Hitachi Virtual Storage Platform E590 and E790

93-04-01

Hardware Reference Guide

This document provides information about the system hardware components and the mechanical and environmental specifications for the VSP E590 and VSP E790 storage systems.

Contents

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Preface

This guide describes the hardware features and specifications of the VSP E590 and VSP E790 storage systems.

Intended audience

This document is intended for Hitachi Vantara representatives, system administrators, authorized service providers, or customers who configure and operate the VSP E590 and VSP E790 storage systems.

Readers of this document should be familiar with the following:

- Data processing and RAID storage systems and their basic functions
- RAID storage system hardware components and operational specifications

Product version

This document revision applies to VSP E590 and VSP E790 firmware 93-04-01 or later.

Release notes

Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document. Release notes are available on Hitachi Vantara Support Connect: https://knowledge.hitachivantara.com/Documents.

Changes in this revision

- Support for the 30 TB NVMe drive.

Document conventions

This document uses the following typographic conventions:

Convention	Description
Bold	▪ Indicates text in a window, including window titles, menus, menu options, buttons, fields, and labels. Example: Click **OK**. ▪ Indicates emphasized words in list items.
Italic	▪ Indicates a document title or emphasized words in text. ▪ Indicates a variable, which is a placeholder for actual text provided by the user or for output by the system. Example: `pairdisplay -g` *`group`* (For exceptions to this convention for variables, see the entry for angle brackets.)
Monospace	Indicates text that is displayed on screen or entered by the user. Example: `pairdisplay -g oradb`
< > angle brackets	Indicates variables in the following scenarios: ▪ Variables are not clearly separated from the surrounding text or from other variables. Example: `Status-`*`<report-name><file-version>`*`.csv` ▪ Variables in headings.
[ ] square brackets	Indicates optional values. Example: [a	b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a	b } indicates that you must choose either a or b.
	vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a	b] indicates that you can choose a, b, or nothing. { a	b } indicates that you must choose either a or b.

This document uses the following icons to draw attention to information:

Icon	Label	Description
	Note	Calls attention to important or additional information.

Preface

Icon	Label	Description
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Caution	Warns the user of adverse conditions and/or consequences (for example, disruptive operations, data loss, or a system crash).
	WARNING	Warns the user of a hazardous situation which, if not avoided, could result in death or serious injury.

Accessing product documentation

Product user documentation is available on the Hitachi Vantara Support Website: https://knowledge.hitachivantara.com/Documents. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

Getting help

The Hitachi Vantara Support Website is the destination for technical support of products and solutions sold by Hitachi Vantara. To contact technical support, log on to the Hitachi Vantara Support Website for contact information: https://support.hitachivantara.com/en_us/contact-us.html.

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Please send us your comments on this document to doc.comments@hitachivantara.com. Include the document title and number, including the revision level (for example, -07), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Vantara LLC.

Thank you!

Chapter 1: Introduction

The Hitachi Virtual Storage Platform E590 (VSP E590) and Hitachi Virtual Storage Platform E790 (VSP E790) storage systems are high-performance, large-capacity data storage systems utilizing all-flash NVMe solid-state drives. The storage system consists of a controller chassis and internal components such as fans and PCIe switches.

The NVMe architecture delivers consistent, low-microsecond latency which reduces the transaction costs of latency-critical applications and delivers predictable performance to optimize storage resources.

Key features

High performance

- Multiple controller configuration distributes processing to each controller

- High-speed processing facilitated by up to 768 GiB of cache

- I/O processing speed increased by NVMe flash drives

- High-speed front-end data transfer up to 3.2 GB/s for FC and 1 GB/s for iSCSI

- Response times as low as 66 microseconds

- Integrated with Hitachi Ops Center to improve IT operational efficiencies

High reliability

- Service continuity by main components in redundant configuration

- RAID 1, RAID 5, and RAID 6 support (RAID 6 including 14D+2P)

- Data security by transferring data to cache flash memory at the time of a power outage

Scalability and versatility

- Scalable capacity up to .72 PB (internal), 144 PB (external), and 4M IOPS for VSP E590 .72 PB (internal), 216 PB (external), and 6.8M IOPS for VSP E790.

- Heterogeneous connectivity supporting concurrent attachment to a variety of hosts, including VMware, Linux, UNIX, and Windows

Storage system specifications

The storage system offers superior performance, resiliency, and agility, featuring response times as low as 64 microseconds, all backed up with the industry's first and most comprehensive 100% data availability guarantee. The following table lists the key operational and performance specifications for the storage system.

Table 1 VSP E790 specifications

Item			Specification
System	Number of NVMe flash drives	Minimum	4
		Maximum	24
	RAID group configuration	RAID 6	▪ 6D+2P ▪ 12D+2P ▪ 14D+2P
		RAID 5	▪ 3D+1P ▪ 4D+1P ▪ 6D+1P ▪ 7D+1P
		RAID 1	▪ 2D+2D ▪ 4D+4D
	Maximum number of spare drives		8
	Maximum number of volumes		49,152
	Maximum storage system capacity (physical capacity)	30 TB 2.5-inch SSD used	.64 PiB (.72 PB)
	Maximum external configuration		192 PiB (216 PB)
Memory	Cache memory capacity		768 GiB
Storage interface	DKC-drive interface		NVMe/Dual Port
	Data transfer rate		8 Gbps
Device interface	Supported channel types		▪ Fibre Channel (shortwave, longwave) ▪ iSCSI (optical)
	Data transfer rate	Fibre Channel	up to 4 GB/s
		iSCSI (Optical)	10 Gbps
	Maximum number of front-end modules		6

Chapter 1: Introduction

Table 2 VSP E590 specifications

Item			Specification
System	Number of NVMe flash drives	Minimum	4
		Maximum	24
	RAID group configuration	RAID 6	▪ 6D+2P ▪ 12D+2P ▪ 14D+2P
		RAID 5	▪ 3D+1P ▪ 4D+1P ▪ 6D+1P ▪ 7D+1P
		RAID 1	▪ 2D+2D ▪ 4D+4D
	Maximum number of spare drives		8
	Maximum number of volumes		32,768
	Maximum storage system capacity (physical capacity)	30 TB 2.5-inch SSD used	.64 PiB (.72 PB)
	Maximum external configuration		128 PiB (144 PB)
Memory	Cache memory capacity		384 GiB to 768 GiB
Storage interface	DKC-drive interface		NVMe/Dual Port
	Data transfer rate		8 Gbps
Device interface	Supported channel types		▪ Fibre Channel (shortwave, longwave) ▪ iSCSI (optical)
	Data transfer rate	Fibre Channel	up to 4 GB/s
		iSCSI (Optical)	10 Gbps
	Maximum number of front-end modules		6

Chapter 2: Hardware overview

The storage system consists of a controller chassis and one or more drive chassis mounted in a 19-inch rack.

