SPARC Enterprise M8000/M9000 Servers

Site Planning Guide

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Contents

Preface

This site planning guide describes the physical, environmental, and electrical specification requirements of the SPARC Enterprise M8000/M9000 servers from Oracle and Fujitsu. References herein to the M8000 server or M9000 server are references to the SPARC Enterprise M8000 or SPARC Enterprise M9000 server.

This chapter includes the following sections:

Audience

This guide is written for experienced system administrators with working knowledge of computer networks and advanced knowledge of the Oracle Solaris Operating System (Oracle Solaris OS).

Related Documentation

All documents for your sever are available online at the following locations:

Documentation	Link
Sun Oracle software-related manuals (Oracle Solaris OS, and so on)	http://www.oracle.com/documentation
Fujitsu documents	http://www.fujitsu.com/sparcenterprise/manual/
Oracle M-series server documents	http://www.oracle.com/technetwork/documentation/sparc-mseries-servers-252709.html

The following table lists titles of related documents.

Related SPARC Enterprise M8000/M9000 Servers Documents
SPARC Enterprise M8000/M9000 Servers Site Planning Guide
SPARC Enterprise M8000/M9000 Servers Getting Started Guide[*]
SPARC Enterprise M8000/M9000 Servers Overview Guide
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Important Legal and Safety Information [*]
SPARC Enterprise M8000/M9000 Servers Safety and Compliance Guide
External I/O Expansion Unit Safety and Compliance Guide
SPARC Enterprise M8000/M9000 Servers Unpacking Guide[*]
SPARC Enterprise M8000/M9000 Servers Installation Guide
SPARC Enterprise M8000/M9000 Servers Service Manual
External I/O Expansion Unit Installation and Service Manual
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual
SPARC Enterprise M4000/M5000/M8000/M9000 Servers Dynamic Reconfiguration (DR) User's Guide
SPARC Enterprise M4000/M5000/M8000/M9000 Servers Capacity on Demand (COD) User's Guide
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Product Notes[†]
SPARC Enterprise M8000/M9000 Servers Product Notes
External I/O Expansion Unit Product Notes
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary

* This is a printed document.

† Beginning with the XCP 1100 release.

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Font/Symbol	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font represents the example of command input in the frame.	XSCF> **adduser jsmith**
AaBbCc123	The names of commands, files, and directories; on-screen computer output. This font represents the example of command output in the frame.	XSCF> **showuser -P** User Name: jsmith Privileges: useradm auditadm
Italic	Indicates the name of a reference manual, a variable, or user-replaceable text.	See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.
" "	Indicates names of chapters, sections, items, buttons, or menus.	See Chapter 2, "System Features."

Notes on Safety

Read the following documents thoroughly before using or handling any SPARC Enterprise M8000/M9000 server.

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Important Legal and Safety Information*
- *SPARC Enterprise M8000/M9000 Servers Safety and Compliance Guide*

Syntax of the Command-Line Interface (CLI)

The command syntax is as follows:

- A variable that requires input of a value must be put in Italics.
- An optional element must be enclosed in [].
- A group of options for an optional keyword must be enclosed in [] and delimited by |.

Documentation Feedback

If you have any comments or requests regarding this document, go to the following websites:

- For Oracle users:

http://www.oracle.com/goto/docfeedback

Include the title and part number of your document with your feedback:

SPARC Enterprise M8000/M9000 Servers Site Planning Guide,
part number E23589-02

- For Fujitsu users:

http://www.fujitsu.com/global/contact/computing/sparce_index.html

CHAPTER 1

Physical Specification

This chapter describes what the reader is expected to know, including physical specification for the SPARC Enterprise M8000/M9000 servers, before planning server installation.

This chapter contains the following sections:

1.1 Before Setting Up the System

Before starting server installation, verify that the requirements listed in TABLE 1-1 are satisfied.

TABLE 1-1 Checklist

Requirements	Item	Check
System components	Have the server components been decided?	❑
	Has the total number of servers been decided?	❑
System management	Have the system administrators and operators taken the necessary training courses??	❑

TABLE 1-1 Checklist *(Continued)*

Requirements	Item	Check
Physical specifications	Has the server installation location been decided?	❑
	Does the installation floor layout satisfy the ventilation and maintenance access requirements? See Section 1.2.4, “Server Installation (Space)” on page 1-12	❑
	Does the device layout guarantee that heated air vented from one device does not enter an air intake of another device? See Section 1.2.4, “Server Installation (Space)” on page 1-12	❑
Access route	Does the access route provide sufficient space for transport of the packed server cabinets? Have you confirmed that all route incline angles are within the permitted range? See Section 1.2.5, “Access Route” on page 1-31	❑
	If a pallet jack is to be used, have you confirmed that the cabinet weight is within the load limit of the pallet jack? See Section 1.2.5, “Access Route” on page 1-31	❑
	If an elevator is to be used, have you confirmed that the elevator car is wide enough for the cabinet to be carried into it and that the cabinet weight is within the load limit of the elevator? See Section 1.2.5, “Access Route” on page 1-31	❑
Network specification	Do you clearly understand what data connections and feeds are required for system startup and network connections? See CHAPTER 2, “Network Connection Specifications” on page 2-1	❑
Environmental specifications	Does the computer room air handling meet temperature and humidity requirements? See Section 3.1, “Environmental Requirements” on page 3-1	❑
	Can the computer room continuously satisfy environmental requirements?	❑
	Is the computer room adequately equipped to extinguish a fire?	❑
	Is the computer room secured?	❑

TABLE 1-1 Checklist *(Continued)*

Requirements	Item	Check
Facility power	Do you know the required operating voltages and electrical current levels of the server and peripherals? See Section 3.3, "Electrical Specifications" on page 3-8	❑
	Are enough power outlets provided for the server cabinet, monitors, and peripherals?	❑
	Are the circuit breakers for the server suitable in terms of voltage and current-carrying capacities? See Section 3.3, "Electrical Specifications" on page 3-8	❑
	If you use single-phase power feed, is a power outlet located within 3.0 meters (9.8 ft) of the server?	❑

1.2 Physical Specifications

This section outlines the M8000/M9000 server components and lists their physical specifications.

1.2.1 Server Components

TABLE 1-2 lists the names, the capacities and functions of the M8000/M9000 server components.

TABLE 1-2 Names and Quantities

Name	Capacity/Function	Remarks
M8000 server	Accommodates up to four CMUs [up to 16 CPU modules: (32 cores for SPARC64 VI processors, 64 cores for SPARC64 VII/SPARC64 VII+ processors)] and up to four IOUs.	
M9000 server (base cabinet)	Accommodates up to eight CMUs [up to 32 CPU modules: (64 cores for SPARC64 VI processors, 128 cores for SPARC64 VII/SPARC64 VII+ processors)] and up to eight IOUs.	The M9000 server, when combined with an expansion cabinet can accommodate up to 16 CMUs [up to 64 CPU modules: (128 cores for the SPARC64 VI processor, 256 cores for the SPARC64 VII/ SPARC64 VII+ processors)] and up to 16 IOUs.
M9000 server (expansion cabinet)	Accommodates up to eight CMUs [up to 32 CPU modules: (64 cores for SPARC64 VI processors, 128 cores for SPARC64 VII/SPARC64 VII+ processors)] and up to eight IOUs.	
Rack-mountable dual power feed	Provides power redundancy (with single-phase dual power feed) for an M8000 server.	Optional.
Power cabinet	There are two types of power cabinet: • Provides three-phase dual power feed for an M8000 server • Provides single-phase dual power feed or three-phase dual power feed for an M9000 server	One power cabinet is required for each M8000 server. One power cabinet is required for each M9000 server of the base or expansion cabinet type. (The single-phase dual power feed for the M9000 server is optional.)

1.2.2 External Dimensions and Weights

TABLE 1-3 lists the external dimensions and weights of the M8000/M9000 server cabinets.

TABLE 1-3 Installation Specifications (External Dimensions and Weights)

	External Dimensions [mm (inch)]			
Name	**Width**	**Depth**	**Height**	**Weight [kg]**
M8000 server	750 (29.5)	1260 (49.6)	1800 (70.9)	700**
M8000 + power cabinet	1054 (41.5)	1260 (49.6)	1800 (70.9)	1020**
M9000 server (base cabinet)	850 (33.5)	1260 (49.6)	1800 (70.9)	940
M9000 (base cabinet) + power cabinet	1154 (45.4)	1260 (49.6)	1800 (70.9)	1290
M9000 (base cabinet + expansion cabinet)	1674 (65.9)†	1260 (49.6)	1800 (70.9)	1880
M9000 (base cabinet + expansion cabinet) + power cabinet	2282 (89.8)†	1260 (49.6)	1800 (70.9)	2580
Rack-mountable dual power feed*	489 (19.3)	1003 (39.5)	278 (10.9) [6U]	75
Power cabinet	317 (12.5)‡	1244 (49.0)	1800 (70.9)	350

* The Rack-mountable dual power feed can only be mounted on the equipment rack.

† When combining a base cabinet and an expansion cabinet, the width of each cabinet is 837 mm (including the exterior side panels).

‡ The width of a power cabinet includes the exterior side panel.

**The weight of a server does not include the weight of optional hardware.

1.2.3 Server Appearance

FIGURE 1-1 to FIGURE 1-6 show each appearance of M8000/M9000 server components.

M8000 Server Appearance

FIGURE 1-1 M8000 Server

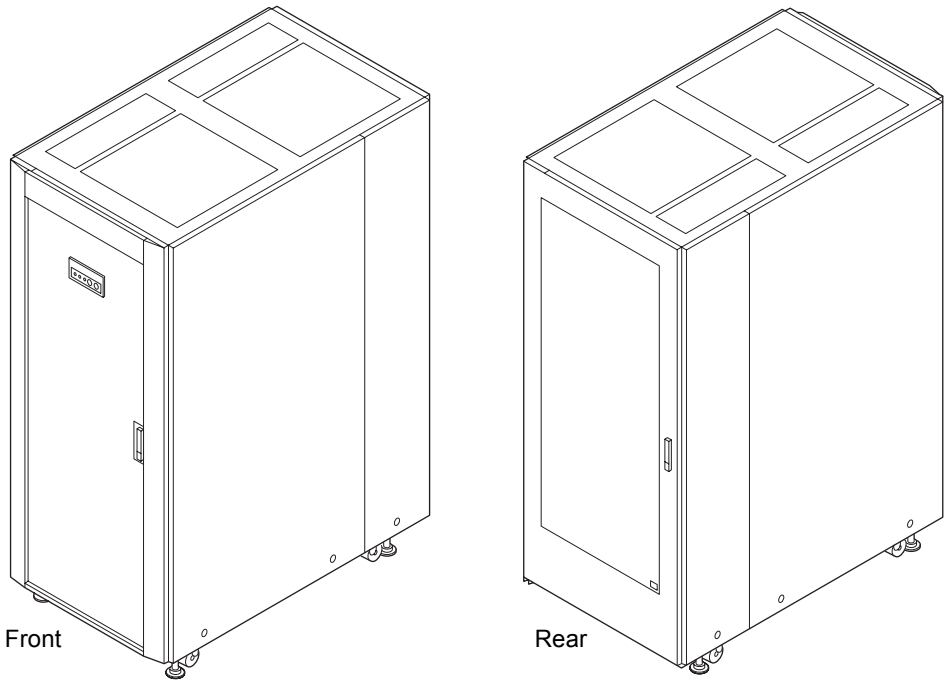


FIGURE 1-2 M8000 Server + Power Cabinet

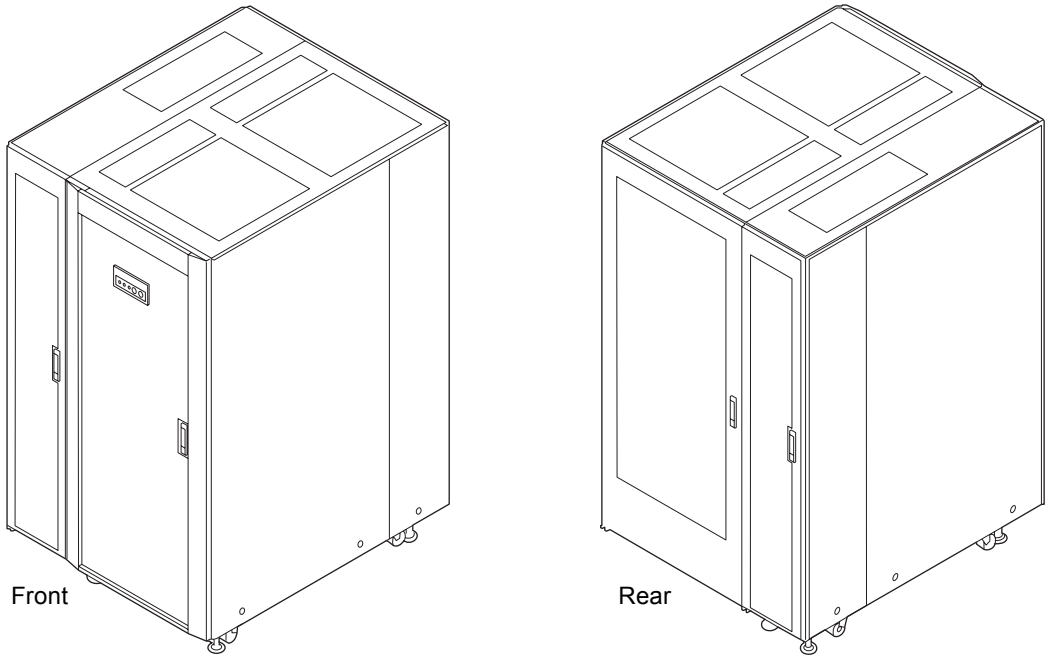


FIGURE 1-3 M9000 Server (Base Cabinet)

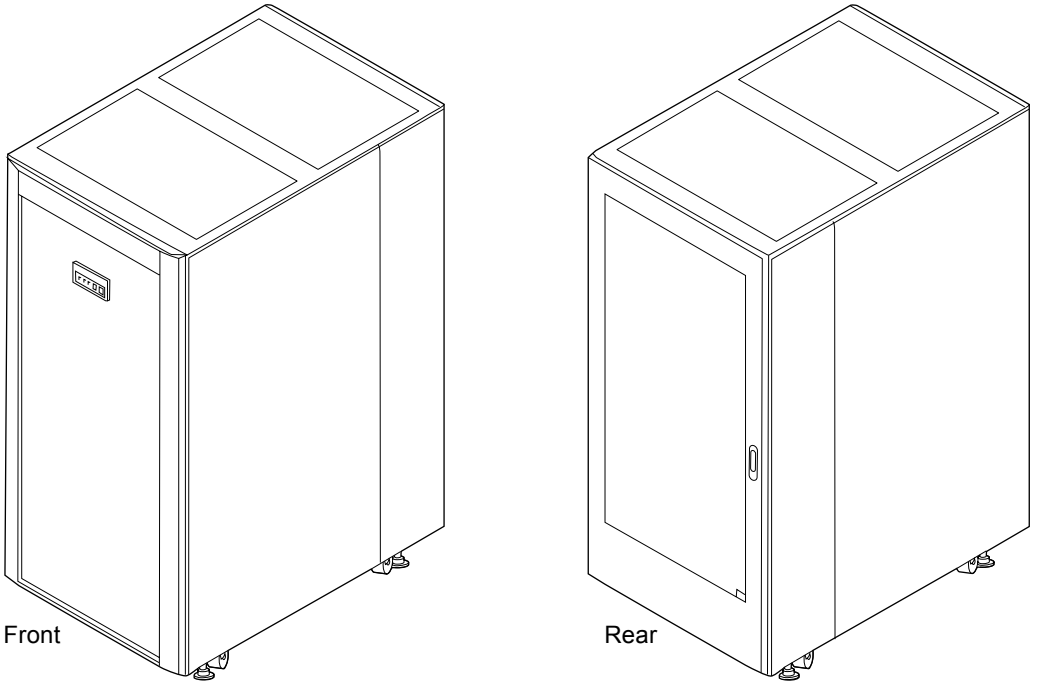


FIGURE 1-4 M9000 Server (Base Cabinet + Expansion Cabinet)

