FUJITSU

# FUJITSU Supercomputer PRIMEHPC FX700

## Operating Manual

C120-0089-12EN

# Preface

This operating manual describes how to install, set up, and operate the FX700 main unit.
The operating manual is intended for those responsible for installing the hardware and ensuring the system runs smoothly. The manual contains all the information they need to run their purchased FX700 main units. To understand the various expansion options, you not only need to be familiar with the fields of hardware and data transmission but also require a basic knowledge of the underlying operating system.

## Organization and Contents of This Manual

This document consists of the following chapters and appendixes.

Chapter 1 Product Description
This chapter provides an overview and information on the FX700 main unit.
Chapter 2 Important Information
This chapter contains important information for using the FX700 correctly and safely.
Chapter 3 Starting Up
This chapter describes the steps from installation to startup of the FX700 main unit.
Chapter 4 Operation
This chapter describes operation of the FX700 main unit.
Chapter 5 Troubleshooting
This chapter describes the troubleshooting of the FX700.
Chapter 6 Technical Specifications
This chapter describes the specifications of the FX700 main unit, chassis, blade, PSU, and FANU.
Appendix A BMC Driver Messages
This appendix shows messages of the BMC driver.
Appendix B CPU-MEM-RAS Driver Messages
This appendix shows messages of the CPU-MEM-RAS driver.

## Warning and Important Notice Symbols

This manual uses the following symbols to provide warnings and indicate useful information to the user, to prevent personal injury and property damage.


WARNING indicates a hazardous (potentially dangerous) situation that could result in death or serious personal injury if the product is not used properly.


CAUTION indicates a hazardous situation that could result in minor or moderate personal injury and/or property damage, such as to the product itself or the user's property, if the product is not used properly.

### Alert Symbols in the Text

An alert statement follows an alert symbol. An alert statement is indented on both ends to distinguish it from regular text. Similarly, one line is inserted before and after the alert statement.

# Revision History

| Edition | Date | Changed Location (Change Classification)(*1) | Description |
|---|---|---|---|
| 01 | February 27, 2020 | - | Created |
| 02 | March 17, 2020 | Preface<br><br>Chapter 2<br>Chapter 3 | Added "Safety, Radio, and Harmonics (Europe, UK)"<br>Added "CE Compliance" to "Regulations"<br>Added "2.5 ErP Directive"<br>Changed wording |
| 03 | June 25, 2020 | Chapter 1<br>Chapter 3<br><br>Chapter 5 | Updated "1.1 Overview of the FX700 Main Unit"<br>Updated "3.17.1 OS Installation Procedure" and "3.17.2 OS Driver Installation Procedure"<br>Added "5.4.5 Precaution on Using the Web GUI"<br>Updated "6.1 FX700 Main Unit Specifications" |
| 04 | September 25, 2020 | Chapter 1<br>Chapter 3<br>Chapter 5 | Updated "1.2.1.1 Front Panel Buttons"<br>Updated "3.17 Installing the OS"<br>Added "5.4.6 PSU Recovery Procedure" |
| 05 | November 24, 2020 | Preface<br><br>Chapter 1<br><br>Chapter 2<br>Chapter 3<br><br>Chapter 5 | Updated "Safety, Radio, and Harmonics (North America)," "Safety, Radio, and Harmonics (Europe, UK)," and "Caution Labels"<br>Updated "1.1 Overview of the FX700 Main Unit" and "1.2 Buttons and LEDs on the FX700 Main Unit"<br>Updated "2.1 Installation Precautions"<br>Updated "3.15 Connecting Cables" and "3.17 Installing the OS"<br>Updated "5.4 Other Problems"<br>Added "5.4.7 Important Information on System Event Logs Messages" and "5.4.8 Control Port Not Possible to Connect with DHCP" |
| 06 | January 28, 2021 | Preface<br><br><br>Chapter 3<br><br><br>Chapter 5<br><br>Appendix A<br>Appendix B | Added "Taiwan"<br>Deleted "Export Related" tables for each country and "Handling Lithium Batteries"<br>Updated "3.15.3 Connecting the Power Cord" and "3.16.2 Initial BMC Settings"<br>Added "3.15.4 Connecting an InfiniBand Cable"<br>Updated chapter title, lead sentence, and "5.4.3 Precaution on Using Commands"<br>Updated everything<br>Updated everything |
| 07 | July 05, 2021 | Chapter 2<br><br>Chapter 3<br><br>Chapter 6 | Updated "Table 2.1 Product Information," "Table 2.2 Critical Raw Material Content," and "Table 2.3 Disassembly Procedures"<br>Updated "3.4 Distribution Panel Cut-Off Characteristics" and "3.14.1 Input Power Connection Specifications (FX700 Main Unit)"<br>Updated "Table 6.1 FX700 Main Unit Specifications" |

| Edition | Date | Changed Location (Change Classification)(*1) | Description |
|---|---|---|---|
| 08 | October 26, 2021 | Preface<br>Chapter 1<br><br><br>Chapter 2<br>Chapter 3<br><br><br>Chapter 5 | Updated "Compliance With Laws and Regulations in Each Country"<br>Updated "1.1 Overview of the FX700 Main Unit" and "1.2 Buttons and LEDs on the FX700 Main Unit"<br>Updated "Table 2.1 Product Information"<br>Updated "3.17 Installing the OS" and "3.18 Installing the InfiniBand Driver"<br>Updated "5.4.1 Control Port and Maintenance Port Both Disabled" and "5.4.6 PSU Recovery Procedure"<br>Added "5.4.9 Precaution After Clearing a PSU Temperature Warning," "5.4.10 Error Occurring in the POST," and "5.4.11 BMC Not Accessible"* |
| 09 | December 17, 2021 | Chapter 1<br>Chapter 2<br>Chapter 6 | Updated "1.1 Overview of the FX700 Main Unit"<br>Updated "Table 2.1 Product Information"<br>Updated "Table 6.1 FX700 Main Unit Specifications" |
| 10 | April 18, 2022 | Chapter 3<br><br><br><br>Chapter 5 | Updated "3.15.4 Connecting an InfiniBand Cable," "3.17.1 OS Installation Procedure," and "3.18 Installing the InfiniBand Driver"<br>Updated "5.4.11 BMC Not Accessible"* to "5.4.11 BMC Web GUI Not Accessible"<br>Added "5.4.12 Console Connection to a Node Not Possible via the BMC" and "5.4.13 Suspected Deterioration in InfiniBand Performance" |
| 11 | December 16, 2022 | Chapter 2<br>Chapter 3<br>Chapter 6 | Updated "Table 2.1 Product Information"<br>Updated "3.17.1 OS Installation Procedure"<br>Updated "Table 6.1 FX700 Main Unit Specifications" |
| 12 | September 30, 2024 | Preface | Updated "Notes on This Product"* to "High Risk Activity"<br>Added "Using This Product on the Internet"<br>Updated "Europe, UK" and "CE Compliance" |

*1 The numbers/titles of the chapters/sections to which changes are made are those used in the latest version. However, the numbers/titles of the chapters/sections with an asterisk are those used in the old version.

This section describes the following:



# For Your Safety

## How to Use This Manual

This manual contains important information required for using this product safely. Read the *FUJITSU Supercomputer PRIMEHPC FX700 Operating Manual* (C120-0089EN), the *FUJITSU Supercomputer PRIMEHPC FX700 Getting Started Guide* (C120-0093XA), the *FUJITSU Supercomputer PRIMEHPC FX700 Safety and Regulatory Information* (C120-0092XA), the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN), and the *FUJITSU Supercomputer PRIMEHPC FX700 Upgrade and Maintenance Manual* (C120-0090EN) thoroughly before using this product. Before attempting to operate this device, carefully read and understand each manual, paying particular attention to the safety precautions.
Be sure to keep this manual in a safe and convenient location for quick reference.
Fujitsu makes every effort to prevent injury to users and bystanders as well as property damage. Be sure to use the product in accordance with the instructions in the manual.

## High Risk Activity

This product is designed and manufactured for use in standard applications such as office work, personal devices, and general industrial use. The product is not intended for special uses (nuclear-reactor control in atomic energy facilities, aeronautic and space systems, air traffic control, operation control in mass transit systems, life support, or missile launch controls) where particularly high reliability requirements exist, where the pertinent levels of safety are not guaranteed, or where a failure, an operational error, or some other factor could be life-threatening or cause a physical injury (referred to below as "high-risk" use).
Customers considering the use of this product for high-risk applications must have safety-assurance measures in place beforehand. Moreover, they are requested to consult our sales representative before embarking on such specialized use.

## Using This Product on the Internet

This product has not been designed or manufactured for distributing services on the Internet.
Use this product in an environment not connected to the Internet (within an intranet). When using this product in an environment connected to the Internet, first ensure that security measures are in place to protect the system from unauthorized intrusion.

# Compliance With Laws and Regulations in Each Country

The FX700 system complies with the laws and regulations listed below.

### North America

Safety, Radio, and Harmonics (North America)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| UL | ANSI/UL 60950-1, 2nd Ed., 2014-10-14<br>ANSI/UL 62368-1, 2nd Ed., 2014-12-01 | ✓ | | |
| FCC | FCC Part-15 Subpart-B (2019) | | ✓ | |
| CSA | CAN/CSA C22.2 No. 60950-1-07, 2nd Ed., 2014-10<br>CAN/CSA C22.2 No. 62368-1-14, 2nd Ed., 2014-12 | ✓ | | |
| ICES | ICES-003 Issue 7 (2020) | | ✓ | |

Environmental Substances (North America)

| Standard Number | Energy-Saving | Environmental Substances | Recycling |
|---|---|---|---|
| Regulations on brominated flame retardants (Maine, Washington, Oregon, and Vermont in the U.S.) | | ✓ | |
| Law on emission of perchloric acid compounds to the environment (California) | | ✓ | |
| Proposition 65 (California) | | ✓ | |
| Prohibition of Certain Toxic Substances Regulations (SOR/2012-285) | | ✓ | |

### Europe, UK

Safety, Radio, and Harmonics (Europe, UK)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| CE, UKCA | IEC 60950-1:2005 (2nd Ed.); Am1:2009+Am2:2013<br>EN 60950-1:2006 +A11:2009 +A1:2010+A12:2011+A2:2013<br>IEC 62368-1:2014<br>EN 62368-1:2014+A11:2017 | ✓ | | |

Safety, Radio, and Harmonics (Europe, UK) *(continued)*

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| | EN 62479 (2010)<br>EN 55035 (2017), +A11 (2020)<br>EN 55032 (2015), +A11 (2020); Class A<br>EN 55024 (2010)<br>EN 61000-4-2 (2009)<br>EN 61000-4-3 (2006), +A1, +A2<br>EN 61000-4-4 (2012)<br>EN 61000-4-5 (2014), +A1<br>EN 61000-4-6 (2014)<br>EN 61000-4-8 (2010)<br>EN 61000-4-11 (2004), +A1<br>EN 300 386 V2.1.1 (2016) | | ✓ | |
| | EN 61000-3-2 (2014)<br>EN 61000-3-3 (2013) | | | ✓ |

Environmental Substances and Recycling/Disposal (Europe, UK)

| Standard Number | Energy-Saving | Environmental Substances | Recycling |
|---|---|---|---|
| ErP Directive (2009/125/EC) | ✓ | ✓ | ✓ |
| RoHS II (2011/65/EU) | | ✓ | |
| New chemical regulation (REACH: No. 1907/2006) | | ✓ | |
| REGULATION (EU) 2023/1542 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC | | ✓ | ✓ |
| Waste Electrical and Electronic Equipment Directive (WEEE Directive) | | | ✓ |
| European Parliament and Council Directive 94/62/EC of 20 December, 1994 on packaging and packaging waste | | | ✓ |
| The Ecodesign for Energy-Related Products Regulations 2010 | ✓ | ✓ | ✓ |
| The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 | | ✓ | |

### Japan

Safety, Radio, and Harmonics (Japan)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| PSE | Act on Product Safety of Electrical Appliances and Materials | ✓ | | |

Safety, Radio, and Harmonics (Japan) *(continued)*

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| VCCI | VCCI (2016)/VCCI-CISPR 32 (2016) | | ✓ | |
| - | JIS C 61000-3-2 (2019) | | | ✓ |

Energy-Saving, Environmental Substances, and Recycling/Disposal (Japan)

| Standard Number | Energy-Saving | Environmental Substances | Recycling |
|---|---|---|---|
| Act on the Rational Use of Energy | ✓ | | |
| Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances | | ✓ | |
| Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Act on Promoting Green Procurement) | | ✓ | |
| Act on the Promotion of Effective Utilization of Resources | | | ✓ |

### South Korea

Safety, Radio, and Harmonics (South Korea)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| KCC | K 60950-1 (2.0) (2011-12)<br>(PSU only) | ✓ | | |
| | KN32 Class A<br>KN35<br>KN61000-4-2/3/4/5/6/8/11 | | ✓ | |

Recycling and Disposal (South Korea)

| Standard Number | Energy-Saving | Environmental Substances | Recycling |
|---|---|---|---|
| Display rules on package separation | | | ✓ |

### Australia/New Zealand

Safety, Radio, and Harmonics (Australia/New Zealand)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| RCM | IEC 60950-1:2005 (2nd Ed.); Amd1+ Amd2 with AU,NZ deviation | ✓ | | |
| | AS/NZS CISPR 32 (2015) | | ✓ | |

### Taiwan

Safety, Radio, and Harmonics (Taiwan)

| Certified Standard | Standard Number | Safety | Radio | Harmonics |
|---|---|---|---|---|
| BSMI | CNS 14336-1 | ✓ | | |
| | CNS 13438 | | ✓ | |

Environmental Substances (Taiwan)

| Standard Number | Energy-Saving | Environmental Substances | Recycling |
|---|---|---|---|
| Taiwan RoHS | | ✓ | |

### Regulatory Compliance Statements

The applicable regulatory compliance statements provided for this product are as follows:

- Voluntary Control Council for Interference (VCCI) - Japan

Be sure to read the notices on this product before installing the product.
The notices on the product are shown below.

- VCCI Class A Notice

> This equipment is Class A information technology equipment. Operation of this equipment in a residential area may cause radio interference, in which case the user may be required to correct the interference at the user's own expense.
>
> VCCI-A

## Regulations

This section describes the applicable regulations.

### CE Compliance

CE

The system complies with the requirements of European regulations, including the equipped lithium batteries.

**⚠CAUTION**

This product is a Class A product. Operation of this product in a residential area may cause radio frequency interference,
in which case the user will be required to correct the interference at the user's own expense.

### FCC Class A Declaration of Conformity

The device may be marked with an FCC declaration, which would apply to the equipment covered in this document unless otherwise specified herein. The declaration for other products will appear in the accompanying documentation.

**CAUTION**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules, and meets all requirements of the Canadian Interference-Causing Equipment Standard (ICES-003) for digital apparatus. These regulations are designed to provide reasonable protection against radio interference when the equipment is operated in a residential installation. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in strict accordance with the instructions, may cause harmful interference to radio communications. However, there is no warranty that interference will not occur in the conditions at a particular installation. If the product causes harmful interference to radio or television reception (which can be confirmed by switching the equipment on and off), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit separate from that connected to the receiver.
- Consult a reseller or experienced radio/TV technician for support.

Fujitsu is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Fujitsu. The user shall be responsible for correcting the interference caused by such unauthorized modification, substitution, or attachment.

The use of shielded I/O cables is required when connecting the equipment to any optional peripheral or host device. Failure to use shielded I/O cables may violate FCC and ICES regulations.

## Manuals in This Series

The documentation can be found online.

For the Japanese market

https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/

For the global market

https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

See the following table for an overview of the documentation.

| Document | Manual Code | Description |
|---|---|---|
| *FUJITSU Supercomputer PRIMEHPC FX700 Operating Manual* | C120-0089EN | Contains information about how to install, set up, and operate the device. (Provided online) |
| *FUJITSU Supercomputer PRIMEHPC FX700 Upgrade and Maintenance Manual* | C120-0090EN | Contains device upgrade procedures and replacement procedures for faulty hardware. (Provided online) |
| *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* | C120-0091EN | Contains information about the BMC (Baseboard Management Controller), which manages the condition of the device. (Provided online) |
| *FUJITSU Supercomputer PRIMEHPC FX700 Safety and Regulatory Information* | C120-0092XA | Contains important safety information. (Provided online and as print version) |
| *FUJITSU Supercomputer PRIMEHPC FX700 Getting Started Guide* | C120-0093XA | Describes how to access the reference manuals and other important information after unpacking the equipment. (The manual is supplied with the product.) |

### Storage of Accessories

Keep the accessories in a safe place because they are required for FX700 main unit operation.

## Notation

This document uses the following fonts and symbols to indicate special meanings.

| Font or Symbol | Meaning | Example |
|---|---|---|
| **AaBbCc123** | Indicates what is input by users and displayed on screens.<br>This font is used to indicate command input examples. | # **adduser jsmith** |
| AaBbCc123 | Indicates the names of commands, files, and directories output by the computer and displayed on screens.<br>This font is used to indicate command output examples in boxes. | Shell> **showinfo**<br>.<br>.<br>M.2 Slot Device Status: PASS |
| *Italics* | Indicates the name of a referenced manual. | See the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide*. |
| " " | Indicates the title of a referenced chapter, section, or subsection. | See "Chapter 4 Operation." |

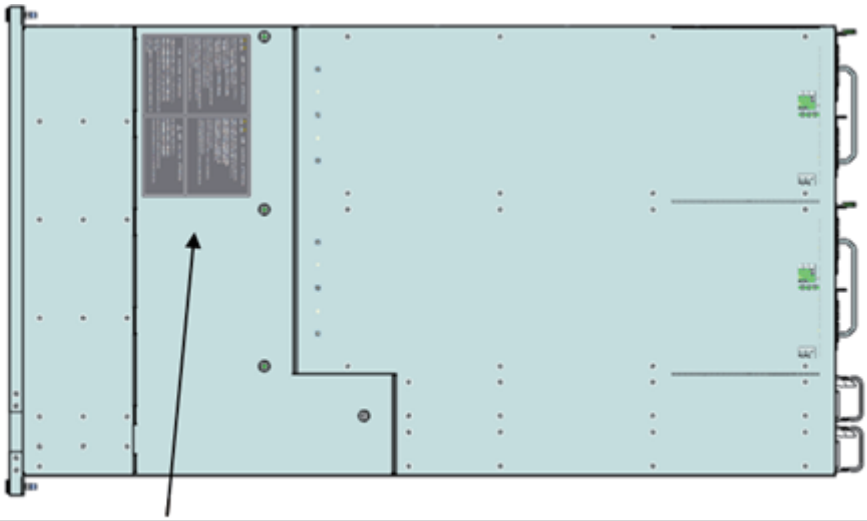
## Caution Labels

Caution labels are affixed to this product.

**CAUTION**

Never peel off the labels.

Main Unit (Top)




## Trademarks

- Company names and product names are the trademarks or registered trademarks of their respective owners.
- Trademark indications (TM, (R)) are omitted for some system and product names in this document.

# Notes on Product Handling

## Maintenance

**WARNING**

Ask a certified service engineer or our sales representative to perform the inspection and repair work for this product and the optional products provided by Fujitsu. The work must not be done by the customer under any circumstances. Otherwise, electric shock, injury, or fire may result.

## Modifying or Recycling the Product

**CAUTION**

Modifying this product or recycling and using a secondhand product may result in personal injury to users and/or bystanders or damage to the product and/or other property.

## Disposal or Recycling of Products That Have Completed Their Life Cycle

Waste must be disposed of in a professional and responsible way in accordance with environmental regulations. For details, please contact your nearest environmental authority or our sales representative.

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## Figure Contents

# Table Contents

# Chapter 1 Product Description

This chapter provides an overview and information on the FX700 main unit.

## 1.1 Overview of the FX700 Main Unit

This section provides an overview of the FX700 main unit.
The FX700 main unit is a product that accommodates multiple blades (CMUs) having ARM-based CPUs (A64FX). This product also includes a BMC board provided with BMC/CPU firmware.

**Remarks**

Use the same type of blade when mounting multiple blades. Operation with a mix of blades of different types cannot be guaranteed.

It has the following features.

- Each blade has two nodes/two CPUs mounted. The FX700 main unit (2U chassis) accommodates one to four blades.
- The CPU uses the A64FX processor developed by Fujitsu for HPC. Armv8.2-A SVE is the command set architecture used by this CPU, which has 48 cores and maintains performance at 3.072 TFlops (operating at 2.0 GHz). There is a built-in HBM interface and PCI-Express (PCIe) Gen3 16-lane controller.
- The CPU processor supports three frequencies: 1.8 GHz, 2.0 GHz, and 2.6 GHz.
- The main memory is High Bandwidth Memory (HBM), providing a high memory bandwidth of 1,024 GB/s.
- Each node is equipped with the following I/O hardware:

  HHHL PCIe card slot x 1
  M.2 Type 2280 slot x 1
  1 GbE LAN port x 1

- Using eight nodes as a single control unit, the BMC processor in the chassis monitors and controls the hardware inside the FX700 main unit.
- The BMC has the function of managing the HCP (Hardware Control Program), which is a firmware bundle, and updating firmware on the FX700 main unit. The term HCP**** refers to the version number of the HCP firmware (****: 4-digit number).
- The firmware installed in the chassis performs hardware diagnostics at node power-on.
- The only supported UEFI shell command is the showinfo command.
- The supported OS is Red Hat Enterprise Linux 8.

For details on the hardware components, see "Chapter 6 Technical Specifications."

## 1.1.1 External Views of the FX700 Main Unit

This section shows external views (front, rear, top, right side) of the FX700 main unit.

Figure 1.1 Main Unit, Front

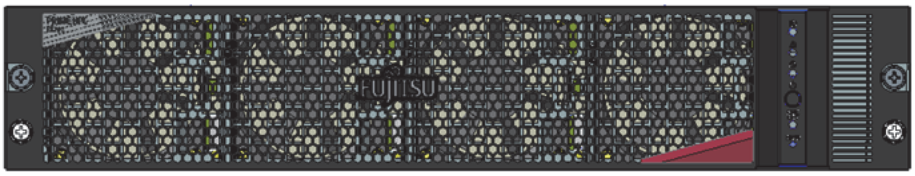



Figure 1.2 Main Unit, Rear

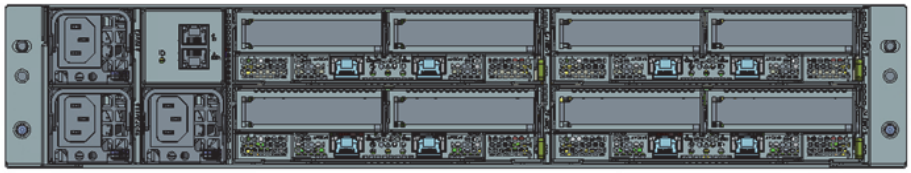


Figure 1.3 Main Unit, Top

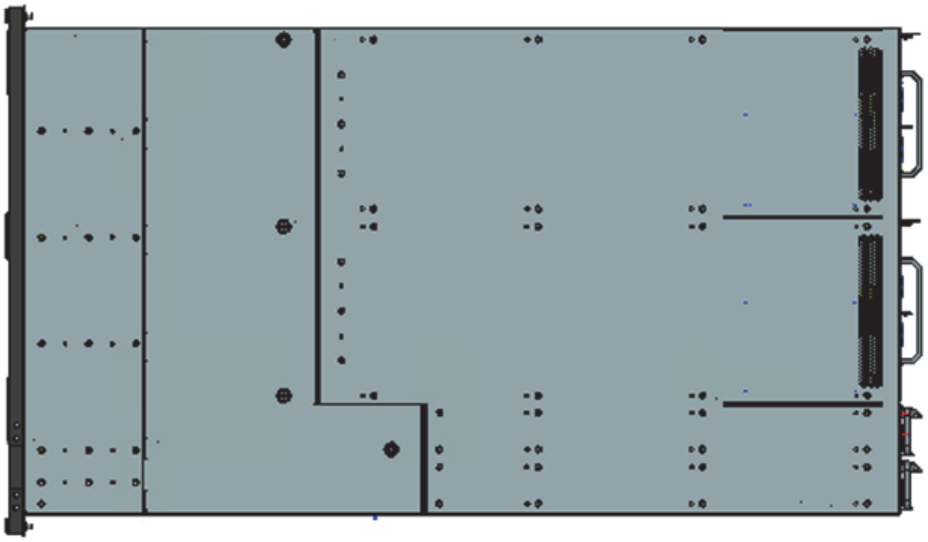
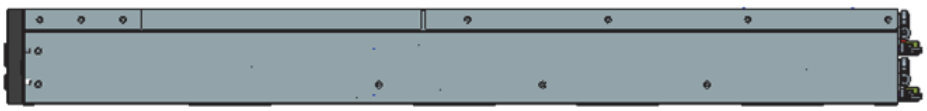


Figure 1.4 Main Unit, Right Side



## 1.1.2 Front Configuration of the FX700 Main Unit

This section shows the front of the FX700 main unit.

