

FUJITSU Storage
ETERNUS AF250 S2,
ETERNUS AF250
All-Flash Arrays

Site Planning Guide



Requirements for transportation/installation

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Fujitsu would like to thank you for purchasing the FUJITSU Storage ETERNUS AF250 S2, ETERNUS AF250 (hereinafter referred to as ETERNUS AF).

The ETERNUS AF is designed to be connected to Fujitsu servers (Fujitsu SPARC Servers, PRIMEQUEST, PRIMERGY, and other servers) or non-Fujitsu servers.

This manual describes the environmental requirements that are necessary to install and use the ETERNUS AF.

This manual is intended for use of the ETERNUS AF in regions other than Japan.

Please carefully review the information outlined in this manual.

Sixth Edition

June 2021

Trademarks

Third-party trademark information related to this product is available at:

<https://www.fujitsu.com/global/products/computing/storage/eternus/trademarks.html>

About This Manual

Intended Audience

This manual is intended for managers of facilities where the ETERNUS AF is installed.

Related Information and Documents

The latest version of this manual and the latest information for your model are available at:

<https://www.fujitsu.com/global/support/products/computing/storage/manuals-list.html>

Document Conventions

■ Third-Party Product Names

- Oracle Solaris may be referred to as "Solaris", "Solaris Operating System", or "Solaris OS".
- Microsoft® Windows Server® may be referred to as "Windows Server".

■ Notice Symbols

The following notice symbols are used in this manual:



Caution

Indicates information that you need to observe when using the ETERNUS storage system. Make sure to read the information.



Note

Indicates information and suggestions that supplement the descriptions included in this manual.

Warning Signs

Warning signs are shown throughout this manual in order to prevent injury to the user and/or material damage. These signs are composed of a symbol and a message describing the recommended level of caution. The following explains the symbol, its level of caution, and its meaning as used in this manual.



This symbol indicates the possibility of serious or fatal injury if the ETERNUS AF is not used properly.



This symbol indicates the possibility of minor or moderate personal injury, as well as damage to the ETERNUS AF and/or to other users and their property, if the ETERNUS AF is not used properly.

IMPORTANT This symbol indicates IMPORTANT information for the user to note when using the ETERNUS AF.

The following symbols are used to indicate the type of warnings or cautions being described.

Electric Shock



The triangle emphasizes the urgency of the WARNING and CAUTION contents. Inside the triangle and above it are details concerning the symbol (e.g. Electrical Shock).

No Disassembly



The barred "Do Not..." circle warns against certain actions. The action which must be avoided is both illustrated inside the barred circle and written above it (e.g. No Disassembly).

Unplug



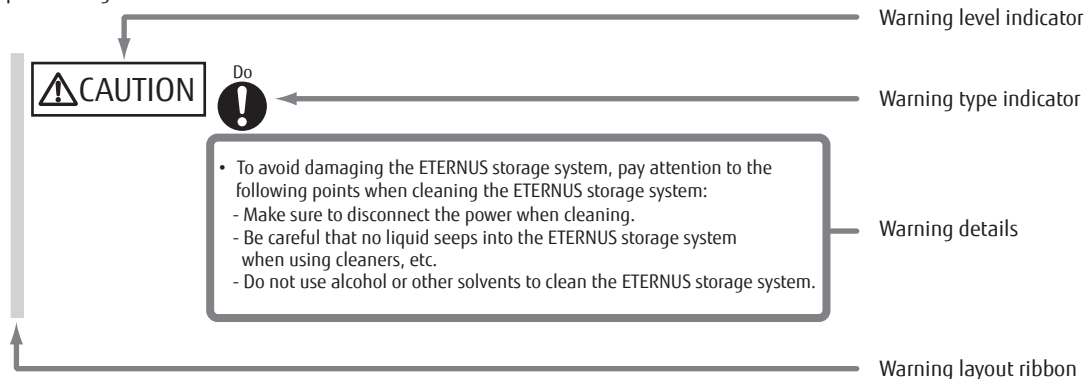
The black "Must Do..." circle indicates actions that must be taken. The required action is both illustrated inside the black disk and written above it (e.g. Unplug).

How Warnings are Presented in This Manual

A message is written beside the symbol indicating the caution level. This message is marked with a vertical ribbon in the left margin, to distinguish this warning from ordinary descriptions.

A display example is shown here.

Example warning



1. ETERNUS AF Installation

This chapter provides the installation specification of the ETERNUS AF.

Installation Specifications

ETERNUS AF250 S2

Table 1 shows the installation specifications of the ETERNUS AF250 S2 and Table 2 shows the efficiency and the power factor of the power supply unit.

Table 1 ETERNUS AF250 S2 Installation Specifications

Item			ETERNUS AF250 S2
Dimensions (W × D × H)	Controller enclosure		482 × 645 × 88mm (2U)
	Drive enclosure		482 × 540 × 88mm (2U)
	Power distribution unit (*1)	1U	435 × 148 × 38mm (*2), 482 × 111 × 44mm (*3)
		2U (*4)	(485 × 280 × 43mm) × 2 (*5), (485 × 123 × 44mm) × 2 (*6)
Maximum weight (*7)	Controller enclosure		35kg
	Drive enclosure		35kg
	Power distribution unit (*1)	1U	2.0kg (*2), 2.5kg (*3)
		2U (*4)	(6.0kg) × 2 (*5), (3.0kg) × 2 (*6)
Power	Voltage		AC 100 – 120V, AC 200 – 240V
	Phase		Single
	Frequency		50Hz/60Hz
Maximum power consumption (*7)	Controller enclosure	AC 100 – 120V	850W (860VA)
		AC 200 – 240V	850W (860VA)
	Drive enclosure	AC 100 – 120V	430W (440VA)
		AC 200 – 240V	430W (440VA)
Maximum heat generation (*7)	Controller enclosure	AC 100 – 120V	3,100kJ/h
		AC 200 – 240V	3,100kJ/h
	Drive enclosure	AC 100 – 120V	1,600kJ/h
		AC 200 – 240V	1,600kJ/h
Maximum amount of exhaust air	Controller enclosure		4.0m ³ /min
	Drive enclosure		4.0m ³ /min

Item			ETERNUS AF250 S2
Environmental conditions	Temperature	Operating	10 – 40°C
		Not operating	0 – 50°C
		Shipping	-40 – 60°C
	Temperature gradient		15°C/Hr or less
	Humidity	Operating	20 – 80%RH
		Not operating	8 – 80%RH
		Shipping	8 – 90%RH
	Humidity gradient		30%/day or less
	Maximum wet bulb temperature		29°C
	Altitude above sea level		0 – 3,000m
	Airborne dust		0.15mg/m ³ or less
	Gas concentration tolerance level		Cl ₂ : 6.8ppb or less, H ₂ S: 7.1ppb or less, SO ₂ : 37ppb or less, NH ₃ : 423.5ppb or less, NO ₂ : 52ppb or less, O ₃ : 5ppb or less, HCl: 6.6ppb or less, HF: 3.6ppb or less
Vibration limit	Oil vapor		0.2mg/m ³ or less
	Seawater (salt corrosion)		If the ETERNUS AF is installed on the ocean or premises within 0.5km from the coast, necessary measures must be taken to prevent salt corrosion.
Noise emission (*8)	Operating		400gal
	Not operating		1,000gal
Noise emission (*8)	Sound pressure level		47dB (A)
	Sound power level		6.5B

- *1:** For power distribution units, there are multiple types of exteriors. For details, refer to ["Specifications for Optional Power Supply Products" \(page 18\)](#).
- *2:** These values are for product ID ETFP4BU-L.
- *3:** These values are for product ID ETFP4DU-L.
- *4:** A 2U power distribution unit is composed of two 1U power distribution units.
- *5:** These values are for product ID ETFP16U-L / ETFP12U-L.
- *6:** These values are for product ID ETFP48U-L / ETFP32U-L.
- *7:** These values are for each enclosure when 24 drives are installed.
- *8:** These values are measured when a single controller enclosure and a single drive enclosure are configured in an environment in which the temperature is 23 ± 2°C at 0 meters above sea level.