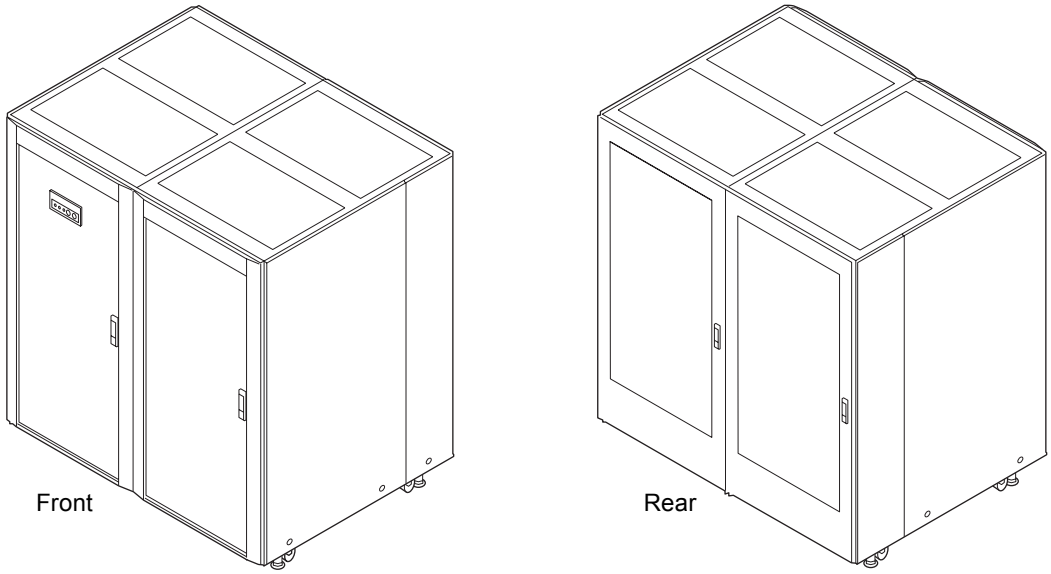


FIGURE 1-5 M9000 Server (Base Cabinet + Power Cabinet)

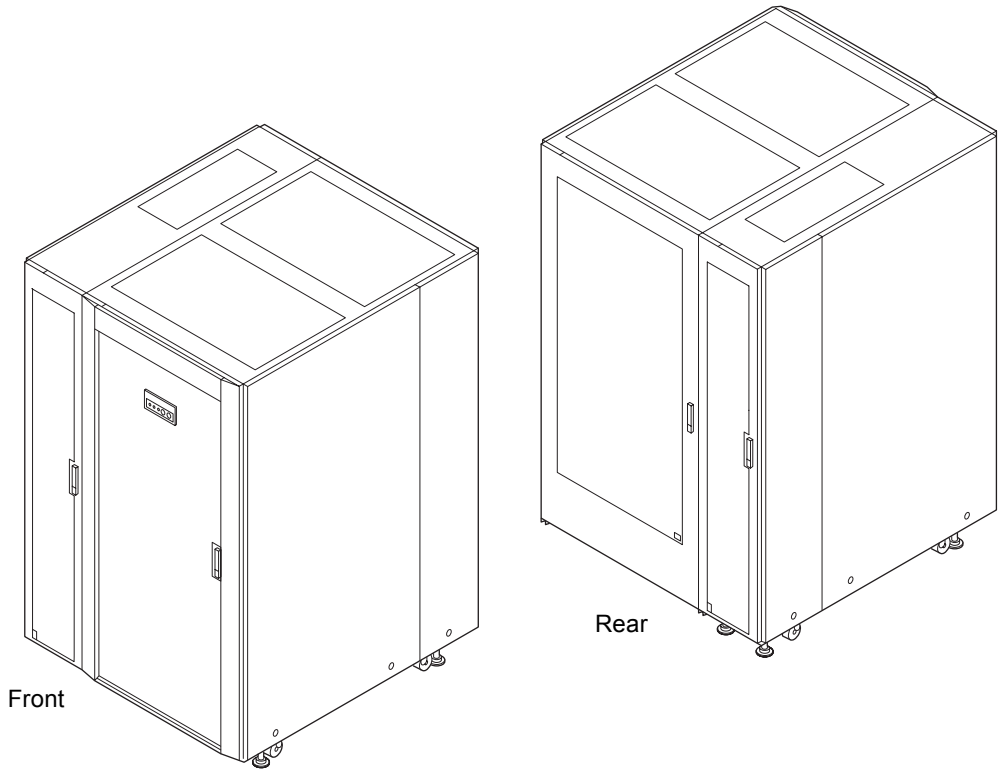
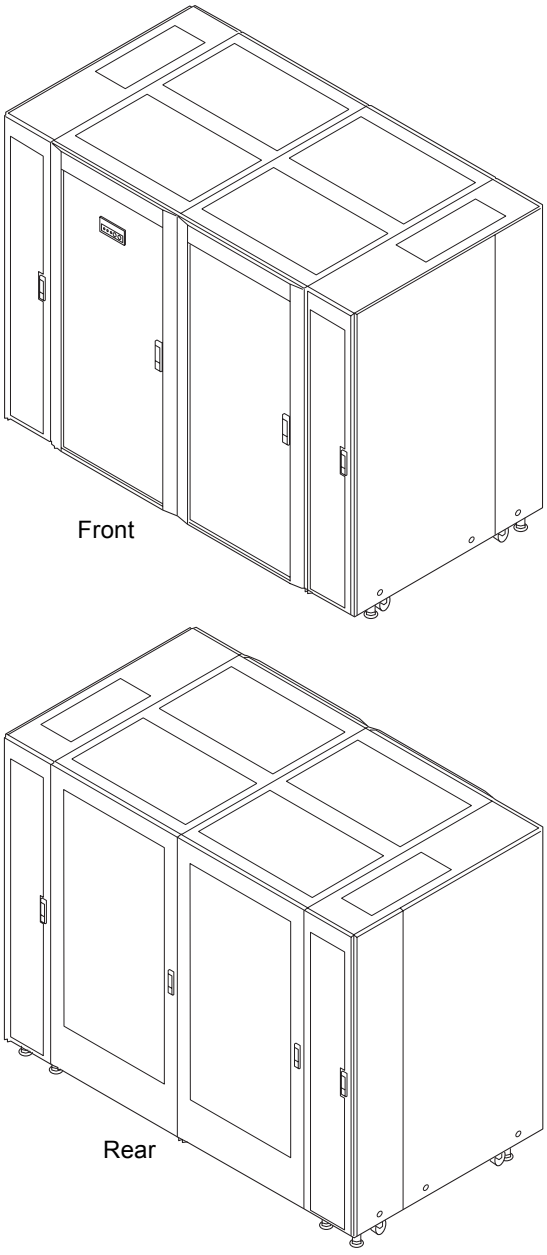


FIGURE 1-6 M9000 Server (Base Cabinet + Expansion Cabinet + Power Cabinet)



1.2.4 Server Installation (Space)

The M8000/M9000 server is intended to be used in a computer room.

1.2.4.1 Size and Space Specifications

Before beginning an M8000/M9000 server installation, secure a service area (maintenance area) that is large enough for each cabinet plus required service access space for each component. FIGURE 1-7 to FIGURE 1-16 show the space required for installation of each server.

M8000 Server Installation Area

FIGURE 1-7 M8000 Server Installation Area

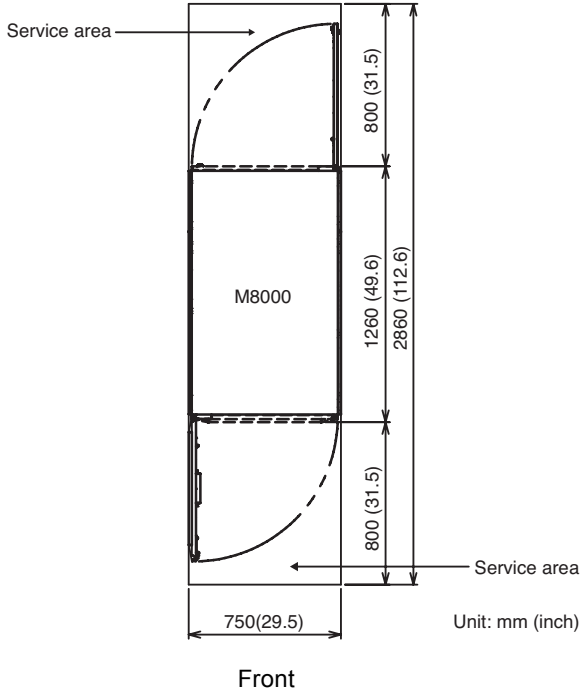
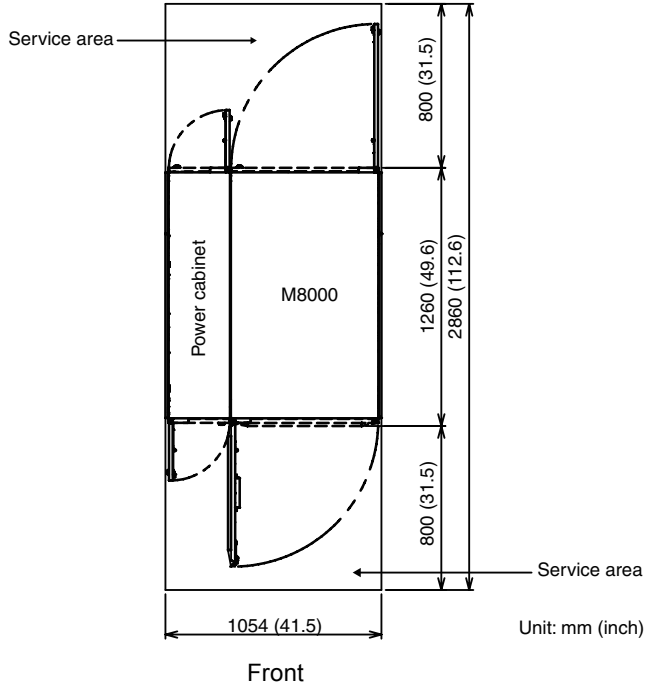


FIGURE 1-8 M8000 Server + Power Cabinet Installation Area



Note – Before mounting units in an M8000 server equipment rack, secure the service areas as shown in FIGURE 1-9 or FIGURE 1-10.

FIGURE 1-9 M8000 Server (With an Equipment Rack) Installation Area

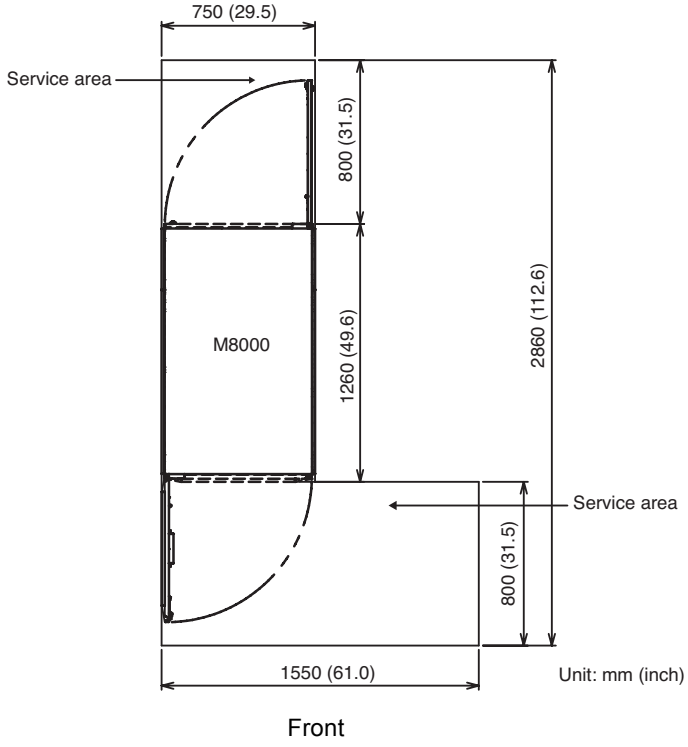
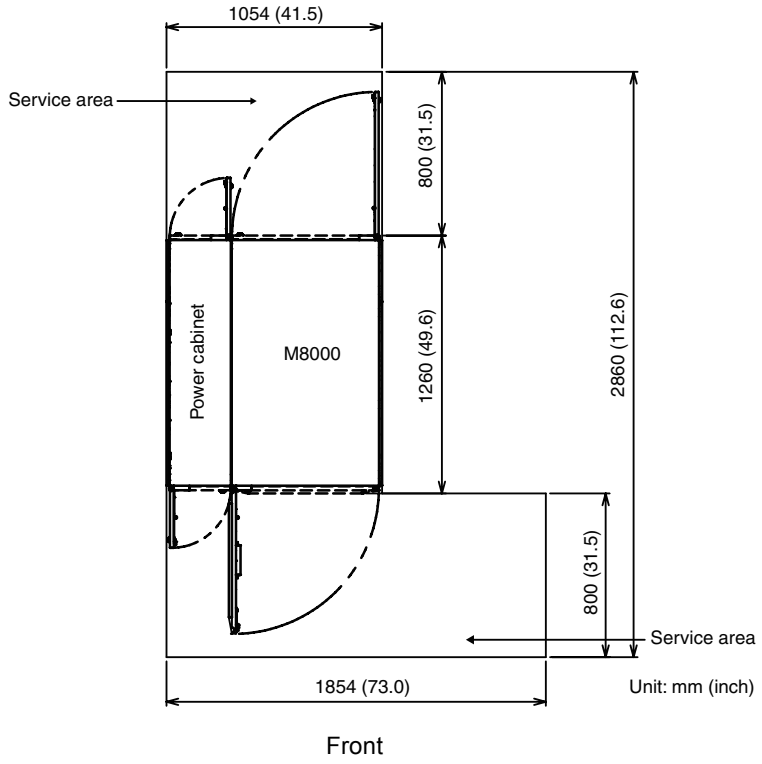


FIGURE 1-10 M8000 Server (With an Equipment Rack) + Power Cabinet Installation Area



Note – Before mounting units in an M8000 server equipment rack at a location where no space can be secured on the right side of the server, secure the service areas as shown in FIGURE 1-11 or FIGURE 1-12.

