User's Guide

NEC Express Server
Express5800 Series

Express5800/R120h-1M (2nd-Gen) EXP804 (N8100-2773F/2774F)

Chapter 1   General Description

Chapter 2   Preparations

Chapter 3   Setup

Chapter 4   Appendix

Manuals

Manuals for this product are provided as booklets	
Safety Precautions and Regulatory Notices	Describes points of caution to ensure the safe use of this server. **<u>Read these cautions before using this server.</u>**
Getting Started	Describes how to use this server, from unpacking to operations. See this guide first and read the outline of this product.
The electronic edition has been published on a website (http://www.nec.com/express/).	
User's Guide	
Chapter 1: General Description	Overviews, names, and functions of the server's parts
Chapter 2: Preparations	Installation of additional options, connection of peripheral devices, and suitable location for this server.
Chapter 3: Setup	System utility configurations and summary of EXPRESSBUILDER
Chapter 4: Appendix	Specifications and other information
Installation Guide (Windows)	
Chapter 1: Installing Windows	Installation of Windows and drivers, and precautions for installation
Chapter 2: Installing the Bundled Software	Installation of NEC ESMPRO, and other bundled software
Maintenance Guide	
Chapter 1: Maintenance	Server maintenance and troubleshooting
Chapter 2: Useful Features	The details of RAID Configuration Utility
Chapter 3: Appendix	Windows Event Logs
Maintenance Guide (Common)	
Chapter 1: Useful Features	The details of System Utility, Starter Pack, and EXPRESSBUILDER
Chapter 2: Appendix	Error messages
Other manuals	
The details of NEC ESMPRO, and other features	

Contents

Conventions Used in This Document

Signs and symbols for safety

WARNING and CAUTION are used in this guide as the following meaning.

⚠ **WARNING**   Indicates there is a risk of death or serious personal injury

⚠ **CAUTION**   Indicates there is a risk of burns, other personal injury, or property damage

Precautions and notices against hazards are presented with one of the following three symbols. The individual symbols are defined as follows:

⚠	**Attention**	This symbol indicates the presence of a hazard if the instruction is ignored. An image in the symbol illustrates the hazard type.	(Example) ⚠ (Electric shock risk)
🚫	**Prohibited Action**	This symbol indicates prohibited actions. An image in the symbol illustrates a particular prohibited action.	(Example) 🚫 (Do not disassemble)
●	**Mandatory Action**	This symbol indicates mandatory actions. An image in the symbol illustrates a mandatory action to avoid a particular hazard.	(Example) (Disconnect a plug)

(Example)

Symbol to draw attention	Description of a warning	Term indicating a degree of danger

⚠ **WARNING**

Use only the specified outlet
Use a grounded outlet with the specified voltage. Use of an improper power source may cause a fire or a power leak.
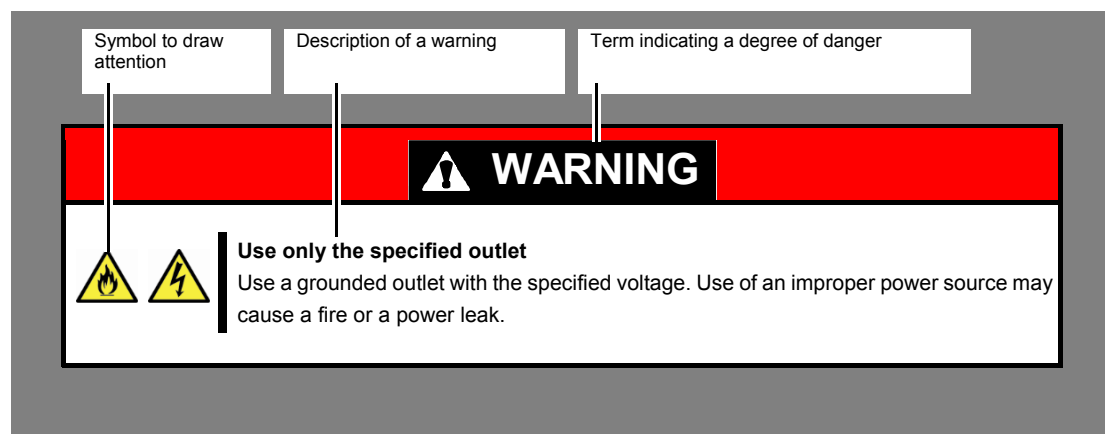
Notations used in the text

In addition to safety-related symbols urging caution, three other types of notations are used in this document. These notations have the following meanings.

Important	Indicates critical items that must be followed when handling hardware or operating software. If the procedures described are not followed, **hardware failure, data loss, and other serious malfunctions could occur**.
Note	Indicates items that must be confirmed when handling hardware or operating software.
Tips	Indicates information that is helpful to keep in mind when using this server.

Optical disk drive

This server is equipped with one of the following drives. These drives are referred to as *optical disk drive* in this document.

- **DVD-ROM drive**

- **DVD Super MULTI drive**

Hard disk drive

Unless otherwise stated, *hard disk drive* described in this document refer to both of the following.

- **Hard disk drive (HDD)**

- **Solid state drive (SSD)**

Abbreviations of Operating Systems (Windows)

Windows Operating Systems are referred to as follows.

See *Chapter 1* (*1.2 Supported Windows OS)* in *Installation Guide (Windows)* **for detailed information.**

Notations in this document	Official names of Windows
Windows Server 2019	Windows Server 2019 Standard
	Windows Server 2019 Datacenter
Windows Server 2016	Windows Server 2016 Standard
	Windows Server 2016 Datacenter
Windows Server 2012 R2	Windows Server 2012 R2 Standard
	Windows Server 2012 R2 Datacenter

Abbreviations of Operating Systems (Linux)

Linux Operating Systems are referred to as follows.

Notations in this document	Official names of Linux
Red Hat Enterprise Linux 7 Server	Red Hat Enterprise Linux 7 Server (x86_64)

Abbreviations of Operating Systems (VMware)

VMware Operating Systems are referred to as follows.

Notations in this document	Official names of VMware
ESXi 6.5	VMware ESXi 6.5 Update2 or later
ESXi 6.7	VMware ESXi 6.7 Update1 or later

POST

POST described in this manual refers to the following.
- **Power On Self-Test**

BMC

BMC described in this manual refers to the following.
- Baseboard Management Controller

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  zlib.h -- interface of the 'zlib' general purpose compression library
  version 1.2.2, October 3rd, 2004

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The most recent version of this guide, as well as other related documents, is also available for download from the following website.
http://www.nec.com/express/

Safety notes

To use this server safely, read thoroughly "Safety Precautions and Regulatory Notices" that comes with your server.

Warning label

Warning label are attached on or near the components with potential hazards. This label is either attached or printed on the component.

Do not remove or black out this label and keep it clean. If no label is attached or printed on the server, contact your sales representative.

Handling precautions (for proper operations)

Be sure to observe the following precautions for the proper functioning of the server. Ignoring the precautions may cause server malfunction or failure.

- When using this server, use System ROM v2.00 or later.   If the version of System ROM is before v2.00 (i.e. v1.XX), this server does not start up. If you apply System ROM v1.XX by mistake, contact your maintenance service provider or sales representative.

- Do not use any cellphones and switch off them near the server. Electric waves from such devices can cause server to malfunction.

- Install the server in an appropriate place. For details about the installation location, see *Chapter 2 Preparations (2. Installation and Connection)*.

- Before connecting/removing cables to/from peripheral devices, make sure that the server is off and unplug the power cord, if they are non plug-and-play devices.

- Connect the power cord to a 100/200 VAC outlet.

- Make sure that the access LED on the server is off before turning off the power or ejecting an optical disk.

- Wait for at least 30 seconds before connecting power cord to power outlet after disconnecting it.

- If any Uninterruptible Power Supply (UPS) unit is connected, set it to wait for at least 30 seconds before turning on the server after power off.

- Do not power off or reset the server, nor disconnect the power cord before POST completes.

- Turn off the server and unplug the power cord before moving it.

- Regularly clean the server to prevent various types of failure. See *Chapter 1 Maintenance (2. Daily Maintenance)* in "Maintenance Guide" for details about cleaning.

- Momentary voltage drop may occur due to lightning strike. To prevent this, use of UPS is recommended.

- In the following cases, check and adjust the system clock before operation.

  - After transportation

  - After storage

- Check the system clock approximately once per month. Use of a time server (NTP server) is recommended if high accuracy timing is required by the system.

- Observe the storage conditions (Temperature: -30°C to 60°C, Humidity: 5% to 95%, No condensation of moisture) to store the server. If this server, internal optional devices, and media set for the backup devices (tape cartridges) are moved from a cold place to a warm place in a short time, condensation will occur and cause malfunctions and failures when these are used in such state. To protect important stored data and property, make sure to wait for a sufficient period to use the server and components in the operating environment.

  Reference: Time effective at avoiding condensation in winter (more than 10°C differences between the room temperature and atmospheric temperature)

  Disk devices: Approximately 2 to 3 hours

  Tape media: Approximately 1 day

- For optional devices, we recommend you use our NEC products. Even if they are successfully installed or connected, installation of unsupported devices can cause the server to malfunction or even failure. You will be charged to repair failure or damage caused by use of such products even within warranty period.

Tips for your health and safety

Using a computer extensively may affect different parts of your body. Here are tips you should follow while working on a computer to minimize strain on your body.

Keep proper posture
The basic body position for using a computer is sitting straight with your hands on the keyboard parallel with the floor, and your eyes directed slightly downward toward the monitor. With the proper posture described above, no unnecessary strain is applied on any part of your body, in other words when your muscles are most relaxed.
Working on the computer with bad posture such as hunching over or being too close to the monitor could cause fatigue or deteriorated eyesight.

Adjust the angle of your display
Most display units are designed for adjustment of the horizontal and vertical angles. This adjustment is important to prevent the screen from reflecting bright lights and to make the display contents easy to see. Working without adjusting the display to a comfortable angle makes it difficult for you to maintain a proper posture and you will get tired easily. Adjust the viewing angle before use.
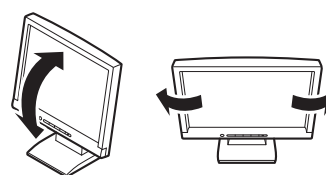
Adjust the brightness and contrast of the display
Display screens have functions to control brightness and contrast. The most suitable brightness/contrast depends on age, individuals, and environment, so adjust it to suit your preferences. A too bright or too dark display is bad for your eyes.
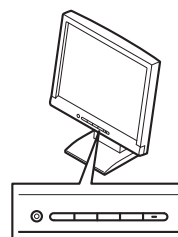
Adjust the angle of keyboard
Some keyboards are ergonomically designed, which allow the angle to be adjusted. Adjusting the angle of the keyboard is effective to reduce tension on your shoulders, arms, and fingers.
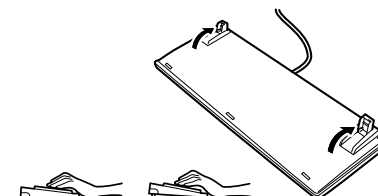
Clean your equipment
Keeping your equipment clean is important not only for the appearance but also for functional and safety reasons. A dusty monitor makes it difficult to see the display contents, so clean it regularly.

Take rest breaks
When you feel tired, take a break. Light exercise is also recommended.

1

NEC Express5800 Series
Express5800/R120h-1M

General Description

This chapter introduces the features of this server and the name of each part

1. Introduction

2. Accessories

Describes the accessories of the server.

3. Features

Describes the features of the server and the server management.

4. Names and Functions of Parts

Describes the name of each part contained in this server.

1. **Introduction**

Thank you for purchasing this NEC Express5800 Series product.

This server is powered by the latest microprocessor "Intel® Xeon® processor".

With our latest technology and architecture, we offer "high performance" and "high reliability" that could not be accomplished by conventional servers. Furthermore, with its design for "extensibility," our servers can be widely used for general purpose. For proper use of the unit, read this manual carefully to fully understand handling of the product.

$\mathcal{2.}$ Accessories

The carton box contains various accessories which are required for setup or maintenance. **Make sure you have them all** for future use.

The rack or server chassis includes all rack-mounting hardware parts required for the server installation.

- Power cord
- Manual and software products
- Rack-mounting hardware and documentation
- Front Bezel
- Bezel Lock Key (attached to Front Bezel)
- Safety Precautions and Regulatory Notices
- Getting Started

In addition to these enclosed items, the following extra items may be required.

- Operating system or application software
- Hardware options
- Drivers (Hexalobular standard, etc.)

Check whether all parts are present and complete. If some parts are missing or damaged, contact the applicable vendor.

Important	**The chassis serial number plate and maintenance label is located on the server. If the serial number does not match the number on the warranty, you may not be guaranteed against failure even within the warranty period. Contact your sales representative if they do not match.**

3. Features

The server has the following features:
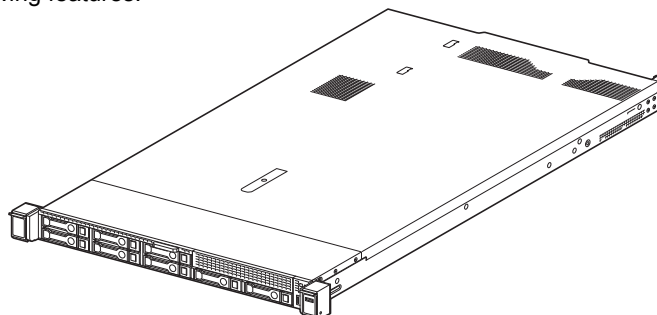
High performance

- Intel® Xeon® Processor Scalable Family

    Xeon Bronze 3204 Processor (1.90 GHz, 6C/6T, TDP 85W, DDR4 2133 1TB),

    Xeon Silver 4208 Processor (2.10 GHz, 8C/16T, TDP 85W, DDR4 2400 1TB),

    Xeon Silver 4210 Processor (2.20 GHz, 10C/20T, TDP 85W, DDR4 2400 1TB),

    Xeon Silver 4214 Processor (2.20 GHz, 12C/24T, TDP 85W, DDR4 2400 1TB),

    Xeon Silver 4215 Processor (2.50 GHz, 8C/16T, TDP 85W, DDR4 2400 1TB),

    Xeon Silver 4216 Processor (2.10 GHz, 16C/32T, TDP 100W, DDR4 2400 1TB),

    Xeon Gold 5215 Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 1TB),

    Xeon Gold 5217 Processor (3.00 GHz, 8C/16T, TDP 115W, DDR4 2667 1TB),

    Xeon Gold 5218 Processor (2.30 GHz, 16C/32T, TDP 125W, DDR4 2667 1TB),

    Xeon Gold 5220 Processor (2.20 GHz, 18C/36T, TDP 125W, DDR4 2667 1TB),

    Xeon Gold 5222 Processor (3.80 GHz, 4C/8T, TDP 105W, DDR4 2933- 1TB),

    Xeon Gold 6226 Processor (2.70 GHz, 12C/24T, TDP 125W, DDR4 2933 1TB),

    Xeon Gold 6230 Processor (2.10 GHz, 20C/40T, TDP 125W, DDR4 2933 1TB),

    Xeon Gold 6234 Processor (3.40 GHz, 8C/16T, TDP 130W, DDR4 2933 1TB),

    Xeon Gold 6238 Processor (2.10GHz, 22C/44T, TDP 140W, DDR4 2933 1TB),

    Xeon Gold 6240 Processor (2.60 GHz, 18C/36T, TDP 150W, DDR4 2933 1TB),

    Xeon Gold 6242 Processor (2.80 GHz, 16C/32T, TDP 150W, DDR4 2933 1TB),

    Xeon Gold 6244 Processor (3.60 GHz, 8C/16T, TDP 150W, DDR4 2933 1TB),

    Xeon Gold 6248 Processor (2.50 GHz, 20C/40T, TDP 150W, DDR4 2933 1TB),

    Xeon Gold 6252 Processor (2.10 GHz, 24C/48T, TDP 150W, DDR4 2933 1TB),

    Xeon Gold 6254 Processor (3.10GHz, 18C/36T, TDP 200W, DDR4 2933 1TB),

    Xeon Platinum 8260 Processor (2.40 GHz, 24C/48T, TDP 165W, DDR4 2933 1TB),

    Xeon Platinum 8268 Processor (2.90 GHz, 24C/48T, TDP 205W, DDR4 2933 1TB),

    Xeon Platinum 8280 Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 1TB),

    Xeon Gold 5215M Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 2TB),

    Xeon Gold 6238M Processor (2.10 GHz, 22C/44T, TDP 140W, DDR4 2933 2TB),

    Xeon Gold 6240M Processor (2.60 GHz, 18C/36T, TDP 150W, DDR4 2933 2TB),

    Xeon Platinum 8260M Processor (2.40 GHz, 24C/48T, TDP 165W, DDR4 2933 2TB),

Xeon Platinum 8280M Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 2TB)

Xeon Gold 5215L Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 4.5TB),

Xeon Gold 6238L Processor (2.10 GHz, 22C/44T, TDP 140W, DDR4 2933 4.5TB),

Xeon Gold 6240L Processor (2.60 GHz, 18C/36T,, TDP 150W, DDR4 2933 4.5TB),

Xeon Platinum 8280L Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 4.5TB)

- Turbo Boost Technology feature *1

- Hyper Threading Technology feature *1

- Intel AVX-512 Extended Instruction Set *2

- Intel Ultra Path Interconnect (UPI) *3

- Intel Run Sure Technology *4

- High-speed memory access (DDR4 2133/2400/2666/2933 supported) *5

- High-speed disk access (SATA 6Gb/s, SAS 12Gb/s supported)

- High-speed 10GBASE-SFP+ / 10GBASE-T / 1000BASE-T/100BASE-TX / 10BASE-T interface (10Gbps / 1Gbps / 100Mbps / 10Mbps supported) can be selected

High reliability
- Processor throttle-ring feature

- Memory monitoring feature (error correction/error detection)

- Memory x4 SDDC feature

- Memory mirroring, memory sparing features

- Bus parity error detection

- Temperature detection

- Error detection

- Internal fan monitoring feature

- Power redundant feature (hot swapping supported)

- RAID system (Disk Array) (An option card is required.)

- Auto rebuild feature (hot swapping supported)

- System utility password feature

- The security lock that comes with Front Bezel

- Redundant fan configuration

- Fan (hot swapping supported)

- HDD (hot swapping supported)

Management Utilities
- NEC ESMPRO

- Remote controlling feature (iLO 5)

- RAID system management utility (Smart Storage Administrator)

- Hard disk drive monitoring

- Power supply monitoring

Power saving and noiseless design
- Selection of power unit appropriate to environment, work load, and configuration

- Power consumption monitoring feature

- Power control feature

- 80 PLUS® Platinum / Titanium certified high efficiency power supply *6

- Fan control appropriate to environment, work load, and configuration

- Silent sound design

- Enhanced Intel SpeedStep® Technology supported

Expandability
- Various option slots

-   PCI Express 3.0 (x16 lanes): 1 slot (Full height)

-   PCI Express 3.0 (x16 lanes): 2 slots (Low profile) *7

-   PCI Express 3.0 (x8 lanes): 1 slot (dedicated to RAID controller)

-   PCI Express 3.0 (x8 lanes): 1 slot (dedicated to LOM card)

- Large capacity memory of up to 3.0TB *8

- Can upgrade to multi-processor system with up to two processors

- Expansion Bay (for hard disk drives): up to 11 slots

- Optical disk drive bay provided as an option

- USB3.0 interface (Front: 1 port, rear: 2 ports, internal: 2 ports)

- USB2.0 interface (Front: 1 port(optional))

- Management LAN port (1 port)

- With optional LOM card, two to four LAN ports can be added.

Ready to use
- No cable connection is required to install a hard disk drive and additional power supply unit (hot swap supported).

- Slide rails for each installation

Many built-in Features
- Redundant power supply system supported (valid when optional power supply unit is installed)

- Software power-off

- Remote power-on feature

- AC-Link feature

- Remote console feature

- Connector for display unit provided on rear panel

- Supports Redfish® API and incorporates baseboard management controller (iLO 5) which conforms to IPMI v2.0

Self-diagnosis
- Power On Self-Test (POST)

Easy setup

- EXPRESSBUILDER (setup utility)

- System utility

*1: The Intel Xeon processor Bronze 3200 series is not supported.

*2: The device that mounts Intel Xeon processor Bronze 3200 series/Silver 4200 series/Gold 5200 series executes one instruction simultaneously. The device that mounts Gold 6200 series/Platinum 8200 series executes two instructions simultaneously.

*3: The device that mounts Intel Xeon processor Bronze 3200 series/Silver 4200 series/Gold 5200 series is 2-UPI. The device that mounts Gold 6200 series/Platinum 8200 series is 3-UPI.

*4: The device that mounts Intel Xeon processor Bronze 3200 series/Silver 4200 series is not supported.

*5: Operating frequency can vary depending on the type or the number of boards of processor or memory installed.

*6: Power supply unit N8181-161 acquired 80 PLUS® Titanium.

Power supply units N8181-159/160/162 acquired 80 PLUS®Platinum.

*7: When PCI Express 3.0 is mounted as the first riser card in 2 slots (x16 lanes) and PCI Express 3.0 is mounted as the second riser card in 1 slot (x16 lanes).

This can be changed to PCI Express 3.0: 1 slot (x16 lane) (full height) using the optional riser card.

*8: For 2 CPU configuration. Up to 1.5TB for 1 CPU configuration

Maximum available memory capacity depends on the type of processor, see below.

CPU	Maximum memory capacity per CPU
"Processor containing an "M" "L" in the model Xeon® Platinum 8260M, 8280M Xeon® Gold 5215M,6238M, 6240M Xeon® Platinum 8280L Xeon® Gold 5215L, 6238L, 6240L	1.5TB
others	768GB

4. Names and Functions of Parts

This section describes the names of the server parts.

4.1 Front View (With Front Bezel)

(2)   (1)
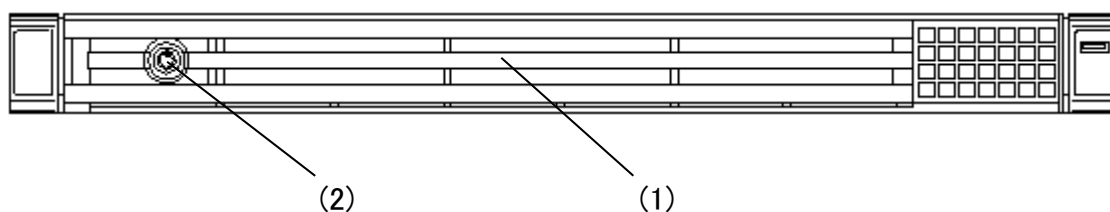
(1) Front Bezel
A cover for protecting the front of the server. This cover can be locked with the provided Bezel Lock Key.

(2) Key Slot
A slot for Bezel Lock Key that is used to lock Front Bezel.

4.2 Front View (Without Front Bezel)

・8x 2.5-inch drive model

・4x 3.5-inch drive model

(1) 2.5-inch Hard Disk Drive Bay
Bays for installing HDDs. The sequential numbers indicate the corresponding slot numbers. All bays include Dummy Trays.

(2) 3.5-inch Hard Disk Drive Bay
Bays for installing HDDs. The sequential numbers indicate the corresponding slot numbers. All bays include Dummy Trays.

(3) Pull-out Tab
A tab for showing the model number and serial number of the server.

(4) Display Port Connector (Optional)
Not support

(5) USB2.0 connector (optional)
Connectors for connecting USB 2.0 interface devices.

(6) Optical disk drive (option)
Attaching the optical disk drive.
According to the order at the time of buying, one of the following option drives is installed.
− DVD-ROM drive
− DVD Super MULTI drive

(7) POWER Switch/LED
A switch for turning on/off the server. Press once to turn on the server. POWER LED lights when it is on. Press it again to turn off the server. Hold down the switch for four seconds or more to forcibly turn off the server.

(8) STATUS LED
LEDs for showing the server status.

(9) UID (unit ID) switch/LED
The switch to turn ON/OFF unit ID LED or restart iLO. When pressed once, the UID LED lights up, and it turns ON. Press it again to turn it OFF.
For instructions on restarting iLO using the UID switch, see iLO 5 User's Guide.
During executing commands from software, remote management of iLO or firmware update, the UID LED lights up or flashes if iLO is restarted via UID switch.

(10) LAN LINK/ACT LED
LEDs for showing the status of accessing to the network.

(11) iLO service port USB connector
A USB connector used for connecting to iLO such as for acquiring log. For details, refer to *iLO 5 User's Guide*.

(12) USB3.0 connector (front)
Connectors for connecting USB 3.0 interface devices.

Important	Do not reboot the iLO from the boot of the server until the completion of the OS boot. Additionally, do not reboot the iLO during using the System Utilities.

4.3 Rear View
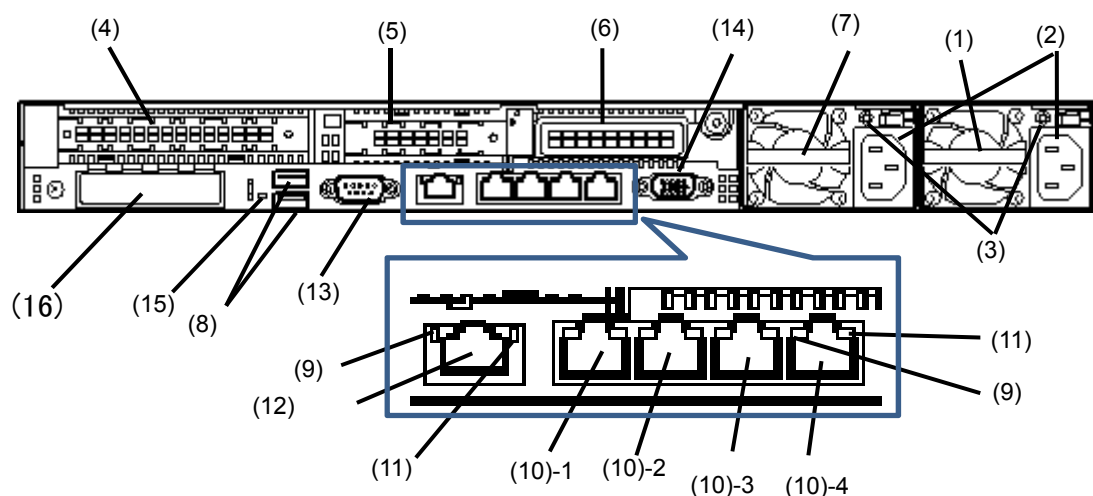
(1) Power Unit (Power supply slot 1) (Required option) A power supply for supplying the DC power to the server.

(2) AC Inlet
A socket for connecting the power cord.

(3) AC POWER LED
An LED for showing the power supply status. (See 4.8.2 LEDs on the backside of the unit)

(4) Slots for Full-height PCI Card
Slots for installing full-height PCI cards. PCI slot number is "1."
The riser card for PCIe 3x16 (16, 8, 4, 1) is standard-equipped.

(5) Slots for low-profile PCI card
Slots for installing low-profile PCI cards. PCI slot number is "2."
The riser card for PCIe 3x8 (8, 4, 1) is standard-equipped.

(6) Slots for low-profile PCI card
Slots for installing low-profile PCI cards. PCI slot number is "3."
The riser card is optional. *1

(7) Power supply unit 2 (power supply slot 2) (Selection option) The second power supply unit.
It can be redundant if the second unit is arranged.

(8) USB 3.0 Connectors
Connectors for connecting USB 3.0 interface devices.

(9) LINK LED
LEDs for showing the access status of LAN. (See 4.8.2 LEDs on the backside of the unit)

(10) LAN connectors
Connectors for connecting to a network (1000BASE-T/100BASE-TX/10BASE-T).
(10)-1: LAN1 connector
(10)-2: LAN2 connector
(10)-3: LAN3 connector

(10)-4: LAN4 connector

(11) ACT LED
LEDs for showing the transfer speed of LAN ports. (See 4.8.2 LEDs on the backside of the unit)

(12) Management LAN Connector
A LAN connector which supports 1000BASE-T/100BASE-TX/10BASE-T.
Incompatible as LANs for regular OS.
This port is used for connecting to iLO.

(13) Serial Port (COM) Connector (optional)
A connector for connecting serial interface devices. This cannot directly connect to a network line.

(14) Display Connector
A connector for connecting a display.

(15) UID (unit ID) LED
Turning ON/OFF the unit ID LED on the front side, it lights up/lights off. It interlocks with the front UID LED. During executing commands from software, remote management of iLO or firmware update, the UID LED lights up or flashes if iLO is restarted via UID switch.

(16) LOM Card Slot
A PCIe slot bay dedicated to an additional LAN card (optional) that can be directly connected to the motherboard.

*1 3rd Riser Card is an option which needs the second processor before the installation.

4.4 External View
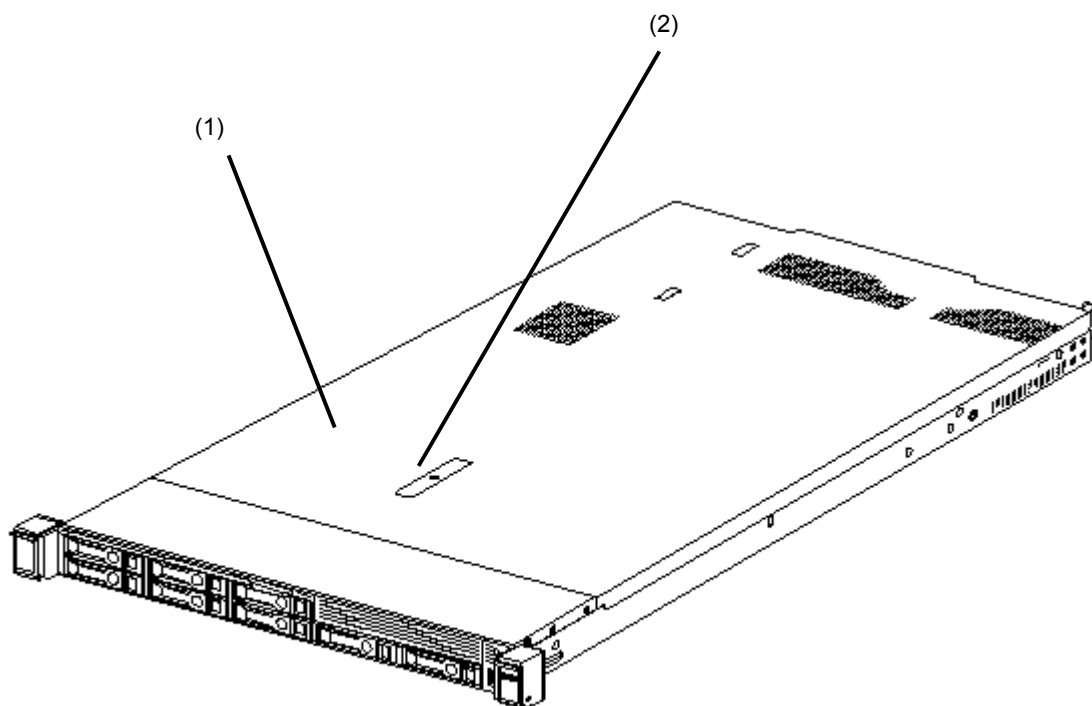
(1)   Top cover
(2)   Hood latch

4.5 Motherboard
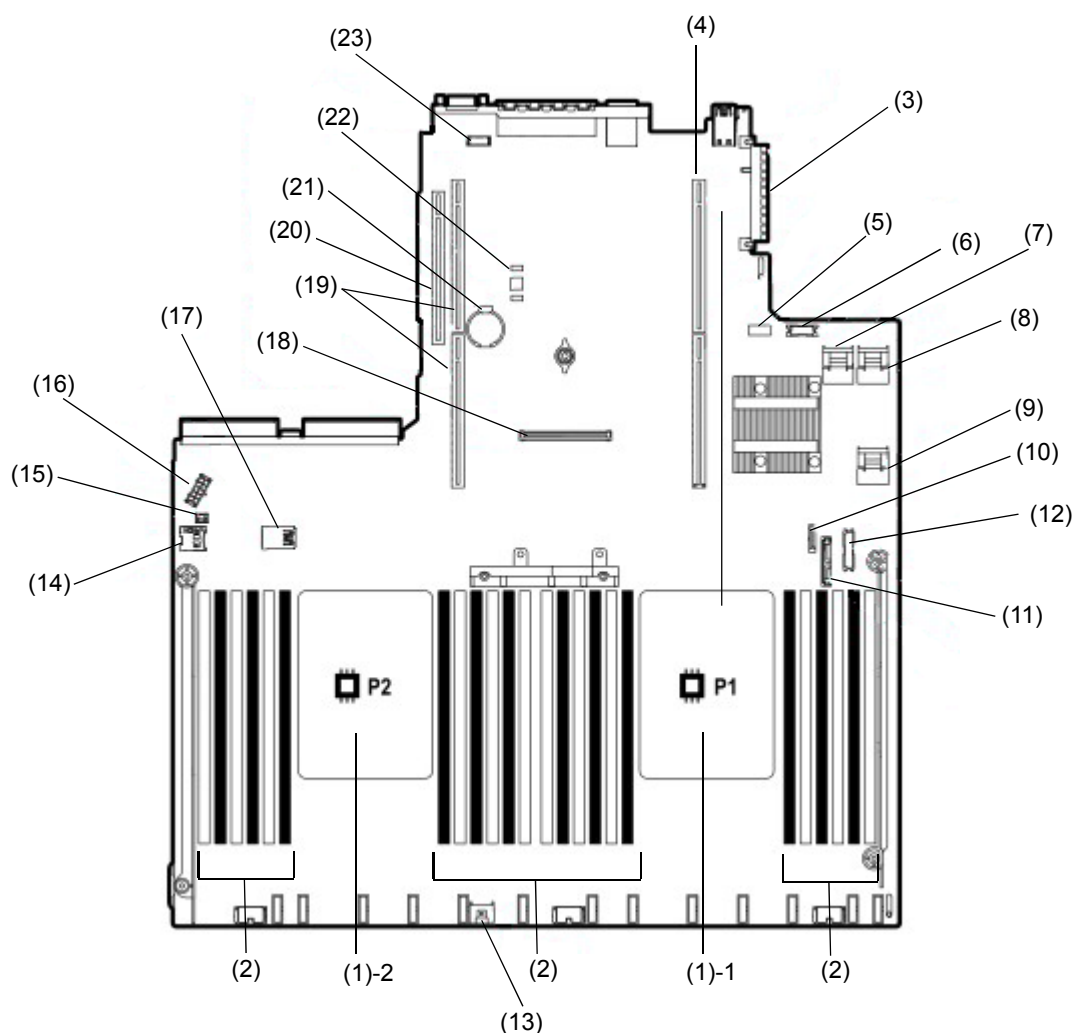
(1)   Processor (CPU) Socket
    -1 Processor #1 (CPU #1)
    -2 Processor #2 (CPU #2)
(2)   DIMM slot
(3)   LAN Mezzanine Card Connector
(4)   Connector for primary Riser Card
(5)   System maintenance switch
(6)   Front display/USB 2.0 connector
(7)   X4 SATA Port 1 connector
(8)   x4 SATA Port 2 connector
(9)   x2 SATA Port 3 connector
(10) x1 SATA Port 4 connector
(11) SATA Port 5 connector for optical disk drive
(12) Power supply SW/USB 3.0 connector
(13) Battery connector for RAID controller

(14) Power Connector for Expander Board
(15) Power Connector for Expander Board
(16) Power connector for HDD BP
(17) Internal x 2 USB 3.0 connector
(18) Connector dedicated to RAID controller
     (Type-a)
(19) Connector for secondary Riser Card
     CPU2 is required for using the secondary riser
     card.
(20) Connector for tertiary Riser Card
     CPU2 is required for using the tertiary riser card.
(21) Lithium Battery
(22) Connector for Option TPM Kit
(23) Connector for Option COM

4.5.1 System Maintenance Switch

Position	Default	Setting	Description
SW1 *1,*5	Off	Off	Set to OFF at regular times.
		On	Sets the security of iLO5 to disabled.
SW2	Off	Reserved	-
SW3	Off	Reserved	-
SW4	Off	Reserved	-
SW5 *2,*5	Off	Off	Set to OFF at regular times.
		On	Clears power-on password and administrator password.
SW6 *3,*5	Off	Off	Set to OFF at regular times.
		On	Set the system configuration back to the default values. *4
SW7	Off	Reserved	-
SW8	Off	Reserved	-
SW9	Off	Reserved	-
SW10	Off	Reserved	-
SW11	Off	Reserved	-
SW12	Off	Reserved	-

Important	Do not change the system maintenance switch that says "Reserved" unless it is instructed by the document. It may cause the trouble or malfunction of the device.

*1 Set the SW1 to ON when all the passwords of iLO5 to which administrator authority is given have become unknown or when enabling the iLO5 features.

*2 Regarding the operation procedure of SW5, see *Chapter 1 (7.4.4 Clearing a Password)* in the *Maintenance Guide*.

*3 Regarding the operation procedure of SW6, see *Chapter 3 (7.4.3 Set the System Configuration Back to the Default Value)* in the *Maintenance Guide*.

*4 Default values may be different from the factory presets.

*5 When you set SW1, SW5, and SW6 to ON at the same time, boot with the backup ROM.

4.5.2 DIMM slot

DIMM slots are numbered in order 1 to 12 for the processor.
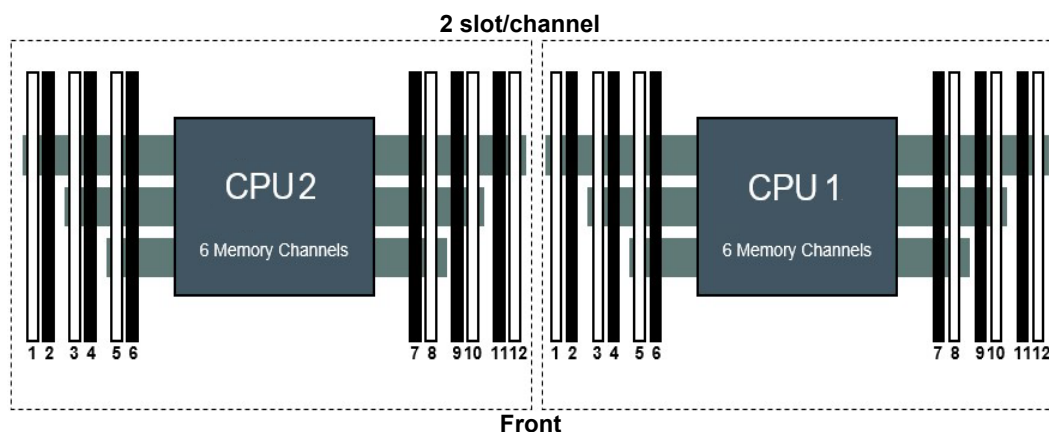
4.6 Internal View
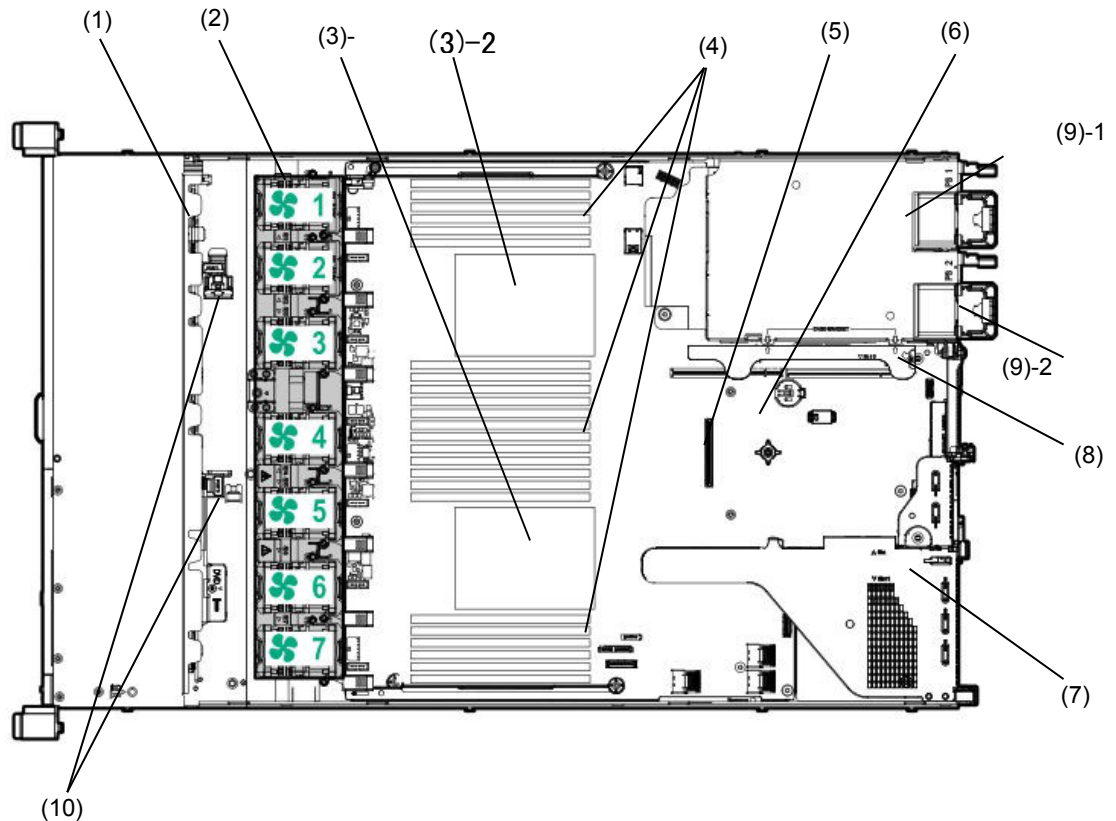
(1) Backplane

(2) Cooling Fan
- -1 FAN1 (option)
- -2 FAN2 (option)
- -3 FAN3
- -4 FAN4
- -5 FAN5
- -6 FAN6
- -7 FAN7

FAN3 to FAN7 are factory installed. FAN 1 and 2 are required in 2-CPU configuration.

(3) Processor (CPU)
- -1 CPU1 (required option)
- -2 CPU2 (option)

(4) DIMM (option)
1 or more option(s) required per CPU

(5) Slot for RAID Controller (option)

(6) Motherboard

(7) Primary Riser Card cage
Standard riser is standard-installed
Changeable by option

(8) Secondary/Tertiary Riser Card cage (option)

(9) Power Supply Unit
The numbers after the parenthesized numbers indicate slot numbers.
-1 PSU1 (required option)
-2 PSU2 (optional)

(10) Battery-holding part for RAID controller

(Lithium ion battery)

4.7 Cooling Fan Option

Important	To prevent damage to server components, make sure to install fan covers on fan bays 1 and 2 for single processor configurations.

Important	If an adequate number of fans are not installed on the server, do not run the server for a longer period of time so as not to damage the device. Sometimes the server may start, but if necessary fans are not installed, the execution of server cannot be recommended.
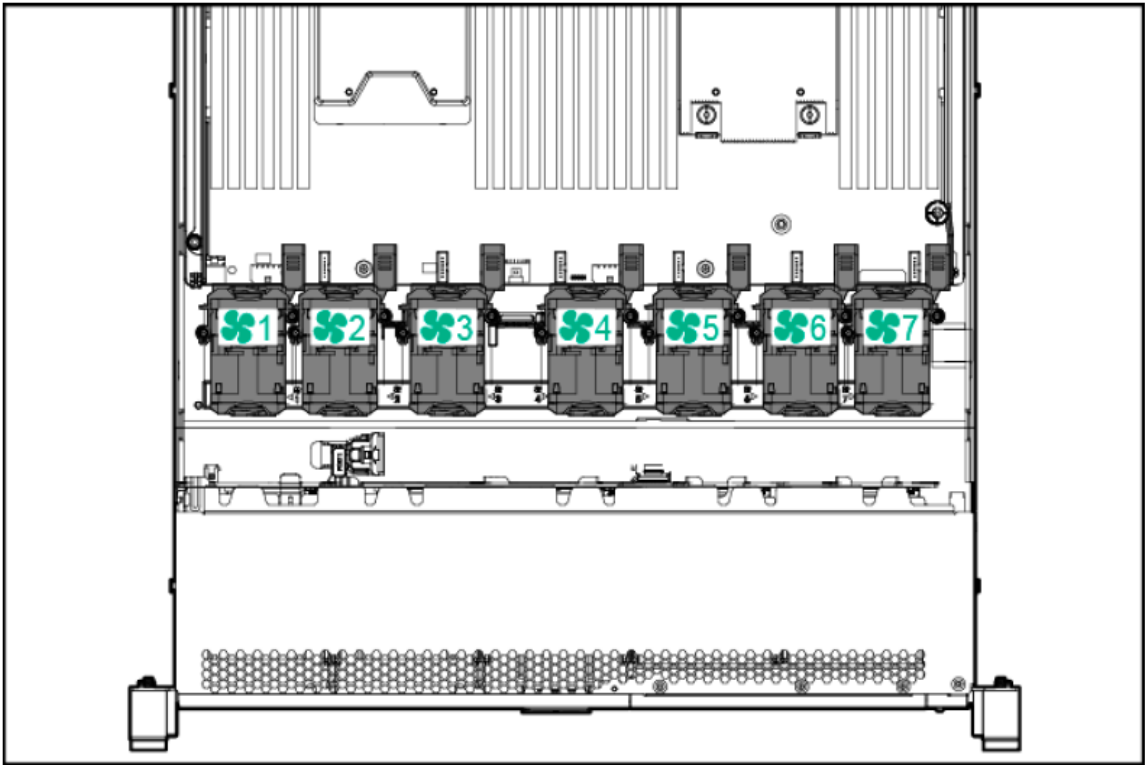
The following displays the structure for installing cooling fans.

Configuration	Fan bay 1	Fan bay 2	Fan bay 3	Fan bay 4	Fan bay 5	Fan bay 6	Fan bay 7
1xCPU	Fan cover	Fan cover	Fan	Fan	Fan	Fan	Fan
2xCPU	Fan	Fan	Fan	Fan	Fan	Fan	Fan

For single processor configurations, a particular cooling fan bay requires five fans and two blank covers for redundancy.

For dual processor configurations, seven cooling fans are required for redundancy.

The server controls the cooling fan speed to the optimal value depending on the environment. The cooling fans rotate at the minimum speed depending on the temperature.

If the factory setting of cooling fans [Optimal Cooling] is selected, the cooling fans may rotate fast when the server internal temperature increases due to the installation environment or operational status of the server.

If the cooling fans rotate fast and slow repeatedly, change the cooling fan setting to [Increased Cooling] in System Utilities.

・Maintenance Guide (Common)

　Chapter 1 Useful Features

　　-1. System Utilities

　　　-「1.2.2 BIOS/Platform Configuration(RBSU)」

　　　　- (12) Advanced Options Menu

　　　　　- (a) Fan and Thermal Options Menu

　　　　　　-「Thermal Configuration

The server executes the specified shutdown under the following temperature control.

● 　In case a temperature at a cautious level is detected, iLO5 executes the shutdown of OS safely. In case a temperature at a critical level is detected, iLO5 executes not a shutdown but a hard shutdown of OS.

● 　With "Thermal Shutdown" function set to "Disabled" at "BIOS/Platform Configuration (RBSU)", in case a temperature at a cautious level is detected, the shut down of OS is not executed and the operation continues, but in case a temperature at a critical level is detected, a hard shutdown is executed.

Important	**If Thermal Shutdown function is set to Disabled in BIOS/Platform Configuration (RBSU), high temperature events may damage server components.**
Tips	In case NEC ESMPRO ServerAgentService is installed, since a shut down due to high temperature is executed by NEC ESMPRO ServerAgentService, you need to set "Thermal Shutdown" to "Disabled."

4.8 Status Indicators

4.8.1 LEDs on the front side of the unit

・2.5-inch drive model

No.	Item	Status	Description
1	UID switch/LED [*1] ※Do not reboot the iLO from the boot of the server until the completion of the OS boot and during using the System Utilities.	Lights in blue	Working in operation
		Flashes in blue (once per second)	Remote management or firmware upgrade is in progress
		Flashes in blue (4 times per second)	The iLO restart sequence using the UID switch has been launched
		Flashes in blue (8 times per second)	The iLO restart sequence using UID switch is in progress
		Lights off	Not working
2	Power switch and system power LED [*1]	Lights in green	The system is powered on
		Flashes in green (once per second)	The power on sequence in progress
		Lights in amber	The system is in standby state
		Lights off	Power is not supplied [*2]
3	Status LED [*1]	Lights in green	Normal state
		Flashes in green (once per second)	Restarting iLO
		Flashes in amber	The function of the system is deteriorating [*3]
		Flashes in red (once per second)	The system is in a critical state [*3]
4	LINK/ACT LED [*1]	Lights in green	Linked to the network
		Flashes in green (once per second)	The network is working
		Lights off	The network is not working

*1 If all the four LEDs described in this table is flashing at the same time, it indicates that a power failure has occurred. For details, refer to *(2) Power failure LED*.

*2 The power is not supplied, the power cord is not connected, the power supply unit is not installed, the power supply unit is defect, or the power cord is disconnected.

*3 If the STATUS LED indicates a degraded or critical condition, check the system IML or use iLO to check the system status.

・3.5-inch drive model

No.	Item	Status	Description
1	UID switch/LED [*1] ※Do not reboot the iLO from the boot of the server until the completion of the OS boot and during using the System Utilities.	Lights in blue	Working in operation
		Flashes in blue (once per second)	Remote management or firmware upgrade is in progress
		Flashes in blue (4 times per second)	The iLO restart sequence using the UID switch has been launched
		Flashes in blue (8 times per second)	The iLO restart sequence using UID switch is in progress
		Lights off	Not working
2	LINK/ACT LED [*1]	Lights in green	Linked to the network
		Flashes in green (once per second)	The network is working
		Lights off	The network is not working
3	STATUS LED [*1]	Lights in green	Normal state
		Flashes in green (once per second)	Restarting iLO
		Flashes in amber	The function of the system is deteriorating [*3]
		Flashes in red (once per second)	The system is in a critical state [*3]
4	POWER Switch/LED [*1]	Lights in green	The system is powered on
		Flashes in green (once per second)	The power on sequence in progress
		Lights in amber	The system is in standby state
		Lights off	Power is not supplied[*2]

*1 If all the four LEDs described in this table is flashing at the same time, it indicates that a power failure has occurred. For details, refer to *(2) Power failure LED*.

*2 The power is not supplied, the power cord is not connected, the power supply unit is not installed, the power supply unit is defect, or the power cord is disconnected.

*3 If the STATUS LED indicates a degraded or critical condition, check the system IML or use iLO to check the system status.

(1) UID switch function

To display Server Health Summary, press the UID switch. To restart iLO, press and hold the UID switch until

the UID lamp starts blinking fast in blue (4 times per second).

Important	**Do not restart iLO during the time from when the server starts up until the OS startup is completed (including the execution of POST (Power On Self Test)). Also, do not restart iLO during System Utilities operations. Restarting iLO at the timing above may result in an unexpected operation.**

(2) Power failure LED

The following table shows a list on power failure LEDs and affected subsystems. Not all power failures are

applied on all servers.

Subsystem	LED status
Motherboard	Flashes once
Processor	Flashes twice
Memory	Flashes 3 times
Riser card board PCIe slot	Flashes 4 times
LOM card	Flashes 5 times
RAID controller/SAScontroller	Flashes 6 times
Motherboard PCIe slot	Flashes 7 times
Power backplane or storage backplane	Flashes 8 times
Power Supply Unit	Flashes 9 times

(3) Status LED Panel (Systems Insight Display)

The Status LED Panel represents the layout of the parts on the motherboard. From these LED indicators, you

can diagnose suspected parts while the top cover is attached.

Procedure

1.   Push the panel and then pull it out.

2.   After pulling out the entire panel, turn back the panel to see the status of LED.
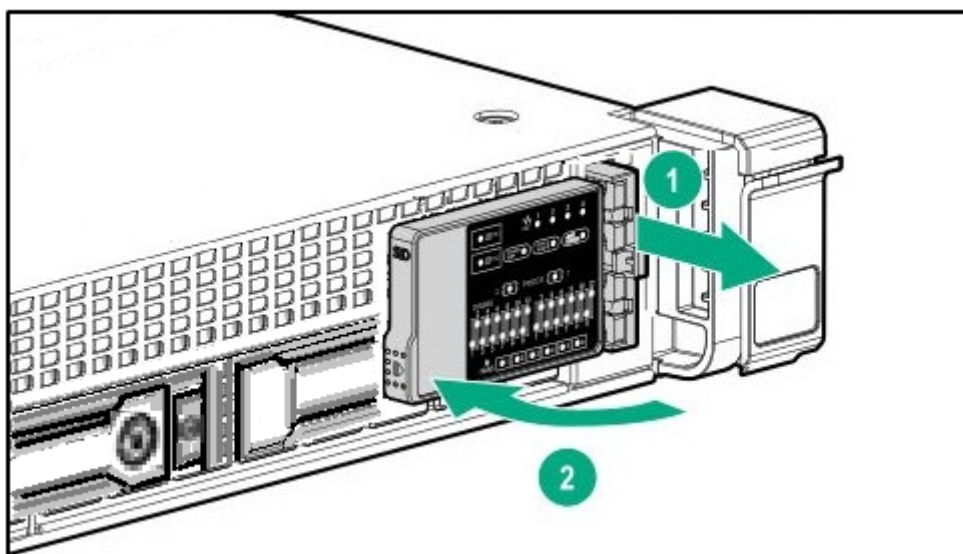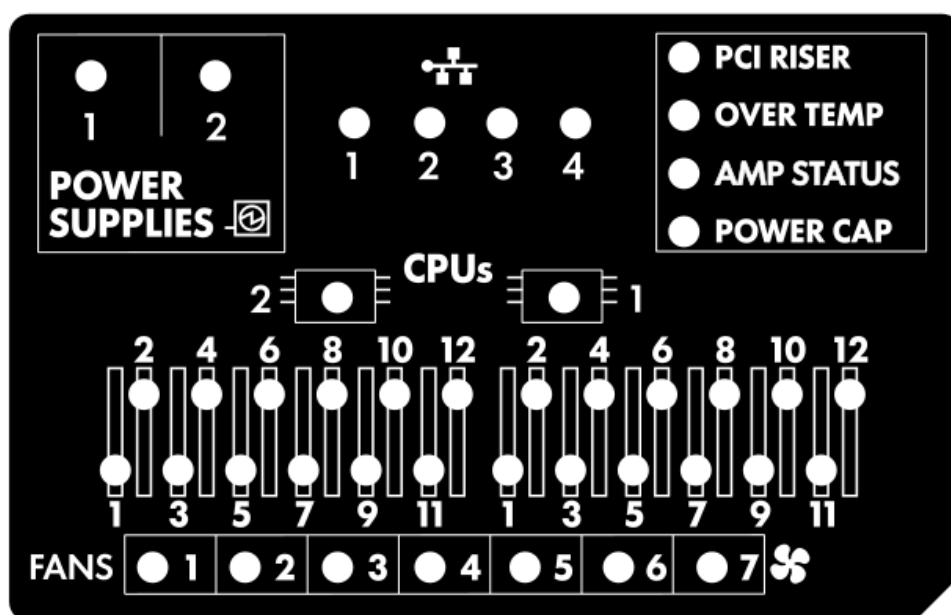
Item	Status	Description
Processor LED	Lights off	Normal state
	Amber	Processor has failed
DIMM LED	Lights off	Normal state
	Amber	The DIMM has failed or there is a configuration problem
Cooling fan LED	Lights off	Normal state
	Amber	The cooling fan has failed or is not recognized
NIC LED	Lights off	Not linked to the network. If the NIC LED is off, check the status with LED on the backside of the unit.
	Lights in green	Linked to the network
	Flashes in green	Linked to the network and working in operation
Power unit LED	Lights off	Normal state
	Lights in amber	The power subsystem is degraded, the power supply unit has failed, or the input power is disconnected
Riser Card LED	Lights off	Normal state
	Amber	Riser card unit is not correctly installed
Overtemperature LED	Lights off	Normal state
	Amber	High temperature detected
AMP status LED	Lights off	AMP mode disabled
	Lights in green	AMP mode enabled
	Lights in amber	Failover
	Flashes in amber	Invalid configuration
Power Capping LED	Lights off	The system is in standby state, or the upper limit of power consumption is not set
	Lights in green	The upper limit of power consumption is applied

When the STATUS LED on the front panel lights in amber or red, it indicates that an event has occurred on the server.

