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# Site Preparation Guide

**Hitachi Virtual Storage Platform G200, G400, G600, G800**

**Hitachi Virtual Storage Platform F400, F600, F800**

Hitachi Data Systems

**MK-94HM8034-07**

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# Contents

# Preface

Before you proceed with your installation, it is important to confirm that your site is ready to support your storage system.

This guide describes how to plan and prepare for the installation of the Hitachi Virtual Storage Platform G200, G400, G600, G800 storage systems and Hitachi Virtual Storage Platform F400, F600, F800 all-flash arrays.

As part of the site-preparation process, customers are required to purchase site-preparation services from Hitachi Global Services. These services include:

- A telephone predelivery site survey to confirm power, location of equipment, access, and expectations.
- Telephone consultation to determine a customer's optimum configuration.

- Comments

# Safety and environmental notices

**Equipment warranty**

The term of guarantee of normal operation of the storage system and free service is one year from date of purchase.

If a failure occurs multiple times, the storage system might shut off to avoid a serious accident.

**Notice of export controls**

Export of technical data contained in this document might require an export license from the United States government, the government of Japan. or both. Contact the Hitachi Legal Department for guidance about any export compliance questions.

**Backup**

Hitachi cannot guarantee against data loss due to failures. Therefore, back up your data to minimize chances for data loss.

Data backup is also critical when hardware components are added or replaced, because performing such hardware procedures restores parameter settings that can affect how data is managed on the storage systems.

**Disposal**

This symbol on the product or on its packaging means that your electrical and electronic equipment should be disposed at the end of life separately from your household wastes.

There are separate collection systems for recycling in the European Union. For more information, contact the local authority or the dealer where you purchased the product.

**UEFI Development Kit 2010**

This product includes UEFI Development Kit 2010 written by the UEFI Open Source Community. For more information, see the UEFI Development Kit website:

http://sourceforge.net/apps/mediawiki/tianocore/index.php?title=UDK2010



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## General safety guidelines

Before starting maintenance:

- Maintenance must be performed by trained and qualified engineers only.
- The safety guidelines and procedures in this manual must be read and followed.
- In this manual and on the storage system, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- If warning labels on the storage system become dirty or start peeling off, replace them.
- If an anomaly such as an unusual noise, smell, or smoke occurs on the storage system while it is running, power off or remove the power cables immediately.
- Hazard warnings in this manual or on the storage system cannot cover every possible case, because it is impossible to predict and evaluate all circumstances beforehand. Be alert and use common sense.
- To ensure normal operation, operate the storage system according to the information in this manual.

Read the following safety guidelines carefully and follow them when you conduct maintenance of the machine:

- Do not use materials that are outside the specifications for the storage system.
- Use the spare parts, consumables, and materials for maintenance that are specified in this manual; otherwise, personal injury, system damage, and degradation in system quality can occur.
- Keep the maintenance area neat.
- Always put away parts, materials, and tools when not in use.

## Handling of heavy parts

- When lifting a heavy object, hold it close to yourself and keep your back erect to prevent back injury.
- When lifting an object designated with a caution in this manual, use a proper lifting tool or have somebody assist you.

## Preventing electric shock

- Before starting work, be sure that, unless otherwise specifically instructed, there is no potential electric hazard in the maintenance area such as insufficient grounding or a wet floor.
- Before starting work, know where the emergency power-off switches are located and be sure you know how to operate them.

- Unless otherwise specifically instructed, remove all power sources to the machine before starting maintenance. Switching off the storage system power supplies is usually not sufficient.
- Do not touch any uninsulated conductor or surface that remains charged for a limited time after the external power supply to the storage system is disconnected.
- Do not replace parts during a thunderstorm.

## Avoiding rotating or moving parts

- Do not supply power to any device with rotating or moving parts that are not properly covered.
- Tuck in your tie, scarf, shirt, or any other loose clothing to prevent it from getting caught by a rotating or moving part.

## Preventing machine damage

- Use the tools and instruments, as instructed in this manual, or equivalent commercially available tools and instruments suited for the purpose.
- Use measurement instruments and powered tools that are properly calibrated or periodically inspected.
- Before finishing your work, be sure all parts removed during maintenance have been installed in their original positions in the storage system. Do not leave any tools or foreign material in the storage system.

## Working when the storage system is turned on

Observe the following safety measures when working on the storage system with the system power turned on. When you perform maintenance, do not touch live electric parts to prevent an electric shock.

- Do not touch heat sinks immediately after a board is removed because the heat sinks are extremely hot.
- While performing maintenance, do not drop tools, screws, or other items into the storage system, because doing so can cause a short circuit.
- While performing maintenance, do not damage or pinch wires.
- When moving a heavy object, have at least two people move the object after confirming there are no obstacles nearby.

## Precautions when using the storage system

- Use the supplied power cords included with the storage system. Do not use the supplied power cords for other products. Do not use other power cords with the storage system.
- Shut off the power feed to the equipment and inform the system administrator immediately if you notice an unusual smell, abnormal heat generation, or smoke emission. Leaving such conditions unattended can cause electric shock or fire.

- Exercise care when handling the storage system and its parts. Do not drop the equipment or parts.
- Do not stand on the storage system. Avoid using the storage system for any use other than the one for which it was originally designed.
- Do not place heavy objects on the storage system, near the vents on the front and rear panels, or on the cables attached to the storage system.
- Do not put a container with water, paper clips, or the like on the storage system or near the power supply.
- Route cables in a way to prevent people from tripping over them.
- Do not operate the storage system in a moist or dusty place.
- Keep these vents open and be sure they are not blocked to keep the storage system ventilated. Cool air enters the storage system from the air vent on the front panel and exits through the vent on the rear panel.
- If a failure occurs in the storage system, follow the instructions in this manual. If the problem is not covered by this manual, contact your system administrator.

## Procedures in an emergency

### For electric shock

- Before performing maintenance, be sure that there is no potential electric hazard in the maintenance area, such as insufficient grounding or a wet floor.
- Before performing maintenance, observe where the emergency poweroff switches are located and be sure you know how to operate them.
- Unless otherwise instructed, remove all power sources to the storage system before starting work. Switching off the storage system power supplies is not sufficient. When power is fed from a wall or floor outlet, unplug the power supply cord, or turn off the switch on the power distribution panel or board.
- If the power supply has a lockout device, lock the device after powering off the storage system and retain the key. Attach a notice on the panel or board prohibiting the use of the switch.
- If the machine power has been already turned off, confirm that these conditions have been satisfied.

### For fire

- Shut off all the power to the machine.
- Turn off the emergency power switch or stop the power supply to the storage system.
- If the fire continues to burn after the power is shut off, take suitable actions, including the use of a fire extinguisher, or call the fire department.

## Audience and qualifications

This guide is intended for data center administrators, facility managers, and others who perform the planning and preparation work for storage system installations. It references skilled tasks and describes important safety considerations, and is not intended as a training aid for untrained personnel.

The information in this guide assumes the reader has the following abilities:

- Is familiar with computing terminology, RAID technology, and optical and Ethernet connectivity.
- Understands networking concepts, network switch technology, and network cabling.
- Knows how to calculate floor loads and power budgeting.
- Understands the procedures for installing rack-mounted components and is trained in safe work procedures.
- Is familiar with high-speed interconnects for modular storage systems.

## Product version

This document revision applies to Hitachi Virtual Storage Platform G200, G400, G600, G800 and Hitachi Virtual Storage Platform F400, F600, F800 firmware 83-03-2*x* 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 Data Systems Support Connect: https://knowledge.hds.com/Documents.

## Changes in this revision

- Updated storage system component information by adding support for running the SVP in a Linux KVM environment.
- Added new section about configuring hte physical SVP for bridged or non-bridged mode.

## 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:<br>Click **OK**.<br>• Indicates emphasized words in list items. |
| *Italic* | • Indicates a document title or emphasized words in text.<br>• Indicates a variable, which is a placeholder for actual text provided by the user or for output by the system. Example:<br>`pairdisplay -g group`<br>(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:<br>• Variables are not clearly separated from the surrounding text or from other variables. Example:<br>`Status-<report-name><file-version>.csv`<br>• 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:<br>[ a \| b ] indicates that you can choose a, b, or nothing.<br>{ 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. |
|  | 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. |

## Conventions for storage capacity values

Physical storage capacity values (for example, disk drive capacity) are calculated based on the following values:

| Physical capacity unit | Value |
|---|---|
| 1 kilobyte (KB) | 1,000 ($10^3$) bytes |
| 1 megabyte (MB) | 1,000 KB or $1{,}000^2$ bytes |
| 1 gigabyte (GB) | 1,000 MB or $1{,}000^3$ bytes |
| 1 terabyte (TB) | 1,000 GB or $1{,}000^4$ bytes |
| 1 petabyte (PB) | 1,000 TB or $1{,}000^5$ bytes |
| 1 exabyte (EB) | 1,000 PB or $1{,}000^6$ bytes |

Logical capacity values (for example, logical device capacity) are calculated based on the following values:

| Logical capacity unit | Value |
|---|---|
| 1 block | 512 bytes |
| 1 cylinder | Mainframe: 870 KB<br><br>Open-systems:<br>• OPEN-V: 960 KB<br>• Others: 720 KB |
| 1 KB | 1,024 ($2^{10}$) bytes |
| 1 MB | 1,024 KB or $1{,}024^2$ bytes |
| 1 GB | 1,024 MB or $1{,}024^3$ bytes |
| 1 TB | 1,024 GB or $1{,}024^4$ bytes |
| 1 PB | 1,024 TB or $1{,}024^5$ bytes |
| 1 EB | 1,024 PB or $1{,}024^6$ bytes |

## Accessing product documentation

Product user documentation is available on Hitachi Data Systems Support Connect: https://knowledge.hds.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

Hitachi Data Systems Support Connect is the destination for technical support of products and solutions sold by Hitachi Data Systems. To contact technical support, log on to Hitachi Data Systems Support Connect for contact information: https://support.hds.com/en_us/contact-us.html.

Hitachi Data Systems Community is a global online community for HDS customers, partners, independent software vendors, employees, and prospects. It is the destination to get answers, discover insights, and make

connections. **Join the conversation today!** Go to community.hds.com, register, and complete your profile.

## Comments

Please send us your comments on this document to doc.comments@hds.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 Data Systems Corporation.

**Thank you!**

# 1

# System components and specifications

# Storage system components

The Hitachi Virtual Storage Platform G200, G400, G600, G800 storage systems and Hitachi Virtual Storage Platform F400, F600, F800 all-flash arrays are modular, rack-mountable systems that incorporate state-of-the-art virtualization, data-management, and fault-tolerant technologies.

All models are compatible with most industry-standard 4-post EIA 19-inch racks with square mounting holes. The storage system can be factory-configured and shipped in a Hitachi 600 x 1200 mm V2 Universal Rack, or shipped without a rack for customer installation into an existing rack.

The Hitachi rack comes with either two or four Power Distribution Units (PDUs), depending on the PDU model selected. The PDUs are installed vertically in the rack.

- If two PDUs are selected, one will be installed on the left side of the rack and the other will be installed on the right side.
- If four PDUs are selected, the PDUs will be half-length and mounted vertically, one above the other, with two on the left side of the rack and two on the right side.

All storage systems are comprised of controllers, drive trays, and a service processor (SVP).

### Controllers

Controllers are components in the storage system that cache and manage data, and provide hosts with a coherent, virtualized view of the system. All storage systems have two controllers.

The controllers for the Hitachi Virtual Storage Platform G200 include either 24 2.5-inch small form-factor (SFF) disk drives or 12 3.5-inch large form-factor (LFF) disk drives.

### Drive trays

Drive trays are intelligent and compact storage units, with each capable of holding a large numbers of disk drives in a small rack space (EIA-standard rack units). VSP G200, G400, G600, G800 storage systems support the following drive trays and drives:

- DW-F800-DBS: 2U drive tray that holds 24 2.5-inch SFF disk drives. Drives are arranged vertically in a single row.
- DW-F800-DBL: 2U drive tray that holds 12 3.5-inch LFF disk drives. Drives are arranged horizontally, with four columns of three disk drives.
- DW-F800-DBF: 2U drive tray that holds 12 Hitachi Accelerated Flash (HAF) or DC2 flash module drives. Drives are arranged horizontally, with three columns of three disk drives.

- DW-F800-DB60: 4U dense drive tray that holds 60 LFF disk drives. Drives are arranged horizontally, with five rows of 12 disk drives.

VSP F400, F600, F800 all-flash array models support various fixed storage capacity configurations of DC2 flash module drives within the DW-F800-DBF drive tray. To deliver consistent low latency host response times and highest IOP performance across all host connection ports, no HDDs are included or permitted to be configured as part of the all-flash array configurations.

#### NAS modules

Some storage systems support NAS modules for sharing file-based information over an IP network using system protocols such as Common Internet File System (CIFS), Network File System (NFS), and Server Message Block (SMB). NAS modules are installed in pairs.

#### Service processor

The service processor (SVP) is a physical or logical device that provides out-of-band configuration and management of the storage system, and collects performance data for key components to enable diagnostic testing and analysis. The SVP operates independently from the storage system's CPU and operating system.

Two physical SVPs are available:

- One physical SVP is supplied by Hitachi Data Systems and runs Windows Embedded Standard 7. When shipped in the Hitachi Universal V2 rack, the SVP is installed above the controller and drive trays. The HDS-supplied SVP can be configured to operate in a bridged or non-bridged network environment.
- The other physical SVP is a customer-supplied server that runs the SVP software. This SVP uses Windows 7 Professional x64 Service Pack 1 supplied by the customer.

Two virtual SVPs are available: one for VMware ESXi hosts and one for Linux KVM hosts. Both virtual SVPs run Windows 7 Professional x64 Service Pack 1 supplied by the customer.

# Storage system specifications

## Model lists

## Hitachi Virtual Storage Platform G200 controller model list

### CBSS controller components

| Part number | Part name | Quantity |
|---|---|---|
| DW800-CBSS | 2U chassis | 1 |
| | AC power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | Backup module (BKM) | 2 |
| | Front bezel (2U) | 1 |
| | Binder | 1 |
| | SAS cable label | 2 |
| | Controller | 2 |
| DW-F800-BM10 | Cache flash memory | 2 |

### CBSS controller optional components

| Part number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLS | Controller Board | 2 |
| DW-F800-CTLSE | Controller Board (Encryption) | 2 |
| DW-F800-2HS10S | Front end module (10 Gbps SFP - iSCSI) | 2-4 |
| DW-F800-2HS10B | Front end module (10 Gbps copper - iSCSI) | 2-4 |
| DW-F800-4HF8 | Front end module (8 Gbps - FC) | 2-4 |
| DW-F800-2HF16 | Front end module (16 Gbps 2-port FC) | 2-4 |
| DW-F800-4HF32R[2] | Front end module (32 / 16 Gbps 4-port FC) | 2-4 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 4 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 4 |
| DW-F800-BM10 | Cache Flash Memory (CFM) | 2 |
| DKC-F810I-200MEM[1] | 200 GB, 2.5-inch, MLC, 12 Gbps, flash drive | 0-24 |
| DKC-F810I-300KCM[1] | 300 GB, 2.5-inch, 15k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-300KCMC[1] | 300 GB, 2.5-inch,15k, 6 Gbps, SAS, drive | 0-24 |

| Part number | Part name | Quantity |
|---|---|---|
| DKC-F810I-400MEM [1] | 400 GB, 2.5-inch, MLC, 12 Gbps, SAS, drive | 0-24 |
| DKC-F810I-600JCM[1] | 600 GB, 2.5-inch, 10k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-600JCMC[1] | 600 GB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-600KGM[1] | 600 GB, 2.5-inch, 15k, 12 Gbps, SAS, drive | 0-24 |
| DKC-F810I-1R2JCM[1] | 1.2 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-1R2JCMC[1] | 1.2 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-1R8JGM[1] | 1.8 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-1R9MEM[1] | 1.92 TB, 2.5-inch, MLC, 12 Gbps, SAS, drive | 0-24 |
| DW-F800-1PS8 | SFP for 8 Gbps shortwave | 0-16 |
| DW-F800-1PL8 | SFP for 8 Gbps longwave | 0-16 |
| DW-F800-1PS16 | SFP for 16 Gbps shortwave | 0-16 |
| DW-F800-1PL16 | SFP for 16 Gbps longwave | 0-16 |
| DKC-F810I-1PS32[2] | SFP for 32 Gbps shortwave | 0-16 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For information about the availability of the 32 Gbps SFPs, contact customer support.