FIGURE 1-11 M8000 Server (With an Equipment Rack) Installation Area

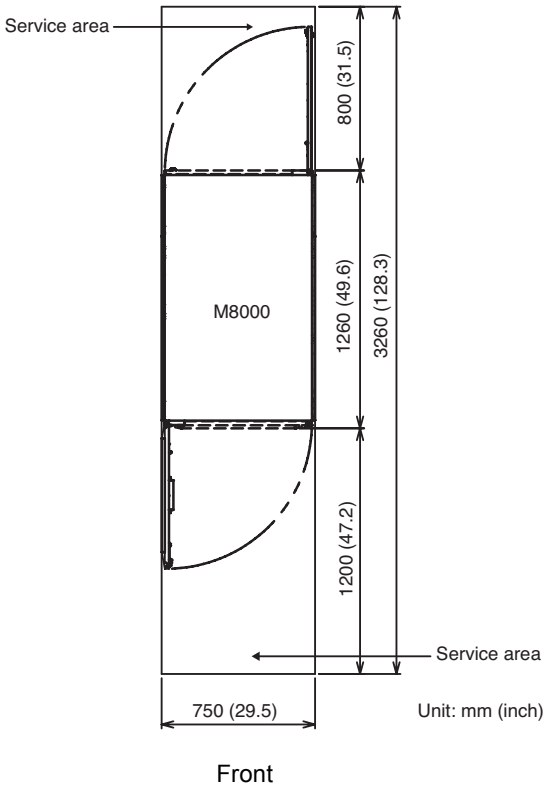


FIGURE 1-12 M8000 Server (With an Equipment Rack) + Power Cabinet Installation Area

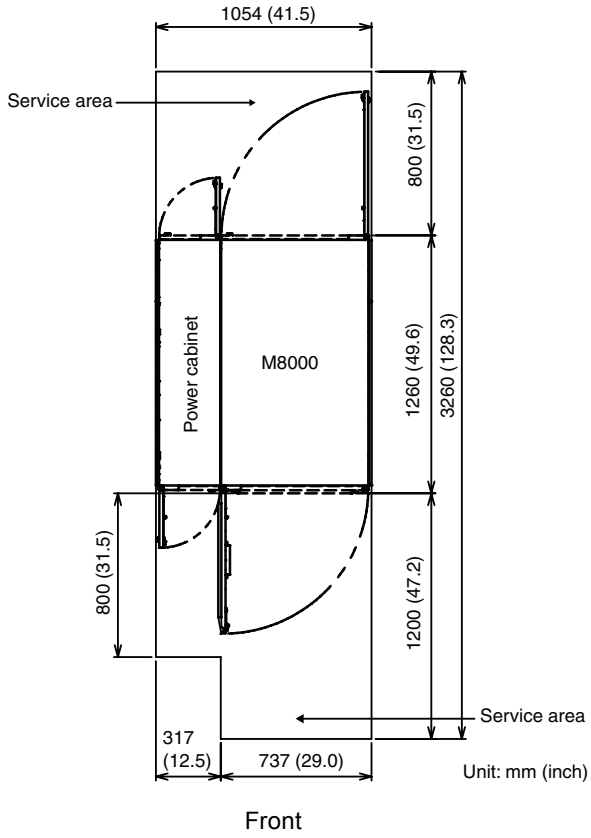


FIGURE 1-13 M9000 Server (Base Cabinet) Installation Area

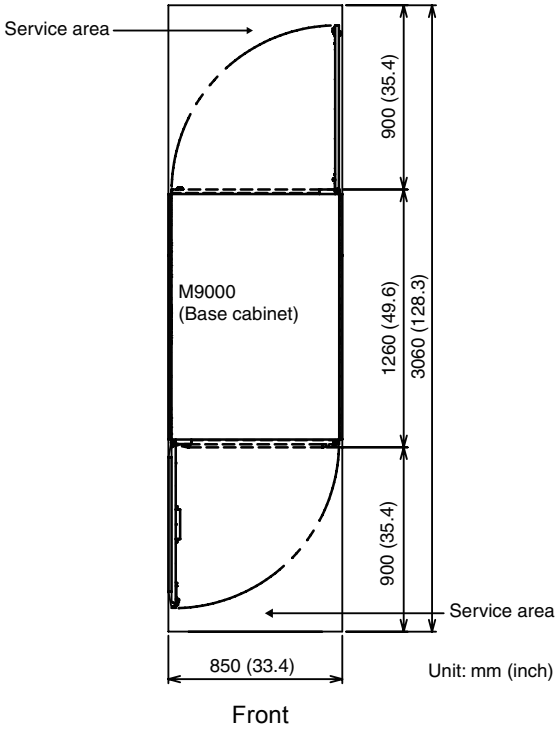


FIGURE 1-14 M9000 Server (Base Cabinet) + Power Cabinet Installation Area

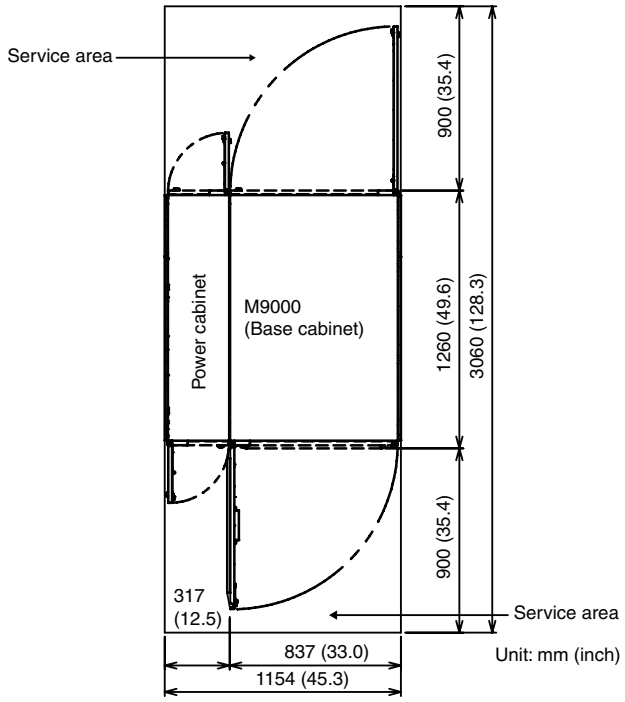


FIGURE 1-15 M9000 Server (Base Cabinet + Expansion Cabinet) Installation Area

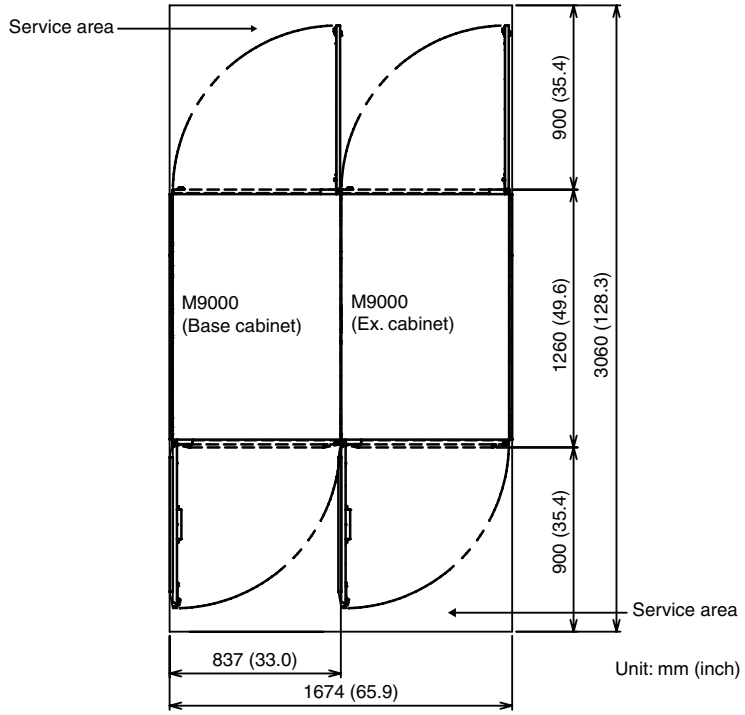
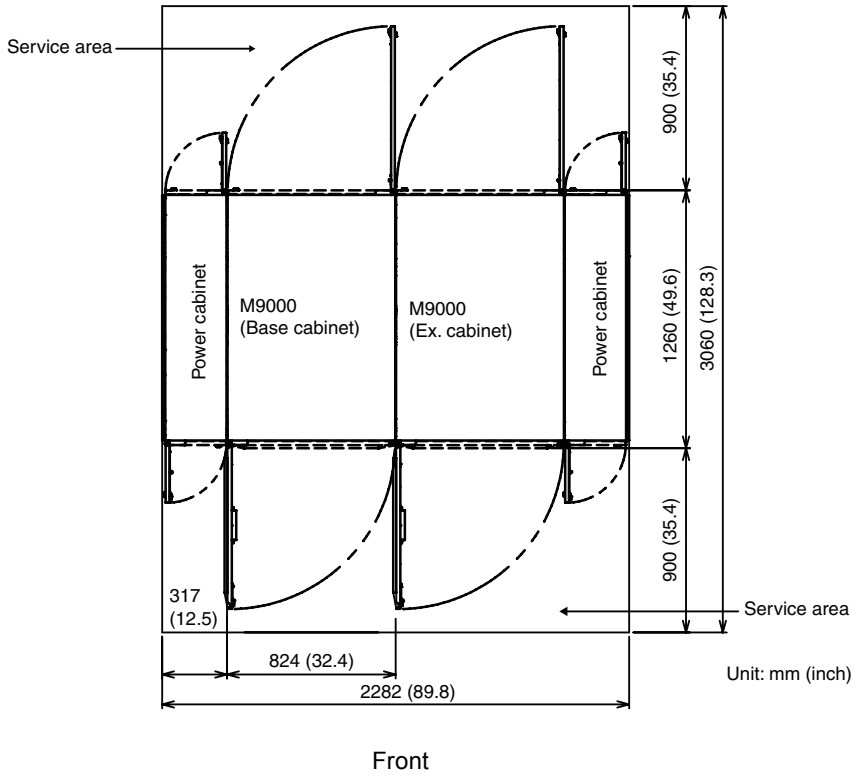


FIGURE 1-16 M9000 Server (Base Cabinet + Expansion Cabinet) + Power Cabinet Installation Area

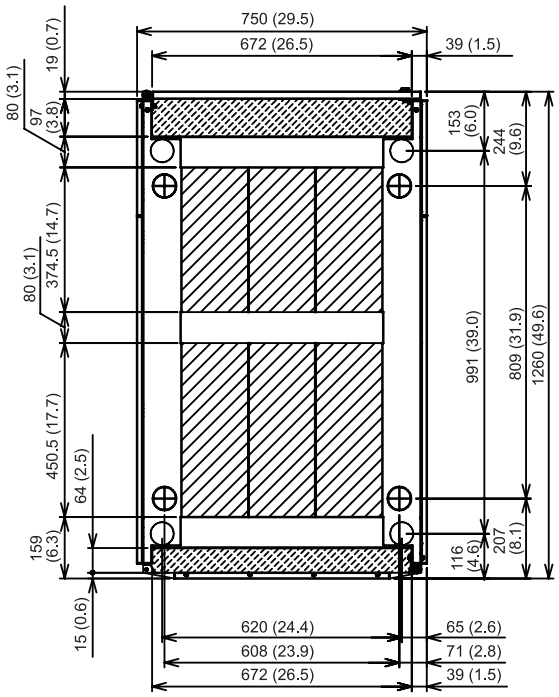


1.2.4.2 Footprints of the Cabinets

FIGURE 1-17 to FIGURE 1-22 show the bottom of the M8000/M9000 server cabinets, such as the openings for laying cables, air inlet ports used for cooling, legs, and casters. The views in these figures are transparent (see-through) views of the bottom surface of the server as seen from directly above the top of the server.

The values indicated are layout values of the cabinet. If its feet are fixed to the floor, size difference (±2 mm/±0.08 inches) must be take into consideration to designate its location. The bottom of the server is at about 90 mm (about 3.4 inches) from the floor surface.

FIGURE 1-17 M8000 Server Footprint



⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

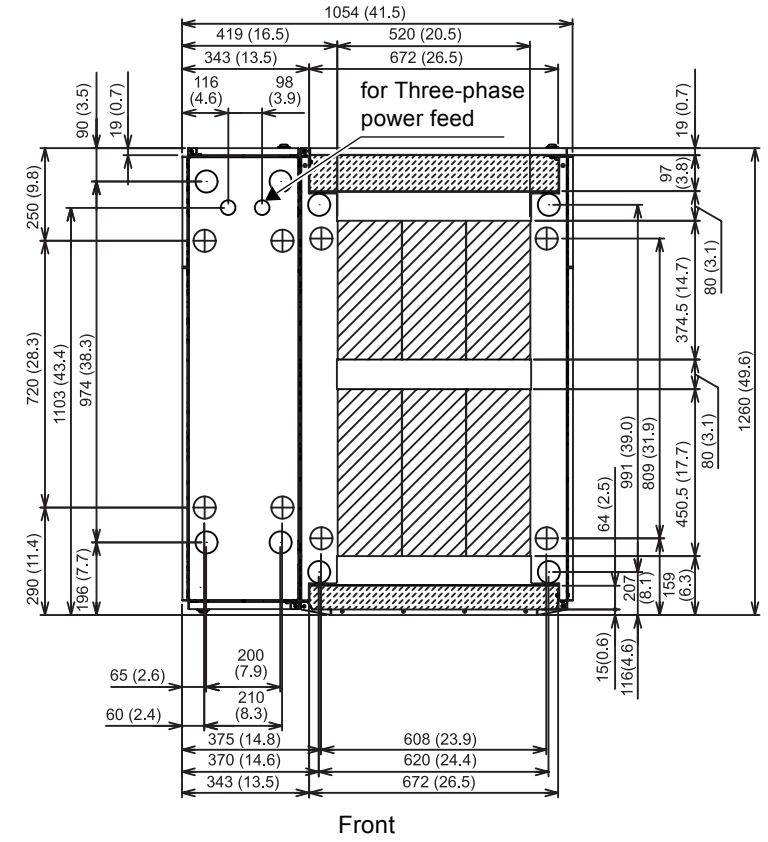
○ Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

Opening for cables inlet and outlet

Opening for air inlet

Unit: mm (inch)

FIGURE 1-18 M8000 Server + Power Cabinet Footprint



Opening for cables inlet and outlet: 36.4 mm (1.4 inches) in diameter

Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

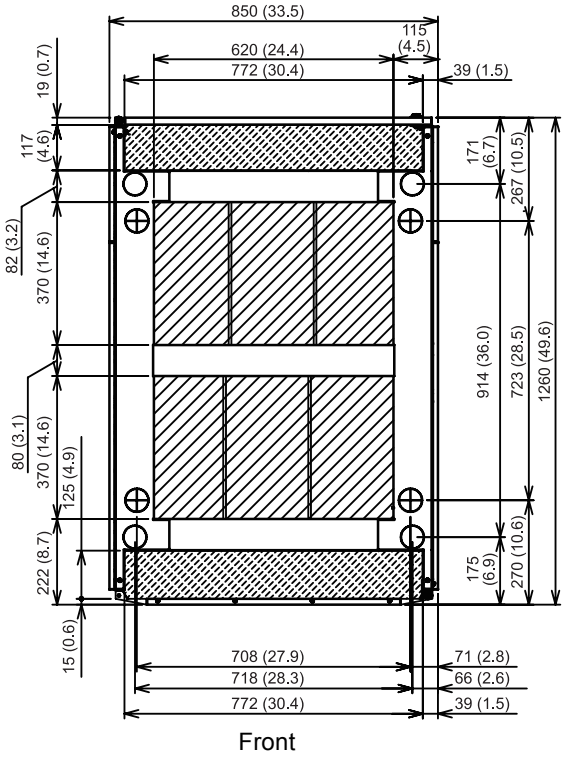
Opening for cables inlet and outlet

Opening for air inlet

Unit: mm (inch)