For details, refer to *(4) Status LED Panel combined LED descriptions* in the next section.

(4) Status LED Panel combined LED descriptions

The combined illumination of the following LEDs indicates a system condition:
- Systems Insight Display LEDs
- System power LED
- Health LED

Status LED Panel LED		Status LED	System power LED	Description
Processor LED	Amber	Red	Amber	One or more of the following conditions may be occurring. ・ Processor in socket X has failed. ・ Processor X is not installed in the socket. ・ Professor X is not supported. ・ During POST execution, the ROM detected a failed processor.
	Amber	Amber	Green	The processor in socket X is in the predicted failure state.
DIMM LED	Amber	Red	Green	One or more DIMM(s) have failed.
	Amber	Amber	Green	The DIMM in slot X is in predicted failure state.
Overtemperature LED	Amber	Amber	Green	Health driver has detected warning temperature.
	Amber	Red	Amber	The server has detected a fault on hardware temperature.
Riser Card LED	Amber	Red	Green	The riser card unit is not properly installed.
Cooling Fan LED	Amber	Amber	Green	One cooling fan has failed or has been removed.
	Amber	Red	Green	Two or more cooling fans have failed or have been removed
Power Supply Unite LED	Amber	Red	Amber	One or more of the following conditions may be occurring. ・ Only one power supply unit is installed and is in the standby state. ・ Power supply failure ・ System board failure
	Amber	Amber	Green	One or more of the following conditions may be occurring. ・ While redundant power supplies are installed, the only one of them is functioning. ・ The AC power cord is not connected to the redundant power supply. ・ Failure on redundant power supply ・ Power supply does not match due to the detection of power supply mismatch during POST execution, or addition of a hot plug.
Upper limit of electricity consumption	Lights off	—	Amber	In standby state
	Green	—	Flashes in green	Waiting for power supply to be turned ON.
	Green	—	Green	Power is available.
	Flashes in amber	—	Amber	Power is not available.

Important	**If the LED in multiple DIMM slots is lit, further troubleshooting is required. Remove all other DIMMs and test each bank of DIMMs. Replace each DIMM in the bank with a properly working DIMM to identify the faulty DIMM.**

4.8.2 **LEDs on the backside of the unit**
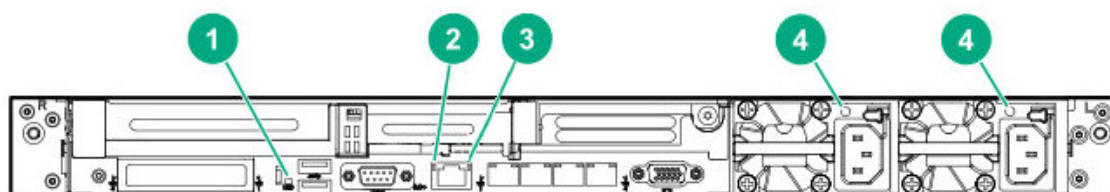
No.	Item	Status	Description
1	UID LED	Lights in blue	Confirmation function is used.
		Flashes in blue	The system is remotely managed.
		Lights off	Confirmation function is not used.
2	LINK LED	Lights in green	Connected.
		Lights off	Not linked to the network.
3	ACT LED	Lights in green	Working in operation.
		Flashes in green	Working in operation.
		Lights off	Not working.
4 (left)	AC POWER2 LED	Lights in green	Normal state
		Lights off	One or more of the following situations are occurring ・ AC power is not supplied ・ Power supply unit has failed ・ Power supply unit is in standby mode ・ Power supply unit exceeds the current limit
4 (right)	AC POWER1 LED	Lights in green	Normal state
		Lights off	One or more of the following situations are occurring ・ AC power is not supplied ・ Power supply unit has failed ・ Power supply unit is in standby mode ・ Power supply unit exceeds the current limit

4.8.3 **Hot plug compatible SATA/SAS drive LED**
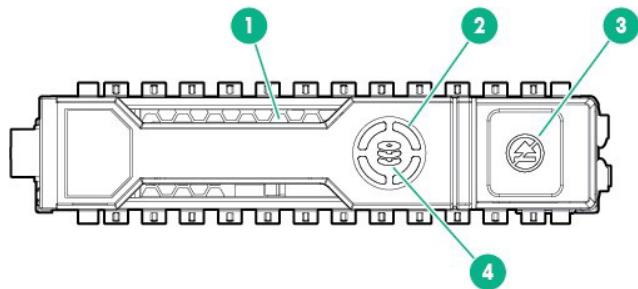
No.	Item	Status	Description
1	Position Check LED	Lights in blue	The drive is identified by the host application
		Flashes in blue	Firmware on the drive carrier is being updated or requires updating
2	DISK ACT LED	Rotates in green	Drive is working
		Lights off	Drive is not working
3	Remove Protect Switch/LED	Lights in white	Do not remove the drive. Removing a drive causes one or more logical drives to fail.
		Lights off	Even if the drive is removed, the logical drive will not fail.
4	DISK STATUS LED	Lights in green	A drive is a member of one or more logical drives.
		Flashes in green	Rebuilding the drive, migrating RAID on the drive, migrating or expanding the capacity of the strip size, expanding the capacity of the logical drive, or erasing the drive.
		Flashes in amber/green.	A drive is a member of one or more logical drives and a drive failure is predicted.
		Flashes in amber	Drive is not configured, and drive failure is predicted.
		Lights in amber	Drive has failed.
		Lights off	In the drive, the RAID controller has not achieved the configuration.

Important	Observe the following precautions when using the auto rebuild function.
	• During rebuilding, do not power off or restart the device.
	• When you dismantle or install the hard disk drive, take a interval of 90 seconds or longer.
	• If there is another hard disk drive under rebuilding, do not change the hard disk drive.

4.8.4 **Optical disk drive access LED (optional)**

The access LED of optical disk drive in the front lights when the device is accessing a CD or DVD.
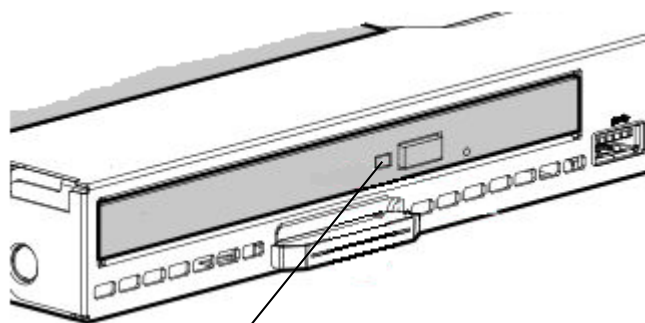
The access LED of optical disk drive

4.9 Device Number

4.9.1 Device number of 8x2.5 inch drive model (SAS/SATA)

4.9.2 Device number of 8x2.5 inch drive model + option 2x2.5 inch drive (SAS/SATA)

Chart number	BOX number
1	BOX1, Bay 1～8
2	BOX2, Bay 1, 2
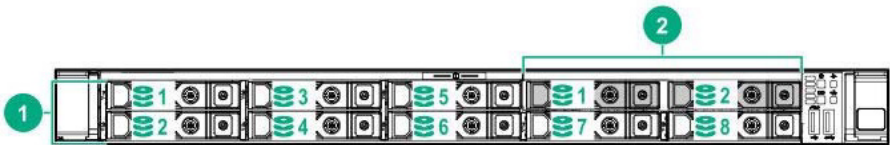
4.9.3 Device number of 4x3.5 inch drive model (SAS/SATA)
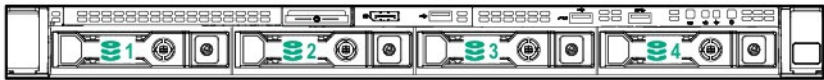
4.9.4 Device number of option rear (SAS/SATA)

Rear Option Device Bay supports 1x2.5 inch drive.

2

NEC Express5800 Series
Express5800/R120h-1M
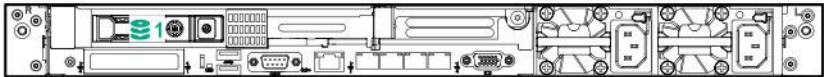
Preparations

This chapter describes preparations for using this server.

1. **Installing Internal Optional Devices**

   You can skip this section if you did not purchase any optional devices.

2. **Installation and Connection**

   Place the server in a suitable location and connect cables following this section.

1. Installing Internal Optional Devices

This section describes the instructions for installing supported optional devices and precautions.

Important	Use only the devices and cables specified by NEC. You will be charged to repair damages, malfunctions, and failures caused by the use of any devices or cables not specified for use with this server even within the warranty period.

1.1 Safety Precautions

Be sure to observe the following precautions to install and remove optional devices properly and safely.

⚠ WARNING

Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, see Safety Precautions and Regulatory Notices.

- **Do not disassemble, repair, or modify the server.**
- **Do not remove the lithium battery, NiMH battery, or Li-ion battery.**
- **Disconnect the power plug when installing and removing devices.**

⚠ CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see Safety Precautions and Regulatory Notices.

- **Do not drop**
- **Do not leave the server being pulled out.**
- **Make sure to complete installation.**
- **Do not install with the cover removed.**
- **Do not get your fingers caught.**
- **High temperature**
- **Electrical shock**

1.2 Overview of Installation and Removal

Install/remove components by using the following procedure.

⚠ **CAUTION**
Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see Safety Precautions and Regulatory Notices. • **Do not drop the server** • **Do not leave the server pulled out of the rack** • **Replace the cover after installing components** • **Beware of high temperatures** • **Do not get your fingers caught when installing components**

1. If the server is mounted on a rack, use the UID switch to identify the target server.

   See *Chapter 2 (1.3 Identifying Servers (UID Switch))*.

2. Remove Front Bezel.

   See *Chapter 2 (1.4 Removing Front Bezel)*.

3. Turn off the server.

   See *Chapter 3 (6. Turning Off the Server)*.

4. Disconnect the power cord from the outlet and the server.

Important	• **After disconnecting the power cord from the server, wait for at least 30 seconds before installing/removing optional devices.** • **Make sure AC POWER LED on power supply unit is unlit.**

5. If only installing a hard disk drive, proceed to step 10. If only installing a power supply unit, proceed to step 11. When installing or removing other internal options, remove from the rack from the main device, and place it on a sturdy, flat desk.

   Please see *Chapter 2 (2.1 Installation)* of this manual.

Important	Do not leave the server being pulled out from the rack.

6. Remove Top Cover.

   See *Chapter 2 (1.5 Removing Top Cover)*.

7. Depending on the components to be installed or removed, follow the procedure in order.

   See *Chapter 2 (1.6 TPM Kit N8115-35*) to (*1.27 Use of Internal Hard Disk Drives in the RAID System*).

8. Attach Top Cover.

   See *Chapter 2* (*1.28 Installing Top Cover)*.

9. Mount the server onto the rack.

   See *Chapter 2 (2.1 Installation)*.

10. Install hard disk drives.

    See *Chapter 2 (1.29 Drives)*.

11. Install power supply units

    See *Chapter 2 (1.30 Power Supply Unit)*.

12. Attach Front Bezel.

    See *Chapter 2 (1.32 Installing Front Bezel)*.

Installation and removal for internal optional devices are now complete.

Continue the setup with reference to *Chapter 2 (2.2 Connection)*.

1.3 **Identifying Servers (UID Switch)**

Using UID (Unit ID) Switch helps you to identify the target server.

When the server is working, **be sure to identify the target server by using UID Switch first** before you turn off the server or disconnect a cable from the server.

To turn UID LED on, press UID Switch. When it is pressed again, the LED will be off.

Front   2.5-inch x8 drive model

UID switch / LED

3.5-inch x4 drive model

UID switch / LED

Rear

UID LED
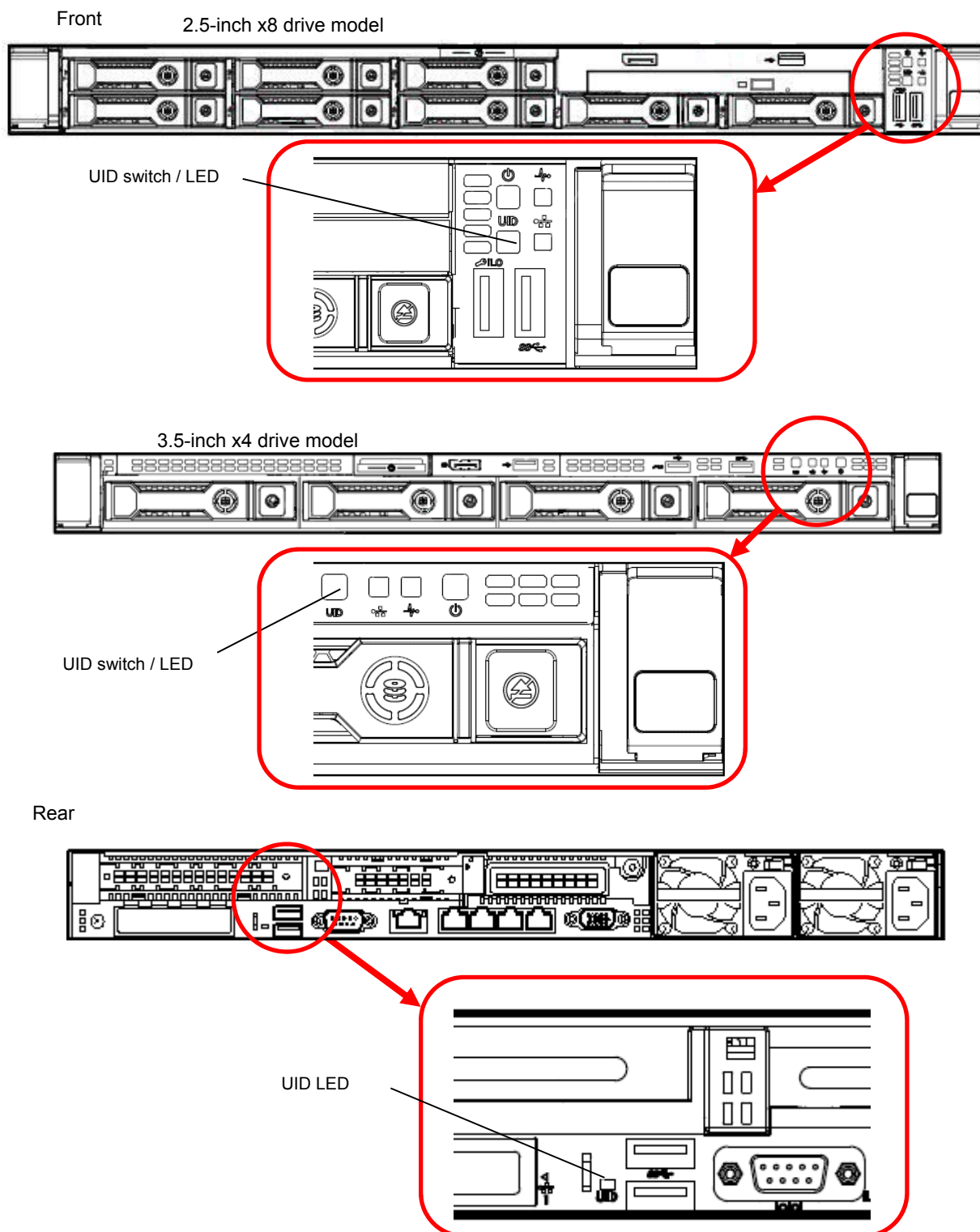
1.4 **Removing Front Bezel**

Remove the front bezel when pressing the POWER switch or removing Top Cover.

1. To unlock the bezel, insert the attached Bezel Lock Key into the key slot and turn the key

Unlock / **Lock**
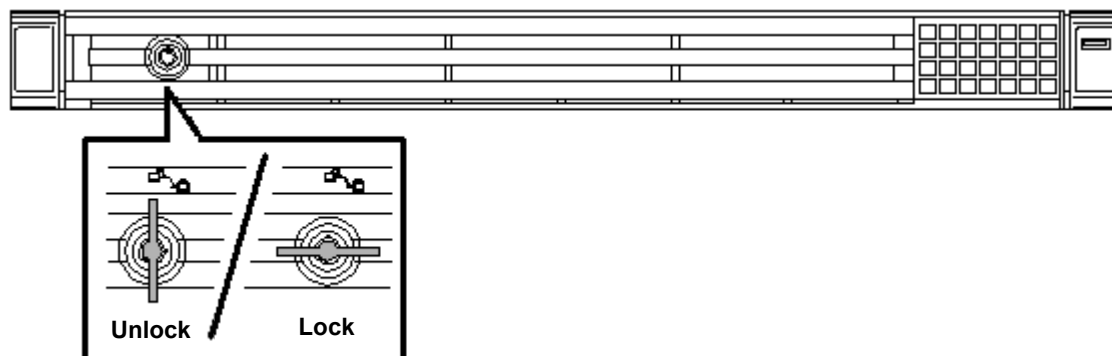
2. Press to the right and unlock the lever seen on the left when you face the front bezel, and pull only the left side of bezel by about 10 cm toward you. Then, as shown in the diagram, pull the bezel to the left toward direction with the lock on the left unlocked to remove the bezel from the device.
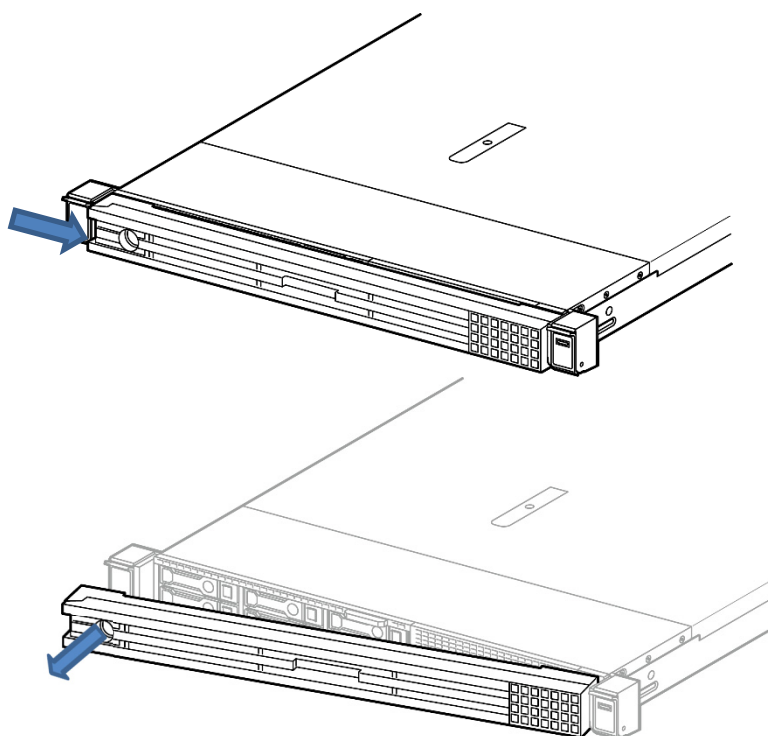
Note	Be careful not to press the POWER Switch.

Important	**If you fail to remove the front bezel properly, the front bezel might be damaged.** **Pay attention not to press the power switch when installing the front bezel.**

1.5 **Removing Top Cover**

Remove Top Cover when installing or removing the optional component or change internal cable connection.

Please have ready a hexalobular driver (T-10) or flathead driver.

1. See steps 1 to 5 in *Chapter 2 (1.2 Overview of Installation and Removal*) for preparations.
2. Unscrew the security screw with the hexalobular driver or flathead driver.
3. Unlock the hood latch on the top by pressing from behind and raise the hood latch.
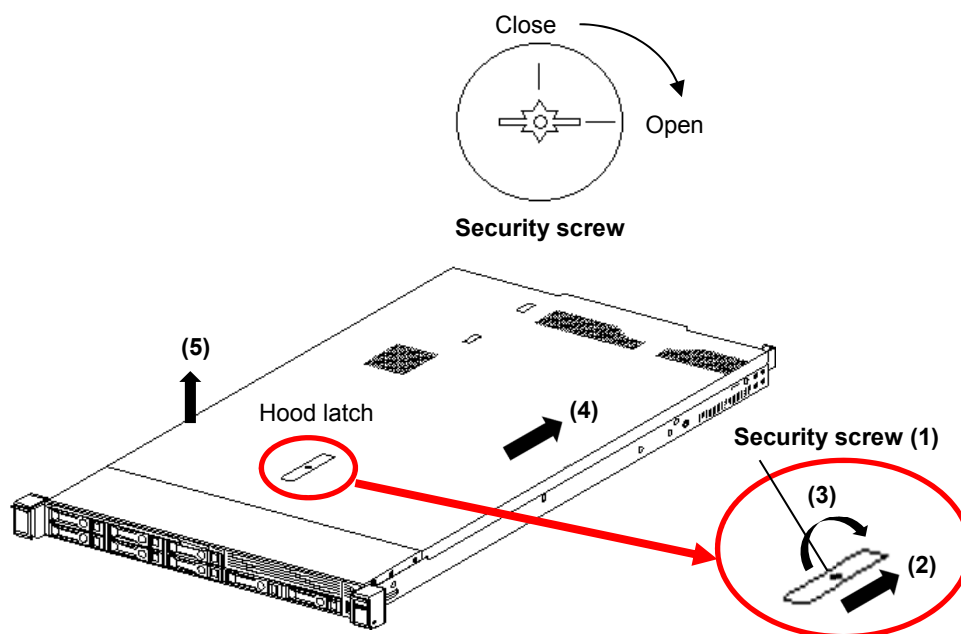
4. Slide the cover a little bit to the rear side of the chassis.
5. Lift Top Cover and remove it from the server.

1.6 TPM Kit N8115-35

Overview

Install the TPM (Trusted Platform Module) Kit unit according to the instructions in this section to enable it.

There are two steps to follow.

1. Installation of TPM Kit

2. Enabling TPM

3. Retaining the recovery key/password.

When using drive encryption technologies, such as Microsoft Windows BitLocker Drive Encryption feature, you must enable TPM. For more information, see the Microsoft Web site.

Note	If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.Be careful not to press the POWER Switch.

TPM 2.0 Guidelines

Important	**Always observe the guidelines in this document. Failure to follow these guidelines can cause hardware damage or halt data access.**

When installing or replacing a TPM, observe the following guidelines:

- Do not remove an installed TPM. Once installed, the TPM is bound to the system board. If an OS is configured to use the TPM and it is removed, the OS may go into recovery mode, data loss can occur, or both.

- When installing or replacing hardware, our service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.

- When returning a system board for service replacement, do not remove the TPM from Motherboard. When requested, our service provides a TPM with the spare Motherboard.

- Any attempt to remove the cover of an installed TPM from Motherboard can damage the TPM cover, the TPM, and Motherboard.

- If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

- When using BitLocker, always retain the recovery key/password. The recovery key/password is required to complete Recovery Mode after BitLocker detects a possible compromise of system integrity or system configuration.

- Our company is not liable for blocked data access caused by improper TPM use. For operating instructions, see the TPM documentation or the encryption technology feature documentation provided by the operating system.

Check the position of the TPM installer connector on the figure below.

TPM KIT CONNECTORS
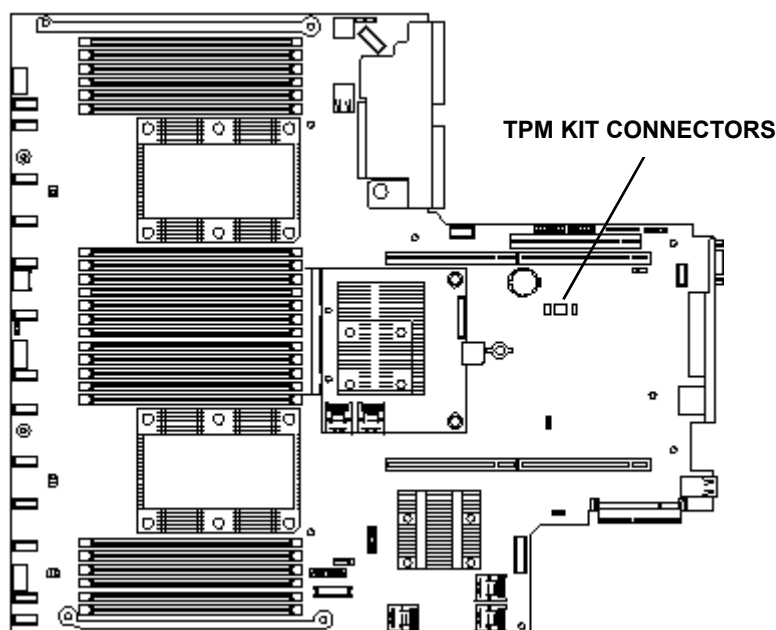
1.6.1 Installing the N8115-35 TPM Kit

Procedure

Important	To reduce the risk of personal injury, electric shock, or damage to the equipment, remove power from the server by removing the power cord. The front panel Power On/Standby button does not shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

Important	To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system

1. Update System ROM
   Please download the latest version from our support center website. For updating System ROM, please follow the instructions on the website.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. If needed, remove any expansion boards installed in slot 3.
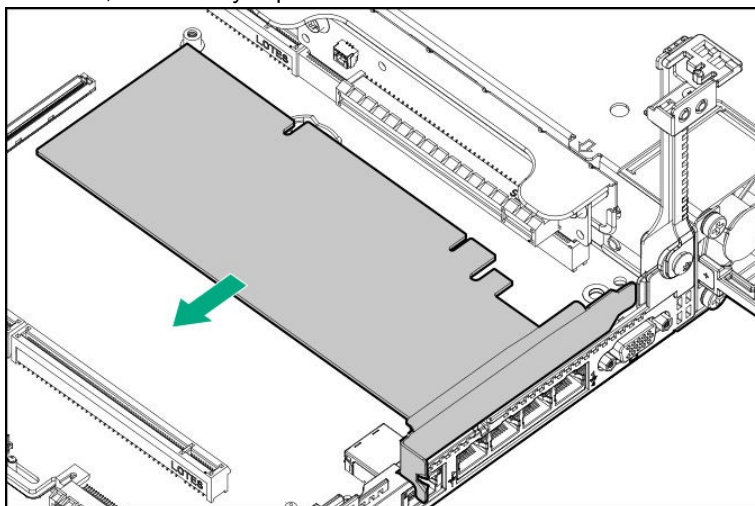
4.   Remove the primary PCI riser cage.

5.   Match the TPM kit with the connector grooves on the motherboard. Press the connector in firmly and install the TPM kit. Please check the location of the TPM connector on the motherboard by looking at the quick reference level attached to the back of the top cover.
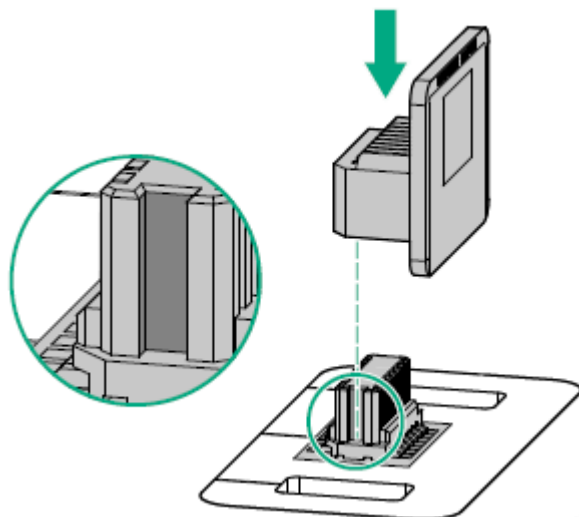
| Note | If you try to remove the already attached TPM from the motherboard you may cause injury to the TPM cover, TPM, and motherboard. If it was installed on a different device, the data (including the key) stored in TPM are deleted when the power is turned on. the TPM that has been removed from the original server and installed on another server. |

6.   Install the TPM cover
   (1)   Align the holes and locking latches on both sides of the TPM connector.
   (2)   Press down the center of the cover firm and straight until you hear a locking sound.
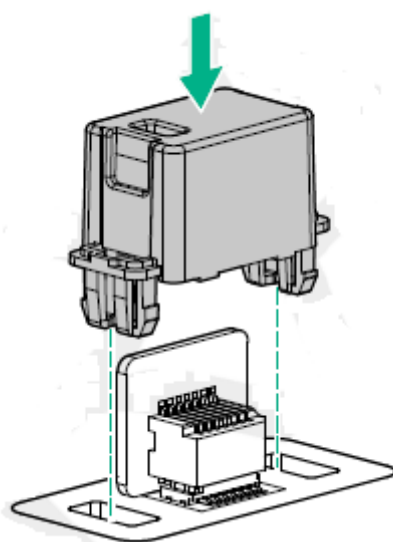
7.   Re-attach the options and cables that were removed in step 3.
8.   See *Chapter 2 (1.28 Installing Top Cover)* to attach the top cover of the server.

| Note | In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays. |

9. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

Important	**TPM Kit once installed cannot be removed.** **Ask your sales representative if you want to remove the TPM kit.**

1.6.2 Enable TPM

This server performs two restarts without any user input. The settings of the TPM Kit become enabled when POST is completed after the restarts. As a result, Microsoft Windows BitLocker and Measured Boot can be performed using the TPM Kit.

When Measured Boot is used, Secure Boot needs to be enabled.

To configure Secure Boot, select **RBSU > Server Security > Secure Boot Settings > Attempt Secure Boot**.

Note	When the TPM Kit is enabled, follow the appropriate steps to perform the following operations. If a wrong operation is performed, data access is blocked. ● Updating the system or optional firmware ● Replacing the system board ● Replacing the hard disk drive ● Changing the OS application TPM Kit settings

If you need detailed information on the update of firmware and the procedure of hardware, refer to the Web Site of NEC Support Center.

For details on how to adjust the TPM Kit used for BitLocker, visit the Microsoft website.

1.6.3 Notes on Windows BitLocker

The recovery key/password is generated during BitLocker setup, and can be saved and printed after BitLocker is enabled. When using BitLocker, always retain the recovery key/password. The recovery key/password is required to enter Recovery Mode after BitLocker detects a possible compromise of system integrity.

To help ensure maximum security, observe the following guidelines when retaining the recovery key/password:

● Always store the recovery key/password in multiple locations.

● Always store copies of the recovery key/password away from the server.

● Do not save the recovery key/password on the encrypted hard drive.

1.6.4 Notes on using the TPM Kit on VMware ESXi

If the version of System ROM is v2.00 and the TPM Kit (N8115-35) is installed, use VMWare ESXi in TPM Mode (*1) of "TPM 2.0".

If TPM Mode is set to "TPM 1.2", PSOD (Purple Screen of Death) may occur in rare cases.

(*1) The factory default is "TPM 2.0".

To check or change the setting of TPM Mode, use the following menu.

• System Utilities > System Configuration > RBSU > Server Security > Trusted Platform

Module Options > Current TPM Type   (to check the setting)

               > TPM Mode Switch Operation   (to check the setting)

1.7 Processor (CPU)

You can configure the multi-processor system by adding an optional processor.

Note	• In order to prevent damage to the processor or system board, please ensure that only an authorized representative conducts replacements and installation of the processor on this server. • In order to prevent server malfunctions or damage to the equipment, for multiprocessor configuration make sure to use a processor with the same product number.

Important	• **To avoid static electricity, see** *Chapter 1 (1.8 Anti-static Measures)* **in Safety Precautions and Regulatory Notices.** • **Make sure to use the CPU authorized by NEC. Installing a third-party CPU may cause a failure of the CPU as well as the motherboard. Repair of the server due to failures or damage resulted from installing such a CPU will be charged.**

Note	• Pins on the motherboard are very fragile and easily damaged. To avoid damaging the motherboard, do not touch the processor or processor socket contact point. • When handling the heat sink always hold along the fin shaft. You may damage the fin by holding it.

Tips	After adding the CPU, Windows may record the event log to System category of Event Viewer, but it is no problem for operation.

1.7.1 Maximum number of processor cores supported by this server

The maximum number of processor cores (logical processors) available on the server depends on the architecture (x86 architecture) and OS specs.

Maximum number of processor cores

OS	The maximum number of logical processors supported by OS	The maximum number of logical processors supported by this server
Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	640 *1	112
Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter	640 *1	112
Microsoft Windows Server 2019 Standard Microsoft Windows Server 2019 Datacenter	640 *1	112
Red Hat Enterprise Linux 7 (x86_64)	384	112
VMware ESXi 6.5	576	112
VMware ESXi 6.7	768	112

*1: When Hyper-V is used, the maximum number of logical processors is as shown below:
- Windows Server 2012 R2: 320
- Windows Server 2016: 512
- Windows Server 2019: 512

1.7.2 Installation

Please prepare the following before installing the option.

- Parts included in the optional processor heat sink kit
- T-30 hexalobular driver

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.
2. Install the processor heatsink assembly:

   ① Locate and align the Pin 1 indicator on the processor carrier and the socket.

Note	Keep the removed protective cover for future use.

   ② Align the processor-heatsink module with the heatsink alignment pins and gently lower it down until it sits evenly on the socket.
   The heatsink alignment pins are keyed. The processor will only install one way.
   Your heatsink may look different than the one shown.
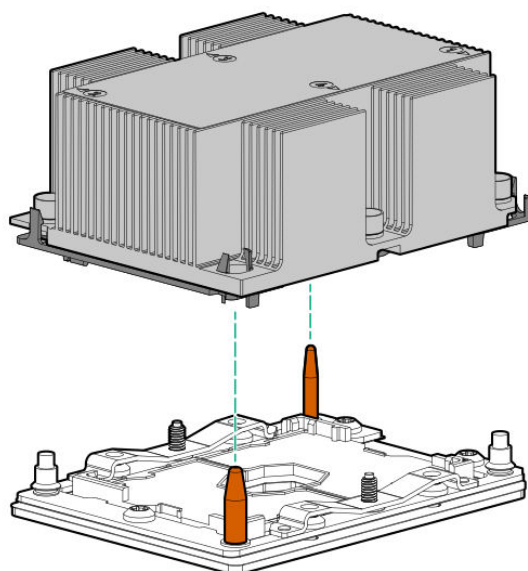
Note	Be sure to tighten each heatsink nut fully in the order indicated. Otherwise, boot failure or intermittent shutdowns might occur.Do not touch the point of contact of the processor.

③ Using a T-30 hexalobular screwdriver, fully tighten each heatsink nut in the order indicated on the heatsink label (1 -2 -3 -4) until it no longer turns.
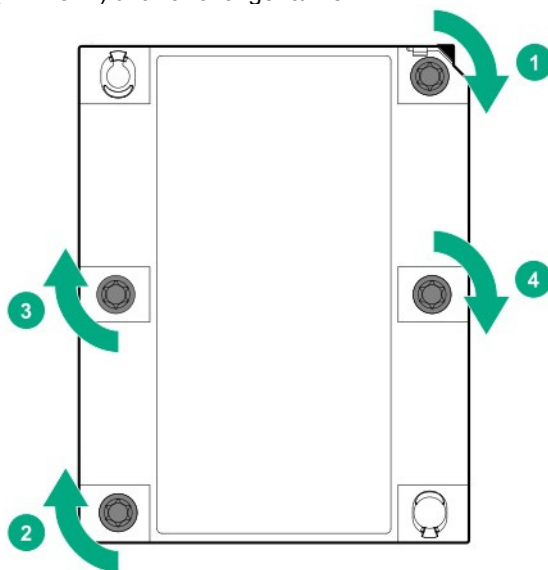
3. If installing a second processor, install fans in bays 1 and 2. These fans are provided with the processor option kit.

4. Make sure that the heat sink is installed on a level with the motherboard.

Note	• If the heat sink is not level, remove it, and then install it again.The following probably causes the heat sink not to be level: – The CPU is not positioned correctly. – All screws are not completely tightened. • Do not move the secured heat sink.

5.   Install an additional fan unit provided with additional CPU kit.

Remove the fan blank cover from the fan bay.
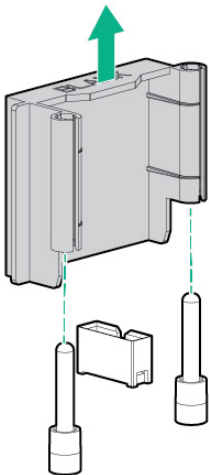
6.   Attach the fan to bay 1 and 2.
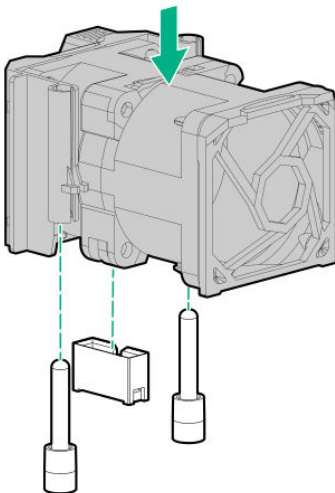
Fan connection conditions are shown in the table below.

Fan bay Configuration	1	2	3	4	5	6	7
1xCPU	Blank cover	Blank cover	Fan	Fan	Fan	Fan	Fan
2xCPU	Fan	Fan	Fan	Fan	Fan	Fan	Fan
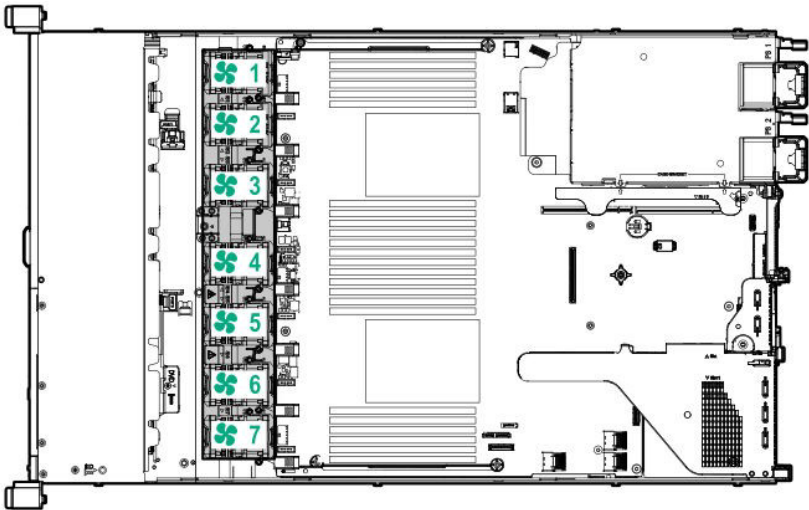
7. See *Chapter 2 (1.28 Installing Top Cover)* to attach the top cover of the server.

Note | In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.7.3 Identifying processor type

The type of processor installed on the server is displayed simply on the POST. To view this information and additional processor specifications follow the directions below

1. Reboot the server.

    The server restarts and the POST screen is displayed.

2. Press **<F9>**.

    System Utility screen appears.

3. Select **System Information > Processor Information**.

    More information about the processors installed on the server appears on the screen.

4. Keep pressing **<ESC>** until the main menu is displayed.

5. Select [OK] to quit the utility and move to boot mode.

Question
Please confirm if you want to exit and resume normal boot or select cancel.

OK   Cancel
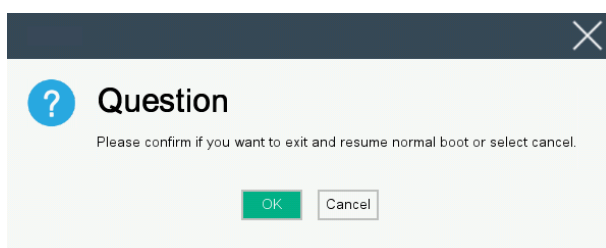
1.7.4 Replacement / Removal

Important | • **Do not remove any CPU unless it is failed.**
• **In case you take off the CPU but do not fit a protection cover or dummy cover, the cooling effect declines and the device may break down.**

To remove CPU, reverse the installation procedure.

Also follow the steps below if the CPU was removed.

1. Mount the protective cover to CPU socket.

2. Remove the additional fan unit.

3. Attach the fan blank cover.

1.8 High-performance fans   N8181-157

1.8.1 Installing the N8181-157 high-performance fan

Note	To prevent damage to the server, confirm that all DIMM latches are locked before installing the fans.

Note	Do not let the server operate for extended lengths of time with the top cover open or removed. When operating under these conditions, poorly controlled airflow and cooling will make it to overheat and cause damage.

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

To install the components, follow these steps.

1.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

Important	**Do not mix standard and high-performance fans in the same server.**

2.   Remove all standard fans from the fan bays.
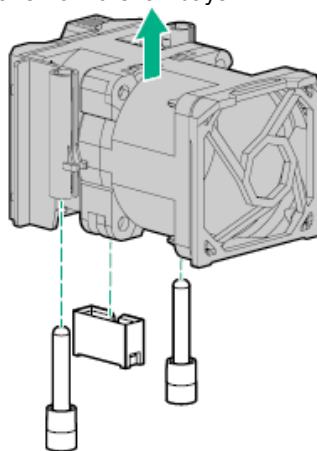
3.   Remove fan blank cover from the fan bay if it has been installed.
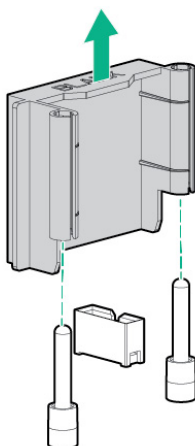
4.   Install high-performance fans in each of the seven fan bays.

If necessary, press the tab and make sure fans are installed safely. At this time please be careful not press anything other than the fan tab area.
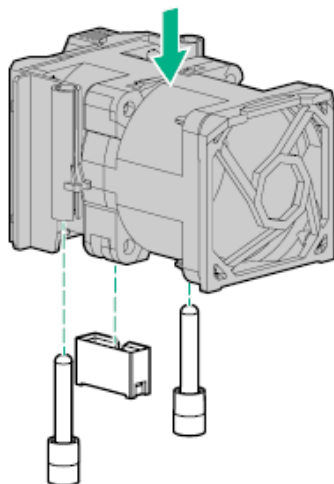
5.   See *Chapter 2 (1.28 Installing Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6.   Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.8.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.8.3 Hot-pluggable fan

Note	To avoid damaging the server parts, the fan blank cover must be installed to the positions of fan 1 and fan 2 in the x1CPU configuration.

Note	To avoid damaging the device, do not run the server over a long period of time if the optimal number of fans are not installed. Although the server may starts up, do not start up the server while the required fans are installed but not operated.

The cooling fan installation configuration is described below.

Fan Bay Configuration	1	2	3	4	5	6	7
1xCPU	Fan Blank Cover	Fan Blank Cover	Fan	Fan	Fan	Fan	Fan
2xCPU	Fan	Fan	Fan	Fan	Fan	Fan	Fan

The server support change of the fan speed. Run the fan at the minimum speed until the temperature rises and the server must be cooled down by increasing the fan speed. The server shuts down under the following conditions related to the temperature.

- If the temperature at the caution level is detected, iLO 5 shuts down during the POST execution and through OS in accordance with the normal procedure. If the server hardware detects the temperature at the critical level before the normal shut-down process starts, the server immediately shuts down.
- If the "Thermal Shutdown" function is set to "Disabled" in "BIOS/Platform Configuration (RBSU)" the iLO 5 does not shut down in accordance with the normal procedure while the temperature at the caution level is detected.
  Even if this function is set to "Disabled", the server hardware immediately shuts down when the temperature at the critical level is detected.

Note	If the high-temperature shutdown function is disabled in the system utility, heat may damage the device parts.

Tips	If NEC ESMPRO ServerAgentService is installed, NEC ESMPRO ServerAgentService executes the high-temperature shutdown. Therefore, set "Thermal Shutdown" to "Disabled".

1.9 High-performance CPU heat sink module N8101-1285

This procedure is illustrated with a standard heat sink as the example. The install method is same for all heat sinks. Before installing, check the parts of processor, heat sink, and plug.

1.9.1 Handling precautions

To prevent personal injury, electrical shock or equipment damage, unplug the power cord and ensure no power is supplied to the server. You cannot turn off the system power supply completely by the power button on the front panel. Until the AC power cord is unplugged, the power supply circuit is still active in some parts of the machine.

1.9.2 Installation

Note	Installing a high-performance heatsink requires the installation of a processor assembly onto the heatsink. To avoid damage to server or components, do not remove or install the processor assembly when installing or replacing other heatsinks.

Please prepare the following before installing the option.
- Parts included in the optional processor heat sink kit
- T-30 hexalobular driver
- 1/4" flat blade screwdriver or nonconductive tool

To install the components, follow these steps.

1.   Please follow the cautions below.

Note	• The processor assembly must be removed and replaced as a unit. Do not remove the processor from the carrier. • When handling the heatsink, always hold it along the top and bottom of the fins. Holding it from the sides can damage the fins. • **THE CONTACTS ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the socket or processor, do not touch the contacts.

Note	• To avoid damage to the mother board and processor please ensure that only licensed staff conduct installation and replacement of the processor. • To prevent server malfunction and damage to the equipment, multiprocessor configuration process the same part numbers.

2.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

Note	• Be sure to loosen each heatsink nut in the order indicated. Otherwise, damage might occur to the heatsink or processor. • Install the processor heatsink assembly as soon as possible after removing it. Do not leave the processor socket unpopulated for extended periods of time.

3. Remove the existing processor heatsink assembly:

(1) Wait for the heat sink to cool.

(2) Use a hexalobular driver to loosen the heat sink screws (4 PCs) in the following order (1→2→3→4).

Note	Contacts on the motherboard are very fragile and easily damaged. To avoid damage to the motherboard, do not touch the processor or processor socket contact.
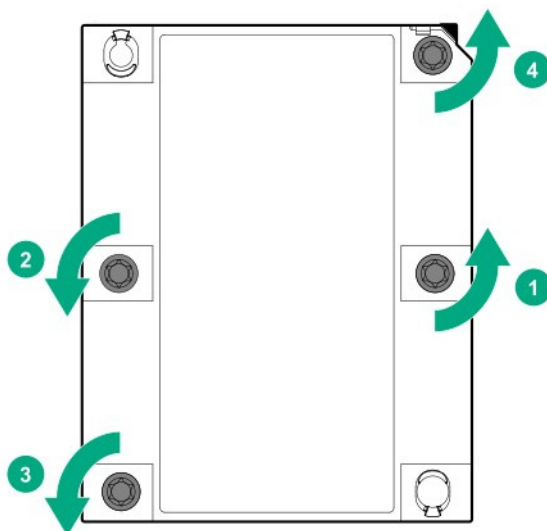
(3) Lift the processor heat sink module up and remove.

(4) Turn over the heat sink module and position the contact surface of the processor at the top.

(5) Install the protective cover on the processor socket.

4. Remove the processor from the heat sink.

(1) Locate the release slot between the processor and heat sink.

Release slot is located on the opposite side of the pin 1 mark.

(2) Insert a 1/4-inch wide flat-blade screwdriver into the release slot.

Note	To avoid damage to the processor, insert the tool between the processor and the heatsink base. The opening in the carrier provides access to a gap between the processor heatsink spreader and the heatsink base.

(3) To release the adhesion of the thermal grease, gently rotate the tool.
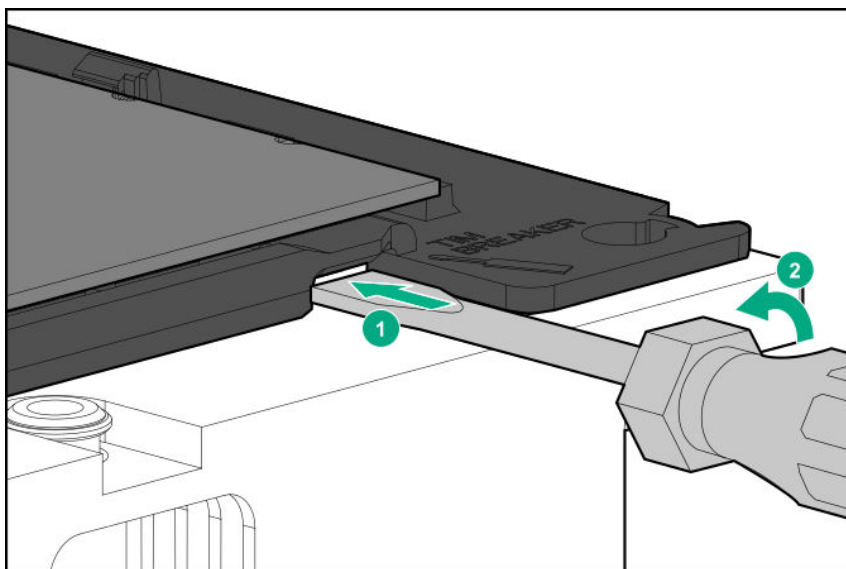
(4)   Unlatch the remaining corners of the processor assembly.

(5)   Separate the processor assembly from the heatsink.

The processor remains attached to the carrier.

5.   Using alcohol, remove thermal grease adhering to the processor.

Before new thermal grease adheres, dry the alcohol.

Note	Do not touch the point of contact of the processor.

6.   Remove the dust cover of the high-performance heat sink.

7.   Align the pin mark 1 on the processor frame with the pin mark 1 on the high performance heat sink, gently press the four corners of the processor frame from the top securing the heat sink latch on the high performance heat sink and attach.

Heat sink latch

Heat sink latch

Pin 1 mark on frame

Pin 1 mark on heat sink
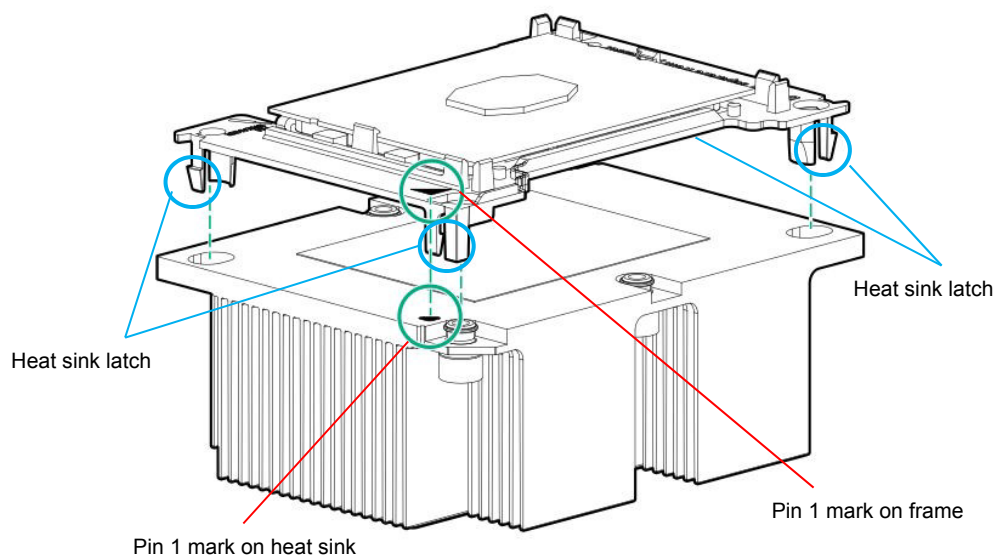
8.   Confirm the location of the processor, remove the processor socket protective cover.

Note	Keep the removed protective cover for future use.

9.   Install the processor heatsink assembly:

    ①   Locate the Pin 1 indicator on the processor carrier and the socket.

    ②   Align the processor heatsink assembly with the heatsink alignment pins and gently lower it down until it sits evenly on the socket. The heatsink alignment pins are keyed. The processor heatsink assembly will only install one way.
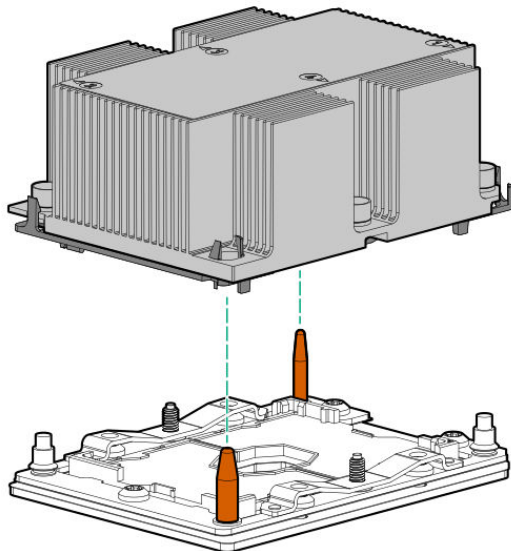
    ③   Using a T-30 hexalobular screwdriver, fully tighten each heatsink nut until it no longer turns.

Note	Be sure to tighten each heatsink nut fully in the order indicated. Otherwise, boot failure or intermittent shutdowns might occur.
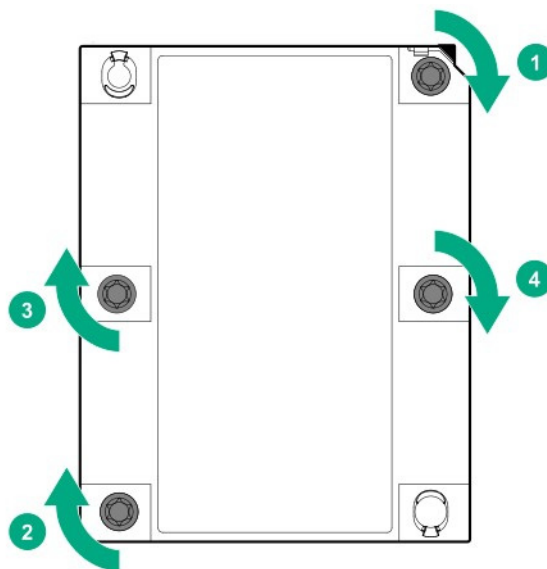
10.   Make sure that the heat sink is installed on a level with the motherboard.

Note	• If the heat sink is not level, remove it, and then install it again.The following probably causes the heat sink not to be level:
	  – The CPU is not positioned correctly.
	  – All screws are not completely tightened.
	• Do not move the secured heat sink.

11. See *Chapter 2 (1.28 Installing Top Cover)* to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

12. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.9.3 Identifying processor type

The type of processor installed on the server is displayed simply on the POST. To view this information and additional processor specifications follow the directions below

1. Reboot the server.

    The server restarts and the POST screen is displayed.

2. Press <F9> key.

    System utility screen appears.

3. Select **System Information** > **Processor Information**.

    More information about the processors installed on the server appears on the screen.

4. Keep pressing <ESC> until the main menu is displayed.

5. The menu below will appear, select "OK" from the system utility and switch to boot mode.

1.9.4 Removal

Important	• Do not remove any CPU unless it is failed. • In case you take off the CPU but do not fit a protection cover or dummy cover, the cooling effect declines and the device may break down.

To remove CPU, reverse the installation procedure.

Also follow the steps below if the CPU was removed.

1. Mount the protective cover to CPU socket.
2. Remove the additional fan unit.
3. Mount the fan blank cover.

1.10 DIMM

Install a Dual Inline Memory Module (DIMM) to a DIMM slot on the motherboard in the server. The motherboard provides 24 slots to install DIMMs.

Important	• **To avoid static electricity, see Chapter 1 (1.8Anti-static Measures) in Safety Precautions and Regulatory Notices.** • **Use only the specified DIMMs. Installing a DIMM from a third party may damage not only the DIMM but the motherboard. You will be charged to repair failures or damages caused by the use of such products even within the warranty period.**

Tips	Up to 3072 GB (128 GB x 24) can be installed in 2-CPU configuration. Up to 1536 GB (128 GB x 12) can be installed in 1-CPU configuration. No DIMM is factory installed in standard configuration.

The memory subsystem in this server supports LRDIMM and RDIMM.

LRDIMM supports a higher density than a single rank or dual-rank. For this reason, you can provide higher system capacity and bandwidth by installing larger capacity DIMM.

For the information corresponding to all the types, all the types are referred to as DIMM. If you specify LRDIMM or RDIMM, the information is applicable only to the type. It is necessary that the type of all of the memory installed on the server is the same.