## CBSSD controller components

| Part number | Part name | Quantity |
|---|---|---|
| DW800-CBSSD | 2U chassis | 1 |
| | DC power supply unit | 2 |
| | Power cable (1.5 m) | 2 |
| | Power cable (3 m) | 2 |
| | Backup module (BKM) | 2 |
| | Front bezel (2U) | 1 |
| | Air filter | 1 |
| | Binder | 1 |
| | SAS cable label | 2 |

| Part number | Part name | Quantity |
|---|---|---|
| | Controller | 2 |
| DW-F800-BM10 | Cache flash memory | 2 |

### CBSSD controller optional components

| Part number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLS | Controller Board | 2 |
| DW-F800-CTLSE | Controller Board (Encryption) | 2 |
| DW-F800-2HS10S | Front end module (10 Gbps SFP - iSCSI optical) | 2-4 |
| DW-F800-2HS10B | Front end module (10 Gbps iSCSI (copper) | 2-4 |
| DW-F800-4HF8 | Front end module (8 Gbps - FC) | 2-4 |
| DW-F800-2HF16 | Front end module (16 Gbps - FC) | 2-4 |
| DW-F800-4HF32R[2] | Front end module (32 / 16 Gbps 4-port FC) | 2-4 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 4 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 4 |
| DW-F800-BM10 | Cache Flash Memory (CFM) | 2 |
| DKC-F810I-200MEM[1] | 200 GB, 2.5-inch, MLC, 12 Gbps, flash drive | 0-24 |
| DKC-F810I-300KCM[1] | 300 GB, 2.5-inch, 15k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-300KCMC[1] | 300 GB, 2.5-inch,15k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-400MEM[1] | 400 GB, 2.5-inch, MLC, 12 Gbps, SAS, drive | 0-24 |
| DKC-F810I-600JCM[1] | 600 GB, 2.5-inch, 10k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-600JCMC[1] | 600 GB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-600KGM[1] | 600 GB, 2.5-inch, 15k, 12 Gbps, SAS, drive | 0-24 |
| DKC-F810I-1R2JCM[1] | 1.2 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive (contains BNST) | 0-24 |
| DKC-F810I-1R2JCMC[1] | 1.2 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |
| DKC-F810I-1R8JGM[1] | 1.8 TB, 2.5-inch, 10k, 6 Gbps, SAS, drive | 0-24 |

| Part number | Part name | Quantity |
|---|---|---|
| DKC-F810I-1R6FN[1] | 1.6 TB, 12 Gbps SAS, Flash Module Drive DC2 | 0-24 |
| DKC-F810I-1R9MEM[1] | 1.92 TB, 2.5-inch, MLC, 12 Gbps, SAS, drive | 0-24 |
| DKC-F810I-3R2FN[1] | 3.2 TB, 12 Gbps SAS, Flash Module Drive DC2 | 0-24 |
| DKC-F810I-6R4FN | 7 TB (6.4 TiB), 12 Gbps SAS, Flash Module Drive DC2 | 0-24 |
| DKC-F810I-1PS8 | SFP for 8 Gbps shortwave | 0-16 |
| DKC-F810I-1PL8 | SFP for 8 Gbps longwave | 0-16 |
| DKC-F810I-1PS16 | SFP for 16 Gbps shortwave | 0-16 |
| DKC-F810I-1PL16 | SFP for 16 Gbps longwave | 0-16 |
| DKC-F810I-1PS32[2] | SFP for 32 Gbps shortwave | 0-16 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For information about the availability of the 32 Gbps SFPs, contact customer support.

## CBSL controller components

| Part number | Part name | Quantity |
|---|---|---|
| DW800-CBSL | 2U chassis | 1 |
| | AC power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | Backup module | 2 |
| | Front bezel (2U) | 1 |
| | Binder | 1 |
| | SAS cable label | 2 |
| | Controller | 2 |
| DW-F800-BM10 | Cache flash memory | 2 |

## CBSL controller optional components

| Part number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLS | Controller Board | 2 |
| DW-F800-CTLSE | Controller Board (Encryption) | 2 |

| Part number | Part name | Quantity |
|---|---|---|
| DW-F800-2HS10S | Front end module (10 Gbps SFP - iSCSI optical) | 2-4 |
| DW-F800-2HS10B | Front end module (10 Gbps copper - iSCSI copper) | 2-4 |
| DW-F800-4HF8 | Front end module (8 Gbps - FC) | 2-4 |
| DW-F800-2HF16 | Front end module (16 Gbps - FC) | 2-4 |
| DW-F800-4HF32R[2] | Front end module (32 / 16 Gbps 4-port FC) | 2-4 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 4 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 4 |
| DW-F800-BM10 | Cache Flash Memory (CFM) | 2 |
| DKC-F810I-400M6M[1] | 400 GB, Flash drive, 3.5-inch | 0-12 |
| DKC-F810I-1R2J5M[1] | 1.2 TB, 3.5-inch, 10kmin, 6 Gbps SAS drive (contains BNST) | 0-12 |
| DKC-F810I-1R2J5MC[1] | 1.2 TB, SAS, 3.5-inch | 0-12 |
| DKC-F810I-1R8J6M[1] | 1.8 TB, 3.5-inch, 10kmin, 6 Gbps, SAS, drive | 0-12 |
| DKC-F810I-4R0H3M[1] | 4 TB, 7.2K 3.5-inch, 6 Gbps, SAS, drive (contains BNST) | 0-12 |
| DKC-F810I-4R0H3MC[1] | 4 TB, 7.2K 3.5-inch, 6 Gbps, SAS, drive | 0-12 |
| DKC-F810I-6R0H9M[1] | 6 TB, 7.2K 3.5-inch, 12 Gbps, SAS, drive | 0-12 |
| DKC-F810I-10RH9M[3] | 10 TB 7.2K, 3.5-inch, 12 Gbps, SAS, drive | 0-12 |
| DKC-F810I-1PS8 | SFP for 8 Gbps shortwave | 0-16 |
| DKC-F810I-1PL8 | SFP for 8 Gbps longwave | 0-16 |
| DKC-F810I-1PS16 | SFP for 16 Gbps shortwave | 0-16 |
| DKC-F810I-1PL16 | SFP for 16 Gbps longwave | 0-16 |
| DKC-F810I-1PS32[2] | SFP for 32 Gbps shortwave | 0-16 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For information about the availability of the 32 Gbps SFPs, contact customer support.

[3]For more information about availability, contact customer support.

### CBSLD controller components

| Part number | Part name | Quantity |
|---|---|---|
| DW800-CBSLD | 2U chassis | 1 |
| | DC power supply unit | 2 |
| | Power cable (1.5 m) | 2 |
| | Power cable (3 m) | 2 |
| | Backup module | 2 |
| | Front bezel (2U) | 1 |
| | Binder | 1 |
| | Air filter | 1 |
| | SAS cable label | 2 |
| | Controller | 2 |
| DW-F800-BM10 | Cache flash memory | 2 |

### CBSLD controller optional components

| Part number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLS | Controller Board | 2 |
| DW-F800-CTLSE | Controller Board (Encryption) | 2 |
| DW-F800-2HS10S | Front end module (10 Gbps SFP - iSCSI optical) | 2-4 |
| DW-F800-2HS10B | Front end module (10 Gbps copper - iSCSI copper) | 2-4 |
| DW-F800-4HF8 | Front end module (8 Gbps - FC) | 2-4 |
| DW-F800-2HF16 | Front end module (16 Gbps 2-port FC) | 2-4 |
| DW-F800-4HF32R[2] | Front end module (32 / 16 Gbps 4-port FC) | 2-4 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 4 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 4 |
| DW-F800-BM10 | Cache Flash Memory (CFM) | 2 |
| DKC-F810I-400M6M[1] | 400 GB, 3.5-inch, flash drive | 0-12 |
| DKC-F810I-1R2J5M[1] | 1.2 TB, 3.5-inch, 10kmn, 6 Gbps, SAS, drive (contains BNST) | 0-12 |
| DKC-F810I-1R8J6M[1] | 1.8 TB, 3.5-inch, 10kmin, 6 Gbps, SAS, drive | 0-12 |
| DKC-F810I-4R0H3M[1] | 4 TB, 7.2K 3.5-inch, 6 Gbps, SAS, drive (contains BNST) | 0-12 |

| Part number | Part name | Quantity |
|---|---|---|
| DKC-F810I-4R0H3MC [1] | 4 TB, 7.2K 3.5-inch, 6 Gbps, SAS, drive | 0-12 |
| DKC-F810I-6R0H9M[1] | 6 TB, 7.2K 3.5-inch, 12 Gbps, SAS, drive | 0-12 |
| DKC-F810I-6R0HLM | 6 TB, 7.2K 3.5-inch, 12 Gbps, SAS, drive | 0-12 |
| DKC-F810I-10RH9M[3] | 10 TB 7.2K, 3.5-inch, 12 Gbps, SAS, drive | 0-12 |
| DKC-F810I-1R6FN[1] | 1.75 TB, 12 Gbps SAS, Flash Module Drive DC2 | 0-12 |
| DKC-F810I-3R2FN[1] | 3.5 TB, 12 Gbps SAS, Flash Module Drive DC2 | 0-12 |
| DKC-F810I-6R4FN | 7 TB (6.4 TiB), 12 Gbps SAS, Flash Module Drive DC2 | 0-12 |
| DKC-F810I-1PS8 | SFP for 8 Gbps shortwave | 0-16 |
| DKC-F810I-1PL8 | SFP for 8 Gbps longwave | 0-16 |
| DKC-F810I-1PS16 | SFP for 16 Gbps shortwave | 0-16 |
| DKC-F810I-1PL16 | SFP for 16 Gbps longwave | 0-16 |
| DKC-F810I-1PS32 [2] | SFP for 32 Gbps shortwave | 0-16 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For information about the availability of the 32 Gbps SFPs, contact customer support.

[3]For more information about availability, contact customer support.

## VSP G400 or VSP F400 and VSP G600 or VSP F600 controller model lists

### CBLM controller components

| Model number | Part name | Quantity |
|---|---|---|
| DW800-CBL | 4U chassis | 1 |
| | Power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | LAN blade (local-area network, uninterruptible power supply) | 2 |
| | Backup module | 8 |
| | Front bezel (4U) | 1 |

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLM | Controller | 2 |
| DW-F800-BAT | Battery | 6 |
| DW-F800-NAS (optional) | NAS module | 2 |

### CBLM controller optional components

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLM | Controller Board | 2 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 8-16 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 8-16 |
| DW-F800-BM20 | Cache flash memory | 2-4 |
| DW-F800-2HS10S | Front end module (10 Gbps SFP iSCSI optical) | 2-16 |
| DW-F800-2HS10B | Front end module (10 Gbps copper iSCSI copper) | 2-16 |
| DW-F800-4HF8 | Front end module (8 Gbps FC) | 2-16 |
| DW-F800-2HF16 | Front end module (16 Gbps 2-port FC) | 2-16 |
| DW-F800-4HF32R[2] | Front end module (32 / 16 Gbps 4-port FC) | 2-16 |
| DW-F800-NAS | NAS Module | 0-2 |
| DW-F800-BS12G | Back end module | 0-2 |
| DKC-F810I-1PS8 | SFP for 8 Gbps shortwave | 0-64 |
| DKC-F810I-1PL8 | SFP for 8 Gbps longwave | 0-64 |
| DKC-F810I-1PS16 | SFP for 16 Gbps shortwave | 0-64 |
| DW-F800-BAT | Battery | 0-14 |
| N/A | SAS cable label | 2 |
| [2]For information about the availability of the 32 Gbps SFPs, contact customer support. | | |

## VSP G800 or VSP F800 controller model list

### CBLH controller components

| Model number | Part name | Quantity |
|---|---|---|
| DW800-CBL | 4U chassis | 1 |
| | Power supply unit | 2 |
| | Power cable (0.9 m) | 2 |

| Model number | Part name | Quantity |
|---|---|---|
| | Power cable (2.5 m) | 2 |
| | LAN blade (LAN, UPS) | 2 |
| | Backup module | 8 |
| | Front bezel (4U) | 1 |
| DW-F800-CTLH | Controller | 2 |
| DW-F800-BAT | Battery | 6 |
| DW-F800-NAS (optional) | NAS module | 2 |

## CBLH controller optional components

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-CTLH | Controller Board | 2 |
| DKC-F810I-CM8G | Cache memory (8 GB) | 8-16 |
| DKC-F810I-CM16G | Cache memory (16 GB) | 8-16 |
| DKC-F810I-CM32G | Cache memory (32 GB) | 8-16 |
| DW-F800-BM30 | Cache flash memory | 2-4 |
| DW-F800-2HS10S | Front end module (10 Gbps SFP-iSCSI optical) | 2-16 |
| DW-F800-2HS10B | Front end module (10 Gbps SFP-iSCSI copper | 2-16 |
| DW-F800-4HF8 | Front end module (8 Gbps FC) | 2-16 |
| DW-F800-2HF16 | Front end module (16 Gbps 2-port FC) | 2-16 |
| DW-F800-4HF32R* | Front end module (32 / 16 Gbps 4-port FC) | 2-16 |
| DW-F800-NAS | NAS Module | 0-2 |
| DW-F800-1HP8 | PCIe module | 2 |
| DW-F800-PC1F | PCIe cable (1.5 m) | 2 |
| DW-F800-BS12G | Back end module | 0-8 |
| DKC-F810I-1PS8 | SFP for 8 Gbps shortwave | 0-64 |
| DKC-F810I-1PL8 | SFP for 8 Gbps longwave | 0-64 |
| DKC-F810I-1PS16 | SFP for 16 Gbps shortwave | 0-64 |
| DKC-F810I-1PL16 | SFP for 16 Gbps longwave | 0-64 |
| DKC-F810I-1PS32* | SFP for 32 Gbps shortwave | 0-64 |
| DW-F800-1PS10 | SFP for 10 Gbps shortwave (for NAS) | 0-12 |
| DW-F800-BAT | Battery | 0-14 |

| Model number | Part name | Quantity |
|---|---|---|
| N/A | SAS cable label | 2 |
| *For information about the availability of the 32-Gbps SFPs, contact customer support. | | |

### CHBB front end module components

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-CHBB | PCP | 2 |
| | IOEXBX | 1 |
| | Power supply unit | 2 |
| | PCIe switch board (fan × 5) | 2 |
| | PCIe module | 2 |
| | PCIe cable (1.5 m) | 2 |
| | Front bezel | 1 |
| | Accessories kit | 1 |

## Drive tray model lists

### SFF drive tray components (AC power) (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DBS and DW-F800-DBSC | 2U chassis | 1 |
| | ENC | 2 |
| | AC power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | Front bezel (2U) | 1 |

### SFF drive tray components (DC power) (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DBSD | 2U chassis | 1 |
| | ENC | 2 |
| | DC power supply unit | 2 |
| | Power cable (1.5 m) | 2 |
| | Power cable (3 m) | 2 |
| | Front bezel (2U) | 1 |

| Model number | Part name | Quantity |
|---|---|---|
| | Air filter | 1 |

## SFF drive tray optional components (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DKC-F810I-200MEM[1] | 200 GB, MLC, 12 Gbps, SFF, flash drive | 0-24 |
| DKC-F810I-300KCM[1] | 300GB, 15kmin, 6 Gbps, SAS, SFF, drive (contains BNST) | 0-24 |
| DKC-F810I-300KCMC[1] | 300 GB, 15kmin, 6 Gbps, SAS, SFF, drive | 0-24 |
| DKC-F810I-400MEM[1] | 400GB, MLC, 12 Gbps, SFF, flash drive | 0-24 |
| DKC-F810I-600JCM[1] | 600 GB, 10kmin, 6 Gbps, SAS, SFF, drive (contains BNST) | 0-24 |
| DKC-F810I-600JCMC[1] | 600 GB, 10kmin, 6 Gbps, SAS, SFF, drive | 0-24 |
| DKC-F810I-600KGM[1] | 600 GB, 15kmin, 6 Gbps, SAS, SFF, drive | 0-24 |
| DKC-F810I-1R2JCM[1] | 1.2 TB, 10kmin, 6 Gbps, SAS, SFF, drive (contains BNST) | 0-24 |
| DKC-F810I-1R2JCMC[1] | 1.2-TB, 10kmin, 6 Gbps, SAS, SFF, drive | 0-24 |
| DKC-F810I-1R8JGM[1] | 1.8-TB, 10kmin, 6 Gbps, SAS, SFF, drive | 0-24 |
| [11] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes. | | |

## LFF drive tray components (AC power) (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DBL and DW-F800-DBLC | 2U chassis | 1 |
| | ENC | 2 |
| | AC power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | Front bezel (2U) | 1 |

### LFF drive tray components (DC power) (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DBLD | 2U chassis | 1 |
| | ENC | 2 |
| | DC power supply unit | 2 |
| | Power cable (1.5 m) | 2 |
| | Power cable (3 m) | 2 |
| | Front bezel (2U) | 1 |
| | Air filter | 1 |

### Optional LFF drive tray components (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DKC-F810I-400M6M[1] | 400 GB, LFF, Flash drive | 0-12 |
| DKC-F810I-1R2J5M[1] | 1.2 TB, 10k, 6 Gbps, SAS, LFF, drive (contains BNST) | 0-12 |
| DKC-F810I-1R2J5MC[1] | 1.2 TB, SAS, LFF, drive | 0-12 |
| DKC-F810I-1R8J6M[1] | 1.8 TB, 10k, 6 Gbps, SAS, LFF, drive | 0-12 |
| DKC-F810I-4R0H3M[1] | 4 TB, 7.2K, 6 Gbps, SAS, LFF, drive (contains BNST) | 0-12 |
| DKC-F810I-4R0H3MC[1] | 4 TB, 7.2K, 6 Gbps, SAS, LFF, drive | 0-12 |
| DKC-F810I-6R0H9M[1] | 6 TB, 7.2K, 12 Gbps, SAS, LFF, drive | 0-12 |
| DKC-F810I-10RH9M[2] | 10 TB, 7.2K, 12 Gbps, SAS, LFF, drive | 0-12 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For more information about availability, contact customer support.