Controller chassis

The controller chassis contains the following components:

- Controller boards (CTLs)
- Front-end modules (FEMs), also called channel boards (CHBs)
- Power supply (PS)
- Backup fan module (BKMF)

The storage system's CTLs contain the cache memory (CM) and cache flash memory (CFM) for the storage system. The VSP E590 and VSP E790 supports 768 GiB of cache memory.

Number	Item	Description
1	LED (POWER, READY, WARNING, ALARM)	Status LEDs for the controller chassis.
2	POWER ON/OFF (main switch)	Switch that controls power to the storage system.
3	Lock	Use to lock and unlock front bezel.

Number	Item	Description
1	POWER LED	Green: Storage system is powered on. Amber: Storage system is receiving power.
2	READY LED	Green: Normal operation.
3	WARNING LED	Off: Normal operation. Amber: Component requires maintenance. Blink: Failure requires maintenance. **Note**: When system option mode (SOM) 1097 is set to ON, the WARNING LED does not blink, even if the following failure service information messages (SIMs) are issued: 452xxx, 462xxx, 3077xx, 4100xx, and 410100. LED might turn off during user maintenance.
4	ALARM LED	Off: Normal operation. Red: Processor failure (system might be down). For assistance, contact customer support: https://support.hitachivantara.com/en_us/contact-us.html.
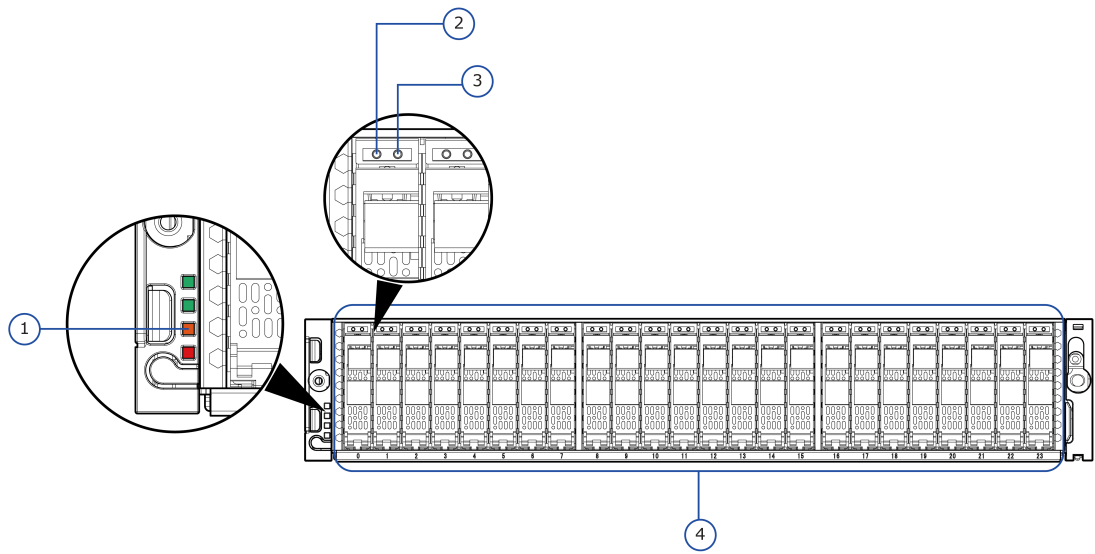
Number	Item	Description
1	LED (POWER, READY, WARNING, ALARM)	Status LEDs for the controller chassis.
2	ALM LED	Red: Drives can be replaced.
3	ACT LED	Green: Normal operation. Green Blinking: The drive is being accessed.
4	Drives	Disk drives
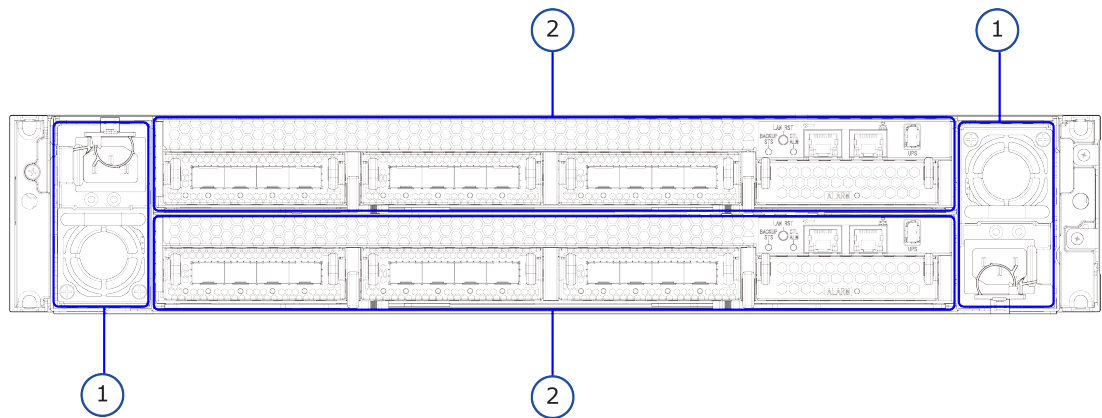
Number	Item	Description
1	Power supply unit	Supplies electric power to the controller components.

Chapter 2: Hardware overview

Number	Item	Description
2	Controllers	Controller 1 (bottom) and Controller 2 (Top)
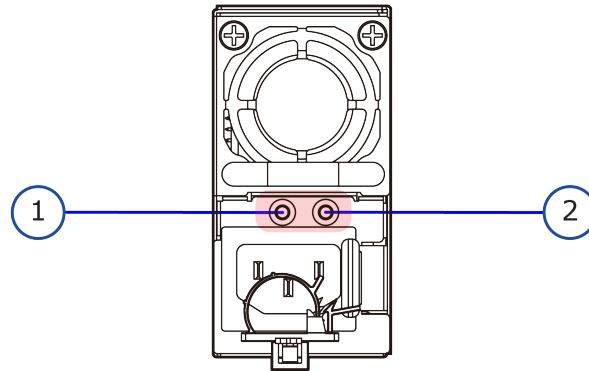
Number	Item	Description
1	RDY LED	On: Normal Operation
2	MAINT LED	On: Power supply unit can be replaced.