Important	**This server does not support mix of LRDIMM and RDIMM. If you allow the mix of any combination of these DIMM, there is a possibility that the server stops during POST.**

1.10.1 Maximum supported memory size

The maximum available memory size on the server depends on the architecture and OS specs.
Maximum memory sizes

OS	The maximum memory size supported on each OS	The maximum memory size supported on the server
Microsoft Windows Server 2012 R2 Standard *1 Microsoft Windows Server 2012 R2 Datacenter *1	4TB	3.0TB
Microsoft Windows Server 2016 Standard *1 Microsoft Windows Server 2016 Datacenter *1	24TB	3.0TB
Microsoft Windows Server 2019 Standard *1 Microsoft Windows Server 2019 Datacenter *1	24TB	3.0TB
Red Hat Enterprise Linux 7 (x86_64)	12TB	3.0TB
VMware ESXi 6.5 *2	12TB	3.0TB
VMware ESXi 6.7 *2	16TB	3.0TB

*1: Shown below is the maximum memory size when Hyper-V is used:
    - Windows Server 2012 R2: 4TB
    - Windows Server 2016: Up to 24TB
    - Windows Server 2019: Up to 24TB
*2: Up to 6 TB on virtual machine

1.10.2 DIMM installation order

Note	See Memory RAS features supported by additional memory board in 1.11.3 Memory RAS Feature before using memory RAS feature.

This server's memory subsystem is divided into channels. Each processor supports 6 channels and each channel supports 2 DIMM slots.

Please see the following chart for the location of the slot number.

Front
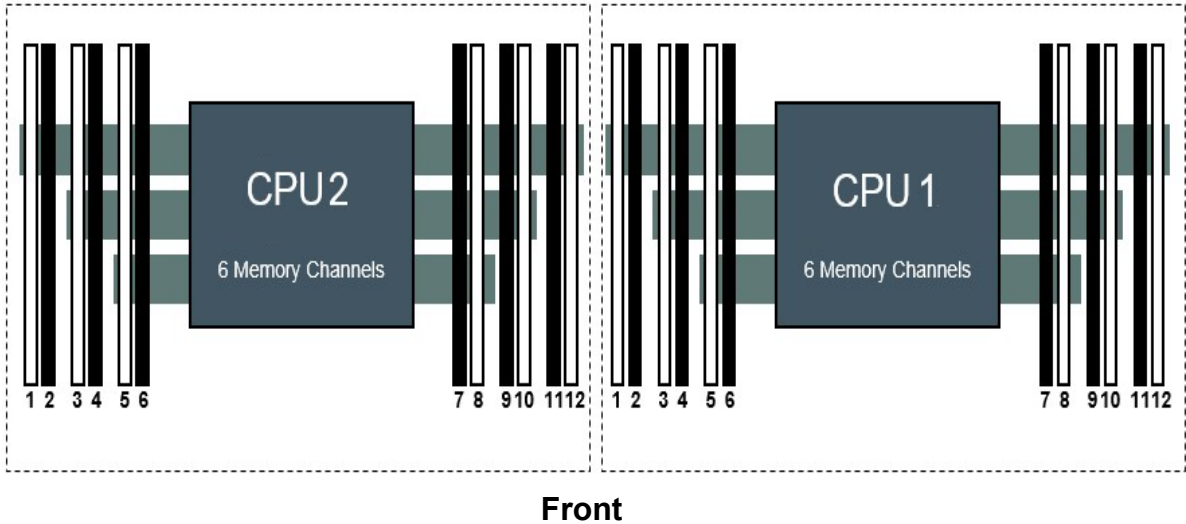
The order of installation may be different on x1CPU (PROC1) configuration and x2 CPU (PROC1, PROC2) configuration.

When only CPU1 is mounted

	DIMM slot number	1	2	3	4	5	6	7	8	9	10	11	12
DIMM Mounted number and installation	**1 DIMM**								1				
	2 DIMM								1		2		
	3 DIMM								1		2		3
	4 DIMM			4		3			1		2		
	5 DIMM			5		4			1		2		3
	6 DIMM	6		5		4			1		2		3
	7 DIMM	6		5		4		7	1		2		3
	8 DIMM			4	8	3	7	5	1	6	2		
	9 DIMM	6		5		4		7	1	8	2	9	3
	10 DIMM	6		5	10	4	9	7	1	8	2		3
	11 DIMM	6		5	11	4	10	7	1	8	2	9	3
	12 DIMM	6	12	5	11	4	10	7	1	8	2	9	3

Important	**If the number of DIMMs mounted is 5, 7, 9, 10, or 11, Information Message 510 is displayed in the "Unbalanced, not recommended" state during POST. This does not require any action.** **510 - The installed number of DIMMs on one or more processors results in an unbalanced memory configuration across memory controllers. This may result in non-optimal memory**

When CPU1 and CPU2 are mounted

DIMM slot number	CPU2 1	2	3	4	5	6	7	8	9	10	11	12	CPU1 1	2	3	4	5	6	7	8	9	10	11	12
2 DIMM								2												1				
3 DIMM								2												1		3		
4 DIMM								2		4										1		3		
5 DIMM								2		4										1		3		5
6 DIMM								2		4		6								1		3		5
7 DIMM								2		4		6			7		5			1		3		
8 DIMM			8		6			2		4					7		5			1		3		
9 DIMM			8		6			2		4					9		7			1		3		5
10 DIMM			10		8			2		4		6			9		7			1		3		5
11 DIMM			10		8			2		4		6	11		9		7			1		3		5
12 DIMM	12		10		8			2		4		6	11		9		7			1		3		5
13 DIMM	12		10		8			2		4		6	11		9		7		13	1		3		5
14 DIMM	12		10		8		14	2		4		6	11		9		7		13	1		3		5
15 DIMM	12		10		8		14	2		4		6		7		15	5	13	9	1	11	3		
16 DIMM			8	16	6	14	10	2	12	4				7		15	5	13	9	1	11	3		
17 DIMM			8	16	6	14	10	2	12	4			11		9		7		13	1	15	3	17	5
18 DIMM	12		10		8		14	2	16	4	18	6	11		9		7		13	1	15	3	17	5
19 DIMM	12		10		8		14	2	16	4	18	6	11		9	19	7	17	13	1	15	3		5
20 DIMM	12		10	20	8	18	14	2	16	4		6	11		9	19	7	17	13	1	15	3		5
21 DIMM	12		10	20	8	18	14	2	16	4		6	11		9	21	7	19	13	1	15	3	17	5
22 DIMM	12		10	22	8	20	14	2	16	4	18	6	11		9	21	7	19	13	1	15	3	17	5
23 DIMM	12		10	22	8	20	14	2	16	4	18	6	11	23	9	21	7	19	13	1	15	3	17	5
24 DIMM	12	24	10	22	8	20	14	2	16	4	18	6	11	23	9	21	7	19	13	1	15	3	17	5

(Left column label, read vertically: DIMM Mounted number and installation order)

Important	If the number of DIMMs mounted is 9, 10, 11, 13, 14, 15, 17, 18, 19, 20, 21, 22, or 23, Information Message 510 is displayed in the "Unbalanced, not recommended" state during POST. This does not require any action. 510 - The installed number of DIMMs on one or more processors results in an unbalanced memory configuration across memory controllers. This may result in non-optimal memory

- Notice for the combination of DIMM

When more than one kinds of DIMM is combined, install them in the order from the following list to the installation order on the above table.

(High priority)　N8102-724 > N8102-723 > N8102-722 > N8102-721 > N8102-720　　(Low priority)

DIMMs cannot be mixed within the server depending on the combination. They can be mixed only in the following combinations.

N Code	N8102- 720	721	722	723	724	725	726
N8102-720, 8GB/R, 1R	✓	✓	✓	✓	✓		
N8102-721, 16GB/R, 1R	✓	✓	✓	✓	✓		
N8102-722, 16GB/R, 2R	✓	✓	✓	✓	✓		
N8102-723, 32GB/R, 2R	✓	✓	✓	✓	✓		
N8102-724, 64GB/R, 2R	✓	✓	✓	✓	✓		
N8102-725, 64GB/LR, 4R						✓	
N8102-726, 128GB/3DS, 8R							✓

✓：Allowed to be install together

1.10.3 **Memory processor compatibility information**

- Memory clock frequency

  Operating frequency of DDR4 memory varies by processor type and memory configuration.

  Please refer to the table below for the actual maximum operating frequency.

CPU brand	Operating frequency driving voltage 1.2 V
Xeon ® Platinum 8200 Series	2933MHz
Xeon ® Gold 6200 Series	
Xeon ® Gold 5222 Processor	
Xeon ® Gold 5200 Series (except Xeon® Gold 5222 processor)	2667MHz
Xeon ® Silver 4200 Series	2400MHz
Xeon ® Bronze 3200 Series	2133MHz

The operation memory speed is decided by rating DIMM speed, DIMM attached on each channel, processor model and speed selected on System Utility.

- The maximum memory capacity

  Maximum memory capacity depends on DIMM capacity, the number of installed DIMM, memory type, and the number of processors installed.

The maximum memory capacity

N code	DIMM type	DIMM rank	Capacity (GB)	1CPU (GB)	2CPU (GB)
N8102-720	RDIMM	Single	8	96	192
N8102-721	RDIMM	Single	16	192	384
N8102-722	RDIMM	Dual	16	192	384
N8102-723	RDIMM	Dual	32	384	768
N8102-724	RDIMM	Dual	64	768	1536
N8102-725	LRDIMM	Quad	64	768	1536
N8102-726	3DS LRDIMM	Octal	128	1536	3072

1.10.4 Checking DIMM

To check out the features of the DIMM, please refer to the label affixed to the DIMM, the following illustrations and tables.
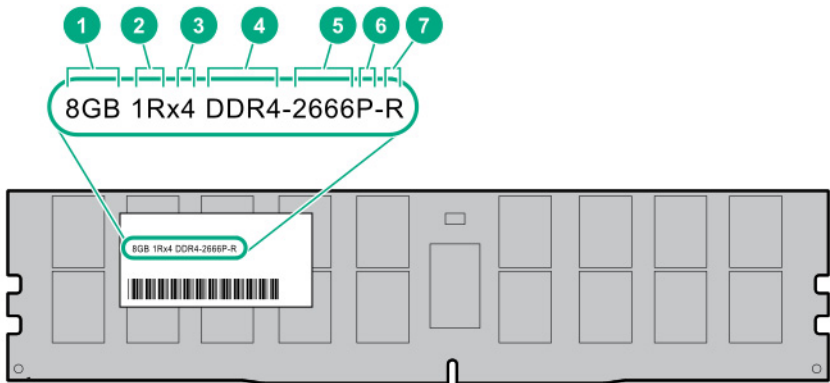
Number	Description	Meaning
1	Capacity	8 GB 16 GB 32 GB 64 GB 128 GB
2	Rank	1R = Single rank 2R = Dual rank 4R = Quad rank 8R = Octal rank
3	DRAM data width	X4 = 4 bit X8 = 8 bit X16 = 16 bit
4	Memory generation	DDR4
5	The maximum speed of the memory	2133 MT/s 2400 MT/s 2666 MT/s 2933 MT/s
6	CAS latency	P = CAS 15-15-15 T = CAS 17-17-17 U = CAS 20-18-18 V = CAS 19-19-19 (for RDIMM, LRDIMM) V = CAS 22-19-19 (for 3DS TSVLRDIMM)
7	DIMM type	R = RDIMM (with register) L = LRDIMM (low loading) E = Unbuffered ECC (UDIMM)

1.10.5 Installation

Follow the steps below to install a DIMM.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Open levers on left and right sides of DIMM slot.

3. Push the DIMM straight into the slot.

   When a DIMM is inserted into the slot, the lever automatically closes.
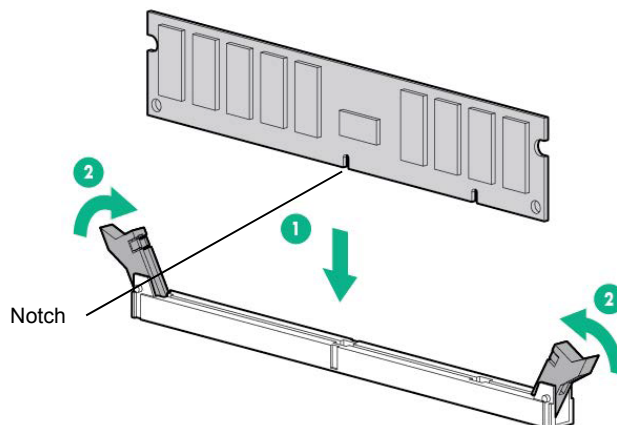
Notch

Important	• **Make sure the orientation of the DIMM. The DIMM has a notch, preventing being incorrectly inserted.**
	• **Do not apply too much pressure when you push a DIMM into the slot. Doing so can damage the socket or terminal part.**

4. Continue to install/remove the internal options.

5. Refer to *Chapter 2 (1.28 Installing Top Cover)* in this manual to replace the top cover.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6. Refer to *Chapter 2* (*2 Installation and Connection*) in this manual to install/connect and turn the power ON.

7. Confirm that no error messages are displayed in POST screen.

   Using RBSU in System Utility, configure the memory mode.

8. Regarding the trouble shooting on a malfunctioning DIMM or the information on LEDs, see (4) Status LED Panel combined LED descriptions.

1.10.6 **Removal / Replacement**

Follow the procedure below to change/ remove DIMM.

To remove DIMM, reverse the installation procedure.

Be sure to install dummy cover to the slots from where DIMMs are removed.

Note	When removing a defective DIMM, check error messages displayed at POST or NEC ESMPRO and check the DIMM socket where the defective DIMM is installed.

Please check if there is no error on POST after replacing/removing DIMM.

1.10.7 **Memory functions**

This server is equipped with the "Advanced ECC function", "Memory ADDDC function", "Memory Mirroring function", and "Memory Sparing function" as memory RAS functions.

The "Advanced ECC function" corrects memory errors to continue operation when errors occur on the same DRAM device on the DIMM.

When the "Memory ADDDC function" is used, the server can correct memory errors to continue operation when errors occur on multiple DRAM devices on the DIMM. This provides more protection against uncorrectable memory errors than provided by Advanced ECC.
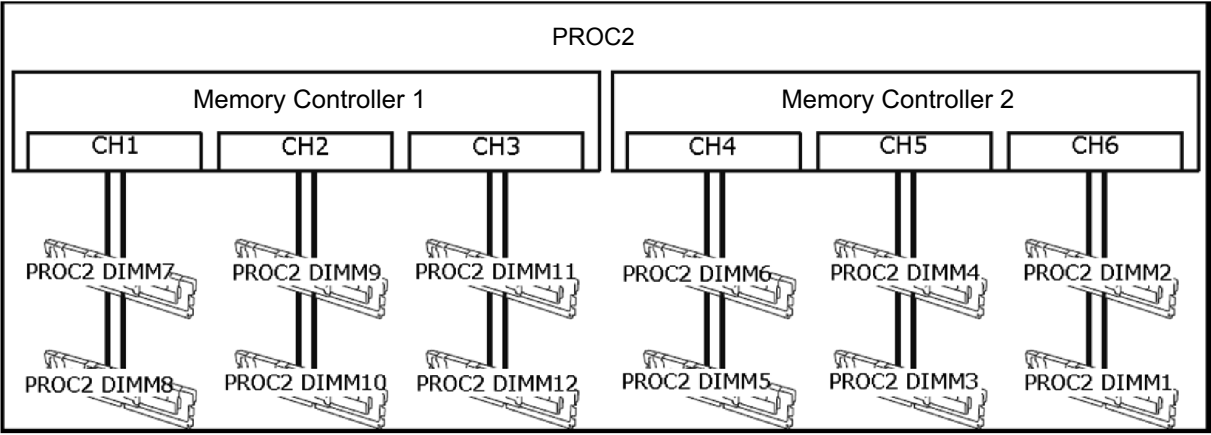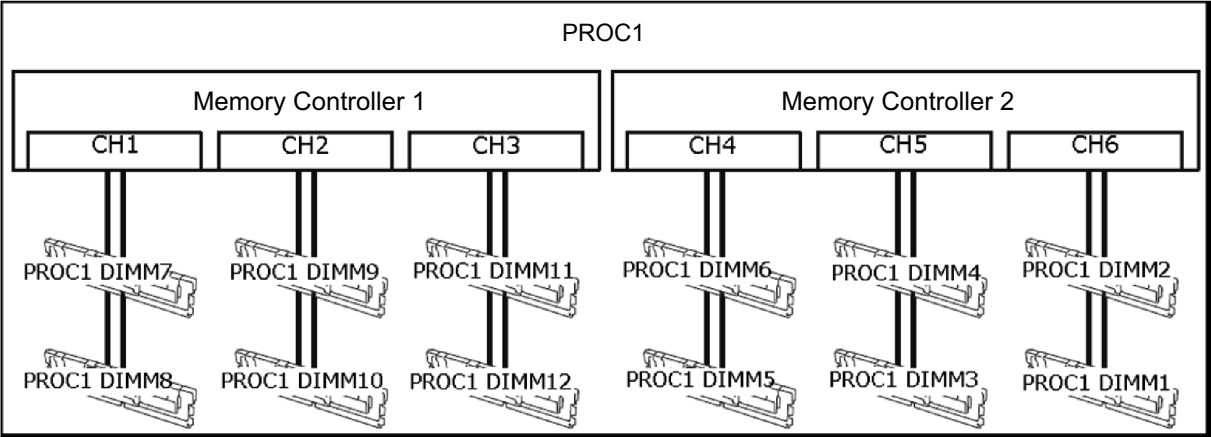
The "Memory Mirroring function" and "Memory Sparing function" create redundancy by monitoring and switching memory between memory channels. These functions are described on the following pages.

Memory RAS functions supported vary depending on the memory installed. Refer to the table below.

N Code	Advance ECC Function	Memory ADDDC Function	Memory Mirroring Function	Memory Sparing Function
N8102-720	✓	-	-	✓
N8102-721	✓ (x4 SDDC)*1	✓	-	✓
N8102-722	✓	-	✓	✓
N8102-723	✓ (x4 SDDC)*1	✓	✓	✓
N8102-724	✓ (x4 SDDC)*1	✓	✓	✓
N8102-725	✓ (x4 SDDC)*1	✓	✓	✓
N8102-726	✓ (x4 SDDC)*1	✓	✓	✓

*1 The Single Device Data Correction (SDDC) function automatically corrects data when one of the memory chips of a DIMM fail.


The mother board of this device has six separate "memory channels" for controlling memory.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                                 PROC1                                     │
│  ┌──────────────────────────────┐  ┌──────────────────────────────────┐  │
│  │      Memory Controller 1     │  │       Memory Controller 2        │  │
│  │  ┌──────┐ ┌──────┐ ┌──────┐  │  │  ┌──────┐ ┌──────┐ ┌──────┐     │  │
│  │  │ CH1  │ │ CH2  │ │ CH3  │  │  │  │ CH4  │ │ CH5  │ │ CH6  │     │  │
│  │  └──────┘ └──────┘ └──────┘  │  │  └──────┘ └──────┘ └──────┘     │  │
│  │                              │  │                                  │  │
│  │  PROC1     PROC1    PROC1    │  │  PROC1    PROC1     PROC1        │  │
│  │  DIMM7     DIMM9    DIMM11   │  │  DIMM6    DIMM4     DIMM2        │  │
│  │                              │  │                                  │  │
│  │  PROC1     PROC1    PROC1    │  │  PROC1    PROC1     PROC1        │  │
│  │  DIMM8     DIMM10   DIMM12   │  │  DIMM5    DIMM3     DIMM1        │  │
│  └──────────────────────────────┘  └──────────────────────────────────┘  │
└─────────────────────────────────────────────────────────────────────────┘