### FMD drive tray components

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DBF | 2U chassis | 1 |
| | ENC | 2 |
| | Power supply unit | 2 |
| | Power cable (0.9 m) | 2 |

| Model number | Part name | Quantity |
|---|---|---|
| | Power cable (2.5 m) | 2 |
| | Front bezel (2U) | 1 |

## FMD drive tray optional components

| Model number | Part name | Quantity |
|---|---|---|
| DKC-F710I-1R6FM[1] (VSP Gx00 models only) | 1.75 TB, MLC, 6-Gbps, Flash Module Drive | 0-12 |
| DKC-F710I-3R2FM[1] (VSP Gx00 models only) | 3.5, TB, MLC, 6 Gbps, Flash Module Drive | 0-12 |
| DKC-F810I-1R6FN[1] | 1.75 TB, Flash Module Drive | 0-12 |
| DKC-F810I-3R2FN[1] | 3.5 TB, Flash Module Drive | 0-12 |
| DKC-F810I-6R4FN[1] | 7 TB, Flash Module Drive | 0-12 |
| DKC-F810I-7R0FP[1], [2] | 7 TB, MLC, 12 Gbps, Flash Module Drive | 0-12 |
| DKC-F810I-14RFP[1], [2] | 14 TB, MLC, 12 Gbps, Flash Module Drive | 0-12 |
| [1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.<br>[2]For more information about availability, contact customer support. | | |

## Dense intermix drive tray components (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DW-F800-DB60 and DW-F800-DB60C | 4U box | 1 |
| | ENC | 2 |
| | Power supply unit | 2 |
| | Power cable (0.9 m) | 2 |
| | Power cable (2.5 m) | 2 |
| | Front bezel (dense intermix drive tray) | 1 |
| DW-F800-SCQ3 | SAS cable (3 m), including 2 omega clips (DW-F800-SCQ3) | 2 |

### Dense intermix drive tray optional components (VSP Gx00 models only)

| Model number | Part name | Quantity |
|---|---|---|
| DKC-F810I-400M8M[1] | 400 GB, MLC, 12 Gbps, flash drive | 0-60 |
| DKC-F810I-1R2J7M[1] | 1.2 TB, 10k, 6 Gbps, SAS, SFF, drive (contains BNST) | 0-60 |
| DKC-F810I-1R2J7MC[1] | 1.2 TB, 10k, 6 Gbps, SAS, SFF, drive | 0-60 |
| DKC-F810I-1R8J8M[1] | 1.8 TB, 10k, 6 Gbps, SAS, LFF drive | 0-60 |
| DKC-F810I-4R0H4M[1] | 4 TB, 7.2K, 6 Gbps, SAS, LFF, drive (contains BNST) | 0-60 |
| DKC-F810I-4R0H4MC[1] | 4 TB, 7.2K, 6 Gbps, SAS, LFF, drive | 0-60 |
| DKC-F810I-6R0HLM[1] | 6 TB, 7.2K, 12 Gbps, SAS, LFF, drive | 0-60 |
| DKC-F810I-10RHLM[1], [2] | 10 TB, 7.2K, 12 Gbps, SAS, LFF, drive | 0-60 |

[1] The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The parity group capacity values displayed in the storage management software are calculated as 1 k byte =1,024 bytes.

[2]For more information about availability, contact customer support.

## Other model list

Numbers in parentheses show the quantities of the components.

### Power cables

| Model number | Specification |
|---|---|
| DW-F800-J1K | 2.5 m, 2-pole power cable with grounding terminal (AC 125 V, 13 A or 15 A) |
| DW-F800-J2H | 2.5 m, 2-pole power cable with grounding terminal (AC 250 V, 13 A or 15 A) |
| DW-F800-J2H5 | 5.0 m, 2-pole power cable with grounding terminal (AC 250 V, 13 A or 15 A) |
| DW-F800-J2H10 | 10.0 m, 2-pole power cable with grounding terminal (AC 250 V, 13 A or 15 A) |
| A-F6516-P620 | Power cable for PDU (1) |
| A-F6516-P630 | Power cable for PDU (1) |

## SAS cables

| Model number | Specification |
|---|---|
| DW-F800-SCQ1 | 1 m SAS cable, including omega clips (2) |
| DW-F800-SCQ1F | 1.5 m SAS cable, including omega clips (2) |
| DW-F800-SCQ3 | 3 m SAS cable, including omega clips (2) |
| DW-F800-SCQ5 | 5 m SAS cable, including omega clips (2) |
| DW-F800-SCQ10A | 10 m SAS optical cable |
| DW-F800-SCQ30A | 30 m SAS optical cable |
| DW-F800-SCQ1HA | 100 m SAS optical cable |

## Optical cables

| Model number | Specification |
|---|---|
| A-6515-GM5L | 5 m LC-LC optical cable for optical |
| A-6515-GM10L | 10 m LC-LC optical cable for optical |
| A-6515-GM20L | 20 m LC-LC optical cable for optical |
| A-6515-GM30L | 30 m LC-LC optical cable for optical |
| A-6515-GM40L | 40 m LC-LC optical cable for optical |
| A-6515-GM50L | 50 m LC-LC optical cable for optical |
| A-6515-GM1JL | 100 m LC-LC optical cable for optical |
| A-6515-GS10L | 10 m LC-LC optical cable for optical |
| A-6515-GS20L | 20 m LC-LC optical cable for optical |
| A-6515-GS30L | 30 m LC-LC optical cable for optical |
| A-6515-GS50L | 50 m LC-LC optical cable for optical |
| A-6515-GS1JL | 100 m LC-LC optical cable for optical |
| A-6515-HM5L | 5 m LC-LC optical cable for optical |
| A-6515-HM10L | 10 m LC-LC optical cable for optical |
| A-6515-HM20L | 20 m LC-LC optical cable for optical |
| A-6515-HM30L | 30 m LC-LC optical cable for optical |
| A-6515-HM50L | 50 m LC-LC optical cable for optical |
| A-6515-HM100L | 100 m LC-LC optical cable for optical |
| A-6515-HM200L | 200 m LC-LC optical cable for optical |
| A-6515-HM300L | 300 m LC-LC optical cable for optical |
| A-6515-JM5L | 5 m LC-LC optical cable for optical |
| A-6515-JM10L | 10 m LC-LC optical cable for optical |
| A-6515-JM20L | 20 m LC-LC optical cable for optical |
| A-6515-JM30L | 30 m LC-LC optical cable for optical |

| Model number | Specification |
|---|---|
| A-6515-JM50L | 50 m LC-LC optical cable for optical |
| A-6515-JM100L | 100 m LC-LC optical cable for optical |
| A-6515-JM200L | 200 m LC-LC optical cable for optical |
| A-6515-JM300L | 300 m LC-LC optical cable for optical |

# Replacement parts

Part replacement is required to maintain high performance. Replacement of parts is covered by the maintenance service contract.

## Battery unit

### Replacement period

Three years.

### Treatment

Use the storage system in a place where the ambient temperature is 86°F (30°C) or less on average.

Periodic parts replacement is required. For customers with maintenance service contracts, parts are replaced periodically in keeping with the terms of the contract.

**Note:** The battery is designed to protect the data in the cache memory in an emergency, such as a sudden power failure. In these situations, follow the normal power down procedure. If not, the battery might reach its lifespan earlier than expected and become unusable within three years. When replacing the battery, follow the given procedure for disposing a used battery.

# Hitachi Virtual Storage Platform G200 mechanical specifications (AC power supply model)

### Configuration

**Controller**

1 CBSS
1 CBSL

**Drive trays**

1 SFF drive tray (DBS)
1 LFF drive tray (DBL)
1 FMD drive tray
1 dense intermix drive tray

## Drive

| Item | Component | Specification |
|---|---|---|
| Drive size (WxDxH) | CBSS, SFF drive tray | 2.5-type: 3.21 x 8.10 x 0.74 inches (81.6 x 205.7 x 18.7 mm) |
| | CBSL, LFF drive tray | 3.5-type: 4 x 5.78 x 1.02 inches (101.6 x 147.0 x 26.1 mm) |
| | FMD drive tray | Flash module drive: 5.74 x 14.44 x 0.78 inches (146 x 366.8 x 19.8 mm) |
| Data capacity (GB) | CBSS, SFF drive tray | 2.5-type: 196.92, 288.20, 393.85, 576.39, 1152.79, 1729.29, 1890.46 |
| | CBSL, LFF drive tray, dense intermix drive tray | 3.5-type: 393.85, 1152.79, 1729.29, 3916.14, 5874.22, 9790.36 |
| | FMD drive tray | Flash module drive: 1759.21, 3518.43 , 7036.87, 14073.74 GB |
| Rotational speed ($min^{-1}$) | CBSS, SFF drive tray | Flash drive, 2.5-type: 196.92 GB, 393.85 GB<br>2.5-type: 288.20 GB, 15,000 RPM<br>2.5-type: 576.39 GB, 10,000 or 15,000 RPM<br>2.5-type: 1152.79 GB, 10,000 RPM<br>2.5-type: 1729.29 GB, 10,000 RPM |
| | CBSL, LFF drive tray | Flash drive, 3.5-type: 393.85 GB<br>3.5-type: 1152.79 GB, 10,000 RPM<br>3.5-type: 1729.29 GB, 10,000 RPM<br>3.5-type: 3916.14 GB, 7,200 RPM<br>3.5-type: 5874.22 GB, 7,200 RPM<br>3.5-type: 9790.36 GB, 7,200 RPM |
| | FMD drive tray | Flash module drive: 1759.21 GB, 3518.43 GB, 7036.87 GB, 14073.74 GB |
| Maximum number of drives that can be mounted | CBSS | 24 drives |
| | CBSL | 12 drives |
| | SFF drive tray (VSP Gx00 models only) | 24 drives |
| | LFF drive tray (VSP Gx00 models only) | 12 drives |

| Item | Component | Specification |
|---|---|---|
| | FMD drive tray | 12 drives |
| | Dense intermix drive tray (VSP Gx00 models only) | 60 drives |
| Maximum number of spare drives | | 16 |

### Host interface

| Item | Component | Specification |
|---|---|---|
| Interface type | Fibre Channel optical | 8 Gbps, 16 Gbps, 32 Gbps |
| | iSCSI optical | 10 Gbps |
| | Copper iSCSI | 10 Gbps |
| Data transfer speed (maximum speed for transfer to host) | Fibre Channel optical | 800 Mbps (Fibre Channel) |
| | Fibre Channel optical | 1600 Mbps (Fibre Channel) |
| | Fibre Channel optical | 3200 Mbps (Fibre Channel) |
| | iSCSI optical | 10 Gbps (iSCSI optical) |
| | Copper iSCSI | 10 Gbps (copper iSCSI) |
| Number of ports | 8 Gbps Fibre Channel optical | 16 |
| | 16 Gbps Fibre Channel optical (2-port) | 8 |
| | 16 Gbps Fibre Channel optical (4-port) | 16 |
| | 32 Gbps Fibre Channel optical | 16 |
| | 10 Gbps optical iSCSI | 8 |
| | 10-Gbps copper iSCSI | 8 |
| Transferred block size | | 512 bytes |
| Maximum number of hosts using a Fibre Channel switch | | 255 |
| Maximum number of hosts using a network switch | | 255 |

### RAID specifications

D: Data drive, P: Parity drive.

Although the storage system with a configuration of RAID 1, RAID 5, or RAID 6 provides data reliability enhanced by redundancy, there is a chance that user data could be lost due to an unexpected host, storage system hardware, or software failure. Therefore, users are requested to back up all data.

| Item | Drive tray |
|---|---|
| RAID Level | SAS, SAS 7.2k, flash drives mounted |
| RAID 1 | 2D+2D, 4D+4D |
| RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| RAID 6 | 6D+2P, 12D+2P, 14D+2P |

| Item | Specification |
|---|---|
| Maximum number of parity groups | 88 |
| Maximum volume size | 3 TB (or 4 TB when using the LDEVs of other storage systems) |
| Maximum volumes/host groups and iSCSI targets | 2,048 |
| Maximum volumes/parity groups | 2,048 |

## Internal logic specifications

| Item | Component | Specifications |
|---|---|---|
| Shared memory | Flash memory | 32 MB |
| | L3 cache memory | 4 MB |
| | SDRAM | 1 GB |
| Data assurance method | Data bus | Parity |
| | Cache memory | ECC (1 bit for correction, 2 bits for detection) |
| | Drive | Data assurance code |

## Physical specifications

| Item | Component | Specifications |
|---|---|---|
| Start-up time (min)[1] | Controller | Standard: 5 to 8 |
| | Drive trays | Standard: 5 to 8 |
| Chassis size | Controller | WxDxH: 19 x 32 x 3.5 inches (483 x 813 x 88 mm) |
| | SFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | LFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | FMD drive tray | WxDxH: 19 x 30 x 3.4 inches (483 x 762 x 87 mm) |

| Item | Component | Specifications |
|---|---|---|
| | Dense intermix drive tray (VSP Gx00 models only) | WxDxH: 19 x 40.5 x 7 inches (482 x 1029 x 176 mm) |
| Mass (approximate)[2] | CBSS | 97 lbs (44 kg) |
| | CBSL | 101.4 lbs (46 kg) |
| | SFF drive tray (VSP Gx00 models only) | 51 lbs (23 kg) |
| | LFF drive tray (VSP Gx00 models only) | 59.5 lbs (27 kg) |
| | FMD drive tray | 84 lbs (38 kg) |
| | Dense intermix drive tray (VSP Gx00 models only) | 198 lbs (90 kg) |
| Required height | CBSS, CBSL | 2 |
| | SFF drive tray (VSP Gx00 models only) | 2 |
| | LFF drive tray (VSP Gx00 models only) | 2 |
| | FMD drive tray | 2 |
| | Dense intermix drive tray (VSP Gx00 models only) | 4 |

**Notes**

1. The startup time might be longer in proportion to the number of drive trays connected. With a maximum configuration of 1 controller and 19 drive trays, startup time is approximately 8 minutes.
2. Value of maximum configuration when all controllers and drives are mounted.
3. Mixing SFF, LFF, FMD, and dense intermix drive trays might affect the maximum number of drives that can be mounted.

## Cache specifications

| Item | Specifications |
|---|---|
| Capacity (GB) | 64 GB |
| Control method | Read LRU, Write after |
| Battery backup | Provided |
| Backup duration | Unrestricted (saving to a nonvolatile memory) |

Data in the cache memory is preserved against power failures. If a power outage occurs, data in cache memory is written to drives.

When the storage system enters Cache Backup mode, the amber WARNING LED goes on to when the system starts. This warning indicates that the battery charge has dropped significantly and the remaining battery capacity is not sufficient; the storage system will continue operating with the Write Cache function disabled.

When the battery is charged, the warning indication disappears, and the storage system continues the operation in the Write Cache function.