Controller board
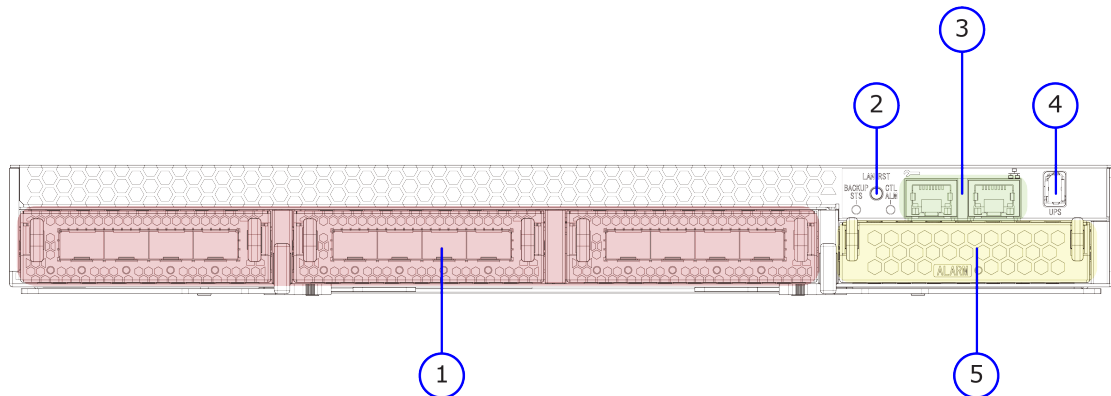
Number	Item	Description
1	Channel board	Channel board component
2	LAN-RST switch	Resets GUM. Use only when instructed by Hitachi Vantara support.
3	LAN port	LAN1: Maintenance LAN port (left)
		LAN2: User LAN port (right)

Number	Item	Description
4	Uninterruptible power supply port	NA
5	Cache flash memory	NA
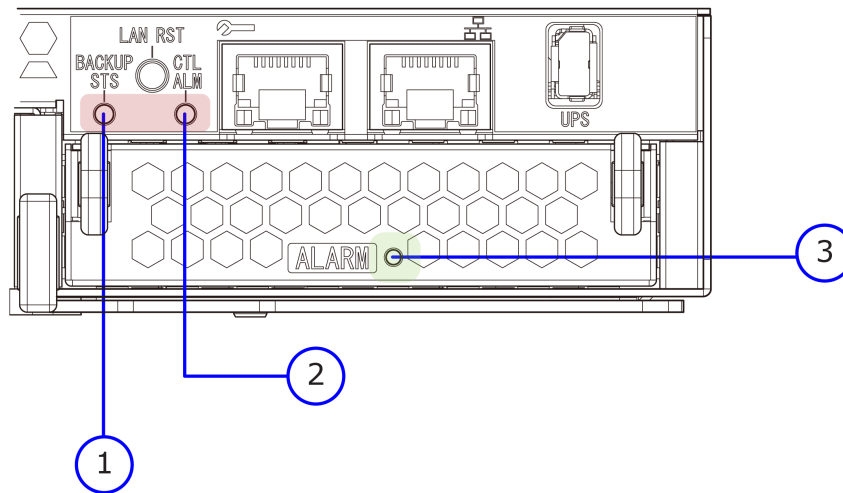
Number	Item	Description

1	BACKUP STS LED	▪ Green: Restoration in progress following power outage.
		  • Fast Blink: Restoring.
		  • Slow Blink: Restoring or sequential shutdown in progress.

2	CTL ALM LED	▪ Red: Controller can be removed. • Failure with the controller's power supply unit. ▪ Amber: LAN reset switch was pressed.
3	ALARM LED (for CFM)	Red: Cache flash memory can be removed.

Front-end modules

The front-end modules (FEMs), also called channel boards (CHBs), control the transfer of data between the host and cache memory. The storage system supports Fibre Channel (FC) and iSCSI front-end modules (FEMs) for attachment to host servers. The front-end module LEDs indicate the operating status of the module.

Specification		Fibre 32-Gbps Ready	iSCSI 10G	iSCSI 10G BASE-T
Model number		DW-F900-4HF32R	DW-F900-2HS10S	DW-F900-2HS10B
Number of PCBs		1	1	1
Host interface		FCP	iSCSI (optical)	iSCSI (copper)
Data transfer rate (MB/s)		16Gbps: 400/800/1,600 32Gbps: 800/1,600/3,200	1,000	100/1,000
Number of options installed( ): DKB slot used		2/4/6/	2/4/6	2/4/6
Number of ports per PCB		4	2	2
Number of ports per storage system( ): DKB slot used		8/16/24/	4/8/12	4/8/12
Maximum cable length	Short wave[1]	400m/190m/125m/ 100m	550m	-
	Long wave	10km	-	-
	Copper	-	-	50m (cat 6a)

1. When 50/125mm laser optimized multi-mode Fibre cable (OM3 or OM4) is used. When using other cable types, contact customer support.

10-Gbps iSCSI board LEDs and connectors (optical)
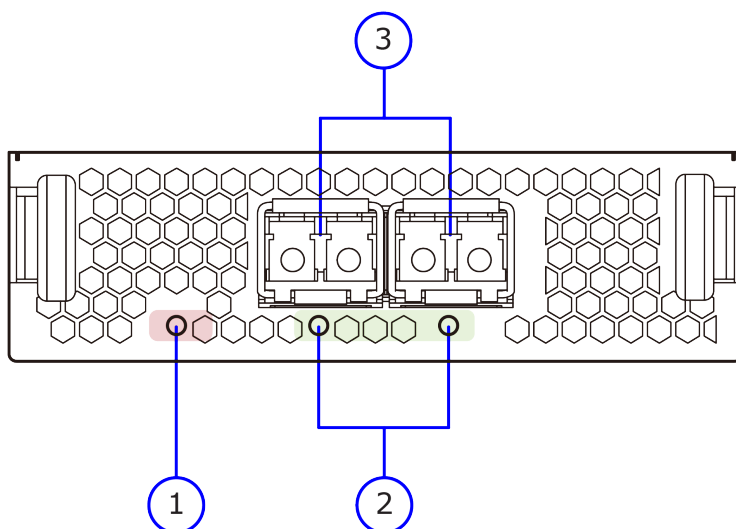
Number	Item	Description
1	STATUS LED	Green: Front-end module is in the power-on state.
		Red: Front-end module can be removed safely.
2	PORT LED	Red: Small form-factor (SFF) pluggable can be removed.
		Blue: Normal link status.
		Blink blue: Front-end module is in communication status.
3	iSCSI connectors	Connect to Ethernet cables.