┌─────────────────────────────────────────────────────────────────────────┐
│                                 PROC2                                     │
│  ┌──────────────────────────────┐  ┌──────────────────────────────────┐  │
│  │      Memory Controller 1     │  │       Memory Controller 2        │  │
│  │  ┌──────┐ ┌──────┐ ┌──────┐  │  │  ┌──────┐ ┌──────┐ ┌──────┐     │  │
│  │  │ CH1  │ │ CH2  │ │ CH3  │  │  │  │ CH4  │ │ CH5  │ │ CH6  │     │  │
│  │  └──────┘ └──────┘ └──────┘  │  │  └──────┘ └──────┘ └──────┘     │  │
│  │                              │  │                                  │  │
│  │  PROC2     PROC2    PROC2    │  │  PROC2    PROC2     PROC2        │  │
│  │  DIMM7     DIMM9    DIMM11   │  │  DIMM6    DIMM4     DIMM2        │  │
│  │                              │  │                                  │  │
│  │  PROC2     PROC2    PROC2    │  │  PROC2    PROC2     PROC2        │  │
│  │  DIMM8     DIMM10   DIMM12   │  │  DIMM5    DIMM3     DIMM1        │  │
│  └──────────────────────────────┘  └──────────────────────────────────┘  │
└─────────────────────────────────────────────────────────────────────────┘
```

(1) Memory Mirroring Function

Memory Mirroring Function is a   function to generate redundancy by writing the same data into DIMM group (mirror set) composed of three channels under the same memory controller (channel1, channel 2 and channel 3 or channel 4, channel 5 and channel 6).

Ex: Configuration with 2 CPUs
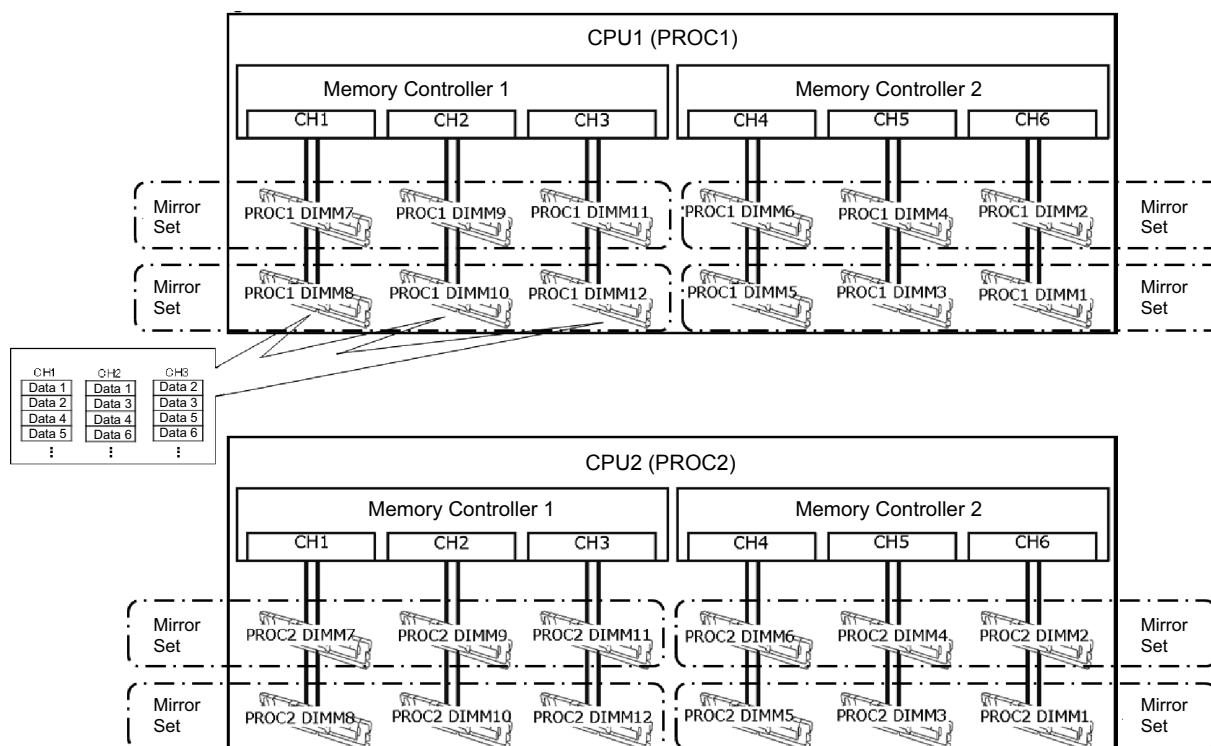
Tips	When Memory Mirroring Function is effective is enabled, one of the following settings can be selected for "Memory Mirroring Mode" ● Full Mirror: Reserves 50% of the total available memory for mirroring. ● Partial Mirror (20% above 4 GB): Reserves approximately 20% of the total available memory above 4 GB for mirroring. ● Partial Mirror (10% above 4 GB): Reserves approximately 10% of the total available memory above 4 GB for mirroring. ● Partial Mirror (Memory below 4 GB): Sets up 2 GB or 3 GB memory below 4 GB for mirroring depending on the memory configuration. ● Partial Mirror (OS Configured): Sets up the system for OS-level partial mirroring.

Important	**Single rank DIMMs do not support the Memory Mirroring function.**

The followings are the conditions to use this function.

● Install 12 DIMMs per CPU.

● Use DIMMs with the same product number for the device.

● Change the following parameters and save them.

From System Utility, set "System Configuration > BIOS/Platform Configuration (RBSU) > Memory Operations > Advanced Memory Protection" to "Mirrored Memory with Advanced ECC Support".

● After rebooting, confirm that "Advanced Memory Protection Mode : Memory Mirroring with Advanced ECC" is displayed in POST.
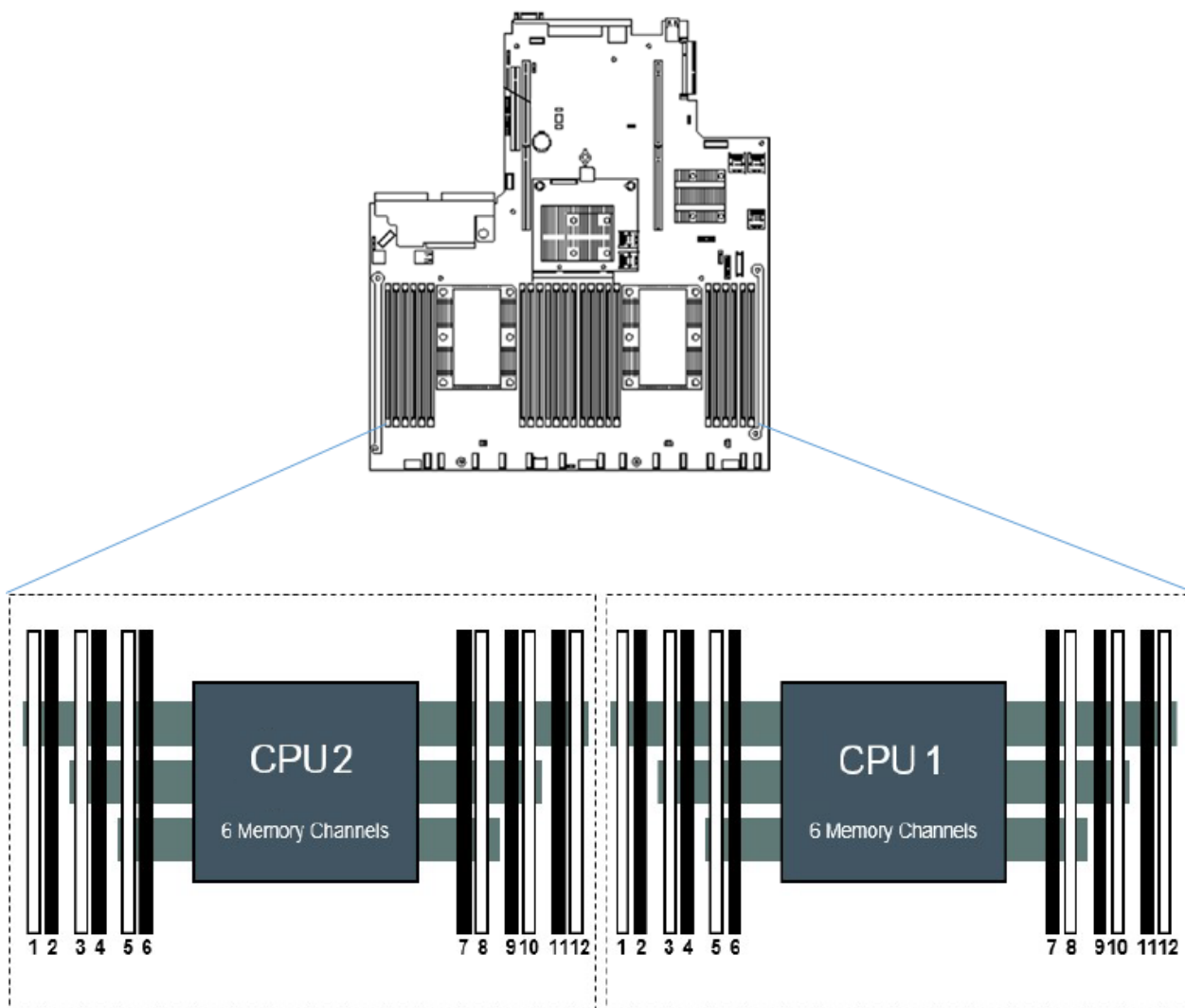
The following mirroring cannot be configured.

● Memory mirroring in the same memory channel

Note	• When using Memory Mirroring Function, install 12 DIMMs per CPU. • Use memories with the same product number for the device. • Partial Mirror supports only Gold5200 series /Gold6200 series /Platinum8200 series of Intel Xeon processor.

Notes for the setting of memory mirroring

Even if "Mirrored Memory with Advanced ECC Support" is set in "Advanced Memory Protection" and Memory Mirroring Configuration is selected, in case DIMM configuration that cannot constitute memory mirroring due to expansion or removal of DIMM is detected, "Advanced Memory Protection" operates as "Advanced ECC" configuration.

In this case,"Advanced ECC Support" is displayed in POST's "Advanced Memory Protection Mode".

IML also records the relevant error events.

Notes for replacements at failure

At the time of failure, identify damaged DIMM(s) from IML and replace DIMM(s) one by one.

(2) Memory Sparing Function

By making a rank of DIMM stored in the memory channel under a memory controller of each CPU stand by as a spare, Memory Sparing Function makes processing continue by making the DIMM standing by perform the task automatically in case a correctable error occurs in a DIMM under the memory channel in operation.

Tips	From the operating system, a size smaller than that is really installed is recognized (it changes depending on the number of DIMM installed and the capacity per one).

For the physical memory capacity available from the operating system, refer to the table below.

The number of CPU	The number of memory	Types of on-board memory						
		8GB (SR)	16GB (SR)	16GB (DR)	32GB (DR)	64GB (DR)	64GB (QR)	128GB (OR)
1	8	32 GB	64 GB	96 GB	192 GB	384 GB	448 GB	768 GB
	12	48 GB	96 GB	144 GB	288 GB	576 GB	672 GB	1152 GB
2	16	64 GB	128 GB	192 GB	384 GB	768 GB	896 GB	1536 GB
	24	96 GB	192 GB	288 GB	576 GB	1152 GB	1344 GB	2304 GB
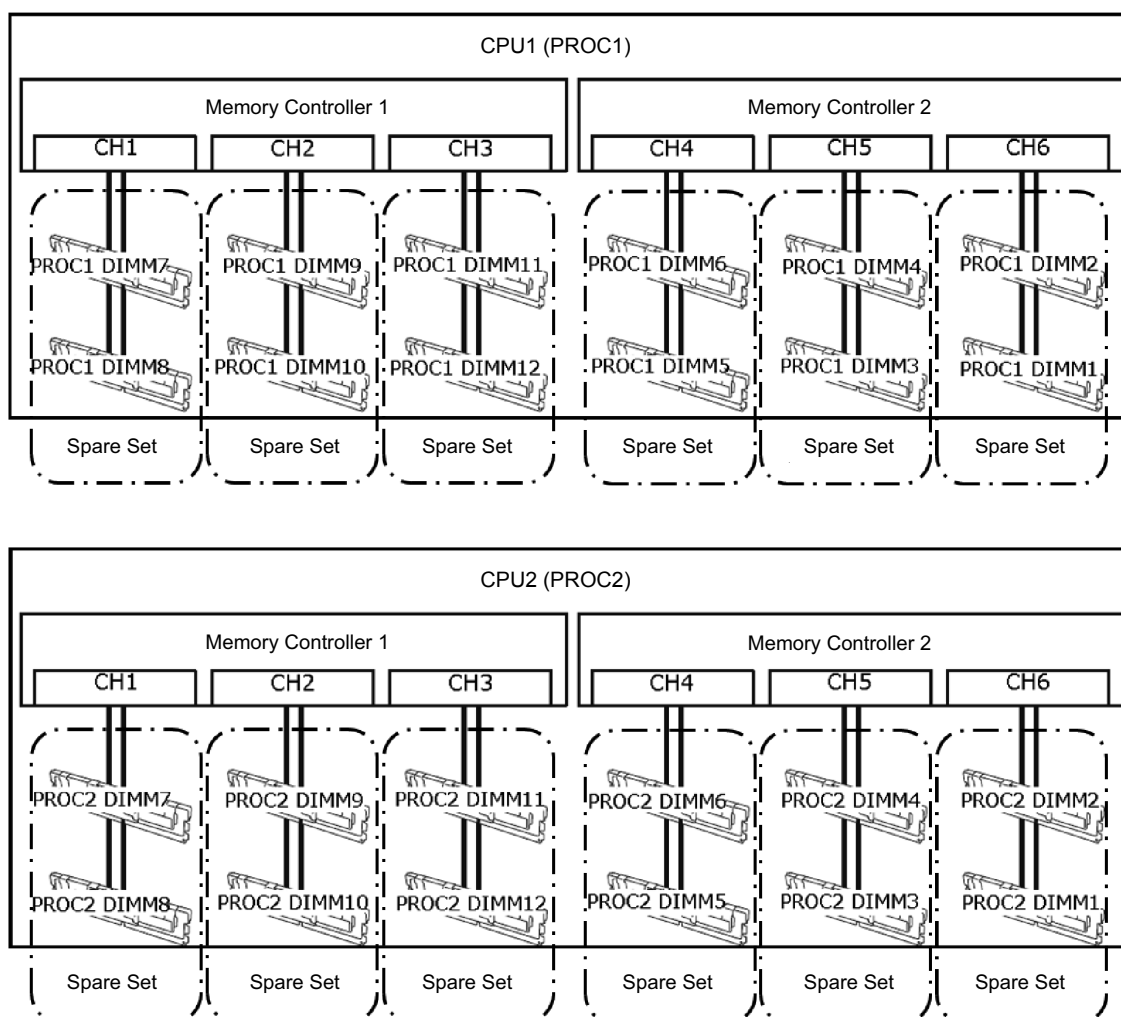
The followings are the conditions to use this function.

● Use DIMMS with the same product number for the device.

● Mount DIMMs in the DIMM socket that constitutes the spare set.

● Change the following parameters and save them.

From System Utility, set "System Configuration > BIOS/Platform Configuration (RBSU) > Memory Oprations > Advanced Memory Protection" to "Online Spare with Advanced ECC Support".

● After rebooting, confirm "Advanced Memory Protection Mode : Online Spare with Advanced ECC" is displayed in POST.

The following memory sparrings cannot be constructed.

● Mounting DIMMs with different product numbers on the spare set

● Memory sparing between different memory channels

Note	• When using Memory Sparing Function, mount 8 or 12 DIMMs per CPU. • Use memories with the same product number for the device.

Notes for the configuration of memory sparing

Even if you set "Advanced Memory Protection" to "Online Spare with Advanced ECC Support" and select memory sparing configuration, in case DIMM configuration which cannot constitute memory sparing due to expansion or removal of DIMM is detected, "Advanced Memory Protection" operates as "Advanced ECC".

In this case,"Advanced ECC Support" is displayed in POST's "Advanced Memory Protection Mode". IML also records the relevant error events.

Notes for replacements at failure

At the time of failure, identify damaged DIMM(s) from IML and replace DIMM(s) one by one.

(3) Fault tolerant memory function (ADDDC)

In case of failures in two chips of more than one memory and chip that are mounted in DIMM, the fault tolerant function (ADDDC) automatically recovers the data and enables the system to continuously run.

Tips	Mount DIMM according to *1.10.2 DIMM installation order*. The operation system recognizes as the same size as the one actually mounted.

The conditions to use this function are described below.

● Change the following parameters and save the settings.

From the System Utilities, select "System Configuration > BIOS/Platform Configuration (RBSU) > Memory Operations to set Advanced Memory Protection to Fault Tolerant Memory (ADDDC)".

● After restarting, check that "Advanced Memory Protection Mode: Fault Tolerant Memory (ADDDC)" appears on POST.

Note	• To use the fault tolerant function (ADDDC), use the x4 DRAM memory. • Mount the memory so that the total number of RANK for each channel is 2 or higher. • When using the memory ADDDC function, install DIMM 8 or DIMM 12 per CPU. • DIMM with the practicable ADDDC function is "N8102-723", "N8102-724", "N8102-725" and "N8102-726". • Please choose identical part number as the memory installed in this server.

Cautions for setting the fault tolerant memory (ADDDC)

When the DIMM configuration supports the fault tolerant memory (ADDDC) and the "Workload Profile" setting is other than "Low Latency" and "Custom", "Advanced Memory Protection" is automatically changed to "Fault Tolerant Memory (ADDDC)".

If the DIMM configuration that cannot allow the fault tolerant (ADDDC) configuration is detected while "Fault Tolerant Memory (ADDDC)" is set to "Advanced Memory Protection" and the fault tolerant (ADDDC) configuration is specified, the "Advanced ECC Support" setting is enabled when "Advanced Memory Protection" runs.

In this case, "Advanced ECC Support" appears in "Advanced Memory Protection Mode:" of POST.

In addition, the related error events are recorded in IML.

Cautions for replacement of DIMM due to a failure

In case of a failure, identify the faulty DIMM from IML, and replace DIMM in a unit of one piece of DIMM.

1.11 Riser Card

This machine has Primary riser card (butterfly riser) which can equip 2 PCI boards (slot 1/2) and Tertiary riser card which can equip 1 PCI board (slot 3) so has high extendability.
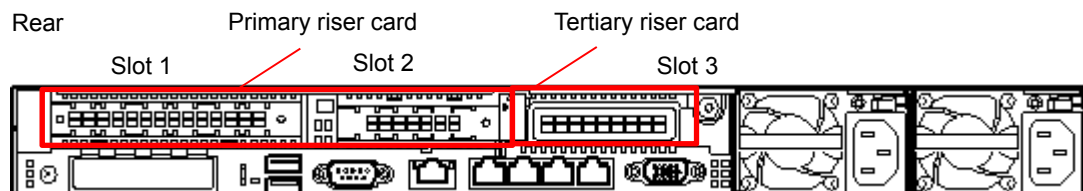
Rear   Primary riser card   Tertiary riser card

Slot 1   Slot 2   Slot 3

Important	**You must avoid static electricity to work with the procedure below. For details, see *Chapter 1 (1.8 Anti-static Measures)* in Safety Precautions and Regulatory Notices.**

1.11.1 Notes

Read the following notes when installing or removing a riser card.

- Do not touch the terminals of the riser cards and the leads of electronic components with your bare hand. Fingerprints and dust left on them cause the server to malfunction due to a connection failure or damage to the leads.

- Available type of PCI card depends on the type of a riser card. Make sure the card type before connecting it to riser card.

1.11.2 Installing primary riser card options N8116-53

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Pick up the both end part of the primary riser card and lift them up to remove.
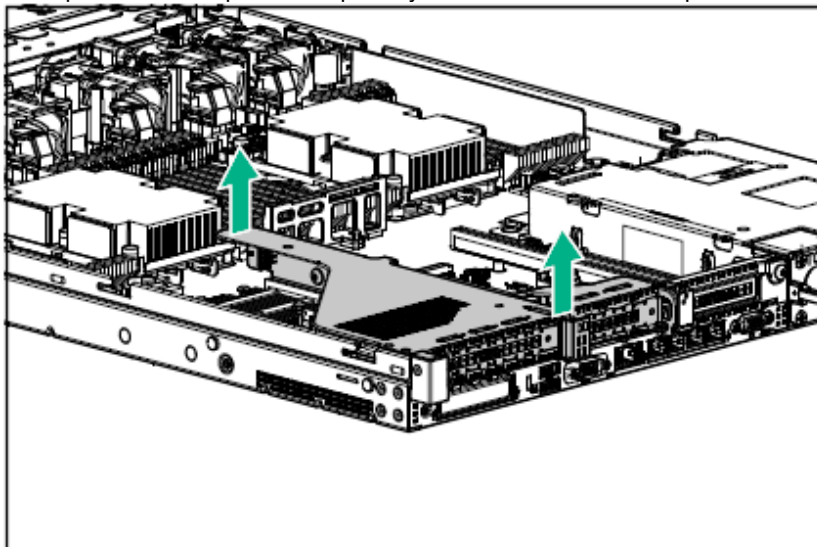
3. Install primary riser card.

   Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.
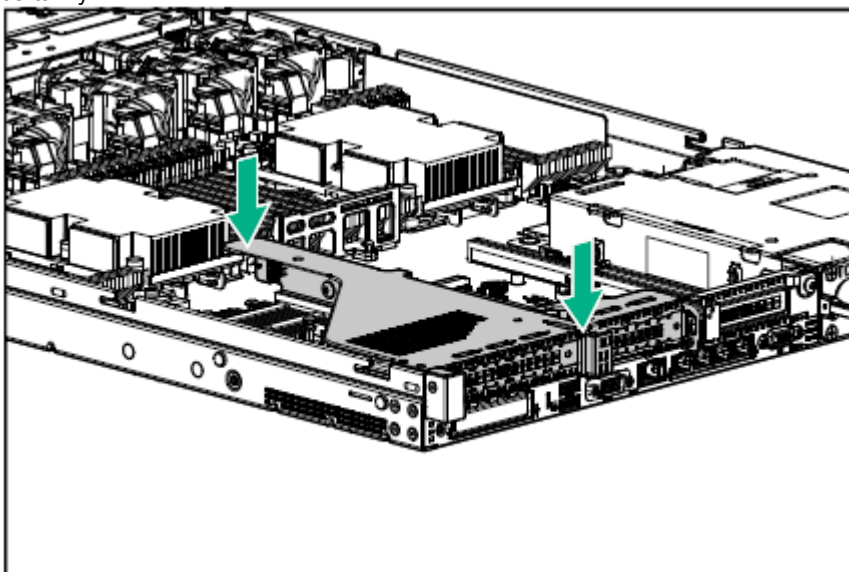
4. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

5. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.11.3 Installing tertiary riser card (low-profile) N8116-55

By fitting this riser card, you can fix a half-length or low profile PCI board.

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.
2. Install optional Tertiary riser card.
   (1) Confirm that positions of Tertiary riser card and the arrow mark on the power cage are correct and keep the riser card as horizontal state.
   (2) In order to connect the edge connector to mother board connector, plug in the Tertiary riser card. Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.
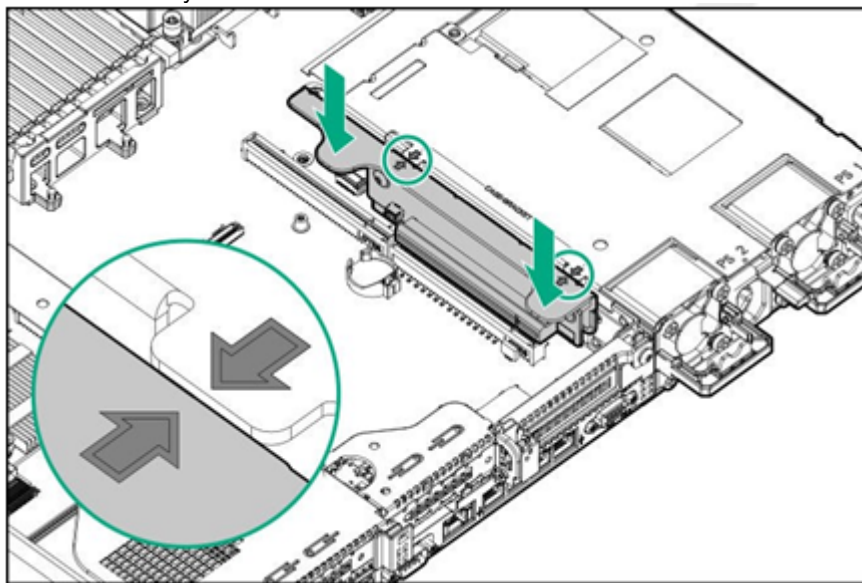
3. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

4. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.11.4 Installing tertiary riser card (full-height) N8116-54

You can fit a full-height/ three-quarter length PCI board on this riser card.

Please prepare the following before installing the option.
- To use this option, CPU 2 is required.

- Parts included in the option kit

- PCI board to be installed

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

|	
Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Pick up the both end part of the primary riser card and lift them up to remove.
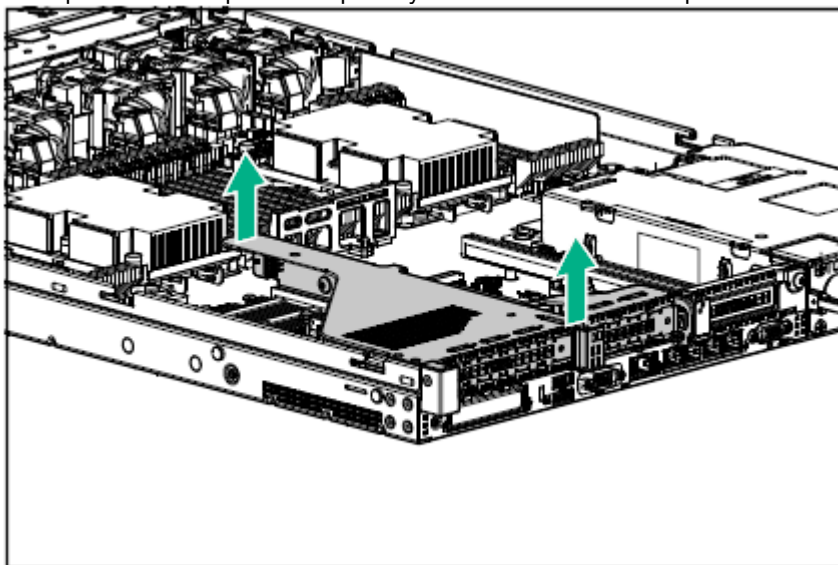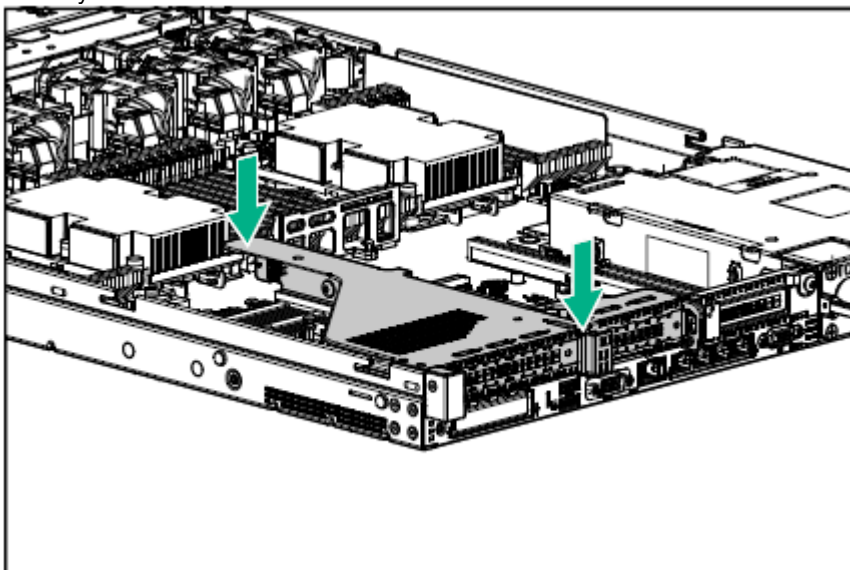
3. From the primary riser card, take off the screws (two) fixing the bracket of Slot2 and take off the bracket.
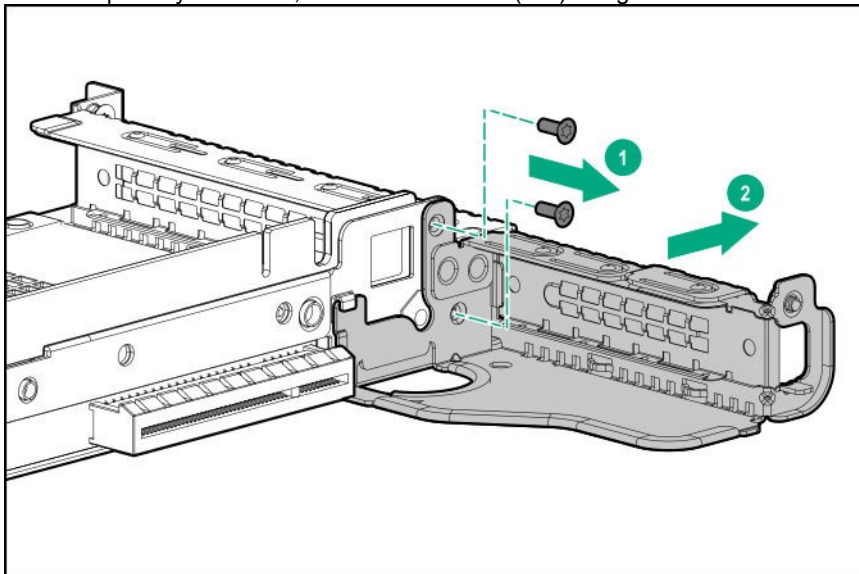
4. In case a low-profile bracket is fixed on it, take the bracket off.
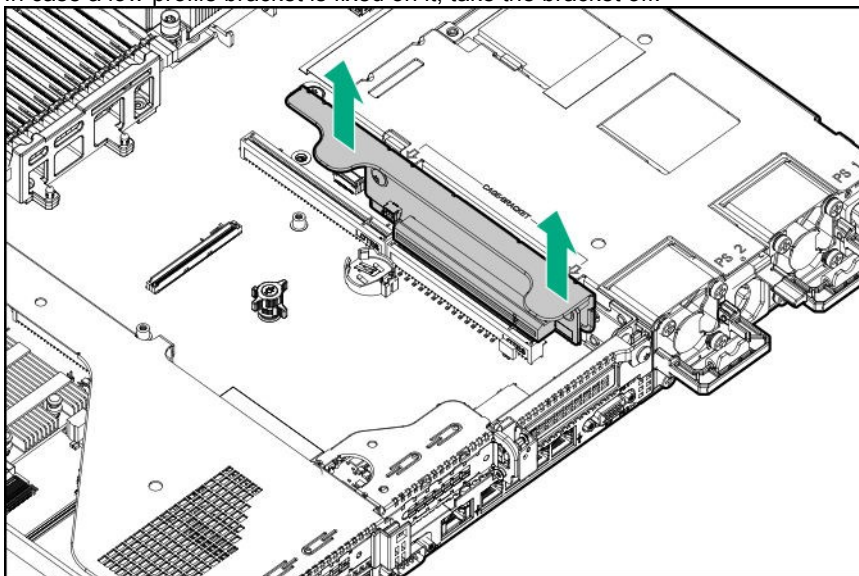
5. Unscrew the screw of Tertiary riser card latch and rift the latch upward to take it off.
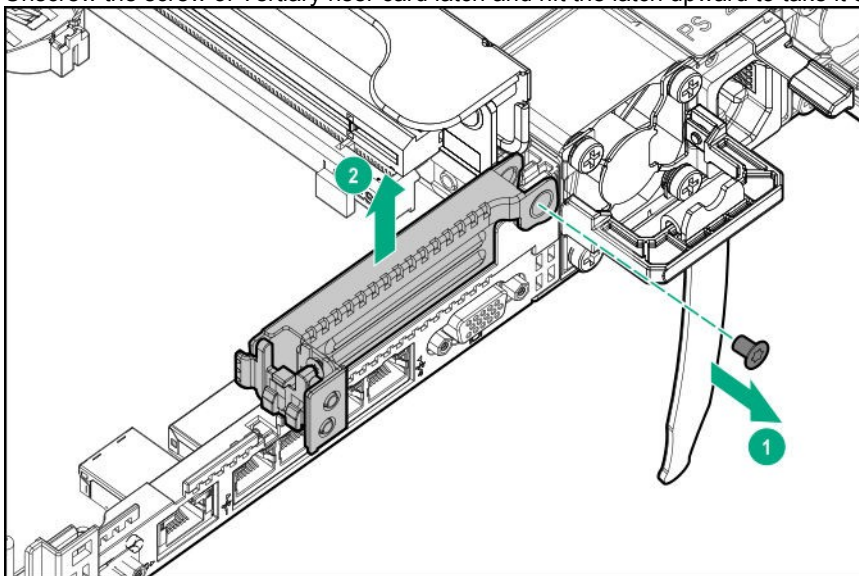
6. Fit a full-height PCIe x16 riser card latch and fix it with a screw.
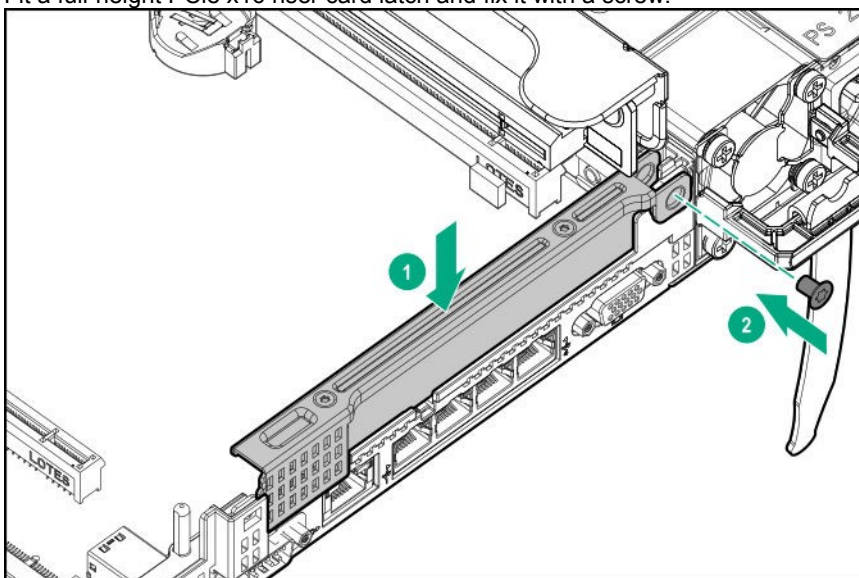
7. Align the terminal of a riser card to the connector, insert the terminal into the connector firmly and then fix the cage.
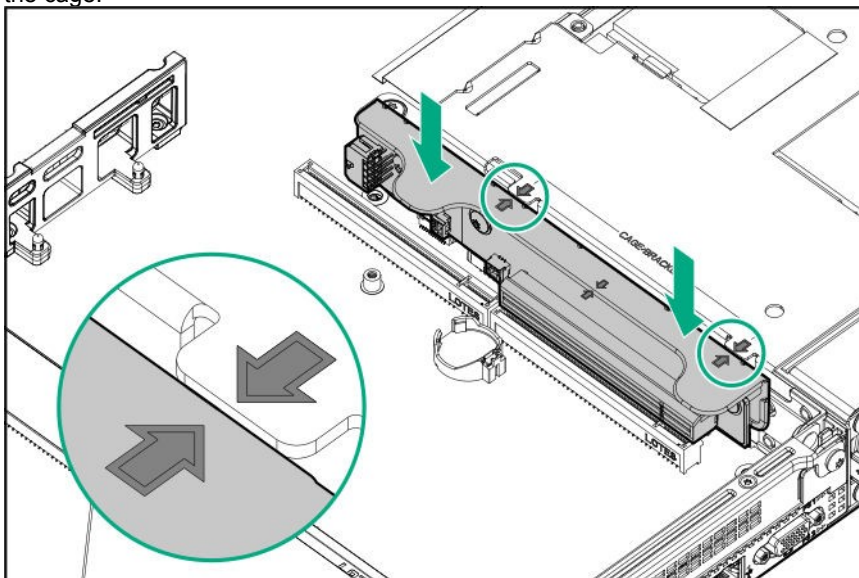
8. See *Chapter 2* (*1.28 Installing Top Cover*) to attach the top cover of the server.

| Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

9. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.11.5 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.12 SATA M.2 SSD

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.

- Parts included in the option kit

- M.2 media (If expanding)

- Phillips screwdriver

1.12.1 Installing SATA M.2 SSD

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Pick up the both end part of the primary riser card and lift them up to remove.
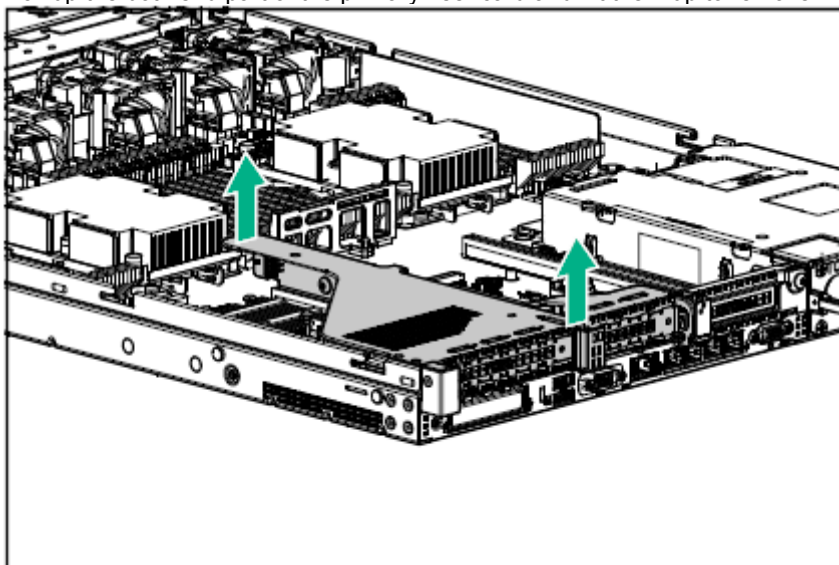

3. Take off the screws fixed on the stand off of riser card.

4. If expanding M.2 media, insert the edge part of M.2 media into the connector to connect and then fix them on with 1 screw.

Screw

M.2 media
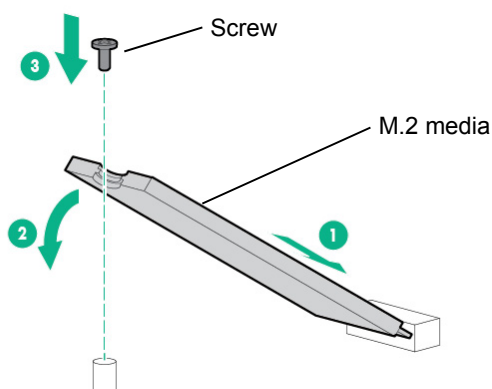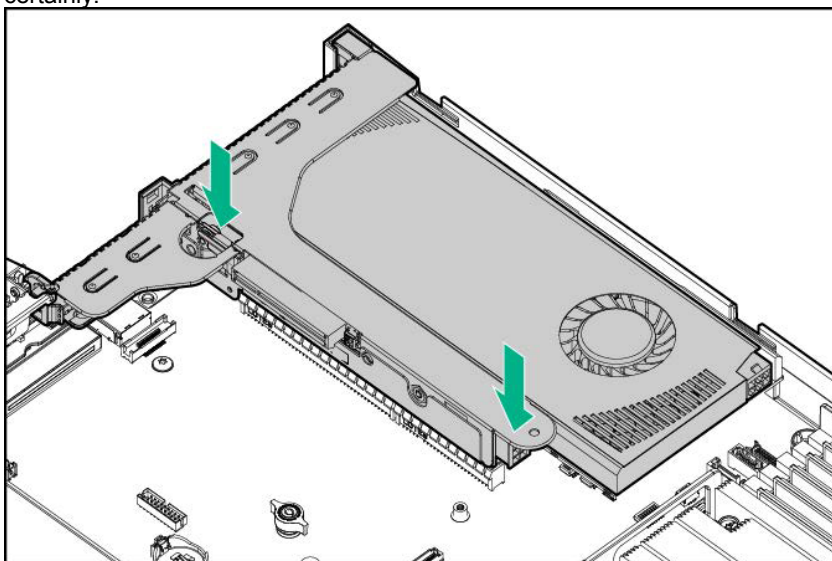
5. Install the primary riser card.

Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.

6. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.12.2 Removal

The procedure for removal is the reverse of installation.

1.13 GPU

This machine can install Primary GPU board (slot 1) or Secondary GPU board (slot 3).

Rear   Primary GPU   Secondary GPU

Slot 1   Slot 2   Slot 3
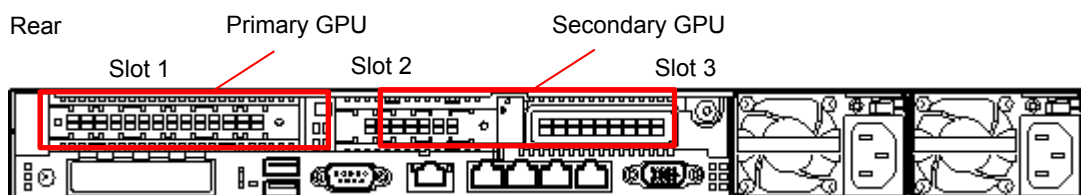
1.13.1 Installing primary GPU and cable options

Please use standard primary riser card to install this GPU option.

Please check if the capacity of power unit is enough before installing this option.

Please prepare the following before installing the option.
- Parts included in the option kit

- Cable

| Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

To install the components, follow these steps.

1.   Create back up data of all data in the server.

2.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3.   Pick up the both end part of the primary riser card and lift them up to remove.
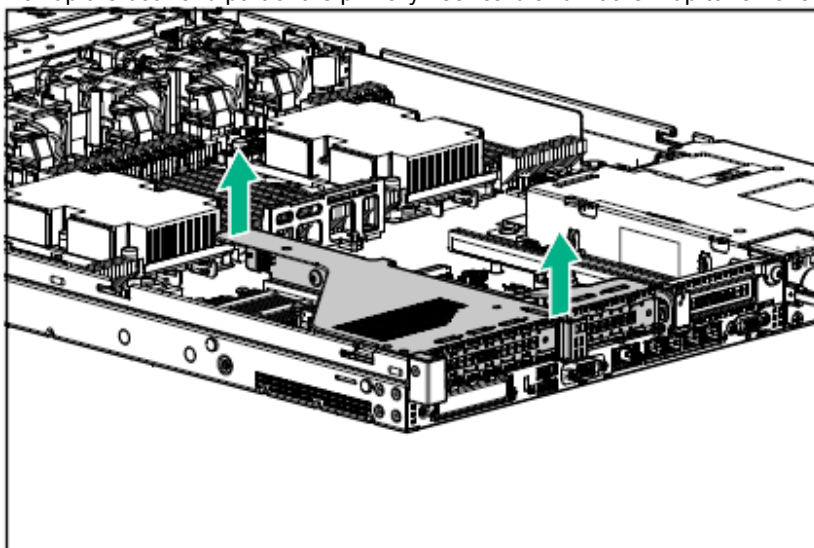
4. Fix GPU on the x16 lane connector of the primary riser card, and in case GPU needs more than 75W of electricity, connect a power cable to GPU and the riser card.
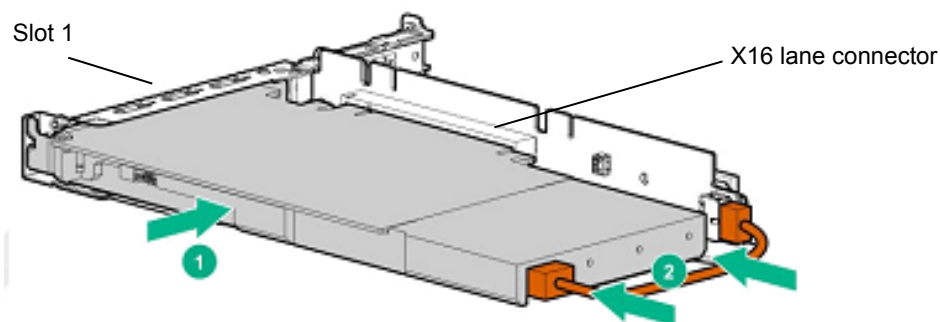
5. Install GPU support bracket.
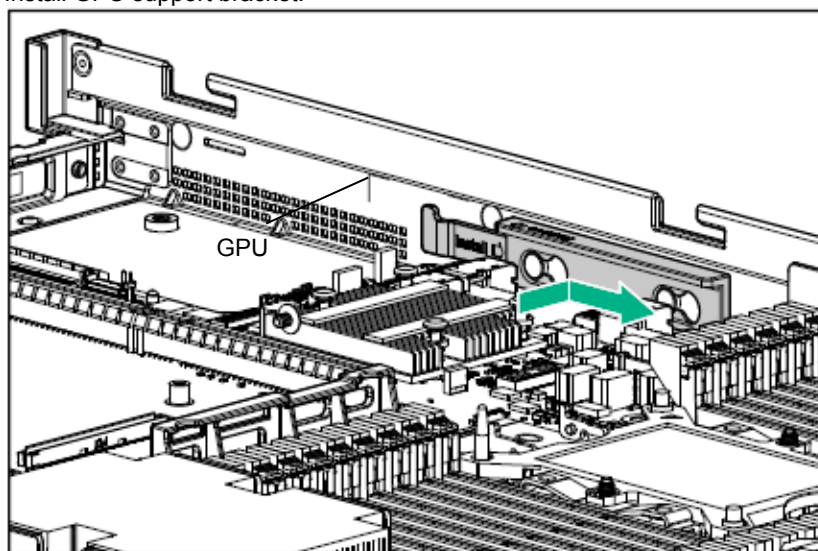
6. Install the primary riser card.

    Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.

7. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.13.2 Installing secondary GPU and cable options

If you intend to mount a three-quarter length GPU option, you should install a low-profile Type-a (AROC) RAID Controller.

Please check if the capacity of power unit is enough before installing this option.

Please prepare the following before installing the option.

*   Parts included in the option kit

*   T-10 hexalobular driver

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. If the secondary riser card is mounted, remove it.
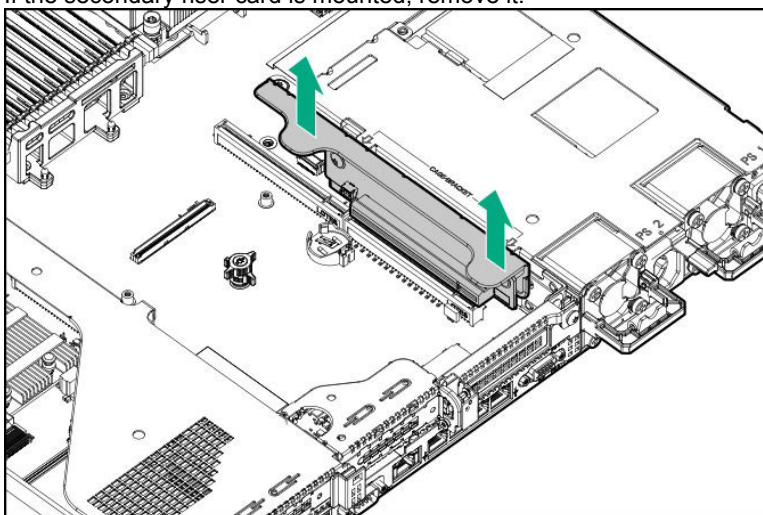
4. If PCI board is mounted on slot-2 riser card, remove PCI board. After that, remove 2 screws on slot-2 and remove cage bracket.
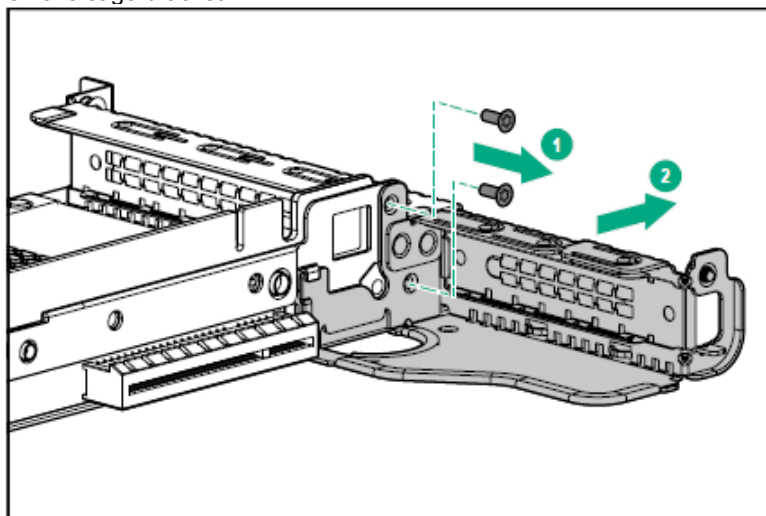

5. Remove the screw which fixes on the riser card latch and lift up the riser card latch to remove.
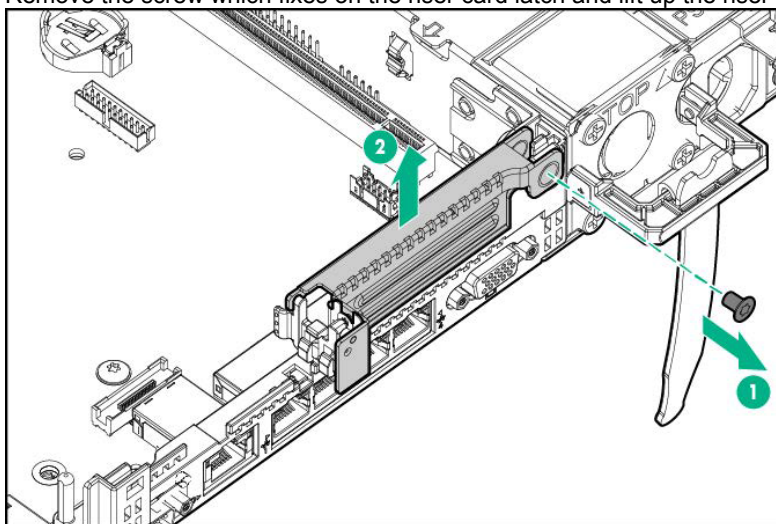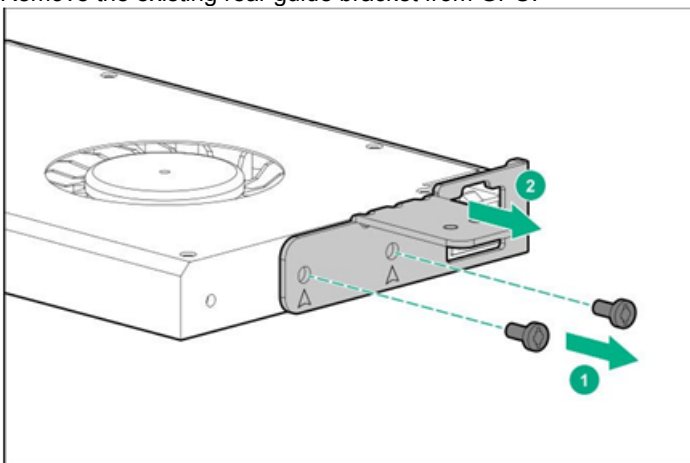

6. Install the full-height PCIe x16 riser card latch and fix it on with the screw which was removed on step.5.
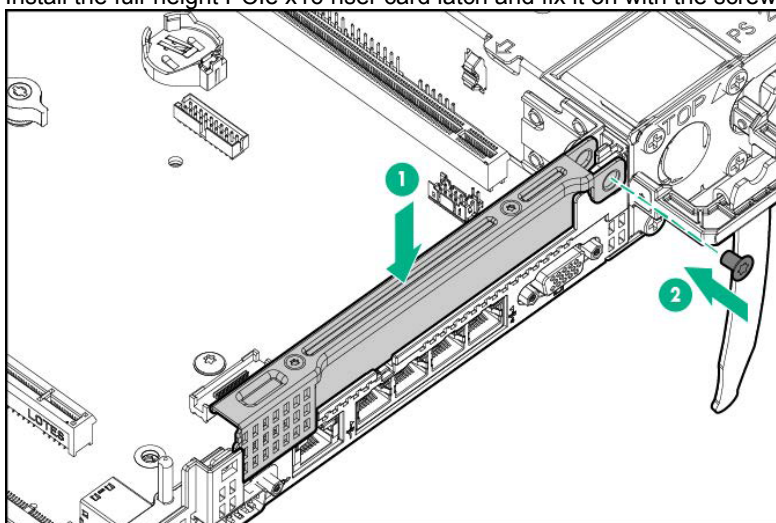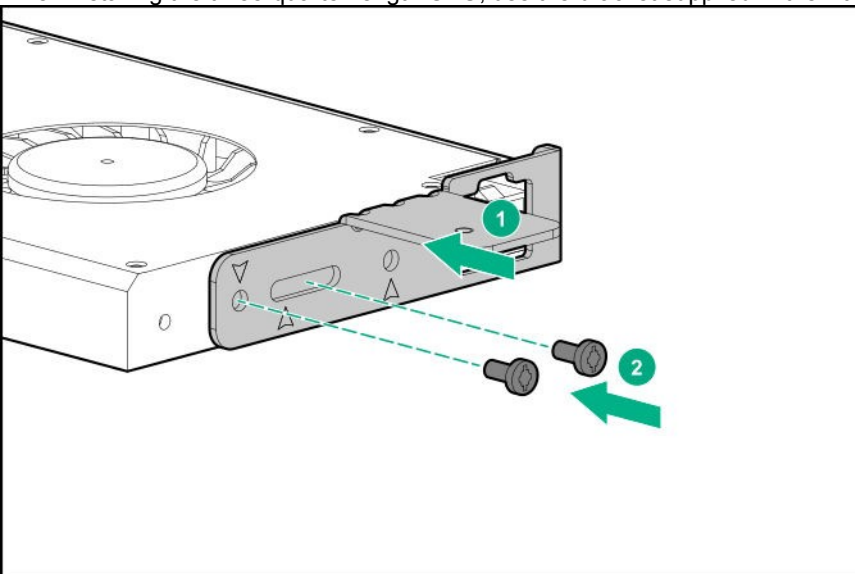
7. Put the PCIe x16 riser card on the position corresponding to the connector on the mother board and insert the riser card. After that, please connect the GPU cable to riser card connector.
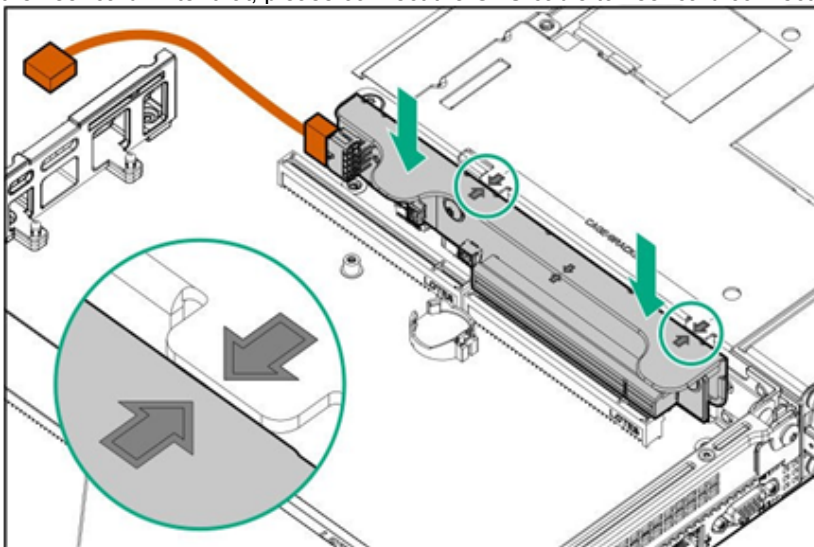
8. Remove the existing rear guide bracket from GPU.

9. When installing the three-quarter length GPU, use the bracket supplied in the kit.

10. Install the GPU card into the riser card, and connect the cable.

    In case a GPU needs more than 75W of electricity, you should use a power cable to connect.
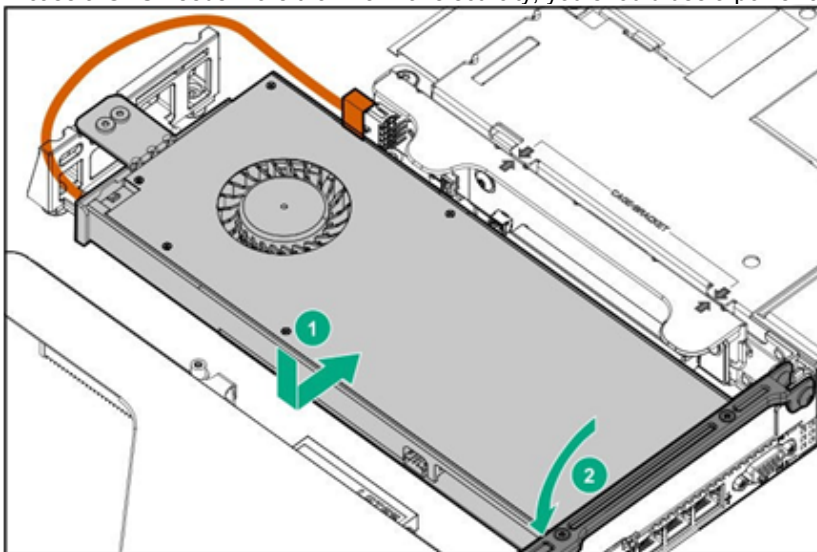
11. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

12. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.13.3 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.14 PCI board

There are 3 places for installing a PCI board. 1 slot dedicated for the LOM card, 1 slot dedicated for the RAID controller, and 1 slot for AROC. The riser card supports 1 full height PCI board, 2 low profile PCI boards, 1 one LOM card in the slot dedicated to the LOM card, and 1 RAID controller in the slot dedicated to the RAID controller. (A total of 5 PCI boards can be mounted).

Important	**You must avoid static electricity to work with the procedure below. For details, see *Chapter 1 (1.8 Anti-static Measures)* in Safety Precautions and Regulatory Notices.**

1.14.1 Notes

Read the following notes when installing or removing a PCI card.
- Do not touch the terminals of the riser cards and the leads of electronic components with your bare hand. Fingerprints and dust left on them cause the server to malfunction due to a connection failure or damage to the leads.

- Available type of PCI card depends on a riser card. Make sure the card type before connecting it to riser card.

1.14.2 Supported PCI cards and available slots

The following tables list supported cards and slots available for them. For details of the features of each card, see the manual supplied with the card.

Tips	If the operation performance of PCI card differs from that of PCI Slot, the PCI card operates at lower frequency.

(1) Standard riser card

Part number	Part name	Riser card name	RAID	FLOM	1st riser card *3 SLOT1	1st riser card *3 SLOT2		3rd riser card *3 SLOT3		Remarks
		CPU connected			CPU1			CPU2		
		PCI standard			PCIe3.0					
		PCI slot performance *1	x8	x8	x16	x8	x16	x16	x16	
		Bandwidth/lane *1			8Gb/s					
		PCI board type *2	—	—	x16	x8	x16	x16	x16	
		Slot size	Dedicated to RAID	Dedicated to LOM	FH	LP	LP	FH	LP	
		Available size			3/4 L	HL	HL	3/4 L*5	HL	
N8103-189	RAID Controller (RAID 0/1) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	
N8103-190	RAID Controller (2GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	Maximum of up to 1 Flash Backup Unit per device
N8103-191	RAID Controller (4GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	Maximum of up to 1 Flash Backup Unit per device
N8103-192	RAID Controller (RAID 0/1) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	
N8103-193	RAID Controller (2GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	Maximum of up to 1 Flash Backup Unit per device
N8103-194	RAID Controller (4GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		O	—	—	—	—	—	—	Maximum of up to 1 Flash Backup Unit per device
N8104-171	Quad Port 1000BASE-T LOM Card [PCI Express 2.0(x8)]		—	O	—	—	—	—	—	
N8104-172	Quad Port 1000BASE-T LOM Card [PCI Express 3.0(x8)]		—	O	—	—	—	—	—	
N8104-173	Quad Port 10GBASE-T LOM Card [PCI Express 3.0(x8)]		—	O	—	—	—	—	—	
N8104-175	Dual Port 10GBASE-T LOM Card [PCI Express 2.0(x8)]		—	O	—	—	—	—	—	
N8104-176	Quad Port 10BASE SFP+ LOM Card [PCI Express 3.0(x1)]		—	O	—	—	—	—	—	
N8104-177	Dual Port 25GBASE SFP28 LOM Card (SFP28/2ch)		—	O	—	—	—	—	—	
N8105-51	GPU Computing Card [PCI Express 3.0(x16)]		—	—	1	—	3	2	—	Up to 1
N8103-201	RAID Controller (2GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Maximum of up to 1 Flash Backup Unit per device
N8103-195	RAID Controller (RAID 0/1) [PCI Express 3.0(x8)]		—	—	1	3		2	2	
N8103-E184	SAS Controller [PCI Express 3.0(x8)]		—	—	1	3		2	2	For external devices (Factory Installation only)
N8103-196	RAID Controller (2GB, RAID 0/1/5/6) [PCI Express 3.0(x8)]		—	—	1	3		2	2	For external device Maximum of up to 1 Flash Backup Unit per device
N8103-197	SAS Controller [PCI Express 3.0(x8)] (2ch)		—	—	1	3		2	2	For external device
N8190-165	Fibre Channel Controller (1ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-163/-164/-171/-172
N8190-166	Fibre Channel Controller (2ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-163/-164/-171/-172
N8190-171	Fibre Channel controller (1ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-165/-166
N8190-172	Fibre Channel controller (2ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-165/-166
N8190-163	Fibre Channel controller (1ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-165/-166
N8190-164	Fibre Channel controller (2ch) [PCI Express 3.0(x8)]		—	—	1	3		2	2	Can't mix with N8190-165/-166
N8104-185	Dual Port 10GBASE SFP+ Adapter [PCI Express 2.0(x8)]		—	—	1	3		2	2	

Part number	Part name	Riser card name	RAID	FLOM	1st riser card *3			3rd riser card *3		Remarks
		Slot number	—	—	SLOT1	SLOT2		SLOT3		
		CPU connected			CPU1			CPU2		
		PCI standard			PCIe3.0					
		PCI slot performance *1	x8	x8	x16	x8	x16	x16	x16	
		Bandwidth/lane *1			8Gb/s					
		PCI board type *2	—	—	x16	x8	x16	x16	x16	
		Slot size	Dedicated to RAID	Dedicated to LOM	FH	LP	LP	FH	LP	
		Available size			3/4 L	HL	HL	3/4 L*5	HL	
N8104-182	Dual Port 10GBASE-T Adapter [PCI Express 2.0(x8)]		—	—	1	3		2	2	
N8104-186	Dual Port 10GBASE SFP+ Adapter [PCI Express 3.0(x8)]		—	—	1	3		2	2	
N8104-184	Dual Port 10GBASE-T Adapter [PCI Express 3.0(x4)]		—	—	1	3		2	2	
N8104-187	Dual Port 10GBASE SFP28 Adapter (SFP28/2ch)		—	—	1	3		2	2	
N8104-183	Dual Port 10GBASE-T Adapter [PCI Express 3.0(x8)]		—	—	1	3		2	2	
N8104-179	Quad Port 1000BASE-T Adapter [PCI Express 2.0(x4)]		—	—	1	3		2	2	Network cables with RJ-45 plug covers cannot be used.
N8104-181	Quad Port 1000BASE-T Adapter [PCI Express 2.0(x4)]		—	—	1	3		2	2	Network cables with RJ-45 plug covers cannot be used.
N8104-178	Dual Port 1000BASE-T Adapter [PCI Express 2.0(x1)]		—	—	1	3		2	2	
N8104-180	Dual Port 1000BASE-T Adapter [PCI Express 2.0(x4)]		—	—	1	3		2	2	Network cables with RJ-45 plug covers cannot be used.

● Installed as standard   ○ Installation Available   — Installation Not Available The numbers stand for the

order of installation.

*1 The data transfer rate of PCI slot is calculated from a transfer band multiplied by the number of lanes.
<Ex.> x8 lanes = 64Gbps (one way)

*2 Shows a connector size. Cards having the number of plugs or lower can be connected.
<Ex.> x8 Plug→ x1card, x4card, or x8card can be installed. x16 card cannot be installed.

- Refer to the technical guide for the detailed feature of each card.
- Various types of riser cards are offered. Depending on the types of riser cards, performance, form and support PCI card of a slot may be different. Check the compatibilities of PCI cards referring to the list of riser cards.
- In case the performances are different between a PCI slot and a PCI board, the device operates on the lower performance.
  - FH: Full height
  - FL: Full length

*3 Refer to the list of riser card slots for slot performance/ slot form of each slot.

*4 Various types of riser cards are offered. Depending on the types of riser cards, performance, form and support PCI card of a slot may be different. Check the compatibilities of PCI cards referring to the list of riser cards.

*5 When low profile types (N8103-192/193/194) are mounted on a type-a controller (AROC) which is installed onto the RAID connector, the controller will be compatible with a three-quarter length. When mounted with standard types (N8103-189/190/191), the controller will be compatible with a half-length.

- For the detailed information on the function of each card, refer to the technical guide.
- The brackets after the part names show the maximum performances of the cards themselves.
- If performances are different between PCI slot and PCI card, the device operates by the lower performance.
- FH: full height, LP: low profile
- 3/4 L: 3/4 length, HL: half length

(2) Riser card list

1st riser card (PCIe3.0)

Part number	SLOT1			SLOT2			Others	
	Slot performance *1	Slot form *2	Slot size	Slot performance*1	Slot form *2	Slot size	M.2 SATA SSD slot	GPU power connector
Standard installation	x16	x16	FH/ 3/4L	x8	x8	LP/ HL	—	Supported
N8116-53	x16	x16	FH/ 3/4L	x16	x16	LP/ HL	2 slots	—

3rd riser card (PCIe3.0) [Option]

Part number	SLOT3			Others	
	Slot performance *1	Slot form *2	Slot size	M.2 SATA SSD slot	GPU power connector
N8116-55	x16	x16	LP/ HL	—	—
N8116-54	x16	x16	FH/ 3/4L*3	—	Supported

*1 The data transfer rate of PCI slot is calculated from a transfer band multiplied by the number of lanes.

<Ex.> x8 lanes = 64Gbps (one way)

*2 Shows a connector size. Cards having the number of plugs or lower can be connected.

<Ex.> x8 Plug→ x1card, x4card, or x8card can be installed. x16 card cannot be installed.

FH: Full height

3/4 L: Three-quarter length

LP: Low profile

HL: Half length

*3 When low profile types (N8103-192/193/194) are mounted on a type-a controller (AROC) which is installed onto the RAID connector, the controller will be compatible with a three-quarter length.

When mounted with standard types (N8103-189/190/191), the controller will be compatible with a half length.

1.14.3 **Installing PCI board in the primary riser slot 1/2**

The primary riser card (butterfly riser card) supports slot 1 (for full height PCI board) and slot 2 (for low profile PCI board).

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare T-10 hexalobular driver before installation.

Follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Pick up the both end part of the primary riser card and lift them up to remove.
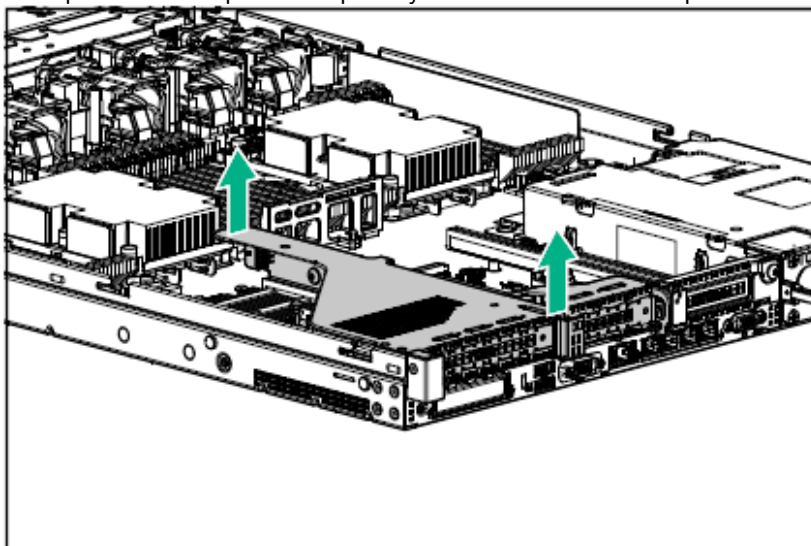
4. See supported PCI boards and mountable slots and confirm the installation location.

5.   Remove the blank cover of the primary riser.

・Slot 1
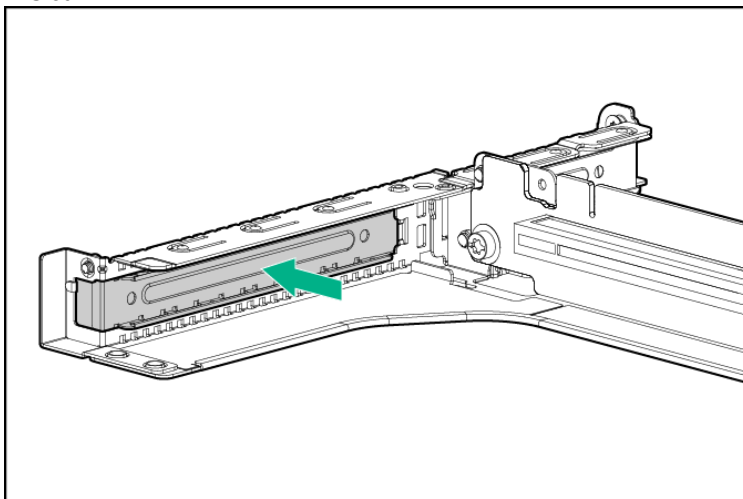
・Slot 2
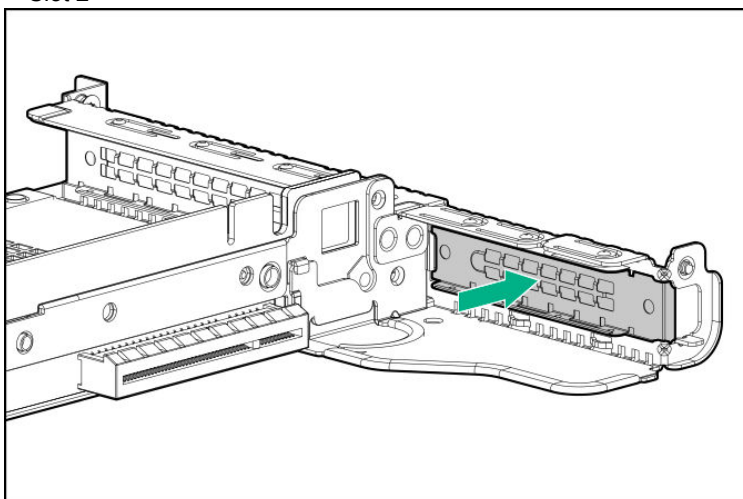
6.   Fit the riser card connector to the PCI board terminal, then insert the terminal into the connector firmly and

fix with a screw.

Important	**Do not touch the terminal part of riser card or PCI card and the signal pins of electric parts installed on the board. Installing boards with dirt or oil can cause malfunction.**

Note	• Make sure that the edge of a PCI card bracket is seated into the fixed slot of the riser card.
	• Depending on type of PCI cards, the terminal part of the PCI card may be too large to fit in the connector.
	• If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure on the card, a PCI card or riser card might break.

7. Connect the required internal and external cables to the PCI board. Refer to the documentation that came with the PCI board.

| Tips | To connect a PCI card to the connector on motherboard with cable, connect a cable to PCI card before installing riser card unit. |

8. Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.

9. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

| Note | In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays. |

10. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.14.4 Installing a PCI board into the Tertiary riser card Slot3

This server supports Slot 3 (low-profile PCI board enabled) by the Tertiary Riser card.

Important	When installing a PCI card, make sure the connector of the card fits the connector of the riser card.

Note	Check the card type (Low Profile or Full Height) which respective riser card supports and the type of PCI card to be installed.

Please prepare T-10 hexalobular driver before installation.

See supported PCI boards and mountable slots and confirm the installation location and PCI boards.

To install PCI board, follow these steps.

1. Back up all data in the server.
2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.
3. Lift up the bracket of slot3 on the Tertiary riser card.

・Low profile

(1) Lift up the low-profile bracket in Slot 3 of riser card.
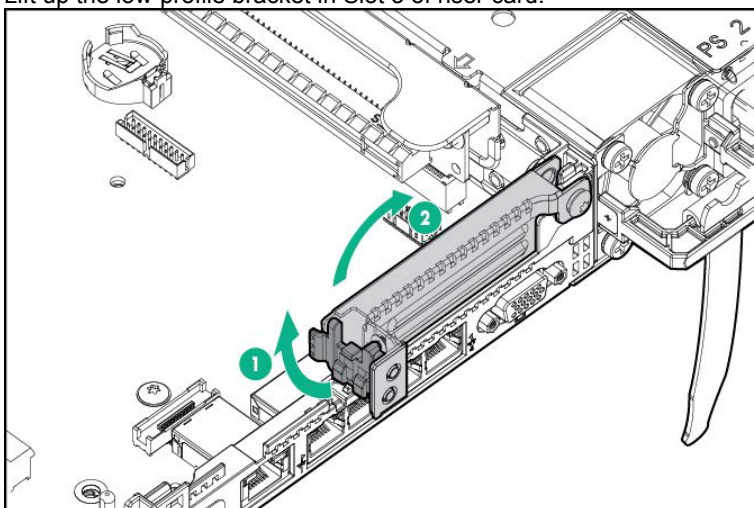
(2) Take off the screw and remove the blank cover.
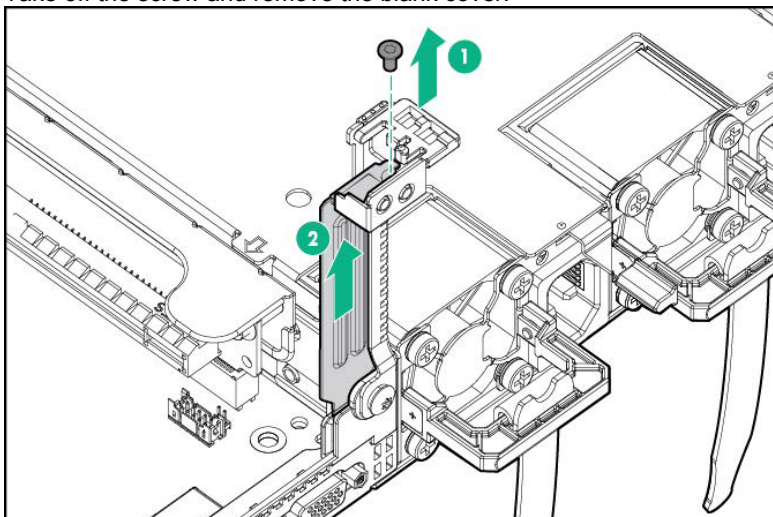
・Full height

Lift up the full-height bracket in Slot 3 of riser card. Take off the two screws and remove the blank cover.
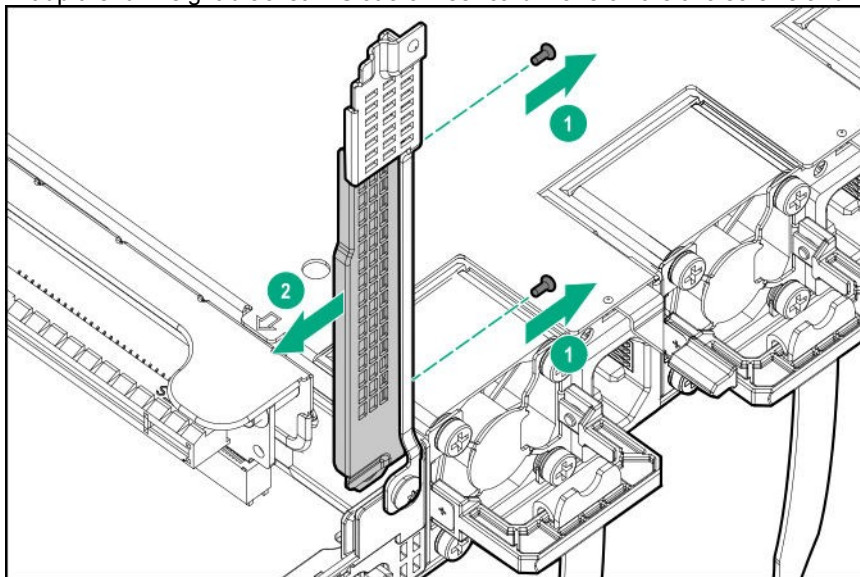
Note	Keep each removed blank covers.