The warning indication disappears within six hours. Even when the warning is shown, normal operation is assured in Write-Through. Read and write performance is lowered because the Write Cache function is disabled.

If the storage system is not charged for more than six months, the battery can become overcharged and sustain unrecoverable damage. To avoid this situation, charge the battery more than 3 hours every six months.

### Insulation performance

| Item | Specifications |
|---|---|
| Insulation withstand voltage | AC 1,500 V (100 mA, 1 min) |
| Insulation resistance | DC 500 V, 10 M Ω or more |

## Hitachi Virtual Storage Platform G200 mechanical specifications (DC power supply model)

### Configuration

#### Controller

1 CBSSD
1 CBSLD

#### Drive trays

1 SFF drive tray (DBSD)
1 LFF drive tray (DBLD)

| Item | Component | Specification |
|---|---|---|
| Drive size (WxDxH) | CBSSD, SFF drive tray | 2.5-type: 3.21 x 8.10 x 0.74 inches (81.6 x 205.7 x 18.7 mm) |
| | CBSLD, LFF drive tray | 3.5-type: 4 x 5.78 x 1.02 inches (101.6 x 147.0 x 26.1 mm) |
| Data capacity (GB) | CBSSD, SFF drive tray | 2.5-type: 196.92, 288.20, 393.85, 576.39, 1152.79, 1729.29, 1890.46 |
| | CBSLD, LFF drive tray | 3.5-type: 393.85, 1152.79, 1729.29, 3916.14, 5874.22, 9790.36 |
| Rotational speed ($min^{-1}$) | CBSSD, SFF drive tray | Flash drive, 2.5-type: 196.92 GB, 393.85 GB<br>2.5-type: 288.20 GB, 15,000 RPM |

| Item | Component | Specification |
|---|---|---|
| | | 2.5-type: 576.39 GB, 10,000 or 15,000 RPM<br>2.5-type: 1152.79 GB, 10,000 RPM<br>2.5-type: 1729.29 GB, 10,000 RPM |
| | CBSLD, LFF drive tray | Flash drive, 3.5-type: 393.85 GB<br>3.5-type: 1152.79 GB, 10,000 RPM<br>3.5-type: 1729.29 GB, 10,000 RPM<br>3.5-type: 3916.14 GB, 7,200 RPM<br>3.5-type: 5874.22 GB, 7,200 RPM<br>3.5-type: 9790.36 GB, 7,200 RPM |
| Maximum number of drives that can be mounted | CBSSD, SFF drive tray | 24 drives |
| | CBSLD, LFF drive tray | 12 drives |
| Maximum number of spare drives | | 16 |

## Host interface

| Item | Component | Specification |
|---|---|---|
| Interface type | Fibre Channel optical | 8 Gbps, 16 Gbps, 32 Gbps |
| | iSCSI optical | 10 Gbps |
| | Copper iSCSI | 10 Gbps |
| Data transfer speed (maximum speed for transfer to host) | Fibre Channel optical | 800 Mbps (Fibre Channel) |
| | Fibre Channel optical | 1600 Mbps (Fibre Channel) |
| | Fibre Channel optical | 3200 Mbps (Fibre Channel) |
| | iSCSI optical | 10 Gbps (iSCSI optical) |
| | Copper iSCSI | 10 Gbps (copper iSCSI) |
| Number of ports | 8 Gbps Fibre Channel optical | 16 |
| | 16 Gbps Fibre Channel optical (2-port) | 8 |
| | 16 Gbps Fibre Channel optical (4-port) | 16 |
| | 32 Gbps Fibre Channel optical | 16 |
| | 10 Gbps optical iSCSI | 8 |
| | 10 Gbps copper iSCSI | 8 |
| Transferred block size | | 512 bytes |
| Maximum number of hosts using a Fibre Channel switch | | 255 |

| Item | Component | Specification |
|---|---|---|
| Maximum number of hosts using a network switch | | 255 |

### RAID specifications

D: Data drive, P: Parity drive.

Although the storage system with a configuration of RAID 1, RAID 5, or RAID 6 provides data reliability enhanced by redundancy, there is a chance that user data could be lost due to an unexpected host, storage system hardware, or software failure. Therefore, users are requested to back up all data.

| Item | Drive tray |
|---|---|
| RAID Level | SAS, SAS 7.2k, flash drives mounted |
| RAID 1 | 2D+2D, 4D+4D |
| RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| RAID 6 | 6D+2P, 12D+2P, 14D+2P |

| Item | Specification |
|---|---|
| Maximum number of parity groups | 88 |
| Maximum volume size | 3 TB (or 4 TB when using the LDEVs of other storage systems) |
| Maximum volumes/host groups and iSCSI targets | 2,048 |
| Maximum volumes/parity groups | 2,048 |

### Internal logic specifications

| Item | Component | Specifications |
|---|---|---|
| Shared memory | Flash memory | 32 MB |
| | L3 cache memory | 4 MB |
| | SDRAM | 1 GB |
| Data assurance method | Data bus | Parity |
| | Cache memory | ECC (1 bit for correction, 2 bits for detection) |
| | Drive | Data assurance code |

## Physical specifications

| Item | Component | Specifications |
|---|---|---|
| Start-up time (min)[1] | Controller | Standard: 5 to 8 |
| | Drive trays | Standard: 5 to 8 |
| Chassis size | Controller | WxDxH: 19 x 32 x 3.5 inches (483 x 813 x 88 mm) |
| | SFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | LFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | | |
| Mass (approximate)[2] | CBSSD | 97 lbs (44 kg) |
| | CBSLD | 101.4 lbs (46 kg) |
| | SFF drive tray (VSP Gx00 models only) | 51 lbs (23 kg) |
| | LFF drive tray (VSP Gx00 models only) | 59.5 lbs (27 kg) |
| Required height | CBSSD, CBSLD | 2 |
| | SFF drive tray (VSP Gx00 models only) | 2 |
| | LFF drive tray (VSP Gx00 models only) | 2 |
| | | |

**Notes**

1. The startup time might be longer in proportion to the number of drive trays connected. With a maximum configuration of 1 controller and 19 drive trays, startup time is approximately 8 minutes.
2. Value of maximum configuration when all controllers and drives are mounted.
3. Mixing DBSD and DBLD drive trays might affect the maximum number of drives that can be mounted.

## Cache specifications

| Item | Specifications |
|---|---|
| Capacity (GB) | 64 GB |
| Control method | Read LRU, Write after |
| Battery backup | Provided |
| Backup duration | Unrestricted (saving to a nonvolatile memory) |

Data in the cache memory is preserved against power failures. If a power outage occurs, data in cache memory is written to drives.

When the storage system enters Cache Backup mode, the amber WARNING LED goes on to when the system starts. This warning indicates that the battery charge has dropped significantly and the remaining battery capacity

is not sufficient; the storage system will continue operating with the Write Cache function disabled.

When the battery is charged, the warning indication disappears, and the storage system continues the operation in the Write Cache function.

The warning indication disappears within six hours. Even when the warning is shown, normal operation is assured in Write-Through. Read and write performance is lowered because the Write Cache function is disabled.

If the storage system is not charged for more than six months, the battery can become overcharged and sustain unrecoverable damage. To avoid this situation, charge the battery more than 3 hours every six months.

### Insulation performance

| Item | Specifications |
|---|---|
| Insulation withstand voltage | AC 1,500 V (100 mA, 1 min) |
| Insulation resistance | DC 500 V, 10 M Ω or more |

## VSP G400 or VSP F400 and VSP G600 or VSP F600 mechanical specifications

### Controller

1 CBLM

### Drive tray

1 SFF drive tray (VSP Gx00 models only)
1 LFF drive tray (VSP Gx00 models only)
1 FMD drive tray
1 Dense intermix drive tray (VSP Gx00 models only)

### NAS module

| Item | Description |
|---|---|
| NAS module | Optional component for block and file storage configuration |

### Drive size

| Item | Specification |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 3.21 x 8.10 x 0.74 inches (81.6 x 205.7 x 18.7 mm) |

| Item | Specification |
|---|---|
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 4 x 5.78 x 1.02 inches (101.6 x 147.0 x 26.1 mm) |
| Flash Module Drive (flash module drive tray) | 5.74 x 14.44 x 0.78 inches (146 x 366.8 x 19.8 mm) |

### Data capacity (Gb)

| | |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 196.92, 288.20, 393.85, 576.39, 1152.79, 1729.29, 1890.46 |
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 393.85, 1152.79, 1729.29, 3916.14, 5874.22, 9790.36 |
| Flash Module Drive (flash module drive tray) | 1759.21, 3518.43 , 7036.87, 14073.74 |

### Rotational speed ($min^{-1}$)

| | |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 196.92/393.85 G bytes<br>2288.20 GB: 15,000 RPM<br>576.39 GB: 10,000 or 15,000 RPM<br>1152.79 GB: 10,000 RPM<br>1729.29 GB: 10,000 RPM |
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 393.85 G bytes: Flash drive<br>1152.79 G bytes: 10,000 RPM<br>1729.29 G bytes: 10,000 RPM<br>3916.14 G bytes: 7,200 RPM<br>5874.22 G bytes: 7,200 RPM<br>9790.36 G bytes: 7,200 RPM |

### Maximum mountable quantity

Mixing SFF, LFF, FMD, and dense intermix drive trays might affect the maximum number of drives that can be mounted.

| | |
|---|---|
| SFF (VSP Gx00 models only) | 24 |
| LFF (VSP Gx00 models only) | 12 |
| Flash module drive (flash module drive tray) (VSP Gx00 models only) | 12 |

| | |
|---|---|
| Dense intermix drive tray (VSP Gx00 models only) | 60 |
| Maximum number of flash module drives (VSP Fx00 models) | VSP F400: 8 +1 spare drive<br>VSP F600 16 + 1 spare drive |

## Host interface

| Item | Component | Specification |
|---|---|---|
| Interface type | Fibre Channel optical | 8 Gbps, 16 Gbps, 32 Gbps |
| | iSCSI optical | 10 Gbps |
| | iSCSI copper | 10 Gbps |
| | NAS module | 10 Gbps (Fibre Channel optical) |
| Data transfer speed (maximum speed for transfer to host) | Fibre Channel optical | 800 Mbps (Fibre Channel) |
| | Fibre Channel optical | 1600 Mbps (Fibre Channel) |
| | Fibre Channel optical | 3200 Mbps (Fibre Channel) |
| | iSCSI optical | 10 Gbps (iSCSI optical) |
| | iSCSI copper | 10 Gbps (iSCSI copper) |
| | NAS module (Fibre Channel) | 1000 Mbs |
| Number of ports | 8 Gbps Fibre Channel optical | 64 |
| | 16 Gbps Fibre Channel optical (2-port) | 32 |
| | 16 Gbps Fibre Channel optical (4-port) | 64 |
| | 32 Gbps Fibre Channel optical | 64 |
| | 10 Gbps optical iSCSI | 32 |
| | 10-Gbps copper iSCSI | 32 |
| Number of ports (NAS Module not installed) | 8 Gbps Fibre Channel optical | 64<br>56 |
| | 16 Gbps Fibre Channel optical (2-port) | 32<br>28 |
| | 16 Gbps Fibre Channel optical (4-port) | 64<br>56 |
| | 32 Gbps Fibre Channel optical | 64<br>56 |
| | 10 Gbps optical iSCSI | 32<br>28 |
| | 10-Gbps copper iSCSI | 32<br>28 |

| Item | Component | Specification |
|---|---|---|
| Number of ports (NAS Module installed) | 8 Gbps Fibre Channel optical | 24 |
| | 16 Gbps Fibre Channel optical (2-port) | 12 |
| | 16 Gbps Fibre Channel optical (4-port) | 24 |
| | 32 Gbps Fibre Channel optical | 24 |
| | 10 Gbps optical iSCSI | 12 |
| | 10 Gbps copper iSCSI | 12 |
| | 10 Gbps Fibre Channel optical | 12 |
| | Transferred block size | 512 bytes |
| | Maximum number of hosts using a Fibre Channel switch | 255 |
| | Maximum number of hosts using a network switch | 255 |

## RAID specifications

D: Data drive, P: Parity drive.

Although the storage system with a configuration of RAID 1, RAID 5, or RAID 6 provides data reliability enhanced by redundancy, there is a chance that user data could be lost due to an unexpected host, storage system hardware, or software failure. Therefore, users are requested to back up all data.

| RAID Level | SAS, SAS 7.2k, flash drives mounted |
|---|---|
| RAID 1 | 2D+2D, 4D+4D |
| RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| RAID 6 | 6D+2P, 12D+2P, 14D+2P |

| Item | Specification |
|---|---|
| Maximum number of parity groups | VSP G400 or VSP F400:160<br>VSP G600 or VSP F600:240 |
| Maximum volume size | 3 TB (or 4 TB when using the LDEVs of other storage systems) |
| Maximum volumes/host groups and iSCSI targets | 2048 |
| Maximum volumes/parity groups | 2048 |

## Shared memory and data assurance

| Item | Specification |
|---|---|

| | |
|---|---|
| Flash memory | 32 M bytes |
| L3 Cache memory | 4 M bytes |
| SDRAM | 1 G bytes |
| Data bus | Parity |
| Cache memory | ECC (1 bit for correction, 2 bits for detection) |
| Drive | Data assurance code |

## Start-up time

| Item |
|---|
| Standard: 5-to-8 minutes.<br>The start-up time may be longer in proportion to the number of drive trays connected. With a maximum configuration 1 controller tray and 19 drive trays, start-up time is approximately 8 minutes. |

## Chassis size

| Component | Specification (WxDxH) |
|---|---|
| CBLM | 19.01 x 35.10 x 6.86 inches (483 x 891.7 x 174.3 mm) |
| SFF/LFF (VSP Gx00 models only) | 18.97 x 22.24 x 3.47 inches (482 x 565 x 88.2 mm) |
| DBF | 19.01 x 30 x 3.42 inches (483 x 762 x 87 mm) |
| Dense intermix drive tray (VSP Gx00 models only) | 18.97 x 40.51 x 6.92 inches (482 x 1,029 x 176 mm)<br>(includes the depth of the cable-management arms) |

**Mass** (value of maximum configuration when all controllers and drives are mounted)

| Component | Specification |
|---|---|
| CBLM | 187.39 pounds (85 kg) |
| SFF (VSP Gx00 models only) | Approx 50.70 inches (23 kg) |
| LFF (VSP Gx00 models only) | Approx 59.52 inches (27 kg) |
| DBF | Aprox. 83.77 pounds (38 kg) |
| Dense intermix drive tray (VSP Gx00 models only) | Approx. 198.41 pounds (90 kg) |

## Required height

| Component | Specification |
|---|---|
| CBLM | 4 U |
| SFF (VSP Gx00 models only) | 2 U |
| LFF (VSP Gx00 models only) | 2 U |
| DBF | 2 U |
| Dense intermix drive tray (VSP Gx00 models only) | 4 U |

### Cache specifications

| Item | Specification |
|---|---|
| Capacity (GB) | VSP G400: 128<br>VSP G600: 256<br>VSP F400: 64<br>VSP F600: 128 |
| NAS module Cache Capacity | DDR3 DIMM 8GB x 12 [Slot]<br>Note:<br>• All 12 slots must be fully installed with DIMMs.<br>• Each DIMM is replaceable when they fail.<br>• The DIMM is not common and cannot be used with DKC DIMM. |
| Control method | Read LRU, Write after |
| Battery backup | Provided |
| Backup duration | Unrestricted (saving to a nonvolatile memory) |

Data in the cache memory is preserved against power failures. If a power outage occurs, data in cache memory is written to drives.

When the storage system enters Cache Backup mode, the amber WARNING LED goes on to when the system starts. This warning indicates that the battery charge has dropped significantly and the remaining battery capacity is not sufficient; the storage system will continue operating with the Write Cache function disabled.

When the battery is charged, the warning indication disappears, and the storage system continues the operation in the Write Cache function.

The warning indication disappears within six hours. Even when the warning is shown, normal operation is assured in Write-Through. Read and write performance is lowered because the Write Cache function is disabled.

If the storage system is not charged for more than six months, the battery can become overcharged and sustain unrecoverable damage. To avoid this situation, charge the battery more than 3 hours every six months.