Table 3 Port assignments

CHB number	Port 1	Port 2
CHB-1A	1A	3A
CHB-1B	1B	3B
CHB-1C	1C	3C
CHB-2A	2A	4A
CHB-2B	2B	4B
CHB-2C	2C	4C

10-Gbps iSCSI board LEDs and connectors (copper)
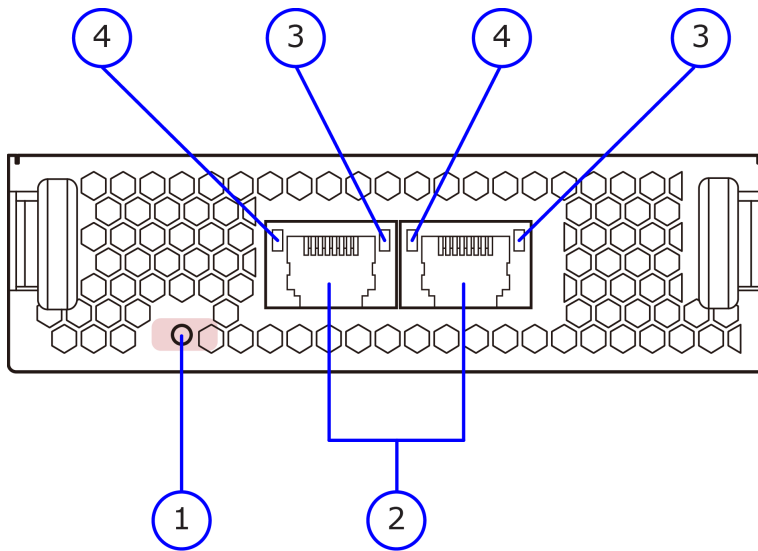
Number	Item	Description
1	STATUS LED	Green: Front-end module is in the power-on state. Red: Front-end module can be removed safely.
2	iSCSI connectors	Connect to Ethernet cables.
3	PORT (Link/Speed) LED	Yellow: 1-Gbps link. Green: 10-Gbps link. Off: No link connection.
4	PORT (Act) LED	Green: Link connection is established. Blinking: Communication is in progress. Off: No link connection or not ready to communicate.

Table 4 Port assignments

CHB number	Port 1	Port 2
CHB-1A	1A	3A
CHB-1B	1B	3B
CHB-1C	1C	3C
CHB-2A	2A	4A
CHB-2B	2B	4B

CHB number	Port 1	Port 2
CHB-2C	2C	4C

16-Gbps or 32-Gbps Fibre Channel (4-port) board LEDs and connectors
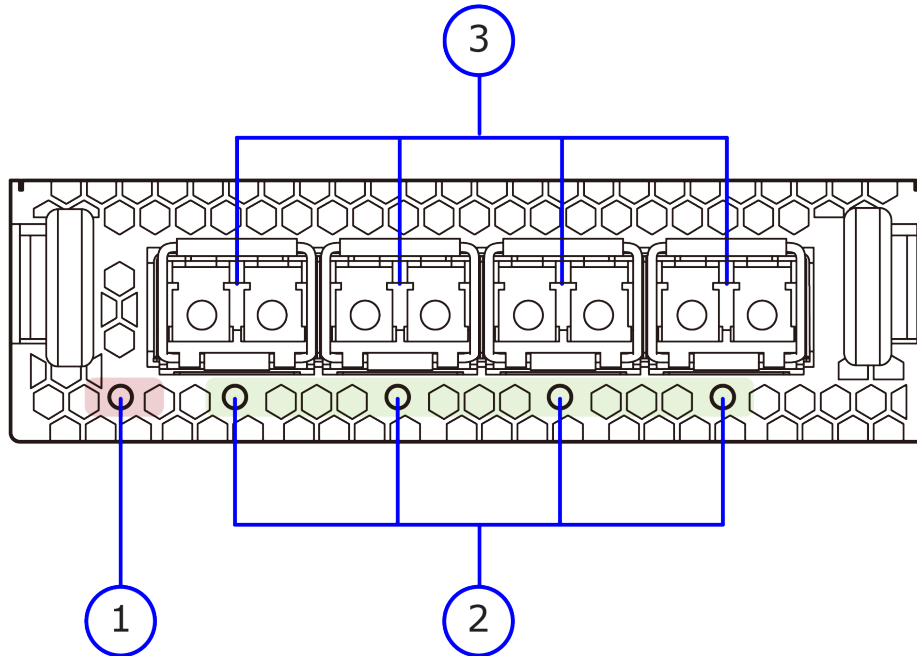
Number	Item	Description
1	STATUS LED	Green: Front-end module is in power-on state. Red: Front-end module can be removed safely.
2	PORT LED	Red: Small form-factor (SFF) pluggable can be removed. Blue: Normal link status at 16-Gbps (16-Gbps). Blue: Normal link status at 32-Gbps (32-Gbps). Green: Normal link status at 4-Gbps or 8-Gbps (16-Gbps). Green: Normal link status at 8-Gbps or 16-Gbps (32-Gbps).

Number	Item	Description
3	Fibre Channel connectors	Connect to Fibre Channel cables.