M9000 Server Footprint

FIGURE 1-19 M9000 Server (Base Cabinet) Footprint



⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

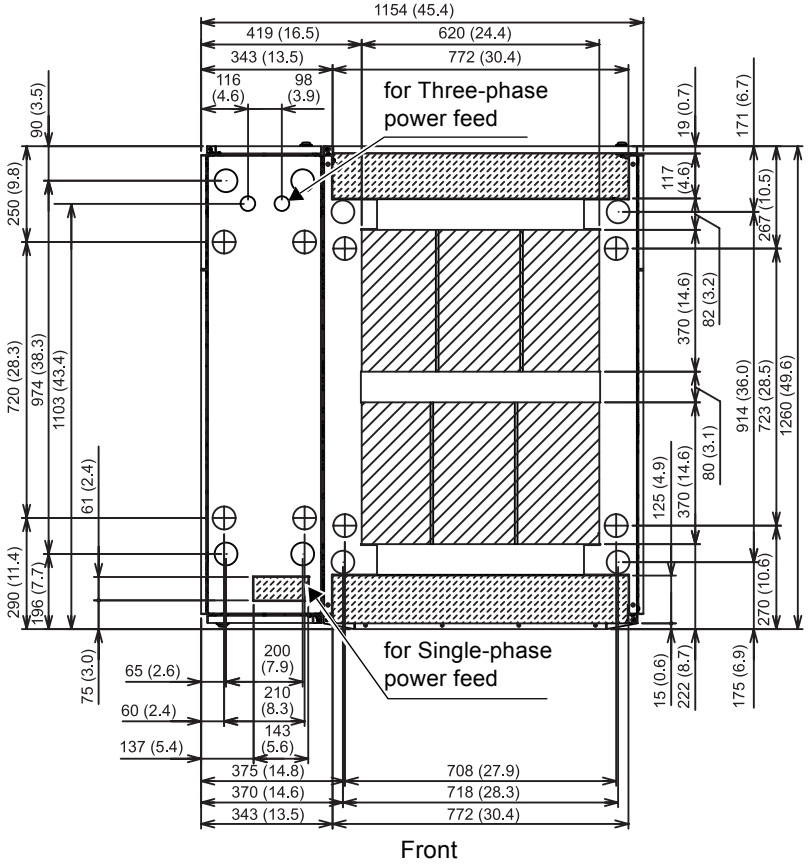
○ Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

▨ Opening for cables inlet and outlet

▨ Opening for air inlet

Unit: mm (inch)

FIGURE 1-20 M9000 Server (Base Cabinet) + Power Cabinet Footprint



Front

○ Opening for cables inlet and outlet: 36.4 mm (1.4 inches) in diameter

⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

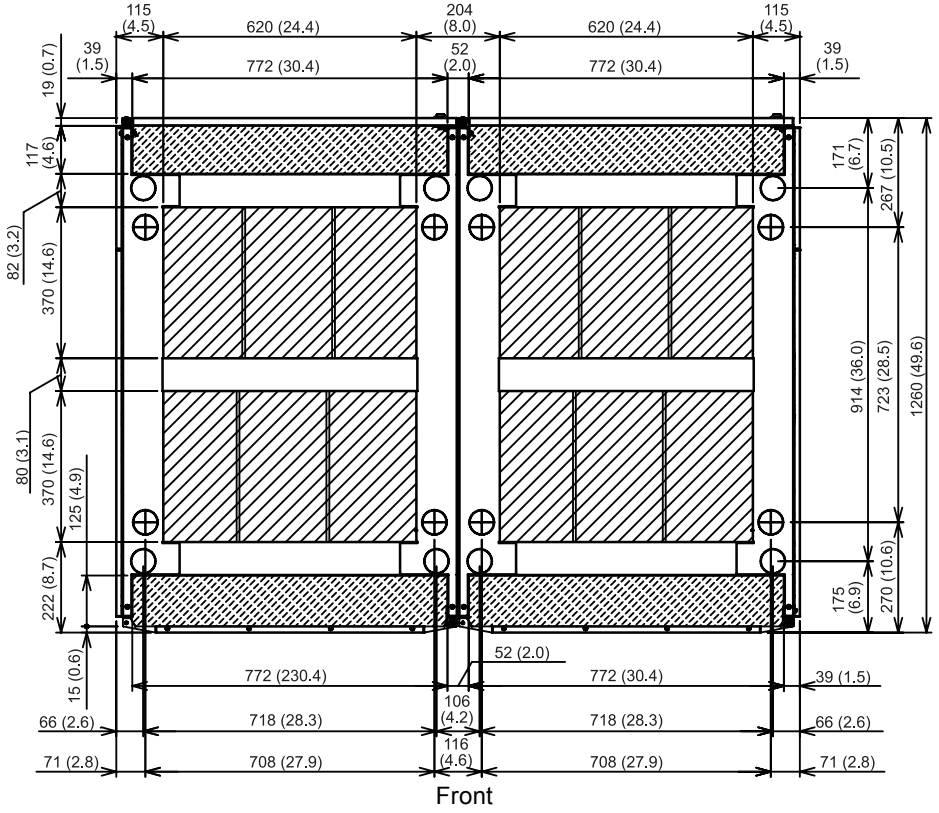
○ Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

▨ Opening for cables inlet and outlet

▨ Opening for air inlet

Unit: mm (inch)

FIGURE 1-21 M9000 Server (Base Cabinet + Expansion Cabinet) Footprint



⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

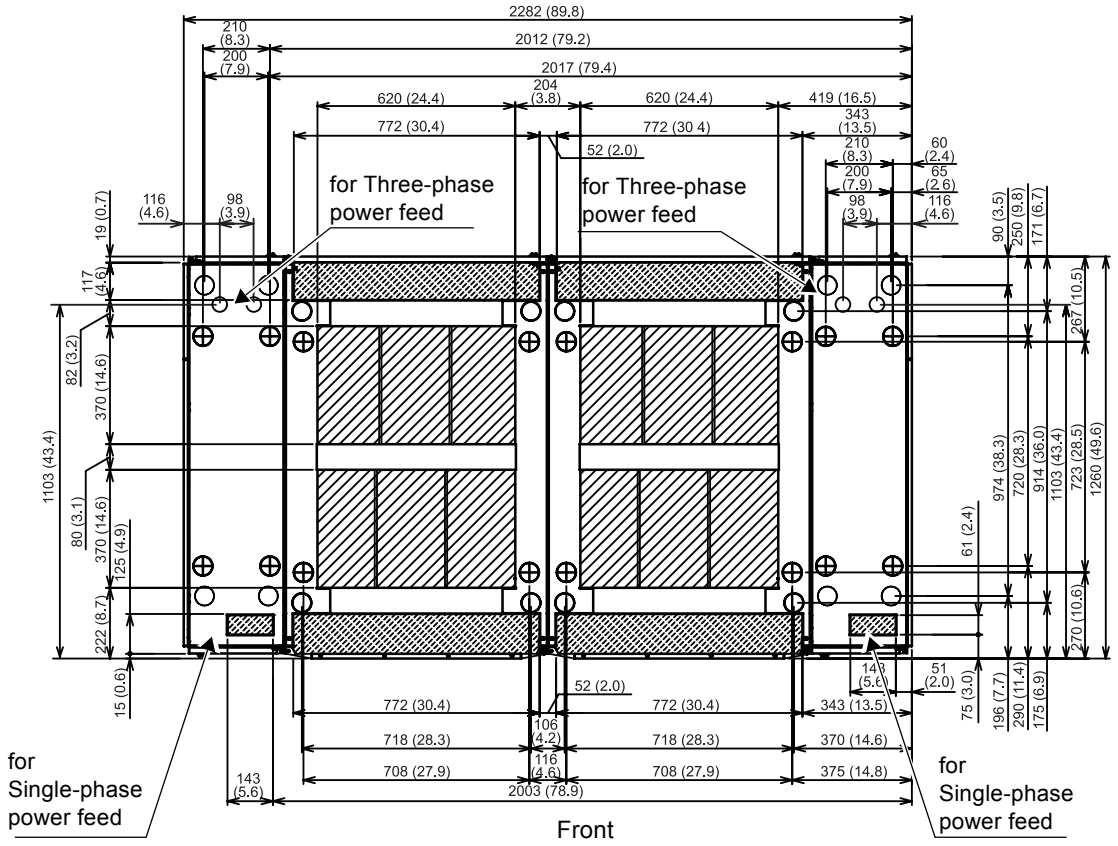
○ Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

Opening for cables inlet and outlet

Opening for air inlet

Unit: mm (inch)

FIGURE 1-22 M9000 Server (Base Cabinet + Expansion Cabinet) + Power Cabinet Footprint



Opening for cables inlet and outlet: 36.4 mm (1.4 inches) in diameter

Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

Feet : 66 mm (2.6 inches) in diameter Attached to the server by using M20

Opening for cables inlet and outlet

Opening for air inlet

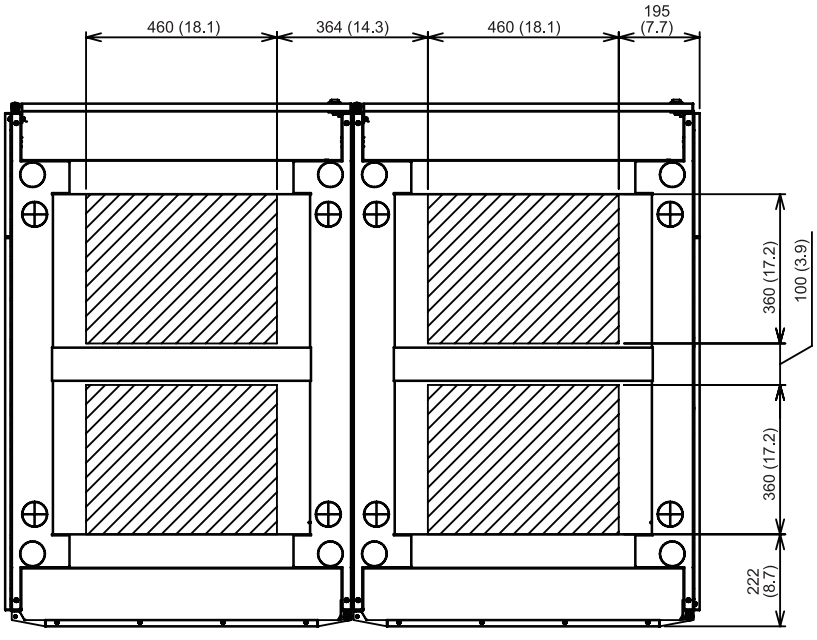
Unit: mm (inch)

1.2.4.3 Free-Access Floor Openings for Underfloor Air Conditioning

Use underfloor air conditioning to cool the M9000 server (with an expansion cabinet).

To use underfloor air conditioning, air-conditioning openings must be provided on the free-access floor under the cabinet. FIGURE 1-23 and FIGURE 1-24 show examples of floor openings. There must be four openings of sizes corresponding to the recommended value for underfloor air-conditioning. However, if these openings cannot be prepared, use the largest possible floor openings that can be prepared in the raised floor under the cabinet or in the area around the cabinet, after taking into consideration such factors as the air-conditioning capacity required for the cabinet, the floor strength, and the locations of the leveling feet.

FIGURE 1-23 M9000 Server (Base Cabinet + Expansion Cabinet) Floor Openings

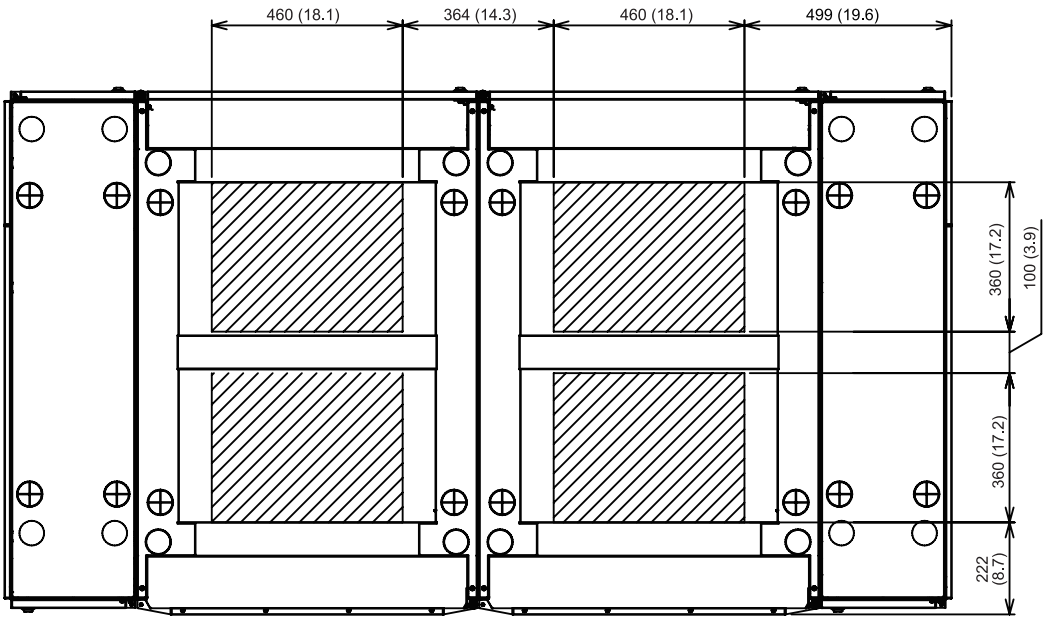


⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

○ Feet : 66 mm (2.6 inches) in diameter

Unit: mm (inch)

FIGURE 1-24 M9000 Server (Base Cabinet + Expansion Cabinet) + Power Cabinet Footprint



Front

⊕ Caster : 113 mm (4.5 inches) in maximum outer diameter
(Maximum diameter when rotating the caster by 360 degrees)

○ Feet : 66 mm (2.6 inches) in diameter

Unit: mm (inch)

1.2.4.4 Ceiling Height

The minimum ceiling height for the M8000/M9000 server is 2.3m (7.5 ft), measured from the true floor or a raised floor, whichever is higher. The space above the server and its surroundings must not restrict the movement of cooling air between the air conditioner and the server.

The space above the server and its surroundings must not restrict the following:

- The movement of cooling air between the air conditioner and the bottom of the server
- The movement of the hot air coming out of the top of the server

1.2.5 Access Route

This section describes necessary considerations before you move the server to its installation destination.

The access route must satisfy the requirements listed in TABLE 1-4.

Each cabinet is packed with simple packaging or in a wood-framed case for shipping of the server. If it is difficult to carry the packed cabinet to the installation destination, remove the packing materials, front and rear doors, side panels, and/or other parts as necessary.

If the cabinet weight exceeds the minimum withstand load for the transport equipment used, you can move the cabinet with its PSU and FAN unit (about 4 kg each) removed.

Also, confirm that the access route is free of any steps and other obstacles that would expose the cabinet to shock.

TABLE 1-4 Space Required for Transport

Name	Status During Transport	Minimum Door Height [mm (inch)]	Minimum Door Width [mm (inch)]	Minimum Passage Width [mm (inch)]	Minimum Elevator Car Depth [mm (inch)]	Minimum Withstand Load of Transport Equipment [kg] ‡	Maximum Inclination of Access Route [°]
M8000 server	Simple packaging*	1900 (74.8)	1000 (39.4)	1200 (47.2)	1500 (59.0)	820	10
	Without front and rear doors or side panels	1900 (74.8)	800 (31.5)	1000 (39.4)	1350 (53.1)	690	10
	Tri-Wall†	2100 (82.7)	1800 (70.9)	1800 (70.9)	1100 (43.3)	830	10
	Wooden† packing	2100 (82.7)	1900 (74.8)	1900 (74.8)	1100 (43.3)	980	10
M9000 server (Base cabinet) (Expansion cabinet)	Simple packaging*	1900 (74.8)	1100 (43.3)	1300 (51.2)	1500 (59.0)	950	10
	Without front and rear doors or side panels	1900 (74.8)	900 (35.4)	1100 (43.3)	1350 (53.1)	820	10
	Tri-Wall†	2100 (82.7)	1800 (70.9)	1800 (70.9)	1200 (47.2)	1050	10
	Wooden† packing	2100 (82.7)	1800 (70.9)	1800 (70.9)	1200 (47.2)	1100	10

TABLE 1-4 Space Required for Transport *(Continued)*

Name	Status During Transport	Minimum Door Height [mm (inch)]	Minimum Door Width [mm (inch)]	Minimum Passage Width [mm (inch)]	Minimum Elevator Car Depth [mm (inch)]	Minimum Withstand Load of Transport Equipment [kg] ‡	Maximum Inclination of Access Route [°]
Power cabinet	Simple packaging*	1900 (74.8)	700 (27.6)	900 (35.4)	1500 (59.0)	350	10
	Without front and rear doors or side panels	1900 (74.8)	700 (27.6)	900 (35.4)	1350 (53.1)	320	10
	Tri-Wall†	2100 (82.7)	1600 (63.0)	1600 (63.0)	1200 (47.2)	450	10
	Wooden† packing	2100 (82.7)	1700 (67.0)	1700 (67.0)	1200 (47.2)	500	10

* Simple packaging means a cabinet is covered only with a packing material such as a vinyl sheet instead of being packed in a wood-framed case or a cardboard box.