### Insulation performance

| Item | Specification |
|---|---|
| Insulation withstand voltage | AC 1,500 V (100 mA, 1 min) |
| Insulation resistance | DC 500 V, 10 M Ω or more |

## Hitachi Virtual Storage Platform G800 or Hitachi Virtual Storage Platform F800 mechanical specifications

### Controller

1 CBLH

### Drive tray

1 SFF drive tray (VSP Gx00 models only)
1 LFF drive tray (VSP Gx00 models only)
1 FMD drive tray
1 Dense intermix drive tray (VSP Gx00 models only)

### NAS module

| Item | Description |
|---|---|
| NAS module | Optional component for block and file storage configuration |

### Drive size

| Item | Specification |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 3.21 x 8.10 x 0.74 inches (81.6 x 205.7 x 18.7 mm) |
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 4 x 5.78 x 1.02 inches (101.6 x 147.0 x 26.1 mm) |
| Flash Module Drive (flash module drive tray) | 5.74 x 14.44 x 0.78 inches (146 x 366.8 x 19.8 mm) |

### Data capacity (Gb)

| | |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 196.92, 288.20, 393.85, 576.39, 1152.79, 1729.29 |
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 393.85, 1152.79, 1729.29, 3916.14, 5874.22, 9790.36 |

| | |
|---|---|
| Flash Module Drive (flash module drive tray) | 1759.21, 3518.43 , 7036.87, 14073.74 |

### Rotational speed ($min^{-1}$)

| | |
|---|---|
| 2.5-inch drive (SFF) (VSP Gx00 models only) | 196.92/393.85 G bytes<br>2288.20 GB: 15,000 RPM<br>576.39 GB: 10,000 or 15,000 RPM<br>1152.79 GB: 10,000 RPM<br>1729.29 GB: 10,000 RPM |
| 3.5-inch drive (LFF and dense intermix drive tray) (VSP Gx00 models only) | 393.85 G bytes: Flash drive<br>1152.79 G bytes: 10,000 RPM<br>1729.29 G bytes: 10,000 RPM<br>3916.14 G bytes: 7,200 RPM<br>5874.22 G bytes: 7,200 RPM<br>9790.36 G bytes: 7,200 RPM |

### Maximum mountable quantity

Mixing SFF, LFF, FMD, and dense intermix drive trays might affect the maximum number of drives that can be mounted.

| | |
|---|---|
| SFF (VSP Gx00 models only) | 24 |
| LFF (VSP Gx00 models only) | 12 |
| Dense intermix drive tray (VSP Gx00 models only) | 60 |
| Flash module drive (flash module drive tray) (VSP Gx00 models only) | 12 |
| Maximum number of spare drives (VSP Gx00 models only) | 64 |
| Maximum number of flash module drives (VSP Fx00 models) | 40 |
| Maximum number of spare drives (VSP Fx00 models) | 2 |

### Host interface

| Item | Component | Specification |
|---|---|---|
| Interface type | Fibre Channel optical | 8 Gbps, 16 Gbps, 32 Gbps |

| Item | Component | Specification |
|---|---|---|
| | iSCSI optical | 10 Gbps |
| | iSCSI copper | 10 Gbps |
| | NAS module | 10 Gbps (Fibre Channel optical) |
| Data transfer speed (maximum speed for transfer to host) | Fibre Channel optical | 800 Mbps (Fibre Channel) |
| | Fibre Channel optical | 1600 Mbps (Fibre Channel) |
| | Fibre Channel optical | 3200 Mbps (Fibre Channel) |
| | iSCSI optical | 10 Gbps (iSCSI optical) |
| | iSCSI copper | 10 Gbps (iSCSI copper) |
| | NAS module (Fibre Channel) | 1000 Mbs |
| VSP Gx00 models maximum number of ports: | | 8 Gbps Fibre Channel (optical): 64<br>16 Gbps Fibre Channel (optical 2-port): 32<br>16 Gbps Fibre Channel (optical 4-port): 64<br>32 Gbps Fibre Channel (optical): 64<br>10 Gbps iSCSI (optical): 32<br>10 Gbps iSCSI (copper): 32 |
| VSP Fx00 models maximum number of ports: | | 8 Gbps Fibre Channel (optical): 48<br>16 Gbps Fibre Channel (optical): 24<br>32 Gbps Fibre Channel (optical): 48<br>10 Gbps iSCSI (optical): 24<br>10 Gbps iSCSI (copper): 24 |
| Maximum number of ports (host port expansion chassis not installed, NAS module installed) | | 8 Gbps Fibre Channel (optical): 16<br>16 Gbps Fibre Channel (optical 2-port): 8<br>16 Gbps Fibre Channel (optical 4-port): 16<br>32 Gbps Fibre Channel (optical): 16<br>10 Gbps iSCSI (optical): 8<br>10 Gbps iSCSI (copper): 8<br>10 Gbps Fibre Channel (optical): 12 |

| Item | Component | Specification |
|---|---|---|
| Maximum number of ports (host port expansion chassis installed, NAS modules not installed) (VSP Gx00 models only) | | 8 Gbps Fibre Channel (optical): 80<br>16 Gbps Fibre Channel (optical 2-port): 40<br>16 Gbps Fibre Channel (optical 4-port): 80<br>32 Gbps Fibre Channel (optical): 80<br>10 Gbps iSCSI (optical): 40<br>10 Gbps iSCSI (copper): 40 |
| Maximum number of ports (host port expansion chassis and NAS module installed) | | 8 Gbps Fibre Channel Optical: 32<br>16 Gbps Fibre Channel Optical (2-port): 16<br>16 Gbps Fibre Channel Optical (4-port): 32<br>32 Gbps Fibre Channel (optical): 32<br>10 Gbps iSCSI (optical): 16<br>10 Gbps iSCSI (copper): 16<br>10 Gbps Fibre Channel (optical): 12 |
| Transferred block size | | 512 bytes |
| Maximum number of hosts using a Fibre Channel switch | | 255 |
| Maximum number of hosts using a network switch | | 255 |

## RAID specifications

D: Data drive, P: Parity drive.

Although the storage system with a configuration of RAID 1, RAID 5, or RAID 6 provides data reliability enhanced by redundancy, there is a chance that user data could be lost due to an unexpected host, storage system hardware, or software failure. Therefore, users are requested to back up all data.

| RAID Level | SAS, SAS 7.2k, flash drives mounted |
|---|---|
| RAID 1 | 2D+2D, 4D+4D |
| RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| RAID 6 | 6D+2P, 12D+2P, 14D+2P |

| Item | Specification |
|---|---|
| Maximum number of parity groups | 480 |
| Maximum number of parity groups | 16 |
| Maximum volume size | 3 TB (or 4 TB when using the LDEVs of other storage systems) |
| Maximum volumes/host groups and iSCSI targets | 2048 |
| Maximum volumes/parity groups | 2048 |

## Shared memory and data assurance

| Item | Specification |
|---|---|
| Flash memory | 32 M bytes |
| L3 Cache memory | 4 M bytes |
| SDRAM | 1 G bytes |
| Data bus | Parity |
| Cache memory | ECC (1 bit for correction, 2 bits for detection) |
| Drive | Data assurance code |

## Start-up time

| Item |
|---|
| Standard: 5-to-10 minutes.<br>The start-up time may be longer in proportion to the number of drive trays connected. With a maximum configuration 1 controller tray and 19 drive trays, start-up time is approximately 10 minutes. |

## Chassis size

| Component | Specification (WxDxH) |
|---|---|
| CBLH | 19.01 x 35.10 x 6.86 inches (483 x 891.7 x 174.3 mm) |
| SFF/LFF (VSP Gx00 models only) | 18.97 x 22.24 x 3.47 inches (482 x 565 x 88.2 mm) |
| DBF | 19.01 x 30 x 3.42 inches (483 x 762 x 87 mm) |
| Dense intermix drive tray (VSP Gx00 models only) | 18.97 x 40.51 x 6.92 inches (482 x 1,029 x 176 mm)<br>(includes the depth of the cable-management arms) |

**Mass** (value of maximum configuration when all controllers and drives are mounted)

| Component | Specification |
|---|---|
| CBLH | 187.39 pounds (85 kg) |
| SFF (VSP Gx00 models only) | Approx 50.70 inches (23 kg) |
| LFF (VSP Gx00 models only) | Approx 59.52 inches (27 kg) |
| DBF | Approx. 83.77 pounds (38 kg) |
| Dense intermix drive tray (VSP Gx00 models only) | Approx. 198.41 pounds (90 kg) |

### Required height

| Component | Specification |
|---|---|
| CBLH | 4 U |
| SFF (VSP Gx00 models only) | 2 U |
| LFF (VSP Gx00 models only) | 2 U |
| DBF | 2 U |
| Dense intermix drive tray (VSP Gx00 models only) | 4 U |

### Cache specifications

| Item | Specification |
|---|---|
| Capacity (GB) | VSP G800: 512<br>VSP F800: 256 |
| NAS module Cache Capacity | DDR3 DIMM 8GB x 12 [Slot]<br>**Note:**<br>• All 12 slots must be fully installed with DIMMs.<br>• Each DIMM is replaceable when they fail.<br>• The DIMM is not common and cannot be used with DKC DIMM. |
| Control method | Read LRU, Write after |
| Battery backup | Provided |
| Backup duration | Unrestricted (saving to a nonvolatile memory) |

Data in the cache memory is preserved against power failures. If a power outage occurs, data in cache memory is written to drives.

When the storage system enters Cache Backup mode, the amber `WARNING` LED goes on to when the system starts. This warning indicates that the battery charge has dropped significantly and the remaining battery capacity

is not sufficient; the storage system will continue operating with the Write Cache function disabled.

When the battery is charged, the warning indication disappears, and the storage system continues the operation in the Write Cache function.

The warning indication disappears within six hours. Even when the warning is shown, normal operation is assured in Write-Through. Read and write performance is lowered because the Write Cache function is disabled.

If the storage system is not charged for more than six months, the battery can become overcharged and sustain unrecoverable damage. To avoid this situation, charge the battery more than 3 hours every six months.

**Insulation performance**

| Item | Specification |
|---|---|
| Insulation withstand voltage | AC 1,500 V (100 mA, 1 min) |
| Insulation resistance | DC 500 V, 10 M Ω or more |

## Electrical specifications

| Item | Controller | Drive tray |
|---|---|---|
| Input voltage (operable voltage range) (V) | AC 100-120/200-240 +6%/-11% | SFF, LFF, FMD, and dense intermix drive tray: AC 200-240 +6%/-11% |
| Input voltage (operable voltage range) (V) | AC 200-240 +6%/-11% | SFF, LFF, FMD, and dense intermix drive tray: AC 200-240 +6%/-11% |
| Frequency (Hz) | 50/60 ±1 | |
| Number of phases, cabling | Single-phase with protective grounding | |
| Steady-state current 100V/ 200V[1], [2] | CBSS: 4.0x2/2.0x2<br>CBSL: 4.0x2/2.0x2<br>CBLM: 4.0x2<br>CBLH: 4.0x2 | SFF drive tray: 2.4x2/1.2x2<br>LFF drive tray: 1.9x2/1.0x2<br>FMD drive tray: 2.6x2/1.3x2<br>Dense intermix drive tray: -/ 3.0x2 |
| Current rating of breaker/fuse (A) | 16.0 (each electrical) | |
| Heat value (normal) (kJ/h) | CBSS: 1800 or less<br>CBSL 1550 or less<br>CBLM: 2160 or less<br>2810 or less | SFF drive tray: 1120 or less<br>LFF drive tray: 940 or less<br>FMD drive tray: 1300/1520 or less<br>FMD drive tray: 1520 or less<br>FMD drive tray: 1520 or less |

| Item | Controller | Drive tray |
|---|---|---|
| | | Dense intermix drive tray: 3460 or less |
| Steady-state power (VA/W)[3] | CBSS: 800/760 or less<br>CBSL: 800/760 or less<br>CBLM: 1600/1560 or less<br>CBLH: 1600/1560 or less | SFF drive tray: 480/460 or less<br>LFF drive tray: 380/350 or less<br>FMD drive tray: 520/490 or less<br>Dense intermix drive tray: 1200/1160 or less |
| Power consumption (VA/W) | CBSS: 520/500 or less<br>CBSL: 450/430 or less<br>CBLM: 640/600 or less<br>CBLH: 840/780 or less | SFF drive tray: 320/310 or less<br>LFF drive tray: 280/260 or less<br>FMD drive tray: 440/420 or less<br>Dense intermix drive tray: 1000/960 or less |

**Notes:**

1. The power current of Nx2 described in this table is required for a single power unit.
2. If one power unit fails, another power unit requires electric current for the two power units. Therefore, plan the power supply facility so that the current-carrying capacity for one power unit can provide the total capacity for two power units.
3. This table shows the power requirement (100 V or 200 V) for the maximum configuration . The actual required power might exceed the value shown in the table when the tolerance is included.

## Environmental specifications

### Temperature

**Caution:** The following VSP Gx00/Fx00 storage system components are not supported in high-temperature environments. Do not operate the following components at temperatures of 40°C or higher:

- DB60 dense drive tray
- HDS provided service processor (SVP) server
- First-generation FMDs (non-DC2 FMDs)

| State | Controller | SFF, LFF drive trays | Dense intermix drive tray |
|---|---|---|---|
| Operating | 50°F to 104°F (10°C to 40°C) | 50°F to 104°F (10°C to 40°C) | 50°F to 95°F (10°C to 35°C) |
| Non-operating | 14°F to 122°F (-10°C to 50°C) | 14°F to 122°F (-10°C to 50°C) | 14°F to 122°F (-10°C to 50°C) |
| Transport, storage | -22°F to 140°F (-30°C to 60°C) | -22°F to 140°F (-30°C to 60°C) | -22°F to 140°F (-30°C to 60°C) |

| State | Controller | SFF, LFF drive trays | Dense intermix drive tray |
|---|---|---|---|
| Temperature change rate (°C/h) | 10 or less | | |

| State | Controller | FMD drive trays |
|---|---|---|
| Operating | 50°F to 104°F (10°C to 40°C) | DKC-F710I-1R6FM or DKC-F710I-3R2FM drive is installed: 50°F to 95°F (10°C to 35°C) |
| Operating | 50°F to 104°F (10°C to 40°C) | DKC-F810I-1R6FN/3R2FN/6R4FN/7R0FP/14RFP drive is installed: 50°F to 104°F (10°C to 40°C) |
| Non-operating | 14°F to 122°F (-10°C to 50°C) | 14°F to 95°F (-10°C to 35°C) |
| Transport, storage | -22°F to 140°F (-30°C to 60°C) | -22°F to 122°F (-30°C to 50°C) |
| Temperature change rate (°C/h) | 10 or less | |

## Humidity

| State | Percentage |
|---|---|
| Operating | 8 to 80 |
| Non-operating | 8 to 90 |
| Transport, storage (%) | 5 to 95 |
| Maximum wet bulb temperature (°C) | 29 (non-condensing) |

## Vibration

| State | $m/s^2$ |
|---|---|
| Operating | 2.5 or less<br>Within 5 seconds (resonance point: 10 Hz or less) |
| Non-operating | 5.0 or less at 5 Hz to 300 Hz (no damage to product)<br>9.8 (1.0 G)<br>Within 5 seconds (resonance point: 10 Hz or less) |
| Transport (packed) | 5.0 or less |

### Impact

| State | $m/s^2$ |
|---|---|
| Operating | 20 or less<br>(10 ms, half sine wave) |
| Non-operating | 50 or less<br>(10 ms, half sine wave) |
| Transport (packed) | 80 or less |

### Altitude

| State | Controller | FMD drive |
|---|---|---|
| Operating (m) | 3,000 (Environmental temperature: 10°C to 32°C)<br>900 (Environmental temperature: 10°C to 40°C) | 3,000 (Environmental temperature 10°C to 32°C)<br>OR<br>900 (Environmental temperature: 10°C to 35°C) when DKC-F710I-1R6FM or DKC-F710I-3R2FM drive is installed. |
| Operating (m) | 3,000 (Environmental temperature: 10°C to 32°C)<br>900 (Environmental temperature: 10°C to 40°C) | 3,000 (Environmental temperature: 10°C to 32°C)<br>OR<br>900 (Environmental temperature: 10°C to 40°C) when DKC-F810I-1R6FN/3R2FN/6R4FN/7R0FP/14RFP drive is installed. |
| Non-operating (m) | -60 to 12,000 | N/A |

| State | Controller | SFF and LFF drives | Dense intermix drive tray |
|---|---|---|---|
| Operating (m) | 3,000 (Environmental temperature: 10°C to 32°C) | 3,000 (Environmental temperature: 10°C to 32°C) | 3,000 (Environmental temperature: 10°C to 28°C)<br>1,000 (Environmental temperature: 10°C to 35°C) |
| | 900 (Environmental temperature: 10°C to 40°C) | 900 (Environmental temperature: 10°C to 40°C) | |
| Non-operating (m) | | N/A | |

### Atmosphere

Avoid areas exposed to corrosive gas and salty air.