Table 2 Efficiency and Power Factor of the Power Supply Unit (ETERNUS AF250 S2)

Component name	80PLUS®	Efficiency			Power factor	Output
		20% (*1)	50% (*1)	100% (*1)	50% (*1)	
Controller enclosure	GOLD (*2)	89.3%	92.5%	90.2%	0.975	Multiple output
Drive enclosure		89.3%	92.5%	90.2%	0.975	

- *1:** Indicates the rated load against the rated output of the PSU.

***2:** 80PLUS® GOLD certified power supply units are used. 80PLUS® is a power saving program for electrical equipment promoted by the 80PLUS® program.

ETERNUS AF250

The following table shows the installation specifications of the ETERNUS AF250.

Table 3 ETERNUS AF250 Installation Specifications

Item			ETERNUS AF250
Dimensions (W × D × H)	Controller enclosure		482 × 645 × 88mm (2U)
	Drive enclosure		482 × 540 × 88mm (2U)
	Power distribution unit (*1)	1U	435 × 148 × 38mm (*2), 482 × 111 × 44mm (*3)
		2U (*4)	(485 × 280 × 43mm) × 2 (*5), (485 × 123 × 44mm) × 2 (*6)
Maximum weight (*7)	Controller enclosure		35kg
	Drive enclosure		35kg
	Power distribution unit (*1)	1U	2.0kg (*2), 2.5kg (*3)
		2U (*4)	(6.0kg) × 2 (*5), (3.0kg) × 2 (*6)
Power	Voltage		AC 100 – 120V, AC 200 – 240V
	Phase		Single
	Frequency		50Hz/60Hz
Maximum power consumption (*7)	Controller enclosure	AC 100 – 120V	810W (820VA)
		AC 200 – 240V	810W (820VA)
	Drive enclosure	AC 100 – 120V	430W (440VA)
		AC 200 – 240V	430W (440VA)
Maximum heat generation (*7)	Controller enclosure	AC 100 – 120V	3,000kJ/h
		AC 200 – 240V	3,000kJ/h
	Drive enclosure	AC 100 – 120V	1,600kJ/h
		AC 200 – 240V	1,600kJ/h
Maximum amount of exhaust air	Controller enclosure		4.0m ³ /min
	Drive enclosure		4.0m ³ /min

Item			ETERNUS AF250
Environmental conditions	Temperature	Operating	10 – 40°C
		Not operating	0 – 50°C
		Shipping	-40 – 60°C
	Temperature gradient		15°C/Hr or less
	Humidity	Operating	20 – 80%RH
		Not operating	8 – 80%RH
		Shipping	8 – 90%RH
	Humidity gradient		30%/day or less
	Maximum wet bulb temperature		29°C
	Altitude above sea level		0 – 3,000m
	Airborne dust		0.15mg/m ³ or less
	Gas concentration tolerance level		Cl ₂ : 6.8ppb or less, H ₂ S: 7.1ppb or less, SO ₂ : 37ppb or less, NH ₃ : 423.5ppb or less, NO ₂ : 52ppb or less, O ₃ : 5ppb or less, HCl: 6.6ppb or less, HF: 3.6ppb or less
	Oil vapor		0.2mg/m ³ or less
	Seawater (salt corrosion)		If the ETERNUS AF is installed on the ocean or premises within 0.5km from the coast, necessary measures must be taken to prevent salt corrosion.
Vibration limit	Operating		400gal
	Not operating		1,000gal
Noise emission (*8)	Sound pressure level		47dB (A)
	Sound power level		6.5B

- *1: For power distribution units, there are multiple types of exteriors. For details, refer to ["Specifications for Optional Power Supply Products" \(page 18\)](#).
- *2: These values are for product ID ETFP4BU-L.
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- *5: These values are for product ID ETFP16U-L / ETFP12U-L.
- *6: These values are for product ID ETFP48U-L / ETFP32U-L.
- *7: These values are for each enclosure when 24 drives are installed.
- *8: These values are measured when a single controller enclosure and a single drive enclosure are configured in an environment in which the temperature is 23 ± 2°C at 0 meters above sea level.

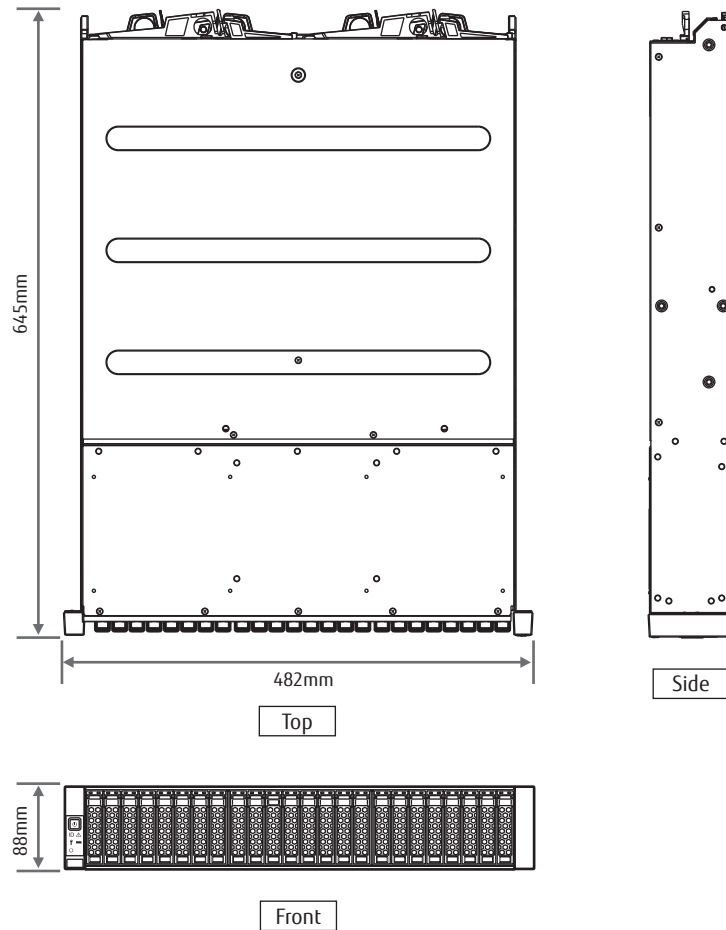
Storage System Dimensions

■ Controller Enclosure Dimensions

The following diagrams show the dimensions of a controller enclosure.

The dimension values do not include any protruding parts (approximation).

Figure 1 Controller Enclosure Dimensions

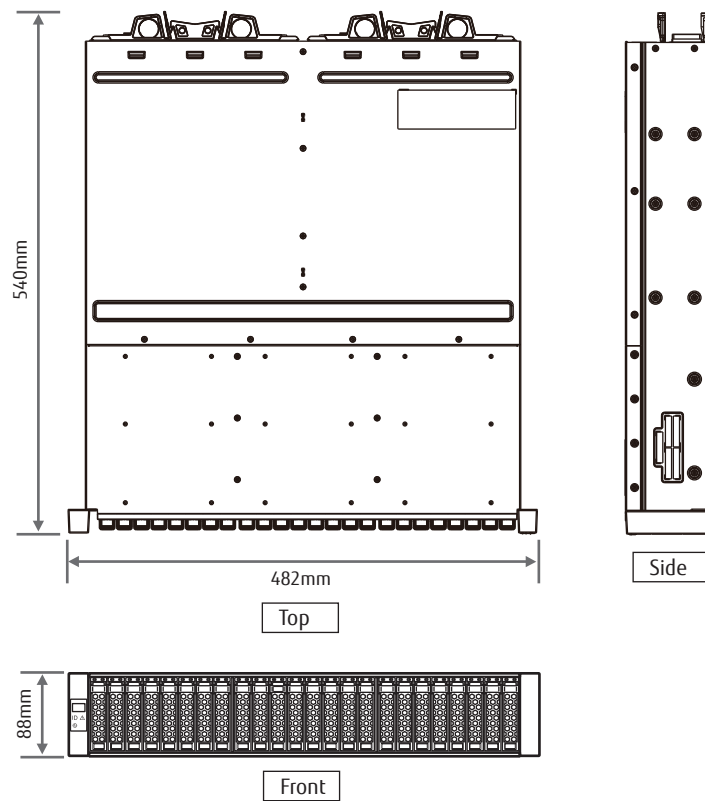


■ Drive Enclosure Dimensions

The diagrams below show the dimensions of a drive enclosure.