† When in Tri-Wall and wooden packing, use the pallet jack to move the cabinet.

‡ The transport equipment includes the elevator and pallet jack used to transport the cabinet.

CHAPTER 2

Network Connection Specifications

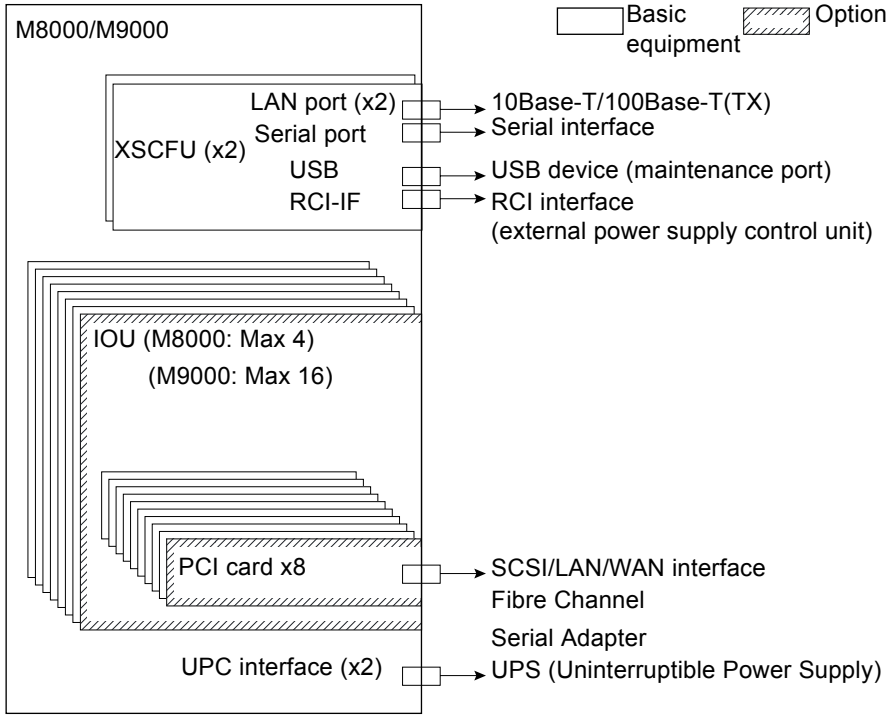
This chapter describes the network connection specifications of the M8000/M9000 servers.

2.1 Planning Your Network Connection

This section provides an overview for starting the M8000/M9000 server network required for system startup and network connections.

For details on the connections, see the *SPARC Enterprise M8000/M9000 Servers Installation Guide*.

FIGURE 2-1 M8000/M9000 Server Connection Schematic Diagram of Interface Cables



2.1.1 Setup and Network Connections

The serial port of the eXtended System Control Facility unit (XSCFU) is used for the following purposes:

- Connecting a local area network (LAN) port to the system administration network
- Monitoring the boot process
- Changing the initial values of the system controller

The administration network connects the XSCFU to the system administrator's management console. A direct connection can be used for this purpose. However, the connection is usually one through a hub or switch specific to the system control network. To initialize a LAN port, direct administration of the serial port must be performed.

2.1.2 Platform and Domain Setup Information

The following information is required for installation of the M8000/M9000 servers:

- Host name
- IP address
- Domain
- Netmask
- IP address of the network gateway
- IP address of the network name server

In addition, the following network connections must be available:

- One serial console connection (9600 baud, N81)
- One 10/100BASE-T Ethernet connection for XSCF (connected to Port 0)
- One 10/100BASE-T Ethernet connection for each domain

Note – The XSCF Ethernet port is IEEE 802.3i and IEEE 802.3u compliant. This requires auto-negotiation for the port into which it terminates.

2.1.3 Selecting a System Control Network Configuration

Consider the following when determining the system control network configuration:

- An IP address appropriate to the existing environment can be assigned to each LAN port, and the Class B private address, which is the default address, can be changed.
- Either dual power feed or single power feed must be selected for the power feed option of your server.
- The customer may segregate the LAN port or network for access by field engineers. Or the field engineer access may be through the serial port in the event that maintenance is required.

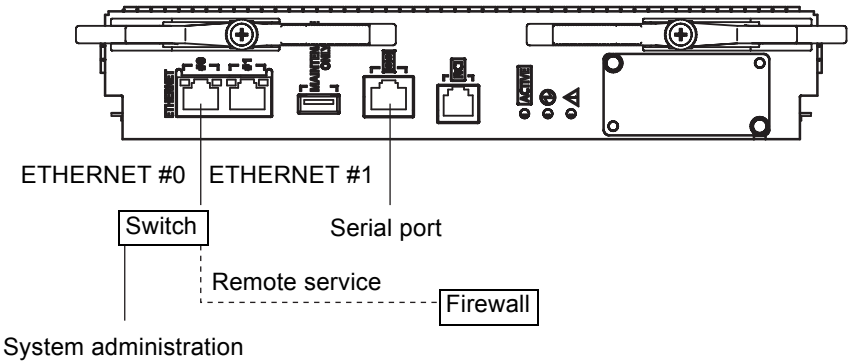
Generally, there are three server control network configurations as follows, according to installation conditions:

- XSCF Configuration A (Basic Configuration)
- XSCF Configuration B (Restricted Redundancy)
- XSCF Configuration C (Maximum Redundancy)

XSCF Configuration A (Basic Configuration)

Only one of the two LAN ports is used. The serial port and the other LAN port are reserved so that they can be used as maintenance ports. The same switch is used for system administration and the remote service. Consequently, any failure of the switch causes a failure of the server control network.

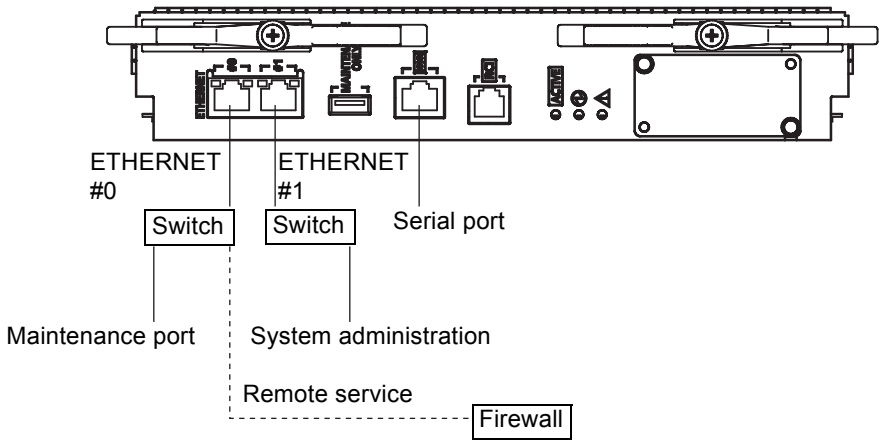
FIGURE 2-2 XSCF Configuration A (Basic Configuration)



XSCF Configuration B (Restricted Redundancy)

Both LAN ports are used. One port is used for system administration, and the other is used for the remote message function. If one switch fails, errors can be reported. The serial port and port for the remote service switch can be used as maintenance ports.

FIGURE 2-3 XSCF Configuration B (Restricted Configuration)

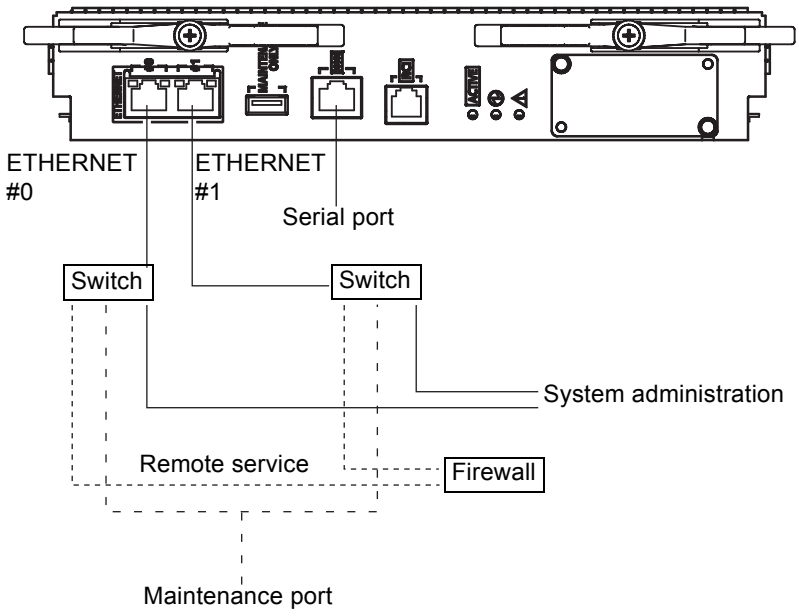


XSCF Configuration C (Maximum Redundancy)

Both LAN ports are used. Each switch has maintenance ports, which are used for the remote service or system administration. The switches are connected for failure management and system administration.

If a switch fails, no interrupt occurs in the system control network.

FIGURE 2-4 XSCF Configuration C (Maximum Configuration)



2.2 UPS Controller

This appendix explains the UPS controller (UPC), which controls an uninterruptible power supply unit (UPS).

2.2.1 Overview

A UPS unit is used to provide a stable supply of power to the system in the event of a power failure or an extensive power interruption.

When a failure is detected in the supply of power, an error can be reported to the server through the signal cable connection between a UPC port on the server and a UPS that has the UPC interface, so that the server can execute emergency shutdown processing to safely shut down the system.

2.2.2 Signal Cables

Prepare shielded and paired cables that have the following specifications:

- DC resistance (roundtrip/1 pair): 400 Ω/km or less
- Cable length: Up to 10 m (33 ft.)

2.2.3 Signal Line Configuration

This section describes signal line definitions and configuration when connected to a UPS.

FIGURE 2-5 shows the signal line configuration when connected to a UPS.

TABLE 2-1 defines these signal lines.

FIGURE 2-5 Connection with UPS and the Server

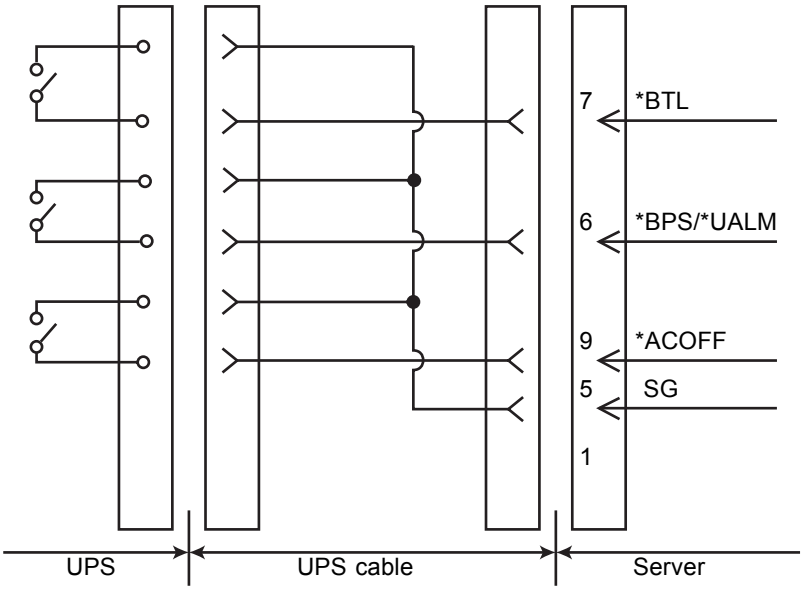


TABLE 2-1 Signal Line Definitions

Signal Name	Definitions	Pin Number	Remarks
*BPS/*UALM	Signal indicates faulty UPS conditions.	6	Normal: OFF Failure: ON
*BTL	Signal provides a warning of a low battery level and a pending UPS failure.	7	Normal: OFF Warning: ON (Note 1)

TABLE 2-1 Signal Line Definitions *(Continued)*

Signal Name	Definitions	Pin Number	Remarks
*ACOFF	Signal indicates power failure at the commercial AC supply connector to the UPS.	9	Normal: OFF Power failure: ON (Note 2)
SG	Signal ground	5	
ER	Signal indicates the main unit is running (Equipment Ready).	1	Do not connect to ER signal pin.

ON: Indicates contacts are closed.

OFF: Indicates contacts are open.

Note 1: Use a UPS that can normally supply power from the battery for at least 10 to 60 seconds after *BTL is turned on.

Note 2: Use a UPS that can normally supply power f from the battery even if *ACOFF does not turn on in the event of an instantaneous power failure lasting two seconds or less.

2.2.4 Cable Connector

The UPS cable specifications are as follows:

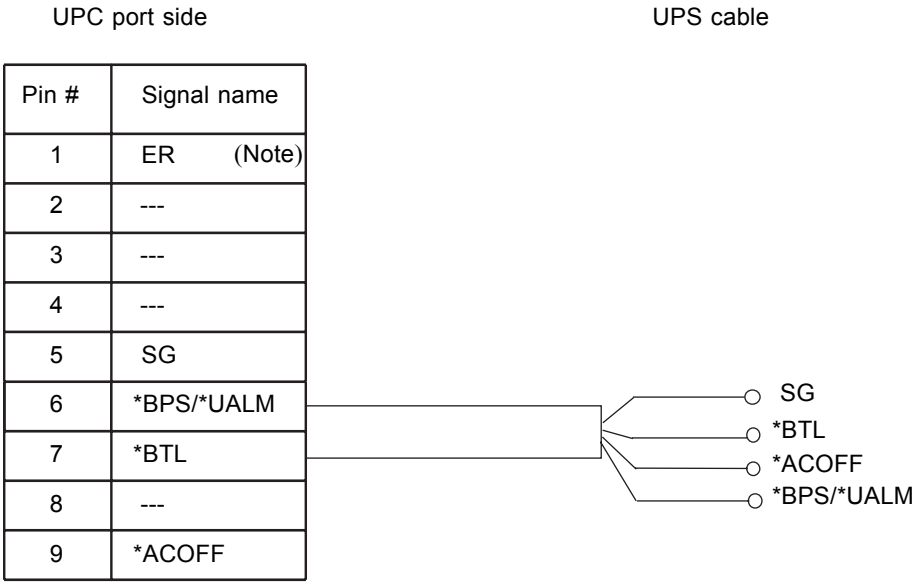
- Connector type

  D-SUB9 pin Male (install side: Female)
  DEU-9PF-F0

- Terminal array

  FIGURE 2-6 identifies pin signals of the UPC port and the UPS cable.
  Do not use the unused pins (pin number 2, 3, 4 and 8 in the FIGURE 2-6). The pins on the cable side are as follows.

FIGURE 2-6 Corresponding Terminals in UPC Connector and the UPS Cable



Note: Do not connect to the ER signal pin.

Note – If you need UPC cables, make arrangements separately. For details, contact your sales representatives.