Figure 1.5 Front Configuration of the FX700 Main Unit (With Bezel)

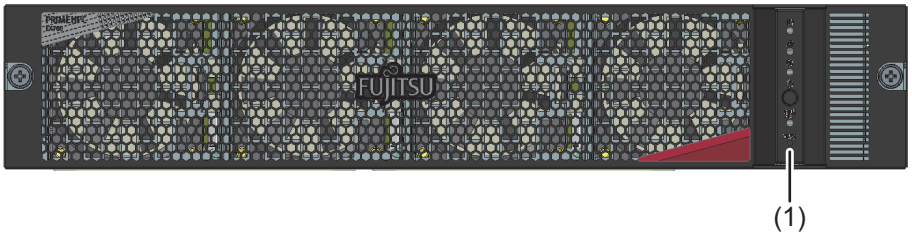
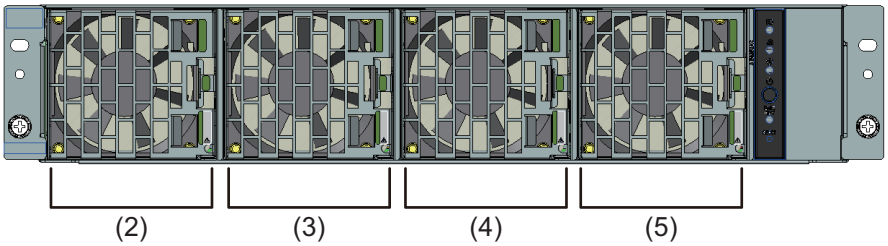



Figure 1.6 Front Configuration of the FX700 Main Unit (Without Bezel)

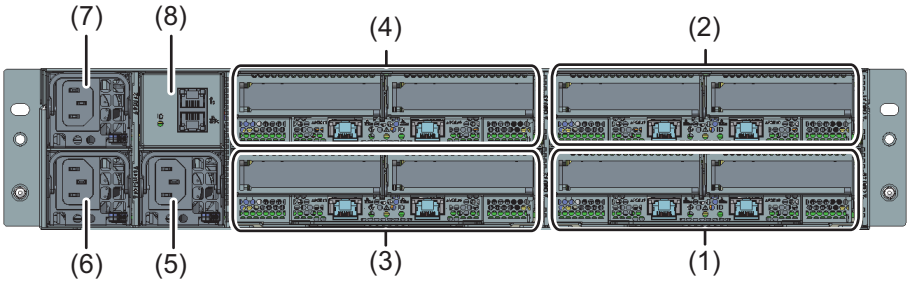



| Location | Component |
|---|---|
| (1) | Front panel |
| (2) | FANU#00 |
| (3) | FANU#01 |
| (4) | FANU#02 |
| (5) | FANU#03 |

## 1.1.3 Rear Configuration of the FX700 Main Unit

This section shows the rear of the FX700 main unit.

Figure 1.7 Rear Configuration of the FX700 Main Unit

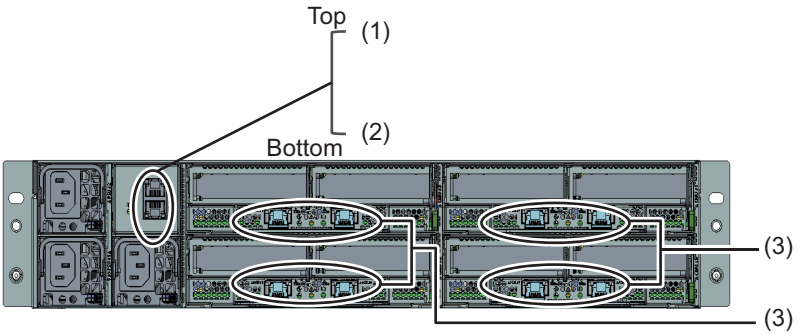



| Location | Component |
|---|---|
| (1) | CMU#00 |
| (2) | CMU#01 |
| (3) | CMU#02 |
| (4) | CMU#03 |
| (5) | PSU#00 |
| (6) | PSU#01 |
| (7) | PSU#02 |
| (8) | BMCIF#00 |

## 1.1.4 LANs of the FX700 Main Unit

This section shows the locations of the BMC maintenance port, BMC control port, and node management ports.

Figure 1.8 Rear Locations for the LANs of the FX700 Main Unit




| Location | Display | Name | Description |
|---|---|---|---|
| (1) | S | Maintenance port | Used to connect a maintenance work terminal when performing maintenance work |
| (2) | C | Control port | Connected to the BMC and used for hardware status monitoring, failure notification, and power control |
| (3) | M | Management port | Used to connect nodes |

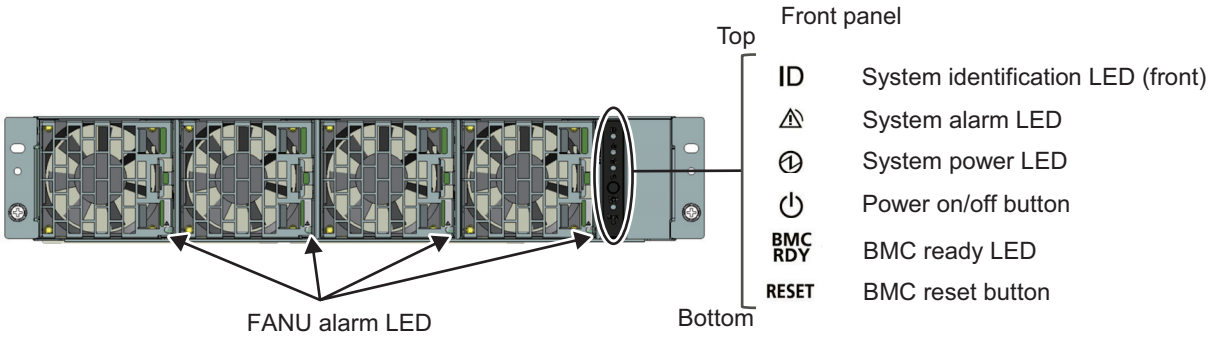
# 1.2 Buttons and LEDs on the FX700 Main Unit

The buttons, when operated, power on/off the FX700 main unit.
The LEDs indicate various conditions, such as which parts need to be replaced and when they can be replaced. By checking the LEDs, maintenance workers can prevent mistakes in operation.

## 1.2.1 Front Buttons and LEDs on the FX700 Main Unit

"Figure 1.9 Locations of the Front Buttons and LEDs on the FX700 Main Unit" shows the locations of buttons and FANU LEDs on the front panel.

Figure 1.9 Locations of the Front Buttons and LEDs on the FX700 Main Unit



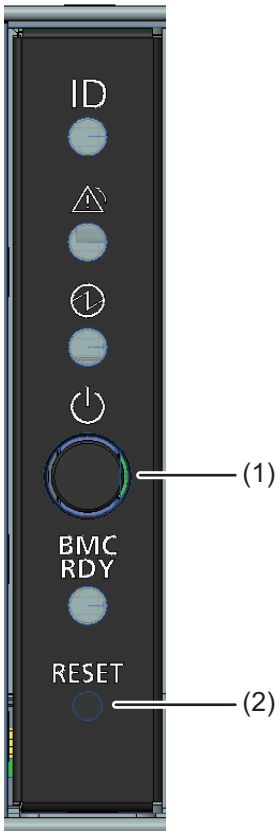

For details, see "1.2.1.1 Front Panel Buttons," "1.2.1.2 Front Panel LEDs," and "1.2.1.3 FANU LED."

### 1.2.1.1 Front Panel Buttons

**CAUTION**

Resetting the BMC during operation may result in abnormal system operation.

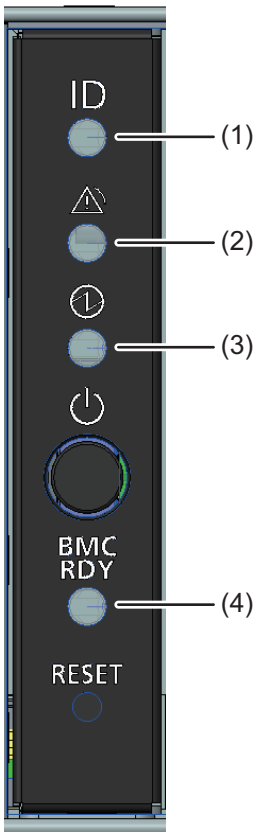
Figure 1.10 Front Panel Buttons




| Location | Display | Button | Description |
|---|---|---|---|
| (1) |  | Power on/off button | Press the button to power on or off the system.<br>- Short press the button to power on all nodes (only if all the nodes in the device are off). For details on boot mode, see the note in "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).<br>- Long press the button (4 seconds or longer) to start shutdown of the operating systems on all nodes. |
| (2) | RESET | BMC reset button | You can reset the BMC by pressing this button. Use the button for maintenance purposes when the BMC is inaccessible. After a BMC reset, the System alarm LED blinks. Before pressing the button, check "5.4.11 BMC Web GUI Not Accessible." |

### 1.2.1.2 Front Panel LEDs

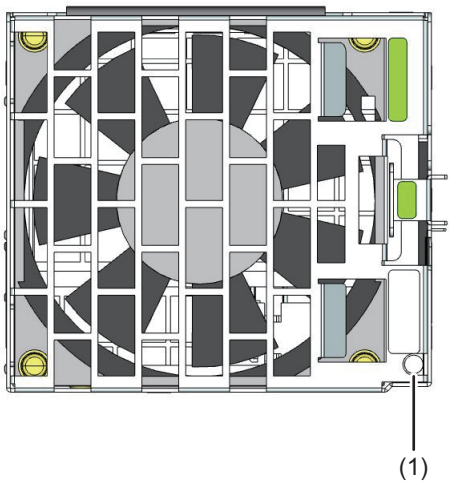
Figure 1.11 Front Panel LEDs




| Location | Display | LED | State | Description |
|---|---|---|---|---|
| (1) | ID | System identification LED (front) | Off<br>Blinking, blue | This device not selected as maintenance target<br>This device selected as maintenance target |
| (2) | | System alarm LED | Off<br>On, orange<br>Orange blinking | No failure<br>This device contains part requiring immediate replacement<br>This device contains part requiring preventive replacement |
| (3) | | System power LED | Off<br>On, green | All nodes powered off<br>At least 1 node powered on |
| (4) | BMC RDY | BMC ready LED | Off<br>On, green<br>Blinking, green<br>Fast blinking, green | AC off/BMC stopped<br>BMC initialization completed<br>BMC initializing<br>BMC failed |

### 1.2.1.3 FANU LED

Figure 1.12 FANU LED

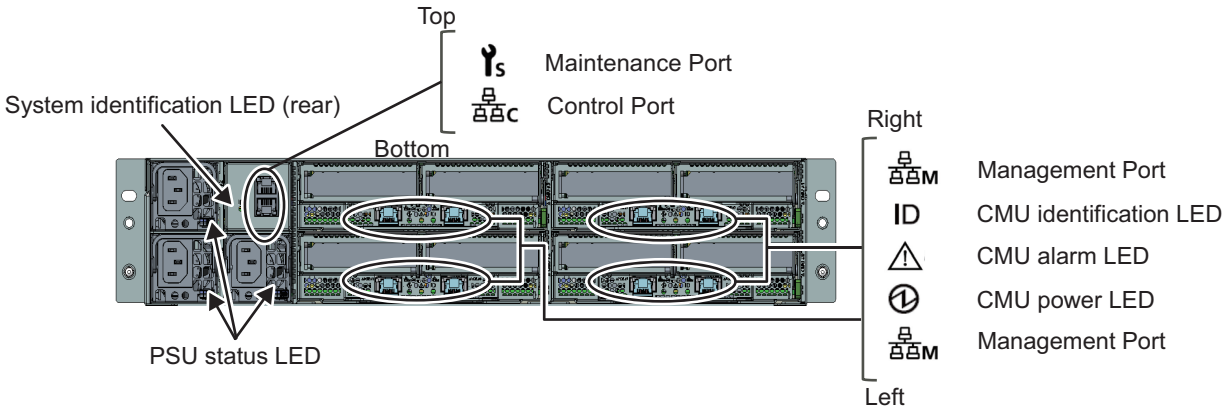



| Location | LED | State | Description |
|---|---|---|---|
| (1) | FANU alarm LED | Off | No failure |
| | | On, orange | This FANU failed |

## 1.2.2 Rear LEDs on the FX700 Main Unit

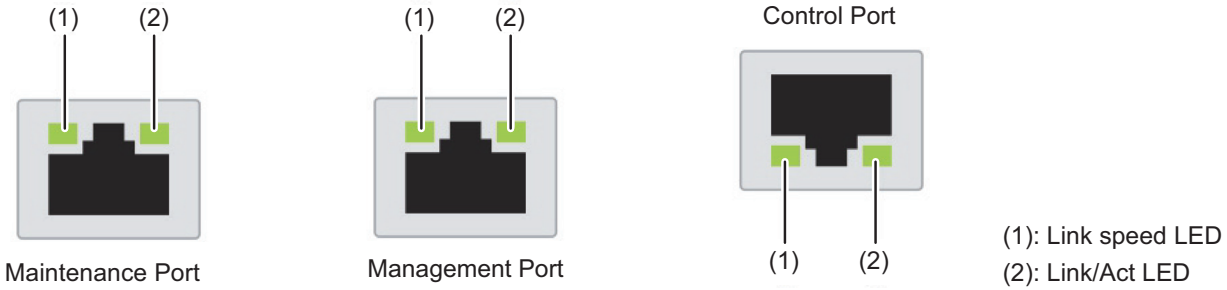
"Figure 1.13 Locations of the Rear LEDs on the FX700 Main Unit" shows the locations of the rear LEDs on the FX700 main unit.

Figure 1.13 Locations of the Rear LEDs on the FX700 Main Unit



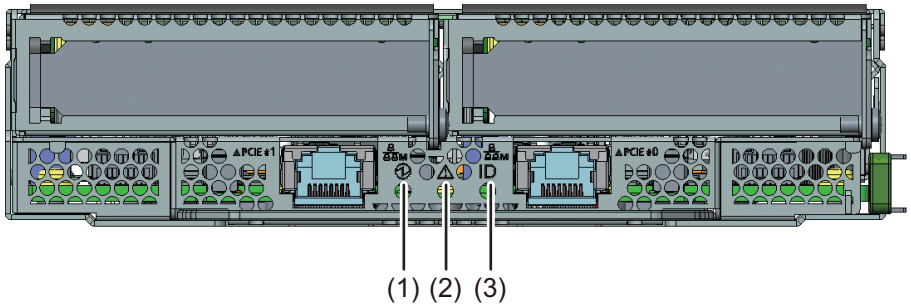

For details on the LEDs, see "1.2.2.1 Rear LEDs Except LAN LEDs on the Blade," "1.2.2.2 Rear LAN LEDs on the Blade," "1.2.2.3 BMCIFU LEDs," and "1.2.2.4 PSU Status LED."
For details on the BMC maintenance port, BMC control port, and node management ports, see "1.1.4 LANs of the FX700 Main Unit."
For details on the LAN port LEDs, see "Figure 1.14 LAN Port LEDs."

Figure 1.14 LAN Port LEDs



### 1.2.2.1 Rear LEDs Except LAN LEDs on the Blade

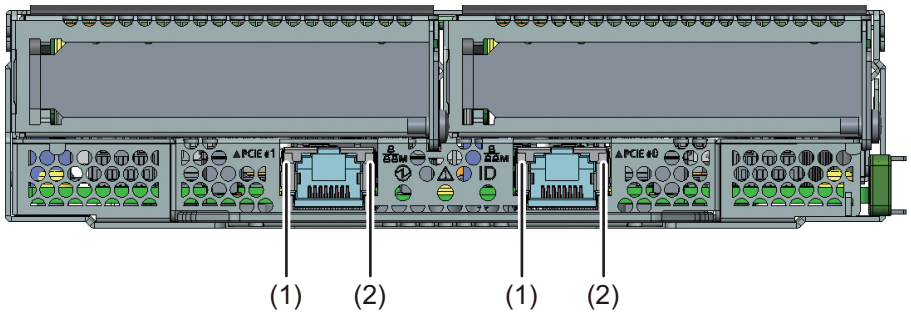
Figure 1.15 Rear LEDs Except LAN LEDs on the Blade




| Location | Display | LED | State | Description |
|---|---|---|---|---|
| (1) | | CMU power LED | Off<br>On, green | This blade node powered off<br>This blade node powered on |
| (2) | | CMU alarm LED | Off<br>On, orange<br><br>Blinking, orange | No failure<br>This blade contains part requiring immediate replacement<br>This blade contains part requiring preventive replacement |
| (3) | ID | CMU identification LED | Off<br>On, blue | This blade not selected as maintenance target<br>This blade selected as maintenance target |

### 1.2.2.2 Rear LAN LEDs on the Blade

Figure 1.16 Rear LAN LEDs on the Blade

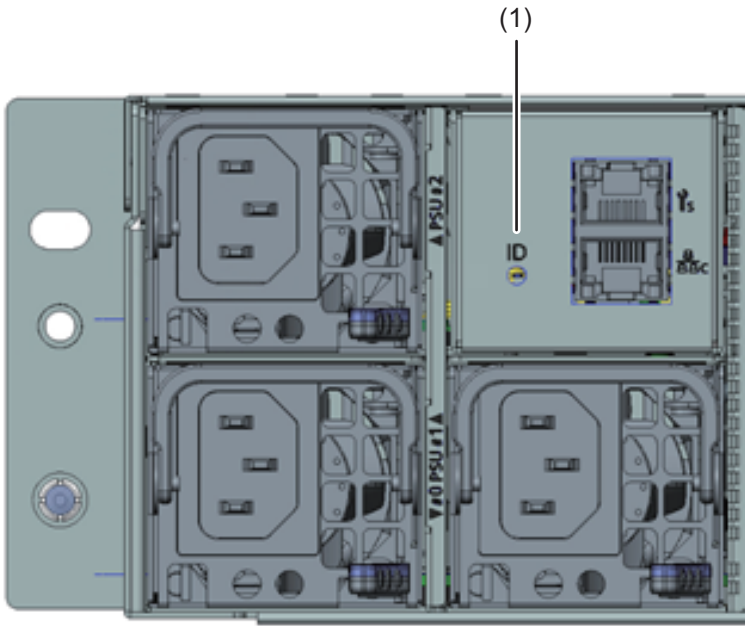



| Location | LED | State | Description |
|---|---|---|---|
| (1) | LAN speed LED | On, orange<br>On, green<br>Off | Indicates data traffic at a transmission speed of 1 Gbit/s.<br>Indicates data traffic at a transmission speed of 100 Mbit/s.<br>Indicates data traffic at a transmission speed of 10 Mbit/s. |
| (2) | LAN link/ transmission LED | On, green<br>Off | A LAN connection has been established.<br>The LAN is not connected. |

| Location | LED | State | Description |
|---|---|---|---|
| | | Green blinking | LAN data is being transmitted. |

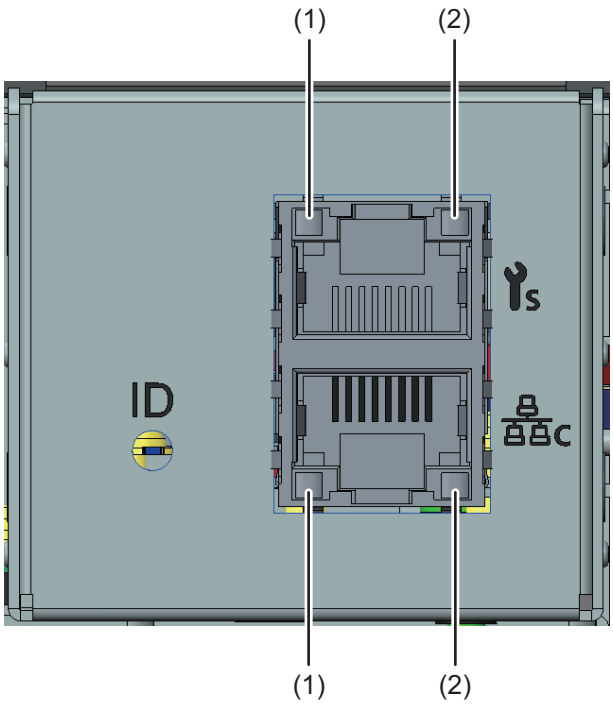
### 1.2.2.3 BMCIFU LEDs

Figure 1.17 BMCIFU LED (ID)




| Location | Display | LED | State | Description |
|---|---|---|---|---|
| (1) | ID | System identification LED (rear) | Off<br>Blinking, blue | This device not selected as maintenance target<br>This device selected as maintenance target |

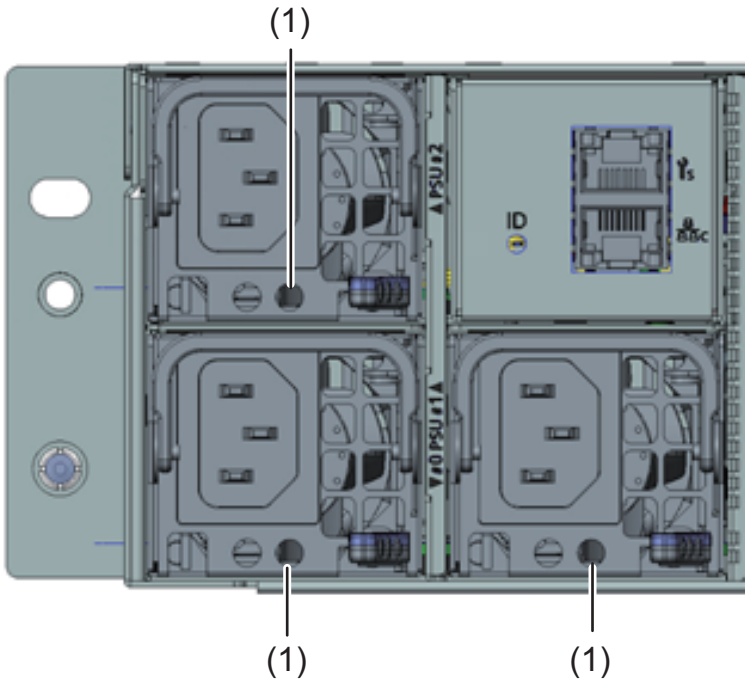
Figure 1.18 BMCIFU LAN LEDs




| Location | LED | State | Description |
|---|---|---|---|
| (1) | LAN speed LED | On, orange | Indicates data traffic at a transmission speed of 1 Gbit/s. |
| | | On, green | Indicates data traffic at a transmission speed of 100 Mbit/s. |
| | | Off | Indicates data traffic at a transmission speed of 10 Mbit/s. |
| (2) | LAN link/ transmission LED | On, green | A LAN connection has been established. |
| | | Off | The LAN is not connected. |
| | | Green blinking | LAN data is being transmitted. |

### 1.2.2.4 PSU Status LED

Figure 1.19 PSU Status LED




| Location | LED | State | Description |
|---|---|---|---|
| (1) | PSU status LED | Off | No AC input to this PSU, and no AC input to another PSU |
| | | On, orange | One of following states:<br>- No AC input to this PSU, and AC input to another PSU<br>- This PSU failed |
| | | Blinking, green | AC input, and all nodes powered off |
| | | On, green | AC input, and 1 or more nodes powered on |

# Chapter 2 Important Information

This chapter contains important information for using this product correctly and safely.