The dimension values do not include any protruding parts (approximation).

Figure 2 Drive Enclosure Dimensions



Compliance Standards

● About Compliance Standards

- Product safety
 - EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
 - IEC 60950-1:2005, 2nd Edition + A1:2009 + A2:2013
 - ANSI/UL 60950-1:2014
 - CAN/CSA-C22.2 No 60950-1-07, + A1:2011 + A2:2014
 - CNS 14336-1:2010
 - IS 13252(Part 1):2010
 - TP TC 004/2011
- CE marking
 - 2014/35/EU, Low Voltage Directive
 - 2014/30/EU, Electromagnetic Compatibility Directive
 - 2009/125/EC, Regulation (EU) 019/424 Erp Directive (*1)
 - 2011/65/EU, (EU) 2015/863 as amended, Restriction of Hazardous Substances (RoHS) Directive
- Electromagnetic Compatibility (EMC)
 - EN 55032 Class A
 - EN 55024:2010
 - EN 61000-3-2:2014
 - EN 61000-3-3:2013
 - FCC Part-15 Subpart B Class A
 - ICES-003 Class A
 - VCCI Class A
 - JIS C 61000-3-2
 - CNS 13438:2006
 - AS/NZS CISPR 32 Class A 2015
 - TP TC 020/2011
 - KN32 Class A
 - KN35
- Environmental compliance
 - 2011/65/EU, (EU) 2015/863 as amended, Restriction of Hazardous Substances (RoHS) Directive
 - WEEE-compliant (waste electrical and electronic equipment)
- Power conversion efficiency
 - 80PLUS® GOLD

***1:** The target ETERNUS AF is the ETERNUS AF250 S2.

Package Size

The ETERNUS AF is shipped in cardboard boxes. These boxes may not fit through some doorways or elevators. To make sure that the ETERNUS AF can be moved to the installation site, carefully check the transport route information.

The following table shows the package size and the maximum package weight of each component for regions other than the EMEA, Central American, and Caribbean regions.

Table 4 Package Size (for Regions other than the EMEA, Central American, and Caribbean Regions)

Component		Package size (W × D × H)	Maximum weight
Controller enclosure		600 × 760 × 240mm	Approximately 40kg
Drive enclosure		600 × 660 × 240mm	Approximately 40kg
Drive (*1)		160 × 278 × 106mm	Approximately 0.5kg
Power distribution unit (*2)	1U	570 × 710 × 160mm (*3), 540 × 380 × 310mm (*4)	Approximately 4kg (*3), Approximately 5kg (*4)
	2U	(390 × 590 × 180mm) × 2 (*5), (540 × 380 × 310mm) × 2 (*6)	(Approximately 7kg) × 2 (*5), (Approximately 10kg) × 2 (*6)

***1:** When an order for optional drives to be installed in the factory is placed, enclosures are shipped with the drives preinstalled.

When optional drives are ordered without preinstallation, each drive is shipped in an individual package.

***2:** For power distribution units, there are multiple types of exteriors.

***3:** These values are for product ID EFTP4BU-L.

***4:** These values are for product ID EFTP4DU-L.

***5:** These values are for product ID EFTP16U-L / EFTP12U-L.

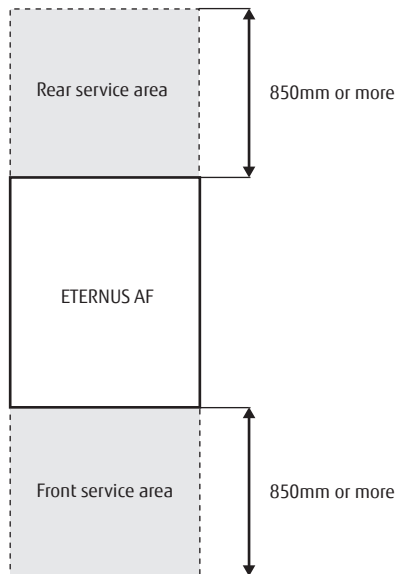
***6:** These values are for product ID EFTP48U-L / EFTP32U-L.

Installation Area

This section explains the installation areas and the service areas that are required for an ETERNUS AF that is installed in a Fujitsu 19-inch rack.

Secure service areas that are 850mm or more in the front and rear of the ETERNUS AF.

Figure 3 Installation Area and Service Area



Installation Environment

Sufficient consideration of the installation environment should be taken to ensure proper use of the ETERNUS AF. Using the ETERNUS AF in an environment that does not satisfy the installation environment requirements may cause a failure to occur with the ETERNUS AF.

Installation of the ETERNUS AF in High Altitude Locations

When the ETERNUS AF is used at high altitudes (1,800m or higher above sea level), "Highland Mode" must be enabled. When "Highland Mode" is enabled, the fans rotate at high speed to maintain the cooling effect of the fans.

Caution

- To set "Highland Mode", perform the subsystem parameter settings for each ETERNUS AF. The Maintenance Operation policy is required to perform this setting.
- The "Highland Mode" setting cannot be changed during a host access.
- After the setting is changed, the ETERNUS AF needs to be turned off and on again.

Air Conditioning

It is important to consider the flows of cooling air (intake air and exhaust air) for the installation location of the ETERNUS AF. The temperature in some ETERNUS AF storage systems may rise by taking in air exhausted from other storage systems depending on how they are installed near each other. In addition, check if the ambient temperature in the installation location always satisfies the usage environment temperature by taking into consideration the room size, whether other storage systems are installed, and how many people are present in the room.

When installing air conditioning, consider the following:

● Ambient Temperature

An ETERNUS AF is cooled by taking in air through the front intakes and pushing out the exhaust air through the rear of the ETERNUS AF. If the intake air temperature does not meet the ambient environment conditions, a temperature error occurs and the power of the ETERNUS AF is shut down.

- Front intake air temperature

Make sure that the front intake air temperature is between 10 and 40°C.

- Rear exhaust air temperature

For example, when the intake air temperature is 40°C, the exhaust air temperature is 50°C or higher.

The necessary cooling capacity of air conditioning must be determined by taking the exhaust air cooling into consideration.

Estimate the amount of heat in the exhaust air from the ETERNUS AF by using the heat generation amount and exhaust air amount that are listed in ["Installation Specifications" \(page 7\)](#).

Installation Methods

- Perform one of the following rack installation methods to ensure the safe use of an ETERNUS AF that is installed in a rack:
 - To secure a rack, use a rack without stabilizers and secure it to the building with the leveling feet.
 - If a rack is not to be secured, make sure to use a rack with stabilizers and use these stabilizers to prevent the rack from toppling over.
- Which installation method should be used depends on the installation location, the floor conditions, and the type of racks that are to be used. Contact your installation contractor for more details regarding installation and how the installation should actually be performed.

Load Bearing Capacity for Floors

Make sure that the following relationship between the load bearing capacity of the floor and the weight of the ETERNUS AF is maintained.