Table 5 Port assignments

CHB number	8-Gbps, 16-Gbps, or 32-Gbps Fibre Channel ports (left to right)			
	Port 1	Port 2	Port 3	Port 4
CHB-1A	1A	3A	5A	7A
CHB-1B	1B	3B	5B	7B
CHB-1C	1C	3C	5C	7C
CHB-2A	2A	4A	6A	8A
CHB-2B	2B	4B	6B	8B
CHB-2C	2C	4C	6C	8C

LAN blade LEDs and connectors
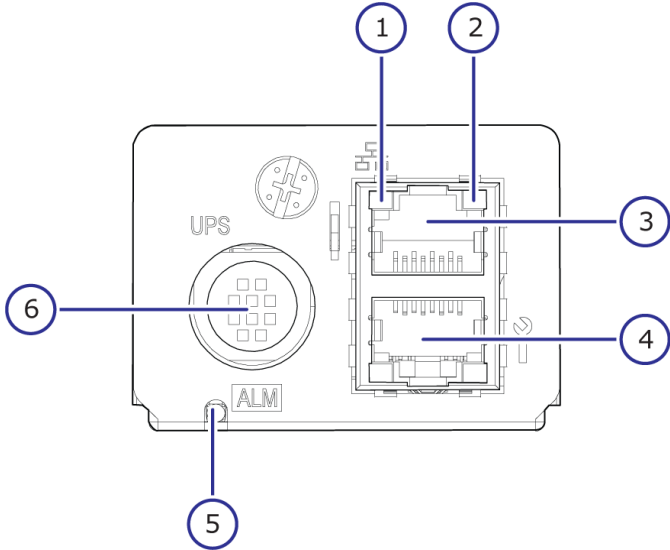
Number	Item	Description
1	LINK LED	Green: Link status is normal.
2	ACT LED	Orange: Data is being transferred.

Number	Item	Description
3	LAN 2	LAN port used by the user.
4	LAN 1	Maintenance LAN port used by service personnel.
5	LAN ALARM LED	Red: LAN blade can be removed.
6	Uninterruptible power supply (UPS) port	N/A

Rack support

The storage system can be installed in the Hitachi Universal V2B rack as well as non-Hitachi 19-inch racks that meet the storage system's specifications.

For details about the Hitachi Universal V2B rack, see the *Hitachi Universal V2B Rack Reference Guide*.

Non-Hitachi racks must be 4-post, EIA 310-D compliant with adequate airflow and weight capacity. The PDUs must be mounted properly to avoid any issues for servicing the storage system. The PDU receptacles must face toward the back (not toward each other). The area behind the storage system and between the vertical 19-inch mounting posts must be free of PDUs and cable loops.

Chapter 3: Specifications

The Hitachi Virtual Storage Platform E590 (VSP E590) and Hitachi Virtual Storage Platform E790 (VSP E790) storage systems are designed to operate in a controlled environment such as a data center. The following tables provide the environmental, electrical, and physical requirements and specifications for the VSP E590 and VSP E790.

Environmental specifications

The following tables provide the environmental specifications, including operating and non-operating, for the Hitachi Virtual Storage Platform E590 (VSP E590) and Hitachi Virtual Storage Platform E790 (VSP E790) storage systems.

Table 6 Temperature

State	Specification
Operating	10°C to 35°C (50°F to 95°F)
Non-operating	-10°C to 50°C (14°F to 122°F)
Transport, storage	-30°C to 60°C (-22°F to 140°F)
Temperature change rate	10°C/hr (18°F/hr)

Table 7 Humidity

State	Specification
Operating	8% to 80%
Non-operating	8% to 90%
Transport, storage	8% to 90%
Maximum wet bulb temperature (°C)	29°C (84.2°F) (noncondensing)

Table 8 Vibration, shock, and impact

Type	State	Specifications
Vibration	Operating	0.98 m/s^2 (0.1 G) or less [frequency component 5 Hz to 100 Hz]
	Non-operating	Same as operating specification
Impact	Operating	No impact
	Non-operating	78.4 m/s^2 (8.0 G), 15 ms
Seismic wave	Operating	2.5 m/s^2 (0.25 G) (approximately 250 Gal) or less
	Non-operating	3.9 m/s^2 (0.4 G) or less: No critical damage for product function (normal operating with part replacement). 9.8 m/s^2 (1.0 G) or less: Ensure own safety with fall prevention.

Table 9 Altitude (Temperature range)

State	Specification
Operating (m)	3,050 m (10°C to 28°C) [10,006 ft. (50°F to 82.4°F)] 950 m (10°C to 35°C) [3,116 ft. (50°F to 95°F)]
Non-operating (m)	-60 m to 12,000 m (-196 ft. to 39,370 ft.)

Table 10 Environment/atmosphere

Type	State	Specifications
Dust	Operating	0.15 µg/m^3 or less
	Non-operating	-
Gaseous contaminants	Operating	Within ANSI/ISA S71.04-2013 G1 classification levels.
	Non-operating	Keep data center clean by monitoring and controlling gaseous contamination.

Table 11 Noise level (recommended)

State	Specification
Operating	90 dB or lower*

Chapter 3: Specifications

State	Specification
Non-operating	

> * **Fire suppression systems and acoustic noise:** When activated, some inert-gas fire-suppression systems release pressurized gas at high velocity through multiple nozzles in the data center, generating high levels of acoustic noise. Pneumatic sirens can also generate high levels of acoustic noise. High levels of acoustic noise can cause vibrations to the media in the storage system, resulting in I/O errors, performance degradation in the media, and to some extent damage to the drives. Media noise-level tolerance varies among different models, designs, capacities, and manufacturers.
>
> The recommended acoustic noise level of 90 dB or less represents the current operating environment guidelines for which the storage systems are designed and manufactured for reliable operation when placed 2 meters or more from the source of the noise.
>
> 📄 **Note:** The storage systems and media are not tested for compatibility with fire-suppression systems or pneumatic sirens. In addition, Hitachi does not recommend or claim compatibility with any fire-suppression systems or pneumatic sirens. The customer is responsible for following applicable regulations.
>
> To prevent I/O errors and damage to the storage system due to high levels of acoustic noise:
>
> - Install noise-reducing baffles to mitigate the noise to the media in the storage system.
> - Consult the fire-suppression-system manufacturer about noise-reduction nozzles to protect the media in the storage system.
> - Locate the storage system as far away as possible from noise sources.
> - If it can be done safely and without risk of personal injury, shut down the storage system before the noise occurs to prevent data loss due to damage to the media in the storage system.
>
> DAMAGE TO MEDIA FROM FIRE-SUPPRESSION SYSTEMS OR PNEUMATIC SIRENS VOIDS THE MEDIA WARRANTY.