## 2.1 Installation Precautions

**⚠WARNING**

- Do not install this product in a place where the floor is unstable. Doing so may cause the floor to collapse.
- Do not install this product in a location exposed to humidity, dust, smoke, poor ventilation, or fire. Doing so may cause malfunctions, fire, or electric shock.
- Do not use this product in locations where water is splashed. Doing so may cause malfunctions, fire, or electric shock.
- Do not block the air intake or exhaust vents. Blocking the air intake and exhaust vents could lead to fire caused by high temperatures inside the product.
- This equipment in not suitable for use in locations where children are likely to be present.
- The FX700 main unit (including the rack system) is designed to operate in an environment with vibrations of 0.2 G or less (equivalent to an earthquake with a seismic intensity of 5 (on the JMA scale: strong earthquake) without any problems.

Consult your sales representative when you design the rack system, because earthquake-proofing measures such as anchoring equipment/racks to the floor, etc. will need to be taken to prevent the equipment from toppling in the event of an earthquake.

**⚠CAUTION**

- Do not use this product in an environment where corrosive gases are generated or where it may be damaged by seawater. Doing so may cause malfunctions. Corrosive gases and salt spray may corrode the equipment, which can lead to malfunctions and damage, dramatically shortening the service life of the equipment. Therefore, measures such as installing an air cleaning system are required.
  Also, using the product in an environment exposed to dust may cause malfunctions and shorten the service life of the equipment by damaging memory media or by impeding equipment cooling.
  - Sources of corrosive gas include chemical factory areas, hot springs, and volcanic areas.
  - A rough standard for an environment that may be exposed to salt spray damage is anywhere within 500 m of the coastline.
- Do not install the power cord or other types of cables at a location where they may catch someone's foot. Otherwise, the equipment may fall or topple, resulting in bodily injury. Equipment damage or improper operation may also result.
- Do not install this product near TVs or speakers since they generate strong magnetic fields. Doing so may cause malfunctions.
- Do not place heavy objects on the equipment. Doing so may cause the equipment to become unbalanced and fall over, leading to bodily injury. Also, do not drop objects on the equipment or expose the equipment to shock or vibration. Doing so may damage the equipment or cause it to

malfunction.
- Install the FX700 main unit on a level surface at a location not subject to strong vibration. Do not install the main unit at a location subject to strong vibration or in an unstable location such as on a slope. Otherwise, the main unit may fall or topple, resulting in bodily injury.
  Also, to prevent danger, do not install the equipment near access aisles. If the equipment is installed near an access route, vibration generated by walking may cause it to fail or malfunction.

## 2.2 Power, Voltage, and Connection Precautions

**⚠WARNING**

- Be sure to fully insert the power plug into the power outlet. Using the product without fully inserting the power plug may lead to fire or malfunctions.
- Connect the grounding wire to equipment requiring a grounding connection before turning the power on. Failing to do so may cause a short circuit, which can lead to fire or electric shock.
- The FX700 main unit is designed to work with power systems having a grounded neutral. To reduce the risk of electric shock or malfunction, do not plug the FX700 main unit into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.
- Do not use household extension cords with your Fujitsu product. Household extension cords do not have overload protection and are not meant for use with computer systems. Using household extension cords may lead to fire or electric shock.
- Do not use the accessory power cord for other equipment or anything other than its intended purpose. The supplied power cord is designed to be connected to and used with the FX700 main unit, and its safety has been confirmed. Never use power cords from other products or for anything other than their intended purpose. Otherwise, fire or electric shock may result.
- This product is also designed for an IT power system with phase-to-phase voltage 230V. (For use in Norway)

## 2.3 Precautions on Handling the FX700 Main Unit

**⚠WARNING**

- Do not remove the cover of the FX700 main unit and the covers attached to the insertion slots except for special cases such as installing optional equipment. If you remove a cover, always mount the cover in its original position before turning on the equipment.
  If the inside of the equipment needs to be checked or repaired, contact the hardware repair consultation center to arrange for such work to be performed. The equipment includes high-voltage parts and such parts may cause electric shock.
- Mount or remove optional equipment according to the procedures in the *FUJITSU Supercomputer PRIMEHPC FX700 Upgrade and Maintenance Manual* (C120-0090EN). Always disconnect the power plugs of the FX700 main unit and connected equipment from the outlets beforehand. Otherwise, electric shock may result.
- Only connect Fujitsu-recommended products to this product. Otherwise, malfunctions, fire, or electric shock may result.

- Do not insert or drop foreign matter, such as metallic chips or flammable material, into the openings (vent holes) of the equipment. Doing so may cause malfunctions, fire, or electric shock.
- Do not insert a finger into the connector insertion opening. Doing so may cause electric shock.
- Do not block the openings (vent holes) of the equipment. Blocking the vent holes could lead to fire caused by high temperatures inside the product.
- Do not use cleaning spray containing flammable substances when cleaning the equipment. Doing so may cause malfunctions or fire.
- When performing pest control using pesticide near the equipment, stop the main unit and cover it with a vinyl sheet.
- Do not splash water on the equipment. Doing so may cause malfunctions, fire, or electric shock.
- Take extreme care when moving the FX700 main unit. The work of moving it must be done by two or more people.

**⚠CAUTION**

- Do not place heavy objects on the equipment. Also, do not expose the equipment to shock or vibration. Doing so may cause the equipment to become unbalanced and fall over, leading to bodily injury.
- When transporting the equipment, always put it back in its original packaging or pack it in a container that protects the equipment from shock and vibration. Do not unpack the equipment until it arrives at the installation location.
- Do not use the FX700 main unit in proximity to devices, such as cell phones, that emit electromagnetic radiation. Doing so may cause the FX700 main unit to malfunction.
- The equipment passed impact tests in accordance with JIS Z 0200, and its load bearing strength has been confirmed. Nonetheless, take sufficient care in handling to avoid exposing the equipment to excessive shock or vibration.

# 2.4 Environmental Protection

### Environmentally-Friendly Product Design and Development

This product has been designed in accordance with the Fujitsu standard for "environmentally friendly product design and development." This means that key factors such as durability, selection and labeling of materials, emissions, packaging, and ease of dismantling and recycling have been taken into account. This saves resources and thus reduces the harm done to the environment.

### Energy-Saving Information

Devices that do not need to be constantly switched on should be switched off until they are needed as well as during long breaks and after completion of work.

### Packaging Information

This packaging information does not apply in Japan and APAC.
Do not throw away the packaging. You may need it later for transporting the equipment. If possible, the equipment should only be transported in its original packaging.

### Information on Handling Consumables

Please dispose of printer consumables and batteries in accordance with the applicable national regulations. In accordance with EU guidelines, batteries must not be disposed of with unsorted domestic waste. They can be returned free of charge to the manufacturer, the dealer, or an authorized agent for recycling or disposal.
All batteries containing pollutants are marked with a symbol (a crossed-out garbage can). They are also marked with the chemical symbol for the heavy metal that causes them to be categorized as containing pollutants:
Cd Cadmium
Hg Mercury
Pb Lead

### Labels on Plastic Casing Parts

Please avoid sticking your own labels on plastic parts wherever possible. Plastic parts with such labels are difficult to recycle.

### Returns, Recycling, and Disposal

Please handle returns, recycling, and disposal in accordance with local regulations.

The device must not be disposed of with domestic waste.
This device is labeled in compliance with European directive 2012/19/EU on waste electrical and electronic equipment (WEEE).
This directive sets the framework for returning and recycling used equipment and is valid across the EU. When returning your used device, please use the return and collection systems available to you.

Details regarding the return and recycling of devices and consumables within Europe can also be found in the *Returning used devices* manual. This manual is available at your local Fujitsu branch.

## 2.5 ErP Directive

The following tables show product compliance with the ecodesign requirements of the ErP Directive.

Table 2.1 Product Information

| Product name | | FUJITSU Supercomputer PRIMEHPC FX700 | |
|---|---|---|---|
| ANNEX Ⅱ 3.1 | | | |
| | | Low-end performance configuration | High-end performance configuration |
| (a) | Product type | HPC Server | |

Table 2.1 Product Information *(continued)*

<table>
<tr><td>(b)</td><td colspan="2">Manufacturer's name, registered trade name and registered trade address at which they can be contacted</td><td colspan="2">Manufacturer's name：Fujitsu Limited<br>Contact：Fujitsu Technology Solutions GmbH<br>Mies-van-der-Rohe-Straße 8<br>80807 Munich, Germany</td></tr>
<tr><td>(c)</td><td colspan="2">Product model number</td><td colspan="2">PHE1CH11x<br>"x" is an arbitrary alphanumeric character or blank.</td></tr>
<tr><td>(d)</td><td colspan="2">Year of manufacture</td><td colspan="2">2020</td></tr>
<tr><td>(e)</td><td colspan="2">PSU efficiency at 10% (if applicable), 20%, 50% and 100% of rated output power</td><td colspan="2"><table><tr><td>Load factor</td><td>20%</td><td>50%</td><td>100%</td></tr><tr><td>Power efficiency</td><td>96.0%</td><td>96.2%</td><td>94.3%</td></tr></table></td></tr>
<tr><td>(f)</td><td colspan="2">Power factor at 50% of the rated load level</td><td colspan="2">0.999</td></tr>
<tr><td>(g)</td><td colspan="2">PSU rated power output [W]</td><td colspan="2">1,800</td></tr>
<tr><td>(h)</td><td colspan="2">Idle state power [W]</td><td>673.3</td><td>1,423.2</td></tr>
<tr><td rowspan="6">(i)</td><td colspan="3">List of all components for additional idle power allowances</td><td></td></tr>
<tr><td></td><td>CPU Performance [W]</td><td>10 x 2.49</td><td>10 x 3.71</td></tr>
<tr><td></td><td>Additional PSU [Number]</td><td>-</td><td>1</td></tr>
<tr><td></td><td>Installed HDD or SSD [Number]</td><td>1</td><td>1</td></tr>
<tr><td></td><td>Memory over base [GB]</td><td>28</td><td>28</td></tr>
<tr><td></td><td>Buffered DDR channel over base [Number]</td><td>-</td><td>-</td></tr>
<tr><td></td><td>I/O devices over base [Number]</td><td>1 [100 Gbit/s]</td><td>1 [100 Gbit/s]</td></tr>
<tr><td>(j)</td><td colspan="2">Maximum power [W]</td><td>791.6</td><td>2,035.7</td></tr>
<tr><td>(k)</td><td colspan="2">Declared operating condition class</td><td colspan="2">A2 with humidity range from 20% RH to 80% RH</td></tr>
<tr><td>(l)</td><td colspan="2">Idle state power [W] at the higher boundary temperature of the declared operating condition class</td><td>672.7 at 35°C ambient</td><td>1,465.1 at 35°C ambient</td></tr>
<tr><td>(m)</td><td colspan="2">The active state efficiency and the performance in active state of the server</td><td>9.1 / 6.4</td><td>21.0 / 33.4</td></tr>
<tr><td>(n)</td><td colspan="2">How to use the functionality, the techniques used and the supported secure data deletion standard(s)</td><td colspan="2">The shred command can wipe data.<br>For more about the shred command, the man command can provide details.</td></tr>
<tr><td>(p)</td><td colspan="2">If a product model is part of a server product family, a list of all model configurations that are represented by the model</td><td colspan="2">Model configurations are listed in the FX700 data sheet.<br>https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/</td></tr>
</table>

Table 2.2 Critical Raw Material Content

| Product name | | FUJITSU Supercomputer PRIMEHPC FX700 | | |
|---|---|---|---|---|
| ANNEX Ⅱ 3.3 (a)<br>Indicative weight range at component level, of the following critical raw materials | | | | |
| (a) | Cobalt in the batteries | ☒ Less than 5 g | ☐ Between 5 g and 25 g | ☐ Above 25 g |
| | | * Not contained | | |

Table 2.3 Disassembly Procedures

| Product name | | FUJITSU Supercomputer PRIMEHPC FX700 |
|---|---|---|
| ANNEX Ⅱ 1.2.1 | | |
| For the disassembly of the following components, refer to the section described in the manual on the right. | | FUJITSU PRIMEHPC FX700<br>Disassembly and Recycling Instruction<br>(KM0205-00001)<br>https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/ |
| (a) | Data storage devices | See "1.2.9 Removing the M.2 SSD" |
| (b) | Memory | - |
| (c) | Processor (CPU) | - |
| (d) | Motherboard | See "1.2.5 Removing the BMCB and PSUBP"<br>See "1.2.8 Removing the CMB and CMBIFB" |
| (e) | Expansion card/Graphic card | See "1.2.10 Removing the PCI card" |
| (f) | Power supply unit (PSU) | See "1.2.1.2 Removing the all PSU" |
| (g) | Chassis | - |
| (h) | Batteries | See "1.2.6 Removing the Battery" |

# Chapter 3 Starting Up

This chapter describes the steps from installation to startup of the FX700 main unit.

## 3.1 Installation Procedure

This section describes the installation procedure. See and read "Chapter 2 Important Information" thoroughly before performing the work.

1. **Decide on the installation site of the FX700 main unit.**

   See "3.2 Installation Specifications," "3.3 Installation Environment," "3.4 Distribution Panel Cut-Off Characteristics," and "3.5 Installation Area and Service Areas."

2. **Open the package, and check for any visible damage that may have occurred during shipping.**
3. **Check whether the delivered goods match the details printed on the invoice.**
   See "3.7 Unpacking the FX700 Main Unit."

   Confirm that you have all the required manuals. If necessary, print the PDF files. For details on the series of FX700 system manuals, see "Manuals in This Series" shown in "Preface."
   **Remarks**
   Separately ordered components may be delivered separately from the FX700 main unit.

4. **Install the rack rails on the rack.**

   See "3.8.1 Installing the Rack Rails on the Rack."

5. **Install the FX700 main unit in the rack.**
   See "3.8.2 Mounting the Chassis in the Rack."
6. **Do the wiring of the FX700 main unit.**
   See "3.15.1 Precautions on Connecting/Disconnecting Cables."
7. **Connect the FX700 main unit to the main power supply.**
   See "3.15.3 Connecting the Power Cord."
8. **The FX700 main unit has buttons and LEDs at the front and rear. Learn in advance about the buttons and the meanings of the LED states.**
   See "1.2 Buttons and LEDs on the FX700 Main Unit."
9. **Make the initial BMC settings for the FX700 main unit.**

   See "3.16 Powering On for the First Time."

10. **Install the OS and drivers.**

    See "3.17 Installing the OS" and "3.18 Installing the InfiniBand Driver."

# 3.2 Installation Specifications

The following table shows the installation specifications of the FX700 main unit.

Table 3.1 Installation Specifications

| Item | | | | Description |
|---|---|---|---|---|
| External dimensions [mm] | Width(*1) | | | 482.6 |
| | Depth(*2) | | | 813 |
| | Height | | | 86.9 (2U) |
| Weight [kg](*3) | | | | 41.8 |
| Air-conditioning conditions | Maximum calorific value [kJ/h] | | | 9,803 |
| | Exhaust volume [$m^3$/min] (*4) | Recommended ambient temperature | | 5.5 |
| | | Maximum | | 7.8 |
| | Temperature and humidity conditions (*5) | Operating | Temperature [°C] | 5 to 35 |
| | | | Humidity [%RH] | 20 to 80 |
| | | Standby | Temperature [°C] | 5 to 40(*6) |
| | | | Humidity [%RH] | 20 to 80 |
| | | Stopped(*7) | Temperature [°C] | 0 to 50(*6) |
| | | | Humidity [%RH] | 8 to 80 |
| | | Temperature gradient | | 15 [°C/Hr] or less |
| | | Humidity gradient | | 30 [%/day] or less |
| | Noise [dB](*8,*9) | | | 66 |
| | Sound power level [B](*9) | | | 8.2 |
| | Allowable vibration [$m/s^2$ (gal)] | Operating (including standby) | | 4.0 (400) (Synthetic seismic wave) |
| | | Stopped(*10) | | 10.0 (1000) (Synthetic seismic wave) |
| | Allowable dust concentration [$mg/m^3$] | | | 0.15 |
| Altitude | Operating [m] | | | 0 to 3,000 |
| | Stopped [m](*6,*7) | | | 0 to 12,000 |
| Power conditions | Input voltage and phase | | | 200 to 240 VAC ±10% Single-phase |
| | Frequency and variable width | | | 50/60 Hz +3/–3% |
| | Maximum power consumption [W] | | | 2,723 |
| | Maximum apparent power [VA] | | | 2,751 |
| | Power factor(*11) | | | 0.95 or more |
| | Inrush current [A] [Rush time](*12) | | | 30 or less |
| | Leakage current [mA](*13) | | | 3.5 or less |

*1 Includes the front cover

*2 Excludes protrusions (With protrusions included: 838.5 mm)

*3 Value for an installation with all optional devices mounted. However, it does not include rack mounting rails and cables.
(For reference, a rack mounting rail weighs 2.7 kg.)
You can calculate the weight according to the device configuration by using the following equation:
Weight = 17.7＋(4.8 x A)＋(1.6 x B)＋(1.0 x C)＋(0.03 x D) [kg]
A = Number of blades mounted (up to 4)
B = Number of PSUs mounted (up to 3)
C = Number of dummy blades mounted (up to 3)
D = Number of dummy PSUs mounted (up to 1)

*4 Even during use at the recommended ambient temperature, the fans may rotate at high speeds when the device is overloaded or a failure is detected.

*5 Condensation not allowed

*6 Freezing temperatures not allowed

*7 The stopped state means the device is packed and in storage.

*8 The actual level of noise heard varies depending on the listening position, condition of mounting in the rack, etc.

*9 The noise and sound power levels vary depending on the hardware configuration, load, and ambient temperature.

*10 The stopped state means that the device is installed but powered off.

*11 Value when operating

*12 Value per input cable

*13 Value per device

# 3.3 Installation Environment

This section describes the installation environment of the FX700 main unit.

## 3.3.1 Dust

### ■ Airborne Particles

Ensure that airborne particles in the computer room do not exceed 0.15 mg/$m^3$. Most computers are designed to withstand this level of airborne particles. This is the same as the permissible level for airborne particles in a general office and should be easily attainable in a computer room where there is little inflow of outside air containing airborne particles of dust and tobacco smoke.

### ■ Eliminating Dust

Capture airborne particles of dust, etc. with the air filters in air conditioners. The computer room must be regularly cleaned to eliminate dust on top of and underneath the floor. Be sure to clean the room in the following cases:

- After building the computer room and before installing equipment
- When the computer room has been renovated
- When the location of the device has changed, such with the replacement of computers

## 3.3.2 Corrosive Gas

Corrosive gases and salty air may corrode equipment, which can lead to malfunctions and damage, dramatically shortening the service life of the equipment. Therefore, they must be eliminated through the installation of appropriate air cleaning equipment. Furthermore, pressurizing the room with fresh, clean air prevents corrosive gases outside from entering. Chemical factory areas, hot springs, volcanic areas, etc. may be sources of corrosive gas.

Table 3.2 Permissible Levels of Corrosive Gases

| Gas Name | Permissible Level |
|---|---|
| Hydrogen sulfide ($H_2S$) | 7.1 ppb or less |
| Sulfur dioxide ($SO_2$) | 37 ppb or less |
| Hydrogen chloride (HCl) | 6.6 ppb or less |
| Chlorine ($Cl_2$) | 3.4 ppb or less |
| Hydrogen fluoride (HF) | 3.6 ppb or less |
| Nitrogen dioxide ($NO_2$) | 52 ppb or less |
| Ammonia ($NH_3$) | 420 ppb or less |
| Ozone ($O_3$) | 5 ppb or less |
| Oil vapor | 0.2 mg/$m^3$ or less |

### 3.3.3 Seawater (Salt Spray Damage)

Due to the salty air, a large volume of sea salt particles are suspended in the air near coastal areas. If these sea salt particles enter computers, they may cause insulation to fail and parts to corrode or degrade due to moisture and chemical condensation. Therefore, computers must be installed far from coastal areas. The installation criteria for preventing salt spray damage from sea salt particles is as follows.
Criteria: The installation is not at sea nor within 0.5 km from the seashore. (An exception is an installation using air conditioners that do not take in outside air.)

## 3.4 Distribution Panel Cut-Off Characteristics

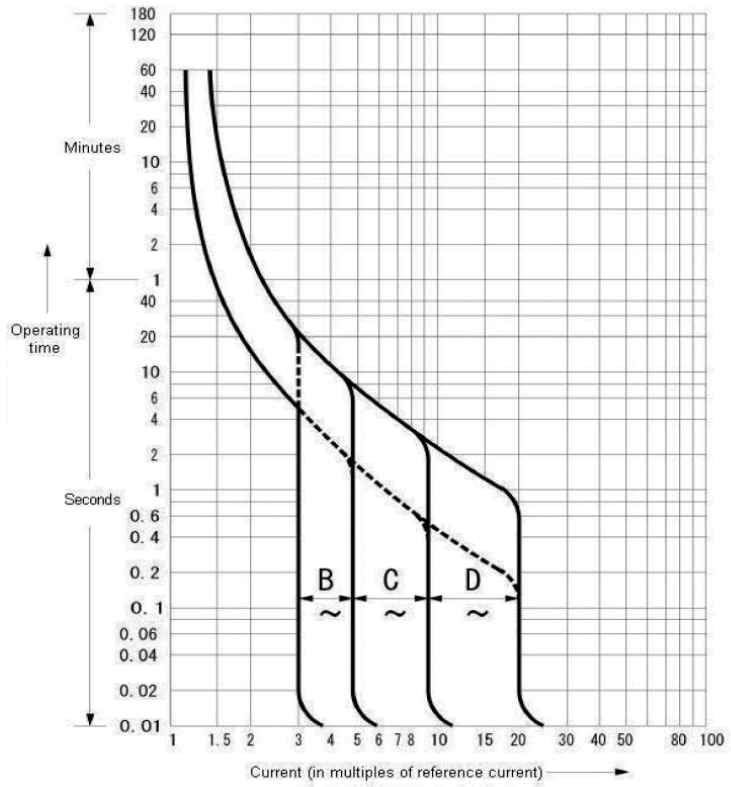
The characteristics of breakers in the customer's distribution panel must be considered so that the FX700 main unit can run optimally. Use suitable breakers according to "Table 3.3 Distribution Panel Breaker Characteristics."

Table 3.3 Distribution Panel Breaker Characteristics

| Power Input | Unit/Device Name | Breaker Capacity in Customer's Distribution Panel for Use in Countries Not in Europe | Breaker Capacity in Customer's Distribution Panel for Use in Europe |
|---|---|---|---|
| 200 to 240 VAC | Main device | 20 A | 16 A |
| | Power distribution box | 30 A | 32 A |

Use a long-time-delay type breaker whose cut-off characteristics correspond to phase D shown in "Figure 3.1 Distribution Panel Breaker Characteristics" (IEC898 or DIN0641 Part II). Alternatively, use a slower breaker.
If the breakers used in the building are faster than cut-off characteristic D, a PSU failure in the device may cause the breakers to cut off power. This cut-off also turns off the PSUs of multiple devices connected to the same power system.