(Load bearing capacity of the floor) > (ETERNUS AF weight ÷ Installation area that includes service areas)

If the condition above is not satisfied, additional measures are required to ensure sufficient load bearing capacity.

Contact your installation contractor for details about the necessary measures that must be taken.

Outlet/Socket Specifications

This section explains the power connection specifications of the ETERNUS AF storage systems.

■ Power Supply Units

Power can be supplied from two power sources in the ETERNUS AF because each enclosure has two power supply units.

During normal operation, each of the power sources supplies half of the necessary power.

When one of the power supply lines fails, all of the necessary power is supplied from only one power source.

Using the same power supply condition for all of the power supply units is recommended so that different power supply conditions (input voltage) are not used for the ETERNUS AF.

■ Current Consumption

The following table shows the current consumption (guideline) of each power cord that is used for the connections to each type of enclosure.

Table 5 Current Consumption of Each Power Cord

Component name	Voltage	
	AC100V	AC200V
Controller enclosure	8.2A	4.1A
Drive enclosure	4.4A	2.2A

When using power distribution units, make sure that the current capacity totaling the current consumption value of power cords that connect to the enclosures does not exceed the actual usage rating of the power distribution unit.

Specifications for Optional Power Supply Products

This section explains the specifications of optional power cords and power related optional products.

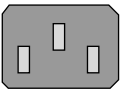
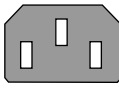
For power distribution units, the number of outlets that are required to connect the controller enclosure and drive enclosures should be taken into consideration, and the most appropriate power distribution units should then be selected.

When an existing power socket is used, make sure that the plug type of the power distribution unit fits the existing power socket and that the power supply facility is able to provide sufficient power to the system. If the plug type does not fit the power socket, electrical work to change the power socket is required. This electrical work must be performed in compliance with the electrical codes of the nation, the municipality, or the region.

■ AC200V Power Cords (for the EMEIA, Central American, and Caribbean Regions)

AC200V power cords are used to connect devices to the IEC60320 C13 power socket type. These power cords can be used if the specifications of the connection device allow AC200V.



Table 6 Specifications for AC200V Power Cords (for the EMEIA, Central American, and Caribbean Regions)

Usage	Plug type	Socket type (Socket)	Cable length	Voltage rating/current rating
Used for connection between the ETERNUS AF and the socket (IEC60320 C13 ↔ IEC60320 C14G)	IEC60320 C14G 	IEC60320 C13 	1.5m	250V 10A

■ AC200V Power Cords (for Regions other than the EMEIA, Central American, and Caribbean Regions)

AC200V power cords are used to connect devices to the NEMA L6-15R power socket type. These power cords can be used if the specifications of the connection device allow AC200V.

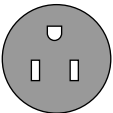
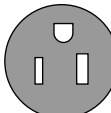
Table 7 Specifications for AC200V Power Cords (for Regions other than the EMEIA, Central American, and Caribbean Regions)

Usage	Plug type	Socket type (Socket)	Cable length	Voltage rating/current rating
Used for connection between the ETERNUS AF and the socket (IEC60320 C13 ↔ NEMA L6-15P)	NEMA L6-15P 	NEMA L6-15R 	4.0m	Rating: 250V 10A (Normal usage rating: 8A)

■ AC125V Power Cords (for Regions other than the EMEA, Central American, and Caribbean Regions)

AC125V power cords are used to connect devices to the NEMA 5-15R power socket type. These power cords can be used if the specifications of the connection device allow AC100V.

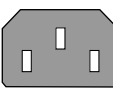
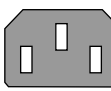
Table 8 Specifications for AC125V Power Cords (for Regions other than the EMEA, Central American, and Caribbean Regions)

Usage	Plug type	Socket type (Socket)	Cable length	Voltage rating/current rating
Used for connection between the ETERNUS AF and the socket (IEC60320 C13 ↔ NEMA 5-15P)	NEMA 5-15P 	NEMA 5-15R 	3.0m	Rating: 125V 13A (Normal usage rating: 10A)

■ AC100V and AC200V Power Cords (for Regions other than the EMEA, Central American, and Caribbean Regions)

AC100V/200V power cords are used to connect devices to the IEC60320 C13 power socket type. These power cords can be used to connect devices with the AC100V and AC200V specifications.

Table 9 Specifications for AC100V and AC200V Power Cords (for Regions other than the EMEA, Central American, and Caribbean Regions)

Usage	Plug type	Socket type (Socket)	Cable length	Voltage rating/current rating
Used for connection between the ETERNUS AF and the socket (IEC60320 C13 ↔ IEC60320 C14)	IEC60320 C14 	IEC60320 C13 	0.5m 1.0m 1.5m 3.0m	Rating: 250V 10A (Normal usage rating: 8A)

■ Power Distribution Units (1U) (Only for Regions other than the EMEA, Central American, and Caribbean Regions)

Two types (Figure 4 and Figure 5) of 1U power distribution units with different specifications are provided.

- Power distribution unit (AC8A/200-240V, 1U, 4 outlets, 2 inlets)

There are four outlets and two inlets.

Figure 4 Power Distribution Units (AC8A/200-240V, 1U, 4 Outlets, 2 Inlets)

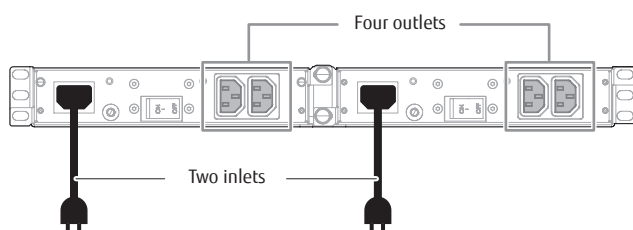





Table 10 Specifications for Power Distribution Units (AC8A/200-240V, 1U, 4 Outlets, 2 Inlets)

Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-15P 	NEMA L6-15R 	4.0m	Rating: 250V 10A (Normal usage rating: 8A)

- Power distribution unit (AC24A/200-240V, 1U, 4 outlets, 1 inlet)

There are four outlets and one inlet.

Figure 5 Power Distribution Units (AC24A/200-240V, 1U, 4 Outlets, 1 Inlet)

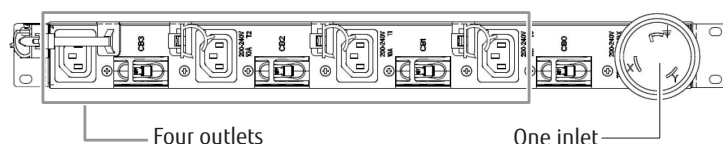
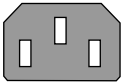
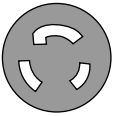
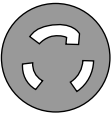


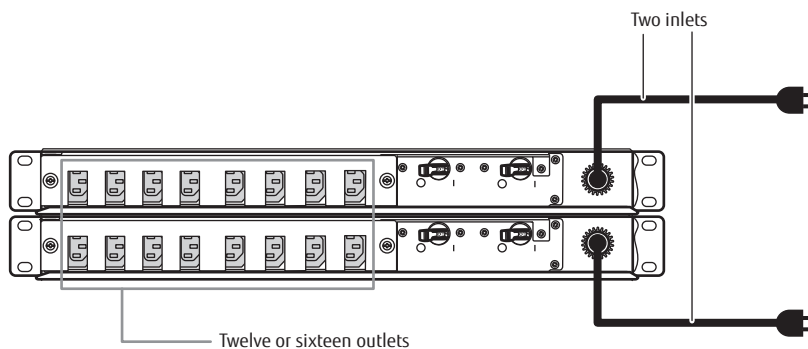
Table 11 Specifications for Power Distribution Units (AC24A/200-240V, 1U, 4 Outlets, 1 Inlet)

Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-30P 	NEMA L6-30R 	4.4m	Rating: 250V 30A (Normal usage rating: 24A)

■ Power Distribution Units (2U) (Only for Regions other than the EMEA, Central American, and Caribbean Regions)

The exterior types that are available for power distribution units (2U) are shown in [Figure 6](#) and [Figure 7](#).