CHAPTER 3

Environmental and Electrical Specifications

This chapter explains environmental and electrical power supply specifications and conditions necessary for stable system operation:

3.1 Environmental Requirements

This section describes ambient environmental and vibration requirements for M8000/M9000 servers.

3.1.1 Ambient Environmental Requirements

The M8000/M9000 servers must satisfy the ambient environmental requirements listed in TABLE 3-1.

TABLE 3-1 Environmental Requirements

	Operating Range	Non-Operating Range	Optimum
Ambient temperature	5°C to 32°C (41°F to 89.6°F)	Unpacked: 0°C to 50°C (32°F to 122°F) Packed: -20°C to 60°C (-4°F to 140°F)	21°C to 23°C (70°F to 74°F)
Relative humidity*	20% RH to 80% RH	to 93% RH	45% RH to 50% RH
Altitude restriction†	3,000 m (10,000 ft)	12,000 m (40, 000 ft)	
Temperature conditions	5°C to 32°C (41°F to 89.6°F) : 0 to less than 1500 m (0 to less than 4921 ft) 5°C to 30°C (41°F to 86°F) : 1500 m to less than 2000 m (4921 ft to less than 6562 ft) 5°C to 28°C (41°F to 82.4°F) : 2000 m to less than 2500 m (6562 ft to less than 8202 ft) 5°C to 26°C (41°F to 78.8°F) : 2500 m to 3000 m (8202 ft to 9843 ft)		

* There is no condensation regardless of the temperature and humidity.

† All altitudes are above sea level.

3.1.2 Recommended Ambient Temperature and Humidity

Keep the temperature in the computer room at a comfortable level for people or slightly lower. This temperature level can prevent inadequate cooling of sections of the computer room which can be due to heat generated by a device or by trapped hot air. Keeping the computer room at a comfortable level can reduce related adverse effects on each device in the entire system configuration.

Special consideration must be paid to humidity if underfloor ventilation is used. Normally, air contains water vapor. Relative humidity, which is indicated as a percentage (%) of the total amount of water vapor that can exist in the air without condensing, is inversely proportional to air temperature; it goes down when the temperature rises, and goes up when the temperature drops. For example, air with a relative humidity of 45% at a temperature of 24°C (75°F) has a relative humidity of 65% at a temperature of 18°C (64°F); and if the temperature drops farther, the relative humidity rises to more than 65%, eventually to condense out as water droplets.

Air conditioning facilities usually do not provide functions to precisely monitor and control the temperature and humidity throughout an entire computer room. Generally, computer room air conditioning controls the temperature and humidity according to the monitoring data at individual points corresponding to multiple exhaust vents in the main unit and other units in the room. However, since air conditioning facilities for underfloor ventilation perform such control according to the monitoring data at each point close to an exhaust vent, the distribution of the temperature and humidity across the entire computer room is uneven.

TABLE 3-2 lists the recommended temperature and humidity values for computer rooms.

TABLE 3-2 Recommended Temperature and Humidity Values for Computer Rooms

Air Conditioning Method	Point Close to Underfloor Exhaust Vent			Monitoring and Control Point in Room			Remarks
	Temperature		Humidity	Temperature		Humidity	
	[°C]	[°F]	[%]	[°C]	[°F]	[%]	
Direct blowing or duct blowing	-	-	-	24 ±2	75 ±4	45 ±5	-
Underfloor ventilation	18 ±1	64 ±2	65 ±5	Target temperature of 24°C	Target temperature of 75°F	About 45% at 24°C	The room temperature and humidity fluctuate, without control, according to the thermal load in the room.
Direct blowing or using duct blowing and underfloor ventilation together	18 ±1	64 ±2	65 ±5	24 ±2	75 ±4	45 ±5	-

3.1.3 Contamination Specifications

The allowable contaminations in the M8000/M9000 servers are listed in TABLE 3-3.

TABLE 3-3 Specifications (Allowable Contamination)

Contamination	Tolerable Limit
Hydrogen sulfide (H_2S)	Up to 7.1 ppb
Sulfur dioxide (sulfur oxide) (SO_2)	Up to 37 ppb
Hydrogen chloride (HCI)	Up to 6.6 ppb
Chlorine (CI_2)	Up to 3.4 ppb
Hydrogen fluoride (HF)	Up to 3.6 ppb
Nitrogen dioxide (nitrogen oxide) (NO_2)	Up to 52 ppb
Ammonia (NH_3)	Up to 420 ppb
Ozone (O_3)	Up to 5 ppb
Oil vapor	Up to 0.2 mg/m^3
Dust	Up to 0.15 mg/m^3
Seawater (salt damage)	The installation site shall not be within 0.5 km of the ocean or coastal areas (unless the computer room uses air conditioners to filter out airborne sea salt particles from outside air).

3.1.4 Vibration Requirements

The allowable vibrations in the M8000/M9000 servers are listed in TABLE 3-4.

TABLE 3-4 Specifications (Allowable Vibration)

	Allowable Vibration [gal]	
Name	Operating	Non-Operating
M8000 server M9000 server	250*	400*, †

* Allowable vibration (Oracle and Fujitsu standards) for artificially generated seismic waves.

† The value for non-operation is applicable when vibration-proofing measures are taken for the leveling feet.

3.2 Cooling Specifications

This section describes cooling specifications for M8000/M9000 servers.

3.2.1 Cooling (Air-Conditioning) Requirements

TABLE 3-5 lists the cooling and air-conditioning requirements for each server component.

TABLE 3-5 Specifications (Cooling and Air-Conditioning Requirements)

Name	Heat Dissipation [kJ/h]	Exhaust Airflow [cmm(m^3/m)]	Cooling Method	Air-Conditioning Type	Noise Level [dBA]
M8000 server	13968-37800*	94	Overfloor/underfloor	Forced air cooling	67
M9000 server (base cabinet)	22320-72792*	102	Overfloor/underfloor	Forced air cooling	68
M9000 server (base cabinet + expansion cabinet)	42912-145584*	205	Underfloor‡	Forced air cooling	69
Rack-mountable dual power feed	-†	-†	Overfloor/underfloor	Forced air cooling	-†
Power cabinet (for M8000 server)	-†	-†	Overfloor/underfloor	Forced air cooling	-†
Power cabinet (for M9000 server base cabinet)	-†	-†	Overfloor/underfloor	Forced air cooling	-†
Power cabinet (for M9000 server base cabinet + expansion cabinet)	-†	-†	Underfloor‡	Forced air cooling	-†

* Heat dissipation varies by power consumption. Determine the power consumption based on the actual system configuration and then confirm the right value.

† The heat dissipation, exhaust airflow and acoustic noise value of the power cabinet is included in the value for the M8000 server or M9000 server.

‡ At an installation altitude ranging from 0 to less than 400 m (1312 ft) above sea level, you can select overfloor cooling as the cooling method of the server.

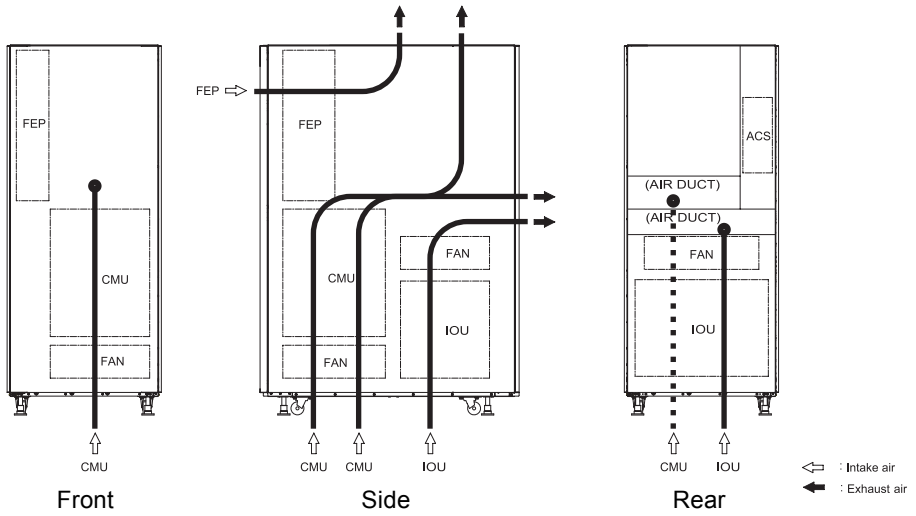
3.2.2 Airflow and Heat Dissipation

Since the M8000/M9000 server is designed to be cooled by forced air convection, sufficient airflow throughout the entire system must be generated. To satisfy the requirements listed below, the installation space requirements listed in Section 1.2.4, “Server Installation (Space)” on page 1-12 must be observed.

Any other equipment installed around the system must not block any of the service areas, or intake and exhaust air vents.

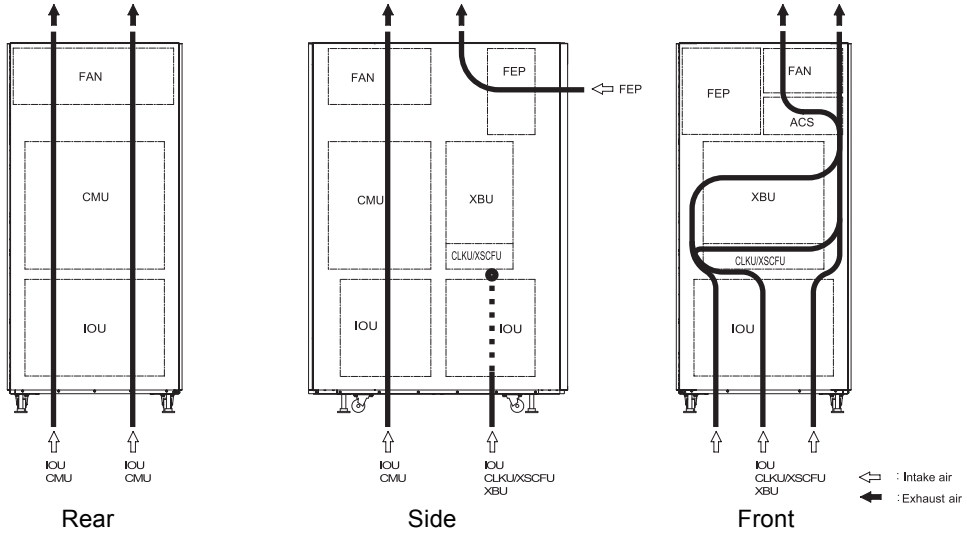
- The M8000 server uses internal fans to generate a total airflow of 94 cubic meters per minute (3320 cubic feet per minute [cfm]) under normal operating conditions.
- The M9000 server uses internal fans in the base cabinet and expansion cabinet, and it generates a total airflow of 102 cubic meters per minute (3600 cubic feet per minute [cfm]) under normal operating conditions.
- The M8000 server and rack-mountable dual power feed system draws air from the bottom of the cabinet and exhausts it at the top and rear.

FIGURE 3-1 Cooling Air and Exhaust Flows of M8000 Server and Rack-mountable Dual Power Feed



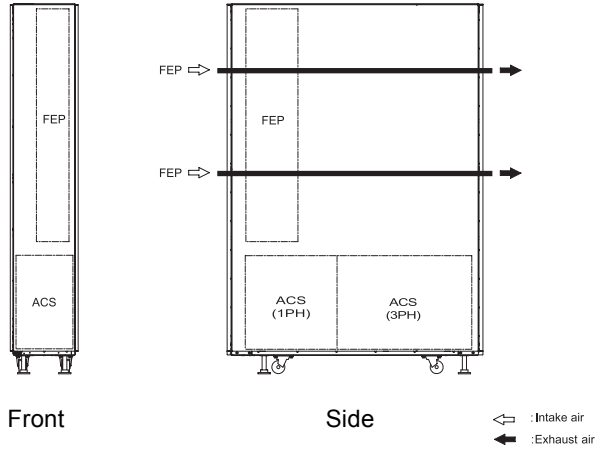
■ The M9000 server draws air from the bottom of the cabinet and exhausts it at the top.

FIGURE 3-2 Cooling Air and Exhaust Flows of M9000 Server



■ The power cabinet draws air from the front of the cabinet and exhausts it at the rear.

FIGURE 3-3 Cooling Air and Exhaust Flows of Power Cabinet



3.2.3 Airflow Indicator

The airflow indicator indicates the amount of air exhausted from the server while the M8000/M9000 servers are up and running. The values do not include the peripheral devices.

To display the amount of exhaust air, use the `showenvironment air` command.

```
XSCF> showenvironment air
Air Flow:5810CMH
```

Note – The `showenvironment air` command displays the calculated airflow based on the fan speed such as Low speed or High speed etc. The fan speed is displayed by the `showenvironment Fan` command.

For details of the `showenvironment`(8) command, refer to the man page. For installation details of the M8000/M9000 servers, see the *SPARC Enterprise M8000/M9000 Servers Installation Guide*.

You can also obtain the exhaust air data using the SNMP agent function. To obtain the data of exhaust air using the SNMP agent function, install the latest XSCF extension MIB definition file to the SNMP manager. For details on the XSCF extension MIB definition file, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

3.3 Electrical Specifications

This section describes the power supply requirements for system operation. Obtain the appropriate power supply after confirming the power requirements for the system to be installed.

M8000/M9000 servers can use two types of power supply: single-phase power and three-phase power. Redundant power cords are supported only on servers that have the dual power feed option. The dual power feed option is included by default on servers that are configured for three-phase power.

Note – Power cords are not redundant on single power feed servers without the dual power feed option. On servers that have single power feed, all power cords must be connected and powered on at all times.

Note – With the dual power feed option, all wiring connected to the server is used to supply power, and the load is balanced at 50%/50%. Note that even if an extremely low load compromises the load balancing, it will not affect operation.

TABLE 3-6, TABLE 3-8 and TABLE 3-9 list the power requirements for single-phase and three-phase power supplies.

Note – The values of power consumption represent power requirements of the system under highest achieved stress and utilization, including environmental conditions. Contact your service engineer for the applicable power requirements.
See the *SPARC Enterprise M8000/M9000 Servers Overview Guide* for some examples of power consumption.

3.3.1 Single-Phase Power Supplies

TABLE 3-6 lists the power requirements for the M8000/M9000 servers and the rack-mountable dual power feed which is used for the dual power feed option and the power cabinet.

Note – In the event of a fault or power failure in the power system of the M8000/M9000 server, the rack-mountable dual power feed and the power cabinet supply power to the M8000/M9000 server using a single power feed. To achieve this, the dual power feed and the power cabinet have the capability equal to the power requirements for the M8000/M9000 servers. In normal operations, power is supplied from both feeds within the range of power consumption of the M8000/M9000 server.