Electrical specifications

The Hitachi Virtual Storage Platform E590 (VSP E590) and Hitachi Virtual Storage Platform E790 (VSP E790) run on single-phase AC power. The AC power input for the VSP E590 and VSP E790 storage systems have a duplex PDU architecture that enables the equipment installed in the rack to remain powered on if power is removed from one of the two power distribution panels.

The following tables provide the electrical specifications for the VSP E590 and VSP E790 storage systems, including input power and input voltage and frequency requirements.

Table 12 Input power specifications

Item	Component	Specification
Rated power	Controller	1,960 V
Input power[1]	Controller	Single-phase AC 50 Hz/60 Hz 200 V to 240 V
Input current[1,2]	Controller	9.8 A
Steady current[3]	Controller	4.9 A
Leakage current	Controller	1.75 mA
Inrush current	Controller	1st (0-p): 30 A 2nd (0-p): 20 A 1st (0-p) time: 25 ms
Power cord plug type	Controller	IEC60320 C14
Notes:		
1. When planning the air-conditioning equipment and power-supply system, use the multiplied value of [Input Power] × [Input Current]. 2. The maximum current of AC input is not a redundant configuration. 3. The maximum current of AC input is a redundant configuration.		

Table 13 Input voltage and input frequency requirements

Frequency	Input Voltage (AC)	Conditions	Tolerance (%)
60 Hz ±2 Hz	200 V to 240 V	1 phase 2 wire + ground	+10% or -11%
50 Hz ±3 Hz	200 V to 240 V	1 phase 2 wire + ground	+10% or -11%
60 Hz ±2 Hz	100 V to 120 V	1 phase 2 wire + ground	+10% or -11%
50 Hz ±3 Hz	100 V to 120 V	1 phase 2 wire + ground	+10% or -11%

Physical specifications

The following table provides the physical specifications for the Hitachi Virtual Storage Platform E590 (VSP E590) and Hitachi Virtual Storage Platform E790 (VSP E790) storage systems, including weight, heat output, power consumption, and air flow specifications.

Table 14 Weight, heat output, power consumption, and air flow specifications

Model number	Weight (kg)[2]	Heat output (W)[2]	Power consumption (VA)[1,2]	Air flow (m^3/min)[3]
DW-F850-CBSFB2	1	-	-	-
DW900-CBSN	11.9	1064	1120	4.0
DW-F900-CM32G	0.054	4	4.2	
DW-F900-BM70	0.2	9.7	10.2	-
DW-F900-BM7E	0.2	9.7	10.2	-
DW-F900-4HF32R	0.4	17.9	19.9	-
DW-F900-2HS10S	0.4	18.0	18.9	-
DW-F900-2HS10B	0.4	28.5	30.0	-
DKC-F810I-1PL16	0.02	0.79	0.88	-
DKC-F810I-1PS16	0.02	0.94	1.05	-
DKC-F810I-1PS32	0.02	1.29	1.43	-
DKC-F910I-1R9RVM	0.21	25.0	26.0	-
DKC-F910I-3R8RVM	0.21	25.0	26.0	-
DKC-F910I-7R6RVM	0.21	25.0	26.0	-
DKC-F910I-15RRVM	0.21	25.0	26.0	-
DKC-F910I-30RRVM	0.21	25.0	26.0	-

1. Actual values at a typical I/O condition. (Random Read and Write, 50 IOPSs for HDD, 2500 IOPSs for SSD, Data Length: 8k bytes. All fans rotate at normal.) These values may change for future compatible drives.
2. The value is from the configuration of Model List.
3. The value is MAX level.

Chapter 4: Turning storage system power on and off

The storage system can be powered on and off using the power control panel located on the controller chassis during normal operating conditions or in case of a power failure.

Powering on the storage system

Use the following procedure to power on the storage system. The main switch on the controller chassis is used to power on the storage system.
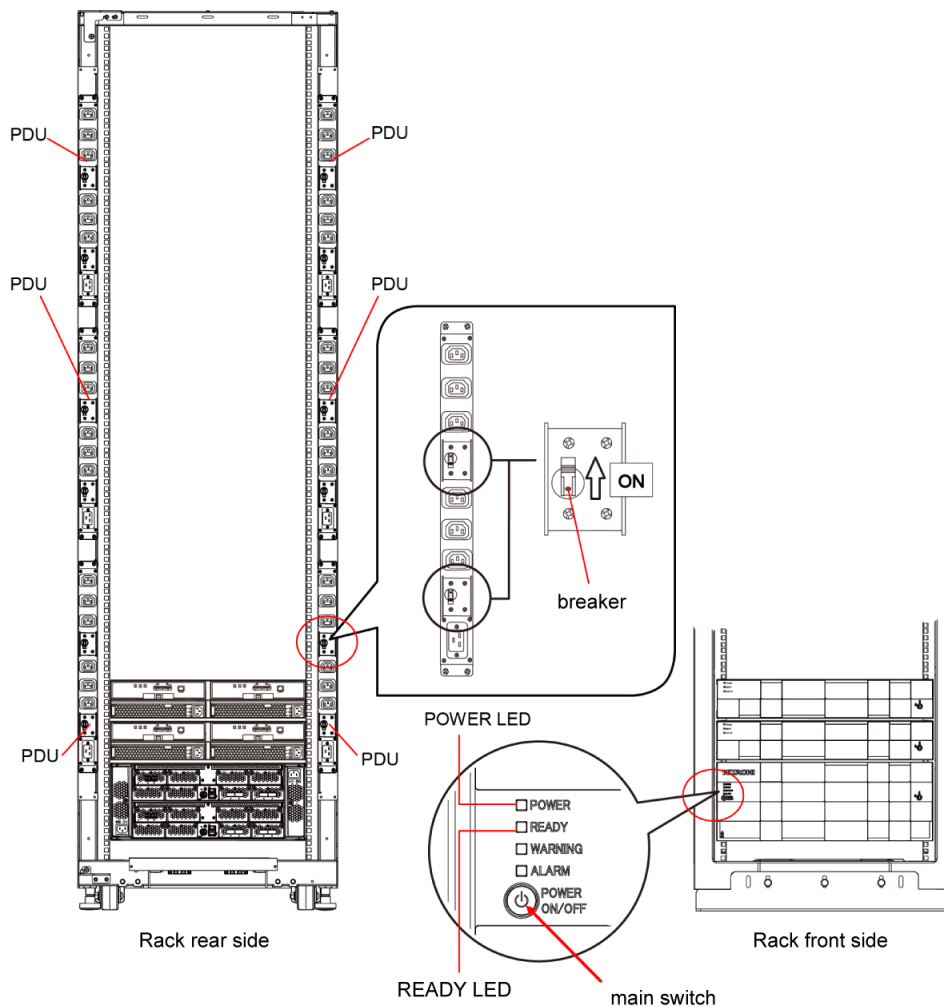
Procedure

1. Turn ON all the breakers to the storage system.

2. Press the main switch on the controller chassis for three seconds until the POWER LED changes from amber to green.

   📄 **Note:** The storage system will take approximately 13 minutes to finish powering on.