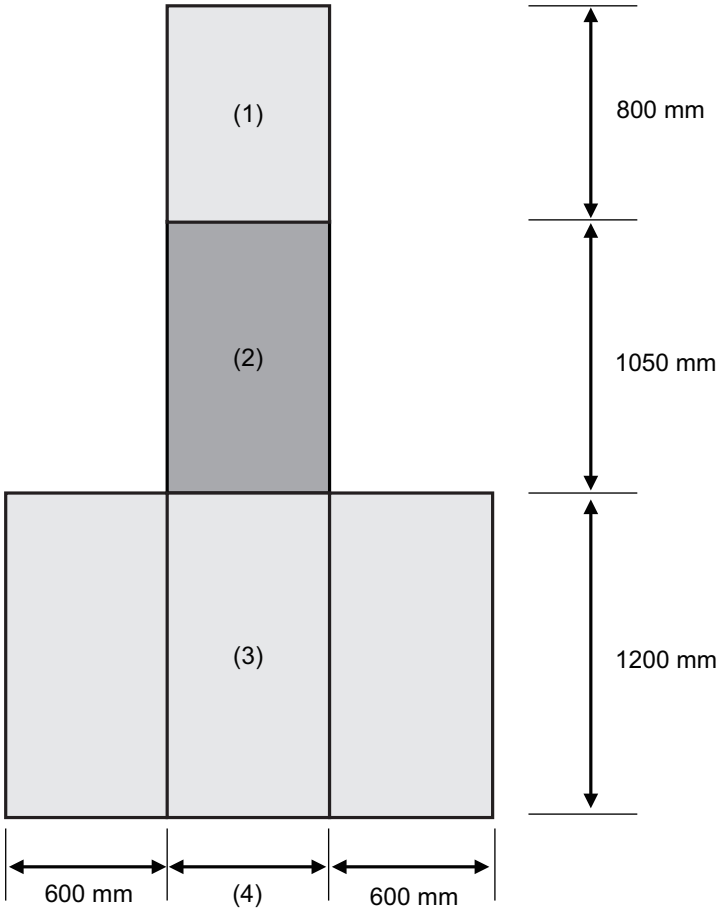
Figure 3.1 Distribution Panel Breaker Characteristics



# 3.5 Installation Area and Service Areas

This section describes the installation area and service areas when the FX700 main unit is mounted in a Fujitsu 19-inch rack. The installation area and service areas vary depending on the 19-inch rack used.

Figure 3.2 Installation Area and Service Areas




| No. | Description | | |
|---|---|---|---|
| (1) | Service area at the back | | |
| (2) | Rack | | |
| (3) | Service area at the front | | |
| (4) | Rack width | Standard type | 700 mm |
| | | Slim type | 600 mm |

# 3.6 Rack System Requirements

Basically, this product has been developed for a Fujitsu 19-inch rack. Operation of the FX700 main unit mounted in this rack is guaranteed. To safely use the product mounted in a Fujitsu 19-inch rack, see the related documentation at the following URL:

For the Japanese market
http://jp.fujitsu.com/platform/server/primergy/peripheral/rack/
https://jp.fujitsu.com/platform/server/primergy/manual/peri_rack.html
For the global market
https://www.fujitsu.com/global/products/computing/servers/primergy/racks/primecenter/m2/index.html

If the product is mounted in a rack from another company, the customer is responsible for confirming that the rack specifications match the FX700 main unit specifications and requirements.
Cover unused areas of the rack with dummy covers in order to conform to the ventilation concept and ensure proper ventilation.
Power is supplied from multiple sockets installed in the rack.

## Mounting Conditions for Third-Party Racks

The rack mount kit (FX700 main unit accessory) is used to mount the equipment in the rack. Therefore, if the equipment has to be mounted in a third-party rack, confirm that the rack satisfies all of the following structural requirements when examining rack mounting.

Table 3.4 Mounting Conditions for Third-Party Racks

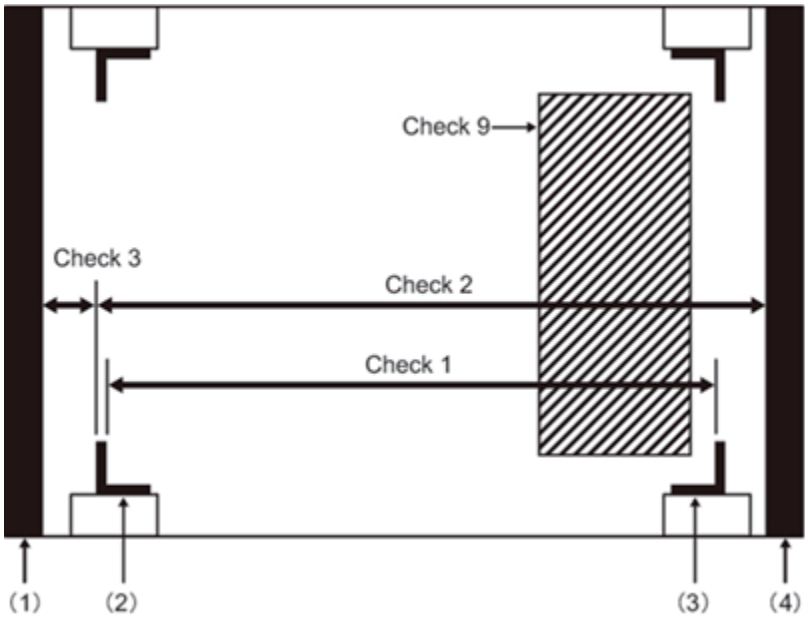
| Check | Item | Condition | Referenced Diagram |
|---|---|---|---|
| Rack depth | | | |
| Check 1 | Inside distance between front and rear support uprights of rack | 695 to 785 mm (27.4 to 30.9 in.) | Figure 3.3 Rack Depth |
| Check 2 | Distance from front support upright of rack to inside of rear door | 920 mm (36.2 in.) or more | Figure 3.3 Rack Depth |
| Check 3 | Distance from front support upright of rack to inside of front door | 60 mm (2.4 in.) or more | Figure 3.3 Rack Depth |
| Rack width | | | |
| Check 4 | Inside width between support uprights of rack | 450 mm (17.7 in.) or more | Figure 3.4 Rack Width<br>Figure 3.5 Support Upright Hole Shape in the Rack |
| Check 5 | Center-to-center width between mounting holes in support uprights of rack | 465 mm (18.3 in.) (EIA standard) | Figure 3.4 Rack Width<br>Figure 3.5 Support Upright Hole Shape in the Rack |

Table 3.4 Mounting Conditions for Third-Party Racks *(continued)*

| Check | Item | Condition | Referenced Diagram |
|---|---|---|---|
| Check 6 | Bracket mounting space | There is no interference (by a support upright for reinforcement or optional mounting) in the shaded area in the diagram. | Figure 3.4 Rack Width |
| Support upright hole shape in rack | | | |
| Check 7 | Mounting hole pitch | EIA standard-compliant, universal pitch | Figure 3.5 Support Upright Hole Shape in the Rack |
| Check 8 | Mounting hole shape and size | The mounting hole is square with a size ranging from 9.4 x 9.4 mm (0.37 in.) to 10 x 10 mm (0.39 in.). Alternatively, the hole is round with a diameter of 7.1 mm (0.28 in.). The support uprights of the rack do not have threaded holes. | Figure 3.5 Support Upright Hole Shape in the Rack |
| Check 9 | Cable routing hole | Cables can be removed from the bottom or the rear door of the rack. | Figure 3.3 Rack Depth |
| Check 10 | Load capacity of rack | The total weight does not exceed the load capacity of the rack.<br>**Note**<br>The load capacity may change when earthquake-proofing measures are taken. | - |
| Check 11 | Open area ratio of rack doors (rate of air flow through all doors) | Open area ratio of front and rear doors: 80% or more<br>**Note**<br>As a whole, the server takes in air from the front of the rack and exhausts air to the rear of the rack. | - |
| Check 12 | Measures to prevent rack from toppling | Measures are taken to prevent the rack from toppling. | - |

### Rack Depth Conditions

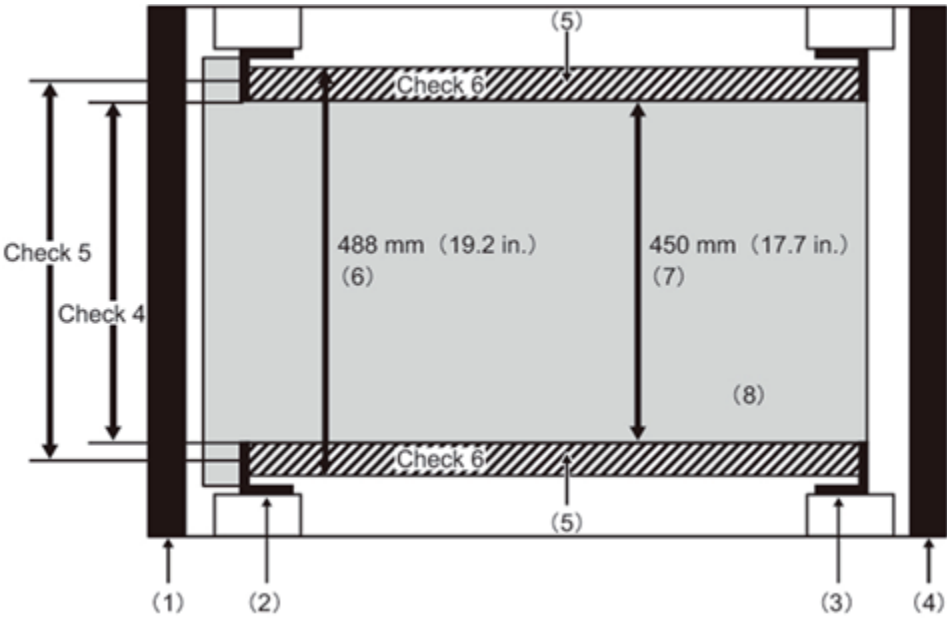
Figure 3.3 Rack Depth




| No. | Description |
|---|---|
| (1) | Front door |
| (2) | Front support upright of rack |
| (3) | Rear support upright of rack |
| (4) | Rear door |

## Rack Width

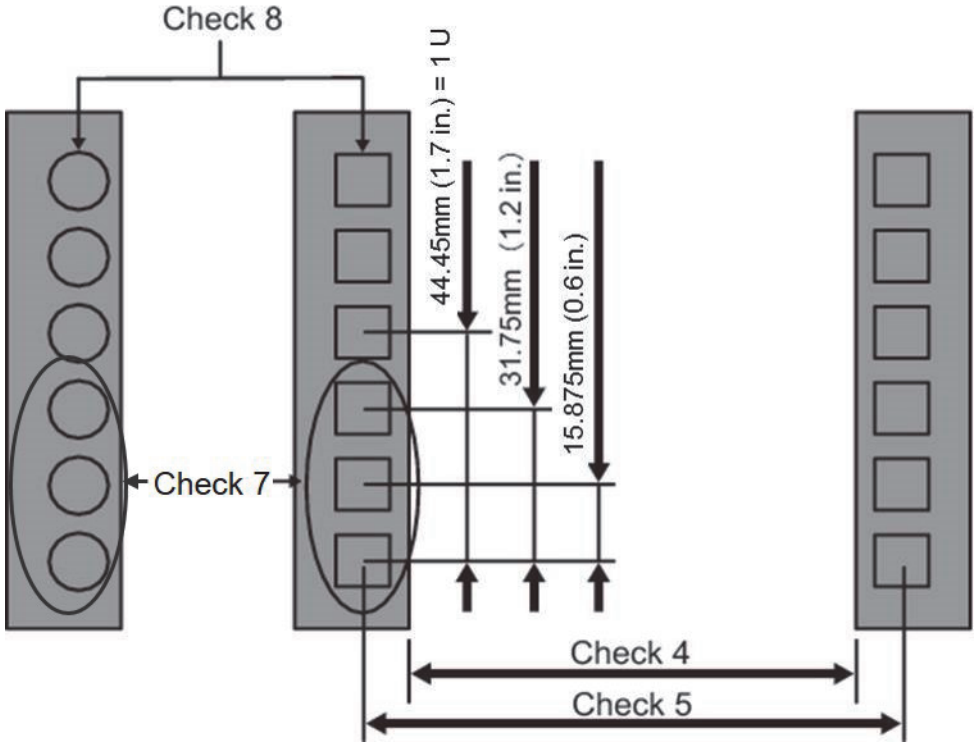
Figure 3.4 Rack Width




| No. | Description |
|---|---|
| (1) | Front door |
| (2) | Front support upright of rack |
| (3) | Rear support upright of rack |
| (4) | Rear door |
| (5) | Bracket mounting area |
| (6) | Width for mounting brackets |
| (7) | Server width |
| (8) | Whole server |

## Support Upright Hole Shape in the Rack

Figure 3.5 Support Upright Hole Shape in the Rack




## Other Conditions

The following conditions must be considered in addition to the structural conditions.

- Cooling performance with the equipment mounted in the rack

  Install the rack such that the temperature inside the rack satisfies the temperature conditions shown in "3.2 Installation Specifications." In particular, measures need to be taken to prevent exhaust air from flowing back in through the intake vents of the equipment. For example, block the front of empty spaces in the rack.

- Securing work areas for use during maintenance (service areas)

  Secure service areas for maintenance work by Fujitsu technicians. Determine the service areas by referring to the service areas shown for Fujitsu racks in "3.5 Installation Area and Service Areas" and the document used in rack installation.

# 3.7 Unpacking the FX700 Main Unit

This section describes the unpacking of parts.

**CAUTION**

**Safety Precautions**

- Do not unpack the FX700 main unit from its packaging box until it reaches the installation site.
- For details, see "Chapter 2 Important Information."

1. **Carry the FX700 main unit to the installation site.**
2. **Unpack all parts.**

   Keep the packaging as you may need it for transporting this product again.

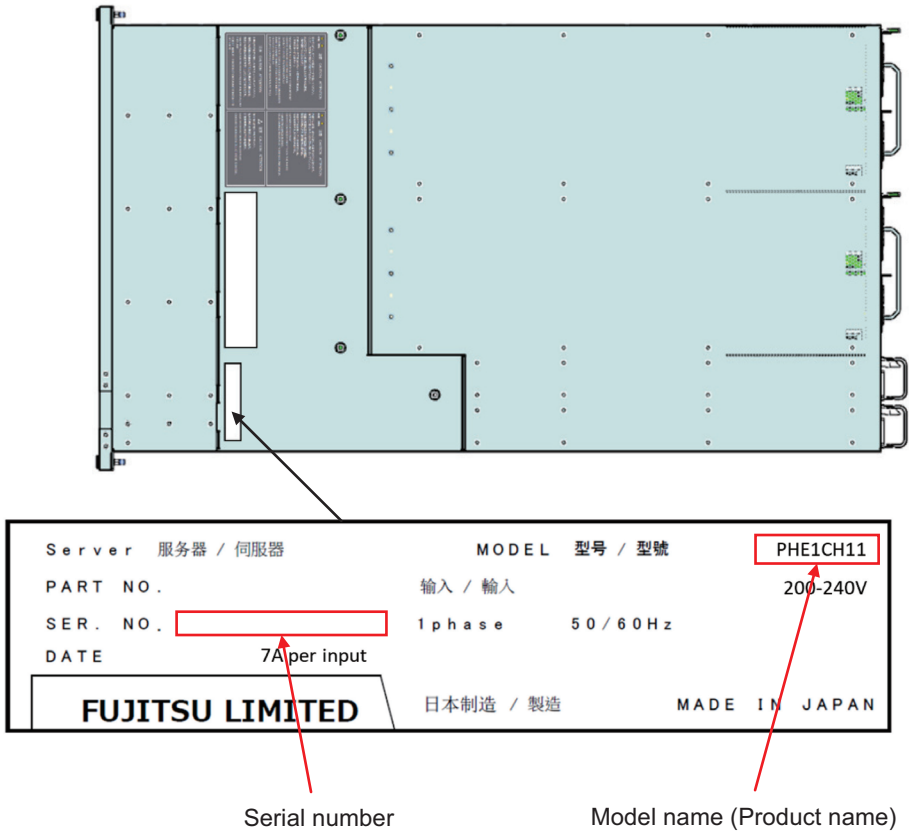
3. **Check for damage caused during transport.**

   If any of the deliverables is damaged or does not match the invoice, contact the vendor immediately.

4. **Check whether the delivered goods match the details printed on the invoice.**

   The product name and serial number are printed on the nameplate (plate at the top of the FX700 main unit).

Figure 3.6 Checking the Product Name and Serial Number




5. **Protective film may be affixed to the logos (Fujitsu and FX700). If so, remove all of the film.**

# 3.8 Mounting the Chassis in the Rack

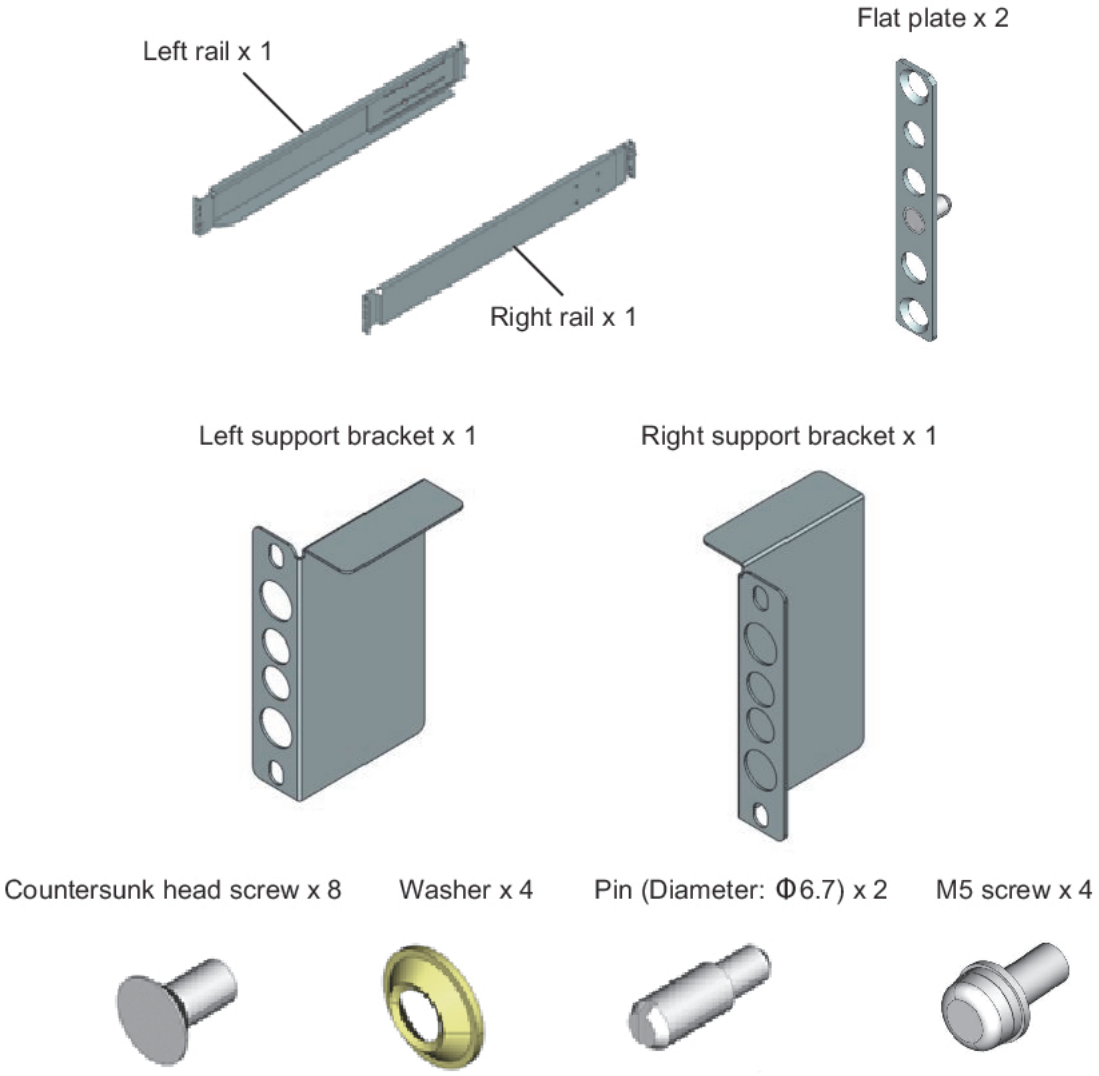
The following is the procedure for mounting the chassis in the rack.

## 3.8.1 Installing the Rack Rails on the Rack

The following is the procedure for installing the rack rails on the rack.

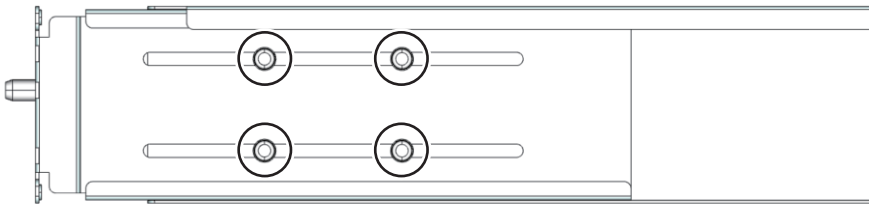
1. **Prepare the necessary parts.**

Figure 3.7 Parts for Rack Rail Installation




2. **Loosen the four Phillips screws each on the left and right rails.**

Figure 3.8 Screw Positions on a Rail



**CAUTION**

**When mounting the FX700 main unit in an EIA standard-compliant 19-inch rack not manufactured by Fujitsu, replace the pins on both the left and right rails according to the shape of the rack mounting hole.**

Figure 3.9 Before Pin Replacement (Pin Diameter: Φ9.2)

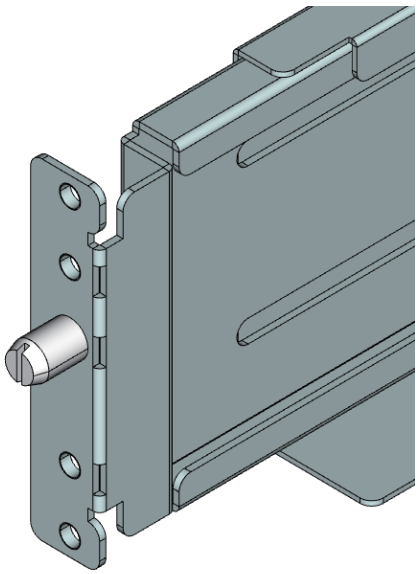
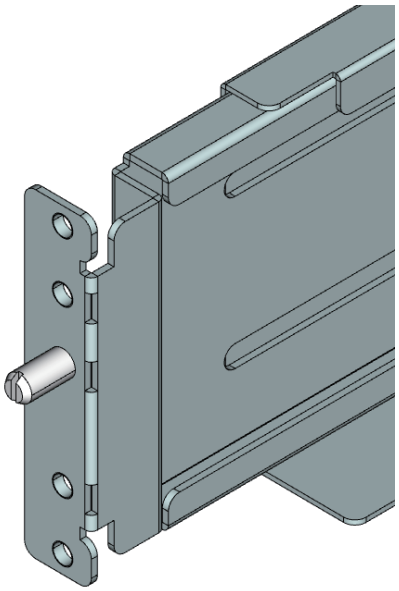
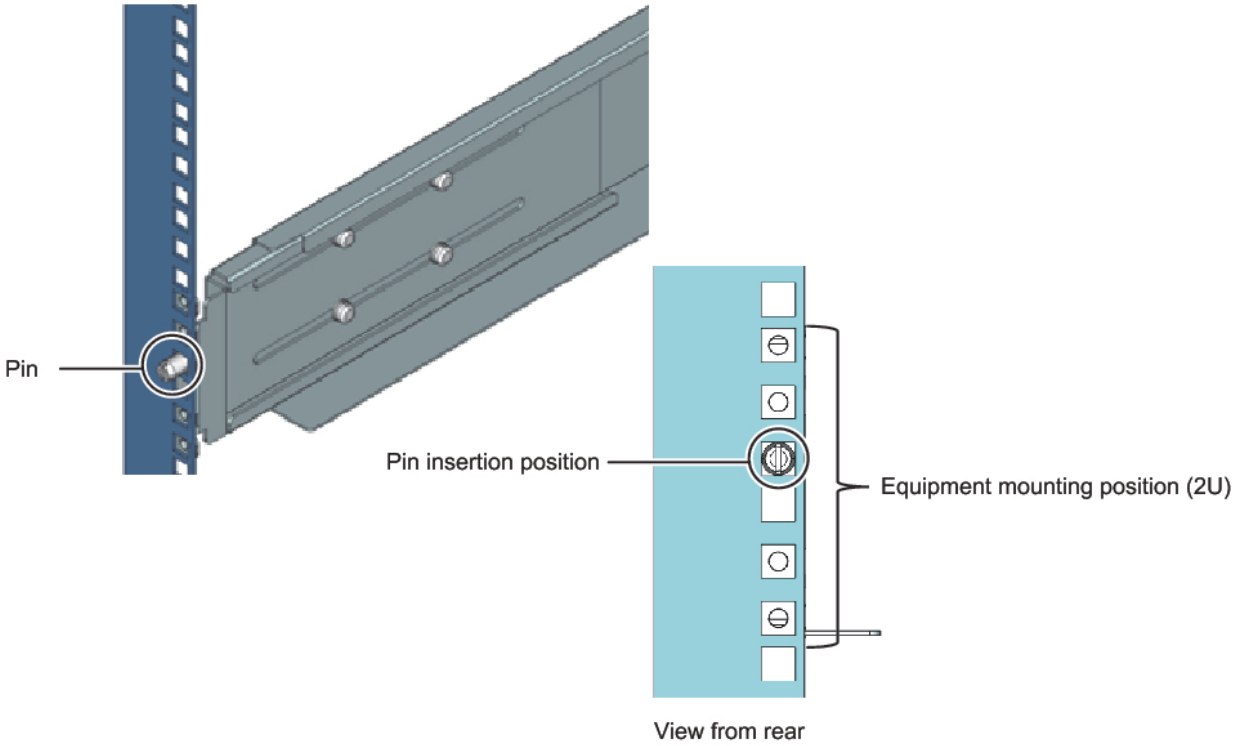