Figure 6 Power Distribution Units (2U)



- Power distribution unit (AC200-240V, 2U, 12 outlets)

There are 12 outlets and two inlets.

Table 12 Power Distribution Unit (AC200-240V, 2U, 12 Outlets) Specifications

Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-20P 	NEMA L6-20R 	4.0m	Rating: 250V 20A (Normal usage rating: 16A)

- Power distribution unit (AC200-240V, 2U, 16 outlets)

There are 16 outlets and two inlets.

Table 13 Power Distribution Unit (AC200-240V, 2U, 16 Outlets) Specifications

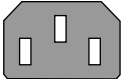


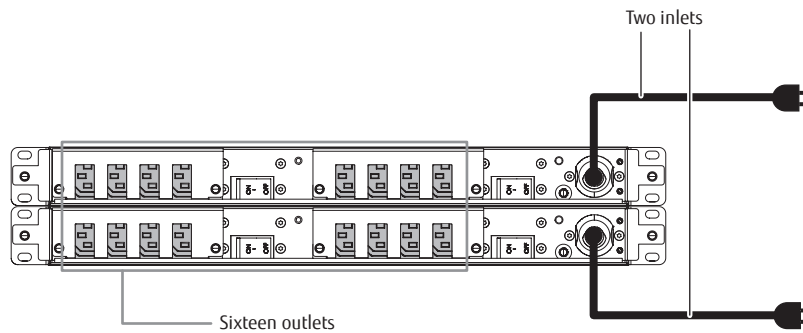
Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-30P 	NEMA L6-30R 	4.0m	Rating: 250V 30A (Normal usage rating: 24A)

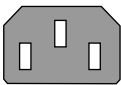
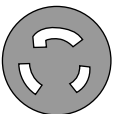

Figure 7 Power Distribution Units (2U)



- Power distribution unit (AC16A/200-240V, 2U, 16 outlets)

There are 16 outlets and two inlets.

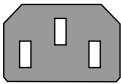
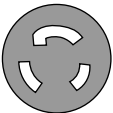

Table 14 Power Distribution Unit (AC16A/200-240V, 2U, 16 Outlets) Specifications

Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-20P 	NEMA L6-20R 	4.0m	Rating: 250V 20A (Normal usage rating: 16A)

- Power distribution unit (AC24A/200-240V, 2U, 16 outlets)

There are 16 outlets and two inlets.

Table 15 Power Distribution Unit (AC24A/200-240V, 2U, 16 Outlets) Specifications

Outlet	Inlet			Voltage rating/current rating
Socket type (Socket)	Plug type	Socket type (Socket)	Cable length	
IEC60320 C13 	NEMA L6-30P 	NEMA L6-30R 	4.0m	Rating: 250V 30A (Normal usage rating: 24A)

Required Number of Outlets/Socket

The number of power outlets/sockets required to install the ETERNUS AF depends on the number of drive enclosures and power distribution units.

It is recommended that the power cords of the drive enclosures are connected to the power distribution units that are installed in the same rack. Secure the necessary number of power outlets within the same rack to avoid connecting power cords to power outlets in different racks. It may be necessary to purchase additional power distribution units depending on the installation locations of enclosures.

■ Without Power Distribution Units

Two power sockets are required for each enclosure.

■ With Power Distribution Units

Two power sockets are required for each power distribution unit.

Circuit Protectors

Protection coordination must be secured between the distribution board circuit protectors and the ETERNUS AF or power distribution units to protect the ETERNUS AF by blocking the failed circuit immediately when a power supply input error occurs.

Distribution board circuit protectors must satisfy the following required conditions and breaking characteristics.

■ Required Conditions

The distribution board circuit protectors must satisfy the required conditions that are listed below.

Table 16 Required Conditions for Distribution Board Circuit Protectors

Connected device	Power supply voltage	Current capacity	
		Regions other than the EMEA, Central American, and Caribbean regions	The EMEA, Central American, and Caribbean regions
Power distribution unit (AC8A/200-240V, 1U, 4 outlets)	AC 200 – 240V	15A	—
Power distribution unit (AC200-240V, 2U, 12 outlets)	AC 200 – 240V	20A	—
Power distribution unit (AC16A/200-240V, 2U, 16 outlets)			
Power distribution unit (AC200-240V, 2U, 16 outlets)	AC 200 – 240V	30A	—
Power distribution unit (AC24A/200-240V, 2U, 16 outlets)			
Power distribution unit (AC24A/200-240V, 1U, 4 outlets)			
ETERNUS AF (without power distribution units)	AC 100 – 120V AC 200 – 240V	15A	16A

■ Breaking Characteristics

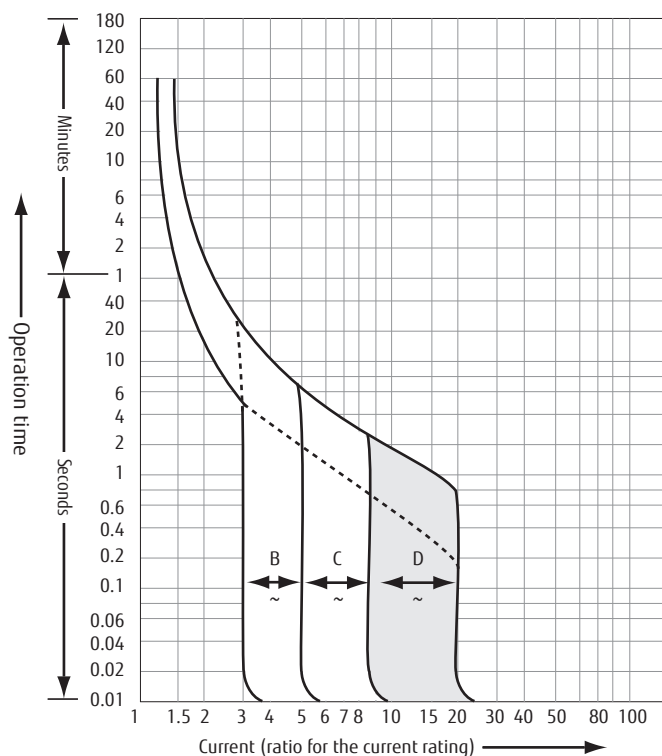
▶ Caution

The breaking characteristics (*1) of the distribution board circuit protectors must be the long-time delay type and must be equivalent to or slower than the D (IEC/EN60898-1) shown in [Figure 8](#).

If the distribution board's circuit protectors have a breaking characteristic that is faster than D, the breaker may trip when a power supply unit in the storage system fails. When the breaker trips, a shutoff occurs on multiple power supply units connected to the same connection line as the failed power supply unit.

***1 :** Relationship between the size of excess current and operation time

Figure 8 Breaking Characteristics of Distribution Board Circuit Protectors



■ Connection Diagrams

The following diagrams show connections between the power distribution units, the ETERNUS AF, and the power sockets of the distribution boards.