4. Insert PCI board into the riser connector, lower the bracket and return and fix the latch.
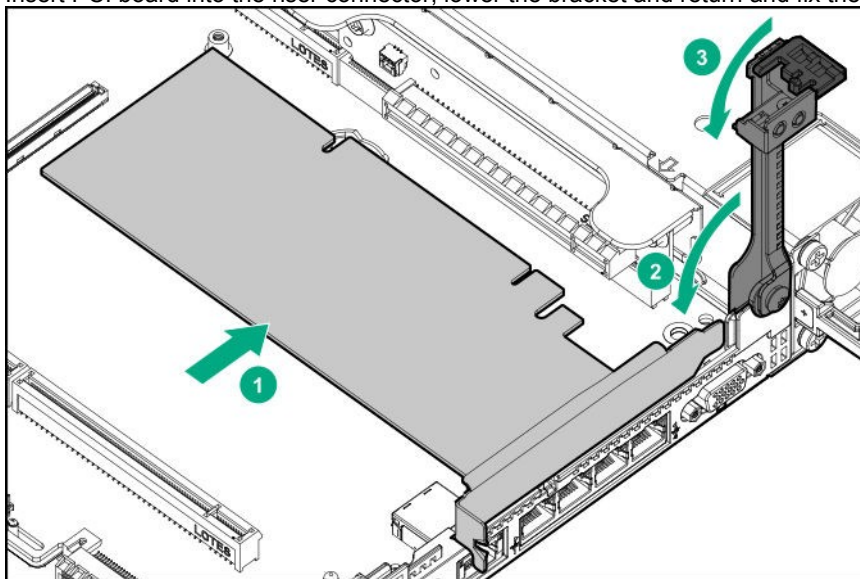
Important	**Do not touch the terminal part of riser card or PCI card and the signal pins of electric parts installed on the board. Installing boards with dirt or oil can cause malfunction.**

Note	• Make sure that the edge of a PCI card bracket is seated into the fixed slot of the riser card.
	• Depending on type of PCI cards, the terminal part of the PCI card may be too large to fit in the connector.
	• If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure on the card, a PCI card or riser card might break.

5.   Connect the required internal and external cables to the PCI board. Refer to the documentation that came with the PCI board.

Tips	To connect a PCI card to the connector on motherboard with cable, connect a cable to PCI card before installing riser card unit.

6.   See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7.   Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.14.5 **Removal**

To remove a PCI card, reverse the installation procedure.

If using the server with the PCI card removed, attach the blank cover that comes with the riser card unit.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.15 RAID controller (PCI Board Type-p)

RAID controller (PCI Board Type-p) is supported.

RAID controller N8103-195/196/201 are provided.

See the table1.14.2 Supported PCI cards and available slots (1) Standard riser card for performance features.

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.15.1 Installing RAID Controller

Please prepare the following before installing the option.
- Parts included in the option kit

- T-15 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Pick up the both end part of the primary riser card and lift them up to remove.
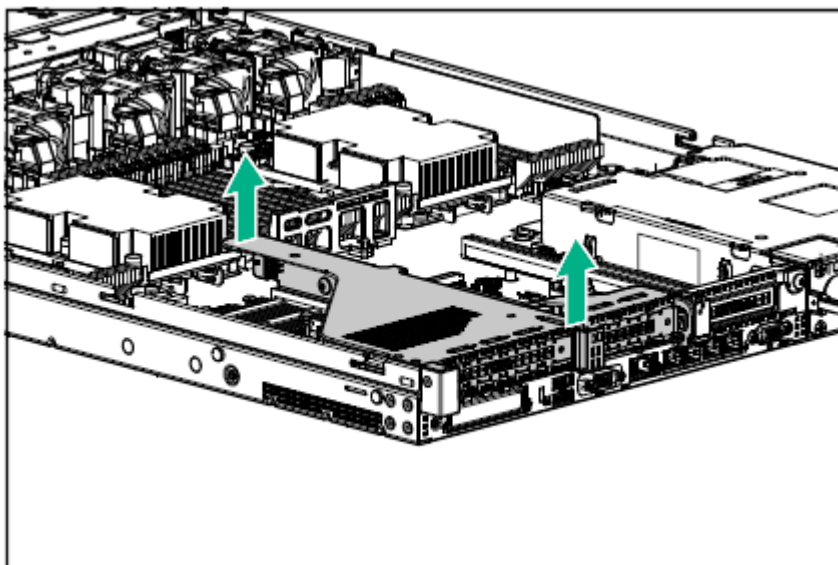
4. Remove the blank cover of Slot 1 or Slot 2. Controller Board can be fit into Slot 1 or Slot 2.
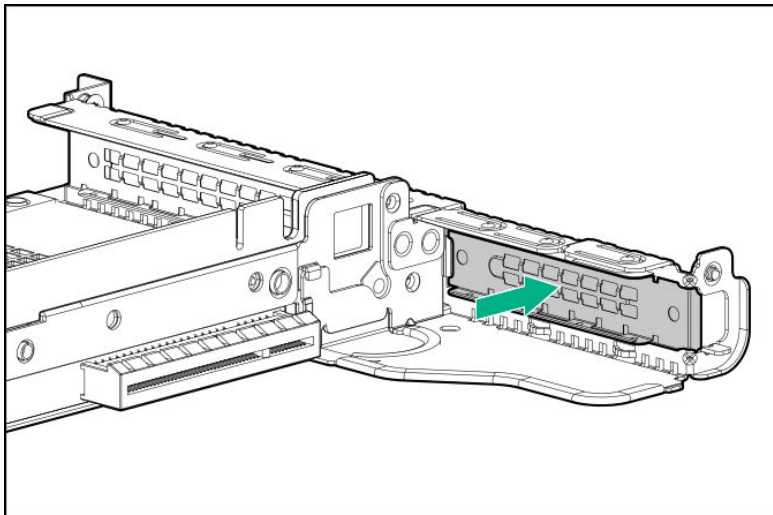
5. Fit the riser card connector of the slot to the PCI board terminal, then insert the terminal into the connector firmly and fix with a screw.
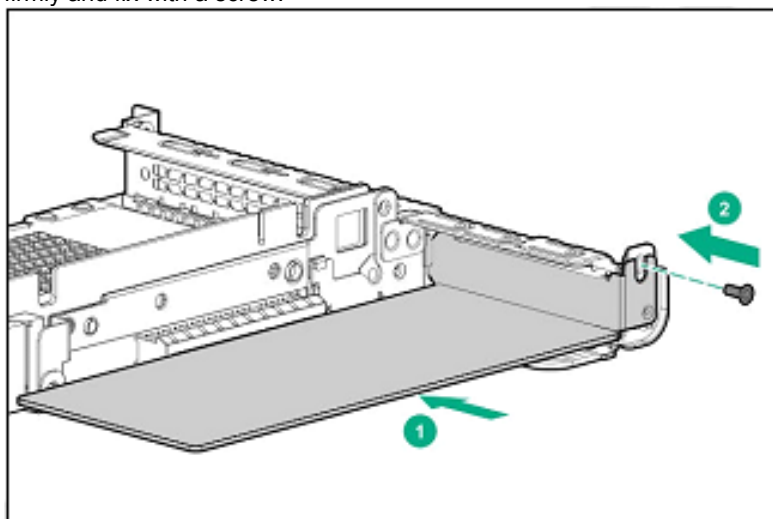
6. Connect power cable for cache backup.
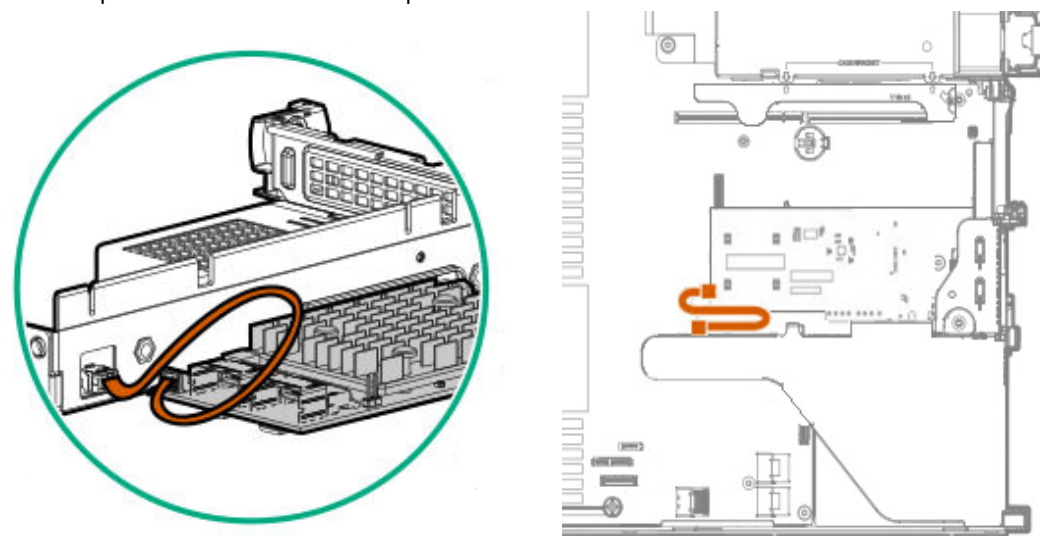
7.   Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.
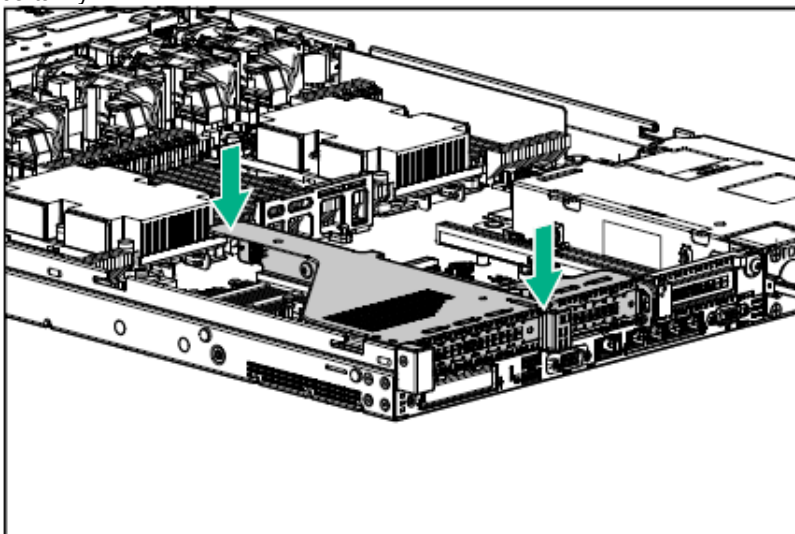
8.   Connect the cables from ports 1 and 2 on the back plane to ports 1 and 2 on the N8103-195/201 controller board.

8x 2.5-inch drive model
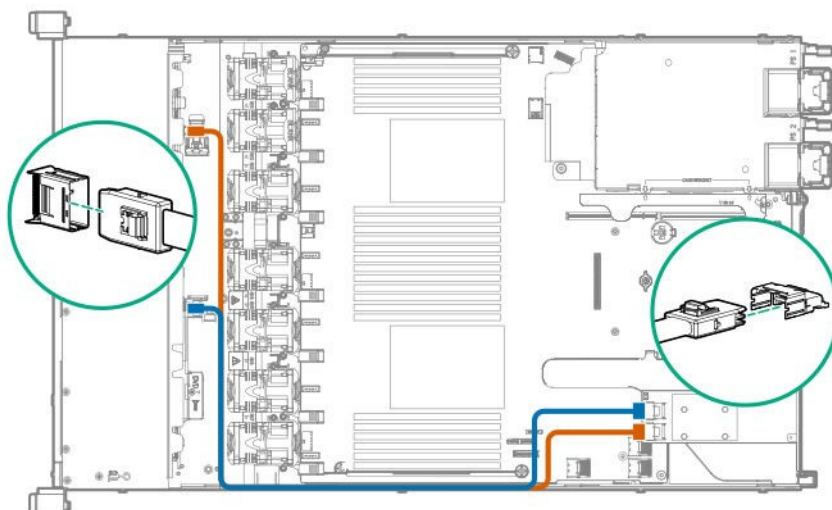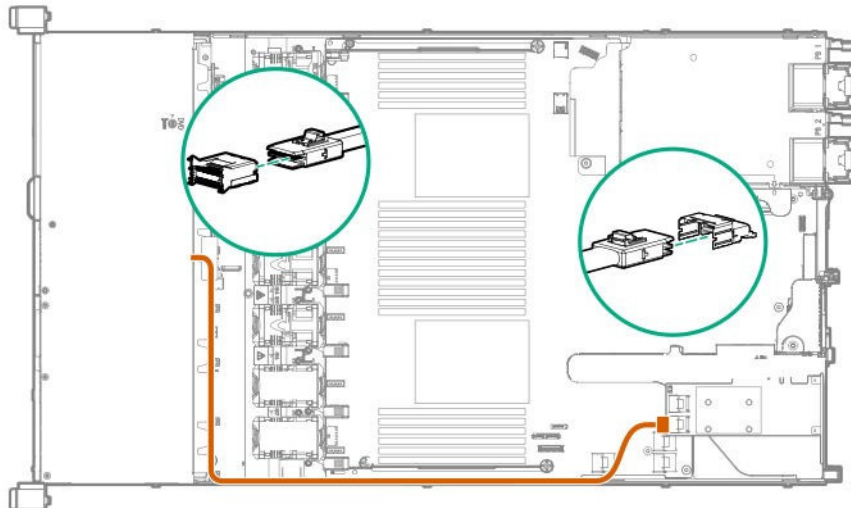
4x 3.5-inch drive model

9. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

10. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.15.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.16 RAID controller N8103-189/190/192/193 (AROC type-a)

Supports RAID controller PCI board dedicated slot.
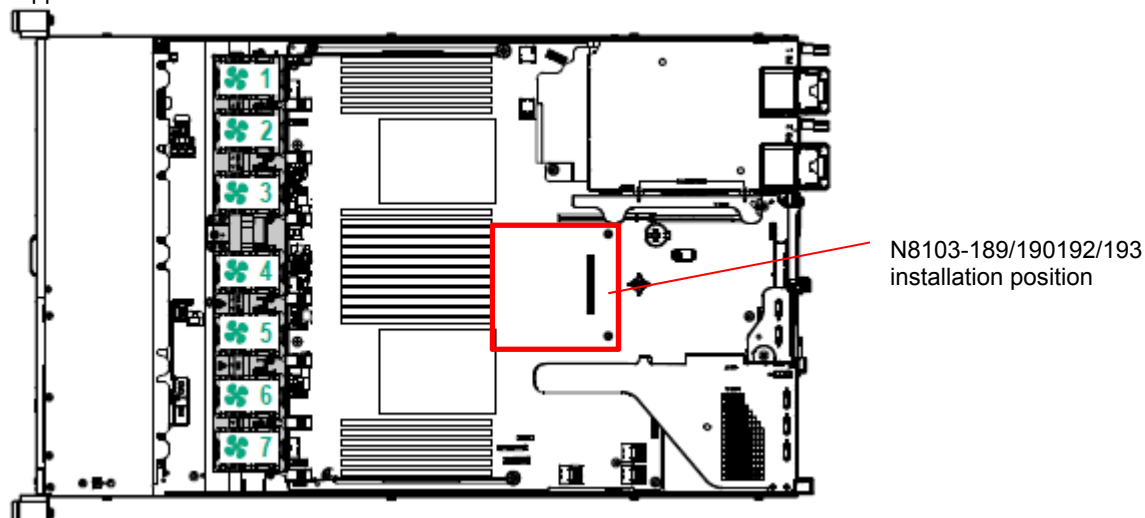
N8103-189/190192/193
installation position

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.16.1 Installing N8103-189/190/192/193 RAID Controller

Please prepare the following before installing the option.
- Parts included in the option kit

- T-15 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Position the guide pin of the RAID controller to the connector of the motherboard, firmly insert it from above, tighten the screws securing it in place.
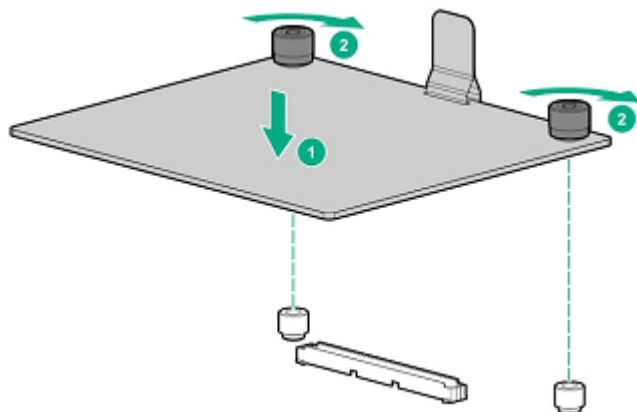
4. Connect the SAS/SATA cable from the back plane to the controller port. The SAS/SATA cables are labeled "Port1" or "Port2". Align with the label number and insert.

8x 2.5-inch drive model
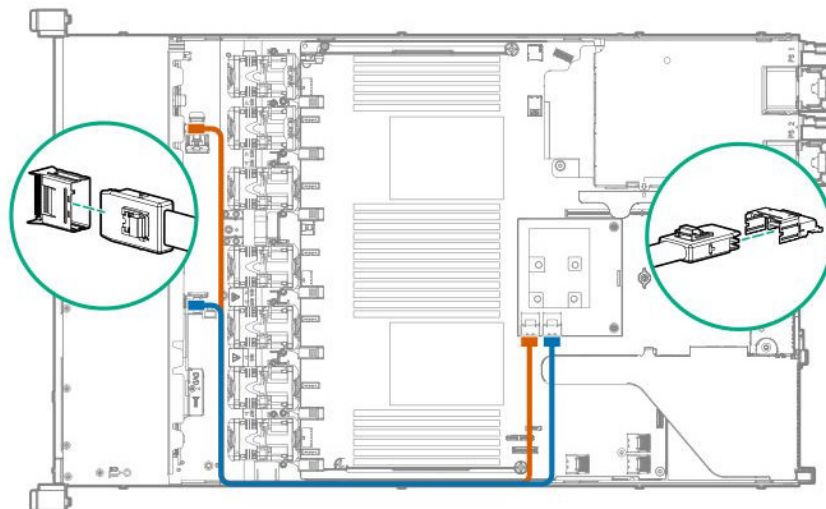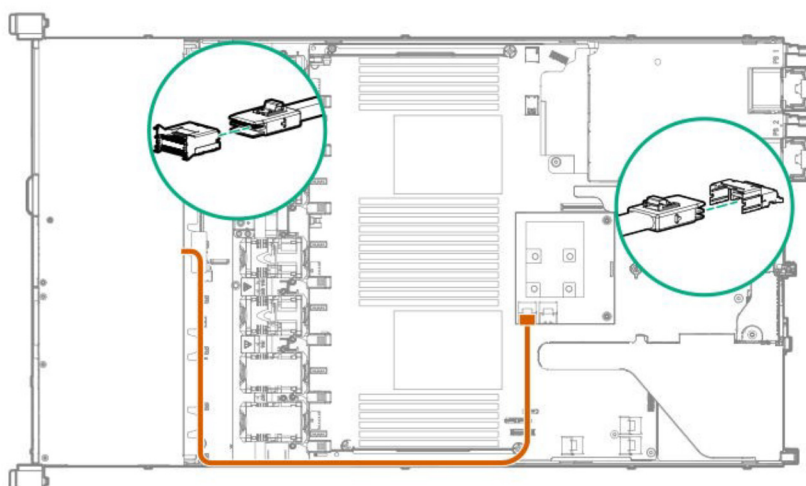
4x 3.5-inch drive model

5. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.16.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.17 RAID controller N8103-191/194 (AROC Type-a)

Supports RAID controller PCI board dedicated slot.
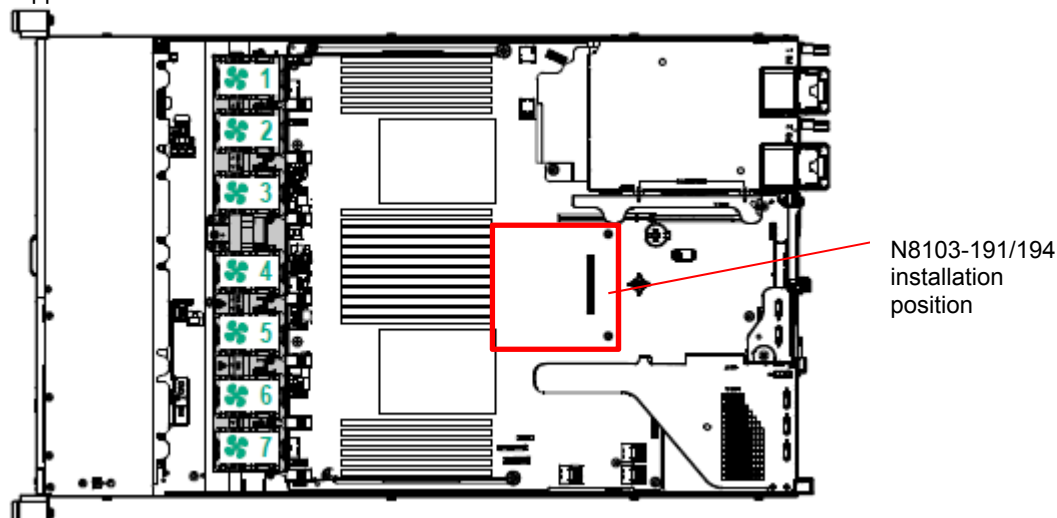
N8103-191/194
installation
position

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.17.1 Installing N8103-191/194 RAID controller

Please prepare the following before installing the option.
- Parts included in the option kit

- T-15 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Position the guide pin of the RAID controller to the connector of the motherboard, firmly insert it from above,

   tighten the screws securing it in place.
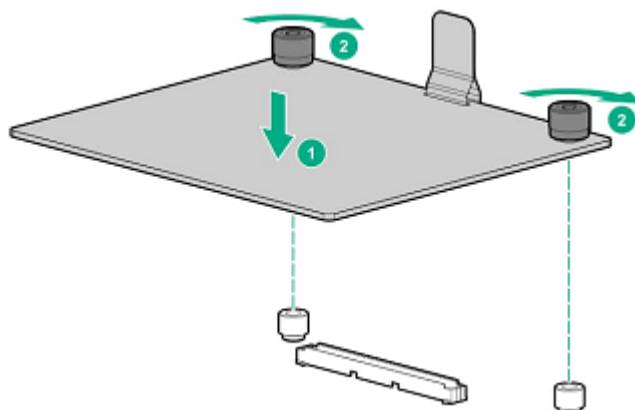
4. The diagram below shows the connection to back plane and controller in case you configure an 8x2.5 inch drive and an optional 2x 2.5 inch drive.

Connect from the standard back plane to port 1 and 2 of controller and from the optional back plane to port 3 of controller.

5. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.17.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.18 LOM Card

The server supports LOM Card which is the replaceable onboard network adapter.

Install LOM Card to the LOM Card slot on motherboard. The motherboard has one slot to install LOM Card.

Important	**You must avoid static electricity to work with the procedure below. For details, see *Chapter 1 (1.8 Anti-static Measures)* in Safety Precautions and Regulatory Notices.**

1.18.1 Installation

Please prepare the following before installing the option.
- Parts included in the option kit

- T-10 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Pick up the both end part of the primary riser card and lift them up to remove.
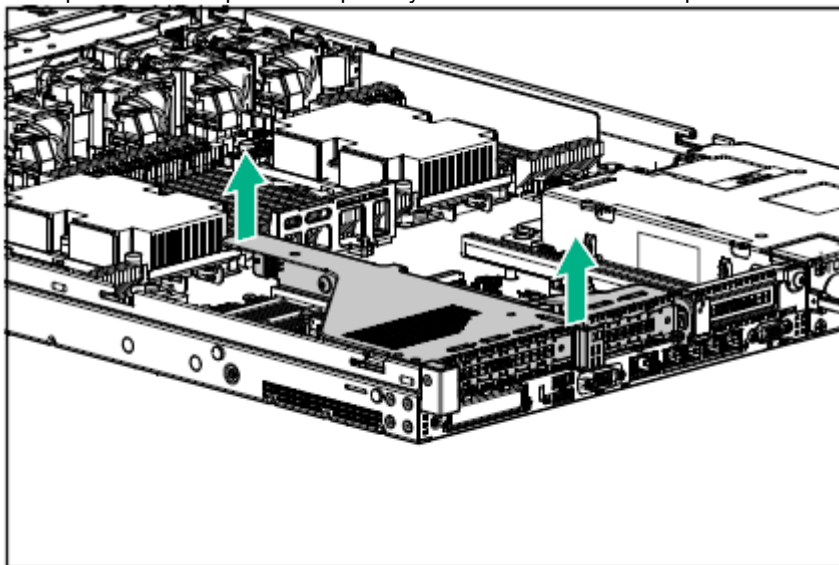
4. Remove the screw (x1) and remove the LOM card blank.
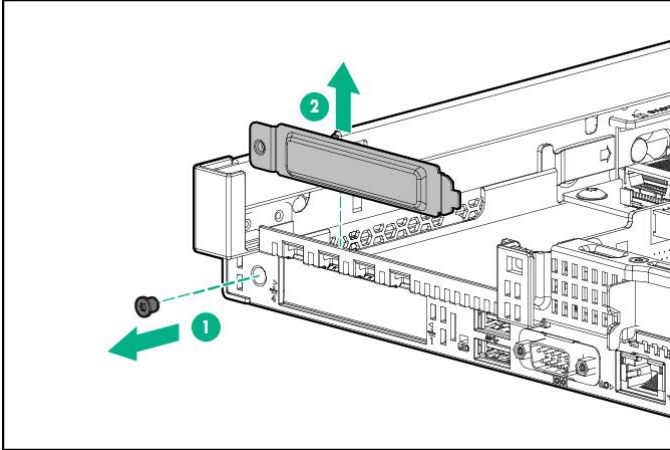
5. Align the LOM card pins to the LOM connector of the motherboard and insert it.

   Tighten the screws firmly.
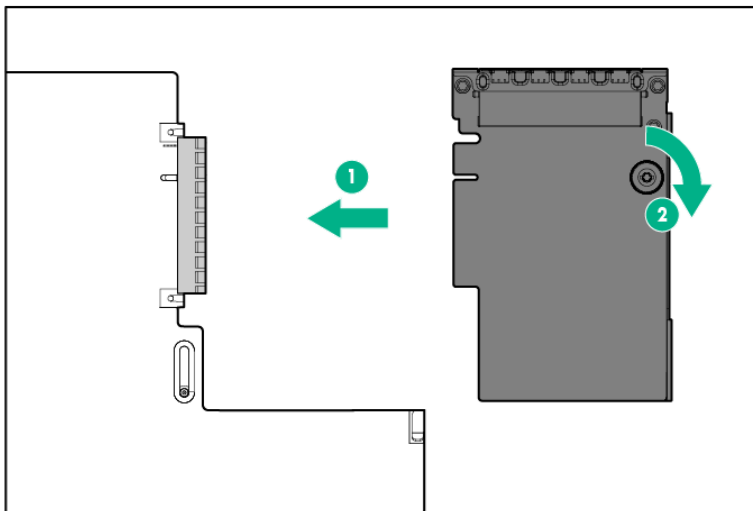
6. Stick the terminal part of riser card and slot part on the mother board together and insert them in with certainly.

7. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.18.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**To maintain the cooling effect in the server, install the blank cover in the vacant LOM Card slot.**

1.19 **Flash Backup Unit N8103-218**

When mounting a RAID controller (N8103-190/191/193/194/196/201), by installing Flash Backup Unit, data loss

due to accident such as power shortage can be avoided. if Write Back being enabled,

1.19.1 **Handling precautions**

When using Flash Backup Unit, please pay attention to the following. If you ignore the following warnings, there

may be loss of data and hardware.

- Flash Backup Unit is an extremely sensitive device. Prior to installation, avoid static electricity by touching the metal frame of the unit or similar.

- Do not drop or otherwise damage Flash Backup Unit.

- For recycling and disposal of extension batteries, refer to the user's guide attached to the RAID controller or Flash Backup Unit.

1.19.2 **Installing Flash Backup Unit (N8103-218)**

Check the parts of the kit before installing extensions.

To install the components, follow these steps.

1. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Remove all fans.
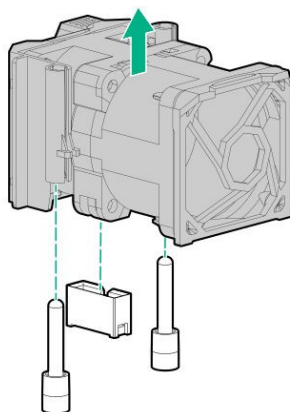
3. Remove the fan baffle.
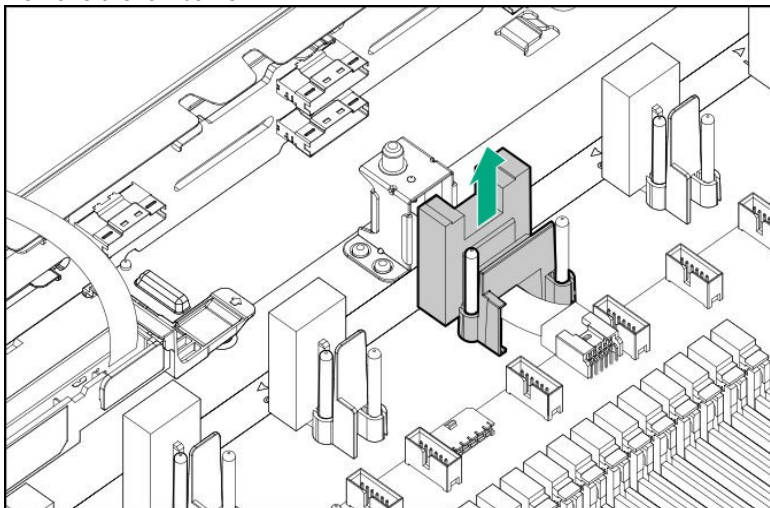
4. Install Flash Backup Unit and connect the cable.
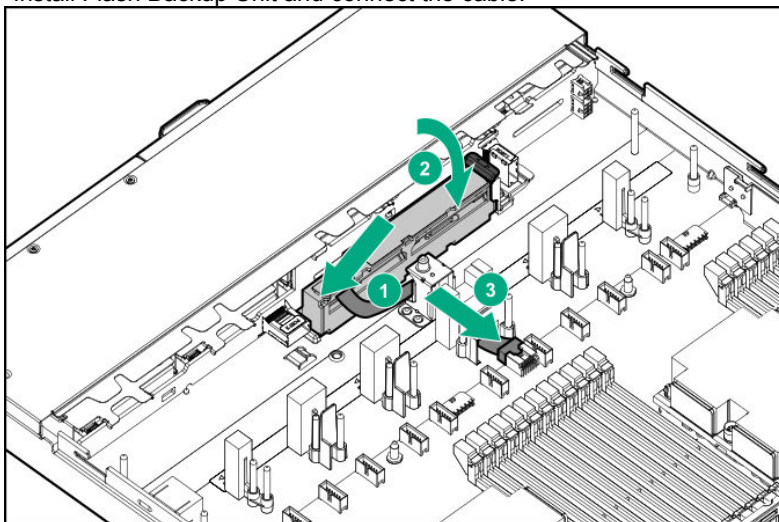
5. Install the fan baffle.

6. Attach all the fans.
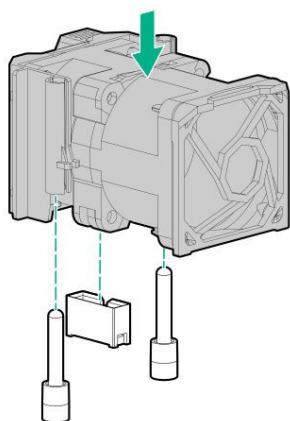
7. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.19.3 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.20 VMware ESXi USB flash memory for installation (N8106-016/017)

VMware ESXi USB flash memory for installation (N8106-016/017) can be connected to USB 3.0 connector inside the device.

Two types of USB flash memory are prepared.

①   N8106-016   2x8GB microSD card installing kit (USB)

Two microSDs able to install and boot VMware ESXi and USB conversion kit

②   N8106-017   8GB USB memory

USB flash memory able to install and boot VMware ESXi

■   Notes

●   N8106-016 2x8GB microSD card installing kit (USB) is equipped with RAID1 function.

●   The function cannot be installed with M.2 SATA SSD.

●   This product does not include an install media of ESXi and the license.

1.20.1 Mounting of USB flash memory N8106-016/017

Note	In order to prevent the damage for the electronic parts, start the installation of system after providing proper anti-static treatment. If a proper earth is not provided, electrostatic discharge may occur.

When installing the components, follow the steps below.

1.   Prepare referring to Step 1- 6 stated in *"Chapter 2 (1.2 Overview of Installation and Removal)"* of this book.

2.   Confirm the position of USB 3.0 connector inside.
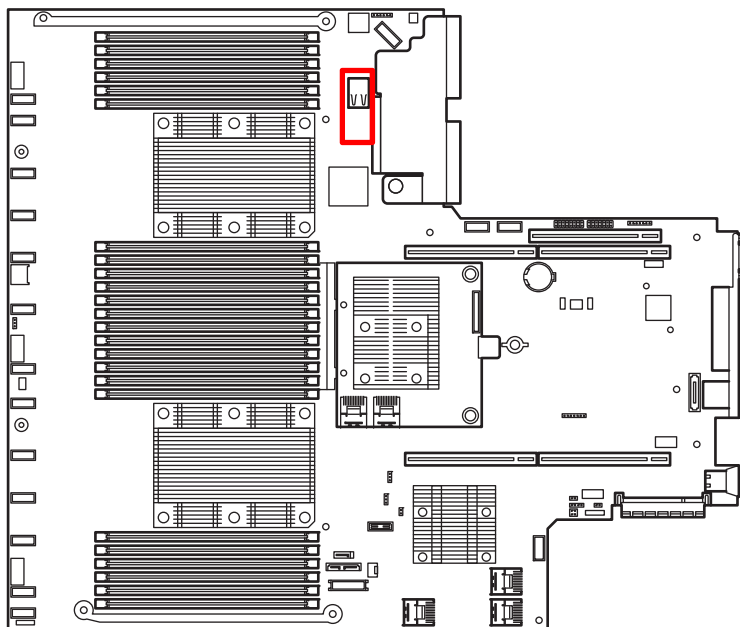
3. Insert USB flash memory into the connector.
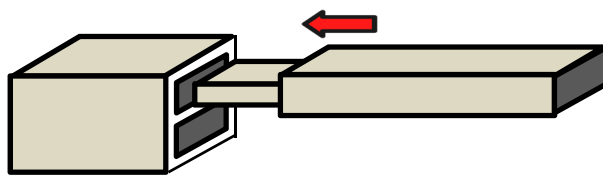
1.20.2 Removal

When removing, practice the steps of installing reversely.

When you operate the device without components, install the blank cover that was installed on the device.

Important	**In order to maintain the cooling effect inside, install the blank cover which you removed.**

1.21 2.5-inch universal media bay

For the 8x 2.5-inch drive model, you can install an optional 2x SAS/SATA drive or optical disk drive in the universal media bay.

Universal media bay
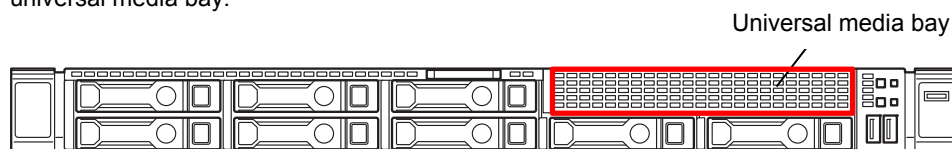
1.21.1 Installing 2x 2.5-inch Drive Cage (SAS/SATA) N8154-89

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit

- T-10 hexalobular driver

- 2x SAS, SATA drive, or dummy tray

- Additional cable

To install the components, follow these steps.

4. Back up all data in the server.

5. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

6. Remove the screws (x3) and remove the universal media bay blank panel.
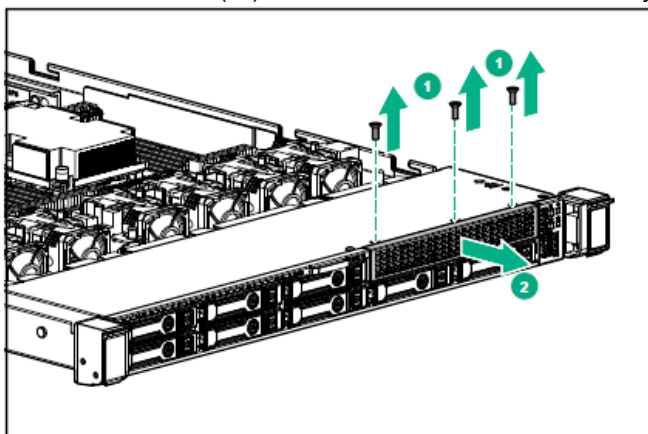
7. Install the 2x SAS/SATA drive cage, and fasten with the screws (x3).
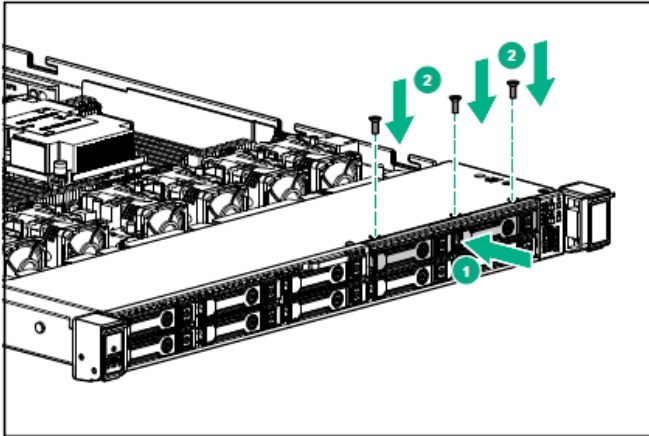
8. The standard cable routing is described below.

    Connect the data cable to port 3 of the RAID controller (AROC) from the drive cage.

9. Connect the power cord to the power connecter on the backplane as shown below.
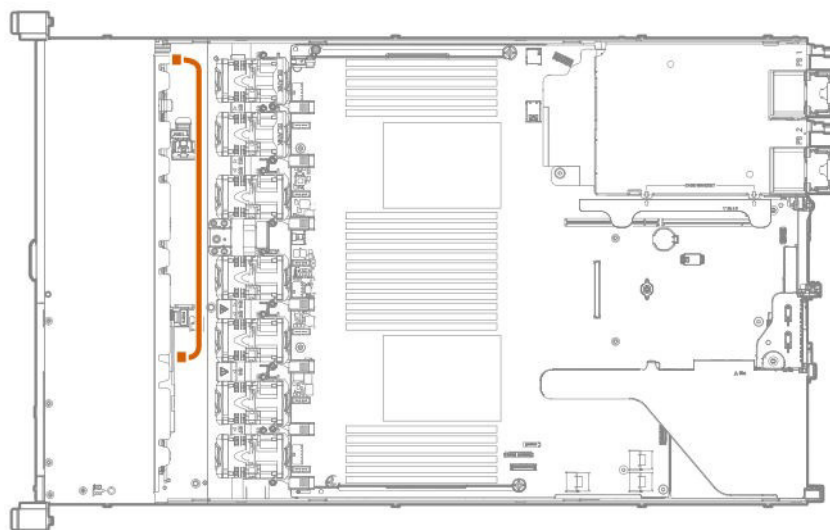
10. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

11. Mount the SAS/SATA drives.

12. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.21.2 Installing the internal DVD drive extension kit N8117-03

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit

- T-10 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Remove the screws (x3) and remove the universal media bay blank pane.
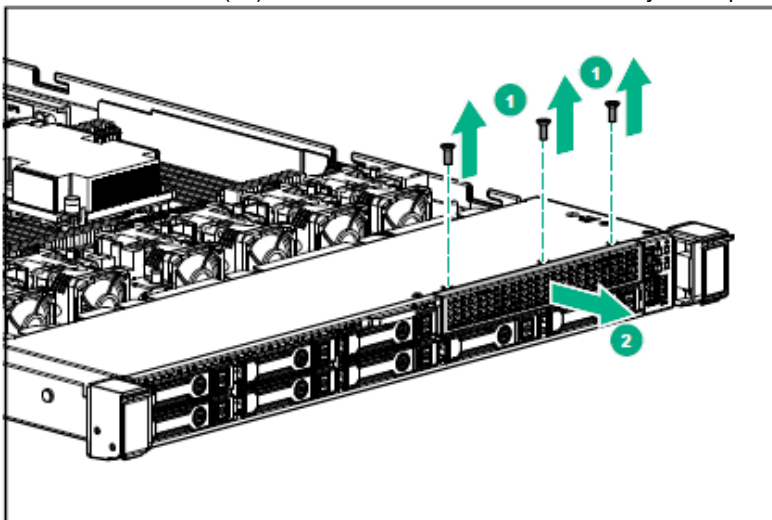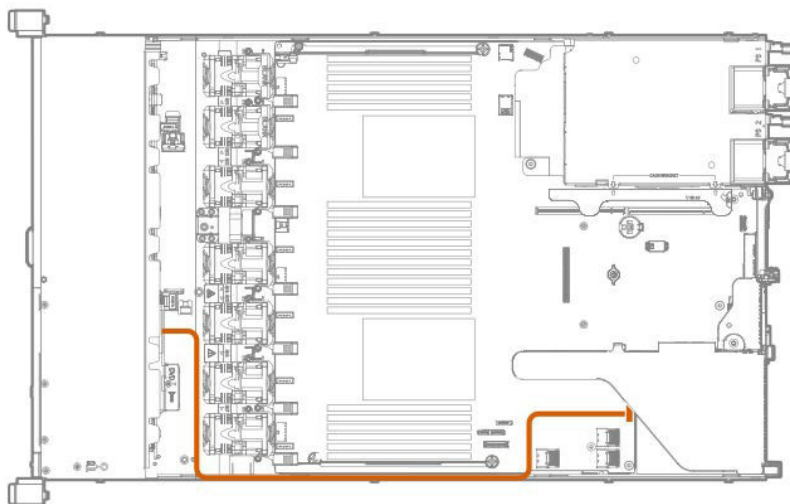
4. Attach the Built-in DVD Drive Expansion Kit, and secure it with the screw (x3).
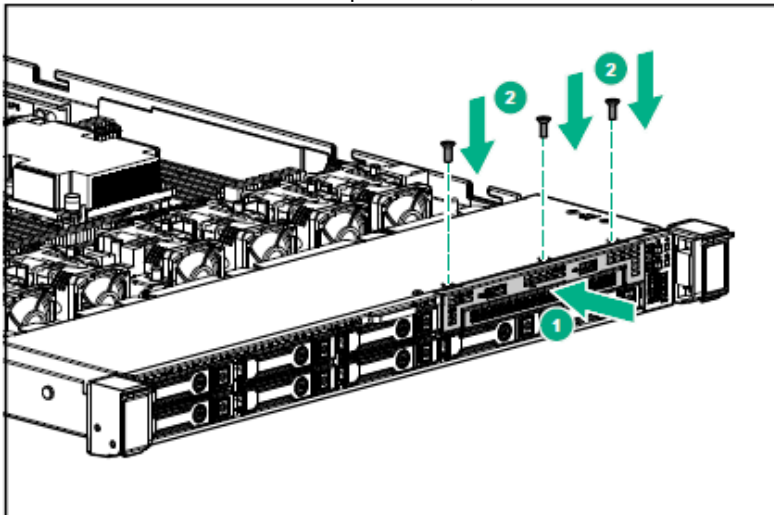
5. Connect the DisplayPort/USB cable to the DisplayPort/USB connector on the rear in a routing shown below.

6. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.21.3 Installing the optical disk drive N8151-137/ 138

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Before installing this optional optical disk drive, the Built-in DVD Drive Expansion Kit must have been installed.

Please prepare the following before installing the option.

- Parts included in the option kit

- T-10 hexalobular driver

- DVD-ROM drive (N8151-137), or DVD-Dual drive (N8151-138)

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in Chapter 2 (1.2 Overview of Installation and Removal) for preparations.

3. Remove the optical disk drive blank cover.

   The blank cover of drive can be detached by pushing out the right end of cover from the inside to the outside or by pulling it out.
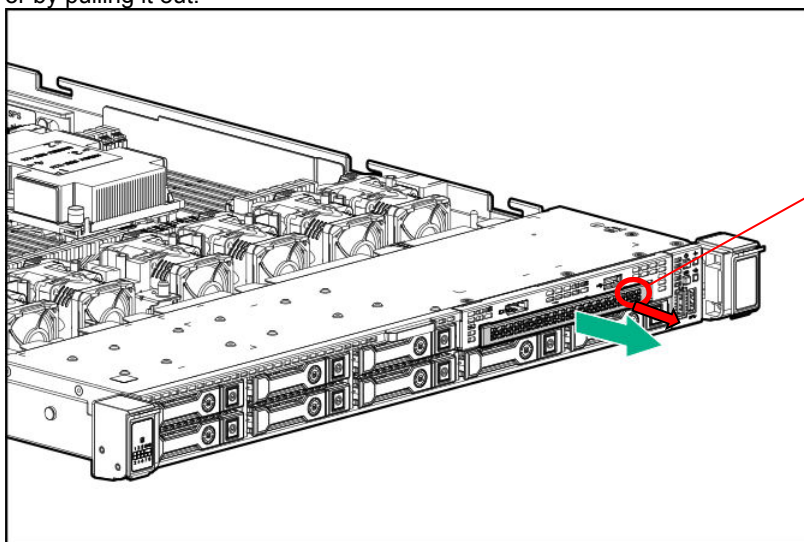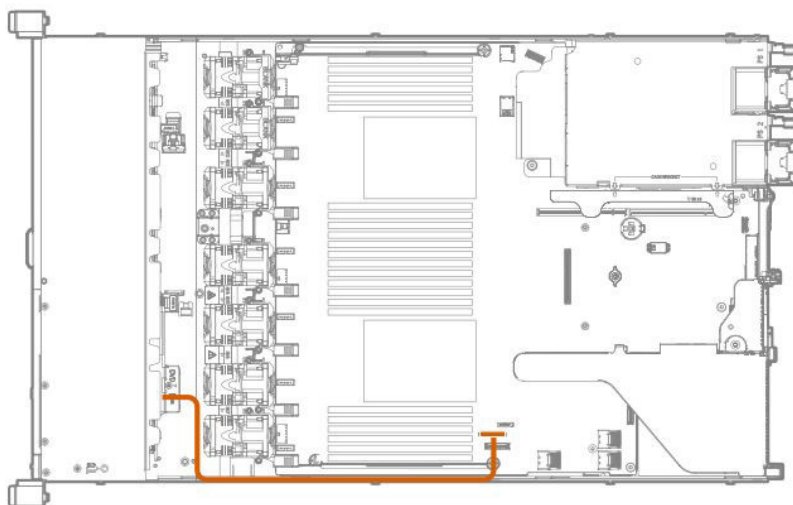

The right side of optical disk drive blank cover Push it out from the inside to the outside or pull it out.

4. Insert the optical disk drive from the front and fix it with a screw.
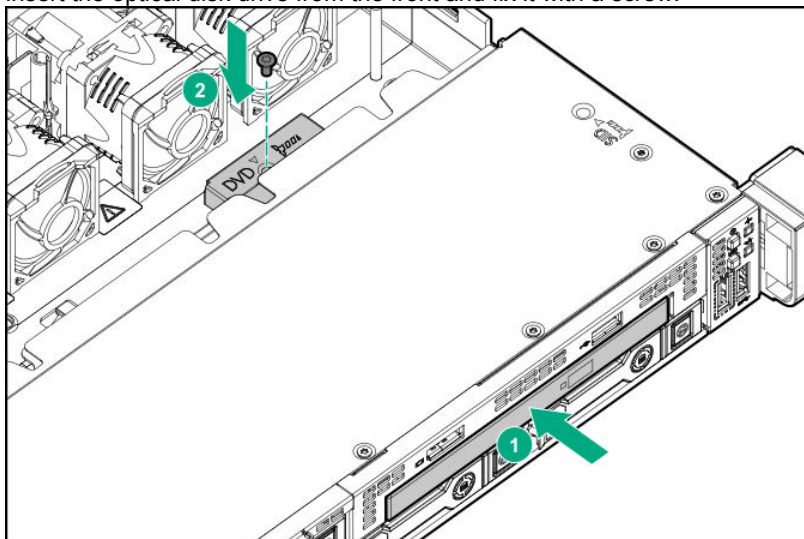
5. Connect the SATA cable for the optical disk drive to the built the on board SATA port 5 connector of as shown below.

6. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.21.4 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.22 **4x 3.5-inch drive model Optical Disk Drive**

4x 3.5-inch drive model can be attached to the universal media Bay optical disk drive.

Optical disk drive bay
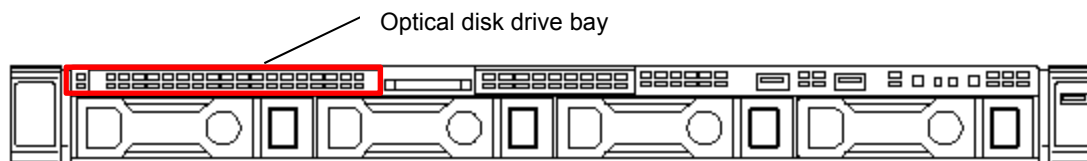
1.22.1 **Installing the optical disk drive N8151-137/138**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the option.
- Parts included in the option kit

- T-10 hexalobular driver

- Optical disc drive cable kit (K410-375(00))

- DVD-ROM drive (N8151-137), DVD-Dual drive (N8151-138)

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Remove the optical disk drive blank cover.

   The blank cover of drive can be detached by pushing out the right end of cover from the inside to the outside or by pulling it out.
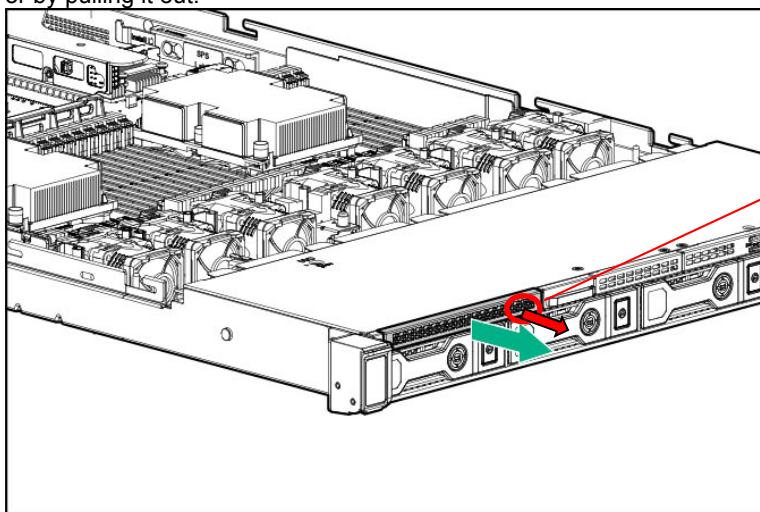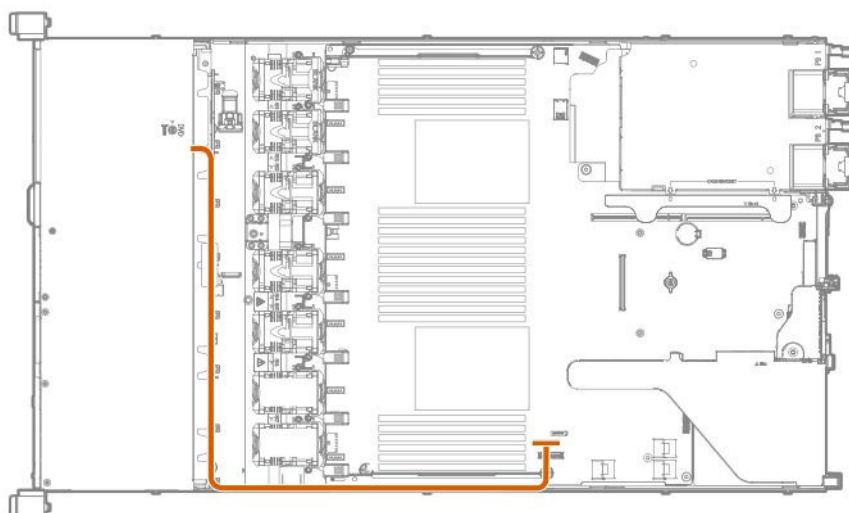
The right side of optical disk drive blank cover
Push it out from the inside to the outside or pull it out.

4. Insert the optical disk drive from the front and then fix it with a screw.
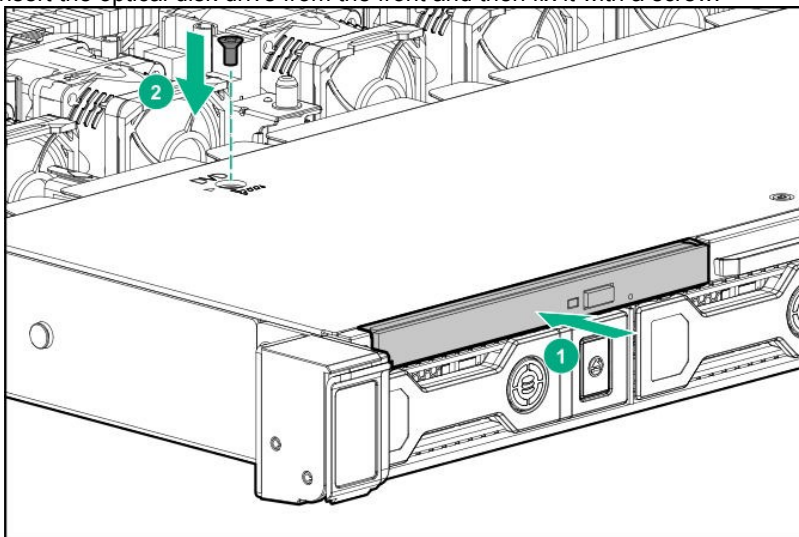
5. Connect the SATA cable (K410 - 375 (00)) for the optical disk drive to the built and the on board SATA port 5 connector as shown below.

6. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

> **Note**   In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.22.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

> **Important**   **Re-attach the blank cover removed to maintain the internal cooling.**

1.23 1x 2.5-inch Drive Cage (SAS/SATA, Rear) N8154-92
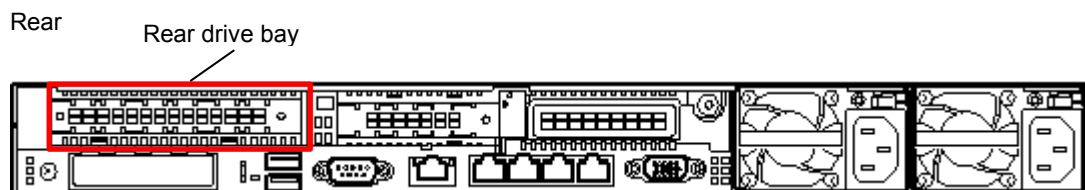
Rear

Rear drive bay

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.23.1 Installing 1x 2.5-inch Drive Cage (SAS/SATA, Rear) N8154-92

Please prepare the following before installing the options.
- Parts included in the option kit

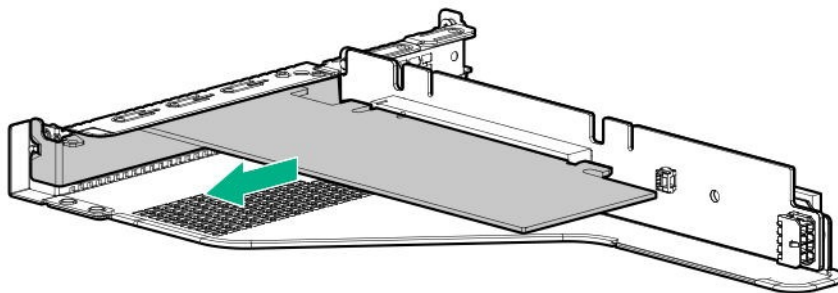- T-10 and T-15 hexalobular drivers

- 2.5-inch drive or dummy tray

To install the components, follow these steps.

1.   See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

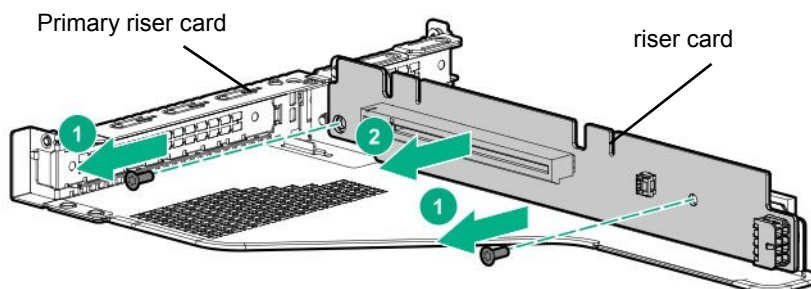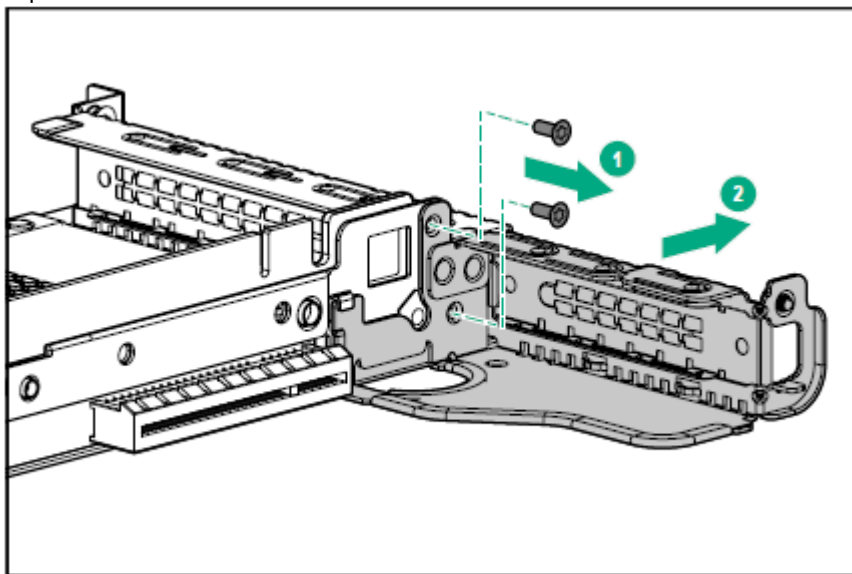2.   Remove the primary riser card.
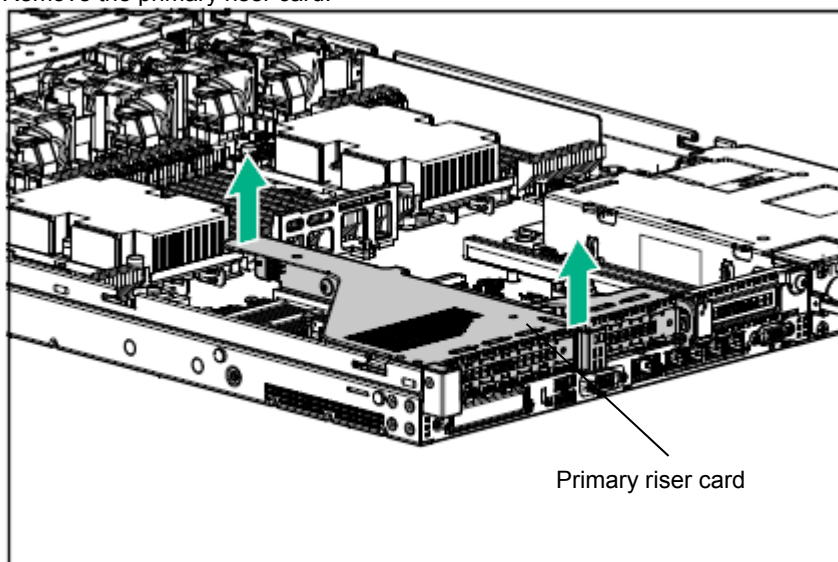
Primary riser card

3. Remove the PCI board on the riser card, if it is mounted.

4. Unfasten the screws (x2) of the riser card to remove the card. This removed card will be reinstalled later.


5. If a PCI board is mounted on the Tertiary riser card, remove it. Remove the screws (x2) of the primary riser card and remove the slot 2 cage bracket. The removed PCI board and cage bracket will be used in a later step.
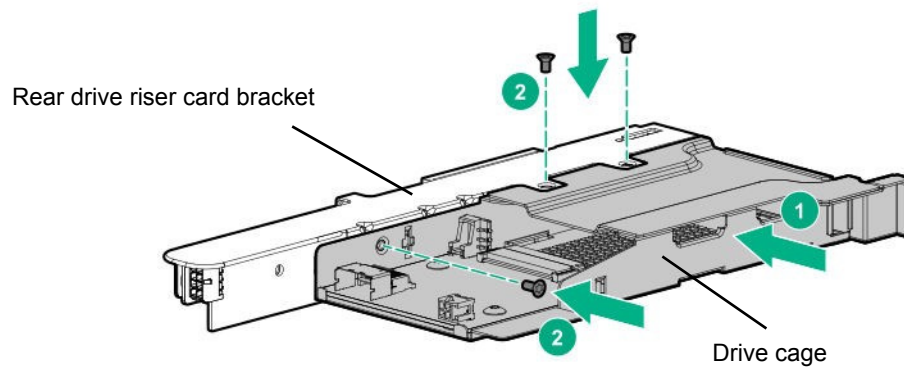

6. Unfasten the screws (x2) of the primary riser card to remove the slot 2 cage bracket. The removed PCI board and cage bracket will be used later.

7. Attach the riser card that was removed in step 4 to the rear drive riser card bracket, and secure it with the screws (x2).

Rear drive riser card bracket
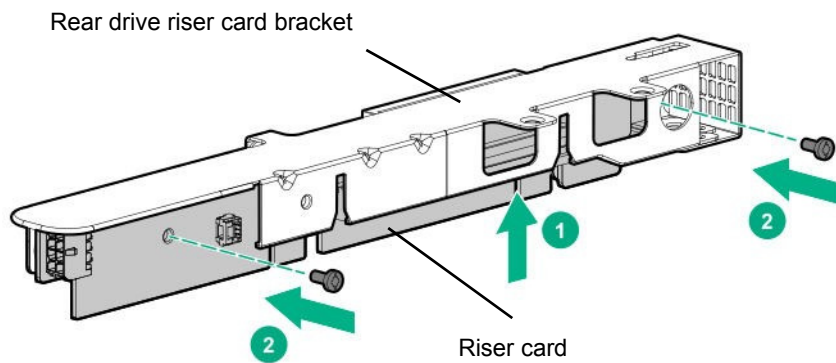
Riser card

8. Attach the drive cage to the rear drive riser card bracket, and secure it with the screws (x3).

Rear drive riser card bracket

Drive cage

9. Secure the slot 2 cage bracket that was removed in step 6 to the rear drive riser card with the mounting screws (x2).
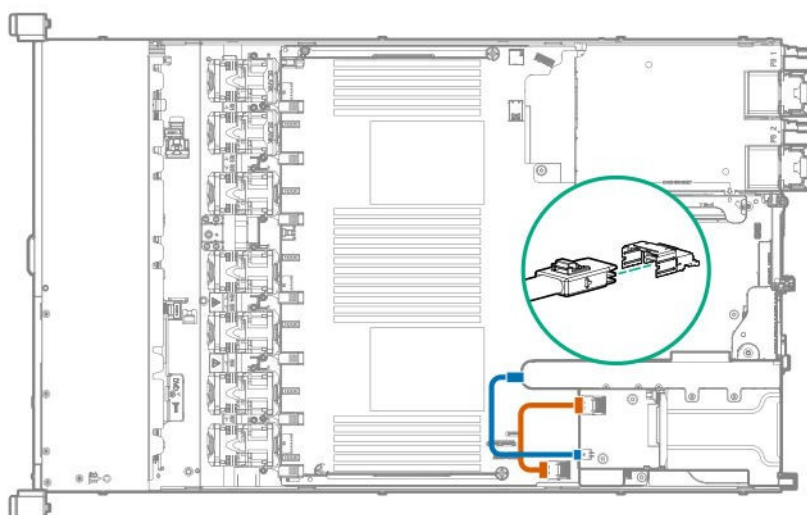
Drive cage

Slot 2 cage bracket
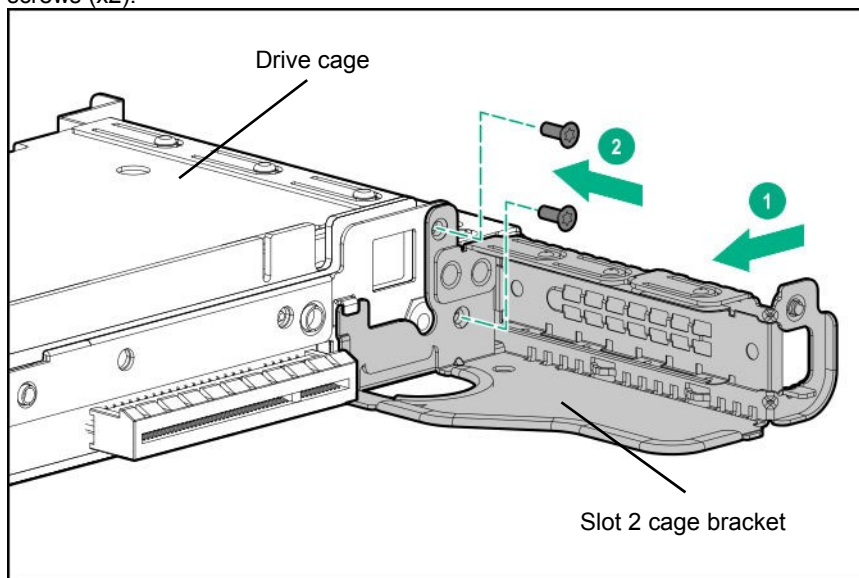
10. Attach the PCI board.

11. Attach the rear drive riser card to the position of the primary riser card. Align the terminal part of the riser card with the slot part on the motherboard, and insert them securely.

Rear drive riser card
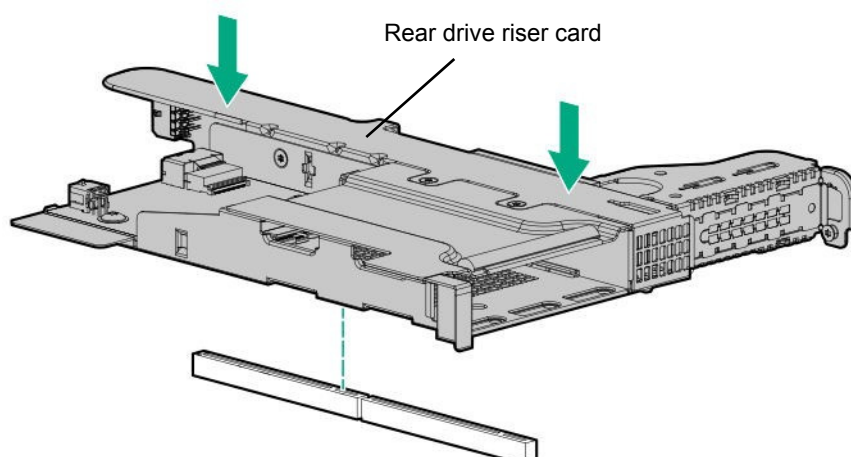
12. Connect the data cable and the power cord as shown below.

13. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

14. Install the driver or the dummy tray.

15. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.23.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.24 **Status LED Panel (Systems Insight Display) kit N8117-07/08**

The LED display panel allows easy monitoring of the operating status of the entire system (Status LED Panel).

Using this panel allows for diagnosing.
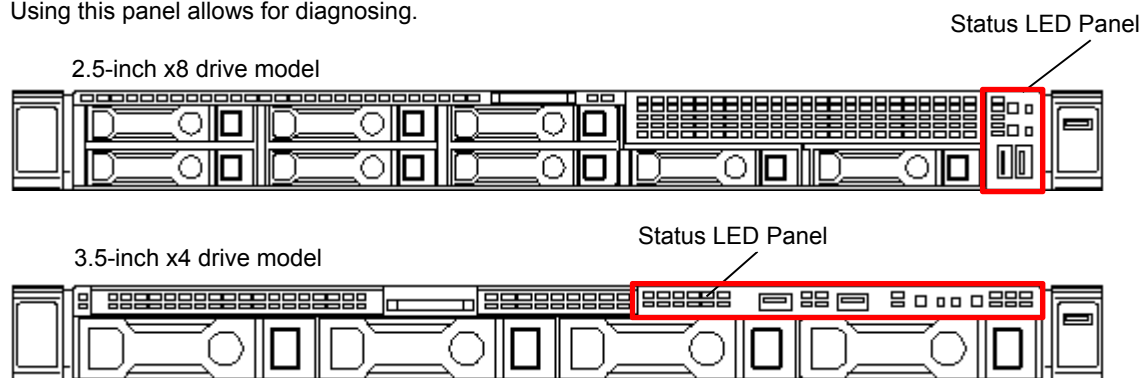
2.5-inch x8 drive model

Status LED Panel

3.5-inch x4 drive model

Status LED Panel

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

| Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.24.1 **Installing N8117-07/08 Status LED Panel kit**

Please prepare the following before installing the options.
- Parts included in the option kit
- T-10 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Remove the power/UID/USB cable from the front power button/USB 3.0 connector on the motherboard.
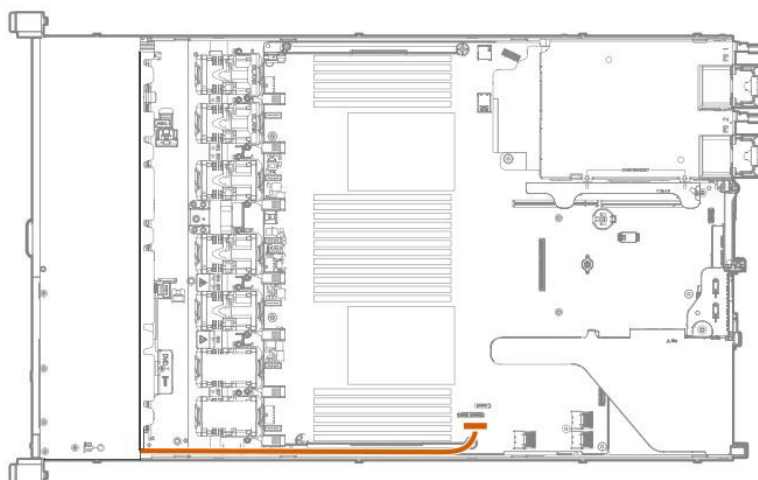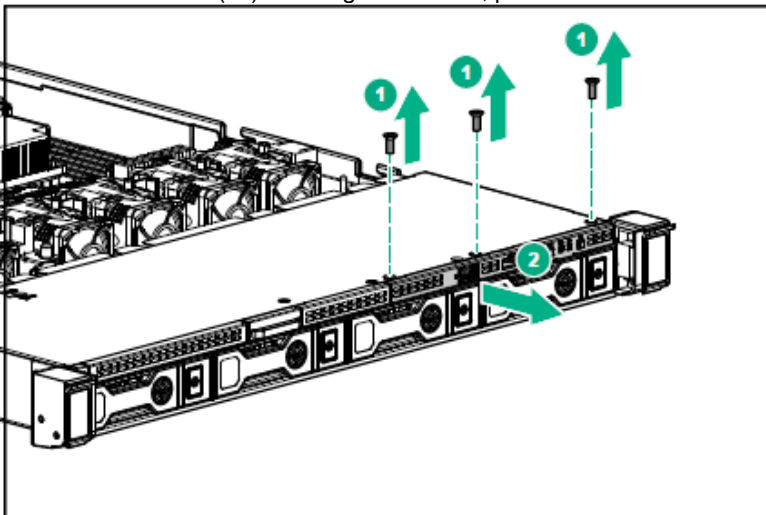
4.   Remove the power/UID/USB assembly.

・8x2.5-inch drive model (N8117-08)

Remove the screws (x2) securing the module, pull the module forward and remove it.
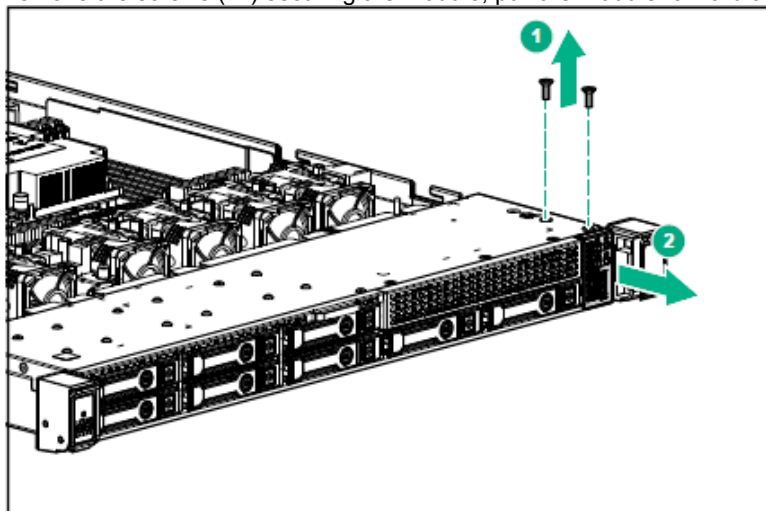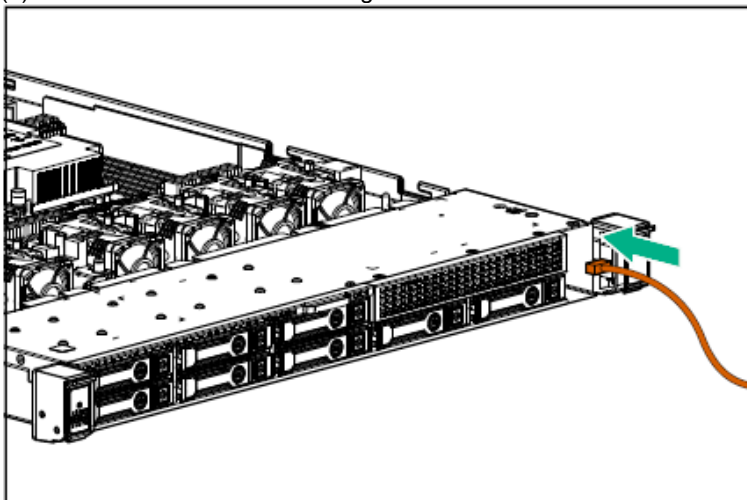
・3.5-inch x4 drive model (N8117-07)

Remove the screws (x3) securing the module, pull the module forward and remove the it.

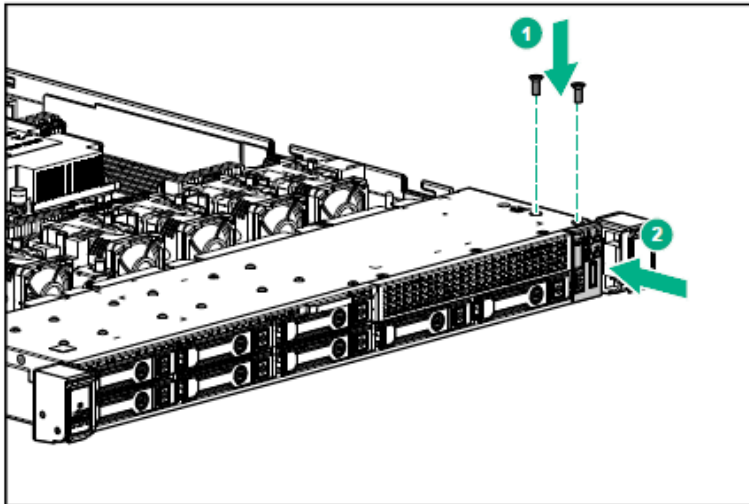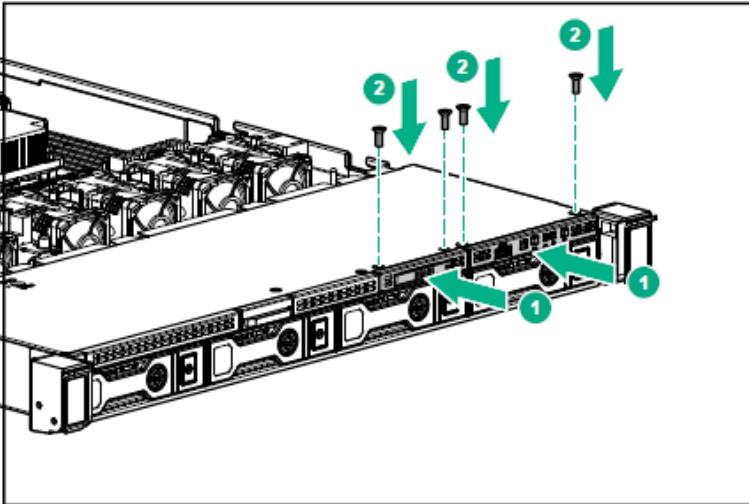5.   Attach the module.

(1)   Pass the module cable through the front of the server.
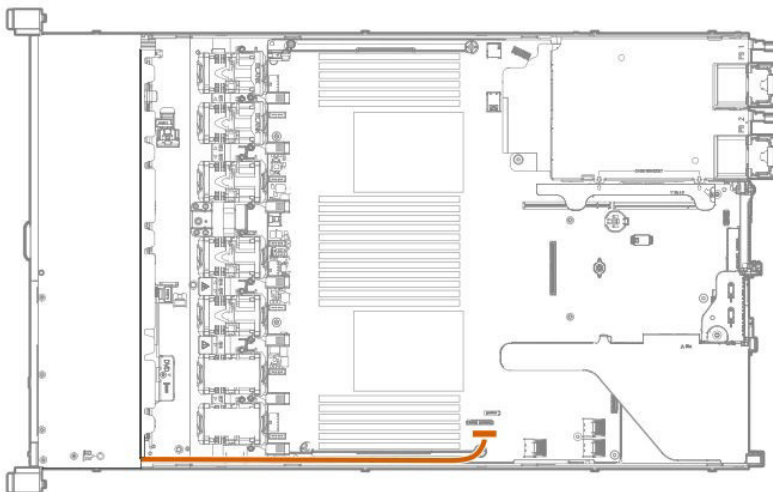
(2)   Attach the module to the front panel, and secure it to the chassis with screws included in the kit.

・2.5-inch x8 drive model (N8117-08)

・3.5-inch x4 drive model (N8117-07)

6.   Connect the module cable to the front power button/USB 3.0 connector on the motherboard.

7.   See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

> **Note**   In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

8.   Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.24.2 Removal
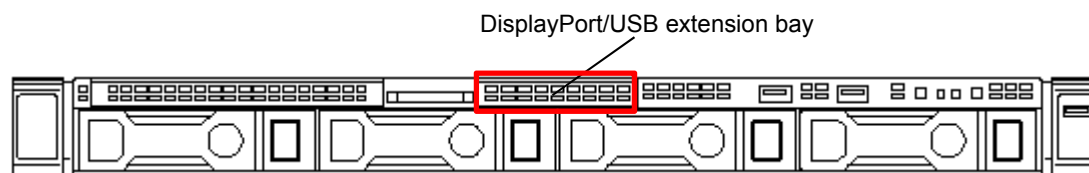
The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

> **Important**   **Re-attach the blank cover removed to maintain the internal cooling.**

1.25 Front DisplayPort Expansion Kit N8117-05

The front of the 3.5-inch x4 drive model supports DisplayPort/USB

DisplayPort/USB extension bay

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.25.1 Installing Front DisplayPort Expansion Kit N8117-05

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

Please prepare the following before installing the options.
- Parts included in the option kit
- T-10 hexalobular driver

To install the components, follow these steps.

1. See steps 1 to 6 in Chapter 2 (1.2 Overview of Installation and Removal) for preparations.

2. Remove the screws (x2) holding the front DisplayPort/USB blank cover and pull the blank cover forward to remove it.
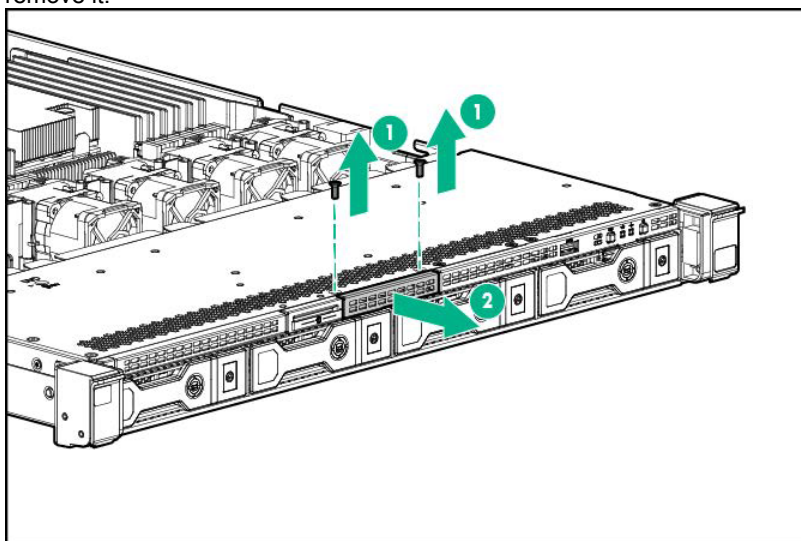
3. Pass the module cable through the front of the server, then install the module body.

4.   Install front DisplayPort/USB and secure with the screws (x2).
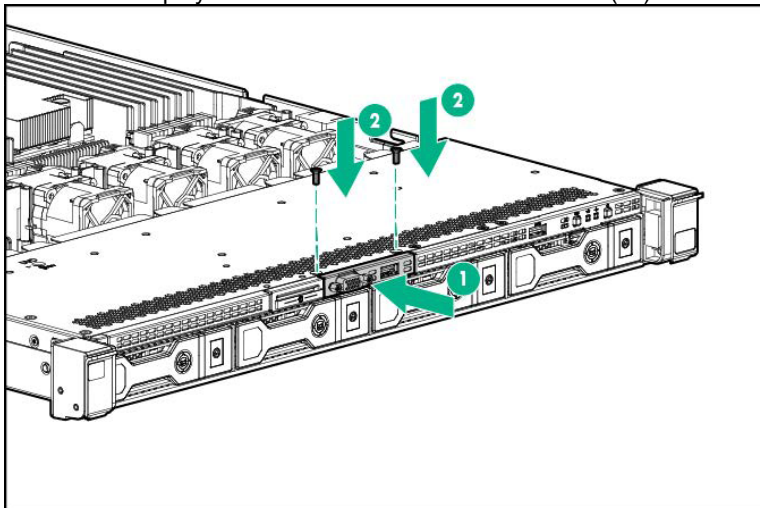
5.   Connect the front DisplayPort/USB cable to the front DisplayPort/USB connector on the back as shown below.
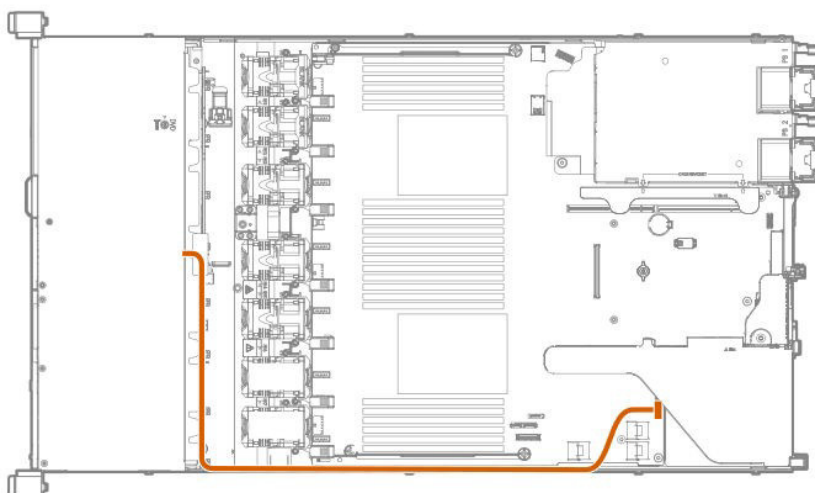
6.   See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

7.   Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.25.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.26 Serial cable

The LED display panel allows easy monitoring of the operating status of the entire system (system-insight display). Using this panel allows for diagnosing.

|	
Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	In order to prevent the damage to electronic components, please start to install the system after conducting the appropriate anti-static treatment. There is a possibility of causing electrostatic discharge if appropriate grounding wire treatment is not conducted.

1.26.1 Installation

Please prepare the following before installing the options.

- Parts included in the option kit

- T-10 hexalobular driver

To install the components, follow these steps.

1. Back up all data in the server.

2. See steps 1 to 6 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

3. Pull the serial cable blank cover forward to remove it.
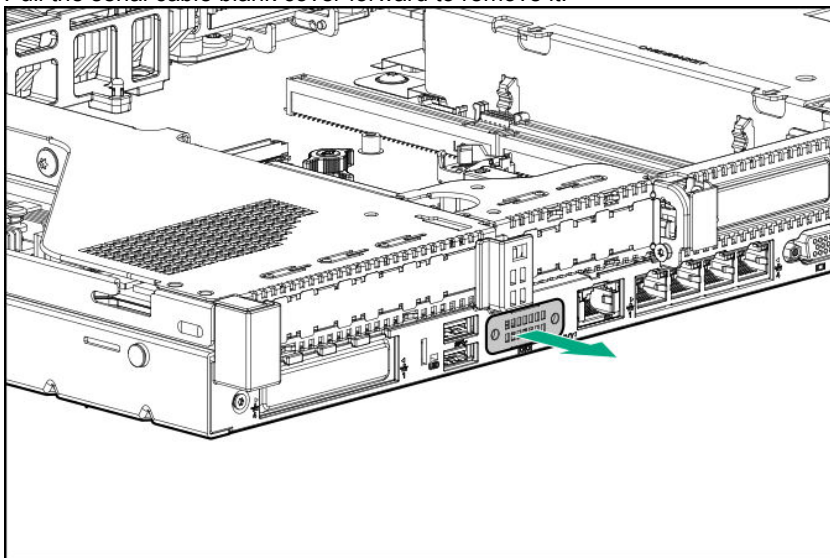
4. Install the serial cable.

    (1) Position the serial cable as shown below.

    (2) Attach the serial cable connector.

    (3) Secure the external connector with screws (x2).

(4) Remove the backing paper of double-sided tape and press it against the specified place to secure the cable.

5. See Chapter 2 (*1.28 Installing Top Cover*) to attach the top cover of the server.

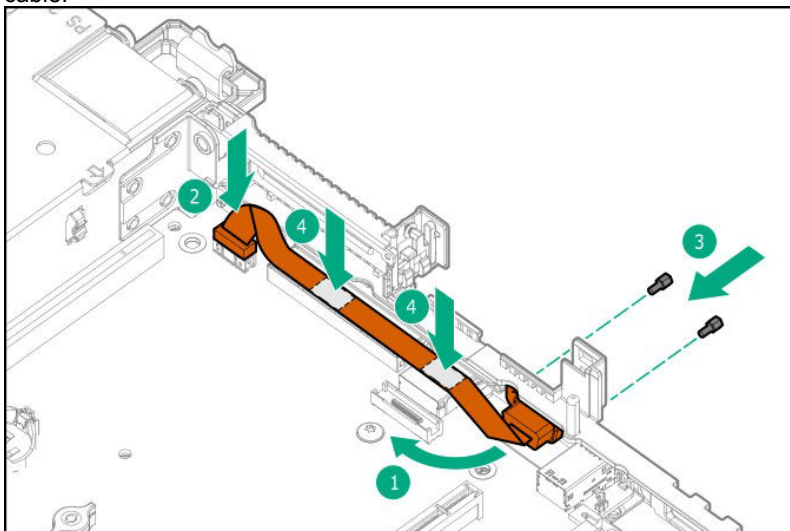| Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

6. Please see *Chapter 2 (2 Installation and Connection)* in this manual to conduct installation and connection, and turn the power supply ON.

1.26.2 Removal

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	Re-attach the blank cover removed to maintain the internal cooling.

1.27 Use of Internal Hard Disk Drives in the RAID System

This section describes how to use the internal hard disk drives in the RAID System.

Important	**If you use hard disk drives in the RAID System or change the RAID level, hard disk drives are initialized. If the hard disk drive contains valuable data, be sure to backup the hard disk drive before installing the RAID Controller and configuring the RAID System.**

Note	Build a Disk Array in the RAID System using hard disk drives that have the same specifications (capacity, rotational speed, and standard).

Tips	• Logical Drives can be created even with only one Physical Device. • When using SAS hard disk drive, SAS SSD, or SATA SSD, it must be connected to RAID Controller.

1.27.1 Notes on Building RAID System

Note the following points when building a RAID System.

● The number of hard disk drives required varies in each RAID level.

● If the optional RAID Controller N8103-189/192/195 is used, the RAID System cannot be built in RAID6/RAID50/RAID60.

RAID level	The minimum number of hard disk drives required to set up a RAID System	
	N8103-189/192/195	N8103-190/191/193/194/201
RAID 0	1	1
RAID 1	2	2
RAID 5	3	3
RAID 6		4
RAID 10	4	4
RAID 50		6
RAID 60		8

● In the RAID System, all the hard disk drives in a group (pack) must have the same capacity, interface type, and rotational speed.

● If you intend to install the OS to the RAID System, the process from RAID configuration to OS installation can be easily completed by using EXPRESSBUILDER.

● To install the OS manually, use the RAID System Configuration Utility. For a detailed description of the utility, refer to *Chapter 2 (2. RAID System Configuration)* in *Maintenance Guide*, or the manual attached to the optional RAID controller (N8103-189/190/191/192/193/194/195/201).

|	
Important	**Build a Disk Array in the RAID System using hard disk drives that have the same specifications (capacity, rotational speed, and standard).**

1.28 Installing Top Cover

When all internal optional devices are installed, close the server with Top Cover.

Please have ready a hexalobular driver (t-10) or flathead driver.

1. Leave the hood latch open and place the top cover straight on the unit so that it is securely inserted in the frame. Adjust the position of the top cover so that it protrudes approximately 1.25 cm (0.5 inch) from the rear of the unit.

(1)

Hood latch

(2)
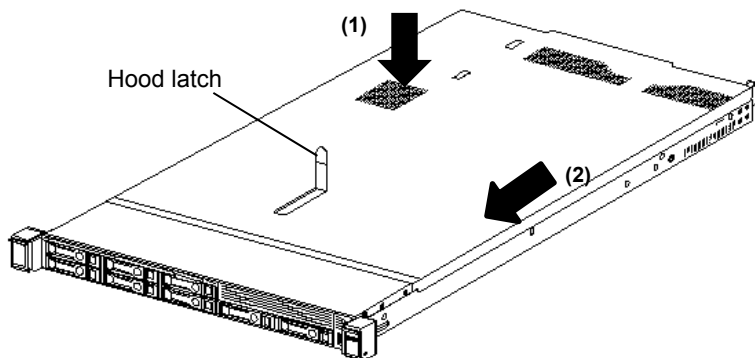
2. Press down on the hood latch. Slide the top cover until it is completely closed.

(1)

(2)
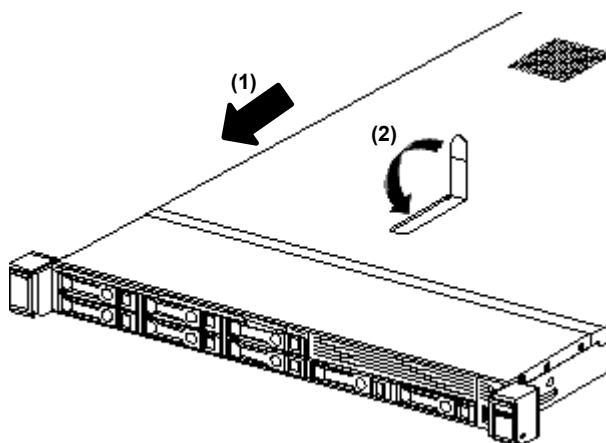
3. Tighten the security screw on the hood latch with hexalobular screwdriver (T-10) or flathead screwdriver.

Close

Open

Security screw
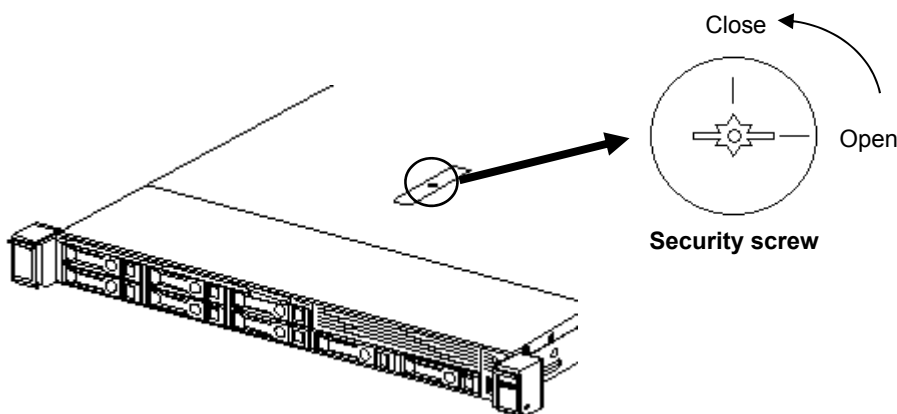
1.29 Drives

The expansion bay for connecting drives is located on the front and back. Drives can be purchased mounted on a dedicated tray. The device should be installed as mounted on the tray.

Important	**Use hard disk drives specified by NEC. Installing a third-party hard disk drive might cause a failure of the server as well as the hard disk drive.**

SAS, SATA, and M.2 drives (depending on configuration) are supported.

Follow these guidelines when adding drives to the server.
- All the device numbers are automatically set by the system.

- If you are using only one hard disk drive, please install it in the bay with the smallest lowest device number.

- When drives that are grouped together into the same drive array, for the most efficient use of storage space, set each drive at the same capacity.

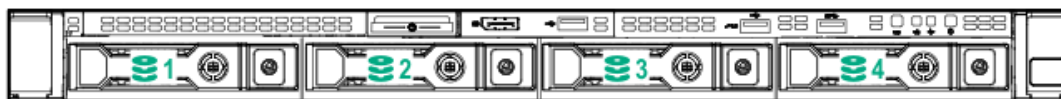Unique device numbers have been assigned to each slot.

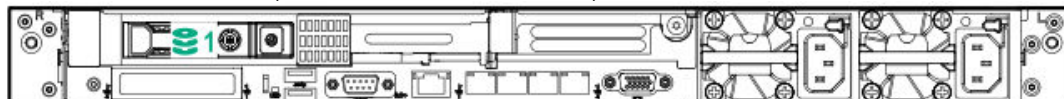8x 2.5-inch drive model (SAS/SATA HDD/SSD)

8x 2.5-inch drive model (SAS/SATA HDD/SSD) + 2x 2.5-inch (SAS/SATA HDD/SSD)

4x 3.5-inch drive model (SAS/SATA HDD)

2.5-inch drive model rear (SAS/SATA/SSD, SSD M.2 *1)

Support Drive Carrier
- ・2.5-inch carrier (SC)
- ・3.5-inch carrier (SC)

   *1: With the optional riser (N8116-53), two M.2 SSD can be installed.

1.29.1 Installing a SAS or SATA drive

Install a hard disk drive by using the following procedure.

| Note	In the RAID System, use hard disk drives that have the same specifications (capacity, rotational speed, and standard) for each Disk Array.

1. See *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

    Locate the slot where you install the hard disk drive.

    Install hard disk drives in ascending order of port number.

2. Remove the dummy tray.

    Dummy trays are installed in every slot.
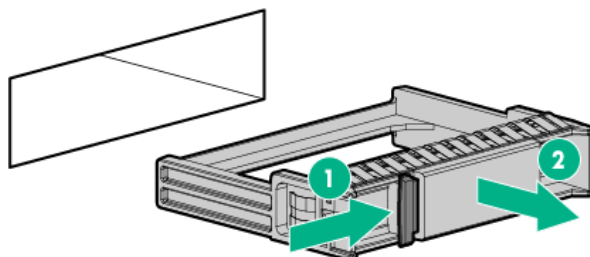
Note	Keep the removed dummy trays for future use.

3. Prepare the drive.

    Unlock the handle of the tray.
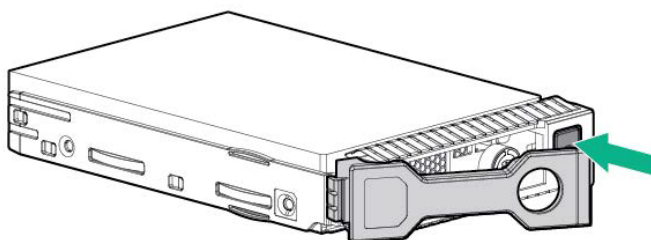
4. Hold the tray firmly and insert it into the slot.
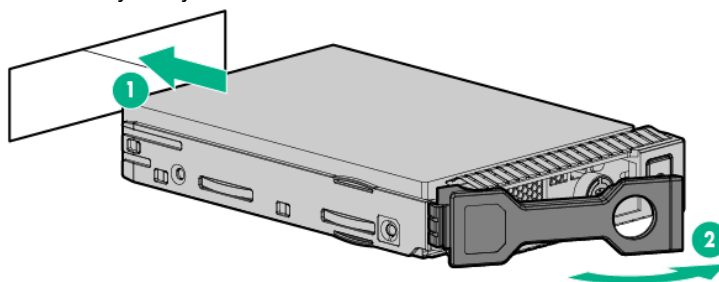
Note	• Push it all the way until the handle's lock touches the frame. • Hold the tray firmly with both hands.

5. Slowly close the handle.

    The tray is locked making a clicking sound.

Note	When you push the drive into the slot, confirm the handle got hooked on the frame.

6. Confirm the status of the drive from the combination of the LEDs of the drive.

1.29.2 **Removing Hot Plug Compatible SAS/SATA driver**

Note	To ensure adequate cooling effect, top cover, baffle, expansion slot cover, and blank should be installed for server operation. If the server supports the hot-pluggable components, please minimize the opening time of the top cover.

1. Confirm the status of the drive from the combination of the LEDs of the hot-plug SAS drive.

2. Back up all server data in the drive.

3. Unlock the handle of the tray.

   Grasp the handle and slowly pull it to remove the drive.
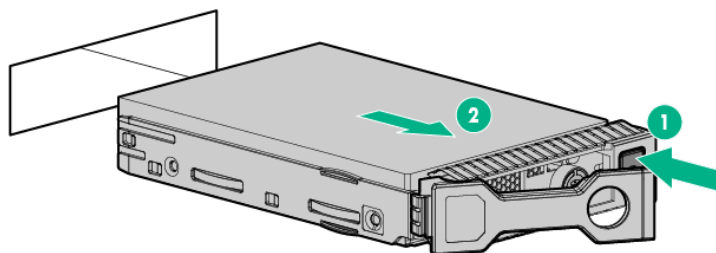
If you transfer or dispose of the removed hard disk drive, see Chapter 1 (1. Relocation and Storage) in "Maintenance Guide" to erase data.

Important	**NEC assumes no liability for data leakage should the product be transferred to a third party without erasing the data.**

Note	The saved boot order is cleared when a hard disk drive is added.

1.30 Power Supply Unit

A redundant configuration can be set with two hot-swappable power supply units (The standard version has one unit which is the required option).

The server provides a redundant power configuration that ensures continued operation of the system in the unlikely event one of the power supply units fails.

Note	AC power supply unit has a cable tie to prevent AC cable from slipping out.

1.30.1 Installation

Follow steps below to install a power supply unit:

Note	The both two power supply units installed in the server must have the same capacity. Make sure that the two power supply units have the same part number and the same label color. If the two power supply units are inappropriate, the system may become unstable to be shut down.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

To install the components, follow these steps.

1.   See steps 1 to 4 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2.   Remove the blank cover of power supply unit.

Rear

Extension slot   Standard slot

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**

Note	Keep the removed blank cover for future use.

3.   Insert the power supply unit until it is locked with clicking sound.
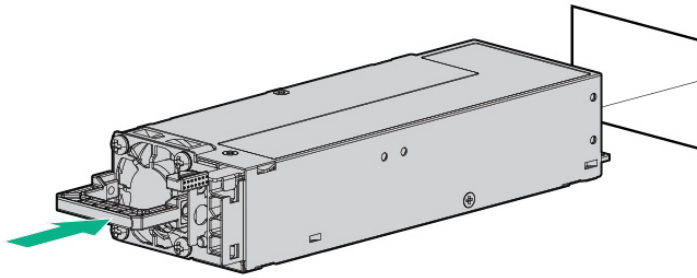
4.   Connect power cords.

      Use the specified power cords.

      When the power cord is connected, the AC power LED on the power unit will turn green.

AC POWER LED

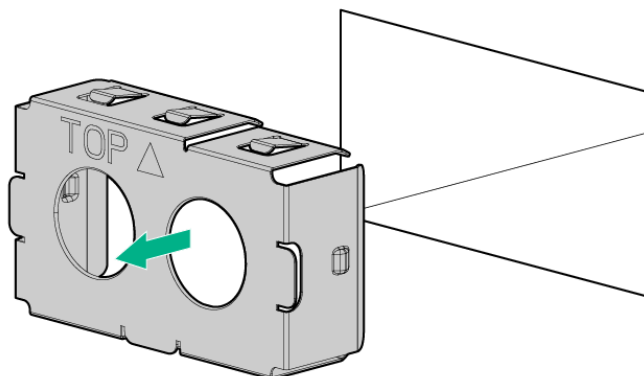Power supply unit 2   Power supply unit 1
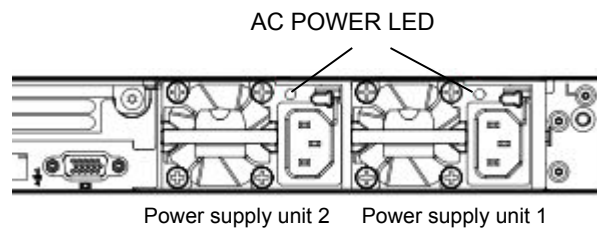
5.   Power on the server.

6.   Confirm, by STATUS LED or on POST screen, that there are no errors related to the power supply units.

      See *Chapter 2 (1. IML Error Message)* in *Maintenance Guide (Common)* for details on POST error messages.

      If AC POWER LEDs are off, reinstall the power supply units. If the same error occurs, contact with your sales representative.

1.30.2 Replacing a failing power supply unit

Replace only when the power supply unit fails.

⚠ **CAUTION**

⚡	**Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, refer to Safety Precautions and Regulatory Notices.** • Pay attention to electric hazard.

| Important	• **Do not remove a power supply unit operating normally.** • **The blank cover installation is essential for maintaining the cooling effect.**

1. Check the power supply unit whose LED indication (AC POWER LED) is off.

2. Power off the server.

Tips	In the redundant power configuration (with two power supply units) and if either one of power supply units fails, the failing power supply unit can be replaced with the system power on.

3. Disconnect the AC power cord from the failing power supply unit.

4. Push the lever of the failing power supply unit toward inside, and pull the power supply unit while holding the handle.
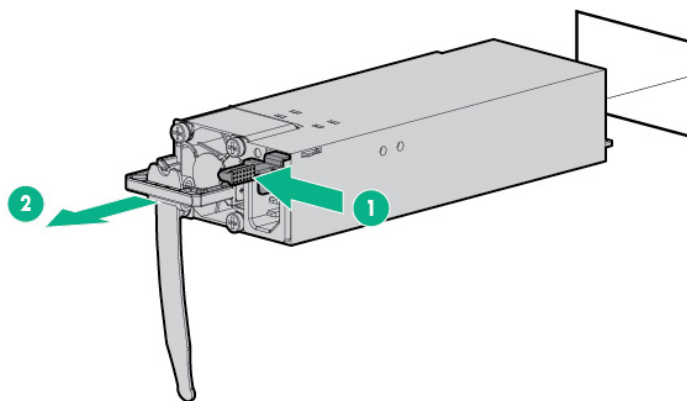
5. If operating the server with a single power supply unit without installing a new one, install the blank cover you removed in step 2 of installation procedure.

Important	To maintain the cooling effect in the server, be sure to install the blank cover in the vacant slot.

6. Install the new power supply unit taking steps 3 to 6 of *"Installation"*, and confirm that the power supply unit is installed normally.

1.31 **Power Supply Unit (800W/DC-48V) N8181-163**

1.31.1 **Installation**

Follow steps below to install a power supply unit:

Note	The both two power supply units installed in the server must have the same capacity. Make sure that the two power supply units have the same part number and the same label color. If the two power supply units are inappropriate, the system may become unstable to be shut down.

Note	In order to prevent damage of the system due to improper cooling or elevated temperature, please do not activate the server or enclosure without implementing any of component or blank on all of drive bays and device bays.

To install the components, follow these steps.

1. See steps 1 to 4 in *Chapter 2 (1.2 Overview of Installation and Removal)* for preparations.

2. Remove the blank cover of power supply unit.

Express5800/R120h-1M Rear
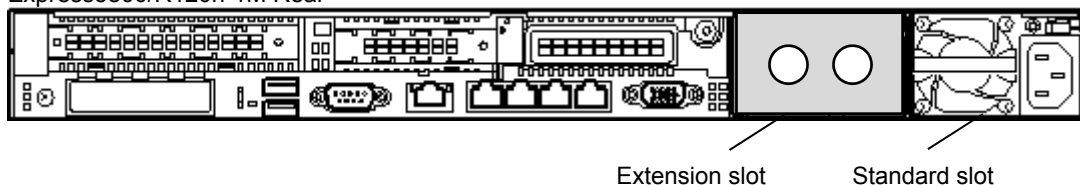
Extension slot   Standard slot

Important	**The surface becomes hot after use so to avoid burns please allow the drive and internal parts of the system to cool before touching.**
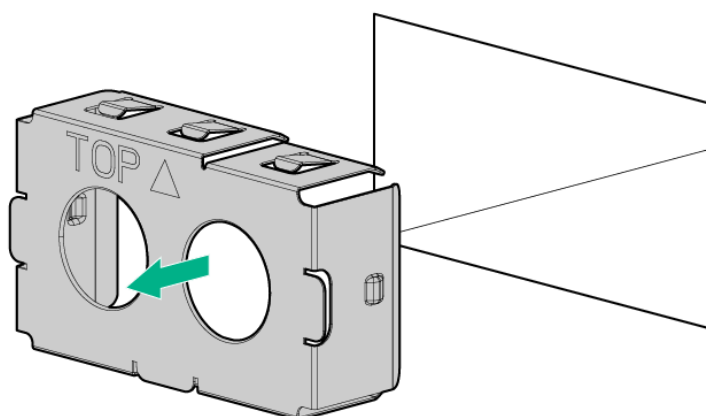
Note	Keep the removed blank cover for future use.

3. Remove the screw, and remove the ground wire terminal.
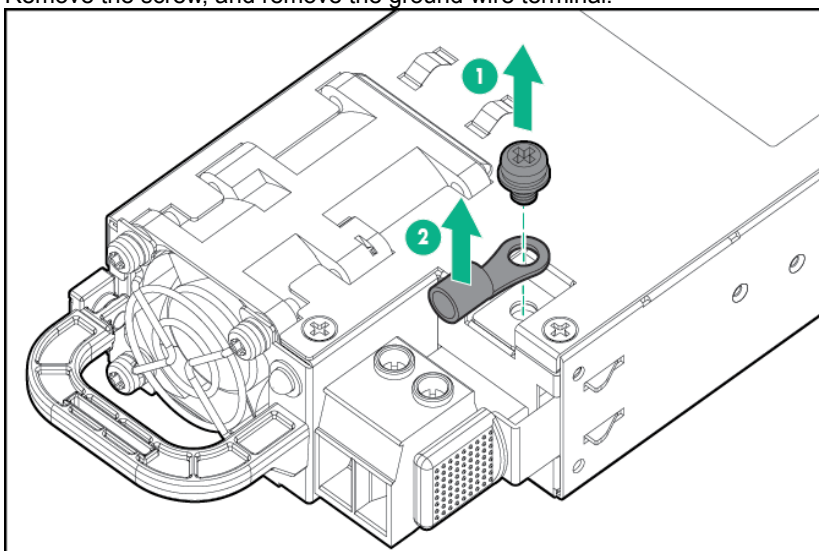
4. Attach the ground wire (green) to the terminal.
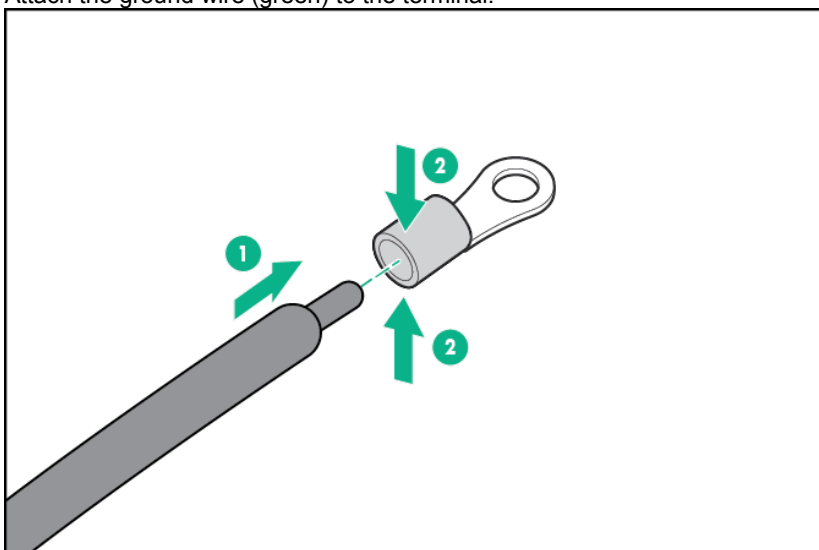
5. Remove the terminal block connector.
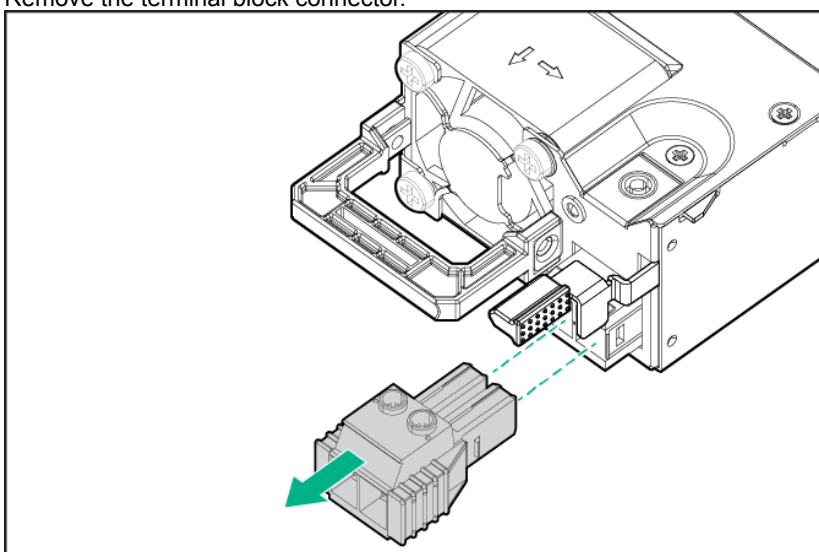
6. Loosen the screws on the terminal block connector.
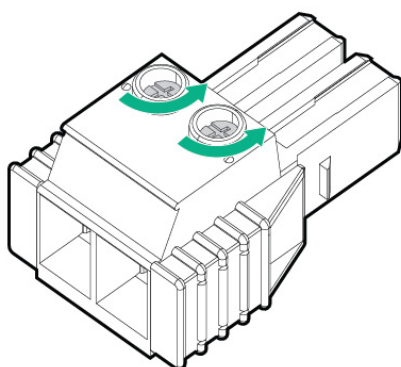
7. Connect the ground wire attached to the contact in Step 4 to the power supply unit (DC) with the screw, as shown below.

Important	Make sure to connect it before connecting the power line.
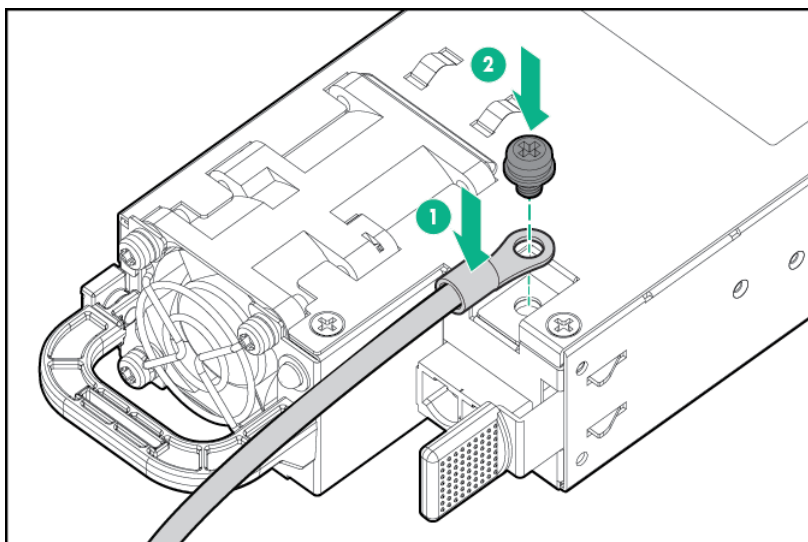
8. Insert the power line (DC) into the left slot of the terminal block connector, and tighten the screw.
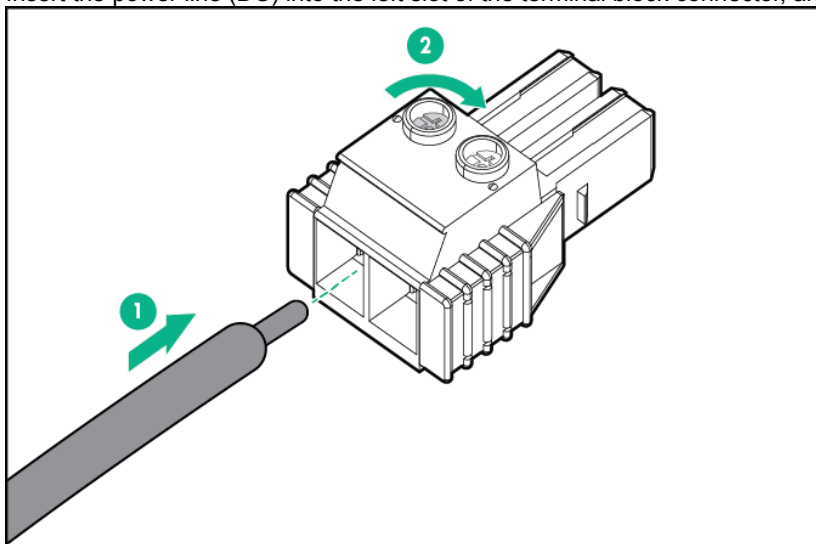
9. Similarly, insert the return line (DC) into the right slot of the terminal block connector, and tighten the screw.
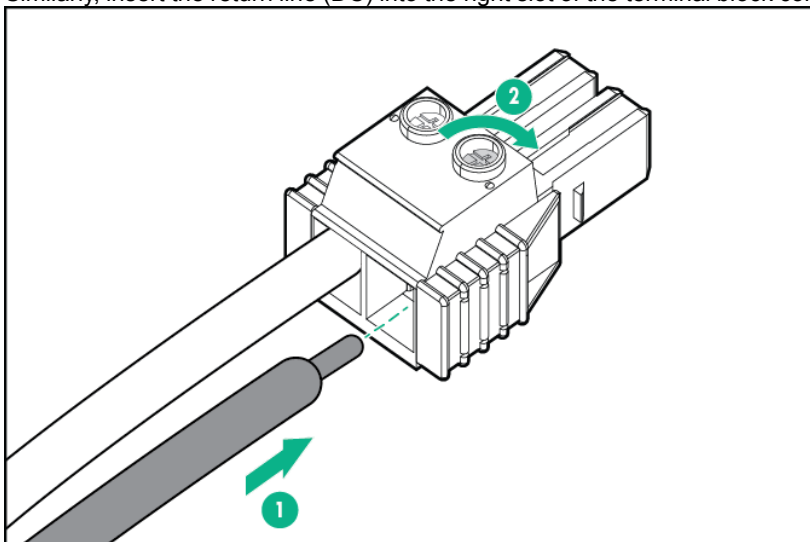
10. After inserting the 2 lines to the terminal block connector, connect it to the power supply unit (DC).
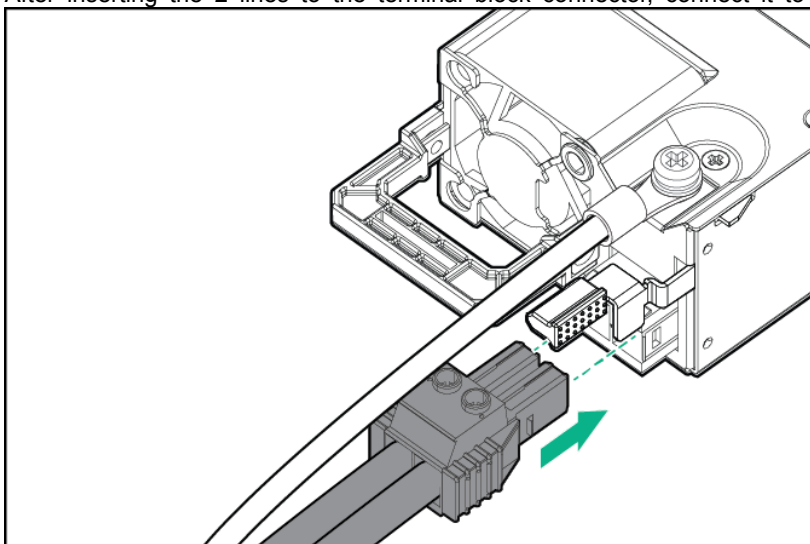
11. Secure the power line and ground wire to the handle of the power supply unit (DC) with a strap.
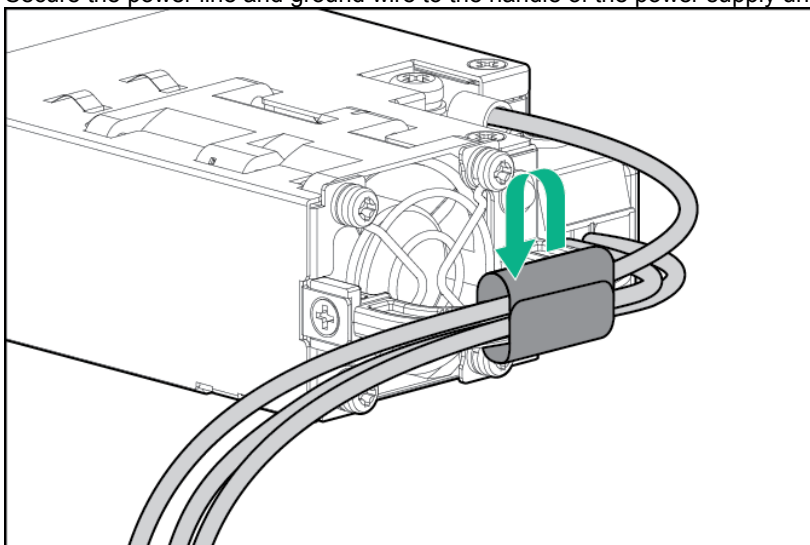
12. Insert the power supply unit until it is locked with clicking sound.
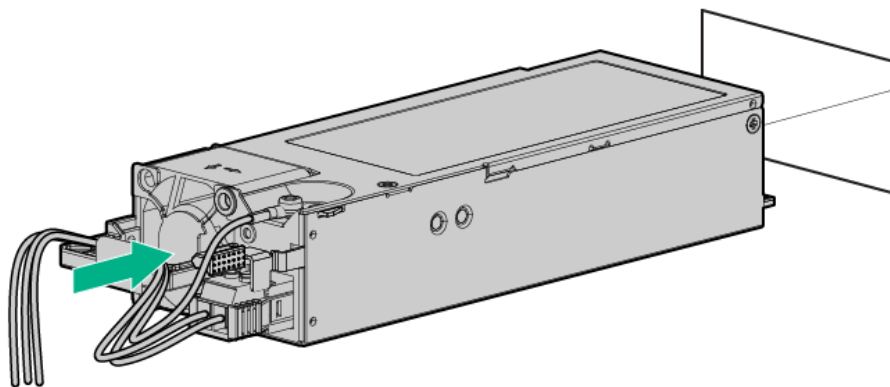
13. With the source of the power supply (DC) or the breaker turned OFF, connect the line from the power supply unit (DC) to the source of the power supply (DC).

14. When the power supply (DC) source is turned ON, the lamps of the power supply unit (DC) illuminate.

AC POWER LED

Express5800/R120h-1M Rear side
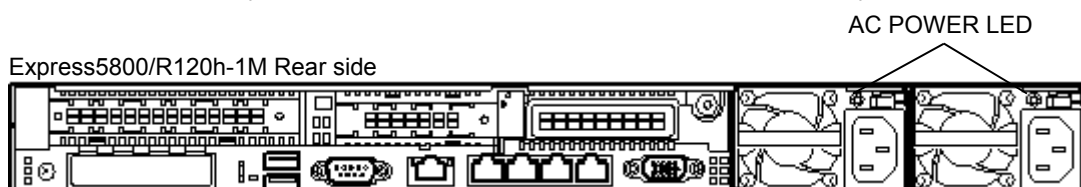
15. Power on the server.

16. Confirm, by STATUS LED or on POST screen, that there are no errors related to the power supply units. See *Chapter 2 (1. IML Error Message)* in *Maintenance Guide (Common)* for details on POST error messages. If AC POWER LEDs are off, reinstall the power supply units. If the same error occurs, contact with your sales representative.

1.31.2 **Removal**

The procedure for removal is the reverse of installation.

Re-attach the blank cover if you operate without it attached.

Important	**Re-attach the blank cover removed to maintain the internal cooling.**

1.32 **Installing Front Bezel**

1. When installing the front bezel, align the upper and lower sides of the front bezel.

2. Fit the right side (from the front view) of the front bezel into a recess on the front part of the device, push the left side lever to the right, set in place the left side of the device, and then release the lever so that it will be locked. Check whether the front bezel is securely locked by pulling it lightly in front.
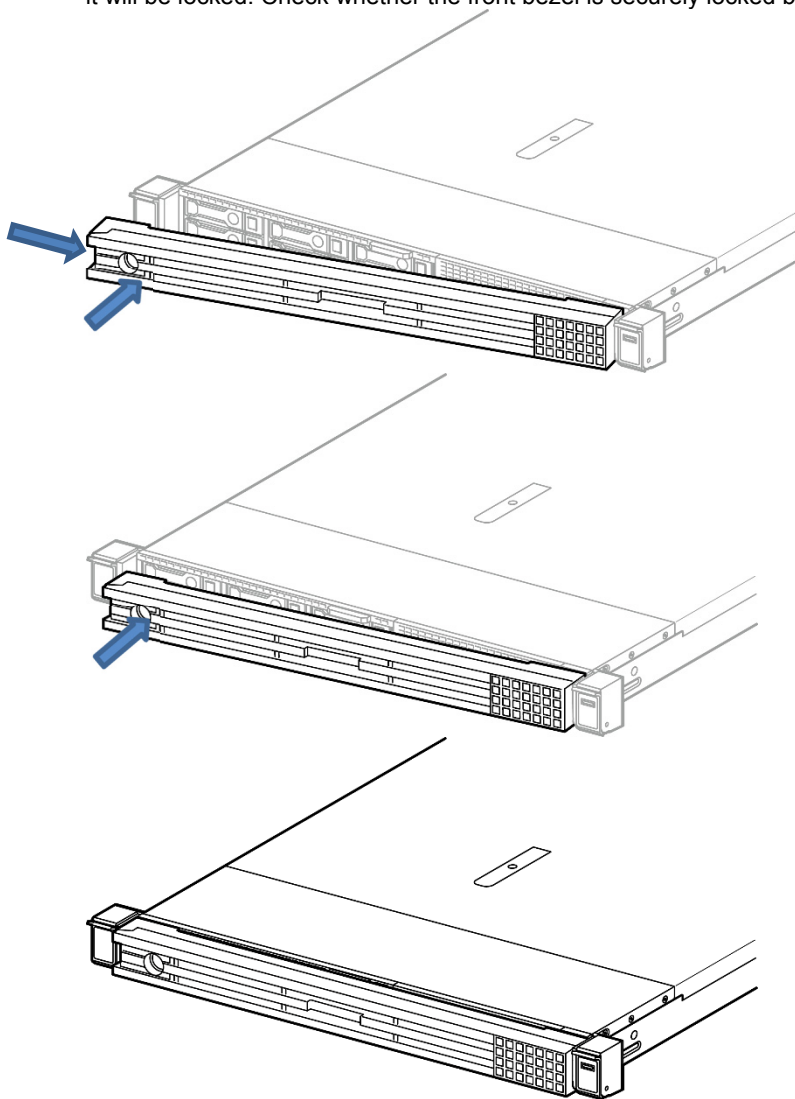
3. Insert the key, and rotate it clockwise while pressing until it is locked into place.

Unlock / **Lock**
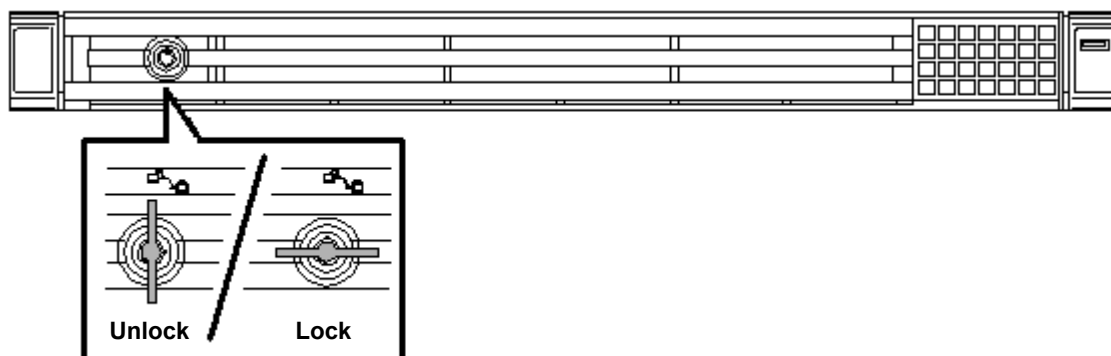
Important	Be careful not to press the POWER Switch.

2. Installation and Connection

This section describes how to install the server and connect cables.

2.1 Installation

This server must be mounted to a rack which conforms to EIA standards for use.

2.1.1 Installing Rack

Refer to the manual that comes with your rack for how to install the rack, or consult with your sales representative.

⚠ **WARNING**
Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, refer to Safety Precautions and Regulatory Notices. • **Use only in the specified environment.** • **Do not connect the ground wire to a gas pipe.**

⚠ **CAUTION**
Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, refer to Safety Precautions and Regulatory Notices. • **Do not carry or install the server only by a single person.** • **Do not install the server so that the load may be concentrated on a specific point.** • **Do not install any components only by a single person.**   **Confirm that hinge pins of the door are completely secured in place.** • **Do not pull out the server from the rack when the rack is unstable.** • **Do not leave more than one device being pulled out from the rack.** • **Do not provide the wiring for the server to exceed the rating of the power supply.** • **Do not use the server in the environment where corrosive gas is generated.**

Do not install the rack or server under the following environment. Doing so may cause malfunction of the server.

- Narrow space from which devices cannot be pulled out from the rack completely
- Place that cannot bear the total weights of the rack and devices mounted on the rack
- Place where stabilizers cannot be installed or where the rack can be installed only after the practice of proper earthquake-resistant construction
- Place of uneven or slanting floor
- Place of drastic temperature change (near a heater, air conditioner, or refrigerator)
- Place where intense vibration may be generated
- Place where corrosive gases (sulfur dioxide, hydrogen sulfide, nitrogen dioxide, chlorine, ammonia, ozone, etc) exist. Place where the air (or dust) includes components accelerating corrosion (ex. sulfur, sodium chloride) or conductive metals
- Place where chemicals may be accidentally sprayed over
- Place where a carpet not subject to anti-static process is laid
- Place where some objects may be fallen on the rack
- Place near a device generating intense magnetic field (such as TVs, radios, broadcast/communication antennas, power transmission wires, and electromagnetic cranes) is placed.
- Place where the power cord of the server must be connected to an AC outlet that shares the outlet of another device with large power consumption
- Place near equipment that generates power noise (e.g., contact spark at power-on/power-off of commercial power supply through a relay).
- Environment where operation of the server is not guaranteed

2.1.2 Space and air flow requirements

For easier repairing and improvement of ventilation, follow the space requirements when you determine the install location of the rack.

- Make a clearance of 63.5 cm (25 in.) or more on the front side of the rack.
- Make a clearance of 76.2 cm (30 in.) or more on the back side of the rack.
- Make a clearance of 121.9 cm (48 in.) or more between the back side of the rack and the back side of the other racks or the rack row.

In this server, the cold air is absorbed from the front , and the hot air inside is discharged via the rear . Therefore, adequate openings able to absorb the air into the cabinet and discharge the heat are required at the front and rear of rack.

Note	To prevent improper cooling situations or damages to the equipment, do not block the ventilation openings.

If a server or rack component is not installed on every shelf in the rack, the air flow through the rack or the server will change because the shelf is empty. To maintain adequate ventilation, blank panels should be covered on all the shelves that do not have components installed.

Note	Blank panels should be used to cover on all the shelves that do not have components installed. This ensures the adequate ventilation. If a rack without a blank panel is used, high-temperature damage may occur due to improper cooling.

Note	When using racks of other companies, the following additional requirements must be met in order to improve the ventilation for preventing damages to the equipment.
	• Front and rear doors - When closing the front or rear doors with a 42U rack, the ventilation holes of 5350 cm 2 (830 sq in.) should be distributed evenly from top to bottom for the proper ventilation (These are equivalent to 64% of the opening required for ventilation).
	• Side - Make at least 7 cm (2.75 in.) clearance between the installed rack components and the side panels of the rack. Blank panels should be used to cover on all the shelves that do not have components installed. This ensures the adequate ventilation. If a rack without a blank panel is used, high-temperature damage may occur due to improper cooling.

2.1.3 Temperature requirement

The system must be installed or located in well-ventilated and well-controlled places so that the equipment operates safely and properly.

For most server products, the maximum recommended ambient operating temperature (TMRA) is 35°C. The temperature inside the room where the rack is installed should not exceed 35°C.

Note	When installing options of other companies, note the following points for preventing damages to the equipment.
	• Never block the ventilation around the server with optional equipment, and make sure that temperature inside the rack does not exceed the maximum specifications.
	• Make sure that the manufacturer`s TMRA specification is not exceeded.

2.1.4 Power requirements

The installation of this equipment must be performed by a qualified electrician according to the electrical standards of your region   regarding to the installation of information technology equipment. This device is designed to operate in the system configuration specified by NFPA 70; 1999 Edition (National Electric Code) and NFPA-75; 1992 (Code for Protection of Electronic Computer/Data Processing Equipment). For the rating of the optional power supply, refer to the rating label of the product or the user document included with the option.

Important	**To prevent injuries, fires, or damages to the equipment, the rated load of the AC power supply branch circuit that supplies power to the rack should not be exceeded. For wiring and installation requirements of electrical equipment, contact the power company in your area.**

Note | Use a UPS (Uninterruptible power supply) to protect the server from unstable power situation or temporary power outages. The UPS protects the hardware against damages caused by power surges and voltage spikes, and allows the system to continue operation even during a power outage.

If more than one server are installed, additional distribution equipment may require to be used for securely powering all the devices. Follow the guidelines below.

- Make sure that each of the power supply loads is uniform among the available AC power branch circuits.

- Make sure that the AC current load through the entire system does not exceed 80% of AC current rating of the branch circuits.

- Do not use the extension cord with the outlet for general use for this unit.

- Prepare a dedicated electrical circuit on the server.

2.1.5 Grounding Requirements

For proper operation and usage, the server must be properly grounded. In the United States, the equipment must be installed according to the section 250 of NFPA 70, 1999 Edition (National Electric Code) as well as regional building standards. In Canada, the equipment must be installed according to Canadian Standards Association, CSA C 22.1, Canadian Electrical Code. In all other countries, the equipment must be installed according to the Electrical Wiring Rules of your region such as the Codes 364-1 to 7 of International Electrotechnical Commission (IEC). In addition, all types of the distribution equipment used for installation such as branch wires and outlets must be the grounded equipment that is specified or approved.

For preventing high voltage leakage current generated from multiple servers that are connected to the same power supply, it is recommended to connect fixedly to the branch circuit of the building, or to use a PDU equipped with a non-removable cord connected to the industrial plug. NEMA locking plugs or IEC 60309 compliant plugs are suitable for this purpose. For the server, an extension cord with the outlet for general use is not recommended to be used.

2.1.6 Connecting DC power cable and DC power supply

Important | **To prevent injuries due to electric shock or high voltage, observe the following precautions.**

- **Installation of this equipment should be performed by a trained specialist that is defined in NEC and IEC 60950-1 Second edition "The standard for Safety of Information Technology Equipment."**

- **Connect the equipment to the secondary circuit power supply that is properly grounded. The secondary circuit does not have direct connection with the primary circuit, and gains power from a transformer, converter, or equivalent isolation device.**

- **The overcurrent protection of the branch circuit should be 27 A.**

Important | **When installing the DC power supply unit, the ground wire must be connected before connecting the positive or negative electrode lead.**

Important	**Turn off the power supply before performing the power supply installation procedure or maintenance.**

Note	The grounded conductor of the DC supply circuit and the ground conductor are connected each other in the server unit. For details, refer to the document included in the power supply.

Note	If the grounded conductor of the DC supply circuit and the ground conductor are DC-connected on the server device, the following conditions must be met. • This device must be connected directly to the grounded electrode conductor of the DC supply system, or to the bonding jumper from the bar or the bus of the ground terminal of the connection destination. • This device must be installed in other devices which the grounded conductors of the same DC supply circuit and the ground conductors are connected to, and in the same adjacent area as the DC system ground point (such as an adjacent cabinet). The DC system must be grounded elsewhere. • The DC source must be installed in the same building where the equipment installed. • The switches or power-off devices should not be located on the grounded circuit conductor between the DC source and the connection point of the ground electrode conductor.

For connecting the DC power cable to DC power supply, follow the procedure below.

1. Cut the DC power cord at least 150 cm (59.06 in.) in length.

2. If ring tongs are required for the power supply, use a crimping tool to attach the ring tongue to the power cord wire.

Important	**The ring terminal must conform to UL certified 12 gauge.**

Important	**The minimum nominal diameter for the sled of pillar or stud type terminal should be 3.5 mm (0.138 in.). Also, the diameter of the screw type terminal should be 4.0 mm (0.157 in.).**

3. Group together wires of the same color and attach them to the same power supply. The power cord consists of three wires (black, red, and green).

For details, refer to the document included in the power supply.

2.1.7 Installing the server to the rack or removing it from the rack

Mount the server to the rack. (This section also describes the removal procedure.)

⚠ WARNING
Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, refer to *Safety Precautions and Regulatory Notices*. • **Do not use any racks out of standards.** • **Use only under the specified environment.**

⚠ CAUTION
Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, refer to Safety Precautions and Regulatory Notices. • **Do not drop.** • **Do not leave the server being pulled out.** • **Do not install with the cover removed.** • **Do not get your fingers caught.**

> **Important** **Temperature increases and airflow in the rack**
>
> **If multiple devices are installed, or if the inside of the rack is not sufficiently ventilated, the internal temperature rises due to the heat emitted from each device, which may result in a malfunction. Review airflow in the rack and room and take sufficient measures so that the internal temperature will not exceed the operational temperature during operation.**
>
> **Air enters the server from the front and exits from the rear.**

(1) Preparation before installing to the rack

Four types of rails are offered to be installed on the rack.

Also, the type of the rail is different depending on the drive model of 2.5-inch or 3.5-inch.

Check the following table for each model.

Model name	N code	Part name	Specification
2.5-inch drive model	N8143-127	Slide Rail Kit for 1U-2.5" Server	Ball bearing type rack rail for 2.5-inch drive model (no inner rail used)
	N8143-131	Tool-free Slide Rail Kit for 1U-2.5inch Server	Slide rail type rack rail for 2.5-inch drive model (inner rail used)
3.5-inch drive model	N8143-128	Slide Rail Kit for 1U-3.5" Server	Ball bearing type rack rail for 3.5-inch drive model (no inner rail used)
	N8143-132	Tool-free Slide Rail Kit for 1U-3.5inch Server	Slide rail type rack rail for 3.5-inch drive model (inner rail used)

Important	Rail for left side has different shape from that for right side. Make sure the orientation of rails to properly install them.

(a) Tool-free Slide Rail Kit for 1U N8143-131/132

- Checking the inner and outer rails

Check the direction of the inner and outer rails.

Since there are markings of "Right" and "Left" on the outer rail, check the proper directions of right and left with it. Likewise, check the directions of front and back with the markings of "Front" and "Rear."

On the inner rail, there is no marking for Front, Rear, Right or Left, so refer to the figure below to check the each direction.
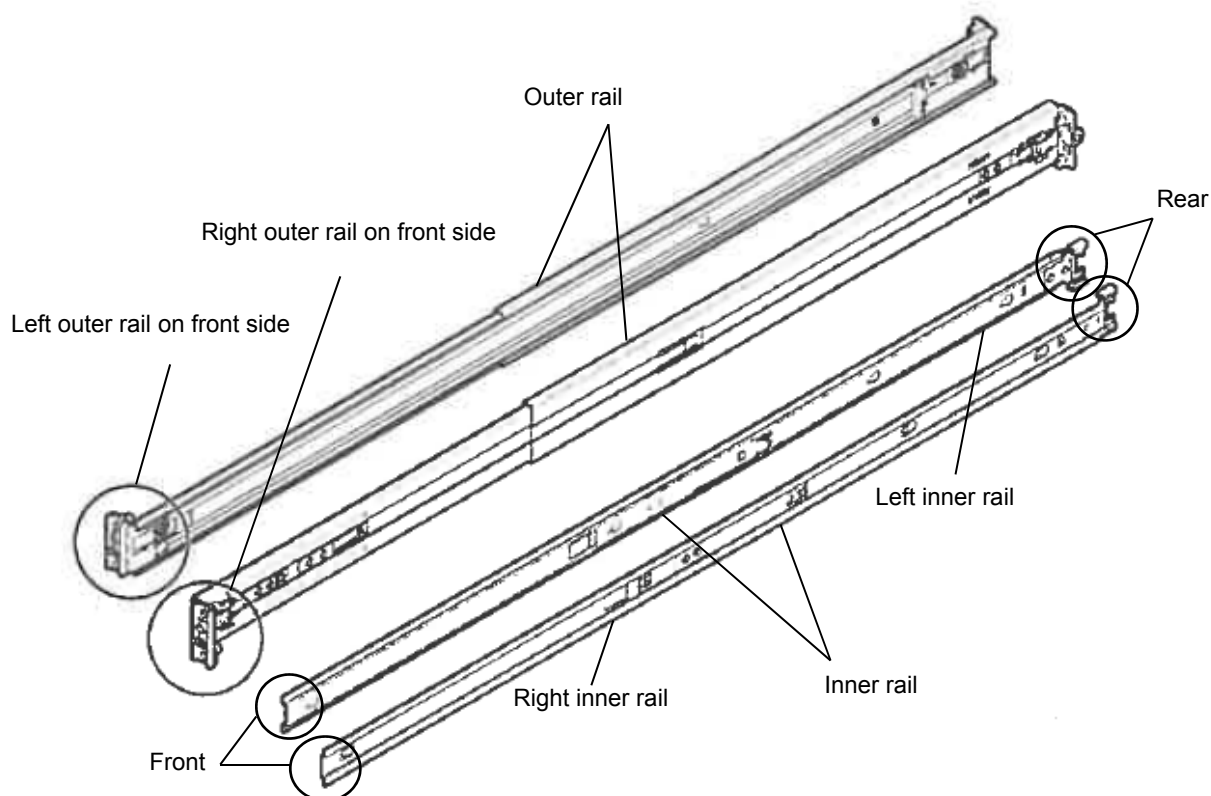
- Attaching the inner rail to the server

  As seen from the front side of the rack, attach the outer rail (LEFT) to the left, and the outer rail (RIGHT) to
  the right.
  Slide the inner rail to the rear side of the unit, in accordance with the four protrusions on the side of the unit.
  At this time, check whether the lock located around the center of the inner rail clicks to be securely locked.
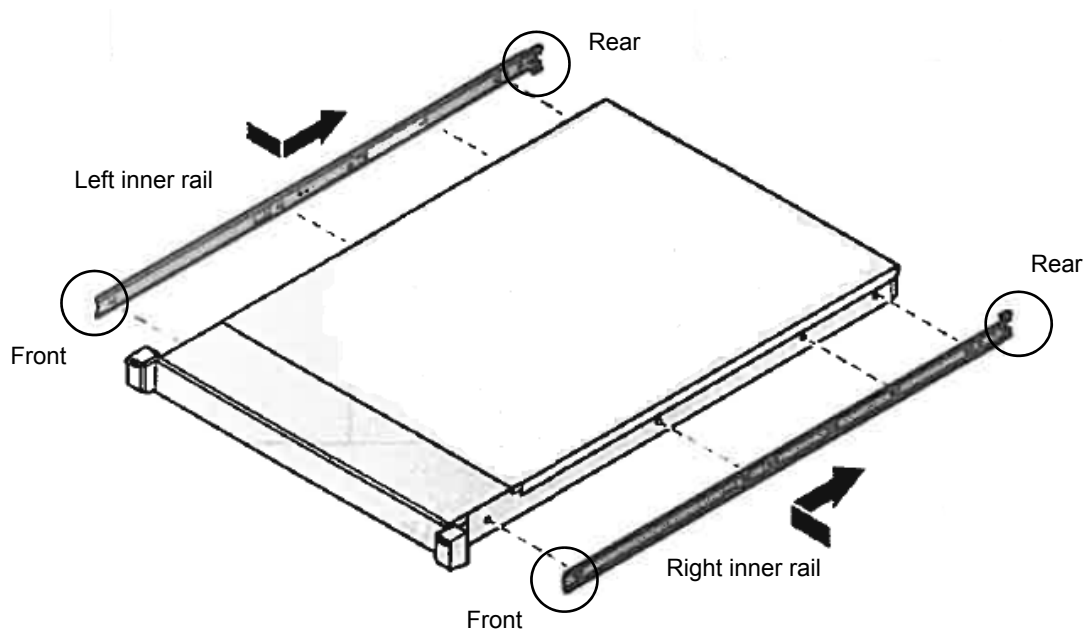
- Removing the inner rail

  Lifting a little the metal plate part located around the center of the inner rail, then the lock will be released.
  Slide it forward in the unlocked state, and it can be removed.

- Attaching the outer rail to the rack

  As seen from the front side of the rack, attach the outer rail (LEFT) to the left, and the outer rail (RIGHT) to the right.

  Insert the round protrusion on the outer rail into the square hole of the 19-inch rack. Make sure that it makes a clicking sound indicating that it is locked.

  The figure on left shows the front side of the right outer rail. The figure on right shows the rear side of the right outer rail.

  Install the left outer rail in the same way.

  Make sure that the rail is installed at the same height as the other rail already installed.

The rear side of the right outer rail

The front side of the right outer rail

Important	**Confirm that the rail are securely locked so that they will not fall off.**

Tips	Although the rail may be somewhat unsteady, it is not defective.

- Removing outer rails

  Remove outer rails from the rack in the following procedure.

  1. See _Chapter 2 (2.1.7 Installing the server to the rack or removing it from the rack, 2) Removal procedure)_ to remove the server from the rack.
  2. Reduce the slide rail of the outer rail. In case the slide rail is locked in the middle, continue pushing the rail stopper on the side of the rail to reduce the slide rail.

3. Push the lock release button of the outer rail in the direction of the arrow and push the rail forward of the rack to remove it.
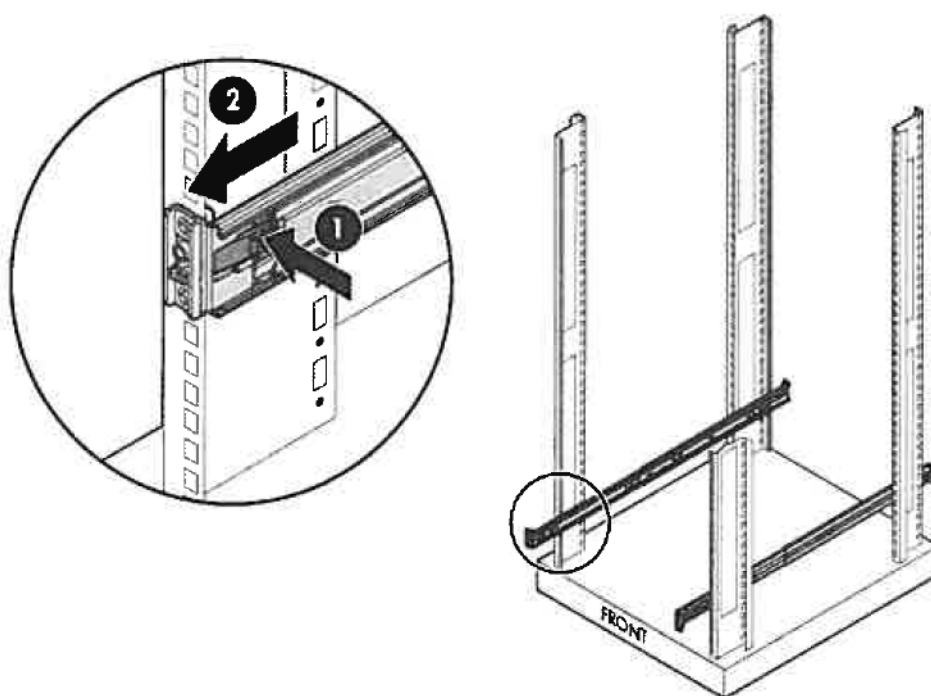
(b) Slide Rail Kit for 1U N8143-127/128

- **Checking the outer rails**

    Check the direction of the outer rail.

    Since there are markings of "Right" and "Left" on the outer rail, check the proper directions of right and left with it. Likewise, check the directions of front and back with the markings of "Front" and "Rear."

Marking of Rear

Left rail

Marking of Front left

Marking of Rear

Right rail

Marking of Front right
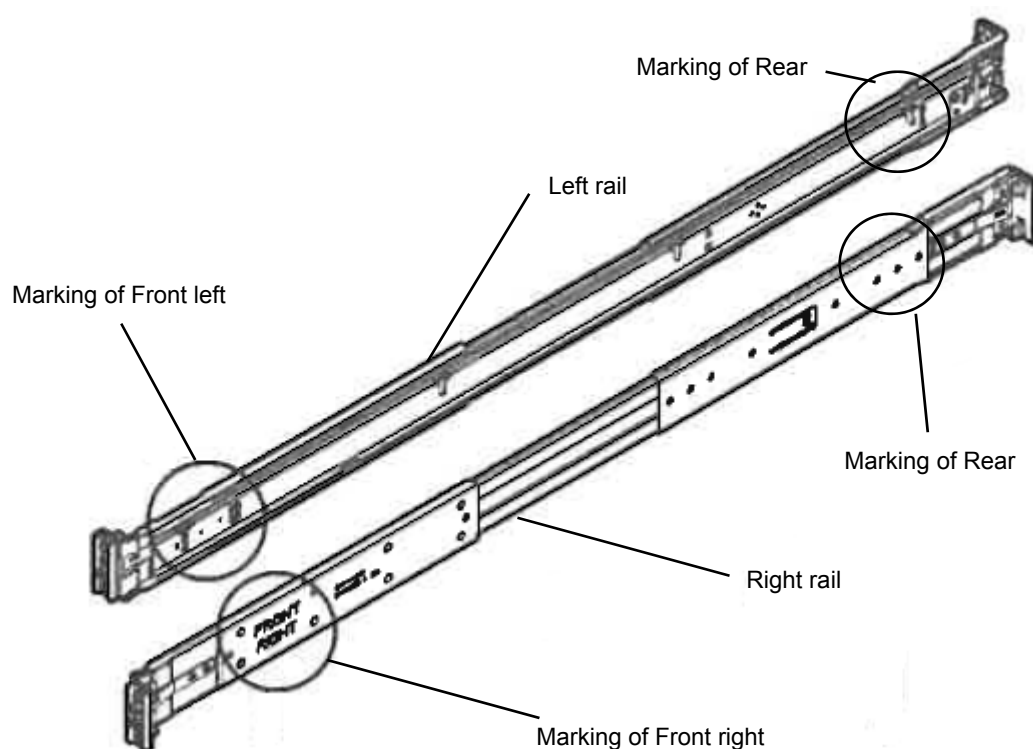
- **Attaching the outer rail to the rack**

  Insert the round protrusion on the outer rail into the square hole of the 19-inch rack. Make sure that it makes a clicking sound indicating that it is locked.

  The figure on left shows the front side of the right outer rail. The figure on right shows the rear side of the right outer rail.

  Install the left outer rail in the same way.

  Make sure that the rail is installed at the same height as the other rail already installed.

The rear side of the right outer rail

The front side of the right outer rail

Important	**Confirm that the rail are securely locked so that they will not fall off.**

| Tips	Although the rail may be somewhat unsteady, it is not defective.

- Removing the outer rails

  Remove outer rails from the rack in the following procedure.

  See *Chapter 2 (2.1.7 Installing the server to the rack or removing it from the rack, 2) Removal procedure)* to remove the server from the rack.

  1. Reduce the slide rail of the outer rail. In case the slide rail is locked in the middle, continue pushing the rail stopper on the side of the rail to reduce the slide rail.

  2. Push the slotted screwdriver into the unlocking hole on the front side of the outer rail, and move it in the direction of the arrow to release the lock, then push the rail forward to remove it.
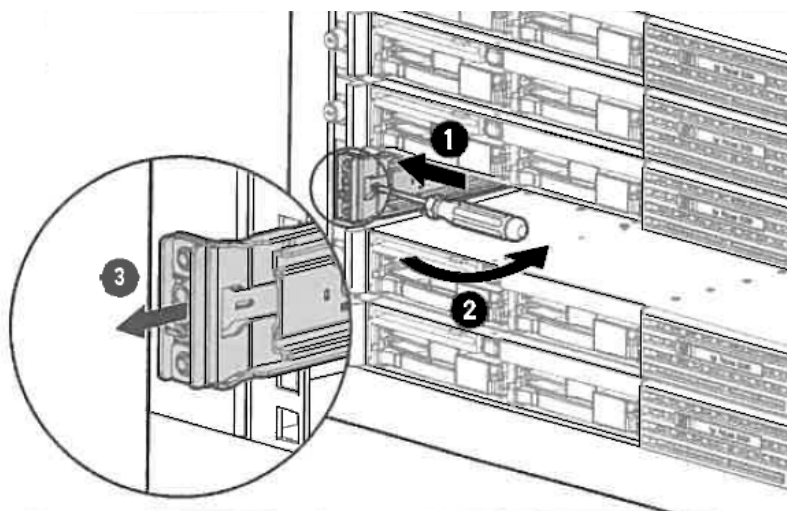
3. Push the slotted screwdriver in the unlocking hole on the back side of the outer rail, and move it in the direction of the arrow to release the lock, then push the rail backward to remove it.
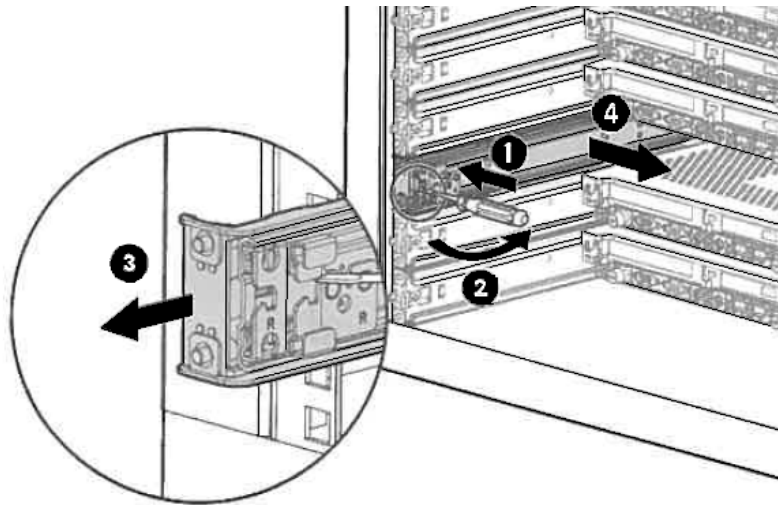
(2) Installing/removing the server

⚠ CAUTION

	Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, refer to Safety Precautions and Regulatory Notices. • Do not attempt to lift the server with single person. • Do not drop. • Do not leave the server being pulled out. • Do not install with the cover removed. • Do not get your fingers caught.

(a) Tool-free Slide Rail Kit for 1U N8143-131/132

1) Installation

Mount the server to a rack in the following procedure.

Important	Always install the server with two or more persons.

1. With two or more persons, firmly hold the server and mount it to the rack.

2. Make sure the inner rails on both sides are correctly inserted in the outer rail.
   Push the device slowly into the back. Push the front lock until it clicks for the unit to be fixed.
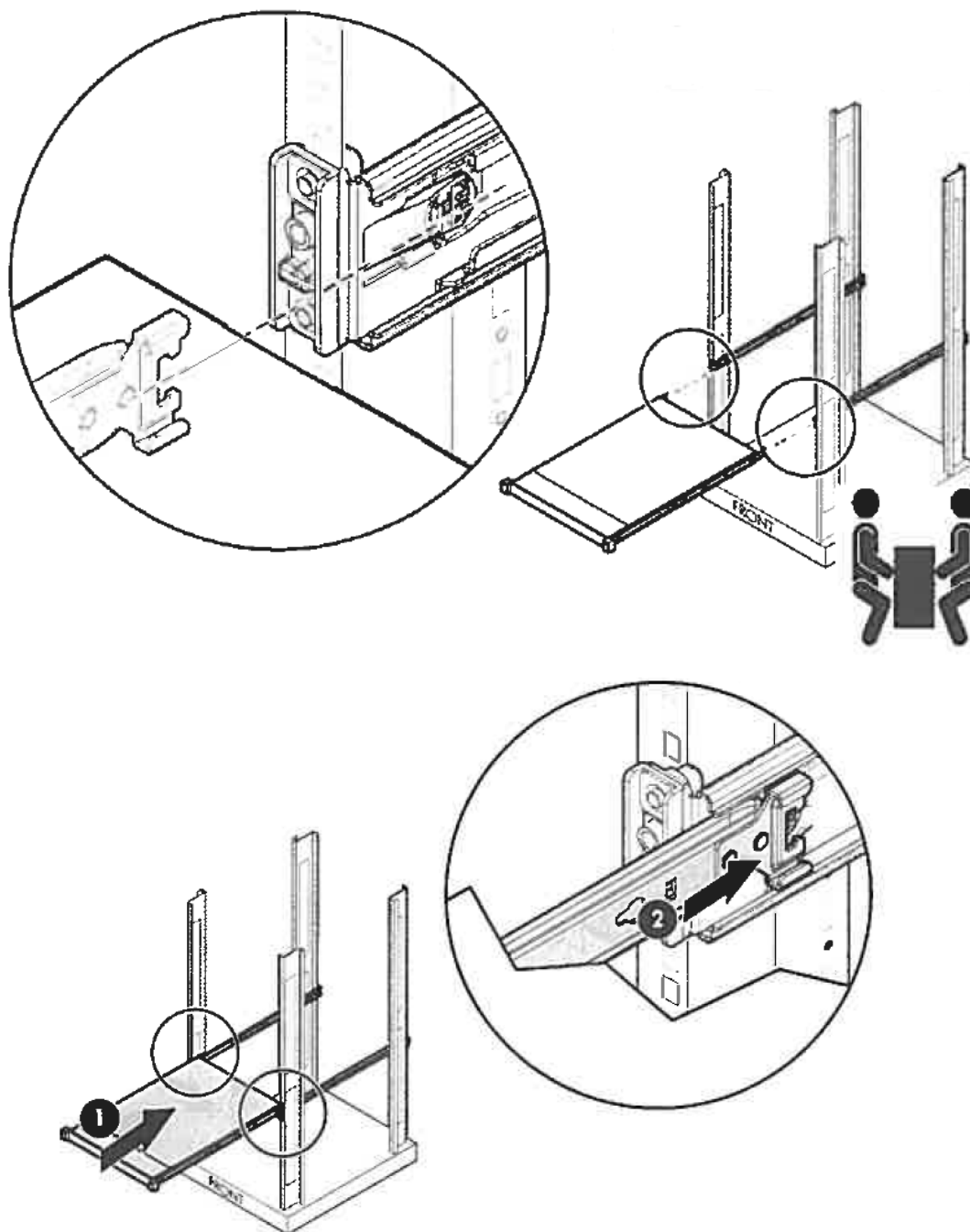
3. If you like to install the included cable tie strip to the rear side of the rack, attach the tie strip to the mounting hole of the outer rail as shown below.

4. If you like to secure the unit to the rack with screw, open the lid of the edge part of the unit and fasten the screw inside with a hexalobular driver to secure the unit to the rack.

2) Removal procedure

Remove the server from the rack in the following procedure.

Important	At least two persons are required to remove the server from rack.

1. Make sure that the server is turned off and then disconnect the power cord or all interface cables from the server.

2. Remove the front bezel.

3. Open the lids of the unit fixing screws on both sides of the device. Then remove the fixing screws inside with hexalobular driver, if the device is screwed on. If the device is not screwed on, you can unlock the device just by opening the lid.

Important	Be careful not to get your fingers caught in the rails or lever.

4. Slide the unit forward, and remove from the rack while holding it securely. In case the unit is locked in the middle, continue pushing the rail stopper on the side of the rail and slowly draw out the unit to remove from the rack.

| Important	• While more than one person is supporting the bottom part of the server, slowly pull out the server. • Do not apply pressure on the server from top when it is being pulled out. Doing so cause the server to drop.

(b) Slide Rail Kit for 1U N8143-127/128

1) Installation
Mount the server to a rack in the following procedure.

Important	Always install the server with two or more persons.

1. Pull out the left and right outer rails until they are completely locked to the front side.

2. Hold the unit securely by two or more persons, and lift it to the height of the rack rail.