Figure 3.10 After Pin Replacement (Pin Diameter: Φ6.7)



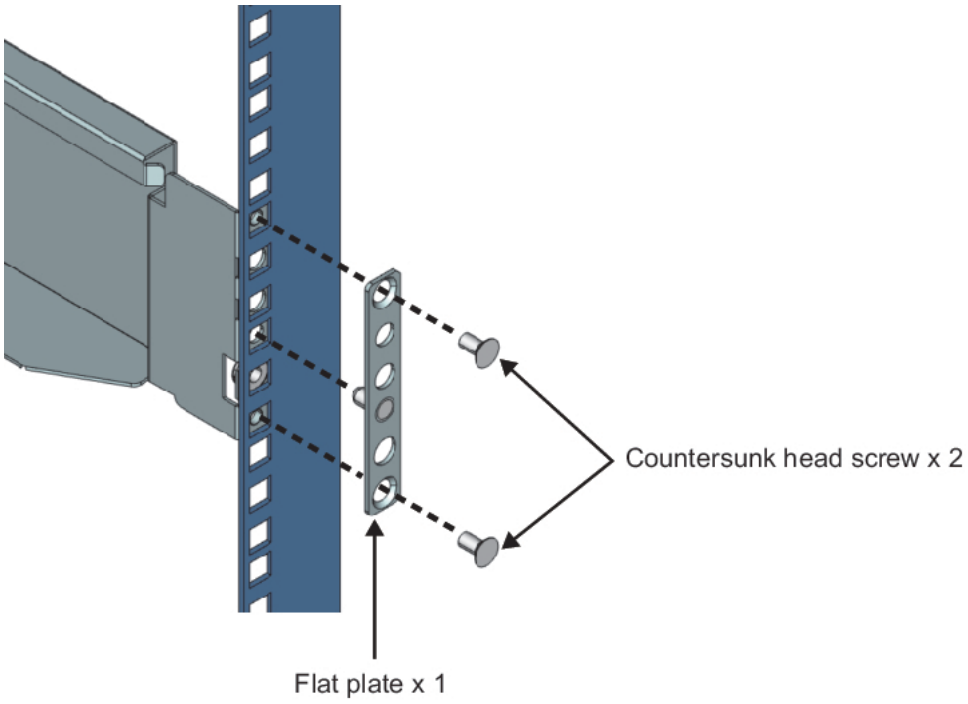
3. **Insert the pin at the rear of the right rail into a rack hole.**

Figure 3.11 Rear of the Rail




4. **Install the flat plate at the front of the right rail.**

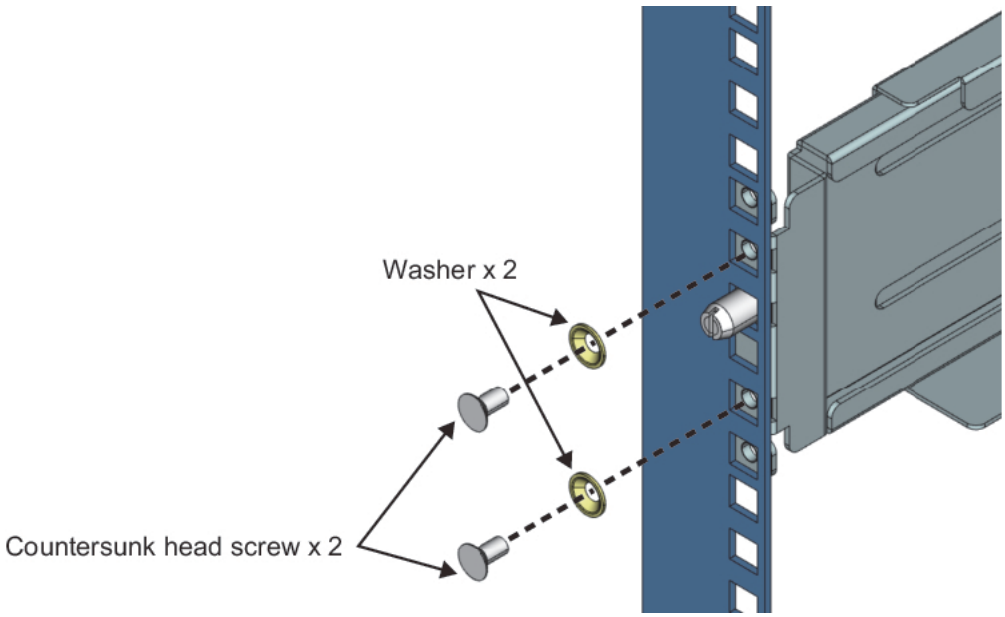
Figure 3.12 Front of the Rail




5. **Fix the rear of the right rail in place.**

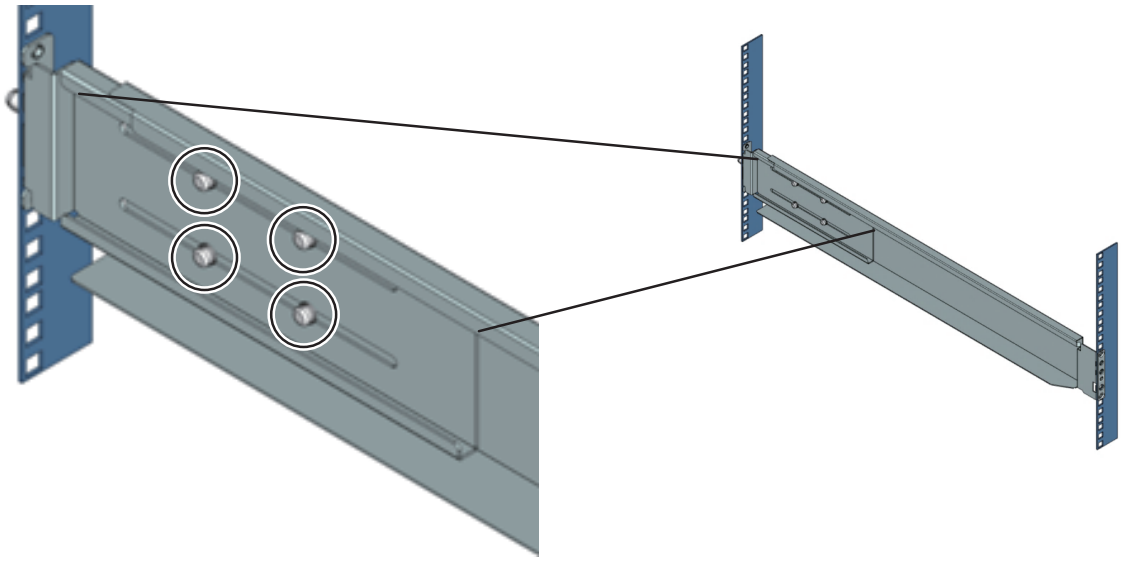
   When using Φ6.5 pins, fix it in place with countersunk head screws directly without washers, depending on the size of the rack mounting hole.

Figure 3.13 Rail Fixing Positions



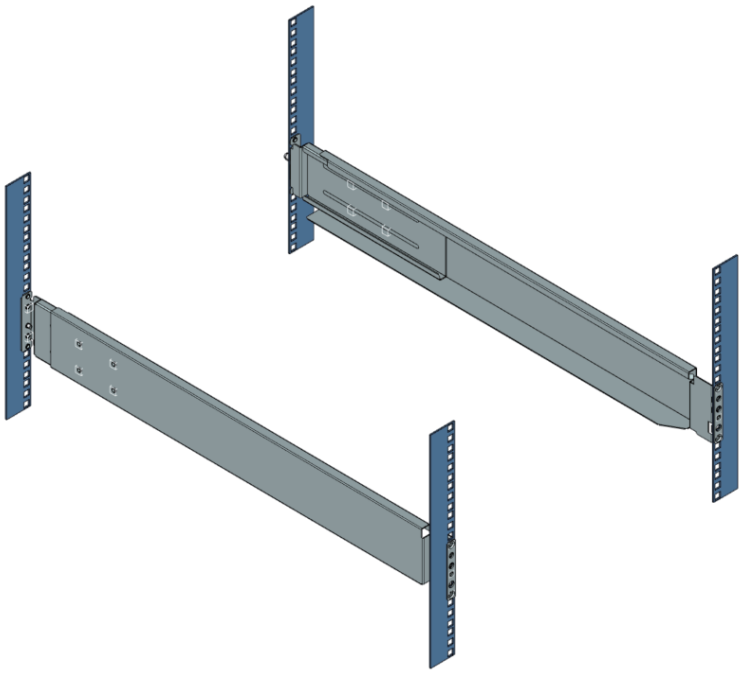

6. **Tighten the four screws on the sliding part of the right rail.**

Figure 3.14 Screw Positions on the Rail



7. **Repeat steps 3 to 6 to install the left rail too in the same way.**

Figure 3.15 After the Rails are Installed



## 3.8.2 Mounting the Chassis in the Rack

The following is the procedure for mounting the chassis in the rack.

**⚠CAUTION**

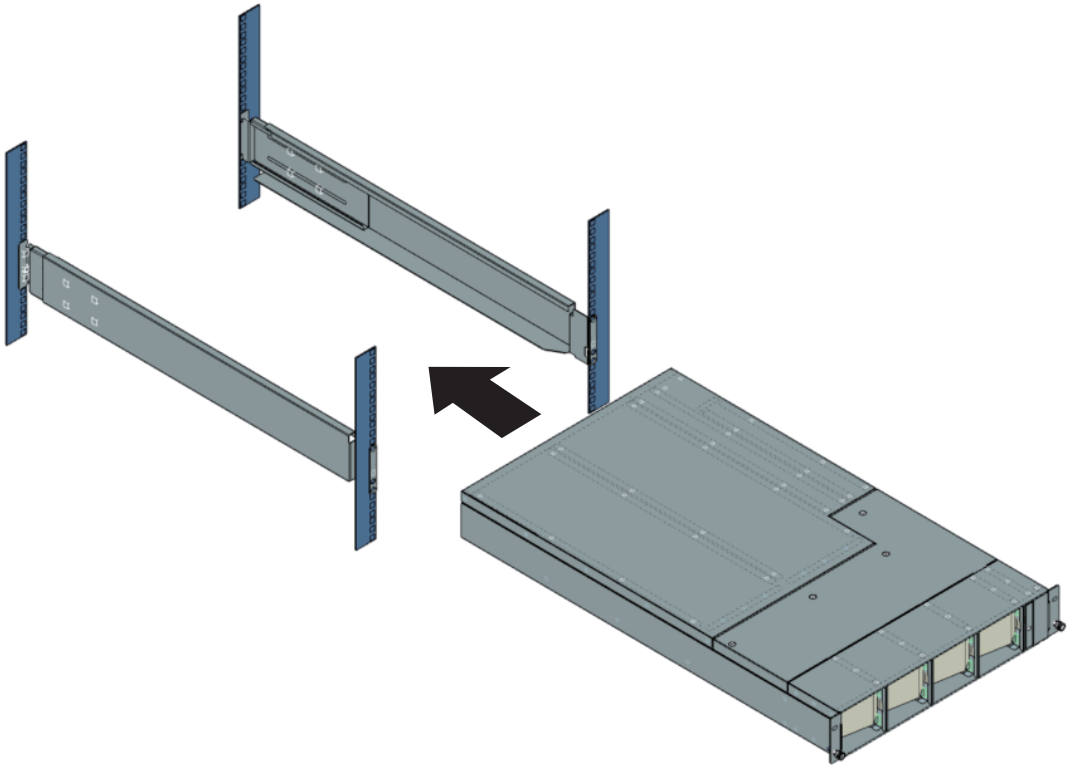
- Remove all units from the chassis before mounting it.
  For details on how to remove each unit, see "3.9.2 Removing the Blade From the Chassis,"

"3.10.2 Removing the PSU From the Chassis," "3.13.2 Removing the FANU From the Chassis," and "3.11.2 Removing the Dummy Blade From the Chassis."

- At least two people are required to perform the work of mounting the chassis in the rack.

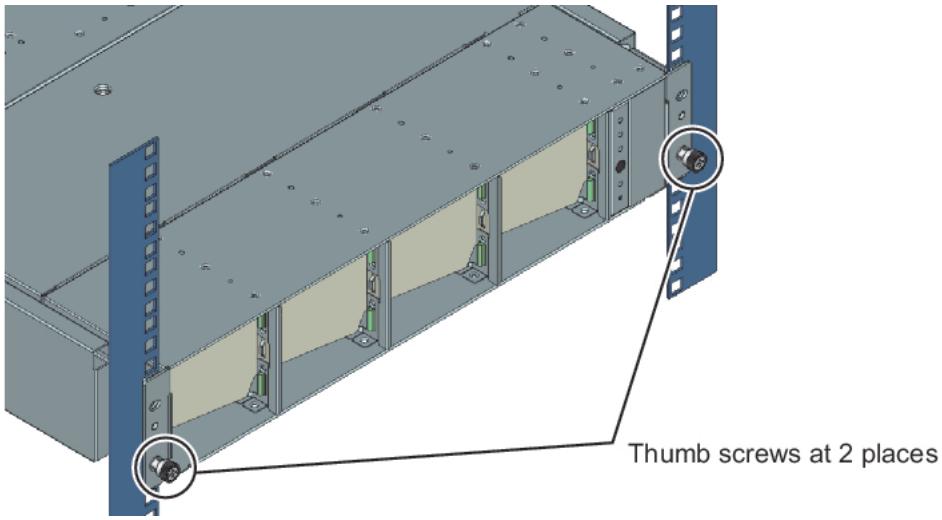
1. **Insert the chassis along the rails into the rack.**

Figure 3.16 Installing the Chassis



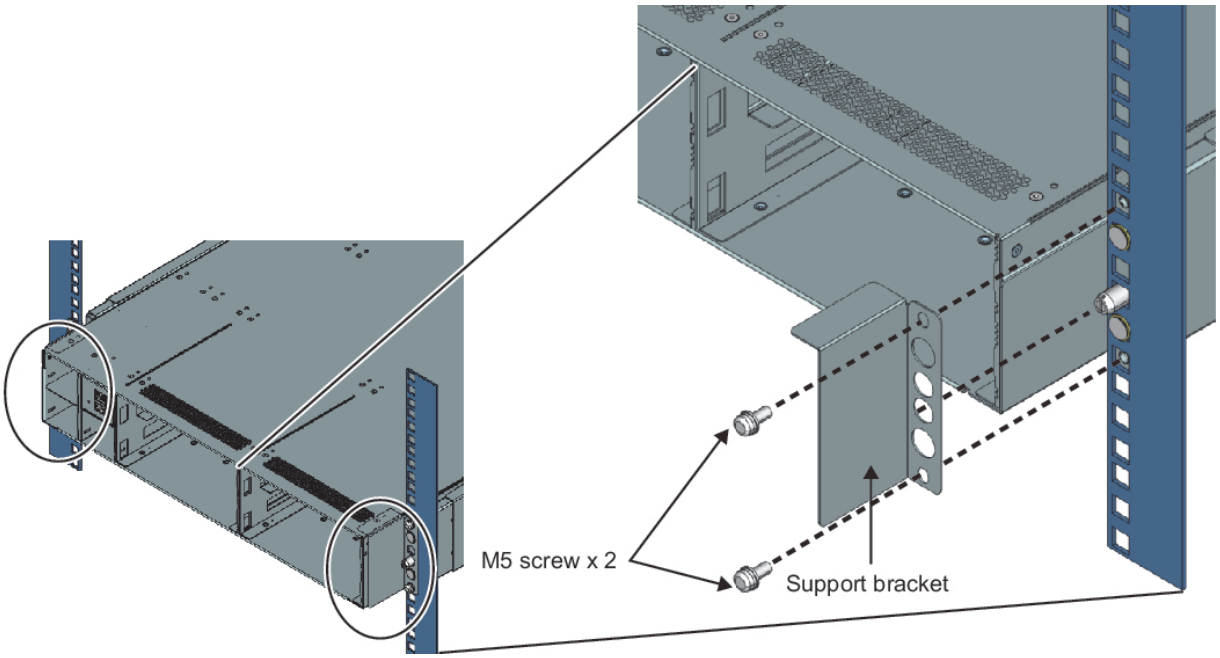
2. **Fix the chassis to the rack.**

Figure 3.17 Chassis Fixing Positions



3. **Install the left and right back plates onto the rack.**

Figure 3.18 Installing the Back Plates




4. **After mounting the chassis, install all the units.**

   For details on how to install each unit, see "3.9.1 Installing the Blade in the Chassis," "3.10.1 Installing the PSU in the Chassis," "3.13.1 Installing the FANU in the Chassis," and "3.11.1 Installing the Dummy Blade in the Chassis."

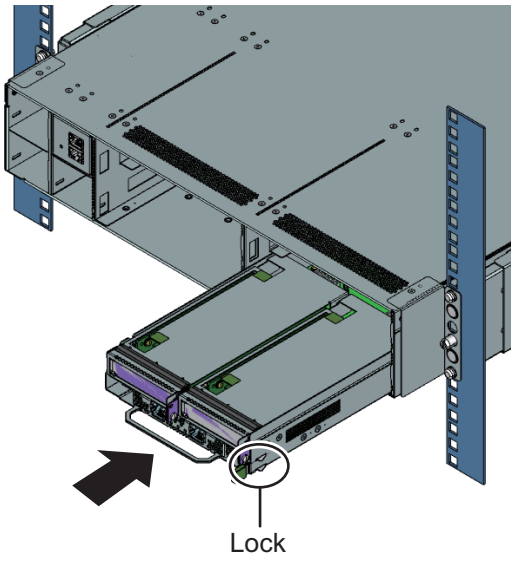
# 3.9 Installing/Removing the Blade

## 3.9.1 Installing the Blade in the Chassis

The following is the procedure for installing the blade in the chassis.

1. **Install the blade in the chassis.**

Figure 3.19 Installing the Blade




**Remarks**

Push the device until it is locked.

**Note**

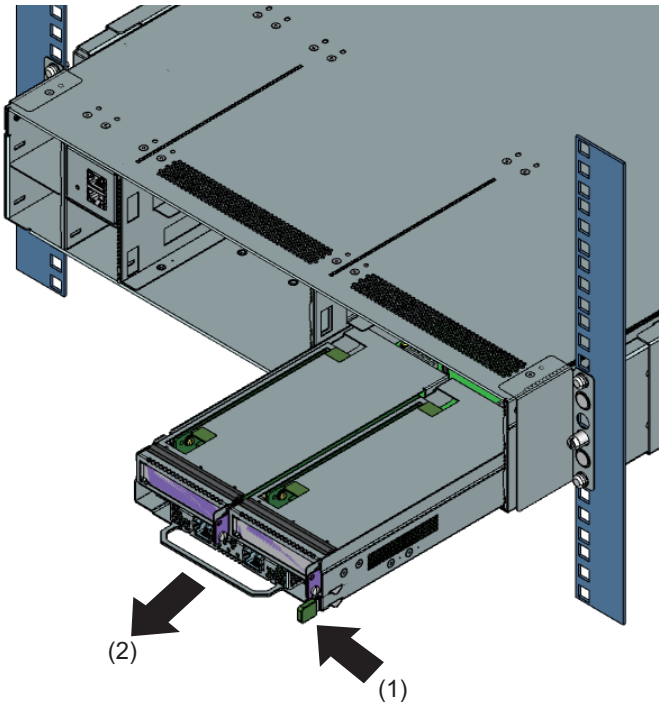
- At any location where no blade will be mounted, a dummy blade must be installed.
  For details on how to install a dummy blade, see "3.11.1 Installing the Dummy Blade in the Chassis."
- When inserting the blade, be careful not to allow foreign objects, such as cables, to enter the chassis.

## 3.9.2 Removing the Blade From the Chassis

The following is the procedure for removing the blade from the chassis.

1. **While the lock is unlocked (1), pull the handle (2) to remove the blade from the chassis.**

Figure 3.20 Removing the Blade



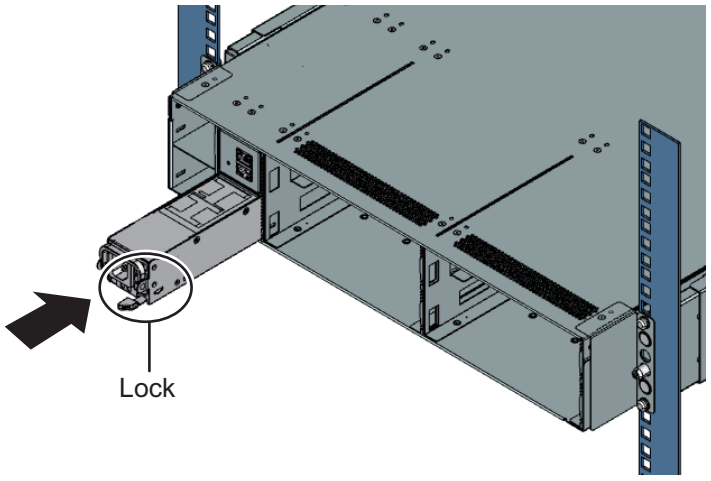

# 3.10 Installing/Removing the PSU

## 3.10.1 Installing the PSU in the Chassis

The following is the procedure for installing the PSU in the chassis.

1. **Install the PSU in the chassis.**

Figure 3.21 Installing the PSU



**Remarks**

- The PSU must be installed with the lock facing right when viewed from the back.
- Push the device until it is locked.

**CAUTION**

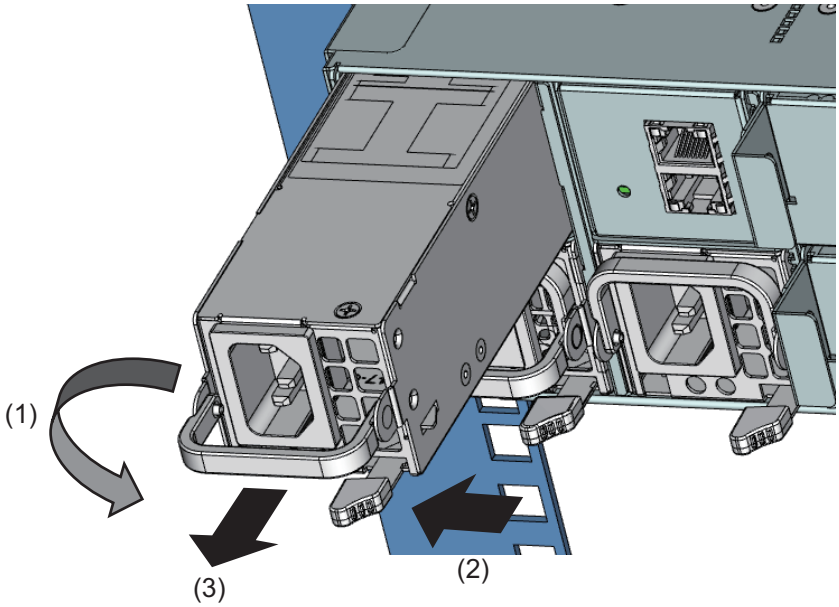
At any location where no PSU will be mounted, a dummy PSU must be installed.
For details on how to install a dummy PSU, see "3.12.1 Installing the Dummy PSU in the Chassis."