### Acoustic Noise

| State | Controller | SFF, LFF | Dense intermix drive tray |
|---|---|---|---|
| Operating | 60 dB (Environmental temperature 32°C or less)[1] | 60 dB (Environmental temperature 32°C or less)[1] | 71 dB (Environmental temperature 32°C or less)[1], [2], [3], [4] |
| Non-operating | 55 dB | 55 dB | 71 dB (Environmental temperature 32°C or less)[1], [2], [3], [4] |

**Notes:**

1. The system's internal temperature controls the rotating speed of the fan module. Therefore, this standard value might be exceeded if the maximum load continues under high-temperature environment or if a failure occurs in the system.
2. Sound pressure level (LA) changes from 66 dB or 75 dB, according to the ambient temperature, drive configuration, and operating status. Maximum volume can reach 79 dB during maintenance procedure for a failed ENC or power supply.
3. Acoustic power level (LwA) measured by the ISO 7779 standard is 7.2 B. This value changes from 7.2 B to 8.1 B, according to the ambient temperature, drive configuration, and operating status.
4. When accessing the dense intermix drive tray, do not work for long times at the rear of the rack.

| State | Controller | FMD | |
|---|---|---|---|
| Operating | 60 dB (Environmental temperature 32°C or less)[1] | 60 dB (Environmental temperature 32°C or less)[1], [2], [3]<br>(When accessing the dense intermix drive tray, do not work for long times at the rear of the rack.) | |
| Non-operating | 55 dB (Environmental temperature 32°C or less)[1], [2], [3], [4] 55 dB | | |

**Notes:**

1. The system's internal temperature controls the rotating speed of the fan module. Therefore, this standard value might be exceeded if the maximum load continues under high-temperature environment or if a failure occurs in the system.
2. Sound pressure level (LA) changes from 66 dB or 75 dB, according to the ambient temperature, drive configuration, and operating status. Maximum volume can reach 79 dB during maintenance procedure for a failed ENC or power supply.
3. Acoustic power level (LwA) measured by the ISO 7779 standard is 7.2 B. This value changes from 7.2 B to 8.1 B, according to the ambient temperature, drive configuration, and operating status.

## Battery specifications

The following table shows the lifetime expectancy of the batteries installed in the storage system.

| Storage system intake temperature | CBSS | CBSL |
|---|---|---|

| | | |
|---|---|---|
| Up to 75.2º F (24º C) | 5 years | 5 years |
| Up to 86º F (30º C) | 5 years | 4 years |
| Up to 93.2º (34º C) | 4 years | 3 years |
| Up to 104º (40º C) | 3 years | 2 years |

| Storage system intake temperature | CBLMCBLH |
|---|---|
| Up to 75.2º F (24º C) | 5 years |
| Up to 86º F (30º C) | 5 years |
| Up to 93.2º (34º C) | 4 years |
| Up to 104º (40º C) | 3 years |

## RAID specifications

| Item | | Controller | SFF, LFF, dense intermix drive trays (range for setup) |
|---|---|---|---|
| RAID level | | SAS, SAS 7.2k, flash drives mounted: 1, 5, 6 | |
| RAID configuration (unit of addition) | RAID 1 | 2D+2D, 4D+4D | |
| | RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P | |
| | RAID 6 | 6D+2P, 12D+2P, 14D+2P | |

| Item | | Controller | SFF, LFF, dense intermix drive trays (range for setup) |
|---|---|---|---|
| RAID level | | N/A | SAS, SAS 7.2 krpm, flash drives mounted: 0, 1, 5, 6, 1+0 (DBW supports SAS 7.2k drives) |
| RAID configuration (unit of addition) | RAID 1 | N/A | 2D+2D, 4D+4D |
| | RAID 5 | N/A | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| | RAID 6 | N/A | 6D+2P, 12D+2P, 14D +2P |

| Item | Controller | FMD drive tray (range for setup) |
|---|---|---|
| RAID level | N/A | SAS, SAS 7.2 krpm, flash drives mounted: |

| Item | | Controller | FMD drive tray (range for setup) |
|---|---|---|---|
| | | | 0, 1, 5, 6, 1+0 (DBW supports SAS 7.2k drives) |
| RAID configuration (unit of addition) | RAID 1 | N/A | 2D+2D, 4D+4D |
| | RAID 5 | N/A | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| | RAID 6 | N/A | 6D+2P, 12D+2P, 14D +2P |

**Note:** Although certain RAID configurations support redundancy in the event of a drive failure, best practices dictate that you back up data on a regular basis.

## iSCSI specifications

| Item | Specification | Comments |
|---|---|---|
| iSCSI target function | Supported | N/A |
| iSCSI target function | Supported | TrueCopy® only |
| iSCSI ports | 2 per interface board | VSP Gx00 models: Maximum 32 per iSCSI system<br>VSP Fx00 models: Maximum 24 per iSCSI system |
| Connection methods | Direct and switch connections | |
| Host connections | 255 (maximum per iSCSI port) | With Linux software initiator, the maximum number decreases. |
| Path failover | HDLM[1] | Supports Microsoft MPIO (Multi Path I/O) |
| Link | 10 Gbps SFP+ | N/A |
| Transfer speed | 10 Gbps | N/A |
| Connector type | LC | N/A |
| Cable | Optical OM3, OM2 MMF cable | N/A |
| Network switch | L2 or L3 switch | Should comply with IEEE802.3ae |
| Switch cascading | Maximum: 5 switches or fewer | Minimum number of cascading switches is recommended. |
| MAC address | Per port (fixed value) | Factory setting: World Wide Unique value. Cannot be changed. |

| Item | Specification | Comments |
|---|---|---|
| Maximum transfer unit (MTU) | 1,500, 4,500, 9,000 bytes (Ethernet frame) | Jumbo frame, MTU size greater than 1500 |
| Link aggregation | Not supported | N/A |
| Tagged VLAN | Supported | N/A |
| IPv4 | Supported | N/A |
| IPv6 | Supported | Note the following precautions:<br>• When iSCSI Port IPv6 is set to Enabled, if the IPv6 global address is set to automatic, the address is determined by acquiring a prefix from an IPv6 router.<br>• If the IPv6 router does not exist in the network, the address cannot be determined. As a result, an iSCSI connection might be delayed. When an iSCSI Port IPv6 is set to Enabled, verify the IPv6 router is connected to the same network, and then set IPv6 global address automatically. |
| Subnet mask | Supported | N/A |
| Gateway address | Supported | N/A |
| DHCP | N/A | N/A |
| DNS | N/A | N/A |
| Ping (ICMP ECHO) Transmit, Receive | Supported | N/A |
| IPsec[2] | N/A | N/A |
| TCP port number | 3260 | Changeable among 1 to 65,535. Observe the following if changing values:<br>• The setting of the corresponding host should also be changed to log in the new port number.<br>• The new port number might conflict with other network communication or be filtered on some network equipment, preventing the storage system from communicating through the new port number. |

| Item | Specification | Comments |
|---|---|---|
| iSCSI name | Both iqn[3] and eui[4] types are supported | The unique iqn value is automatically set when a target is made. iSCSI name is configurable. |
| Error recovery level | 0 (zero) | Error recovery by retrying from host. Does not support Level 1 and Level 2. |
| Header digest | Supported | Detects header error or data error with iSCSI communication. The storage system follows the host's digest setting. If digest is enabled, the performance degrades. The amount of the degradation depends on factors such as host performance of host and transaction pattern. |
| Data digest | Supported | |
| Maximum iSCSI connections at one time | 255 per iSCSI port | N/A |
| CHAP | Supported | Authentication: login request is sent properly from host to storage. CHAP is not supported during discovery session. |
| Mutual (2-way) CHAP | Supported (not available if connected to Linux software initiator) | Authentication: login request is sent properly from host to storage. |
| CHAP user registration | Max 512 users per iSCSI port | N/A |
| iSNS | Supported | With iSNS (name service), a host can discover a target without knowing the target's IP address. |

**Note:**

1. JP1, HiCommand Dynamic Link Manager. Pass switching is achieved. Not supported on Windows Vista and Windows 7 operating systems.
2. IP Security. Authentication and encryption of IP packets. The storage system does not support IPsec.
3. iqn: iSCSI Qualified Name. The iqn consists of a type identifier, "iqn," a date of domain acquisition, a domain name, and a character string given by the individual who acquired the domain. Example: iqn.1994-04.jp.co.hitachi:rsd.d7m.t.10020.1b000.tar
4. eui: 64-bit Extended Unique Identifier. The eui consists of a type identifier, "eui," and an ASCII-coded, hexadecimal, EUI-64 identifier. Example: eui.0123456789abcdef

## iSCSI standards

The following standards apply to the management, maintenance, and iSCSI data ports. To configure this system, use switches that comply with the following standards:

- IEEE 802.1D STP
- IEEE 802.1w RSTP
- IEEE 802.3 CSMA/CD
- IEEE 802.3u Fast Ethernet
- IEEE 802.3z 1000 BASE-X
- IEEE 802.1Q Virtual LANs
- IEEE 802.3ad Dynamic LACP
- IEEE 802.3ae 10 Gigabit Ethernet
- RFC 768 UDP
- RFC 783 TFTP
- RFC 791 IP
- RFC 793 TCP
- RFC 1157 SNMP v1
- RFC 1231 MIB II
- RFC 1757 RMON
- RFC 1901 SNMPv2

## Regulatory compliance

This equipment has been tested and certified for compliance with the following standards.

| Standard | Specification | Mark on the product | Country regulation |
|---|---|---|---|
| Electronic emission controls | FCC part 15 Subpart B: 2013 | FCC | USA and Canada |
| | ICES-003 Issue 5:2012 | ICES-003 | USA and Canada |
| | AS/NZS CISPR 22:2009+A1 | RCM | Australia and New Zealand |
| | TP TC 020/2011 | EAC | Russia, Belarus, and Kazakhstan |
| | CNS 13438 | BSMI | Taiwan |
| | KN22 | KC | Korea |
| | KN24 | KC | Korea |
| Electronic emission certifications | EN5522: 2010 | CEmarking | EU |
| | EN5524: 2010 | CEmarking | EU |
| | EN61000-3.2:2006+A1 +A2 | CEmarking | EU |
| | EN61000-3.3:2008 | CEmarking | EU |
| Safety certifications | UL and CSA 60950-1:2007 | cTUVus | USA and Canada |
| | EN60950-1:2006+A1 | TUV | Germany |
| | IEC60950-1:2005+A1 | N/A | All CB countries |

| Standard | Specification | Mark on the product | Country regulation |
|---|---|---|---|
| | IEC60950-1:2005+A1 | S_Mark | Argentina |
| | TP TC 004/2011 | EAC | Russia |
| | CNS 14336-1 | BSMI | Taiwan |
| | EN60950-1:2006+A1 | CEmarking | EU |
| Radio interference voluntary control | VCCI V-3/2013.04 | VCCI | Japan |

## Dense intermix drive tray connection restrictions

If a drive is inserted into a slot of a dense intermix drive tray when the installed number of drives exceeds 240 slots per path, the drive is blocked.

# Physical SVP specifications

The following sections describe the specifications for the physical SVP.

## Physical SVP hardware specifications

The following table lists the hardware specifications for the physical SVP supplied by Hitachi Data Systems.

**Caution:** The physical SVP is not supported in high-temperature environments. Do not operate it in locations where the temperature is 40°C or higher.

| Item | Specification |
|---|---|
| Dimensions | Height: 1.7 inches (43 mm)<br>Width: 17.2 inches (437 mm)<br>Depth: 14.5 inches (369 mm)<br>Weight: 14 lbs (6.4 kg) |
| Processor | Celeron G1820 2.7-GHz 2M, 2C, 2T<br>• Cores: 2<br>• Instruction set: 64-bit<br>• SmartCache: 2 MB<br>• Maximum memory size: 32 GB<br>• Memory types: DDR3-1333, DDR3L-1333 @ 1.5V |
| Memory | 8-GB RAM DDR3 |
| Hard drive | 2 TB |

| Item | Specification |
|---|---|
| Network interface card | x4 ports (on-board NIC) +<br>x1 IPMI (BMC) port |
| Fans | 2x 4-cm 4-pin PWM fans |
| Operating system | Windows Embedded Standard 7 |

## Physical SVP environmental specifications

The following table lists the environmental specifications for the physical SVP supplied by Hitachi Data Systems.

| Item | Specification |
|---|---|
| Operating temperature | 41°F ~ 95°F<br>(5°C ~ 35°C) |
| Non-operating temperature range | -40°F ~ 140°F<br>(-40°C ~ 60°C) |
| Operating relative humidity range | 8% ~ 90% (non-condensing) |
| Non-operating relative humidity range | 5% - 95% (non-condensing) |

## Physical SVP electrical specifications

The following table lists the electrical specifications for the physical SVP supplied by Hitachi Data Systems.

| Item | Specification |
|---|---|
| Rated AC voltage | 100-240 V, 50-60 Hz, 4.2 - 1.8A |
| Power supply | 350-Watt AC power supply with PFC |
| AC voltage | 100-240 V, 50-60 Hz, 4.2 - 1.8 Amp |
| Power supply safety / EMC | • USA - UL listed, FCC<br>• Canada - CUL listed<br>• Germany - TUV Certified<br>• Europe/CE Mark<br>• EN 60950/IEC 60950-Compliant |

| MFT p-code | Description | Watts |
|---|---|---|
| MBD-X10SLM+-LN4F-O | Single-socket H3 (LGA 1150) / 32-GB DDR3 ECC 1600 MHz / 6x SATA / 4x GbE | 20 |
| CSE-512F-350B | Two 350 W 3.5-inch internal drive bays | 26.4 |
| CM8064601483405 | Intel Celeron G1820 2.7 Ghz 2M tray | 53 |
| 0F11000 | 3.5-inch 25.4 mm 2 TB 32 MB 7200 RPM | 9.1 |

| MFT p-code | Description | Watts |
|---|---|---|
| KVR16E11S8 | 4 GB 1600 Mhz DIMM SR x8 with TS Kingston F | 4.05 |
| | | 112.55 Watts total |

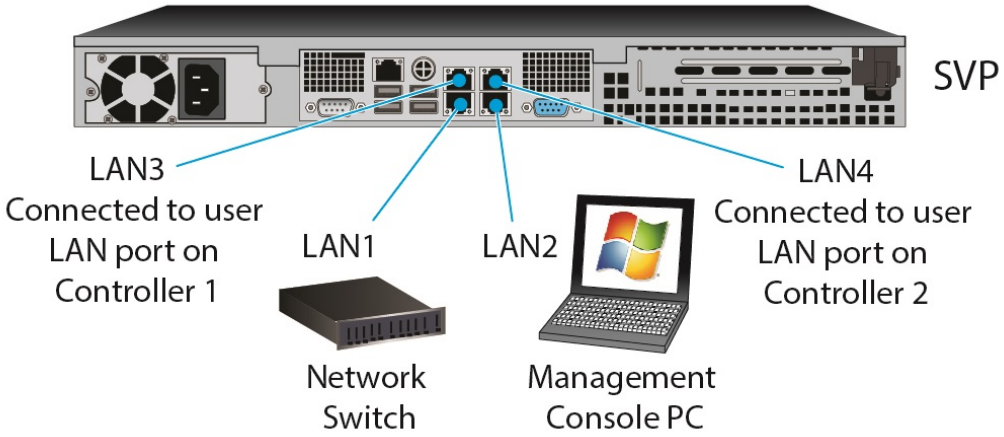
VA is 140.69, with a 0.8 power factor.