3. Wait for the storage system to complete its power-on self-test and bootup processes. When the READY indicator is ON (green LED), the storage system is ready for use.

   ⚠️ **Caution:** If the ALARM indicator is also ON (red LED), or if the READY indicator is not ON after 40 minutes, contact customer support for assistance.

Powering off the storage system

Use the following procedure to power off the storage system. The main switch on the controller chassis is used to power off the storage system.

Before you begin

- Ensure that all software-specific shutdown procedures have been completed. Refer to the applicable user manuals for details.

- Ensure that all I/O activity to the storage system has stopped. You can vary paths offline and shut down the attached hosts.

Procedure

1. Press the main switch on the controller chassis for approximately three seconds until the POWER LED on the front of the chassis changes from solid green to a blinking status.

2. Release the main switch and the POWER LED returns to solid green after blinking for approximately three seconds.
   The power-off process begins. The process takes approximately 18 minutes or longer depending on the amount of data that needs to be written. The POWER LED is solid green during the powering off process. The POWER LED changes from green to amber when the process is completed.

3. Verify the POWER LED on the front of the storage system changes from green to amber.

4. To stop the power supply, remove the power cables from the power supply units on the controller chassis and drive box.

   If the storage system is connected to a PDU, you can stop the power supply by turning off the PDU breaker.

   📄 **Note:** If the storage system does not receive power for more than six months, the battery can become discharged and possibly damaged. To avoid this situation, charge the battery for more than three hours at least once every six months.

Chapter 5: Site preparation

The delivery and installation site for the storage system must meet certain requirements to ensure successful and efficient installation of the storage system.

> **Note:** The following information is provided to assist in installation planning and is not intended to be complete. The installation and maintenance documents used by Hitachi Vantara personnel contain complete specifications. For further information about site preparation for storage system installation, contact customer support.

Site preparation checklist

Verify the availability of each item in the site preparation checklist.

The responsibilities for installation planning are shared by the customer and the Hitachi Vantara account team. The required installation planning tasks must be scheduled and completed to ensure successful and efficient installation of the storage system.

The following tasks might take several weeks to complete:

- Acquiring required power outlets.

- Adding or modifying air conditioning systems.

- Making room alterations to accommodate the storage system.

- Ordering third-party equipment, such as non-Hitachi racks, network switches, and host servers for the storage system.

The following checklist will assist you as you perform your installation. You can make copies of this checklist for each installation you perform and check each step after it has been performed.

Requirement	Yes	No
Is the data center free of any equipment servicing hazards, such as electrical or data cables that obstruct access?		
Does the data center have a suppression system?		
Does the floor plan meet the service clearance and cutout requirements?		
Does the floor meet the load rating requirements?		

Requirement	Yes	No
Does the data center meet the environmental requirements including temperature, humidity, airflow, and acoustic?		
Is all equipment not supplied by Hitachi (for example, connectors, receptacles, and network switches) on site and ready for use?		
Are the input circuit breakers adequate for equipment loads?		
Are uninterruptible power supplies (UPS) in place?		
Have all sources of electrical interference been addressed?		
Does the site enforce access controls (for example, will Hitachi representatives need an escort)?		
Will the equipment fit through all doors and corridors and in elevators?		

Site planning

All planning activities should be scheduled and completed before the equipment is delivered.

The planning process includes:

- Planning hardware configuration, such as system component layout in the rack and drive allocation.

- Planning for specific network topologies, cabling configurations, network switches, and cabling of connected host computers.

- Ensuring all cables for specific controller and drive tray configurations are properly ordered.

- Verifying all electrical service wiring is installed at the predetermined location.

Complete the suggested tasks before receiving and installing the storage system:

- Prepare a preliminary layout of the installation.

- Review the power and the heating, ventilation, and air-conditioning requirements before ordering any additional support equipment.

- Make a final layout of the installation and review the layout with the Hitachi Vantara representative.

- Verify the installation of electrical service wiring at the predetermined location is proper before installing the storage system.

- Verify all additional equipment, such as switches and host computers, is installed and operational.

Installation site considerations

When planning and preparing for the installation of a storage system, consider the following:

- The delivery area must provide enough space and floor strength to support the packaged equipment cartons for the storage system. Doorways and hallways must provide enough clearance to move the equipment safely from the delivery area to the destination.

- The computer room must have sufficient space to accommodate the storage system and other necessary equipment and provide minimum clearance around the storage system for service access and to verify proper weight distribution on the computer room floor. It must also include correctly positioned floor cutouts for the storage system's power and data cables.

- If the storage system arrives in hot or cold weather or you notice any condensation, do not unpack it until it has been allowed to reach room temperature or the condensation to clear (one to two hours). Immediately exposing the storage system to warm temperature can cause condensation to occur, which could damage the electronics. Maintain recommended humidity level and airflow rates.

- Take the necessary precautions to prevent electrostatic discharge (ESD). Verify that all equipment and flooring are grounded. Store spare electric parts in antistatic bags until you are ready to install them. When handling the storage system, wear protective devices like wrist straps, sole grounders, and conductive shoes.

- Proper environmental conditions for the storage system must be maintained. For optimal performance, storage systems require controlled environmental conditions that are often best facilitated through raised flooring and under-floor air conditioning. It is the responsibility of the customer to monitor this environment and ensure continued conformance with the recommended environmental specifications.

- The computer room must have adequate power facilities for the storage system. Adequate power is necessary to ensure reliable functioning of electronic equipment and for the safety of the customer's installation. The customer is responsible for procuring, installing, and maintaining adequate power to the equipment.

Floor cutout and service clearance

Be sure your site has sufficient space to accommodate the storage system.