### 3.10.2 Removing the PSU From the Chassis

This section describes how to remove the PSU.

1. **Lift up the handle on the PSU halfway in the direction of the arrow (1), and push the latch (2). While pushing the latch, pull out the PSU (3).**

Figure 3.22 Removing the PSU



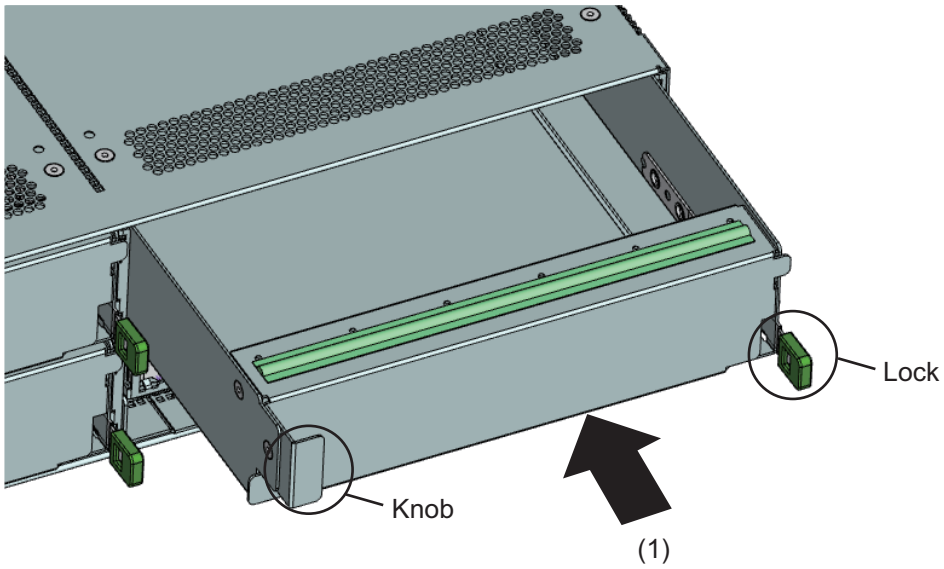

## 3.11 Installing/Removing the Dummy Blade

### 3.11.1 Installing the Dummy Blade in the Chassis

This section describes how to install the dummy blade in the chassis.

1. **Push the dummy blade into the chassis until it is locked (1).**

Figure 3.23 Installing the Dummy Blade




**Note**

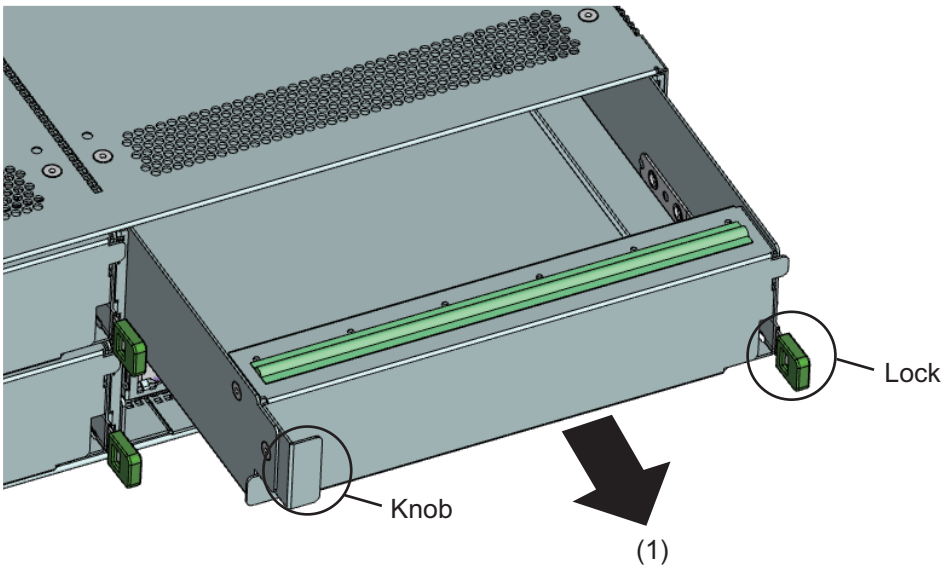
- When inserting the dummy blade, be careful not to allow foreign objects, such as cables, to enter the chassis.

## 3.11.2 Removing the Dummy Blade From the Chassis

This section describes how to remove the dummy blade from the chassis.

1. **Unlock the lock, grasp the knob, and pull out the dummy blade (1).**

Figure 3.24 Removing the Dummy Blade



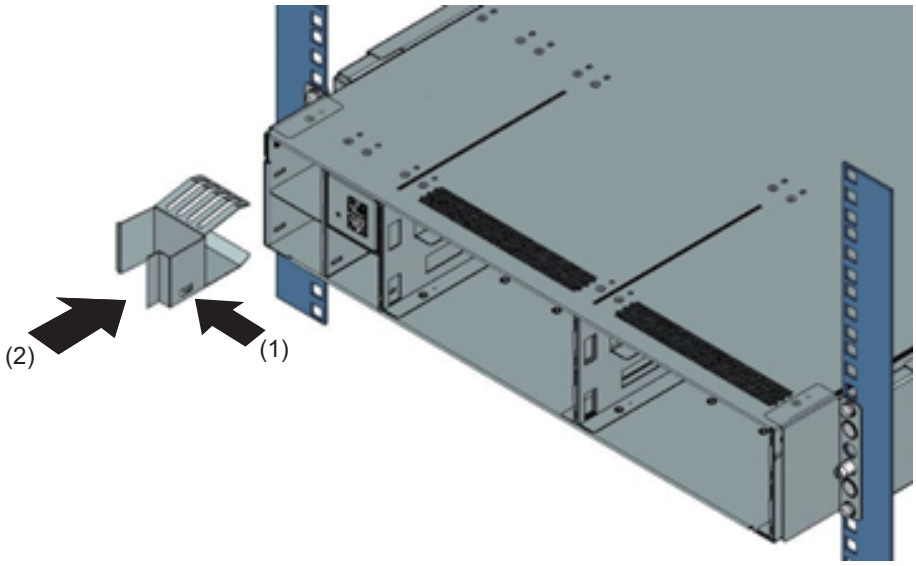
# 3.12 Installing/Removing the Dummy PSU

## 3.12.1 Installing the Dummy PSU in the Chassis

This section describes how to install the dummy PSU in the chassis.

1. **While pushing the lock (1), install the dummy PSU in the direction of the arrow (2).**

Figure 3.25 Installing the Dummy PSU



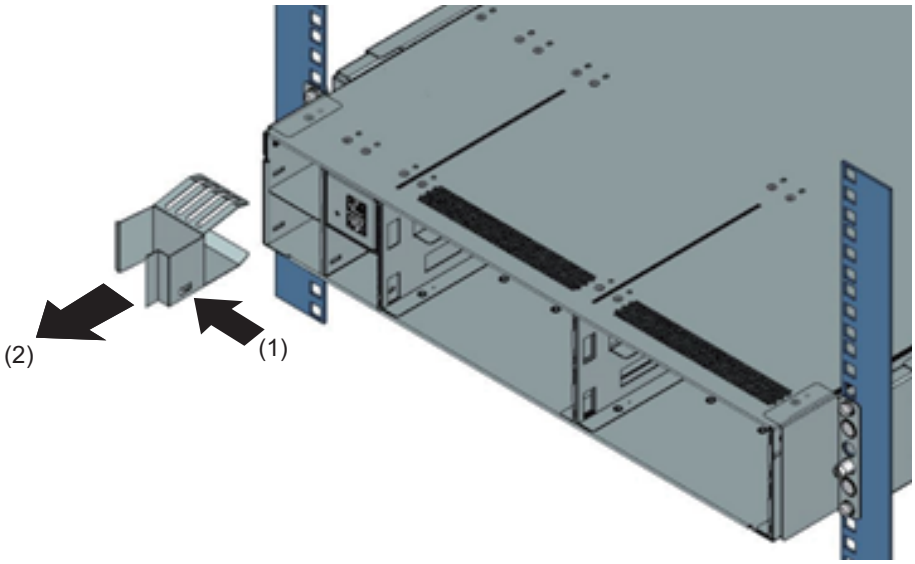

2. **Push in the dummy PSU until it is locked.**

## 3.12.2 Removing the Dummy PSU From the Chassis

This section describes how to remove the dummy blade from the chassis.

1. **While pushing the lock (1), remove the dummy PSU in the direction of the arrow (2).**

Figure 3.26 Removing the Dummy PSU



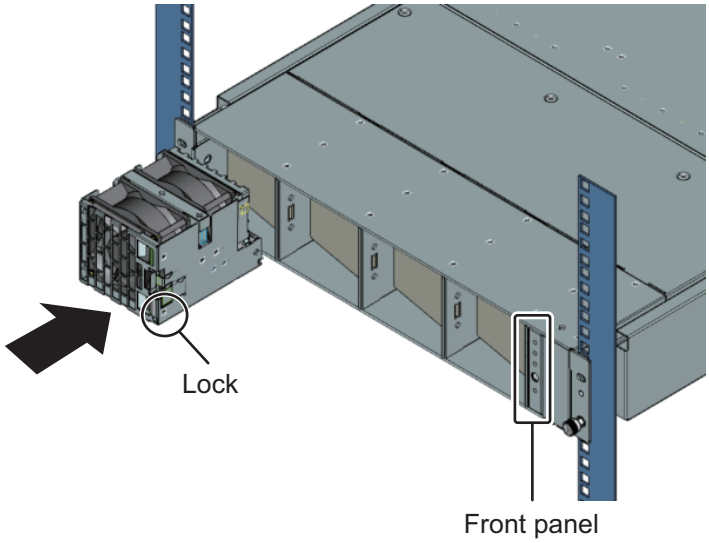

# 3.13 Installing/Removing the FANU

## 3.13.1 Installing the FANU in the Chassis

The following is the procedure for installing the FANU in the chassis.

1. **Install the FANU in the chassis.**

Figure 3.27 Installing the FANU



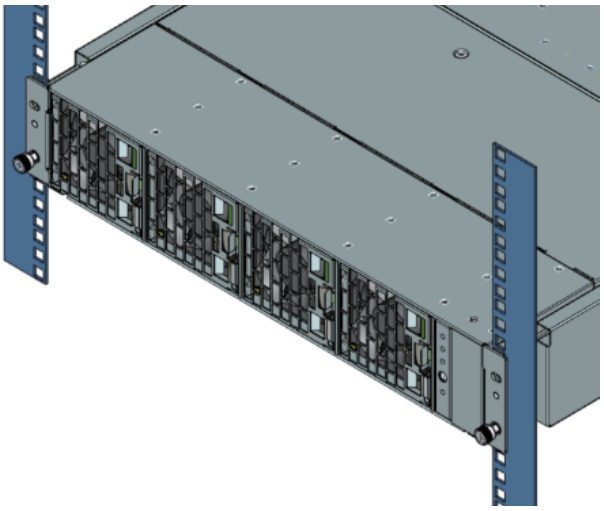

**Remarks**

- Confirm that the front surface of the FANU is aligned with the front panel surface.

- Push the device until it is locked.

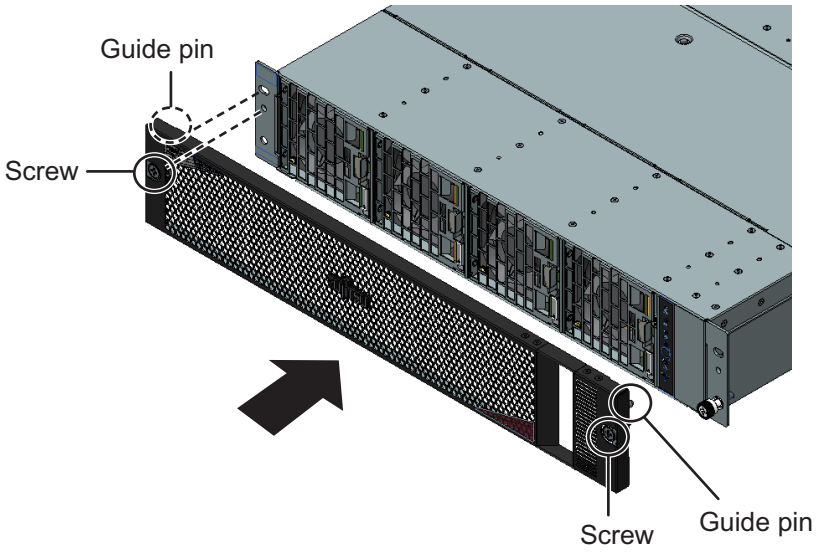
2. **Repeat step 1 to install a FANU in every other mounting location.**

Figure 3.28 FANU Installation Completed



3. **Install the bezel.**

Figure 3.29 Installing the Bezel



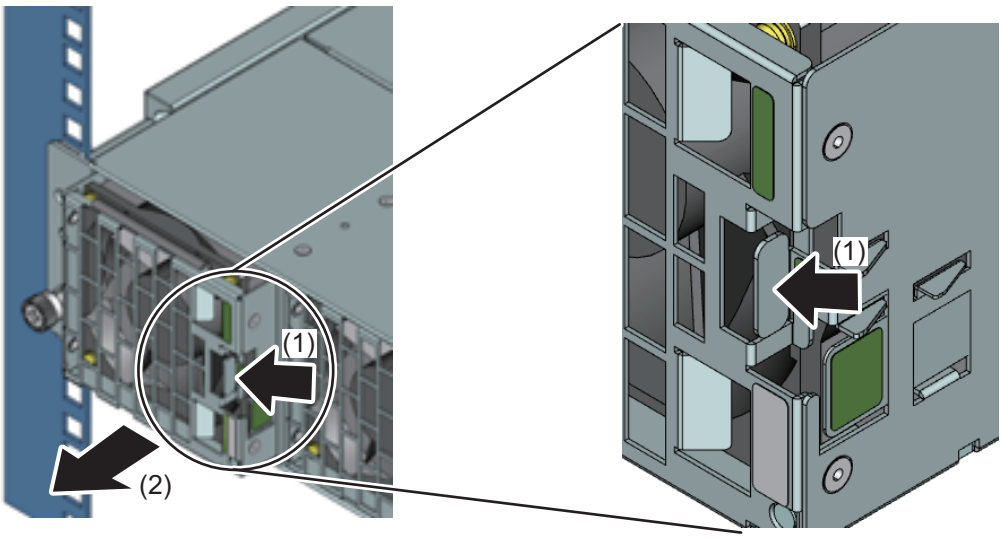

4. **Insert the left and right guide pins into the chassis, and fix the front panel in place with two screws.**

## 3.13.2 Removing the FANU From the Chassis

The following is the procedure for removing the FANU from the chassis.

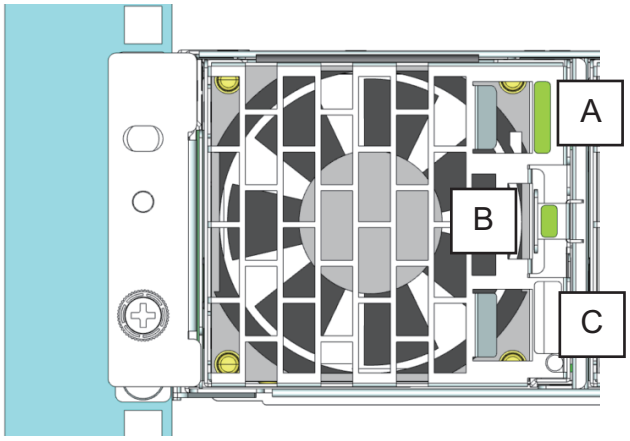
1. While the first lock is unlocked (1), pull out the FANU in the direction of (2).

Figure 3.30 Unlocking the FANU




**Remarks**
The following shows the places to hold a FANU when removing it.

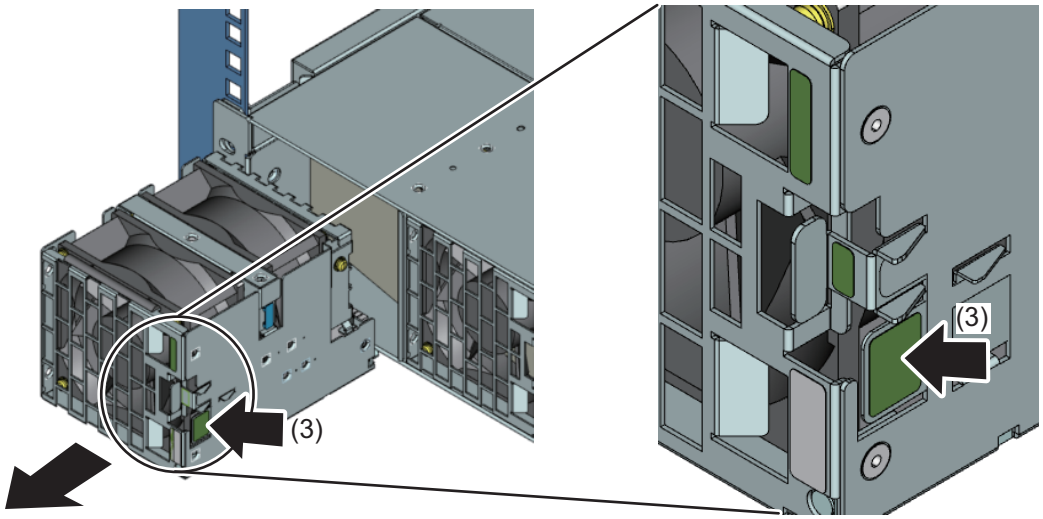
Figure 3.31 Places to Hold a FANU When Removing It




| Example | Thumb | Index Finger |
|---|---|---|
| Operation with right hand | C | B |
| Operation with left hand | B | A |

2. While pushing the second lock (3), pull out the FANU from the chassis.

Figure 3.32 Removing the FANU



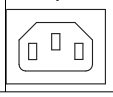

# 3.14 Input Power Connection Specifications

This section describes the input power connection specifications of the FX700 main unit.

## 3.14.1 Input Power Connection Specifications (FX700 Main Unit)

The following table shows the input power connection specifications of the FX700 main unit.

Table 3.5 Power Cord Specifications

<table>
<tr><th>Destination</th><th>Connector Shape</th><th>Plug Shape</th><th colspan="2">Remarks</th></tr>
<tr><td rowspan="3">Inside Japan: 200 V<br>Outside Japan: 200 V</td><td rowspan="3">IEC60320-C13</td><td rowspan="2">2-pole, 3 wire grounded locking plug<br>NEMA standard name: L6-15P</td><td colspan="2">Plugs into wall outlet</td></tr>
<tr><td>Outlet receptacle shape<br>  </td><td>2-pole, 3 wire grounded locking plug<br>(250 V, 15 A) outlet<br>NEMA standard name: L6-15R</td></tr>
<tr><td>IEC60320-C14</td><td>Shape of receiving outlet<br>  </td><td>IEC60320-C13</td></tr>
</table>

**Remarks**

- For the power cord connected to the device, use the one that was shipped together with either the device or optional parts. Do not use these shipped power cords with any other product.
- Use an outlet box that has the matching outlet receptacle shape.
- Connect the power cords to circuit breakers on a 1-to-1 basis. If a breaker is connected to multiple power

cords, the breaker may cut off power to multiple PSUs.

# 3.15 Connecting Cables

This section contains precautions and information on connecting cables.

## 3.15.1 Precautions on Connecting/Disconnecting Cables

**⚠CAUTION**

- Always read the documentation supplied with the device you want to connect. Never connect or disconnect cables during a thunderstorm. Never pull on a cable when disconnecting it. Always hold the cable by the plug.
- If your finger is too big to touch the connector lock when disconnecting a LAN or other cable, the cable cannot be removed. In that case, unlock the connector lock by pushing it with a flathead screwdriver. Then, remove the cable by pulling it and the screwdriver out together.

**Information for Ensuring Electromagnetic Compatibility**
All the cables must have sufficient shielding. The recommended cable type is S/FTP Cat5 or higher.
Use of unshielded or badly shielded cables may lead to increased emission of interference and/or reduced fault-tolerance of the device.

## 3.15.2 Connecting LAN Cables

The following is the procedure for connecting LAN cables.

1. **Connect the LAN cables to the LAN ports.**

   For details on the LAN ports on the FX700 main unit, see "1.1.4 LANs of the FX700 Main Unit."

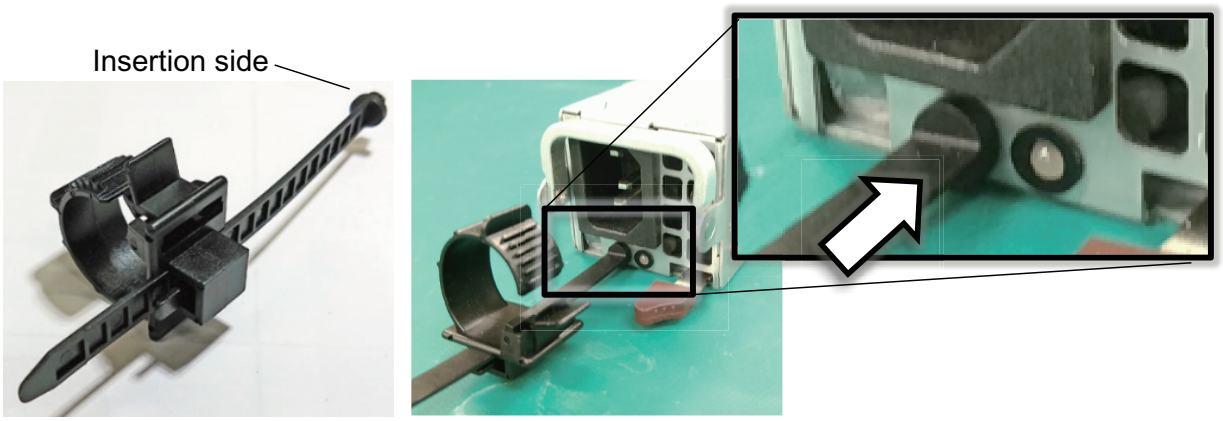
2. **Check the port LEDs.**

   See "1.2.2.2 Rear LAN LEDs on the Blade."

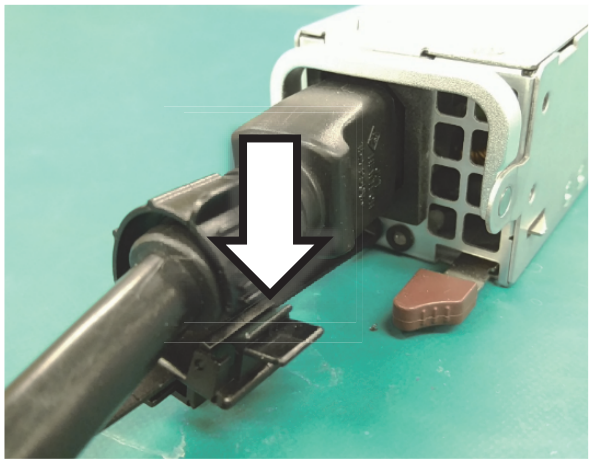
## 3.15.3 Connecting the Power Cord

At the basic configuration level, the FX700 main unit has two PSUs mounted.
You can ensure a redundant supply of power by adding a third PSU.
PSUs purchased in or after February 2021 come with an AC clip to prevent the power cord from being unplugged. If one is included, perform steps 1 to 5. Otherwise, perform steps 2 and 5.