TABLE 3-6 Specifications (Single-Phase Power Requirements)

Name	Power Supply			Power Consumption [kW]	Apparent Power [kVA]	Power Factor	Rush Current [A0-p]	Leakage Current [mA]	Circuit Breaker Capacity [A]
	Voltage [V]	Phase	Frequency [Hz]						
M8000 server	200 to 240 VAC ±10%	Single	50/60 +2%, -4%	3.88-10.50*	4.11-10.98*	0.9 or higher	100 or less†	4.1 or less†	30‡
Rack-mountable dual power feed (for M8000 server)	Equivalent to the M8000 server								
M9000 server (base cabinet)	200 to 240 VAC ±10%	Single	50/60 +2%, -4%	6.20-20.22*	6.58-21.45*	0.9 or higher	100 or less†	4.1 or less†	30‡
Power cabinet (for M9000 server base cabinet)	Equivalent to the M9000 server (base cabinet)								
M9000 server (base cabinet + expansion cabinet)	200 to 240 VAC ±10%	Single	50/60 +2%, -4%	11.92-40.44*	12.64-42.89*	0.9 or higher	100 or less†	4.1 or less†	30‡
Power cabinet (for M9000 server base cabinet + expansion cabinet)	Equivalent to the M9000 server (base cabinet + expansion cabinet)								

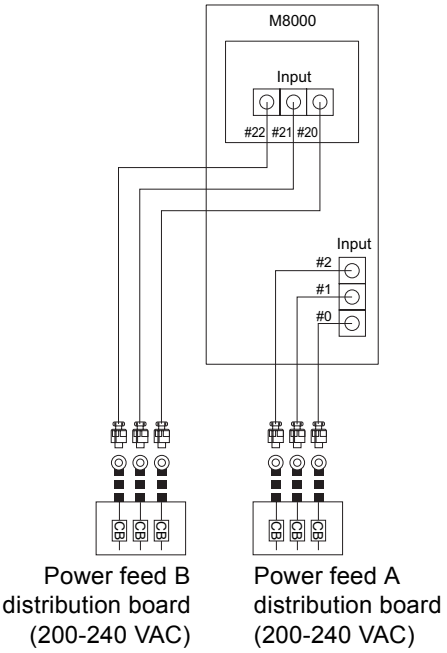
* Maximum power consumption and apparent power vary by the type of CPU mounted. To plan the installation of a server equipped with different types of CPU, use the CPU of larger power consumption as a basis.
For the types of CPU, see Section 3.3.6, “CPU Types and Server Maximum Power Consumption” on page 3-25.

† This value represents the current for each cable.

‡ This value represents the capacity of a system main line switch for each power supply of the single-phase power supplies.

FIGURE 3-4 and FIGURE 3-5 show the single-phase power supply connections.

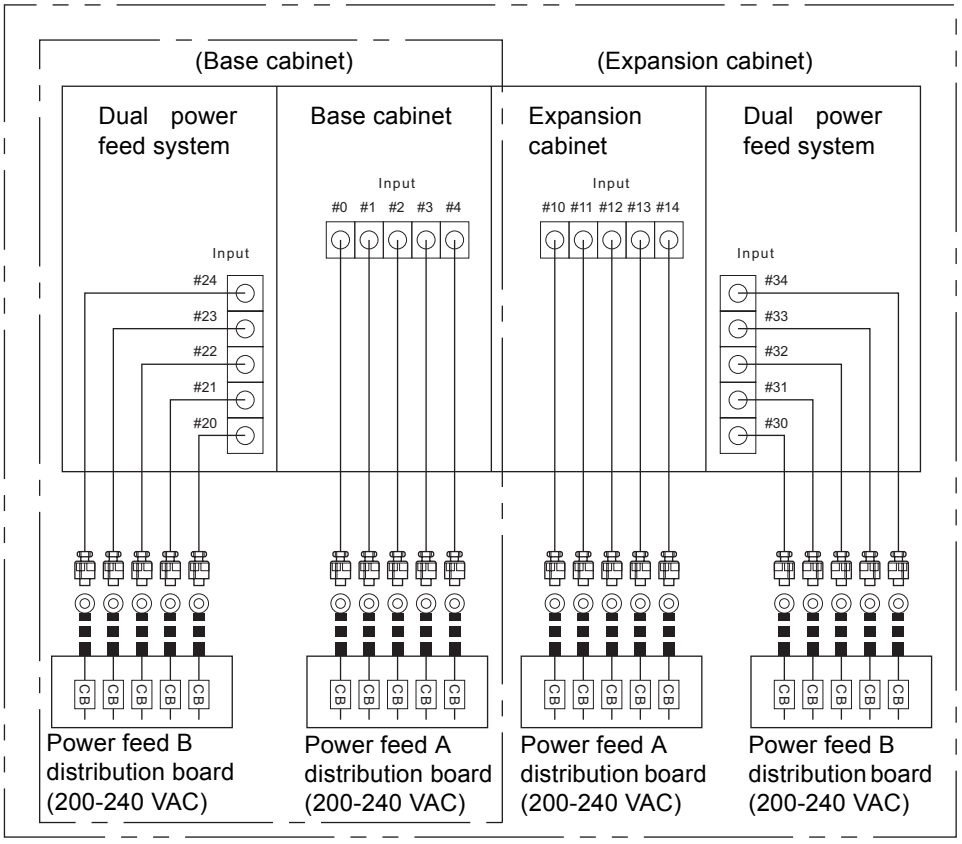
FIGURE 3-4 Single-Phase Power Supply Connections (M8000 Server)



Note – Connect the power feed A and the power feed B (for dual-power feed) to a separate AC power supply from each other.

Note – To connect power cords for this system directly to your power distribution board, the power cords must be connected on a one-to-one basis as shown in the above figure.

FIGURE 3-5 Single-Phase Power Supply Connections (M9000 Server)



Note – Connect the power feed A and the power feed B (for dual-power feed) to a separate AC power supply from each other.

Note – To connect power cords for this system directly to your power distribution board, the power cords must be connected on a one-to-one basis as shown in the above figure.

Power Cord Connection Specifications

TABLE 3-7 lists specifications for single-phase power supply connections.

The M8000/M9000 servers are equipped with the required number of single-phase power cords.

TABLE 3-7 Specifications (Single-Phase Power Supply Connections)

Name	Destination	Power Cord Length*	Plug Geometry	Number of Plugs	Outlet in Facility
M8000 server	Japan	3.0 m (9.8 ft)	30A-250V 3P, locking type (NEMA L6-30P)	3 (single power feed) 6 (dual power feed)	30A-250V 3P, locking type (NEMA L6-30R) Embedded type: 3320-L6 <American Denki> Exposed type: 3321-L6 <American Denki> 
	North America General overseas	3.0 m (9.8 ft)	NEMA L6-30P	3 (single power feed) 6 (dual power feed)	NEMA L6-30R (North America only) 
	Europe	3.0 m (9.8 ft)	EN60309 (32A)	3 (single power feed) 6 (dual power feed)	EN60309 (32A) 

TABLE 3-7 Specifications (Single-Phase Power Supply Connections) *(Continued)*

Name	Destination	Power Cord Length*	Plug Geometry	Number of Plugs	Outlet in Facility
M9000 server	Japan	3.0 m (9.8 ft)	30A-250V 3P, locking type (NEMA L6-30P)	(Base cabinet) 5 (single power feed) 10 (dual power feed) (Base cabinet + expansion cabinet) 10 (single power feed) 20 (dual power feed)	30A-250V 3P, hook type, locking (NEMA L6-30R) Embedded type: 3320-L6 <American Denki> Exposed type: 3321-L6 <American Denki> 
	North America General overseas	3.0 m (9.8 ft)	NEMA L6-30P†	(Base cabinet) 5 (single power feed) 10 (dual power feed) (Base cabinet + expansion cabinet) 10 (single power power feed) 20 (dual power feed)	NEMA L6-30R (North America only) 
	Europe	3.0 m (9.8 ft)	EN60309 (32A)	(Base cabinet) 5 (single power feed) 10 (dual power feed) (Base cabinet + expansion cabinet) 10 (single power power feed) 20 (dual power feed)	EN60309 (32A) 

* The power cord length is the length from the cable port on the cabinet to the outlet plug.

† Plugs for the North American and general overseas markets must be replaced locally in accordance with local electrical standards as required. Make sure that a qualified electrician performs the replacement work.

Note – For the servers that have the plug with lock function, confirm that a 30A overcurrent protection device is available outside the server. If one is not available, prepare an external 30A overcurrent protection that can be achieved by means of no-fuse breakers (NFBs) or fuses. The plug with lock function refers to plugs other than grounding-type ones with two parallel blades, such as the NEMA L6-30, L6-20, L6-15, and L5-15.

3.3.2 Three-Phase Power Delta Supplies

Three-phase power of the M8000/M9000 servers is supplied by the power cabinet. TABLE 3-8 lists the power requirements of the power cabinet for the three-phase power supply.

Note – The power cabinet is provided with dual power feed and supplies power to the M8000/M9000 server. In the event of a fault or power failure in one power feed, the other supplies the power which is equal to the power consumption. In normal operations, power is supplied from both feeds within the range of power consumption of the power cabinet.

TABLE 3-8 Specifications (Three-Phase Delta Power Requirements)

Name	Power Supply			Power Consumption [kW]	Apparent Power [kVA]	Power Factor	Rush Current [A0-p]	Leakage Current [mA]	Circuit Breaker Capacity [A]
	Voltage [V]	Phase	Frequency [Hz]						
Power cabinet (for M8000 server)	200 to 240 VAC ± 10%	Three-phase delta	50/60 +2%, -4%	3.88-10.50*	4.11-10.98*	0.9 or higher	100 or less†	30 or less†	50‡
Power cabinet (for M9000 server base cabinet)				6.20-20.22*	6.58-21.45*	0.9 or higher	170 or less†	40 or less†	80‡

TABLE 3-8 Specifications (Three-Phase Delta Power Requirements) *(Continued)*

Name	Power Supply			Power Consumption [kW]	Apparent Power [kVA]	Power Factor	Rush Current [A0-p]	Leakage Current [mA]	Circuit Breaker Capacity [A]
	Voltage [V]	Phase	Frequency [Hz]						
Power cabinet (for M9000 server base cabinet + expansion cabinet)	200 to 240 VAC ± 10%	Three-phase delta	50/60 +2%, -4%	11.92-40.44*	12.64-42.89*	0.9 or higher	170 or less†	40 or less†	80‡

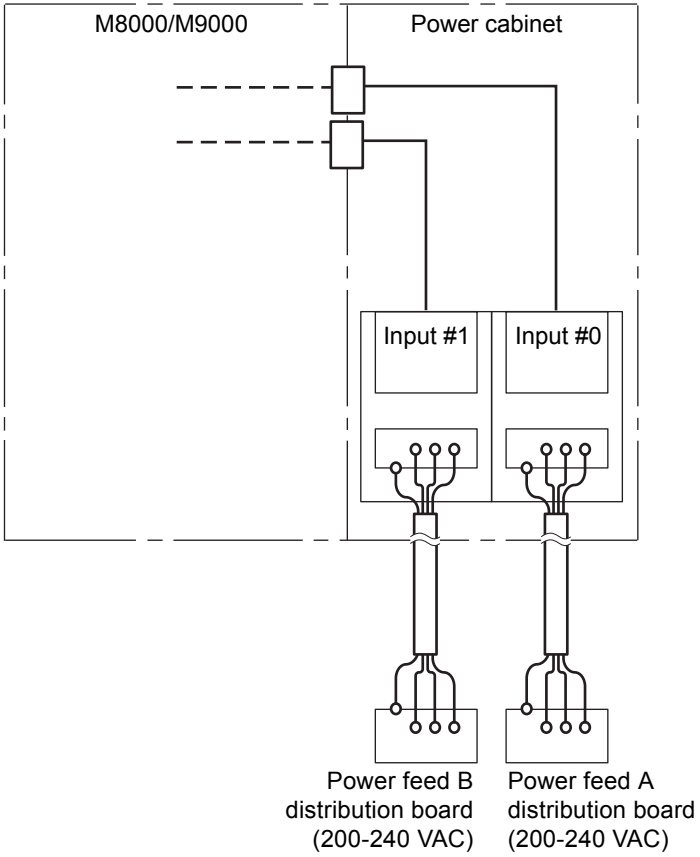
* Maximum power consumption and apparent power vary by the type of CPU mounted. To plan the installation of a server equipped with different types of CPU, use the CPU of larger power consumption as a basis.
For the types of CPU, see Section 3.3.6, "CPU Types and Server Maximum Power Consumption" on page 3-25.

† This value represents the current for each cable.

‡ This value represents the capacity of a system main line switch for each power supply of the single-phase power supplies.

FIGURE 3-6 shows the three-phase delta power supply connections for M8000/M9000 servers.

FIGURE 3-6 Three-Phase Delta Power Supply Connections



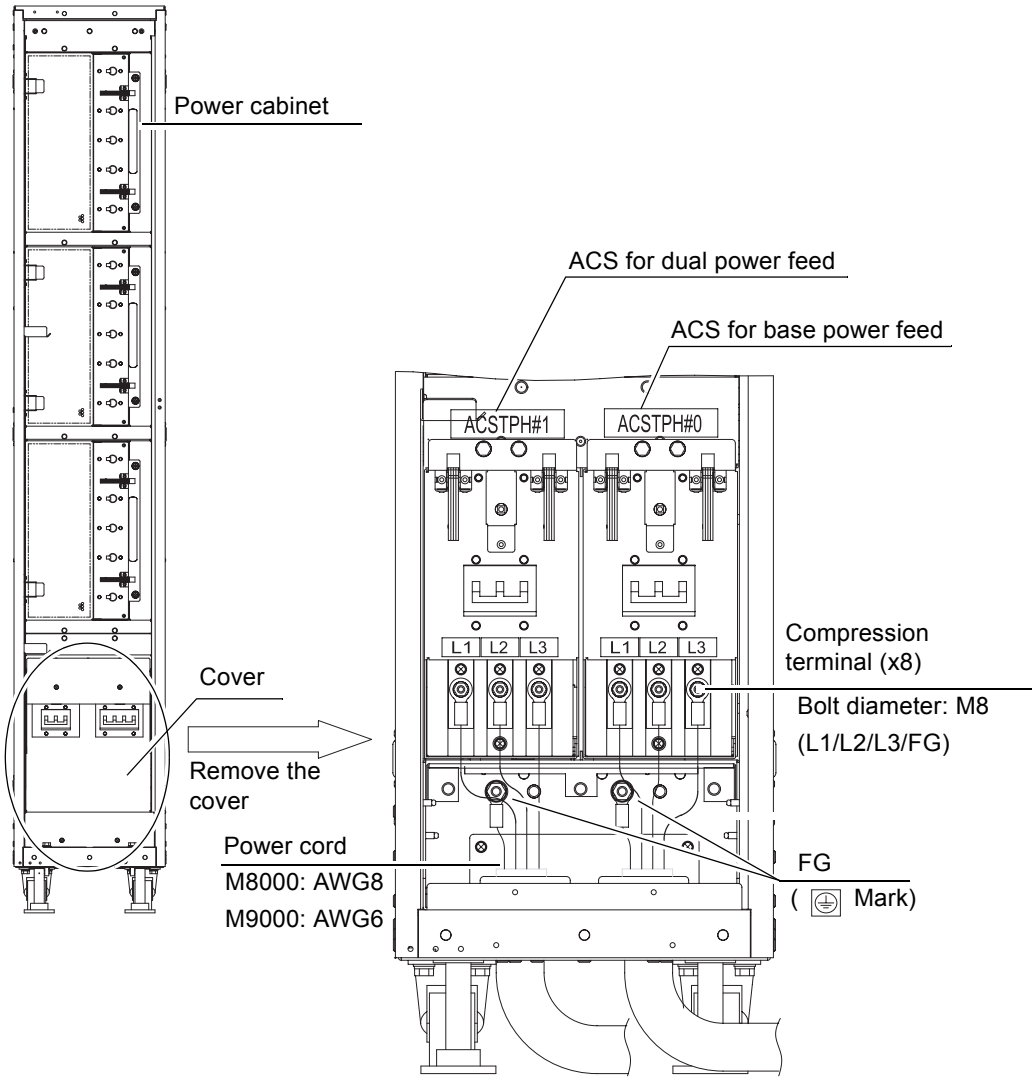
Note – Connect the power feed A and the power feed B (for dual-power feed) to a separate AC power supply from each other.

Power Cord Connection Specifications

If the three-phase power feed is used, connect the input power cable from the customer's distribution board directly to the power cabinet, as part of the on-site electrical work.

Make sure that the facility administrator or a qualified electrician performs the electrical work.

FIGURE 3-7 Three-Phase Delta Power Supply Connections



3.3.3 Three-Phase Star Power Supplies

Three-phase power of the M8000/M9000 servers is supplied by the power cabinet. TABLE 3-9 lists the power requirements of the power cabinet for the three-phase power supply.

