections

5. Check whether the ends of a signal cable are connected firmly.
6. Check whether each signal cable is installed as described in the label, whether no signal cable is installed on a wrong interface, and whether all required signal cables are installed.

Notice

Before the thunderstorm season, you must check whether the device is properly grounded to avoid lightning strike. If any problem is found, report it for repair in time.

Checking Grounding Wire Connections

7. Check the connections at both ends of a grounding wire.
   In normal cases, both ends of a grounding wire must be securely connected. All grounding wires must be securely connected, but not cascaded to the rack and Pow-

er Distribution Frame (PDF). The distance between each protective grounding wire and the grounding busbar is the same, and their difference must be smaller than 1 m.

8. Measure the joint grounding resistance to check whether it is less than 1 Ω.

4.3 Checking Spare Parts

Abstract

This procedure describes how to check spare parts in the warehouse periodically to ensure their safety and reliability.

Steps

1. Check the stock ages of spare boards and devices, and send them to VANTAGEO for in- spection in accordance with the following principles (if you have any questions about inspection, please contact 800-830-1118).
   If the stock age is beyond one year, but within three years, spare parts are sent for inspection once a year. If the stock age is equal to or beyond three years, but within six years, spare parts are sent for inspection once every half year.

   Notice

   A mechanical hard disk should be used within half a year to avoid damage from long-term storage.

2. Check whether a spare part is damaged, dropped, impacted, waterlogged, or dampened. If yes, send the spare part to VANTAGEO for inspection.

Chapter 5
Reference

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5.1 Exporting Data

Abstract

This procedure describes how to export the data in the 2230-RE system, including logs and alarms.

Steps

1. Log in to the BMC Web portal.

   Note

   For how to log in to the WEB portal of the BMC, refer to "Chapter 2 Logging in to the Web Portal of the BMC" in the *2230-RE Rack Server Configuration Guide*.

2. Obtain system logs.

   Note

   For how to obtain system logs, refer to "3.6.4 Querying System Logs" in the *VANTAGEO Server BMC User Guide*.

3. From the menu bar in the left pane, select **Maintenance**. The **Maintenance** page is displayed.
4. Click **Expert Data**. The **Download Expert Data** page is displayed, see Figure 5-1.

Figure 5-1 Download Expert Data Page

5. Click **Download Data**.

5.2 Maintenance Forms

Daily Maintenance Form

Checked by:

Attended by:

Checking time:

No.	Check Item	Check Result	Exception Description
1	Maintaining the equipment room environment	□ Normal □ Abnormal □ Not involved	
2	Checking the indicators of each server	□ Normal □ Abnormal □ Not involved	
Fault and troubleshooting:			
Unsolved problems: Note: Problems that cannot be solved at the current stage also need to be recorded in this form. They can be handed over to VANTAGEO for resolution.			

Weekly Maintenance Form

Checked by:

Attended by:

Checking time:

No.	Check Item	Check Result	Exception Description
1	Checking Guide Rails	□ Normal □ Abnormal □ Not involved	
2	Checking the Health Status of the Devices	□ Normal □ Abnormal □ Not involved	

No.	Check Item	Check Result	Exception Description
3	Checking the Operational Status of Devices	□ Normal □ Abnormal □ Not involved	
Fault and troubleshooting:			
Unsolved problems: Note: Problems that cannot be solved at the current stage also need to be recorded in this form. They can be handed over to VANTAGEO for resolution.			

Monthly Maintenance Form

Checked by:

Attended by:

Checking time:

No.	Check Item	Check Result	Exception Description
1	Cleaning the servers	□ Normal □ Abnormal □ Not involved	
2	Checking cable connections	□ Normal □ Abnormal □ Not involved	
3	Checking spare parts	□ Normal □ Abnormal □ Not involved	
Fault and troubleshooting:			
Unsolved problems: Note: Problems that cannot be solved at the current stage also need to be recorded in this form. They can be handed over to VANTAGEO for resolution.			

Glossary

AC

- Alternating Current

ANSI

- American National Standards Institute

ASHRAE

- American Society of Heating, Refrigerating and Air Conditioning Engineers

BMC

- Baseboard Management Controller

DC

- Direct Current

EMS

- Element Management System

EPLD

- Erasable Programmable Logic Device

ESD

- Electrostatic Discharge

GE

- Gigabit Ethernet

HVDC

- High-Voltage Direct Current

I/O

- Input/Output

IP

- Internet Protocol

ISA

- Interim Standard Architecture

ISO

- International Organization for Standardization

NIC

- Network Interface Card

NVMe

- Non-Volatile Memory Express

OCP

- Open Computer Project

PC

- Personal Computer

PCIe

- Peripheral Component Interconnect Express

RAID

- Redundant Array of Independent Disks

SAS

- Serial Attached SCSI

SATA

- Serial ATA

SSD

- Solid State Drive

SSH

- Secure Shell

TC

- Technology Consulting

TCP

- Transmission Control Protocol

TELNET

- Telecommunication Network Protocol

UID

- Unit Identification Light

USB

- Universal Serial Bus

VGA

- Video Graphic Adapter

WEB

- Web

iSAC

- Integrated Server Administrator Controller