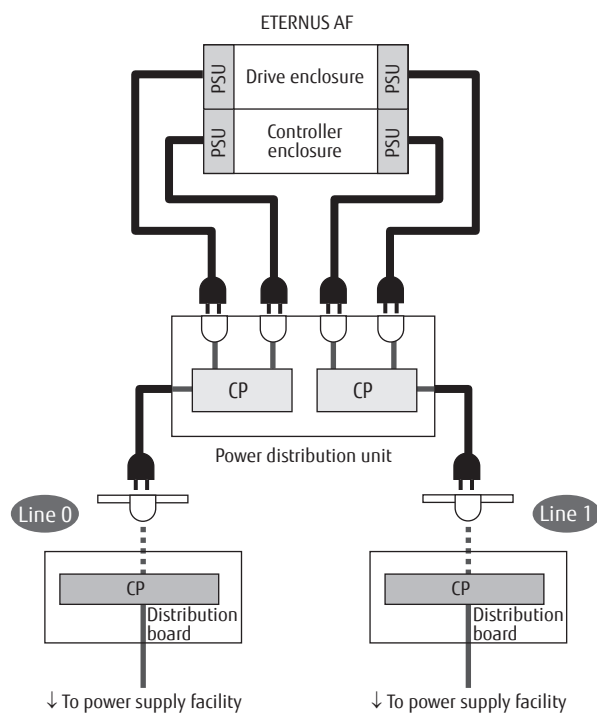
▶ Caution

Do not connect just one power distribution unit to multiple ETERNUS storage systems.

● For Power Distribution Unit (1U) Connections

The following diagram shows a power supply connection example when power distribution unit (AC200-240V, 1U, 4 outlets) is used.

Figure 9 Example of a Power Supply Connection When a Power Distribution Unit (1U) Is Used



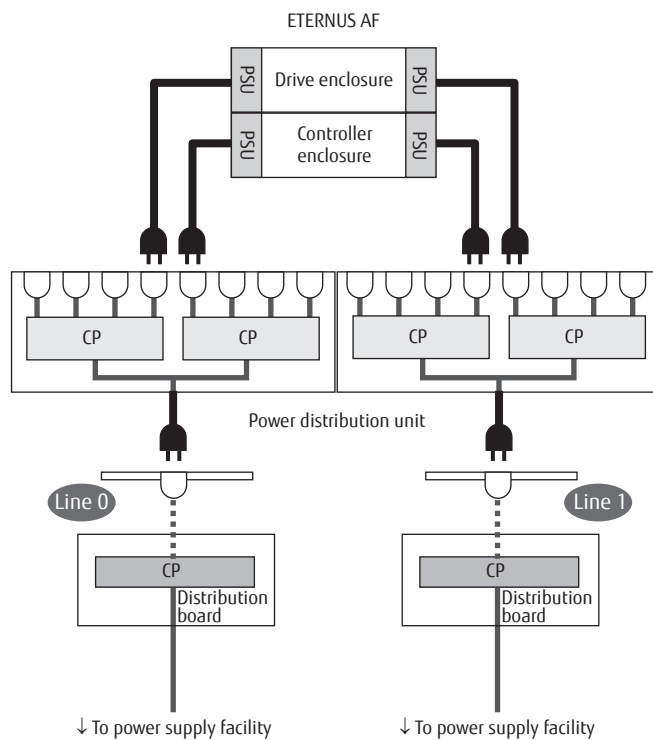
PSU: Power Supply Unit

CP: Circuit Protector

● For Power Distribution Unit (2U) Connections

The following diagram shows a power supply connection example when power distribution unit (AC200-240V, 2U, 12 outlets) or power distribution unit (AC200-240V, 2U, 16 outlets) is used.

Figure 10 Example of a Power Supply Connection When a Power Distribution Unit (2U) Is Used

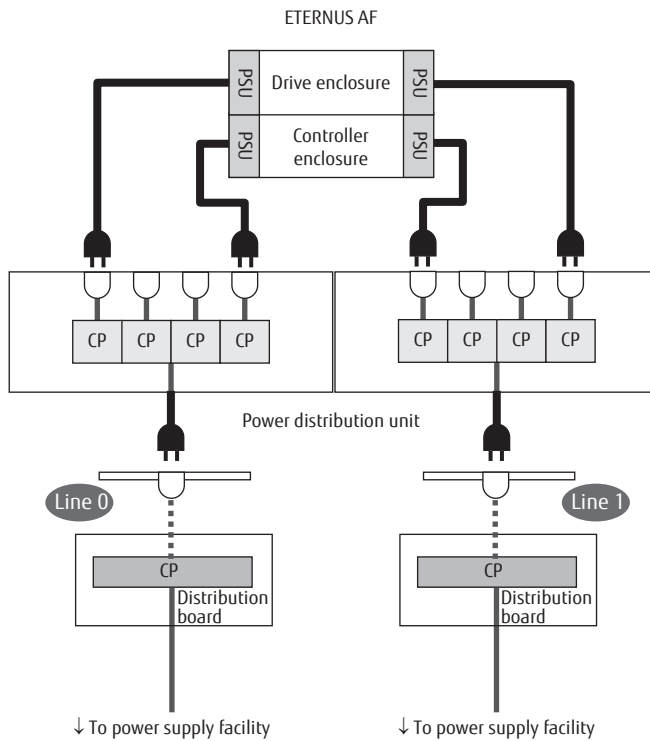


PSU: Power Supply Unit

CP: Circuit Protector

Note

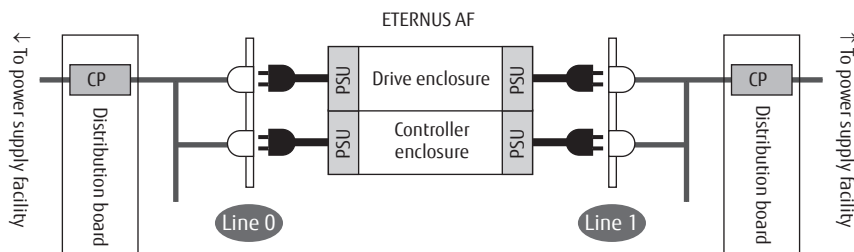
When power cords are connected to a single power supply line, the connections are more secure if each power cord is connected to a different circuit breaker.



● For Direct (No Power Distribution Unit) Connections

The following diagram shows a power supply connection example when no power distribution units are used.

Figure 11 Example of a Power Supply Connection When a Power Distribution Unit Is Not Used



PSU: Power Supply Unit

CP: Circuit Protector



- Only connect the ETERNUS AF to circuit protectors.

Input Power Supply Lines

Multiple power supply facilities in the building or multiple UPS units are recommended for power supply redundancy. A redundant configuration is used for the power supply of the ETERNUS AF. Business can continue even if one of the power supply lines fails.

However, a single power supply facility configuration is also allowed for the entire system optimization (including the server). When selecting a single configuration, take into consideration the availability of the system.

Figure 12 Dual-Line Power Supply (When Connecting to Power Sockets)

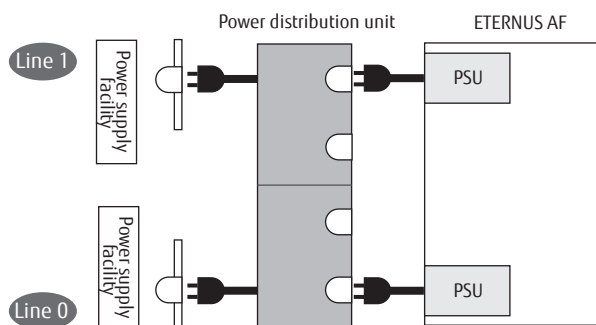


Figure 13 Dual-Line Power Supply (When Connecting to a UPS Unit)

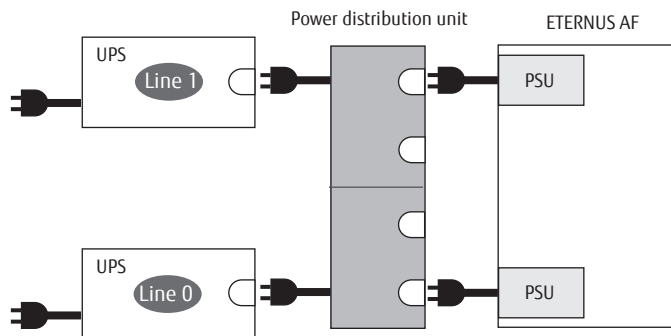


Figure 14 Single-Line Power Supply (When Connecting to Power Sockets)