3.   Carefully install the device to the rail while confirming that the protrusion part of the device is correctly inserted in the groove of the rail in the order of 1 → 2 → 3 → 4 on both sides of the outer rail.
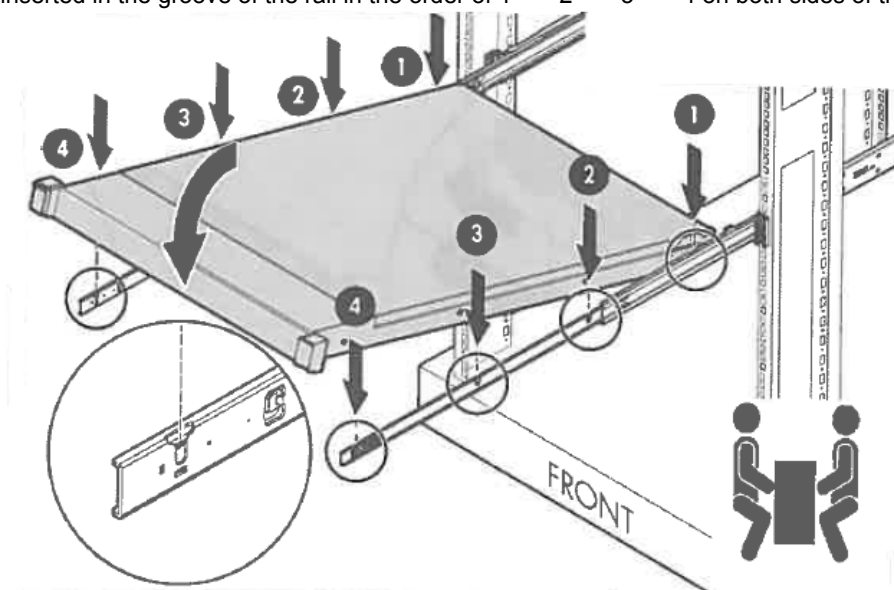
4.   Press the lock release button on the side of the rail, and slowly push the device backward with the lock released. Push the server until its lock on front panel clicks.
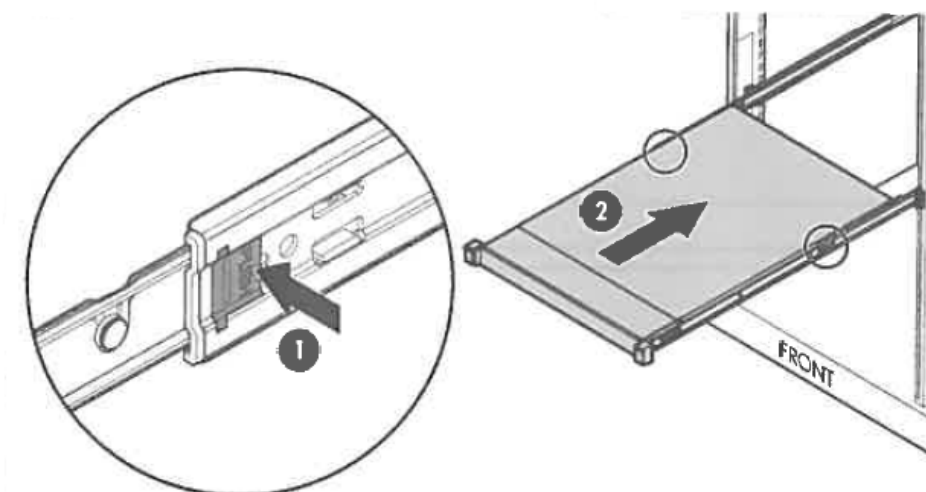
5.   If you like to install the included cable tie strip to the rear side of the rack, attach the tie strip to the mounting hole of the outer rail as shown below.

6. If you like to secure the unit to the rack with screw, open the lid of the edge part of the unit and fasten the screw inside with a hexalobular driver to secure the unit to the rack.

2) Removal procedure

Remove the server from the rack in the following procedure.

Important	At least two persons are required to remove the server from rack.

1. Make sure that the server is turned off and then disconnect the power cord or all interface cables from the server.
2. Remove the front bezel.

3. Open the lids of the unit fixing screws on both sides of the device. Then remove the fixing screws inside with hexalobular driver, if the device is screwed on. If the device is not screwed on, you can unlock the device just by opening the lid.

4. Slide the unit forward until it is locked. For removing the device from the rack, hold the device securely by two or more persons, press the stopper button on the side of the rail, and lift the device above the rails in the order of 1 → 2 → 3 → 4 to remove it from the rail.

Stopper button
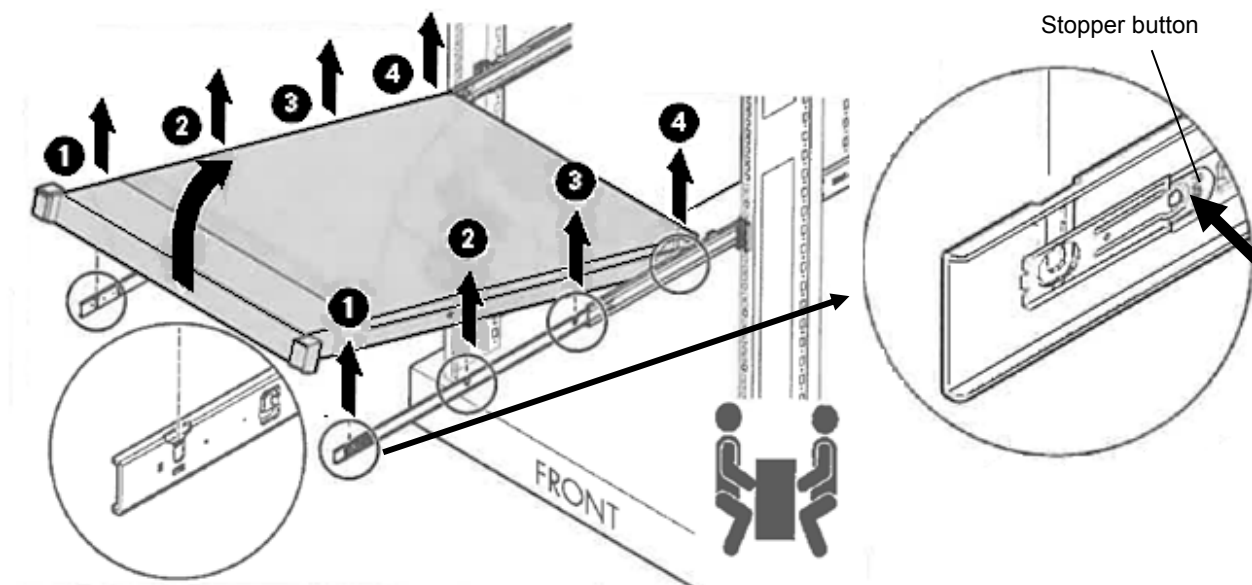
Important	Be careful not to get your fingers caught in the rails or lever.

Important	• While more than one person is supporting the bottom part of the server, slowly pull out the server.
	• Do not apply pressure on the server from top when it is being pulled out. Doing so cause the server to drop.

2.2 Connection

Connect peripheral devices to the server.

Connectors that allow a variety of peripheral devices to be connected are provided at the front and rear of the server. Images on the following pages show the peripheral devices that can be connected in their standard state and their respective connector positions.

⚠ WARNING

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause death or serious injury. For details, refer to Safety Precautions and Regulatory Notices.

- Do not hold the power plug with wet hands
- Do not connect the ground wire to a gas pipe

⚠ CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, refer to Safety Precautions and Regulatory Notices.

- Use only the specified outlet to insert.
- Do not connect the power cord to an outlet that has an illegal number of connections.
- Insert the power plug into the outlet as far as it goes.
- Use only the specified power cord
- Do not connect or disconnect the interface cable with the power plugged in the outlet.
- Use only the specified interface cable

USB 2.0 device   USB 3.0 device

4x 3.5-inch drive model

Front   8x 2.5-inch drive model

Hub, switching hub, etc.   Display unit

1000BASE-T/
100BASE-TX/
10BASE-T

Data
LAN ports   1   2   3   4

Rear

USB3.0 device

Finally, connect the provided
power cord to an outlet *1

Device with serial interface   Management LAN port
                                1000BASE-T/
                                100BASE-TX/
                                10BASE-T
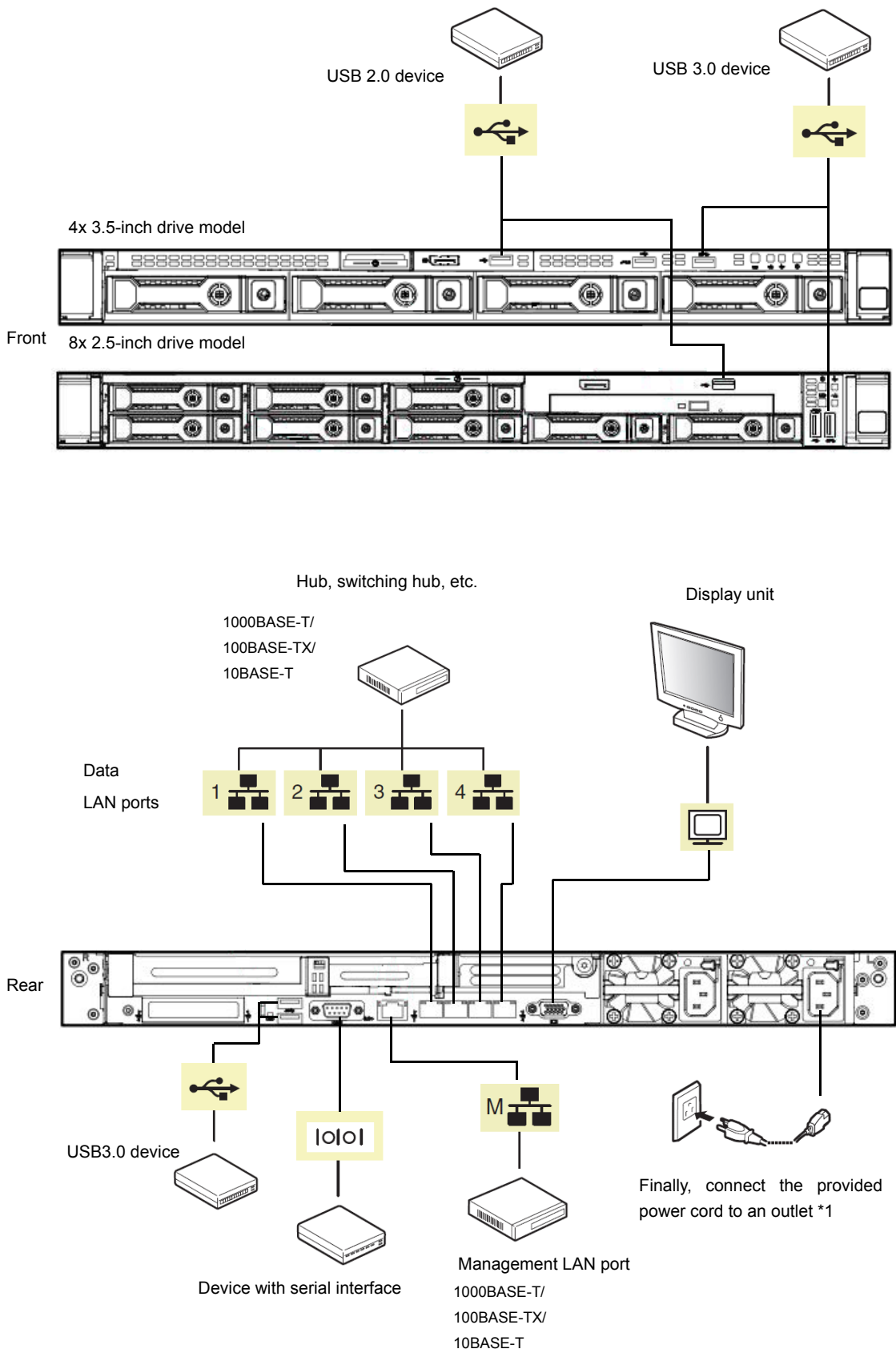
Tips   The serial port cannot be used to connect with leased line.

Note the following precautions to connect cables.

- When the device is not Plug and Play device, turn off the server and devices to be connected before connecting.
- If connecting any peripheral device and its interface cable made by other companies (a third party), contact your sales representative to check if they can be used with the server beforehand.
- Fix the power cord or interface cable with cable ties.
- Make sure that no pressure is applied on the plug of power cord.

2.2.1 **Connecting to Uninterruptible Power Supply (UPS)**

To connect the power cord of the server to a UPS, use the connector output on the rear of the UPS. For details, refer to the manual supplied with the UPS.
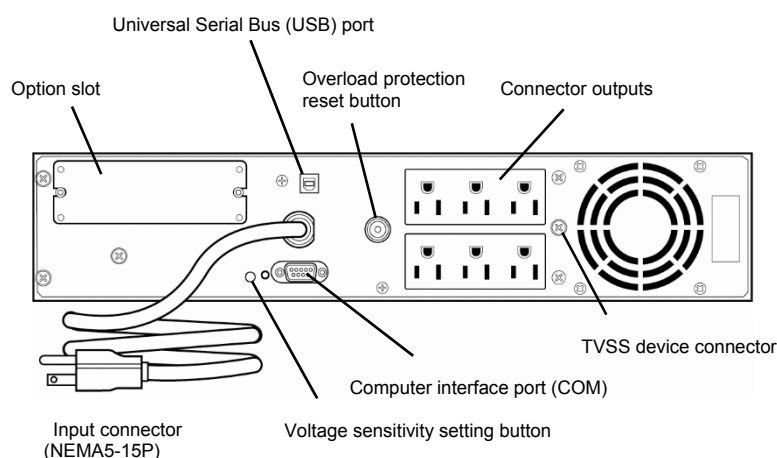
When the power cord is connected to a UPS, change the settings from System Utility in order to link the server with the power supply from the UPS.

To change the settings, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** > **Automatic Power-On**. Select **Always Power On** to perform automatic operations by using the UPS. For details, see *Chapter 3 (2. Description on System Utility))*.

When connecting UPS to a serial port, set the following item to 'Disabled'.

1. System Configuration > BIOS/Platform Configuration (RBSU) > System Options > Serial Port Options > BIOS Serial Console and EMS > BIOS Serial Console Port → 'Disabled'
2. System Configuration > BMC Configuration Utility > Setting Options > Serial CLI Status → 'Disabled'

2.2.2 Installing cable management arm N8143-125

A cable management arm can be installed to the unit for combining the multiple cables connected to the device.

Install the cable management arm in the following steps.

1) Insert the two fixed parts of the cable management arm into the outer rail and the inner rail behind the rack. It can also be mounted on the opposite side.
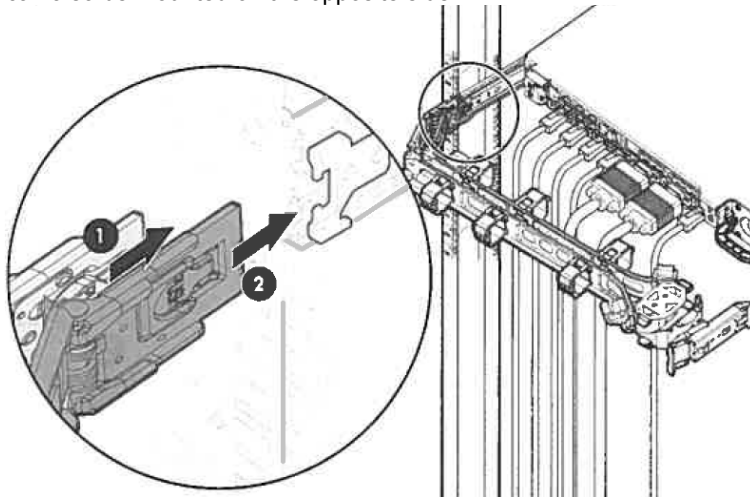
2) Put multiple cables in the binding belt and secure them.
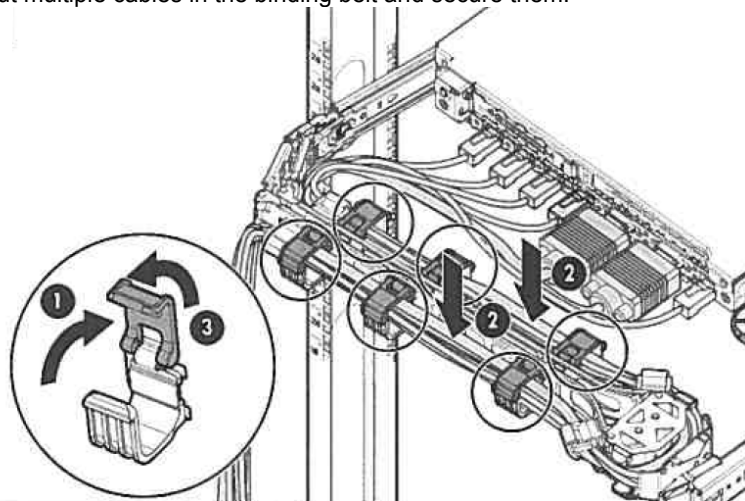
3) Insert the fixed parts of the supplied cable management arm into the outer rail on the opposite side to attach the cable arm.
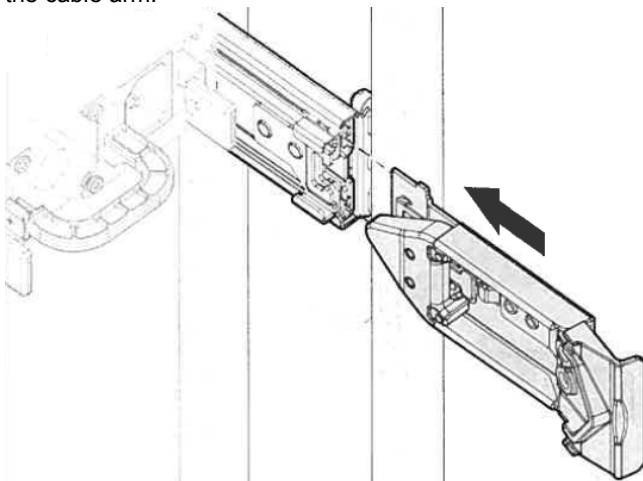
2.2.3 Removing the cable management arm

1) Press the lock release button on the fixed part of the cable management arm to release the lock, and pull it out forward.
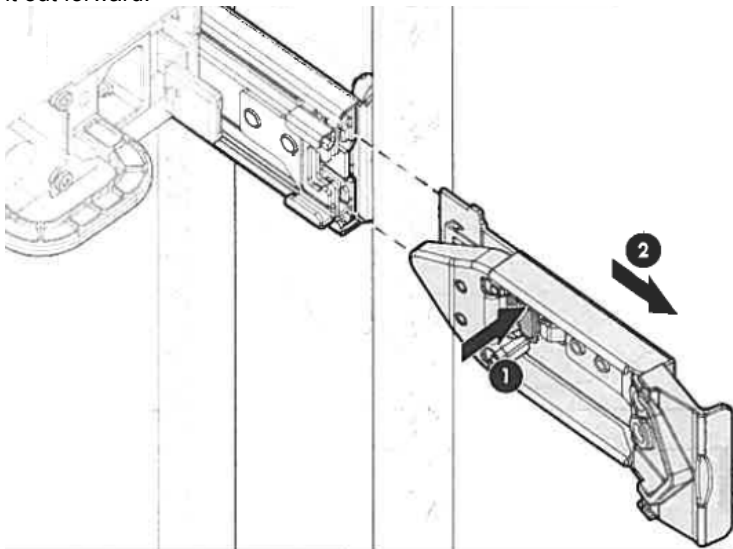
2) Press the lock release button on the two fixed part on the opposite side of the cable management arm to release the lock, and pull it out forward.
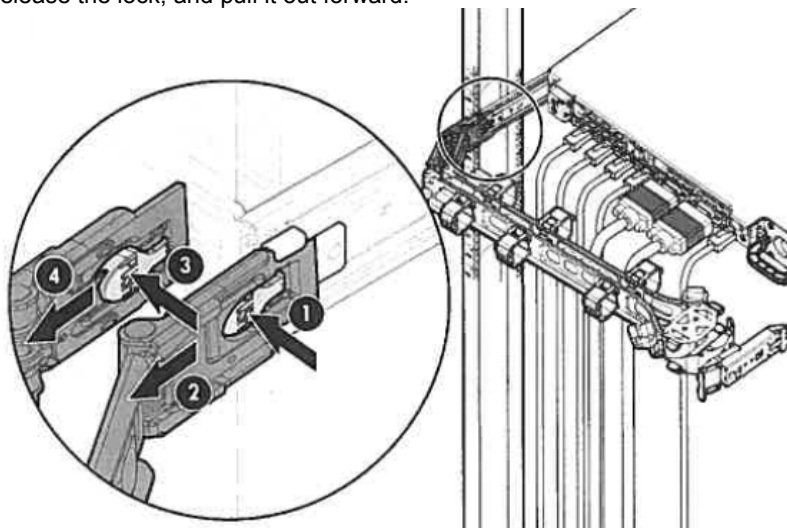
NEC Express5800 Series
Express5800/R120h-1M

3

Setup

This chapter describes how to set up the server.

1. Turning on the Server

Power-On Self-Test (POST) is explained in this section.

2. Description on system utility

Describes how to set up the system.

3. iLO 5

Describes iLO 5 installed in the unit.

4. EXPRESSBUILDER and Starter Pack

EXPRESSBUILDER helps you to install Windows and maintain the server.

5. Installing Software Components

You can install Windows and software by following the instructions in *Installation Guide (Windows)*.

6. Turning off the Server

Turn off power when not using the server.

1. Turning on the Server

Pressing POWER Switch at the front of the server turns on the server.

Turn on the server by using the following procedure.

1. Turn on a display, an Uninterruptible Power Supply (UPS), and other peripherals.

Note	If the power cord is connected with the power supply control unit such as uninterruptible power supply (UPS), make sure that the power supply control unit is turned ON.

2. Remove Front Bezel.

3. When the STATUS lamp flashes green (once per second), wait until the lamp lights in steady state.

4. Press POWER Switch at the front of the server.
   POWER LED flashes green (once per second) and after a while, logo appears on the display.

Important	Do not connect/disconnect USB devices during POST execution.

・2.5-inch drive model

POWER Switch

• 3.5-inch drive model

POWER switch
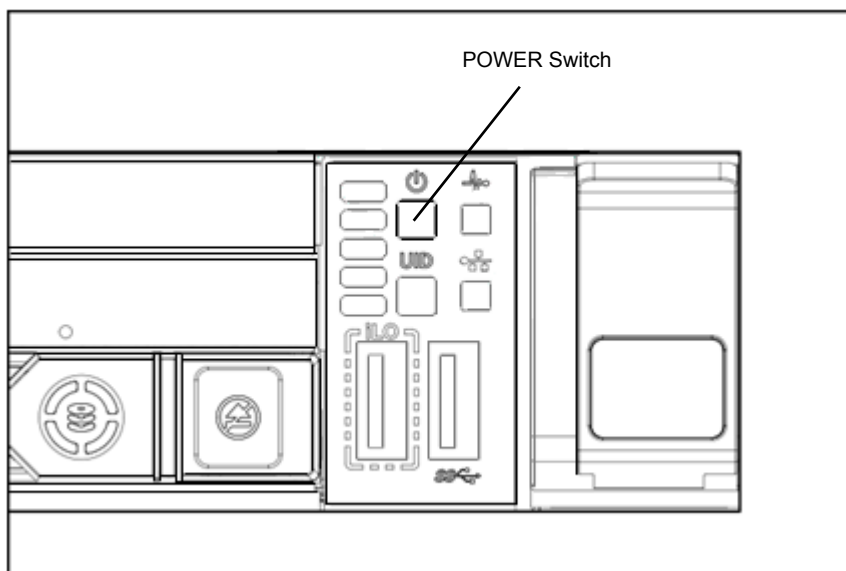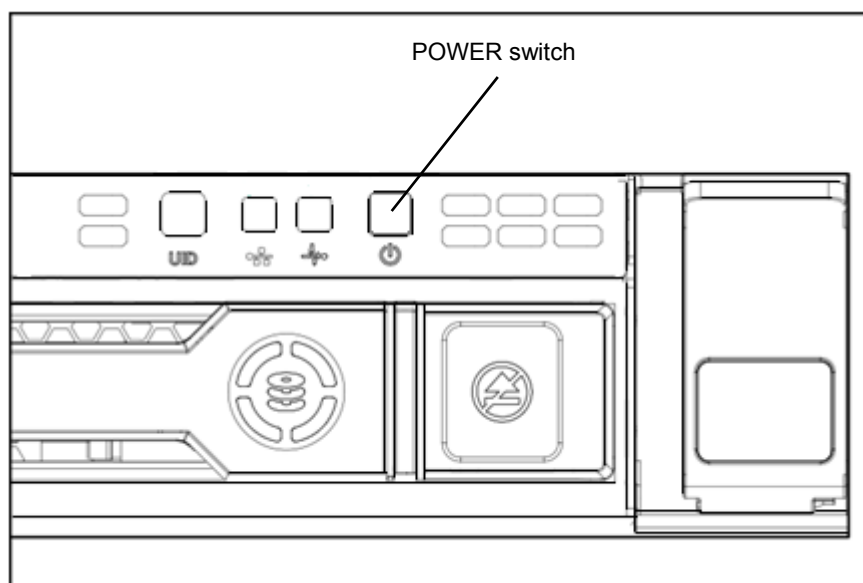
While logo is being displayed, the self-diagnostic program (POST) runs and diagnoses the hardware.
For details, see *Chapter 3 (1.1 POST)*.

1.1 POST

Power-On Self-Test (POST) is a self-diagnostic program stored in the server as standard. POST automatically runs immediately after the server is turned on and checks the motherboard, memory, and processor (CPU). POST also displays the start-up messages of different utilities during the operation.

<u>Usually, you do not need to check the contents of POST.</u> However, check messages displayed at POST in the following cases.

* When introducing a server

* If you suspect a failure

* When any error message is displayed

1.1.1 POST sequence

Explains how POST runs in order.

1. When the server is turned on, POST starts, and an initialization message is displayed. The message to tell initialization of a memory and a PCI device.

Note	• While the initialization messages are being displayed, the screen may change several times. There is no problem in operation by this. • If an option VGA controller is connected, or depending on system utility settings, logos or initialization messages may not be displayed. • Initialization message is shown also in the console redial screen in the serial port.

2. In System Utility, by setting up your password in **Set Power On Password** under **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** menu, a screen to enter your password is displayed during post. If you enter the incorrect password three times consecutively, POST aborts. (You can no longer proceed.) In this case, power off the server, and power it on.

Important	**Do not set a password before OS is installed.**

3. After a while, the following message is displayed on the screen. (The on-screen message depends on your environment.)

| F9 System Utilities | F10 EXPRESSBUILDER | F11 Boot Menu | F12 Network Boot |
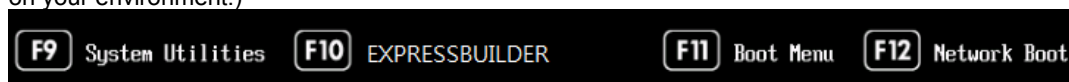
By pressing the function key following messages, you can call the functions below upon completion of POST.

<F9> key: Start System Utility. See *Chapter 3 (2 Description on System Utility)*.
<F10> key: Run EXPRESSBUILDER. For details, see *Chapter 3 (4. EXPRESSBUILDER and Starter Pack)*.
<F11> key: Start Boot Menu.
<F12> key: Boot from network.

Regarding designated utilities, see instruction documents attached to each option board.

Necessary key inputs are different depending on option boards installed, so you are requested to operate according to messages.

4. The OS starts when POST is completed.

| Tips | • When no bootable device is connected, the following message is displayed by terminating POST.
  - **No bootable devices ware detected**
  - **Please attach a UEFI bootable device.**
  - **System will automatically retry the UEFI Boot Order in x seconds.** |

1.1.2 POST error messages

When POST detects an error, it displays an error message on the screen. For descriptions of error messages, causes, and countermeasures, see *Chapter 2 (1. IML Error Message)* in "*Maintenance Guide (Common)*".

| Note | Tell the indication displayed on display unit your sales representative. Alarm messages are useful information for maintenance. |

2. Description on System Utility

Here we describe System Utility. You need to fully understand the content and configure correctly.

2.1 Overview

System Utility is a utility to set up this device. This utility is installed in a flash memory in the server as standard and can be run without requiring a media for boot.

Since the device is delivered with optimum set-up, in almost all cases no change is required. **Use only when the case applies to any of cases described in _Chapter 3 (2.4 Cases that Require Configuration)._**

By using System Utility, wide variety of set-ups as follows become possible.
- Configuration of the system device and options installed.

- Enabling and disabling system functions

- Display of system information

- Selection of Primary Boot Controller

- Configuration of Memory Option

- Selection of language

- Start of pre-boot environment such as built-in UEFI shell or EXPRESSBUILDER.

Regarding the details of System Utility, see _Chapter 1 (1. System Utility)_ of _Maintenance Guide (Common)._

Important	• **Back up the system information beforehand to provide against an unexpected failure or an update of System ROM.** • **After changing the settings of System Utilities, make sure to create a backup. For details on how to create a backup, refer to _"1. System Utilities" in Chapter 1 of "Maintenance Guide (Common)"._**

2.2 Starting SETUP Utility

Run POST following *Chapter 3 (1.1.1 POST sequence)*.

After a while, the following message is displayed on the screen. (The on-screen message depends on your environment.)
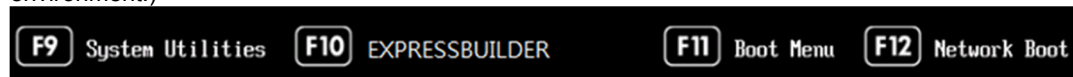
By pressing <F9> Key here, System Utility starts after POST is completed.

Furthermore, if an Admin Password has been set, a dialog box for password input will be displayed before starting the system utility. Please enter the correct Admin Password.
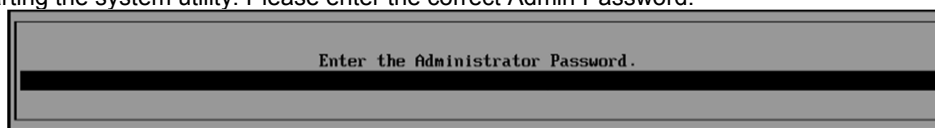
You can enter password three times. **If you enter wrong passwords three times in a row, further entry of password is rejected.**

To enter password again, reboot the server.

To save your change in System Utility and exit, press <F12> Key (F12: Save and Exit). In case you cancel your change and exit, press <ESC> Key (Exit).

Tips	• To put the setting back to the default values, press <F7> Key (F7: Load Defaults).
	• The default value might be different from the factory setting.
	• **iSCSI Configuration** menu in **Network Options** menu cannot be put back to the default values.

The default language of System Utility is English.

2.3 **Description on On-Screen Items and Key Usage**

Here we describe the operation of System Utility. Use keyboard and mouse to operate System Utility.
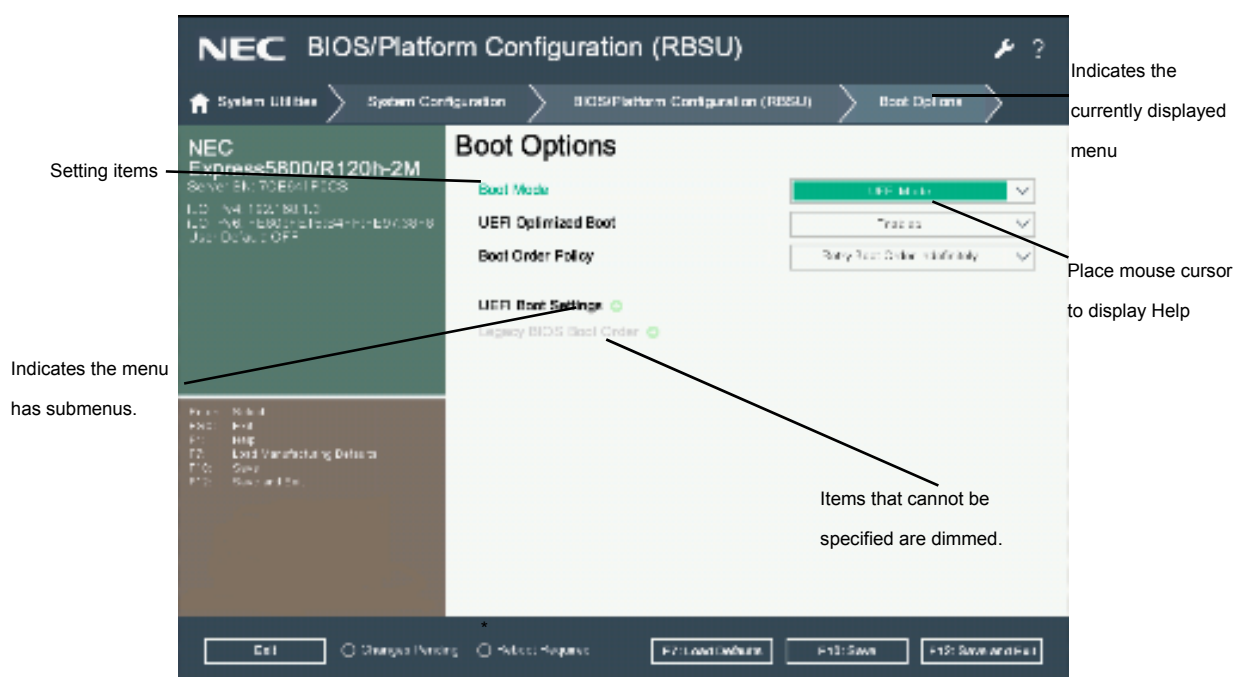
□ Cursor keys (〈↑〉, 〈↓〉, 〈←〉, 〈→〉)

　　Select an item displayed on the screen. If characters of an item are highlighted, that means the item is currently selected.

□ 〈−〉 key / 〈+〉 key

　　Change the value (parameter) of the selected item. You cannot use this key when a menu which has on the left is selected.

□ 〈Enter〉 key

　　Press this key to determine the selected parameter.

□ 〈Esc〉 key

　　Pressing this key cancels pop-up window. On the submenu, pressing this key takes you to the previous screen.

　　On the top menu, the following window is displayed. Choose **OK** to close System Utility.
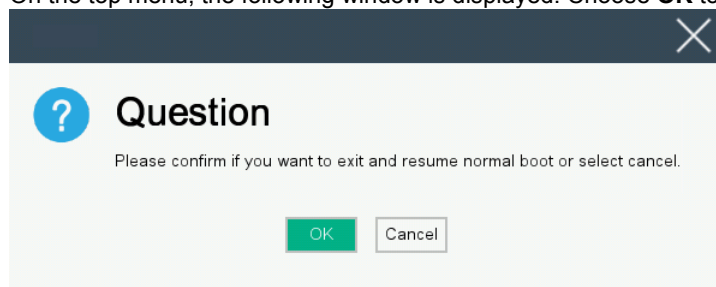
In case the setting has been changed, the following screen is displayed. To put the changed parameters back to the original setting, select **No - Discard Changes**.

□ 〈F1〉 key
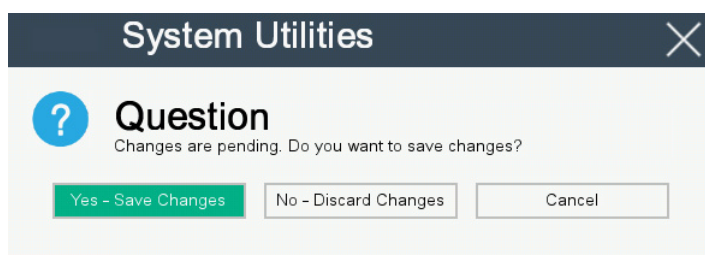
Press this key to display help information. Press this key when you have any questions about the operation of System Utility. Press <Esc> key to go back to the original screen.

□ 〈F7〉 key

The following screen is displayed. To put the parameters of System Utility back to the default setting, select **Restore Defaults and Reboot**. This operates in the same manner as **Restore Default System Settings** in the **System Default Options** menu. For details, refer to *Chapter 1 (1. System Utilities)* in the *Maintenance Guide (Common)*.
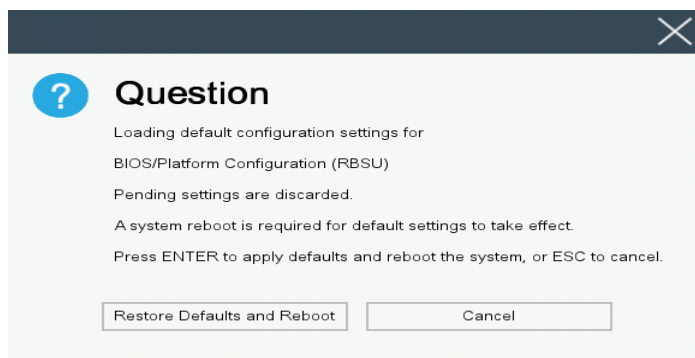
Note	**iSCSI Configuration** menu in **Network Options** menu cannot be put back to the default setting.

□ 〈F10〉 key

The following screen is displayed. To save parameters you set, select **Yes**.

□   〈F12〉 key
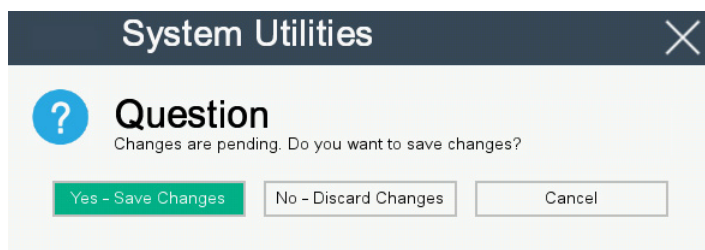
The following screen is displayed. If you choose **Yes**, the parameter you set is saved and then a message

urging to reboot is displayed.
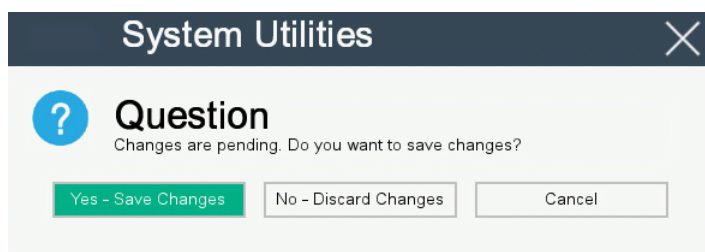
If you select **Reboot**, the device restarts.
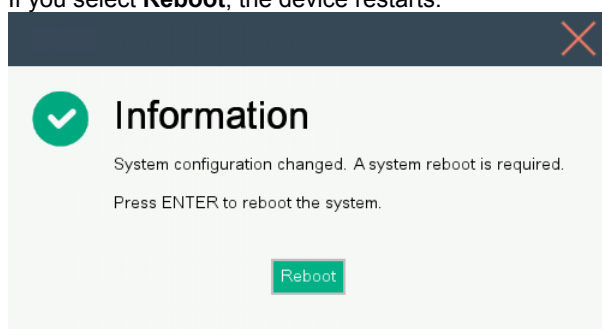
□   Operation for a restart of iLO in "BMC Configuration Utility" of System Utilities

When saving settings after a setting change in "BMC Configuration Utility" of System Utilities, a restart of iLO

may be required. In this case, perform the following steps.

(1)   When settings are changed in "BMC Configuration Utility" of System Utilities, the Warning pop-up shown

below may be displayed to restart iLO.
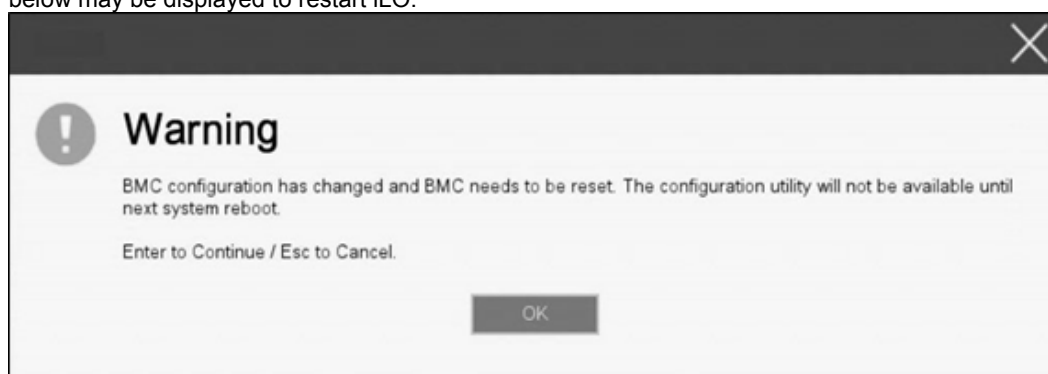
(2)   Click OK to proceed.

(3)   The Warning pop-up shown below (*) is displayed, and iLO is restarted.

(*) The message may be slightly different.
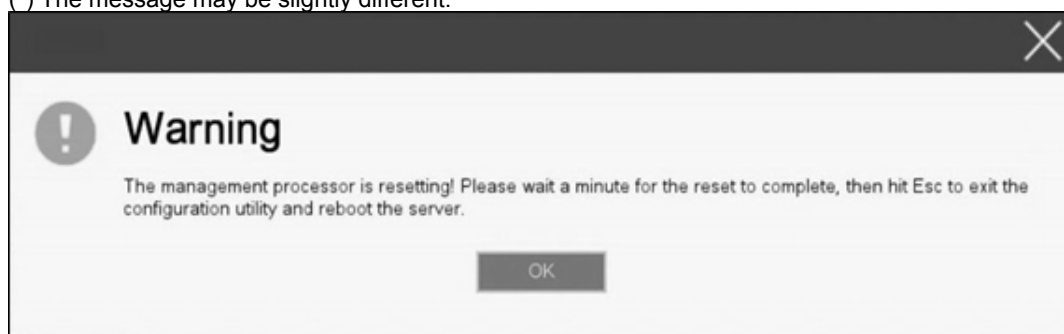
(4)   Wait one minute with the Warning pop-up displayed.

(5)   Check that the restart of iLO is completed.

Important	If you proceed without waiting for the completion of the restart of iLO, the subsequent system reboot may not operate properly, or setting information such as Serial Number and Product ID recorded in the device may be lost. The operation status of iLO can be checked with the STATUS lamp on the front of this product. The STATUS lamp blinking in green (once per second) indicates that iLO is being restarted. The STATUS lamp illuminating in green indicates that the restart of iLO is completed and it is operating normally.

(6)   After checking that the restart of iLO is completed, click OK.

(7)   Press the <ESC> key several times to return to the System Utilities screen.

(8)   Select "Reboot the System" of System Utilities to reboot.

☐   Operation for the Question pop-up of Submit Fail For Form

When the   the Question pop-up of Submit Fail For Form as shown below is displayed while changing settings in System Utilities, select Cancel to discard the change. After that, reboot the server, enter System Utilities, and change the settings again.

Important	If you click OK to proceed with the setting changes, the setting information such as Serial Number and Product ID recorded in the device may be lost.
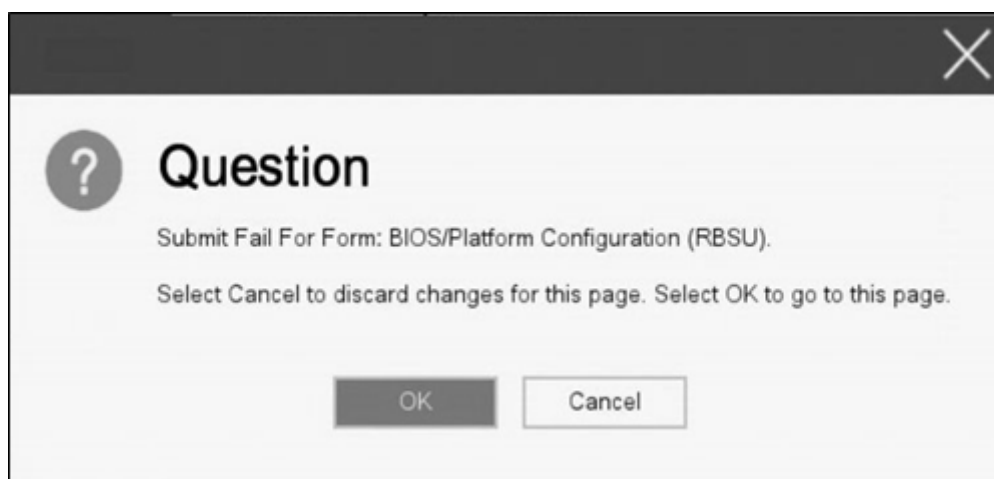
2.4 Cases that Require Configuration

If any of the following cases are applicable, operate in System Utility to change parameters from the factory preset. Other than cases described below, do not change the settings. The catalog of parameters in System Utility and the factory presets can be found in *Chapter 1 (1. System Utility)* **of** *Maintenance Guide (Common).*

(1/4)

Category	Description	To be changed	Remark
Settings to be saved in the user default	Items to be set at all times	Set to **Allow Operation with Critical Fan Failure** at **System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Fan and Thermal Options > Fan Failure Policy**.	At the time of shipment, **Fan Failure Policy** is set to **Allow Operation with Critical Fan Failures**.
		Set **System Configuration > BIOS/Platform Configuration (RBSU) > System Options > USB Options > Internal SD Card Slot** to **Disabled**.	At the time of shipment, **Internal SD Card Slot** is set to **Disabled**.
		Set to **Custom** at **System Configuration > BIOS/Platform Configuration (RBSU) > Workload Profile.**	At the time of shipment, **Workload Profile** is set to **Custom.**
		Set to **No C-states** at **System Configuration > BIOS/Platform Configuration (RBSU) > Power and Performance Options > Minimum Processor Idle Power Core C-State.**	At the time of shipment, **Minimum Processor Idle Power Core C-State** is set to **No C-states.**
		Set to **No Package States** at **System Configuration > BIOS/Platform Configuration (RBSU) > Power and Performance Options > Minimum Processor Idle Power Package C-State.**	At the time of shipment, **Minimum Processor Idle Power Package C-State** is set to **No Package States.**
	Setting up the **Time Format** in accordance with your OS	・If you use Windows or Linux Set to **Coordinated Universal Time (UTC)** at **System Configuration > BIOS/Platform Configuration (RBSU) > Date and Time]-[Time Format.**	Set up following the pre-install checklists in the installation guide below. ・If you use Windows For Windows: Chapter 1 Installing Windows
		・If you use another OS Set up following the pre-install checklist in the installation guide of your OS.	
	If you use the NEC ESMPRO ServerAgentService	Set to **Disabled** at **System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Fan and Thermal Options > Thermal Shutdown**.	At the time of high temperature, shutdown is executed by NEC ESMPRO ServerAgentService

(2/4)

Category	Description	To be changed	Remark
Basic	Change date and time	Fix the date as follows; **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Date**. Then, fix the time as follows **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Time**	The setting can also be done from the OS.
	Setting up **Time Zone** when **Time Format** is set to **UTC**	・If you use the device in Japan Set **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Date and Time** - **Time Zone** to **UTC+09:00**.	
Memory	Use memory RAS feature	Set **System Configuration > BIOS/Platform Configuration (RBSU)** > **Memory Oprations** - **Advanced Memory Protection**	Some of RAS features may not be used depending on DIMM configuration.
Optional board	Start the system from installed option board.	Set to **Enabled** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **PCIe Device Configuration** > **SlotXX** – **PCIe Option ROM**.	XX is PCI slot number of the installed option board
Boot	Set the Boot Mode to UEFI Mode according to your OS.	Change **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** – **Boot Mode** to **UEFI Mode** *1 ・The following OSs are applicable. － Red Hat Enterprise Linux 7 (x86_64) － Windows Server 2012 R2 － Windows Server 2016 － Windows Server 2019 － VMware ESXi6.5 － VMware ESXi6.7	The setting must be done in compliance with the checklist before setup in the installation guide of your OS For Windows: [Chapter 1 Installing Windows]
	Set the Boot Mode to Legacy BIOS Mode according to your OS.	Change **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** – **Boot Mode** to **Legacy BIOS Mode** *1	The setting must be done in compliance with the checklist before setup in the installation guide of your OS
	Change [Embedded SATA Configuration] according to your configuration	・If you use the built-in SW RAID controller on Windows, set [Smart Array SW RAID Support] in System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options.	
		・If you use Linux, set [Enable SATA AHCI Support] in System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options.	Do not use [Smart Array SW RAID Support] on Linux.
	Change the boot order of devices	In case **Boot Mode** is **UEFI Mode**, change the boot order in **System Configuration** > **BIOS…** **(RBSU)** > **Boot Options** > **UEFI Boot Settings** - **UEFI boot Oder** In case **Boot Mode** is **Legacy BIOS Mode**, change the boot order in **System Configuration > BIOS… (RBSU)** > **Boot Options** - **Legacy BIOS Boot Order**.	**When you use CD/DVD, set CD/DVD to the highest priority.**

(3/4)

Category	Description	To be changed	Remark
Boot	Use console redirection feature	Configure in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Serial Port Options** > **BIOS Serial Console and EMS**	In console redirection connection, if the corrupted text is displayed on terminal screen, change font type (character code) appropriate to your environment.
	Enable X2APIC feature according to your OS.	Set to **Enabled** in System Configuration > BIOS/Platform Configuration (RBSU) > Processor Options］－[Processor x2APIC Support. *1 ・The following OSs are applicable. － Red Hat Enterprise Linux 7 (x86_64) － Windows Server 2012 R2 － Windows Server 2016 － Windows Server 2019 － VMware ESXi 6.5 － VMware ESXi 6.7	The setting must be done in compliance with the checklist before setup in the installation guide of your OS For Windows: [Chapter 1 Installing Windows]
	Use Wake on LAN (WOL)	Set Enabled/Disabled in (a) and (b) below. The setting of (b) is not reflected when Embedded LOM is used. (a) [System Configuration > (Network Device) > MBA Configuration Menu or NIC Configuration]－[Pre-boot Wake On LAN or Wake On LAN] (b) [System Configuration > BIOS/Platform Configuration (RBSU) > System Options > Server Availability]－[Wake-On LAN] When performing WOL from an OS shutdown, perform the following setting in addition to (a). **Windows OS:** Set Enabled for the following options from Device Manager > Device used for WOL under Network adapters > Advanced. - [Enable PME] - [Wake on Magic Packet] To disable WOL, set [Disabled]. **Linux OS:** Perform the following on the terminal. Execute the following command to check the name of the device on which WOL is set. "/sbin/ifconfig" Enable or disable WOL with the following commands. Enable: "ethtool -s DeviceName wol g" Disable: "ethtool -s DeviceName wol d" The WOL setting can be checked with the following command. "ethtool DeviceName" WOL is enabled if the output information is "Wake-on: g", or disabled if it is "Wake-on: d".	For information on WOL support of option network cards, refer to the User's Guide of the option card.

(4/4)

Category	Description	To be changed	Remark
Security	Restrict System Utilities operations with a password	Set your password in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** - **Set Admin Password**	If you set your password, your are prompted to enter the password from the next time you start System Utility
	Restrict bootup by entering password	Set your password in **System Configuration** > **BIOS/PlatformConfiguration (RBSU)** > **Server Security** using **Set Power On Password**	If you set your password, your are prompted to enter the password from the next time you start the system
	To make Intel(R) TXT(Trusted Execution Technology), which is needed for tboot(Trusted Boot), enabled	Install optional TPM kit and set to **Enabled** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** - Intel (R) TXT Support.	Do not disable TPM with the TPM management module after setting [TXT Support] to [Enabled] to start OS. You may not be able to change [TPM Support] and [TXT Support]. In that case, execute [F7: Load Defaults].
UPS Powerlink	When the server is supplied with power from UPS, always turn on the power.	Set to **Always Power On** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	To connect the UPS to the serial port, set [Disabled] for the settings below. 1. Set to **Disabled** in **System Configuration > BIOS/Platform Configuration (RBSU) > System Options > Serial Port Options > BIOS Serial Console and EMS - BIOS Serial Console Port.** 2. Set to **Disabled** in **System Configuration > BMC Configuration Utility > Setting Options - Serial CLI Status.**
	If it is turned off by using POWER switch, leave it OFF even when UPS supplies power.	Set to **Restore Last Power Stats** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	
	Keep the power OFF even when UPS supplies power.	Set to **Always Power Off** in **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **Server Availability** - **Automatic Power-On**	

*1   The factory setting is that "the Boot Mode menu" is set as "UEFI" and "the X2APCI menu" is set as "Enabled".

2.5 **Management of RBSU Settings of System Utilities via Networks**

2.5.1 **Overview**

By using RESTful Interface Tool, which is provided as one of the server administration tool, you can backup and restore your BIOS/Platform Configuration (RBSU) in System Utirities.

Use the RESTful Interface Tool Version 2.4 or later.
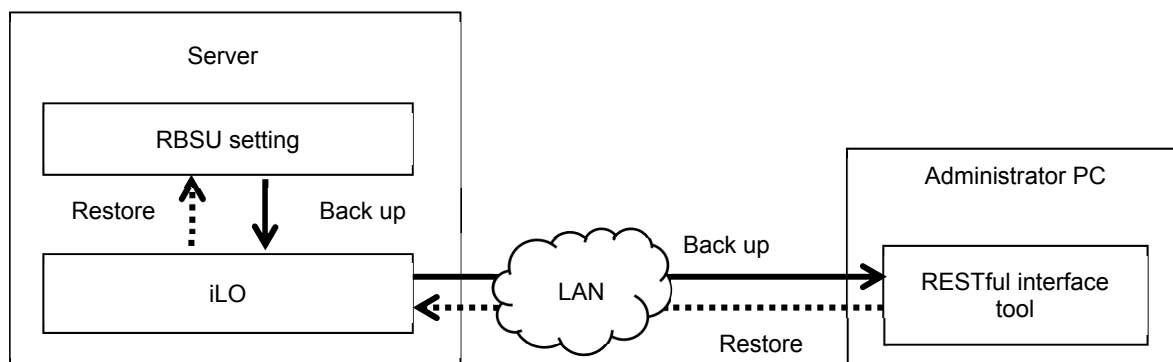
□   Back up

The backup of RBSU is established by downloading JSON format file describing RBSU (hereafter called "RBSU File") via ILO of controlled server.

・The power of the server is OFF

・OS is running

Avoid performing a backup in the following situations because the backup may not be done properly.

・Immediately after the power is turned OFF

・While POST

・Immediately after POST

Important	**The Serial Number and Product ID are device-specific information. Make a note of them and store it in a safe place.**