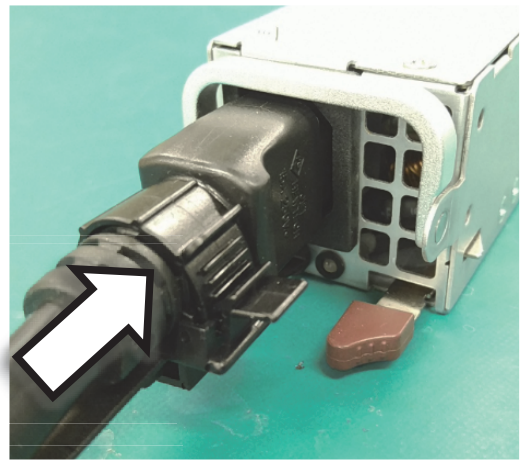
1. **Prepare the AC clip, and check the insertion side. Secure it by inserting it into the mounting hole in the PSU.**




2. **Connect the power cord to the PSU.**
3. **Insert the power cord through the clip, and insert the claw of the clip in the direction of the arrow to lock it.**



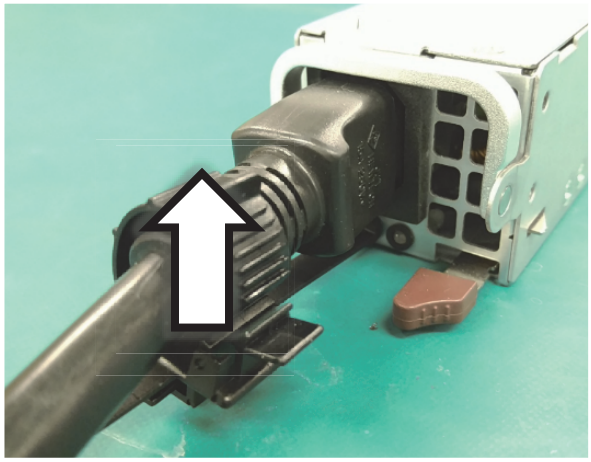
4. **Push the clip in the direction of the arrow to firmly secure the plug with no gap between the clip and the plug.**



5. **Connect the main power plug to the power strip.**

   Confirm that the PSU status LED is blinking in green.
   See "1.2.2.4 PSU Status LED."

**Remarks**
If removing the power cord from the PSU, unlock the clip locked in step 3. Unplug the power cord from the PSU.



### 3.15.4 Connecting an InfiniBand Cable

The following is the procedure for connecting an InfiniBand cable.

1. **Connect the InfiniBand cable to the InfiniBand card.**
2. **Check the LED on the InfiniBand card.**

   For the LED light specifications, see the user manual of the InfiniBand card used, from the NVIDIA website (https://www.nvidia.com/).

## 3.16 Powering On for the First Time

This section describes AC power-on and how to configure various settings.
**Remarks**
To use the control port in a DHCP configuration, it must be connected to a configured DHCP server before AC power-on.

**CAUTION**

Power on the equipment within the temperature range in the prescribed temperature conditions. For details on the operating environment, see "3.2 Installation Specifications." Failure to operate the equipment within the prescribed temperature range may lead to malfunctions or loss of data. Fujitsu is not responsible for any damage or failure caused by use of the equipment outside the temperature range for guaranteed operation.

### 3.16.1 AC Power On

The green BMC ready LED blinks (see "Figure 1.11 Front Panel LEDs") when the equipment is connected to the main power supply.

Approximately 240 seconds are required until the node can be powered on. The BMC ready LED stays on and does not blink when the node can be powered on.

## 3.16.2 Initial BMC Settings

After confirming that the BMC ready LED has stayed on, make initial settings from the BMC Web GUI. If not using DHCP, make the settings from the maintenance port. For details on browser and other settings, see "Chapter 1 Environment and Settings for Using the Web GUI" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Logging in to the BMC

For details on how to log in to the BMC, see "2.1.1 Login" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Setting the Time

To set the BMC time, select [Time Settings] from the [Configuration] menu. For details, see "3.4.4 Time Settings" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Configuring the Network

To configure the network to use the BMC, select [Network Settings] from the [Configuration] menu. For details, see "3.4.3 Network Settings" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Configuring SNMP Traps

To configure SNMP traps, select [SNMP Trap Settings] from the [Configuration] menu. For details, see "3.4.5 SNMP Trap Settings" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Setting the Altitude

To set the altitude, select [Chassis Settings] from the [Configuration] menu. For details, see "3.4.1 Chassis Settings" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Powering On

To power on, select [Power On All] from [Node Power Control] in the [Power Control] menu. For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Checking the Configuration

To check the configuration, select [FRU Information] from the [Server Status] menu. For details, see "3.1 Server Status" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Powering Off

To power off, control the power from [Power Control] in the [Power Control] menu. For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

### Checking the Error Log

To check the error log, select the [System Event Logs] menu. For details, see "3.2 System Event Logs" in

the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

# 3.17 Installing the OS

This section describes the procedures for installing the OS and OS drivers.

## 3.17.1 OS Installation Procedure

The following is the procedure for installing the OS.
Install the supported OS and apply the supported kernel.
For details on the supported OS and kernel, see the following sites:
For the Japanese market
https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/
For the global market
https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

To install the OS, perform the following two procedures in the order shown:
- Obtaining an ISO Image
- Installing the OS From the Network

### Obtaining an ISO Image

The following is the procedure for obtaining an ISO image.

1. **Log in to RHN (Red Hat Network).**

   To sign up for RHN, see "Understand the Red Hat subscription model" from Red Hat, Inc.

2. **Open the ISO image publishing page.**
3. **Select the distribution you want to install.**
4. **Download the Binary Disc ISO image.**

   The RHN screen displays the MD5 checksum. Confirm that the checksum of the downloaded ISO image is correct.

### Installing the OS From the Network

The following is the procedure for installing the OS from the network.

1. **Obtain MAC address information for each node.**

   1-1. **Connect the console.**

   For the console connection to the node, use an ssh connection to the BMC.
   The port number is 9000 + node number.
   Example: For node 1
   9000 + 1 = 9001

```
$ ssh -p 9001 hpcipmi@{BMC IP address}
hpcipmi@{BMC IP address}'s password:
```

   The initial password for hpcipmi is "HPCIPMI".

1-2. **Power on the node.**

Specify "Power on" in [Power Control] on the [Power Control] screen of the Web GUI. Specify "Force boot into EFI Boot Manager" in [Boot Script Number].
For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

1-3. **Check the MAC address.**

After processing stops at UEFI, execute the showinfo command to check the MAC address.

```
Shell> showinfo
```

After checking the MAC address, power off the node. For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

**Note**

The input of a command or characters other than showinfo may interfere with device operation.

1-4. **Enter "#." (number sign + period) to disconnect the console.**

2. **Configure the PXE server.**

Configure the TFTP server and DHCP server. For details, see "Preparing to install from the network using PXE" and "Configuring a TFTP server for UEFI-based clients" in *Performing an advanced RHEL 8 installation* on the Red Hat Customer Portal (https://access.redhat.com/).

- *Performing an advanced RHEL 8 installation*
  Products & Services > Product Documentation / Red Hat Enterprise Linux > 8 > Performing an advanced RHEL 8 installation
  https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/html/performing_an_advanced_rhel_8_installation/index

To configure the TFTP server, set grub.cfg.
To connect the console, add the following kernel option to the grub.cfg configuration file.

```
earlycon=pl011,0x1c050000 console=ttyAMA0
```

Example: grub.cfg

```
menuentry 'install' {
linux uefi/RHEL8GA/vmlinuz ip=dhcp inst.repo=http://172.23.220.1/
pxinst/repos/RHEL8GA inst.text earlycon=pl011,0x1c050000
console=ttyAMA0
initrd uefi/RHEL8GA/initrd.img
 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
}
```

3. **Prepare a kickstart file.**

Configure an HTTP server, and set the kickstart file. For details, see "Making a Kickstart file available on an HTTP or HTTPS server" in *Performing an advanced RHEL 8 installation* on the Red Hat Customer Portal (https://access.redhat.com/).

- *Performing an advanced RHEL 8 installation*
  Products & Services > Product Documentation / Red Hat Enterprise Linux > 8 > Performing an advanced RHEL 8 installation
  https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/8/html/performing_an_advanced_rhel_8_installation/index

To connect the console, add the following parameter to "bootloader --append=" in the kickstart file.

```
earlycon=pl011,0x1c050000 console=ttyAMA0
```

Example:

```
bootloader --append="crashkernel=auto earlycon=pl011,0x1c050000
console=ttyAMA0" --location=mbr --boot-drive=nvme0n1
```

4. **Connect the console.**

   See step 1-1.

5. **Power on the node.**

   Specify "Power on" in [Power Control] on the [Power Control] screen of the Web GUI. Specify "02h" in [Boot Script Number].

6. **Install the OS.**

   When the node has started up and the installation screen appears, install the OS according to the instructions displayed on the console connection screen.
   If you prepared the kickstart file, the OS is automatically installed.
   Perform the following steps without pressing the [ENTER] key while "Installation complete. Press ENTER to quit:" is displayed. Pressing the [ENTER] key may restart OS installation.

7. **From the Web GUI, restart the node.**

   To restart the node, specify [reset] in [Power Control] from the [Power Control] screen of the Web GUI. Specify "00h" in [Boot Script Number].
   For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

8. **After completing the network settings (IP address, etc.) of each node, enter "#." (number sign + period) to disconnect the console.**

## 3.17.2 OS Driver Installation Procedure

The following is the procedure for applying the OS drivers for FX700 hardware.

The BMC driver is required for basic operations (such as powering on/off the node).
The CPU-MEM-RAS driver is required for CPU and memory failure detection.

Driver RPM files are available online.
For the Japanese market
https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/
For the global market
https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

**Remarks**

The version numbers of the driver packages vary depending on the OS version number.

(1) BMC driver RPM file: FJSVxosbmc-xxxxx.aarch64.rpm
(2) CPU-MEM RAS driver RPM file: FJSVxoscpuras-xxxxx.aarch64.rpm

This procedure assumes that the OS supported by the drivers has already been installed and the kernel supported by the drivers has already been applied on the FX700 node.

The OpenIPMI package is required for the BMC driver. Before installing the BMC driver, install the OpenIPMI package first.

1. **Power on the FX700 node to start the OS.**

   See "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

2. **Transfer the OS driver RPM files.**

   Transfer the above two RPM files to the FX700 node by using the scp command, etc. The following step assumes that the two files have been transferred to the /SOMEWHERE directory on the FX700 node.

3. **Apply the RPM files.**

   Apply the RPM files by executing the yum command on the FX700 node.

```
# yum -y install /SOMEWHERE/FJSVxosbmc-x.x.x-xx.xxx.aarch64.rpm
# yum -y install /SOMEWHERE/FJSVxoscpuras-x.x.x-xx.xxx.aarch64.rpm
```

4. **Reflect settings.**

   Execute the following command on the FX700 node to restart the FX700.

```
# shutdown -r now
```

5. **Check the installation status.**

   (1) BMC driver
   If active is the status of the systemd service FJSVxosbmc, installation completed successfully.

```
# systemctl status FJSVxosbmc
```

   (2) CPU-MEM RAS driver
   If active is the status of the systemd service FJSVxoscpuras, installation completed successfully.

```
# systemctl status FJSVxoscpuras
```

# 3.18 Installing the InfiniBand Driver

The InfiniBand driver (MLNX_OFED) and installation procedure can be found online.
For the Japanese market
https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/
For the global market
https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

**CAUTION**

Only the specified driver versions described on the above sites are supported.
After installation, you can check the InfiniBand driver (MLNX_OFED) version number with the following command.

```
# ofed_info | head -1
```

# Chapter 4 Operation

This chapter describes operation of the FX700 main unit.
Keep the contents of "Chapter 2 Important Information" in mind when using the equipment.

## 4.1 Power On/Off

This section describes how to power on/off the system.

**CAUTION**

Power on the equipment within the temperature range in the prescribed temperature conditions. For details on the operating environment, see "3.2 Installation Specifications." Failure to operate the equipment within the prescribed temperature range may lead to malfunctions or loss of data. Fujitsu is not responsible for any damage or failure caused by use of the equipment outside the temperature range for guaranteed operation.

- Press the button to power on or off the system.
- Short press the button to power on all nodes (only if all the nodes in the device are off).
- Long press the button (4 seconds or longer) to start shutdown of the operating systems on all nodes.

### 4.1.1 Turning On/Off AC Power to the FX700 Main Unit

#### Turning On AC Power to the FX700 Main Unit

The green PSU status LED blinks when the equipment is connected to the main power supply. Approximately 4 minutes are required until the node can be powered on. The BMC ready LED blinks during this period. The BMC ready LED stays on and does not blink when the node can be powered on.

#### Turning Off AC Power to the FX700 Main Unit

Confirm that the green PSU status LED is blinking, and then remove the power cord.

### 4.1.2 Changing the Power Supply Status of Nodes

When using operations management software, follow the manual for your operations management software. For the procedure to power on/off a node without using operations management software, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

**CAUTION**

**Data Loss**

If the node is not automatically powered off, you can shut it down by pressing the power button for at least 4 seconds. However, data loss may occur when the node is not properly shut down according to

the procedure in "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

# 4.2 Removing the Chassis

## 4.2.1 Removing the Chassis From the Rack

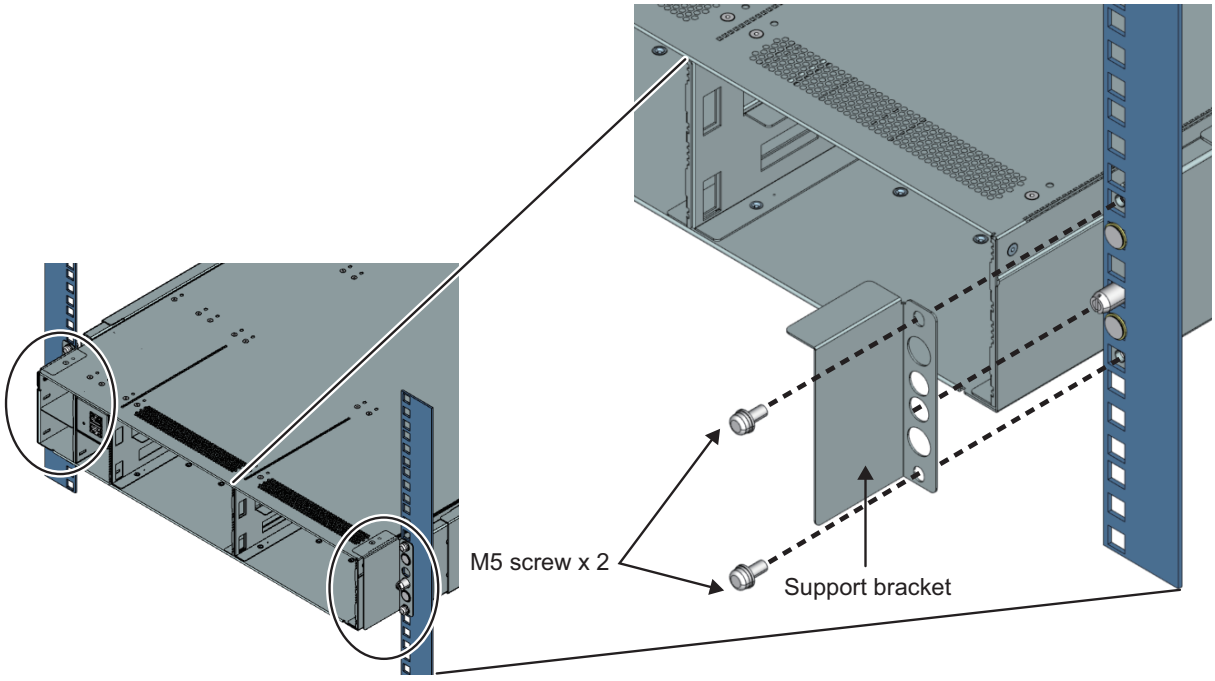
The following is the procedure for removing the chassis from the rack.

**CAUTION**

- Remove all units from the chassis before removing it from the rack.
  For details on how to remove each unit, see "3.9.2 Removing the Blade From the Chassis," "3.10.2 Removing the PSU From the Chassis," "3.13.2 Removing the FANU From the Chassis," and "3.11.2 Removing the Dummy Blade From the Chassis."
- The work of removing the chassis from the rack must be done by two or more people.

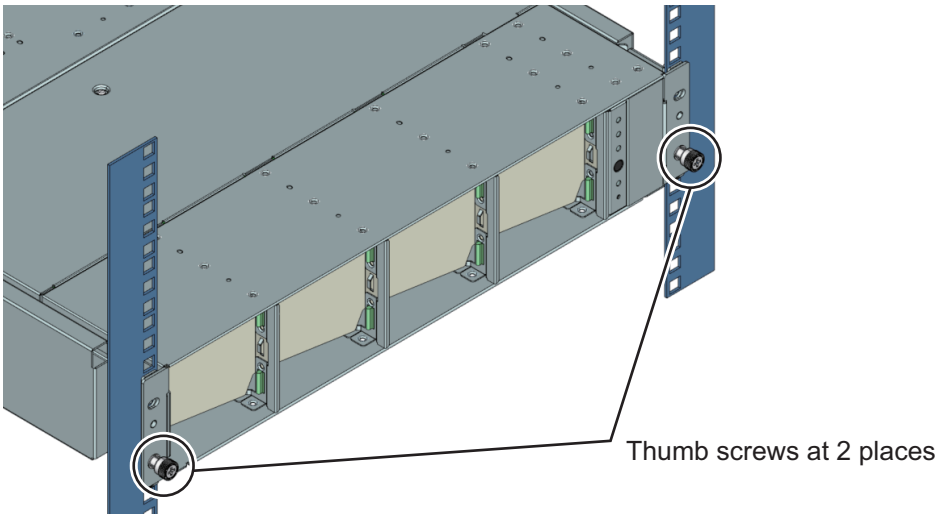
1. **Remove the back plates.**

Figure 4.1 Removing the Back Plates



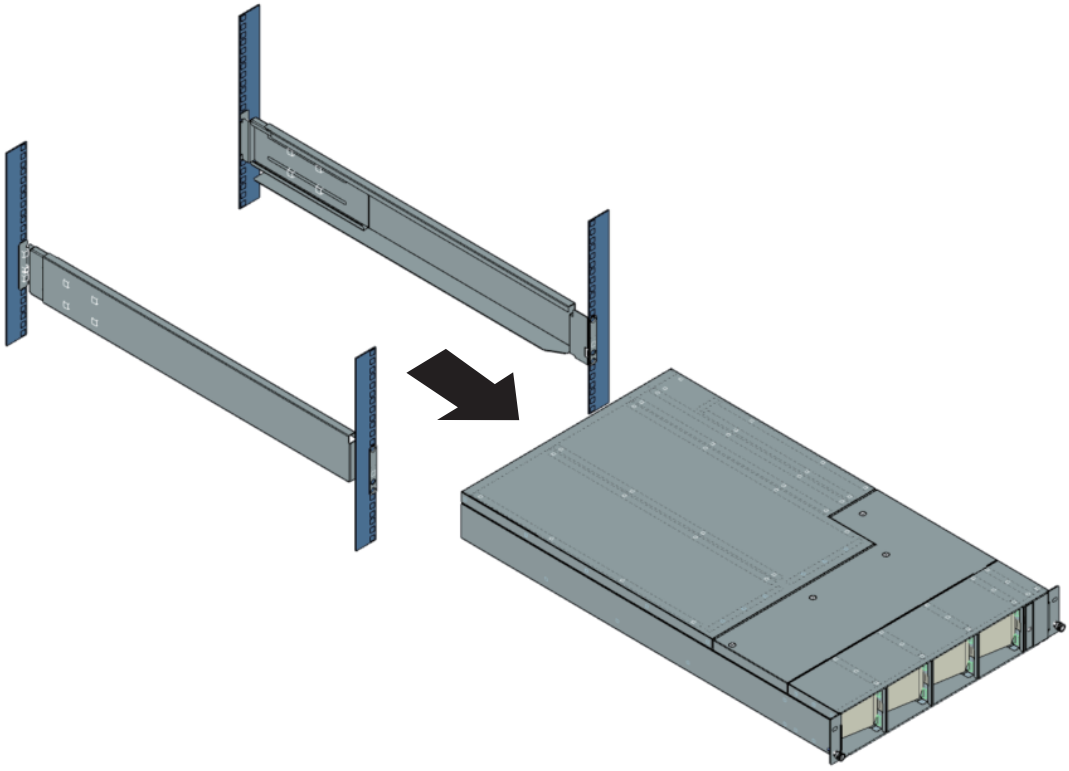

2. **Remove two thumb screws.**

Figure 4.2 Removing the Thumb Screws




3. **Remove the chassis from the rack.**

Figure 4.3 Removing the Chassis



# 4.3 Cleaning the FX700 Main Unit

**⚠CAUTION**

- Power off the FX700 main unit. Then, disconnect the power plugs from their properly grounded outlets.
- Do not clean the internal components yourself. Instead, ask a service technician.
- Do not use cleaning agents that contain abrasive materials or that can cause plastics to corrode.
- Do not allow any liquid to enter the system. Keep the ventilation areas of the FX700 main unit clean.
- Do not use spray cleaners (including flammable types). Doing so may damage the device or cause fire.
- Wipe the FX700 main unit with a dry cloth when cleaning it. If an area is particularly dirty, dilute a household cleaning agent in a solution. Moisten a cloth in the solution, wring out the cloth thoroughly, and wipe the area with the cloth.

# Chapter 5 Troubleshooting

This chapter describes the troubleshooting of the FX700.

## 5.1 Log (Snapshot) Collection Procedure

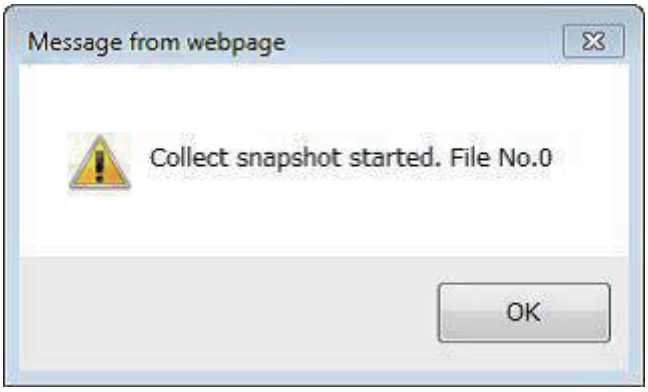
If you need a detailed investigation, collect and send a snapshot by performing the following procedure when hardware trouble occurs.

1. **Log in to the Web GUI.**
2. **From the navigation bar, select [System Event Logs].**
3. **Click the [Collect] button at the bottom right of [Snapshot Files].**
4. **Set the collection conditions on the [Collect Settings] screen, and click the [Collect] button.**

   - [Type]: Select [Partial] or [Full].
   - [Encrypt]: To enable file encryption, check the [Enable] check box.
   - [Encrypt Key]: If the [Encrypt] check box is checked, enter an encryption key in the field.

5. **The following message appears. Click the [OK] button to start snapshot collection:**

Figure 5.1 Message Displayed




A new file is registered in [Snapshot Files] when collection is completed.

**Remarks**

- The file No. corresponds to [No.] in [Snapshot Files].

6. **Click the name of the collected file to save it in the folder of your choice.**

## 5.2 Hardware Trouble

If various alarm LED light up or are blinking, plan maintenance according to the *FUJITSU Supercomputer PRIMEHPC FX700 Upgrade and Maintenance Manual* (C120-0090EN).

# 5.3 OS Driver-Related Problems

This section describes how to solve problems related to the OS drivers.

## 5.3.1 Collecting Information for Maintenance Purposes

If an OS driver-related problem occurs, collect the following information:

### ■ Common to the OS Drivers

- **OS memory dump**

  When using operations management software, follow the manual for your operations management software.
  When not using operations management software, collect the dump by issuing a OS dump collection instruction from "Power Control" on the BMC Web GUI.
  For details, see "3.3 Power Control" in the *FUJITSU Supercomputer PRIMEHPC FX700 BMC User's Guide* (C120-0091EN).

- **sosreport**

  Collect the sosreport file of the FX700 system node.
  For the procedure in detail, see the Red Hat, Inc. website.