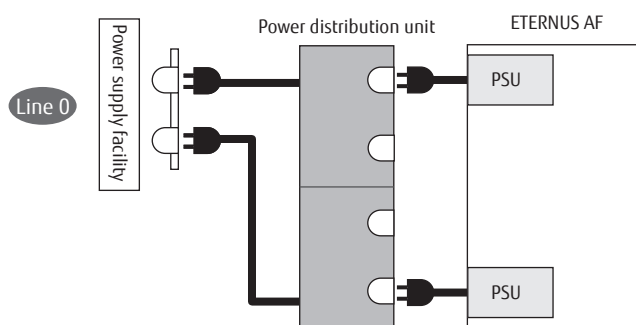


Figure 15 Single-Line Power Supply (When Connecting to a UPS Unit)

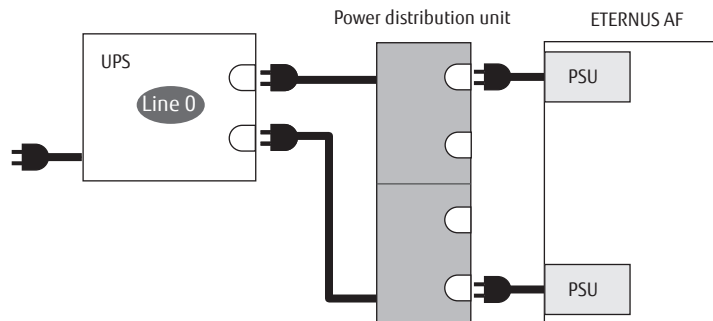
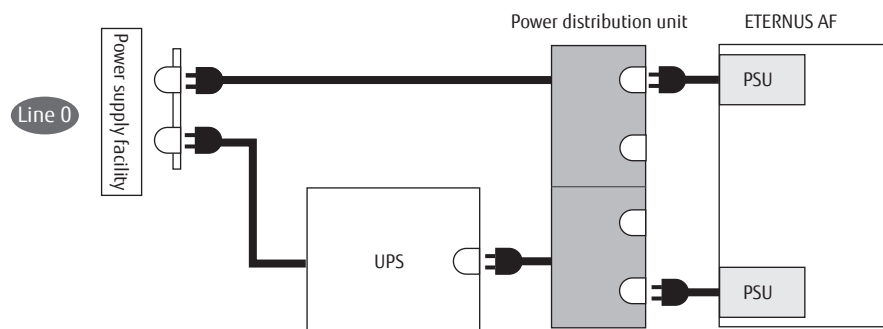
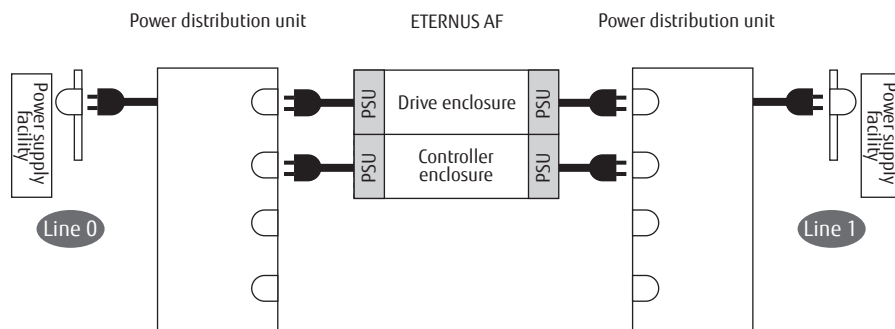


Figure 16 Single-Line Power Supply (When Connecting to a Power Socket and a UPS Unit)



Note

When the power distribution units are separately connected to line 0 (PSU#0) and line 1 (PSU#1), the availability of the power supply facilities is improved.



2. Rack Installation Specifications

This chapter provides the rack installation specification of the ETERNUS AF.

Rack Installation Requirements

This section explains the requirements for installing the ETERNUS AF in a 19-inch rack.

Placement in the Rack

Note the following when installing the ETERNUS AF in the rack.

- The center of gravity must be taken into consideration to prevent a rack from toppling over. Enclosures should generally be installed from bottom to top to lower the center of gravity and to ensure the safe use of racks.
- Enclosures are installed in the following order (from bottom to top).

Table 17 Enclosure Installation Order

Installation order	Enclosure	Size (height)
4	Drive enclosure	2U
3	Controller enclosure	2U
2	Power distribution unit Power Synchronized Unit (*1)	1U/2U 1U
1	UPS (*2)	—

***1:** This is an optional product for only the ETERNUS AF.

***2:** This is an Uninterruptible Power Supply.

Note

- When determining the rack-mounting layout of each enclosure and power distribution unit, consider the length of each cable. For example, if the ETERNUS AF is installed at the top of a 2000mm rack and a 4m power cord is used, the surplus length of the power cord at the bottom of a rack should be about 2m.
- If the storage system is installed at the bottom of a rack, a space for the surplus of cables may not be available in some racks, preventing the storage system from being pulled out when maintenance work is required.
In this case, secure a space of 1U or more at the bottom when installing the storage system.
- If drive enclosures are to be added in the future, securing sufficient space for power distribution units in the bottom of the rack is recommended.

Cable Connection

Cable Connection (Power)

This section describes the power cord connection with the ETERNUS AF.

■ Estimated Power Cable Length

The required cable length may differ depending on the application of the connection. This section describes the estimated cable length according to the application of each connection.

▶ Caution

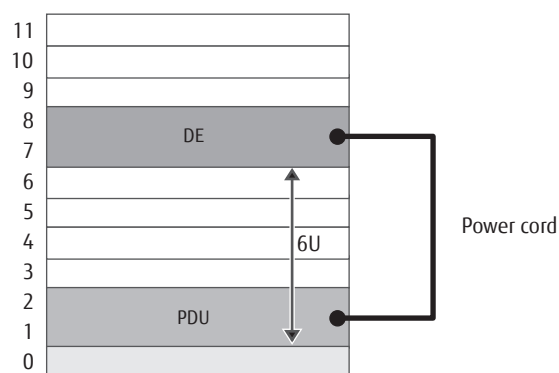
This section describes the cable lengths used to connect to a rack for the ETERNUS AF.
The required cable length may differ depending on the racks that are used.

● When Connecting Each Enclosure to the Power Distribution Unit

Table 18 Cable Lengths When Connecting Each Enclosure to the Power Distribution Unit

Distance between each enclosure and the power distribution unit	Power cable length
5U or shorter	1.0m or more
6 - 16U	1.5m or more
17U or longer	3.0m

Figure 17 Distance between Each Enclosure and the Power Distribution Unit (Example)

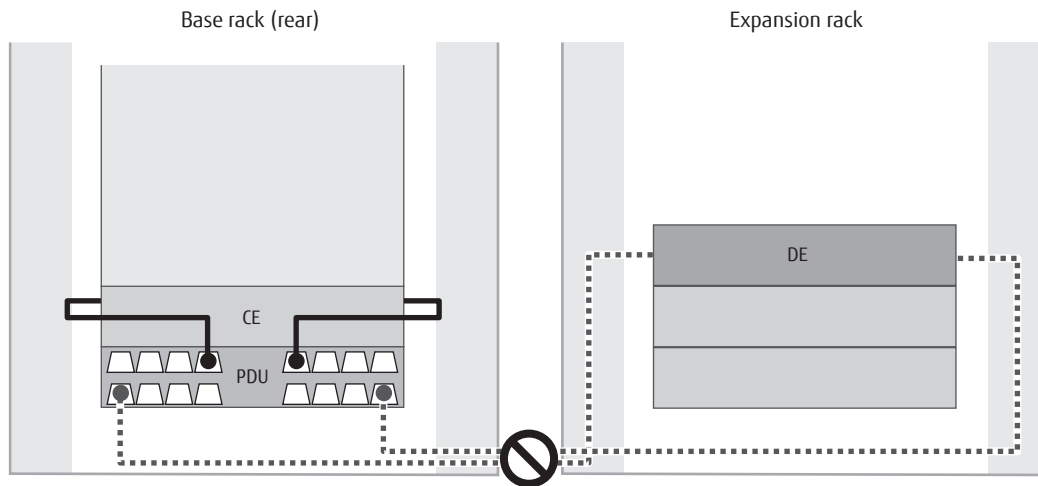


The distance between the enclosure and the power distribution unit in this example is 6U, which is calculated by subtracting the PDU in location 1 from the DE in location 7.