Tips	• After completion of POST execution or the powering OFF, it may take several minutes to reach downloadable state. Please wait for a while to start download. • The time required to reach downloadable state may vary depending on configuration or operating status of the unit.

□   Restore

The restore of RBSU is established by uploading RBSU file from the administrator PC via iLO of controlled server. The RBSU uploaded is reflected at the next boot.

Restore is possible only when the device is in the following conditions.

・The power of the server is OFF

・OS is running

Restore is not possible under the following condition.

・Immediately after the power is turned OFF

・While POST

・Immediately after POST

Tips	• After completion of POST execution or the powering OFF, it may take several minutes to reach downloadable state. Please wait for a while to start download. • The time required to reach downloadable state may vary depending on configuration or operating status of the unit.

2.5.2 How to Backup RBSU

Here we describe how to backup RBSU file from the administrator PC.

1. Trun OFF the server or start the OS.

2. Start RESTful Interface Tool.

3. Execute login command to log In iLO of the controlled server.
   Initial user name and initial password, which are required to log in, are written on a slide tag attached to the controlled server

4. Execute types command and confirm the parameter on whose lead "Bios" is displayed.

5. Select BIOS in select command.
   As the argument of select command, specify the parameter you confirmed in step 4.

6. Execute save command to backup RBSU relating to BIOS.
   If you do not specify file name, the default file name becomes "ilorest.json".
   The backup completes in several minutes.

Examples of Command Execution

iLOrest > login 192.168.xxx.xxx –u Administrator –p <password>

iLOrest > select Bios.v1_0_0

iLOrest > save

When backup is completed, the following message is displayed.

Configuration saved to: ilorest.json

Tips	• When you log in, use proper user account having administrator authority. • 192.168. xxx. xxx is the IP address of management specialized LAN of controlled server.

2.5.3 **How to Restore RBSU**

Here we describe how to restore RBSU file via administrator PC.

1. Trun OFF the server or start the OS.

2. Start RESTful Interface Tool.

3. Execute login command to log in iLO of the controlled server.
   Initial user name and initial password, which are required to log in, is written on a slide tag attached to controlled server.

4. Execute types command and confirm the parameter on whose lead "Bios" is displayed.

5. Select BIOS in select command.
   As the function of select command, specify the parameter you confirmed in step 4.

6. Execute load command to restore RBSU you backed up.
   As the argument of select command, specify the parameter you confirmed in step 4

   The restore completes in several minutes.

7. When the power of device is OFF, make it ON. Or, in case OS is running, reboot.

Command execution example:

iLOrest > login 192.168.xxx.xxx –u Administrator –p <password>

iLOrest > select Bios.v1_0_0

iLOrest > load –f <RBSU Setting File Name>.json

The restore is completed when the following message is displayed.

One or more properties were changed and will not take effect until system is reset.

Tips	Since the changes of RBSU are applied during POST, please wait until POST is completed. Then the device restarts automatically.

2.5.4 **Notes**

- When a restore is performed while the OS is running, reboot the server to reflect the RBSU settings.
- Configurations whose backup and restore are possible are the menus under **System Utilities – System Configuration** - **BIOS/Platform Configuration (RBSU)** of System Utility.
- Do not use the backup data on any server other than the backup source server. If the backup data is restored on a different server, the Serial Number and Product ID of the backup source server are overwritten to the server on which the data is restored. In this case, enter the Serial Number and Product ID by referring to *"Serial Number and Product ID are lost"* in *"5.11 Supplementary notes"* in *"5. Troubleshooting"* in *Chapter 1 of "Maintenance Guide"*.
- The following menus and menus under them cannot be backed up or restored.
  - ➤ [Date and Time]－[Date (mm/dd/yyyy)]
  - ➤ [Date and Time]－[Time (hh:mm:ss)]
  - ➤ [Server Security]－[Secure Boot Settings]
  - ➤ [Server Security]－[TLS (HTTPS) Options]
  - ➤ [Server Security]－[Device Encryption Options]
  - ➤ [Network Options]－[iSCSI Configration]
  - ➤ [Boot Options]－[UEFI Boot Settings]
  - ➤ [Boot Options]－[Legacy BIOS Boot Order]
- The following Information display menus cannot be backed up or restored.
  - - Status
  - - Version and revision of firmware
- You cannot restore RBSU in case the System ROM version is different between the time of restoring and the time of backup.
- You cannot restore some RBSU in case there is a difference in hardware configuration between the time of back up and that of restore.

3. iLO 5

3.1 Overview

Using iLO5, which is LSI for system management, this device has realized various features.

Regarding the details of iLO5 features, see *iLO5 User's Guide.*

iLO5 provides the following controls.

The main features of iLO	Description
Monitoring server conditions	iLO monitors a temperature inside server, controls the cooling fan, and cools down the server to the proper temperature. In addition, iLO monitors versions of firmware and software installed, the cooling fan installed to the device, memory, network, processor, power supply unit, storage, and statuses of device and others.
Agentless management	The service operates not on host OS but within iLO firmware, so you can manage without using the memory on host OS or the resources of processor. In addition to the monitoring of all the important inner sub-systems, iLO can, even if host OS is not installed, send SNMP notification directly to management software such as NEC ESMPRO Manager.
Integrated Management Log (IML)	You can display events occurred on the server and configure SNMP notification, Email alert, and notifications in Remote Syslog.
Active Health System Log (AHS Log)	Download Active Health System Log. In case the support is needed, AHS Log file may need to be sent to NEC or taken by maintenance staff.
iLO Cooperative Network Management	By using iLO Cooperative Function, you can detect and manage multiple servers at once without using management software.
Integrated Remote Console (IRC)	If network connection is established with a server, by using remote console, you can access the server speedily and safely from anywhere in the world and execute display or management.
Virtual Media	From Remote, you can mount high-performance virtual media devices on the server.
Virtual Power Control	From Remote, you can control the power state of controlled server safely.
Deployment and Provisioning	From numerous GUI and CLI for the tasks including computerizing of deployment and provisioning, you can use power control and virtual media.
Power Consumption and Power Management Setting	You can monitor power consumption and set the power limit on supported server.
User Account	By using local or directory service user account, you can log in to iLO.
Kerberos Support	You can set Kerberos authentication. **Zero Sign In** button is added to the log-in screen.

Important **Back up the iLO 5 setting information beforehand to provide against an unexpected failure or an update of the iLO firmware. For the detailed procedure, refer to "*iLO 5 User's Guide*".**

3.2 Comparison of License Features

By applying optional license, you can use the following features.

Item	On-board Functions	Remote Management Extended License (Advanced) N8115-33	Remote Management Extended License (Scale-Out) N8115-34
Directory Service Certification(Active Directory, LDAP)	×	○	×
Two-Factor Certification (Kerberos Support)	×	○	×
Virtual Media via Integrated Remote Console	×	○	×
Script Method Virtual Method	×	○	×
Integrated Remote Console (IRC)	Pre-OS only	○	Pre-OS only
Global Team Collaboration by 6 server administrators at the maximum via IRC	×	○	×
Recording and playback of video via IRC	×	○	×
Recording and playback of Virtual Serial Port	×	○	○
Remote Console of text base via SSH	×	○	○
Email alerts	×	○	○
Remote Syslog	×	○	○
Advanced Power Management (power graph, dynamic power capping) *	×	○	○
iLO Collaborative Management	×	○	○
iLO Collaborative Detection	○	○	○
Remote Serial Console (Virtual Serial Port)	○	○	○
Server Health Summary	○	○	○
iLO Reboot	○	○	○
Redfish® API	○	○	○
Agentless Management	○	○	○
Monitoring server conditions	○	○	○
Web base GUI	○	○	○
Virtual Power Control	○	○	○
SSH/SMASH CLI (Including serial console redirection)	○	○	○
IPMI/DCMI (Including serial console redirection)	○	○	○
SMTP Certification (iLO 1.35 later support)	○	○	○

* Some units may not be supported.

3.3 iLO 5 Network Settings

Take the steps below to use iLO 5 through the Web browser.

1. Run POST following *Chapter 3 (1.1.1 POST sequence)*. After a while, the following message is displayed on the lower part of the screen.
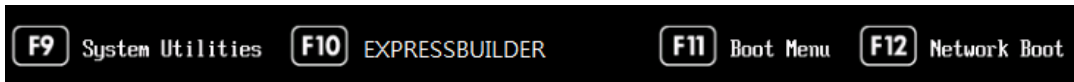
2. Press the <F9> key while the message is being displayed to launch System Utilities.

3. From the menu of System Utilities, select **System Configuration** → **BMC Configuration Utility**.
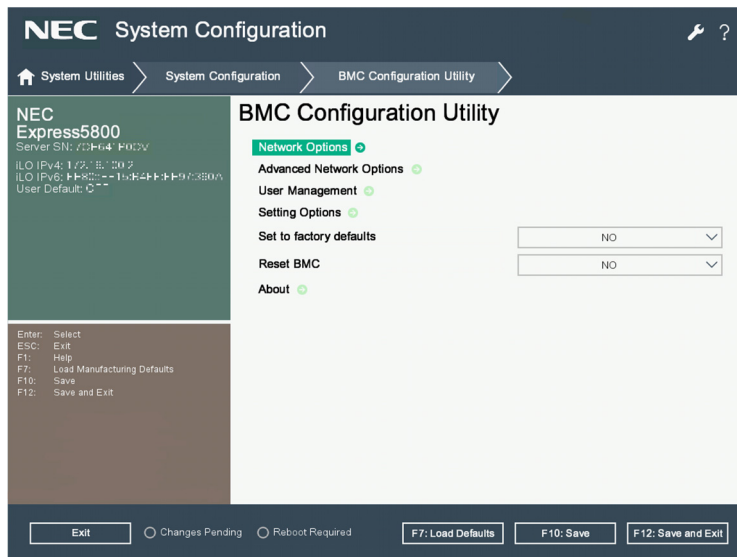
View example when **BMC Configuration Utility** is selected

4. Then, on the screen on which you selected **Network Options**, use DHCP (make "DHCP Enable" **ON**) or configure items under IP Address/Subnet Mask.

Important	When the setting of Shared Network Port - LOM or Shared Network Port – FlexibleLOM is changed in [BMC Configuration Utility], a restart of iLO is required. Follow the steps as described in *"Operation for a restart of iLO in "BMC Configuration Utility" of System Utilities"* in *"2.3 Description on On-Screen Items and Key Usage"*.
Tips	When you configure Shared Network Port - LOM or Shared Network Port - FlexibleLOM, the network connection of iLO5 may be disconnected temporarily. In such a case, wait a while and reconnect.

View example when **Network Options** is selected

5. On the next screen, use DHCP (Set DHCP to **Enable**), or set the item under IP Address/Subnet Mask.

Connect a LAN cable to a management specialized LAN connector to connect to the network. Follow the setting in Step 4. to access iLO5 from Web browser of the administrator PC.

iLO5 contains default username, password, and DNS name set at the time of shipment. The default username, password, and DNS name are written on a slide tag attached to a device to which iLO is installed. Using these values and the network setting you configured in Step 4., access iLO remotely from network client with your Web browser.

The default values are as follows.

・Username: Administrator

・Password: randomly selected 8 characters including alphabets and numbers

・DNS name: BMCXXXXXXXXXXXX (12 Xs is the serial number of server)

If you enter a wrong username or password or fail to log in, iLO imposes security delay time.

Important	**If you do not change and use default password in devices controlled via network, risk of unauthorized access by a malicious third party will increase. If your device is taken over by unauthorized access, not only data breach but also such losses as system damage due to retardation of availability or integrity, or an improper use as the means of cyber attack by botnets will become possible.** **The initial password of this product is simply provided for the initial configuration for maintenance and operation. Change password without fail at the time of initial setup. If you use the initial password unchanged and then you suffer unauthorized access, we will not hold any responsibility at all.** **Even if you change the initial password, less strong ones (ones including fewer figures) or easily conceivable ones ("123456789," "abrade," "Administrator," etc.) are difficult to prevent unauthorized accesses. Please change to a stronger password (ones with more than 8 figures containing capital letters, small letters and numbers are recommended).** **"How to change password"** **1. Log in iLO 5 and then go to Administration - User Administration page.** **2. Select "Administrator User" and click Edit.** **3. Put the check in "Change password" and enter a new password in New Password and Confirm Password.** **4. Click Update User to update.**

4. EXPRESSBUILDER and Starter Pack

EXPRESSBUILDER and Starter Pack help you to install Windows or maintain the server.

4.1 Features of EXPRESSBUILDER/Starter Pack

Feature	Description
EXPRESSBUILDER	
Setup (OS reinstallation)	Installs Windows or Linux on your server.
Maintenance	Configures system settings and RAID array.
Starter Pack	
SPP installation	Updates OS drivers and BIOS/FW by using Standard Program Package (SPP). EXPRESSBUILDER does not install SPP automatically when installing OS. SPP must be installed after installing OS.
Application installation	Installs NEC ESMPRO, RESTful Interface Tool, and other applications.
Manuals	Stores manuals for applications.

4.2 Usage of EXPRESSBUILDER

Run EXPRESSBUILDER by pressing <F10> key during POST when you want to configure RAID array or install OS.

For details, see *Chapter 1. (2. Details of EXPRESSBUILDER)* of *Maintenance Guide (Common)*.

4.3 Usage of Starter Pack

Starter Pack includes OS driver, application, and other software.

Starter Pack is provided as an optional product and on the following web site.

http://www.nec.com/express/

(Download - Documents & Software - Select Model)

For details, see *Chapter 1. (3. Details of Starter Pack)* of *Maintenance Guide (Common)*.

5. Installing Software Components

Continue to install software components such as OS.

See the instructions below.

- Installation Guide (Windows)

6. Turning Off the Server

Turn off the server by using the following procedure. If the power cord of the server is connected to a UPS, refer to the documentation supplied with the UPS or the documentation for the application controlling the UPS.

1. Shut down the OS.

2. The server automatically turns off after the OS shuts down.
   Confirm that POWER LED lights amber.

3. Turn off peripheral devices.

In the upgrading or maintenance procedure, back up the important server data and programs before shutting down the server.

Important	**Auxiliary power will continue to be supplied to the system, even if the server is in standby mode.**

When shutting down the server, use one of the following methods.
- Press and release the POWER switch.
  This method shuts down applications and OS in the correct order before the server enters standby mode.

- Press and hold the POWER switch for 4 seconds or more to force the server to enter standby mode.
  This method forces the server to enter standby mode without shutting down applications and OS in the correct order. If the application stops responding, this method can be used to force it to shut down.

- Use the virtual POWER switch via the iLO 5.
  This method remotely shuts down applications and OS in the correct order before the server enters standby mode.

Before continuing with the procedure, make sure that the server is in standby mode (POWER LED in amber color).

Important	● **When rebooting the OS after it starts up, allow an interval of 5 minutes or longer.** ● If a Restful API error occurs during POST due to a shorter OS rebooting interval, turn off the power, and turn it on again.

NEC Express5800 Series
Express5800/R120h-1M

4

Appendix

1. **Specifications**

2. **Glossary**

3. **Revision Record**

1. Specifications

Part Number				N8100-2773F	N8100-2774F
CPU	On-board CPU, operation frequency Number of cores (C)/ threads (T) (1CPU) Intel Smart Cache (Last level cache)			See the attached file "On-board CPU"	
	Number of standard installation/ maximum installation			0/2	
Chipset				Intel® C621 Chipset	
Memory	On-board capacity standard/ maximum			Not included in Standard Installation/ (Option) Registered DIMM: 1536GB (24x 64GB), Load Reduced DIMM: 3.0TB (24x 128GB)	
	On-board Memory			DDR4-2933 Registered DIMM (8/16/32/64GB), DDR4-2933 Load Reduced DIMM (64/128GB)	
	Maximum operation frequency			2933MHz (See the attached file "On-board CPU" regarding the maximum operation frequency of each CPU)	
	Error Detection and Correction			ECC, x4 SDDC	
	Memory sparing			Capable	
	Memory mirroring			Capable	
Secondary memory device	Drive bay	Built-in slot	Front	8x2.5 inch drive 2x2.5 inch additional drive (maximum one)	4x3.5 inch drive
			Rear	1x 2.5 inch drive (maximum one)	
			Internal parts	2x M.2 SATA slots	
		Built-in standard		—	
		Maximum built-in		2.5 inch HDD: SATA 22TB (11x 2TB), SAS 26.4TB (11x 2.4TB) 2.5 inch SSD: SATA 42.24TB (11x 3.84TB), SAS SSD: 10.56TB（11×960GB） (When an optional HDD cage is added)	3.5 inch HDD: SATA 48TB (4x 12TB), Near Line SAS 48TB (4x 12TB) + 2.5 inch HDD: SATA 2TB(1x 2TB), SAS 2.4TB(1x 2.4TB), 2.5 inch SSD: SATA 3.84TB(1x 3.84TB) (When an optional HDD cage is added)
		Hot-swap		Capable	
	Interface specification and RAID configuration			SATA 6Gb/s : RAID 0/1/5/6/10/50/60 (Option), SAS 12Gb/s : RAID 0/1/5/6/10/50/60 (Option)	
	Optical disk drive			Connection of built-in/ external drive (Option) *1	
	FDD			Option: flash FDD(1.44MB) *2	
	Expansion bay			-	
Expansion	Corresponding Slots			Standard configuration 1x PCI Express 3.0 (x16 lanes, x16 sockets) (full-height, 3/4 length/slot1) 1x PCI Express 3.0 (x8 lanes, x8 sockets) (low profile, half-length/ slot2) 1x PCI Express 3.0 (x8 lanes, x8 sockets) (exclusive use for RAID controller) 1x PCI Express 3.0 (x8 lanes, x8 sockets) (exclusive use for LOM card) (You can change PCI configuration by preparing optional raiser cards. See the system configuration guide for the detailed information.)	
Graphics	Built-in chips/ video RAM			Internal management controller chip/ 16MB	
	Graphics and resolution			1677 million colors: 640x480, 800x600, 1,024x768, 1,280x1,024, 1,600x1,200, 1,920x1,200	
Standard interface	Front			Standard specification 1x USB3.0(Type A), 1x USB2.0(Type A) (for iLO) Options 1x USB3.0 (Type A), 1x Status LED Panel (Systems Insight Display)	Standard specification 1x USB3.0(Type A), 1x USB2.0(Type A) (for iLO) Options 1x USB3.0 (Type A), 1x Status LED Panel (Systems Insight Display), 1xDisplayport,1xUSB2.0(Type A)
	Rear			2x USB3.0 (TypeA), 1x Analog RGB (Mini D-Sub pin), 1x Management Dedicated LAN Connector (Compatible with 1000BASE-T/100BASE-TX/10BASE-T, RJ-45) 4x Data LAN Connector (Compatible with 1000BASE-T/100BASE-TX/10BASE-T (RJ-45)) 1x Serial Port (Option)	
	Internal parts			2x USB3.0 (TypeA), 2x (4x SATA2.0 Port), 1x (2x SATA2.0 Port)	
Redundant power supplies				Capable (Optional, hot plug-able)	
Redundant fans				Capable (Standard specification, hot plug-able)	
Dimensions (Width x depth x height)				434.6mm × 707.0mm × 42.9mm (Front bezel/ rails /protuberances not included)	434.6mm × 749.8mm × 42.9mm (Front bezel/ rails/ protuberances not included)
Mass (Minimum*3 / maximum)				14kg /26kg	14kg/29kg

Part Number	N8100-2773F	N8100-2774F
Power source	AC Power Unit (N8181-159, 160) 500W/800W 80 PLUS® Platinum power supply unit (Outlet with two pole parallel earth) (Hot plug-able) (Max: 2) AC100-240V±10%, 50/60Hz±3Hz (Power cable type needs to be selected) AC Power Unit (N8181-161) 800W 80 PLUS® Titanium power supply unit (Outlet with two pole parallel earth) (Hot plug-able) (Max: 2) AC200-240V±10%, 50/60Hz±3Hz (Power cable type needs to be selected) AC Power Unit (N8181-162) 1600W 80 PLUS® Platinum power supply unit (Outlet with two pole parallel earth) (Hot plug-able) (Max: 2) AC200-240V±10%, 50/60Hz±3Hz (Power cable type needs to be selected) DC Power Unit (N8181-163) 800 W DC-48v power (Outlet with two pole parallel earth) (Hot plug-able) (Maximum: 2) (Power cable type needs to be selected)	
Temperature/ humidity conditions	During operation: 10～35℃/8～90%, In storage: －30～60℃/5～95% ※both during operation and in storage, avoid condensation	
Chief accessories	Getting Started, Safety Precautions and Regulatory Notices, front bezel	
Install OS	－	
OS supported — NEC support	Microsoft® Windows Server® 2012 R2 Standard, Microsoft® Windows Server® 2012 R2 Datacenter, Microsoft® Windows Server® 2016 Standard, Microsoft® Windows Server® 2016 Datacenter, Microsoft® Windows Server® 2019 Standard, Microsoft® Windows Server® 2019 Datacenter, Red Hat® Enterprise Linux® 7.6 or later VMware ESXi™ 6.5 Update 2 or later, VMware ESXi™ 6.7 Update1 or later	
Operation Check OS	Regarding the latest operational information, refer to our information sight "Linux on Express 5800"	

*1   If you do not install an on-board DVD-ROM or on-board DVD SuperMULTI, please purchase an optional external DVD-ROM for the maintenance and the reinstall of OS.

*2   Please purchase as necessary. Regarding the main use, refer to the follow-up notes on Flash FDD in the system configuration guide.

*3   Operable minimum constitution (1x CPU, 1x DIMM, 1x HDD, 1x power unit)

On-board CPU

| On-boardCPU, Operation Frequency Number of cores(C)/Threads(T) (1CPU) Intel Smart Cache(Lat Level Cache)MB **TDP** （Thermal Disign Power）Maximum heat radiationW | Intel® Xeon® Processor Scalable Family
Xeon Bronze 3204 Processor (1.90 GHz, 6C/6T, TDP 85W, DDR4 2133 1TB),
Xeon Silver 4208 Processor (2.10 GHz, 8C/16T, TDP 85W, DDR4 2400 1TB),
Xeon Silver 4210 Processor (2.20 GHz, 10C/20T, TDP 85W, DDR4 2400 1TB),
Xeon Silver 4214 Processor (2.20 GHz, 12C/24T, TDP 85W, DDR4 2400 1TB),
Xeon Silver 4215 Processor (2.50 GHz, 8C/16T, TDP 85W, DDR4 2400 1TB),
Xeon Silver 4216 Processor (2.10 GHz, 16C/32T, TDP 100W, DDR4 2400 1TB),
Xeon Gold 5215 Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 1TB),
Xeon Gold 5217 Processor (3.00 GHz, 8C/16T, TDP 115W, DDR4 2667 1TB),
Xeon Gold 5218 Processor (2.30 GHz, 16C/32T, TDP 125W, DDR4 2667 1TB),
Xeon Gold 5220 Processor (2.20 GHz, 18C/36T, TDP 125W, DDR4 2667 1TB),
Xeon Gold 5222 Processor (3.80 GHz, 4C/8T, TDP 105W, DDR4 2933- 1TB),
Xeon Gold 6226 Processor (2.70 GHz, 12C/24T, TDP 125W, DDR4 2933 1TB),
Xeon Gold 6230 Processor (2.10 GHz, 20C/40T, TDP 125W, DDR4 2933 1TB),
Xeon Gold 6234 Processor (3.40 GHz, 8C/16T, TDP 130W, DDR4 2933 1TB),
Xeon Gold 6238 Processor (2.10GHz, 22C/44T, TDP 140W, DDR4 2933 1TB),
Xeon Gold 6240 Processor (2.60 GHz, 18C/36T, TDP 150W, DDR4 2933 1TB),
Xeon Gold 6242 Processor (2.80 GHz, 16C/32T, TDP 150W, DDR4 2933 1TB),
Xeon Gold 6244 Processor (3.60 GHz, 8C/16T, TDP 150W, DDR4 2933 1TB),
Xeon Gold 6248 Processor (2.50 GHz, 20C/40T, TDP 150W, DDR4 2933 1TB),
Xeon Gold 6252 Processor (2.10 GHz, 24C/48T, TDP 150W, DDR4 2933 1TB),
Xeon Gold 6254 Processor (3.10GHz, 18C/36T, TDP 200W, DDR4 2933 1TB),
Xeon Platinum 8260 Processor (2.40 GHz, 24C/48T, TDP 165W, DDR4 2933 1TB),
Xeon Platinum 8268 Processor (2.90 GHz, 24C/48T, TDP 205W, DDR4 2933 1TB),
Xeon Platinum 8280 Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 1TB),
Xeon Gold 5215M Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 2TB),
Xeon Gold 6238M Processor (2.10 GHz, 22C/44T, TDP 140W, DDR4 2933 2TB),
Xeon Gold 6240M Processor (2.60 GHz, 18C/36T, TDP 150W, DDR4 2933 2TB),
Xeon Platinum 8260M Processor (2.40 GHz, 24C/48T, TDP 165W, DDR4 2933 2TB),
Xeon Platinum 8280M Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 2TB)
Xeon Gold 5215L Processor (2.50 GHz, 10C/20T, TDP 85W, DDR4 2667 4.5TB),
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Xeon Gold 6240L Processor (2.60 GHz, 18C/36T,, TDP 150W, DDR4 2933 4.5TB),
Xeon Platinum 8280L Processor (2.70 GHz, 28C/56T, TDP 205W, DDR4 2933 4.5TB) |

𝟤. **Glossary**

Terms	Description
AHS	Active Health System (AHS) monitors the status/configuration of the server, and records it to a log file if any changes occur. AHS log is used for maintenance to investigate the failure.
AMP	Advanced Memory Protection (AMP) is a technology for realizing a fault tolerance of the server by memory redundancy (such as mirroring).
AMS	Agentless Management Service (AMS) is an OS service for sending information (such as OS events) that iLO cannot collect directly. iLO records the information recieved by AMS, and send it to Agentless Management.
EXPRESSBUILDER	Software for setting up the server. EXPRESSBUILDER can be started by pressing <F10> key during POST.
Express Report Service	Software that can report the server failure to the contact center by E-mail or modem. This software is installed with NEC ESMPRO ServerAgentService to the server.
Express Report Service (HTTPS)	Software that can report the server failure to the contact center by HTTPS. This software is installed with NEC ESMPRO ServerAgentService to the server.
Hexalobular	A type of screw head characterized by a 6-point star-shaped pattern. This is often called as "Torx" (the Torx is a third party's trademark). Head sizes are described from T1 to T100. This is sometimes abbreviated as 6lobe.
iLO	A built-in controller that supports the IPMI version 2.0 protocol. The controller is called as iLO5 because this server adopts a generation 5 version controller.
NEC ESMPRO ServerAgentService	Software for monitoring the server. This works with NEC ESMPRO Manager. You can choose Service Mode or Non-Service Mode when installing this software. Service Mode resides as the OS service and Non-Service Mode does not use the OS service to reduce memory, CPU power, and other OS resources.
NEC ESMPRO Manager	Software for managing a number of servers on network.
PC for Management	A computer for managing the server on network. A general Windows/Linux computer can be used as "PC for Management".
Product Info Collection Utility	Software for collecting several hardware/software statuses and event logs. You can easily collect the data for the server maintenance by using this software.
RAID Report Service	This service monitors the RAID status and notifies failures.
RBSU	ROM-Based Setup Utility (RBSU) is a built-in utility that can configure connected devices and BIOS settings. RBSU is called from System Utilities.
RESTful Interface Tool	A tool that supports API based on Representational State Transfer (REST) architecture. You can send maintenance commands in JSON format to iLO by HTTP protocol after installing this tool.
SID	System Insight Display (SID) is an optional product that can indicate the statuses of each device on motherboard.

Terms	Description
SPP	Standard Program Package (SPP) is a software package that includes BIOS, FW, driver, and other basic software. SPP is included in Starter Pack.
SSA	Smart Storage Administrator (SSA) is a utility that can configure RAID arrays. SSA is provided for Windows/Linux and can also start from F10 key function.
Starter Pack	A software package that includes SPP, instruction manual, application, and other software for the server. This must be installed before using OS on the server. Starter Pack is provided as an optional product and ISO data on our website.
System Maintenance Switch	A DIP switch on motherboard. This switch can enable/disable initialization, password, iLO settings, and other functions of maintenance.
System Utilities	System Utilities is a built-in utility that provides system information, calling RBSU, collecting system log, and other system utilities. You can start System Utilities by F9 key during POST.
TPM Kit	An optional product of Trusted Platform Module for the server.

3. Revision Record

Document Number	Date Issued	Description
10.201.01-101.01	May 2019	Newly created

[MEMO]

NEC Express Server

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(2nd-Gen)

User's Guide

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