**Note:** The measurements are not kilo values.

## Bridged and non-bridged network configurations

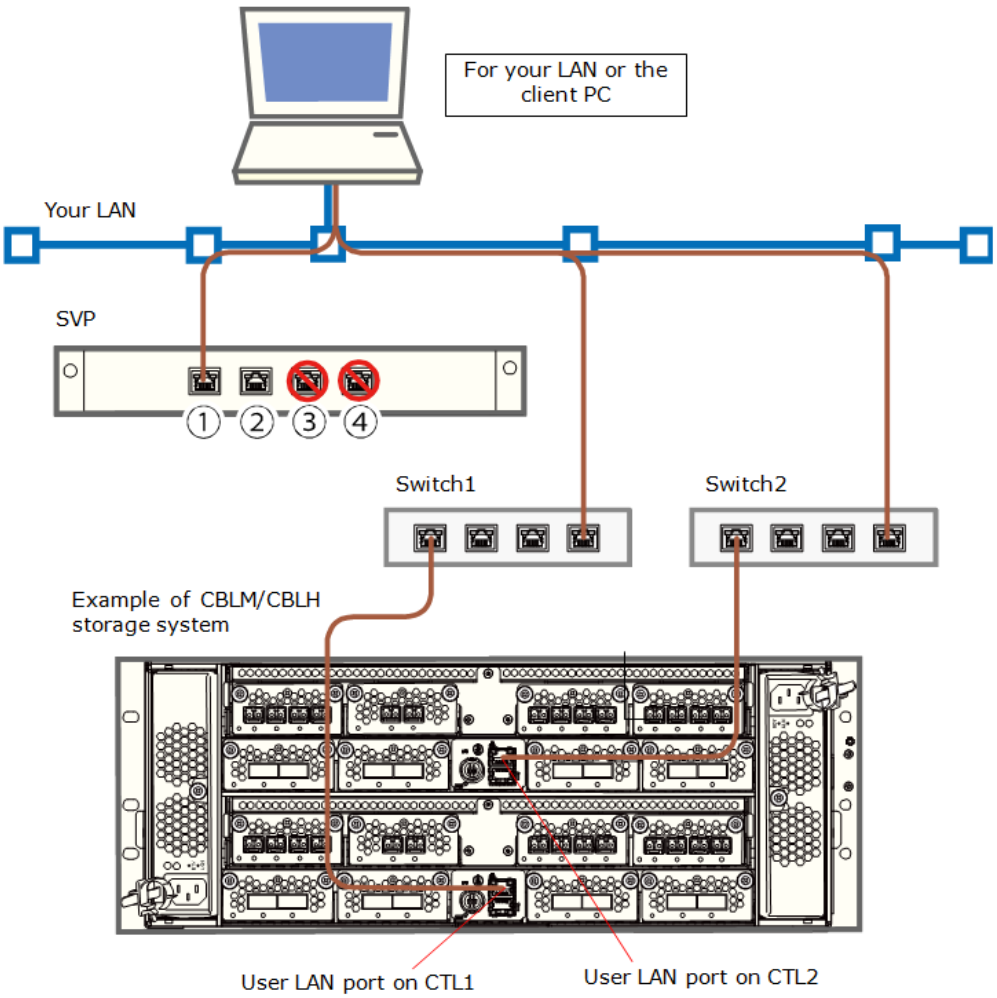
The physical SVP can operate in a bridged or non-bridged network configuration.

When you first receive the physical SVP. you must configure it for bridged operation. In this configuration, the SVP's internal bridge is used, with all Ethernet RJ-45 ports on the rear of the SVP populated by Ethernet LAN cables.




After you connect the physical SVP, you can set up an encrypted Secure Sockets Layer (SSL) connection between the storage system and the SVP.

If you prefer, you can switch the SVP from bridged to non-bridged configuration after running the initial setup. A non-bridged configuration disables the SVP's internal bridge. It also allows you to remove the Ethernet cables from SVP ports LAN3 and LAN4 and connect them to your own Ethernet switches instead. For example:




## Minimum requirements for a virtual SVP

The virtual SVP requires the following minimum requirements.

**Prerequisites**

**ESX Server** (provided by the customer)

- VMware ESXi server 6.x
- Two quad core processors, Intel Xeon 2.29 GHz
- One-port NIC
- SVP guest OS (maximum 1 per ESX server)
- 32-GB RAM

**SVP Guest OS (1 DKC)** (maximum one DKC per SVP guest OS)

- Windows 7 Professional x64 Service Pack 1 (provided by the customer)
- Two vCPUs

- One virtual network adapter
- 4-GB RAM
- 120-GB disk space

**Miscellaneous**
- WinZip

## Minimum requirements for a Linux KVM SVP

An SVP that will be used in a Linux KVM environment requires the following minimum requirements.

**Prerequisites**

**Linux KVM Server** (provided by the customer)
- Oracle Linux 7.x server
- Two quad core processors, Intel Xeon 2.29 GHz
- One-port NIC
- SVP guest OS (up to eight per Linux KVM server)
- 128-GB RAM

**SVP Guest OS (1 DKC)** (maximum 1 DKC per SVP guest OS)
- Windows 7 Professional x64 Service Pack 1 (provided by the customer)
- Two vCPUs
- One virtual network adapter
- 4-GB RAM
- 120-GB disk space

**Miscellaneous**
- WinZip

# 2

# General site planning

## Hitachi Data Systems responsibilities

Your Hitachi Data Systems account team will assist you throughout the site planning process. The Hitachi Data Systems account team is responsible for:

- Assisting you as needed to plan the installation for your specific site and operational configuration.
- Coordinating Hitachi Data Systems resources to ensure smooth delivery, installation, and configuration of the units.

## User responsibilities

When planning and preparing for the installation of a storage system, the user assumes the following responsibilities:

- Purchase site-planning services from Hitachi Global Services.
- Provide the space, people, and tools for unpacking, installing, and operating the storage system.
- Confirm that the path from where the storage system is delivered to the installation site is large enough to support the storage system. Take into account all ramps, walkways, and elevators and possible obstructions.
- Maintain the proper environmental conditions for the storage system.
- Provide adequate power facilities for the storage system.
- Supply the network connections and external cabling required by the storage system.

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 user's responsibility to monitor this environment and ensure continued conformance with the recommended environmental specifications.

Adequate power is necessary for the reliable functioning of electronic equipment and for the safety of the user's installation. The user is responsible for procuring, installing, and maintaining adequate power to the equipment.

**Related references**

- Environmental specifications on page 57
- Pre-installation planning on page 72

## Pre-installation planning

Successful installation of the storage system requires careful pre-installation planning. Proper planning will help provide for a more efficient installation and greater reliability, availability, and serviceability.

All pre-installation activities should be scheduled and completed before the equipment is delivered.

The pre-installation process includes:

- Hardware configuration planning, such as system component layout in the rack and drive allocation.
- Networking and cabling planning, such as network topologies, cabling configurations, network switches, and cabling of connected host computers.
- Ensuring that all controllers and drive trays in the specified configuration and all cables of the required length have been ordered.
- Selecting key personnel who will handle the installation.
- Confirming that all electrical service wiring has been installed at the predetermined location.

The following are suggested pre-installation tasks to be completed prior to the delivery and installation of the storage system:

- Prepare a preliminary layout of the installation.
- Review the power and the heating, ventilation, and air-conditioning (HVAC) requirements, and then ordering any additional support equipment.
- Work with your Hitachi representative to ensure that all controllers and drive trays in the specified configuration and all cables of the required length have been ordered.
- Make a final layout of the installation and reviewing the layout with your Hitachi representative.
- Verify the electrical service wiring has been installed at the predetermined location before installing the storage system.
- Verify that all additional equipment , such as switches and host computers, is installed and operational.

## Delivery space requirements

Verify that the delivery area, the destination, and the path between them meet the standard delivery clearance and weight requirements of the storage system.

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. Permanent obstructions such as pillars or narrow doorways can cause equipment damage. If necessary, plan for the removal of walls or doors.

Verify that all floors, stairs, and elevators you use when moving the storage system to its destination can support the weight and size of the equipment. Failure to do so could damage the equipment or your site.

**Related references**

- Hitachi Virtual Storage Platform G200 mechanical specifications (AC power supply model) on page 35
- VSP G400 or VSP F400 and VSP G600 or VSP F600 mechanical specifications on page 44
- Hitachi Virtual Storage Platform G800 or Hitachi Virtual Storage Platform F800 mechanical specifications on page 50

## Unpacking the equipment

The storage system is shipped directly from Hitachi.

Hitachi recommends that three physically able individuals unpack the storage system equipment. Individuals must be knowledgeable and experienced with the safe handling of large, heavy, and sensitive computer equipment.

As you unpack the equipment, match the delivered items to the packing list (invoice) and visually check the items for damage. If any items are missing, damaged, or not the ones you ordered, contact Hitachi.

**Note:** To avoid condensation from occurring with the storage system, do not unpack the storage system in a location subject to rapid differences in temperature.

## Climatization

Storage systems that are shipped or stored at extreme temperatures require time to adjust to operating temperatures before startup.

If the storage system arrives in hot or cold weather, do not unpack it until it has been allowed to reach room temperature (one to two hours).

Immediately exposing the storage system to warm temperature can cause condensation to occur, which could damage the electronics.

If you notice any condensation, allow the storage system to stand unattended for one to two hours, and then unpack it.

3

# Structural and environmental considerations

## Space requirements

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.

## Floor load ratings

The floor space at the installation site must be strong enough to support the combined weight of the:

- Controller.
- Drive trays.
- Rack.
- All associated equipment.

To verify adequate load-bearing capacity, plan for the maximum configuration. The following table lists the weight for maximum configurations. The table takes into account a rack that is not sold by Hitachi Data Systems. The weights below do not include the rack itself, so add the

weight of the rack to the values shown below. The maximum allowable weight in the Hitachi rack is 2,000 pounds (907 kg). For more information about racks, refer to the *Hitachi Universal V2 Rack Reference Guide*.

**Table 1 CBSS and physical SVP**

| Controller, physical SVP | Drive trays | Weight |
|---|---|---|
| 1 CBSS | 7 SFF drive trays | 1245.6 lbs (565 kg) |
| | 7 LFF drive trays | 1239 lbs (562 kg) |
| | 7 FMD drive trays | 1373.4 lbs (623 kg) |
| | 4 dense intermix drive trays | 1563.1 lbs (709 kg) |
| Physical SVP | — | 39.5 lbs (17.9 kg) |

**Table 2 CBSL and physical SVP**

| Controller, physical SVP | Drive trays | Weight |
|---|---|---|
| 1 CBSL | 7 SFF drive trays | 1294.1 lbs (567 kg) |
| | 7 LFF drive trays | 1243.4 lbs (564 kg) |
| | 7 FMD drive trays | 1377.9 lbs (625 kg) |
| | 8 dense intermix drive trays | 1567.5 lbs (711 kg) |
| Physical SVP | — | 39.5 lbs (17.9 kg) |

**Table 3 CBLM and physical SVP**

| Controller, physical SVP | Drive trays | Weight |
|---|---|---|
| 1 CBLM | 16 SFF drive trays | 2597.1 lbs (1178 kg) |
| 1 CBLM | 16 LFF drive trays | 2581.6 lbs (1171 kg) |
| 1 CBLM | 16 FMD drive trays | 2940.9 lbs (1334 kg) |
| 1 CBLM | 8 dense intermix drive trays | 3075.4 lbs (1395 kg) |
| Physical SVP | — | 39.5 lbs (17.9 kg) |

**Table 4 CBLM and physical SVP**

| Controller, physical SVP | Drive trays | Weight |
|---|---|---|
| 1 CBLM | 24 SFF drive trays | 3243 lbs (1471 kg) |
| 1 CBLM | 24 LFF drive trays | 3223.2 lbs (1462 kg) |
| 1 CBLM | 24 FMD drive trays | 3734.6 lbs (1694 kg) |
| 1 CBLM | 12 dense intermix drive trays | 4515.1 lbs (2048 kg) |
| Physical SVP | — | 39.5 lbs (17.9 kg) |

**Table 5 CBLH and physical SVP**

| Controller, physical SVP | Drive trays | Weight |
|---|---|---|
| 1 CBLH | 48 SFF drive trays | 6236.9 lbs (2829 kg) |
| 1 CBLH | 48 LFF drive trays | 6195 lbs (2810 kg) |
| 1 CBLH | 48 FMD drive trays | 7167.2 lbs (3251 kg) |
| 1 CBLH | 24 dense intermix drive trays | 8194.6 lbs (3717 kg) |
| Physical SVP | — | 39.5 lbs (17.9 kg) |

# Third-party racks for VSP G200, G400, G600, G800 and VSP F400, F600, F800

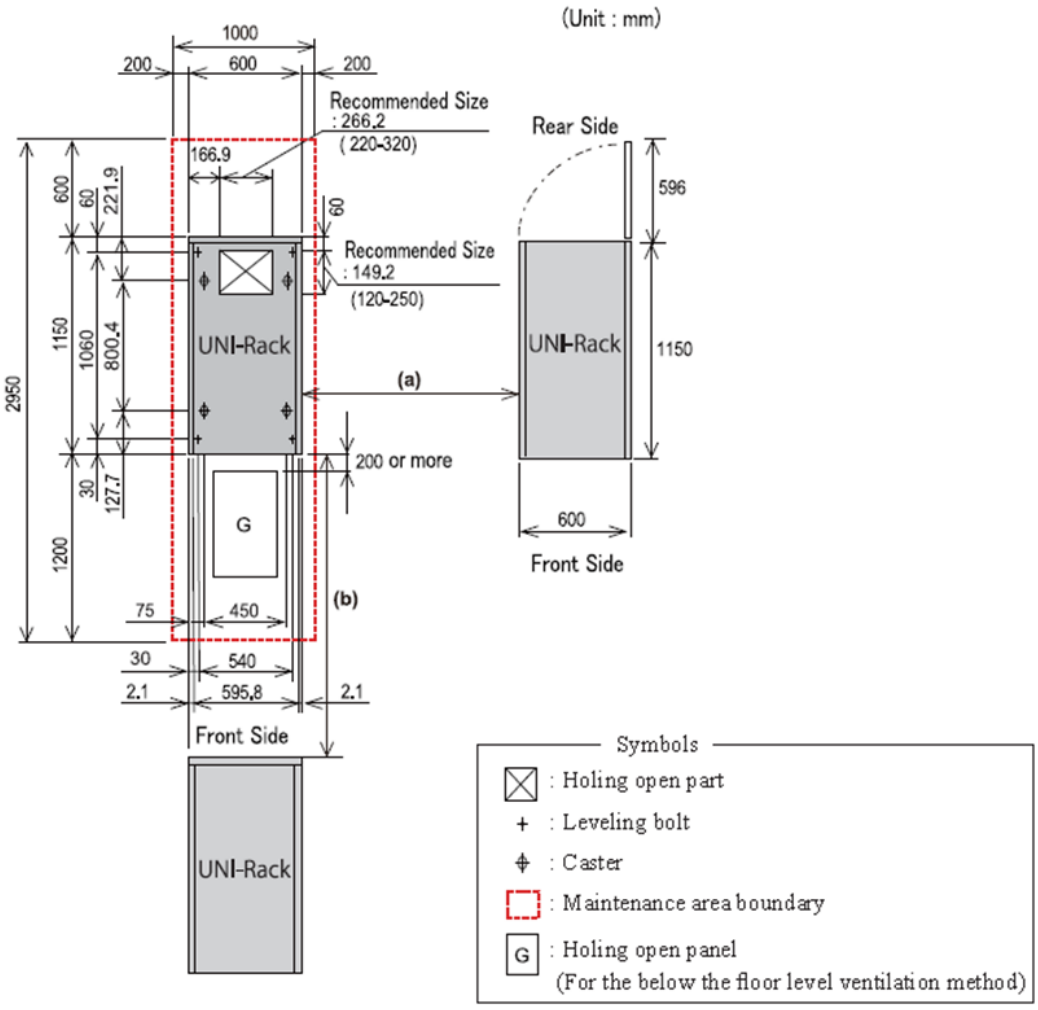
VSP G200, G400, G600, G800 and VSP F400, F600, F800 storage systems support third-party racks that meet Hitachi Data Systems specifications.

- VSP G200, G400, G600, G800 and VSP F400, F600, F800 storage systems support any 4-post, EIA310-D compliant rack, which must have adequate airflow and weight capacity.
- PDUs must be mounted with no serviceability issues. The PDU receptacles must face rearward (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.

# Using dense intermix drive trays with third-party racks

When mounting DB60 dense intermix drive trays in third-party racks, observe the following guidelines and refer to the following figure.

- Use anti-tilt floor plates or ceiling-mounted fixing brackets to stabilize racks.
- Use a rack that is at least 1040 mm deep to accommodate the dense intermix drive tray and cable-management arms.
- Dense tray rail kits require square mounting holed racks.
- If a dense intermix drive tray is mounted above shelf RU32, you must use ladders to service the dense intermix drive tray safely.



## Raised and non-raised floors

Your storage system can be installed on a raised or non-raised floor.