■ Connection Method When Multiple Racks Are Installed

When connecting the power cords (AC cables) of the enclosures to the power distribution units, make sure to secure the necessary number of power outlets within the same rack. Avoid exceeding the power cord length and connecting power cords to different racks.

Figure 18 AC Cable Connection



- : AC cable
- CE: Controller Enclosure
- DE: Drive Enclosure
- PDU: Power Distribution Unit

This section explains the requirements for connecting a power distribution unit with the ETERNUS AF.

● Power Distribution Units (2U, 16 Outlets, 24A)

- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT8 within 24A for each power distribution unit.
- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT4 and the current capacity totaling the current consumption value of power cords that connect to outlets OUT5 to OUT8 within 12A for each power distribution unit.
- When connecting a new enclosure, if the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT4 exceeds 12A, connect to OUT5.

When the current capacity totaling the current consumption value of power cords that connect to outlets OUT5 to OUT8 exceeds 12A, connect to the next power distribution unit.

● Power Distribution Units (2U, 16 Outlets, 16A)

- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT8 within 16A for each power distribution unit.
- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT4 and the current capacity totaling the current consumption value of power cords that connect to outlets OUT5 to OUT8 within 8A for each power distribution unit.

- When connecting a new enclosure, if the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT4 exceeds 8A, connect to OUT5.
When the current capacity totaling the current consumption value of power cords that connect to outlets OUT5 to OUT8 exceeds 8A, connect to the next power distribution unit.

● Power Distribution Units (2U, 12 Outlets, 16A)

- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT6 within 16A for each power distribution unit.
- When connecting, keep the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT3 and the current capacity totaling the current consumption value of power cords that connect to outlets OUT4 to OUT6 within 8A for each power distribution unit.
- When connecting a new enclosure, if the current capacity totaling the current consumption value of power cords that connect to outlets OUT1 to OUT3 exceeds 8A, connect to OUT4.
When the current capacity totaling the current consumption value of power cords that connect to outlets OUT4 to OUT6 exceeds 8A, connect to the next power distribution unit.

For details on the current consumption of each power cord for each type of enclosure, refer to "[Outlet/Socket Specifications](#)" (page 17).

Cable Connection (Between Enclosures)

In the ETERNUS AF, longer cables may be required according to the installation locations of the enclosures in the same rack or the installation locations of enclosures that are used in multiple racks.

For drive enclosures, the length of the provided cables between enclosures is 0.75m.

For extended connections, 2.5m, 3.5m, 6.0m, 15m, and 30m cables are available.

Cables with a length of 0.75m, 2.5m, 3.5m, and 6.0m are Mini SAS HD copper cables, and cables with a length of 15m and 30m are Mini SAS HD active optical cables. There are no operational issues even if different types of cables exist in the ETERNUS AF.

The following guideline shows how the mini SAS HD cables between enclosures should be used according to their cable length.

Table 19 Usage of Cables for Connecting Enclosures

Cable length	Usage
0.75m	Supplied with drive enclosures as standard and used for connecting drive enclosures.
2.5m	Used as extension cables when the lengths of the cables that are supplied with drive enclosures as standard are not sufficient.
3.5m	Used as extension cables when the connection length is longer than 2.5m or when enclosures are connected between the racks.
6.0m	Used as extension cables when the connection length between the racks is longer than 3.5m.
15m	Used as extension cables when the connection length between the racks is longer than 6.0m.
30m	Used as extension cables when the connection length between the racks is longer than 15.0m.

Installable Racks

This section explains the racks in which the ETERNUS AF can be installed.

Fujitsu Racks

The ETERNUS AF can be installed in a Fujitsu 19-inch rack. For information about whether the ETERNUS AF can be installed in an EOled rack or not, contact your sales representative.

Non-Fujitsu Racks

The ETERNUS AF storage systems are developed and their operation is guaranteed on the assumption that they are installed in Fujitsu 19-inch racks. Since the ETERNUS AF cannot be tested (for cooling and strength) in non-Fujitsu 19-inch racks, the operations of ETERNUS AF storage systems cannot be guaranteed. Any problem that may occur by installing the ETERNUS AF in non-Fujitsu racks is not covered by the warranty.

If the ETERNUS AF needs to be installed in a non-Fujitsu rack, the following conditions must be satisfied.

■ Rack Specifications

Use the rack mount kit supplied with the product to install the ETERNUS AF in the rack. The rack specifications must satisfy the conditions listed below. For rack specifications, refer to the manual for the rack that is used.

- Pitch for mounting holes
EIA Standard Universal pitch
- Size for mounting holes
The size of the square holes must be 9mm or more.
- Load bearing capacity
The load bearing capacity must be equal to or larger than the total weight of the ETERNUS AF.
- Unit Installation Area
The dimensions of the area shown in [Figure 19](#) must match the conditions described in [Table 20](#).

Figure 19 Unit Installation Area

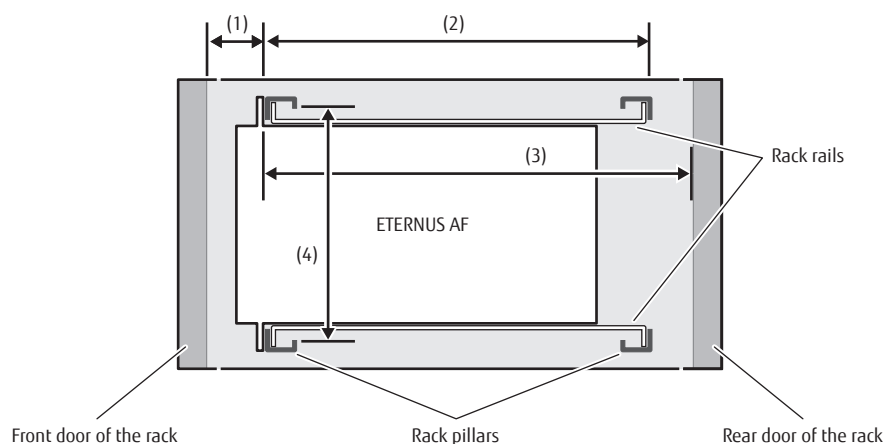


Table 20 Specifications for the Unit Installation Area

Specification		Condition
(1)	Rack front space (Space between the fixed part of the ETERNUS AF on the front side and the front of the rack)	40mm or more
(2)	Mount bracket length (Size between each end of the front and rear rack pillars)	685mm or more 775mm or less
(3)	Rack space (Space between the fixed part of the ETERNUS AF on the front side and the rear of the rack)	830mm or more
(4)	Rack mount kit installation area	482mm or more (recommended)

■ Placement Requirements

When determining service areas, refer to the manual of the rack that is to be used.

Make sure to perform the installation according to the placement requirements described in "Installation Specifications" (page 7) and "Installation Environment" (page 16).

FUJITSU Storage ETERNUS AF250 S2, ETERNUS AF250 All-Flash Arrays Site Planning Guide

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