When preparing the space required for your storage system, be sure the site:

- Is large enough to hold the new storage system and other equipment.

- Provides minimum clearance around the storage system for service access and to verify proper weight distribution on the computer room floor.

- Includes correctly positioned floor cutouts for the storage system's power and data cables.

To verify there is sufficient space for the storage system, document your site's floor plan, including the locations of:

▪ Structural support columns and other immovable objects

▪ Walls

▪ All existing equipment, cabinets, racks, networking equipment, and other systems

▪ Where the new storage system will be installed

▪ Floor and electrical cutouts

▪ Interconnecting cables and power cords, including lengths

▪ Floor vents

The space requirements must take into consideration the total floor clearance required for the storage system. This includes:

▪ The space required by the equipment

▪ Service clearance - the floor space required to access the storage system.

▪ Additional space required to distribute the equipment weight on your computer room's raised floor. The amount of additional space required depends on your floor load rating.

▪ Additional space required to view the storage system LEDs on the front and rear panels.
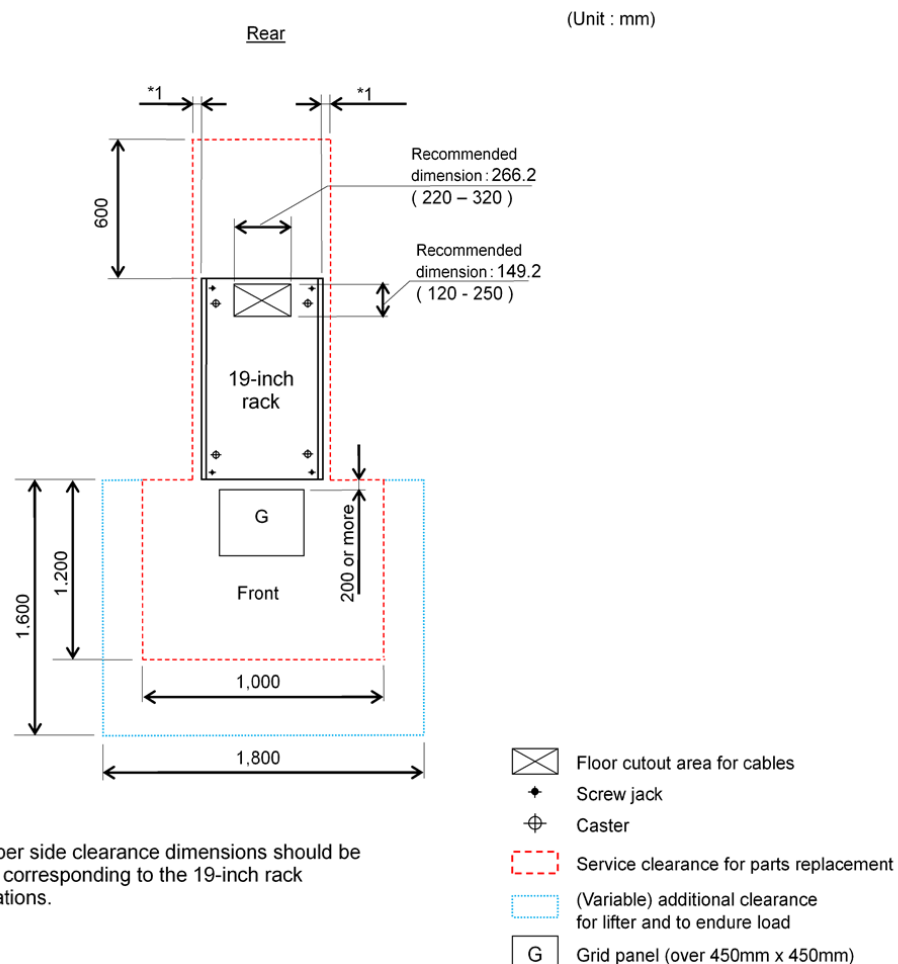
If your computer room uses floor cutouts to route power and data cables, position the cutouts toward the center of the rack. If this is not possible, position the cutouts off-center from the rack as long as the cutout is within the allowable range and allows smooth routing and entrance of cables. Check the relationship between the position of the cutout and the cable openings on the rack.

Floor load rating

The floor space at the installation site must support the combined weight of all associated component and equipment. The maximum load rating is 709 kg.

Appendix A: Component list

The following table lists and describes the components of the storage system. For more information, contact your Hitachi Vantara representative or customer support.

Component list

Table 15 CBSN controller components

Model number	Description	Quantity
DW900-CBSN	2U chassis	1
	Binder (two types)	4
DW-F900-EQRR1	Optional Earthquake Resistivity Bracket	1
DW-F850-CBSFB2	Front bezel (2U)	1
DKC-F910I-1R9RVM	1.9 TB, 12 Gbps, SFF, NVMe flash drive	0-24
DKC-F910I-3R8RVM	3.8 TB, 12 Gbps, SFF, NVMe flash drive	0-24
DKC-F910I-7R6RVM	7.6 TB, 12 Gbps, SFF, NVMe flash drive	0-24
DKC-F910I-15RRVM	15 TB, 12 Gbps, SFF, NVMe flash drive	0-24
DKC-F910I-30RRVM	30 TB, 12 Gbps, SFF, NVMe flash drive	0-24
DW-F900-CTLSN	Controller board	2
DW-F900-CTLSNE	Encrypting controller board	2
DW-F900-CTLMN	Controller board	2
DW-F900-CTLMNE	Encrypting controller board	2
DW-F900-CM32G	Cache memory (32 GB)	2-12
DW-F900-BM70	Cache flash memory non-encrypted (CFM)	2-4
DW-F900-BM7E	Cache flash memory with encryption (CFM)	2-4

Model number	Description	Quantity
DW-F900-2HS10S	Front-end module (also know as a channel board) (10-Gbps SFP optic-iSCSI)	2-6
DW-F900-2HS10B	Front-end module (10-Gbps copper-iSCSI)	2-6
DW-F900-4HF32R	Front-end module (32/16-Gbps 4port-FC)	2-6
DKC-F810I-1PS16	SFP for 16 Gbps Shortwave	0-24
DKC-F810I-1PL16	SFP for 16 Gbps Longwave	0-24
DKC-F810I-1PS32	SFP for 32 Gbps Longwave	0-24

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