For BMC driver-related problems, collect the following additional information:

### ■ BMC Driver

- /var/opt/FJSVxos/bmc/log/common file on the node
- /var/opt/FJSVxos/bmc/log/ipmi_message file on the node

# 5.4 Other Problems

## 5.4.1 Control Port and Maintenance Port Both Disabled

If the control port and maintenance port are both disabled, LAN connection is not possible. Also, the IP addresses are initialized.
The following is the procedure for enabling the LAN ports.

- HCP1600 or earlier

  1. Turn AC power off and on.
     - When both the control port and maintenance port are disabled, powering on the BMC enables the LAN ports.
  2. Set IP addresses for both the control port and maintenance port.

- HCP1700 or later

  If anyone tries to disable the control port and maintenance port, a message appears, and the operation fails.

## 5.4.2 Node Console Hangs

If the console cannot be end normally, it may hang.
If so, kill all processes on the console, and open the console.
The following is an example of recovery measures.

1. Log in via ssh as the root user to the node where the hang occurred.

```
$ ssh -l root [host name]
```

2. Identify the PIDs of processes running on the console.

```
[root@xxxx ~]# ps -ef | grep ttyAMA0
root      2942  2904  0 23:48 ttyAMA0  00:00:00 -bash
root      3019  2942  0 23:56 ttyAMA0  00:00:00 cat large-file
[root@xxxx ~]#
```

3. Kill a running process.

```
[root@xxxx ~]# kill -9 3019
[root@xxxx ~]#
```

4. Kill the bash process used by the console.

```
[root@xxxx ~]# kill -9 2942
[root@xxxx ~]#
```

5. Kill the bash parent process used by the console.

```
[root@xxxx ~]# kill -9 2904
[root@xxxx ~]#
```

## 5.4.3 Precaution on Using Commands

When a command other than showinfo is entered in the UEFI shell, the node may be powered off, and [Node] on the Web GUI screen may display "Reserved."
To clear "Reserved" from the display, turn AC power off and on.

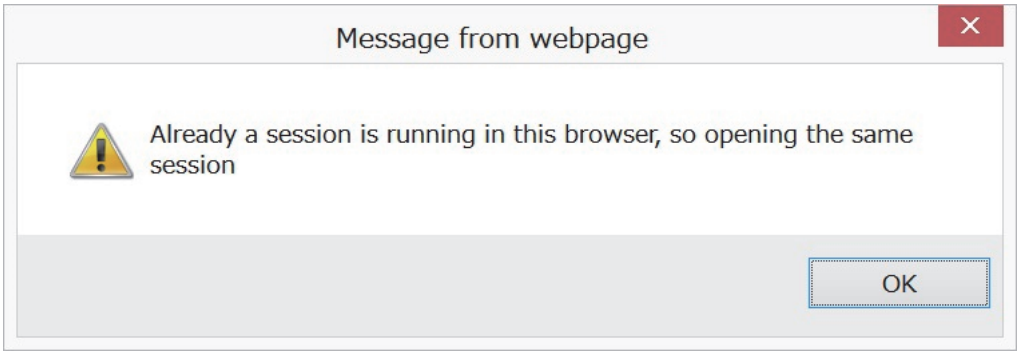
## 5.4.4 Precaution on Removing a PSU

Removing a PSU during warm maintenance and clicking [Exit Maintenance] causes the System alarm LED on the main unit to blink and the Web GUI screen to display a warning for the chassis. However, use of the chassis can continue.
To clear the warning from the display and turn off the LED, turn AC power off and on.

## 5.4.5 Precaution on Using the Web GUI

Multiple accesses from the same PC are not supported. The following message appears when multiple accesses are attempted. If the message appears, close the session.

Figure 5.2 Message From the Webpage




## 5.4.6 PSU Recovery Procedure

If [Power Status] of a PSU is [Off] due to a broken (unplugged) power cord, as an example, then simply replacing the power cord (plugging in the power cord) does not automatically change [Power Status] of the PSU to [On].
If [Power Status] of a PSU is [Off], check the status of the chassis and PSU from the Web GUI, and restore the PSU according to one of the following procedures.

### ■ When "EPO" (Emergency Power Off) is Shown for the Chassis

1. **From the Web GUI, confirm that [Power Status] is [Off] for all CMUs.**
2. **Unplug the power cords from all PSUs, and wait until their orange PSU status LEDs are turned off.**
3. **Plug the power cords into all PSUs, and confirm that their green PSU status LEDs are blinking. If any of the green LEDs is not blinking, replace the PSU or power cord.**
4. **From the Web GUI, confirm that [Normal] is shown for the chassis.**

### ■ When "Warning" is Shown for the Chassis and [Alarm] for the Target PSU

1. **Select [Maintenance] from the Web GUI navigation bar.**
2. **From the Web GUI, select the target PSU, and click the [Enter Maintenance] button.**
3. **From the Web GUI, confirm that [Power Status] of the PSU is [Off].**
4. **Unplug the power cord from the PSU, and remove the PSU.**
5. **Wait until the orange PSU status LED of the PSU is turned off.**
6. **Install the PSU, and connect the power cord.**
7. **Confirm that the green PSU status LED is blinking. If the green LED is not blinking, replace the PSU or power cord.**
8. **From the Web GUI, select [On] under [Power Control] for the PSU, and click the [Start Power Control] button.**
9. **Click [Refresh] to update the screen display.**
10. **From the Web GUI, confirm that [Power Status] of the PSU is [On]. Then, click the [Exit Maintenance] button.**
11. **From the Web GUI, confirm that [Normal] is shown for the chassis.**

## 5.4.7 Important Information on System Event Logs Messages

The Tofu interconnect is not implemented in the FX700, so ignore any Tofu-related messages registered in System Event Logs.

## 5.4.8 Control Port Not Possible to Connect with DHCP

Suppose, for example, that the DHCP server is not connected when the BMC starts. Then, configuration of the network for the control port may not complete successfully, so DHCP connection is not possible.
The following procedure shows how to establish a DHCP connection.

1. **Connect to the already configured DHCP server.**
2. **Turn AC power off and on.**

## 5.4.9 Precaution After Clearing a PSU Temperature Warning

After a PSU temperature warning occurs, a message about a cleared warning is registered in the System Event Logs each time the BMC is restarted, even if the warning has been cleared by eliminating the cause. To prevent its registration, turn AC power off and on.

## 5.4.10 Error Occurring in the POST

The logs (snapshot) contain POST error messages displayed on the console screen. The descriptions of the errors are intended for support technicians.
If an error occurs, contact Fujitsu Support with the snapshot.

## 5.4.11 BMC Web GUI Not Accessible

1. **Confirm that the peripherals (network hub, server, etc.) and network connections of this device do not have any problems.**
2. **Check "5.4.1 Control Port and Maintenance Port Both Disabled."**
3. **Check "5.4.8 Control Port Not Possible to Connect with DHCP."**
4. **If you found no problem in the check in steps 1 to 3, click the [Reset] button.**

   If the BMC is still not accessible after the reset, replace the BAREBONE. Even when the BMC is accessible after the reset, there was likely a failure, so replace the BAREBONE during scheduled maintenance.

## 5.4.12 Console Connection to a Node Not Possible via the BMC

If you can access the Web GUI but cannot connect to the console via the BMC, turn AC power off and on.

## 5.4.13 Suspected Deterioration in InfiniBand Performance

One likely cause of InfiniBand performance deterioration is an inability to link up using the bandwidth/ number of lanes (PCIe Gen3 16 lanes) expected from the FX700. This section shows how to check and

take action for that cause.

1. **Confirm that the FX700 supports the OS/firmware/driver combination.**
   for the possible combinations, see the following site:
   For the Japanese market

   https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/
   For the global market
   https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

2. **Check /var/log/messages on the OS of the target node.**
   If "8 GT/s x16" is shown, perform step 3 because the link up uses PCIe Gen3 16 lanes.

   Otherwise, if "8 GT/s x16" is not shown, perform step 4.
   Example of a message showing "8 GT/s x16":

```
Dec 15 00:16:40 fx700n1 kernel: mlx5_core 0000:05:00.0: 126.016
Gb/s available PCIe bandwidth, limited by 8 GT/s x16 link at 0000:
00:00.0 (capable of 252.048 Gb/s with 16 GT/s x16 link)
```

   Example of a message showing something other than "8 GT/s x16":

```
Dec 15 00:22:15 fx700n1 kernel: mlx5_core 0000:05:00.0: 32.000 Gb/s
available PCIe bandwidth, limited by 2.5 GT/s x16 link at 0000:
02:10.0 (capable of 252.048 Gb/s with 16 GT/s x16 link)
```

3. **Confirm that the peripherals (InfiniBand switch, etc.) and InfiniBand cable connections of this device do not have any problems.**
4. **Consider applying the sample script (IB_Sample1.tar.gz) that can be downloaded from the site shown in step 1.**
   By applying the sample script, you may enable link up using the expected bandwidth/number of lanes.
   If the problem persists even after you apply the sample script, contact Fujitsu Support.

# Chapter 6 Technical Specifications

This chapter describes the specifications of the FX main unit, chassis, blade, PSU, and FANU.

**Note**

- Please note that the FX700 main unit specifications may be updated without notice.

## 6.1 FX700 Main Unit Specifications

Detailed technical specifications are printed on the data sheet of the FX700 main unit. The data sheet is provided online.

- For the Japanese market:
  https://www.fujitsu.com/jp/products/computing/servers/supercomputer/downloads/
- For the global market:
  https://www.fujitsu.com/global/products/computing/servers/supercomputer/documents/

Table 6.1 FX700 Main Unit Specifications

| | Name | A64FX | | |
|---|---|---|---|---|
| CPU | Command set architecture | Armv8.2-A SVE | | |
| | Number of arithmetic cores | 48 cores | | 24 cores |
| | Clock | 1.8 GHz | 2.0 GHz | 2.6 GHz |
| | Theoretical computation performance (double precision) | 2.7648 TFLOPS | 3.072 TFLOPS | 1.9968 TFLOPS |
| Node | Architecture | 1 CPU/node | | |
| | Memory capacity | 32 GiB (HBM2, 4-stack) | | |
| | Memory bandwidth | 1,024 GB/s | | |
| | Interconnect (option setting) | InfiniBand EDR/HDR100 (PCI slot, PCIe Gen3 16-lane) | | |
| | Internal storage (option setting) | M.2 SSD Type 2280 slot (PCIe Gen3 4-lane, NVMe) | | |
| Main unit | Form factor | 2U rack mount chassis | | |
| | Maximum number of nodes | 8 nodes/chassis | | |
| | Cooling method | Air cooling | | |

Table 6.1 FX700 Main Unit Specifications *(continued)*

| | | |
|---|---|---|
| | PSU (option setting for redundancy) | 2+1 redundancy<br>Input voltage: 200 to 240 VAC ±10%, single phase<br>Input frequency: 50/60 Hz ±3 Hz |
| | FANU | 4 units/chassis<br>(2 fans/unit, fan: 7+1 redundancy) |

# Appendix A BMC Driver Messages

This appendix explains the messages that are output to the operating system when defects, etc. are detected in the BMC driver.

## Error Messages

### [ERR.] xos IOP-BMC 0001 -*internal information* Invalid parameter and command. [*CODE*]

**Meaning**

The specified data is invalid as a command and parameter.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0002 - *internal information* Invalid parameter. File Name Size:[*NAME*] Data Size:[*DATA*] Name:[*PTR1*] Data:[*PTR2*]

**Meaning**

A specified value is invalid as an emergency dump request parameter.

*NAME*: Filename size

*DATA*: Data size

*PTR1*: Pointer to the filename storage area

*PTR2*: Pointer to the data storage area

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0003 -*internal information* Invalid parameter. [*TYPE*/(NULL)]

**Meaning**

The specified value is invalid as an input parameter.

*TYPE*: Status code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0004 -*internal information* Invalid parameter. Info:[*PTR*] Size:[*SIZE*]

**Meaning**

A specified value is invalid as a status control request parameter.

*PTR*: Pointer to the error log storage area

*SIZE*: Error log size

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0005 -*internal information* Detected an internal error of the IPMI command.. [CODE]**

**Meaning**

The command cannot be executed due to an internal error.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0006 -*internal information* Detected hard error. [*CODE*]**

**Meaning**

A hardware error response was received from the BMC.

*CODE*: IPMI command code

**Action**

There is a suspected hardware failure. Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0007 -*internal information* BMC could not allocate enough memory requested. [*CODE*]**

**Meaning**

A response was received from the BMC about not being able to secure an area of the requested size.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0008 -*internal information* Failed to create a log file for developers.**

**Meaning**

Generation of a log file for developers failed, and BMC driver initialization failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0009 -*internal information* Failed to create a log file for IPMI messages.**

**Meaning**

Generation of an IPMI message log file failed, and BMC driver initialization failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0010 -*internal information* Command time out. [*CODE*]**

**Meaning**

A timeout occurred while waiting for the completion of an issued command.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0011 -*internal information* Unable to get device number.**

**Meaning**

Retrieval of a char-type device number failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0012 -*internal information* Unable to allocate device file.**

**Meaning**

Securing a char-type device failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0013 -*internal information* Unable to register device file.**

**Meaning**

Registration of a char-type device failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0014 -*internal information* Unable to register the interrupt handler.**

**Meaning**

Registration of a BMC driver interrupt process failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0015 -*internal information* Base address is missing. address [*VALUE*]**

**Meaning**

The RAM base address is an abnormal value.

*VALUE*: Abnormal base address

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0016 -*internal information* Failed to run the shutdown command [VALUE]**

**Meaning**

A Shutdown command request to the OS failed.

*VALUE*: Execution result

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos IOP-BMC 0017 -*internal information* Requested an unsupported command. [*VALUE*]**

**Meaning**

Unknown ioctl was requested.

*VALUE*: Requested ioctl value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0018 -*internal information* Could not Create procfs entry.

**Meaning**

A proc file entry could not be created.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0019 -*internal information* Could not Create procfs parameter entry. [*PARAM*]

**Meaning**

A proc file could not be created.

*PARAM*: Parameter file to be created

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0020 -*internal information* Taking the user data failed. size [SIZE]

**Meaning**

Reading of request data from the user failed.

*SIZE*: Size of unreadable data

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0021 -*internal information* BMC driver is not ready. [CODE]

**Meaning**

The BMC driver cannot accept commands because loading is in progress or failed.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0022 -*internal information* An unexpected error occurred. [*CODE*]

**Meaning**

An unexpected error response was received from the BMC.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0023 -*internal information* The I/O error occurred. [*CODE*]

**Meaning**

An I/O error response was received from the BMC.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0024 -*internal information* BMC is not ready to accept the command. [*CODE*]

**Meaning**

The BMC is not ready to accept the command.

*CODE*: IPMI command code

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0025 -*internal information* Failed to create work queue.

**Meaning**

Queue generation failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0026 -*internal information* Failed to initialize IPMI driver.

**Meaning**

IPMI initialization failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0030 -*internal information* Invalid parameter. name_flag [*VALUE*]

**Meaning**

The specified value is invalid as an input parameter.

*VALUE*: Set name_flag value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0031 -*internal information* Invalid parameter. data_flag [*VALUE*]

**Meaning**

The specified value is invalid as an input parameter.

*VALUE*: Set data_flag value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos IOP-BMC 0032 -*internal information* Invalid parameter. wait_flag [*VALUE*]

**Meaning**

The specified value is invalid as an input parameter.

*VALUE*: Set wait_flag value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then

contact Fujitsu Support with the collected data together with the output message.

## Information Messages

**[INFO] xos IOP-BMC 1001 -*internal information* Sub System status Report. (Panic)**

**Meaning**

The system status changed to the Panic state.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1002 -*internal information* Sub System status Report. (Shutdown start)**

**Meaning**

The system status changed to the Shutdown Start state.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1003 -*internal information* Sub System status Report. (System Running)**

**Meaning**

The system status changed to the System Running state.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1004 -*internal information* Shut down the system by the Shutdown notification.**

**Meaning**

The system received a Shutdown notification and is powering off.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1005 -*internal information* Copyright(c) 2018 FUJITSU LIMITED. All rights reserved.**

**Meaning**

The message displays the copyright to the BMC driver.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1006 -*internal information* BMC driver VERSION: *DATE*.**

**Meaning**

The message displays the version and build date of the BMC driver.

*VERSION*: Version

*DATE*: Build date

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1007 -*internal information* Started the notification of trouble information.**

**Meaning**

Failure information notification processing has begun.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1008 -*internal information* Started the Emergency dump.**

**Meaning**

An emergency dump request has begun.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1009 -*internal information* Started loading BMC driver.**

**Meaning**

The BMC driver is being loaded.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1010 -*internal information* Started the notification of State notification.**

**Meaning**

Status control has begun.

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1011 -*internal information* Command Busy. Another command is executing it. [CODE]**

**Meaning**

The current state is Busy because another command is being executed.

*CODE*: IPMI command code

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1012 -*internal information* Could not accept the execution of the command under kill termination. [*CODE*]**

**Meaning**

The command cannot be executed because forced termination processing by kill is in progress.

*CODE*: IPMI command code

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1013 -*internal information* Command was killed. [*CODE*]**

**Meaning**

The command was killed.

*CODE*: IPMI command code

**Action**

No action is necessary.

**[INFO] xos IOP-BMC 1014 -*internal information* Started unloading BMC driver.**

**Meaning**

The BMC driver is being unloaded.

**Action**

No action is necessary.

# Appendix B CPU-MEM-RAS Driver Messages

This appendix explains the messages that are output to the operating system when defects, etc. are detected in the CPU-MEM-RAS driver.

## Error Messages

### [ERR.] xos RAS 0000 - *internal information* Failed to register HOST SOFTWARE ERROR virq.

**Meaning**

Registration of the logical interrupt number of HOST SOFTWARE ERROR failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0001 - *internal information* HOST SOFTWARE ERROR request_irq failed. (ERR1)

**Meaning**

Registration of the interrupt handler for HOST SOFTWARE ERROR failed.

*ERR1*: Error code of the interrupt handler registration function

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0002 - *internal information* Failed to register GUEST SOFTWARE ERROR virq.

**Meaning**

Registration of the logical interrupt number of GUEST SOFTWARE ERROR failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0003 - *internal information* GUEST SOFTWARE ERROR request_irq failed. (ERR1)

**Meaning**

Registration of the interrupt handler for GUEST SOFTWARE ERROR failed.

*ERR1*: Error code of the interrupt handler registration function

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0004 - *internal information* acpi_register_gsi() failed. ret=ERR1

**Meaning**

Registration of a logical interrupt number failed.

*ERR1*: Error code of the logical interrupt number registration function

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0005 - *internal information* ioremap failed for GICv3_GICD.**

**Meaning**

Memory mapping to the GICv3 Distributor (GICD) area failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0006 - *internal information* ioremap failed for GICv3_ITS_CNTL_REG.**

**Meaning**

Memory mapping to the GICv3 Distributor (ITS) area failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0007 - *internal information* register_ras_handler failed, since the handler has already been registered.**

**Meaning**

The RAS handler is already registered. Alternatively, registration of the RAS handler failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0008 - *internal information* ITS HOST SOFTWARE ERROR detected. GITS_FJ_ITS_ERROR_STATUS=DATA1**

**Meaning**

HOST SOFTWARE ERROR was detected in the ITS setting trigger.

*DATA1*: ITS error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0009 - *internal information* ICC HOST SOFTWARE ERROR detected. GICD_FJ_ICC_ERROR_STATUS=DATA1**

**Meaning**

HOST SOFTWARE ERROR was detected in the ICC setting trigger.

*DATA1*: ICC error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0010 - *internal information* ICH ICV GUEST SOFTWARE ERROR detected. GICD_FJ_ICH_ICV_ERROR_STATUS=DATA1**

**Meaning**

GUEST SOFTWARE ERROR was detected in the ICH or ICV setting initiator.

*DATA1*: ICH_ICV error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0011 - *internal information* Uncorrectable Error RAW L1 detected.

**Meaning**

A raw UE detected on the L1 cache was not error-marked.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0012 - *internal information* Uncorrectable Error RAW L2 detected.

**Meaning**

A raw UE detected on the L2 cache was not error-marked.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0013 - *internal information* Clearing ERR0STATUS.UE failed. ERR0STATUS=DATA1 -> DATA2

**Meaning**

Clearing of an uncorrected error bit failed in the error status register.

*DATA1*: Error status register value before clearing

*DATA2*: Error status register value after clearing

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0014 - *internal information* Clearing valid bit failed. ERR0STATUS=DATA1 -> DATA2 -> DATA3

**Meaning**

Clearing of a valid bit failed in the error status register.

*DATA1*: Error status register value before clearing

*DATA2*: Error status register value after clearing an uncorrected error bit

*DATA3*: Error status register value after clearing a valid bit

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0015 - *internal information* Assertion failure detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

An error was detected in a data path system (arithmetic unit, etc.) in the core.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0016 - *internal information* Internal data path detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

An error was detected in a register outside the range of the IMPLEMENTATION DEFINED error report.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0017 - *internal information* Internal control register detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

An undefined error was detected.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0018 - *internal information* DG L1 TLB detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

The L1I cache, L1D cache, and/or TLB was degraded.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0019 - *internal information* DG L2 detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

The L2 cache was degraded.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0020 -*internal information* Uncorrectable Address Error (Store) detected. esr=DATA1 ERR0STATUS=DATA2 count=DATA3

**Meaning**

An error due to incorrect memory access (Store) was detected.

*DATA1*: ESR register value

*DATA2*: Error status register value

*DATA3*: Cumulative number of occurrences of this error after module load

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0021 - *internal information* GPR, SP register error detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

A parity error was detected in GPR or Stackpointer.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0022 - *internal information* FP&SIMD, vector, predicate register error detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

A parity error was detected in the FP&SIMD register.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0023 - *internal information* Invalid error code or type detected when SError occurred. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

SError occurred.

The error code or error type is invalid.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0024 - *internal information* MARKED_UE detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

Error-marked data was used.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

### [ERR.] xos RAS 0025 - *internal information* Uncorrectable Address Error(Load, Instruction access) detected. esr=DATA1 ERR0STATUS=DATA2

**Meaning**

An error due to incorrect memory access (Load, Instruction access) was detected.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0026 - *internal information* A pending error was not detected even though an interrupt was received. GICD_FJ_GIC_HOST_SOFTWARE_ERROR_PENDING=DATA1**

**Meaning**

No pending error was detected even though an interrupt was received.

*DATA1*: Error pending register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0027 - *internal information* HOST SOFTWARE ERROR detected. GICD_FJ_GIC_HOST_SOFTWARE_ERROR_PENDING=DATA1**

**Meaning**

HOST SOFTWARE ERROR was detected.

*DATA1*: Error pending register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0028 - *internal information* Invalid error code or type detected when memory abort occurred. esr=DATA1 ERR0STATUS=DATA2**

**Meaning**

A memory abort occurred.

The error code or error type is invalid.

*DATA1*: ESR register value

*DATA2*: Error status register value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0029 - *internal information* Failed to detect the error. [DATA1]**

**Meaning**

Error detection failed.

*DATA1*: Function name that failed error detection

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0030 - *internal information* Failed to hook the function. [DATA1] (ret=DATA2)**

**Meaning**

Hook of the error detection function failed.

*DATA1*: Function name to hook

*DATA2*: Hook function return value

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0031 - *internal information* Failed to create workqueue to suppress Uncorrectable Address Error (Store) log.**

**Meaning**

Creating a work queue to suppress the Uncorrectable Address Error (Store) log failed.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0032 - *internal information* Unsupported environment.**

**Meaning**

The environment is not supported.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

**[ERR.] xos RAS 0033 - *internal information* Missing symbol for dependent module.**

**Meaning**

There is no symbol for the dependent module.

**Action**

Collect investigation data according to "5.3.1 Collecting Information for Maintenance Purposes," and then contact Fujitsu Support with the collected data together with the output message.

## Information Message

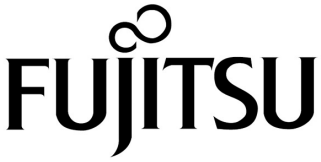
**[INFO] xos RAS 0000 -*internal information* no need to clear ERR0STATUS register.**

**Meaning**

The error status register does not need to be cleared.

**Action**

No action is necessary.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