Note – The power cabinet is provided with dual power feed and supplies power to the M8000/M9000 server. In the event of a fault or power failure in one power feed, the other supplies the power which is equal to the power consumption. In normal operations, power is supplied from both feeds within the range of power consumption of the power cabinet.

TABLE 3-9 Specifications (Three-Phase Star Power Requirements)

Name	Power Supply			Power Consumption [kW]	Apparent Power [kVA]	Power Factor	Rush Current [A0-p]	Leakage Current [mA]	Circuit Breaker Capacity [A]
	Voltage [V]	Phase	Frequency [Hz]						
Power cabinet (for M8000 server)	380 to 415 VAC ± 10%	Three-phase star	50/60 +2%, -4%	3.88-10.50*	4.11-10.98*	0.9 or higher	100 or less†	10 or less†	30‡
Power cabinet (for M9000 server base cabinet)				6.20-20.22*	6.58-21.45*	0.9 or higher	170 or less†	20 or less†	50‡
Power cabinet (for M9000 server base cabinet + expansion cabinet)				11.92-40.44*	12.64-42.89*	0.9 or higher	170 or less†	20 or less†	50‡

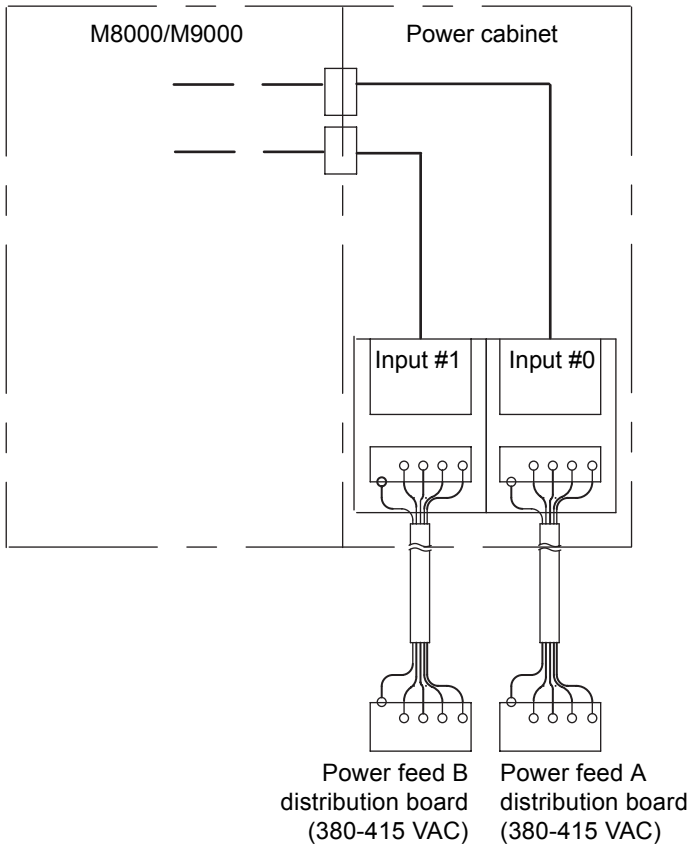
* Maximum power consumption and apparent power vary by the type of CPU mounted. To plan the installation of a server equipped with different types of CPU, use the CPU of larger power consumption as a basis.
For the types of CPU, see Section 3.3.6, "CPU Types and Server Maximum Power Consumption" on page 3-25.

† This value represents the current for each cable.

‡ This value represents the capacity of a system main line switch for each power supply of the single-phase power supplies.

FIGURE 3-8 shows three-phase star power supply connections for M8000/M9000 servers.

FIGURE 3-8 Three-Phase Star Power Supply Connections



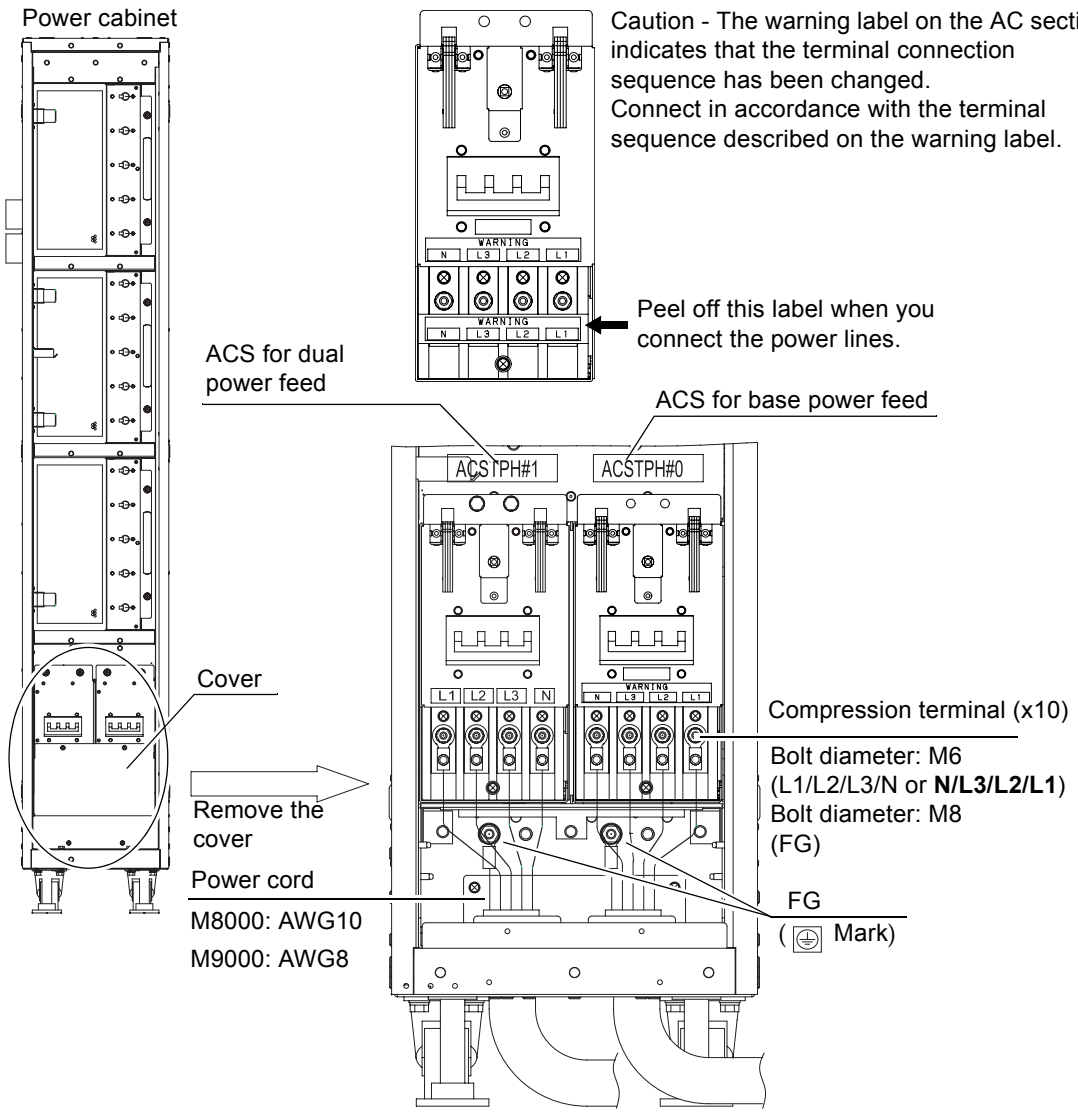
Note – Connect the power feed A and the power feed B (for dual-power feed) to a separate AC power supply from each other.

Power Cord Connection Specifications

If the three-phase power feed is used, connect the input power cable from the customer's distribution board directly to the power cabinet, as part of the on-site electrical work.

Make sure that the facility administrator or a qualified electrician performs the electrical work.

FIGURE 3-9 Three-Phase Star Power Supply Connections



3.3.4 Circuit Breaker Capacity and Characteristics

As a condition for maintaining the linked protection that would trip a system circuit breaker before a circuit breaker in your distribution panel in the M8000/M9000 servers, the circuit breakers in your distribution panel must have the characteristic described below. Use circuit breakers that have these characteristics in your distribution panel.

TABLE 3-10 shows the circuit breaker capacity of customer panel board.

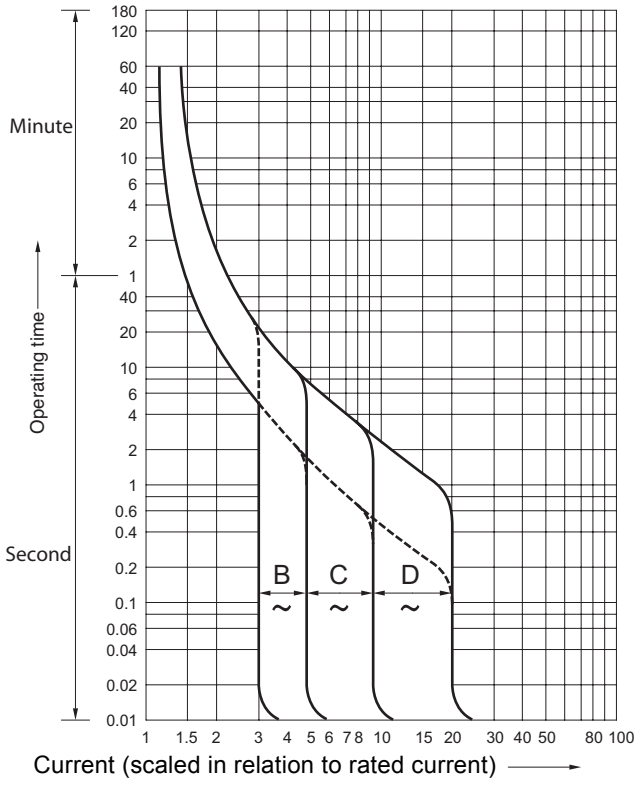
TABLE 3-10 Circuit Breaker Capacity of Customer Panel Board

Power Supply Input	Name	Circuit Breaker Capacity of Customer Panel Board (Japan/North America/Overseas in General)	Capacity of Customer Panel Board (Europe)
Single phase (200-240 VAC)	M8000 server	30A	32A
	M9000 server	30A	32A
3 phase delta (200-240 VAC)	M8000 server	50A	50A
	M9000 server	80A	80A
3 phase star (380-415 VAC)	M8000 server	30A	32A
	M9000 server	50A	50A

FIGURE 3-10 shows the blockade character of circuit breaker.

The blockade character of the circuit breaker is long-time delay type. Use a circuit breaker which is equivalent to, or slower than, blockade character D (IEC898 or DIN0651 part II) of FIGURE 3-10.

FIGURE 3-10 Circuit Breaker Characteristics of Customers' Power Distribution Boards



3.3.5 Grounding

Use a power outlet using the correct grounding method.

Grounding for Single-phase Power Supply

The single-phase power supply M8000/M9000 servers are shipped with a grounded (three-wire) power cord.

The power cord must always be connected to a power outlet that has a grounding receptacle. When you connect the power cord to the power outlet, the server grounding completes.

Grounding for Three-phase Power Supply

The power cable is not supplied with the three-phase power supply M8000/M9000 servers.

Ensure that the power cable wiring includes a ground wire from the distribution board to the terminal board of the power cabinet, as a part of the on-site electrical work.

For the installation positions, see FIGURE 3-7 and FIGURE 3-9.

The grounding resistance must not be greater than 10 Ω. The grounding method varies by the building where you install the server. Make sure that the facility administrator or a qualified electrician verifies the grounding method for the building and performs the grounding work.

3.3.6 CPU Types and Server Maximum Power Consumption

This section describes the CPU types and the maximum power consumption of the server. There are five types of CPU. The power specifications of the SPARC Enterprise M8000/M9000 servers from Oracle and Fujitsu vary depending on the CPU type and the system configurations.

TABLE 3-11 through TABLE 3-13 list the specifications of maximum power consumption, apparent power, and heat dissipation by the type of CPU. The figures represent the system configuration described below the table, in which every CPU/memory board unit (CMU) is mounted with the same CPU.

TABLE 3-11 CPU Types and Power Specifications on the M8000 Server

CPU	Frequency (GHz)	Number	Power Consumption (KW)	Apparent Power (KVA)	Heat Dissipation (KJ/h)
SPARC64 VI processor	2.28	16	9.42	9.99	33912
	2.4	16	9.52	10.09	34272
SPARC64 VII processor	2.52	16	10.07	10.68	36252
	2.88	16	10.32	10.86	37152
SPARC64 VII+ processor	3.0	16	10.50	10.98	37800

* The M8000 system configuration: CMU x 4, 4GB DIMM x 128, IOU x 4, HDD x 16, PCI-E x 32, DAT x1.

TABLE 3-12 CPU Types and Power Specifications on the M9000 Server (Base Cabinet)

CPU	Frequency (GHz)	Number	Power Consumption (KW)	Apparent Power (KVA)	Heat Dissipation (KJ/h)
SPARC64 VI processor	2.28	32	18.06	19.16	65016
	2.4	32	18.26	19.37	65736
SPARC64 VII processor	2.52	32	19.36	20.54	69696
	2.88	32	19.87	21.07	71532
SPARC64 VII+ processor	3.0	32	20.22	21.45	72792

* The M9000 (base cabinet) system configuration: CMU x 8, 4GB DIMM x 256, IOU x 8, HDD x 32, PCI-E x 64, DAT x1.

TABLE 3-13 CPU Types and Power Specifications on the M9000 Server (Base Cabinet + Expansion Cabinet)

CPU	Frequency (GHz)	Number	Power Consumption (KW)	Apparent Power (KVA)	Heat Dissipation (KJ/h)
SPARC64 VI processor	2.28	64	36.11	38.30	129996
	2.4	64	36.51	38.73	131436
SPARC64 VII processor	2.52	64	38.71	41.06	139356
	2.88	64	39.72	42.13	142992
SPARC64 VII+ processor	3.0	64	40.44	42.89	145584

* The M9000 (base cabinet + expansion cabinet) system configuration: CMU x 16, 4GB DIMM x 512, IOU x 16, HDD x 64, PCI-E x 128, DAT x1.

Abbreviations

A

ACS	AC Section
ACSTPH	ACS Three-Phase

B

BP	Backplane
BUI	Browser User Interface

C

CMB	CPU Memory Board
CMU	CPU/Memory Board Unit
CLI	Command-Line Interface
CLKU	Clock Control Unit
CPUM	CPU Module

D

DAT	Digital Audio Tape
DDC	DC to DC Converter
DPF	Dual Power Feed
DR	Dynamic Reconfiguration

E

EMI	Electromagnetic Interference

F

FAN	FAN Unit
FRU	Field Replaceable Unit

H

HDD	Hard disk drive

I

IOB	I/O Board
IOU	I/O Unit
IOUA	IOU Onboard Device Card_A

M

MAC	Memory Access Controller
MEDBP	Media Backplane

O

OBP	OpenBoot PROM
OPNL	Operator Panel

P

PCICS	PCI Cassette
PCI-ES	PCI-Express Short
PFC	Power Factor Correction
PHP	PCI Hot Plug
POST	Power-On Self-Test
PSU	Power Supply Unit

R

RCI	Remote Cabinet Interface
RDPF	Rack-mountable Dual Power Feed

S

SAS	Serial Attached SCSI
SATA	Serial ATA (Advanced Technology Attachment)
SC	System Controller
SNSU	Sensor Unit
SWBP	Switch Backplane

T

TAPEU	Tape drive unit

U

UPS	Uninterruptible Power Supply

X

XBU	Crossbar Unit
XSCF	eXtended System Control Facility
XSCFU	eXtended System Control Facility Unit

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