A raised floor consists of load-bearing floor panels laid in a horizontal grid above a building floor. The raised floor is supported by adjustable vertical pedestals to provide an underfloor space for distributing cables, power outlets, and other services.

Installing the storage system on a raised floor is preferred because it:

- Provides efficient cooling.
- Makes it easy to accommodate cabling layouts.
- Prevents tripping hazards because cables are routed below the raised floor.

If your site has a raised floor, consider the following factors:

- The raised floor must be built of noncombustible materials.
- Treat concrete subfloors to prevent them from releasing dust.
- Confirm there is positive air pressure below the raised floor to verify adequate airflow.
- The raised floor clearance must be adequate to accommodate cables. Remove all unused cables from the area below the raised floor to prevent these areas from becoming dust and dirt traps.
- Eliminate sharp edges on floor cutouts to avoid damage to cables.
- Apply sealant to raised-floor cable openings to prevent chilled air from escaping.
- For metallic raised floor structures, it is a safety hazard to expose metal or highly conductive material at ground potential to the walking surface.

Although raised floors are preferred, the storage system can be installed on non-raised floors. In these environments, overhead cabling can be used to provide power to the storage system. Installation planning, cable length, and rack location in relation to the cable openings on the rack are critical to installations that use overhead cabling.

## Floor covering and cutouts

Do not use carpeting, including antistatic varieties, because they can shed dust over time that can cause problems with the storage system.

If your computer room has carpeting, place static discharge mats so that personnel must walk across them before touching any part of the storage system. Failing to comply with this precaution can damage the equipment through static discharge.

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.

## Meeting environmental conditions

For optimal performance, the storage system requires controlled environmental conditions.

Hitachi recommends that you maintain a controlled environment, with a high degree of cleanliness and close control of temperature and humidity. The storage system operating environment must be free from continuous vibration, dust, and other environmental contaminants.

Keep the location as free of airborne particulates as possible. To eliminate obvious sources of particulates, do not permit anyone to eat, drink, or smoke near the storage system. Do not place the storage system close to a copier or printer that can emit toner and paper dust.

If the site will be undergoing construction that involves sawing, welding, or drilling, protect the storage system from concrete, metal particles, and other debris during construction.

**Related references**

- Environmental specifications on page 57

## Maintaining the optimal temperature

The site must provide sufficient airflow capacity to remove the heat generated by the storage system.

Prior to installation, verify that the site has a cooling system that can support all thermal emissions.

The level of cooling required for the storage system is not the same as the air conditioning used in offices and homes. Air-conditioning systems in offices and homes provide comfort for the low heat and higher moisture generated by the human body. In contrast, electronic equipment generates high dry-heat output that is moisture-free.

Your storage system can tolerate temperature and humidity fluctuations if the specified ranges are followed. Exceeding the maximum temperature and humidity ranges for any period of time, however, can affect storage system performance adversely. To ensure that the ambient temperature near the intake at the front of the storage system does not exceed system specifications, verify that the location where the storage system will be installed has a cooling system that can support all thermal emissions.

**Note:** Do not store or install the equipment in an environment with temperatures of 104ºF (40ºC) or higher because battery life will be shortened.

Air enters the storage system at the front and exits through the rear. Be sure the front of the storage system is neither blocked nor exposed to heated air blown from nearby equipment.

If conditions at the site change (for example, new units are added or the system is moved), airflow checks should be made.

If the site has a raised floor, the room must have positive air pressure below the floor to verify adequate airflow. Remove all unused cables from the area below the raised floor to prevent these areas from becoming dust and dirt traps.

## Earthquake considerations

Consider whether earthquake-restraining equipment is needed for your storage system installation.

In seismic-prone regions, use the appropriate flooring, racks, and fasteners to restrain the storage system during earthquakes, prevent human injury, and limit potential damage to system components.

# 4

# Power requirements

## Electrical requirements

The storage system requires two easily accessible power outlets near the rear of each controller. Each drive tray requires an additional power outlet.

The storage system controller and drive trays are equipped with two fully redundant wide-ranging power supplies that automatically accommodate voltages to the AC power source. The power supplies operate within the range of the storage system model:

- Hitachi VSP G200: single phase 100-120 VAC or 200-240 VAC
- Hitachi VSP G400, G600 or VSP F400, F600: single phase 200-240 VAC
- Hitachi VSP G800 or VSP F800: single phase 200-240 VAC

The power supplies meet standard voltage requirements for both domestic (inside USA) and international (outside USA) operation. When connecting to an AC source, be sure the current does not exceed the rating of the power source circuitry. This includes cabling, power distribution units, filters, and any other components through which the main AC flows.

These requirements must be added to the power demands of any other electrical devices installed in the rack to arrive at a total power consumption figure. In addition, surge currents must be accommodated. Disk drives normally consume twice the amount of current at startup as they do during steady-state operation.

## Power considerations

Hitachi storage systems have an input power rating of 125V–200V operation. The units come with a set of power cables.

**Note:** The power cables included with the storage system are considered part of the unit and are not intended for use with any other equipment.

A label near the power cord indicates the correct voltage, frequency, current draw, and power dissipation that should be used with the cable. Please be sure to use the appropriate power cable for your location. Also, check the power at your site to verify that you are receiving "clean" power (free of spikes and noise). Install a power conditioner if necessary.

## Electrostatic discharge

Electrostatic discharge (ESD) can harm the electronic components of your storage system.

ESD is created when the electrical field surrounding different objects varies and becomes balanced. The spark that is created when contact balances the fields can damage your storage system.

To minimize possible ESD-induced failures in your computer room:

- Verify that all equipment and flooring are grounded. Any charge that might build up would be discharged safely through that common ground.
- Maintain recommended humidity level and airflow rates. Relative humidity above 40% reduces the resistance of items that can generate a charge, making it more difficult to generate an ESD.
- Store spare electric parts in antistatic bags until you are ready to install them. These bags are designed to prevent a charge from building.
- When handling the storage system, wear protective devices like wrist straps, sole grounders, and conductive shoes. These items help to prevent electrostatic charge from building.
- Before working inside your storage system, ground yourself to the storage system enclosure by contact to verify that your personal static charge has been discharged.

## Sources of electrical interference

Verify that the storage system is protected from sources of electrical interference.

The following table provides examples of electrical interference.

| Potential source | Description |
|---|---|
| Wall outlets | Power outlets for building maintenance and janitorial equipment, such as vacuum cleaners and floor buffers, must be wired from circuit breakers on a power panel separate from the computer system panel. The ground wires from these outlets must connect to the normal building distribution panel and not to the system ground. If a separate power source and separate ground are not provided, maintenance and janitorial equipment can induce electrical noise that can affect operation of the storage system. Your electrician can verify whether maintenance outlets are on separate panels. |
| Lightning | In geographical areas subject to lightning storms, you may want install lightning protection for your storage system. The principles of lightning protection and personnel safety are described in the National Fire Protection Association (NFPA) Handbook. |
| Electromagnetic interference | Electromagnetic interference can cause various problems. The storage system is designed to reduce its susceptibility to radiated and conducted interference. A Hitachi representative can advise you about common causes of electromagnetic interference. |

## Branch circuits

Prepare your site to support the recommended power parameters of your storage system.

Plan to set up redundant power for each rack that contains a Hitachi VSP storage system. Supply the power with a minimum of two separate circuits on the building's electrical system. That way, if one circuit fails, the remaining circuit(s) should be able to handle the full power load of the rack. In addition, each Power Distribution Unit (PDU) within the rack should be powered by a separate power circuit.

Each circuit should be rated appropriately for the storage system model and input voltage. Refer to the storage system's electrical specifications for power requirements specific to each model.

**Note:** When calculating the power requirements for circuits that supply power to the rack, consider the power requirements for network switches.

**Related references**

- Electrical specifications on page 56

## Emergency power control

For safety purposes, consider installing emergency power-off controls for disconnecting the main power to the storage system.

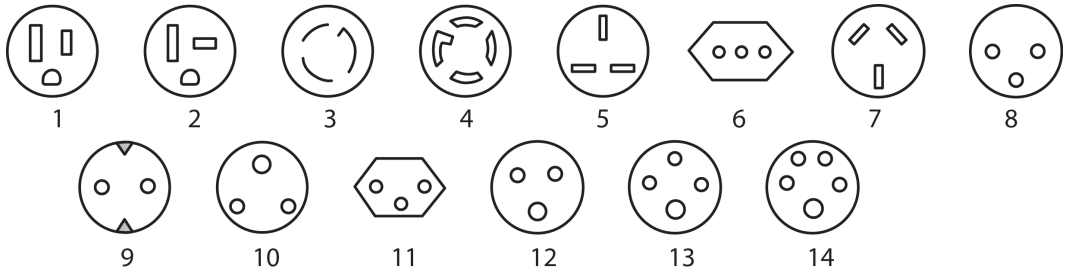
These controls should be installed at a location within easy access to operators, such as next to the exit doors of the computer room. Before installing power controls, check and comply with all local electrical codes.

## Power cable assemblies

For information about racks and power distribution units (PDUs), refer to the *Hitachi Universal V2 Rack Reference Guide*.

Hitachi power cables consist of three parts:

- **Plug:** Male connector for insertion into the AC outlet providing power. The physical design and layout of the plug's contact meet a specific standard.
- **Cord:** Main section of insulated wires of varying length, whose thickness is determined by its current rating.
- **Receptacle:** Female connector to which the equipment attaches. The physical design and layout of the receptacle's contacts meet a specific standard. Common standards are the IEC C13 receptacle for loads up to 10 amperes (A) and the IEC C19 receptacle for loads up to 15 A.




| Number | Country or region | Voltage rating (VAC) | Current rating (amperes) | Plug type |
|---|---|---|---|---|
| 1[1] | North America | 100-127 | 15 | NEMA 5-15P |
| | Brazil | 200-240 | 10, 20 | NEMA 5-15P |
| | Japan | 100-127 | 12 | JIS C8303 |
| | Taiwan | 100-127 | 12, 16 | CNS 690 |
| 2 | North America | 100-127 | 20 | NEMA 5-20P |
| 3 | North America | 200-240 | 20 | NEMA L6-20P |
| 3 | North America | 200-240 | 30 | NEMA L6-30P |
| 4[2] | North America | 200-240 | 30 | NEMA L15-30P |
| 5[3] | Hong Kong | 200-240 | 13 | BS-1363 |
| | Singapore | 200-240 | 13 | BS-1363 |
| 6 | Chile | 200-240 | 10, 16 | CEI 23-50 |
| | Italy | 200-240 | 10, 16 | CEI 23-50 |
| 7 | Argentina | 200-240 | 10, 15 | IRAM 2073 |
| | Australia | 200-240 | 10, 15 | AS-3112 |
| | China | 200-240 | 10, 16 | GB-1002 |
| | New Zealand | 200-240 | 10, 15 | AS-3112 |
| 8 | Denmark | 200-240 | 10 | DK 2-5 |
| | Israel | 200-240 | 10, 16 | SI-32 |
| 9[4] | Europe | 200-240 | CEE 7, 7 | |
| 10[5] | India | 200-240 | 6, 16 | IS-1293 |
| | South Africa | 200-240 | 10, 16 | SABS-164 |
| 11 | Switzerland | 200-240 | 10 | SEV 1011 |
| 12[6] | International | 200-240 | 20 | IEC 309 |
| 13[7] | United Kingdom | 200-240 | 13 | BS-1363 |
| | International | 200-240 | 20 | IEC 309 |
| 14[8] | International | 200-240 | 30 | IEC 309 |

**Notes:**

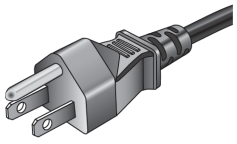
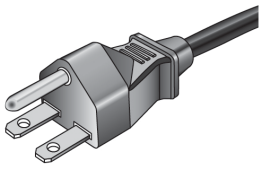
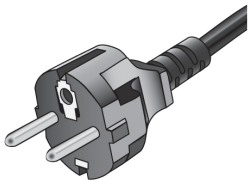
1. Also used for 200-240 VAC applications in Korea and Philippines.
2. Three-phase AC.
3. Also Malaysia and Ireland.
4. Also known as "Schuko" connector and used in Austria, Belgium, Finland, France, Germany, Greece, Hungary, Indonesia, Netherlands, Norway, Poland, Portugal, Russia, Spain, and Sweden.

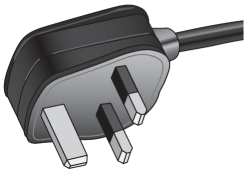
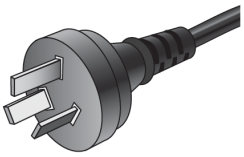
| Number | Country or region | Voltage rating (VAC) | Current rating (amperes) | Plug type |
|---|---|---|---|---|

**5.** Supersedes type BS 546.
**6.** 3-wire (two-phase and earth). Physical variations (connector size and color) indicate amperage rating. Used in Switzerland for a true 16 A application.
**7.** 4-wire (three-phase and earth). Physical variations (connector size and color) indicate amperage rating.
**8.** 5-wire (three-phase, earth and neutral). Physical variations (connector size and color) indicate amperage rating.

# AC connections

The following table shows and describes the types of AC connections on your storage system.

| Description | Receptacle (male end) | Input rating | Reference standards |
|---|---|---|---|
| NEMA 5-15P |  | 100V-120V (standard attachment) | 1 ANSI C73.11<br>2 NEMA 5-15P<br>3 IEC 83 |
| NEMA L6-20P |  | 200V-240V | 1 ANSI C73.11<br>2 NEMA 6-15P<br>3 IEC 83 |
| CEE 7/7 |  | 200V-240V | 4 CEE (7) II, IV, VII<br>3 IEC 83 |
| BS-1363 | | 200V-240V | 5 BS 1365<br>3IEC 83 |

| Description | Receptacle (male end) | Input rating | Reference standards |
|---|---|---|---|
| |  | | |
| AS-3112 |  | 200V-240V | 6 AS C112 |

# DC power requirements

The VSP G200 is available with DC power supply units.

## Hitachi Virtual Storage Platform G200 mechanical specifications (DC power supply model)

### Configuration

#### Controller

1 CBSSD
1 CBSLD

#### Drive trays

1 SFF drive tray (DBSD)
1 LFF drive tray (DBLD)

| Item | Component | Specification |
|---|---|---|
| Drive size (WxDxH) | CBSSD, SFF drive tray | 2.5-type: 3.21 x 8.10 x 0.74 inches (81.6 x 205.7 x 18.7 mm) |
| | CBSLD, LFF drive tray | 3.5-type: 4 x 5.78 x 1.02 inches (101.6 x 147.0 x 26.1 mm) |
| Data capacity (GB) | CBSSD, SFF drive tray | 2.5-type: 196.92, 288.20, 393.85, 576.39, 1152.79, 1729.29, 1890.46 |

| Item | Component | Specification |
|---|---|---|
| | CBSLD, LFF drive tray | 3.5-type: 393.85, 1152.79, 1729.29, 3916.14, 5874.22, 9790.36 |
| Rotational speed ($min^{-1}$) | CBSSD, SFF drive tray | Flash drive, 2.5-type: 196.92 GB, 393.85 GB<br>2.5-type: 288.20 GB, 15,000 RPM<br>2.5-type: 576.39 GB, 10,000 or 15,000 RPM<br>2.5-type: 1152.79 GB, 10,000 RPM<br>2.5-type: 1729.29 GB, 10,000 RPM |
| | CBSLD, LFF drive tray | Flash drive, 3.5-type: 393.85 GB<br>3.5-type: 1152.79 GB, 10,000 RPM<br>3.5-type: 1729.29 GB, 10,000 RPM<br>3.5-type: 3916.14 GB, 7,200 RPM<br>3.5-type: 5874.22 GB, 7,200 RPM<br>3.5-type: 9790.36 GB, 7,200 RPM |
| Maximum number of drives that can be mounted | CBSSD, SFF drive tray | 24 drives |
| | CBSLD, LFF drive tray | 12 drives |
| Maximum number of spare drives | | 16 |

## Host interface

| Item | Component | Specification |
|---|---|---|
| Interface type | Fibre Channel optical | 8 Gbps, 16 Gbps, 32 Gbps |
| | iSCSI optical | 10 Gbps |
| | Copper iSCSI | 10 Gbps |
| Data transfer speed (maximum speed for transfer to host) | Fibre Channel optical | 800 Mbps (Fibre Channel) |
| | Fibre Channel optical | 1600 Mbps (Fibre Channel) |
| | Fibre Channel optical | 3200 Mbps (Fibre Channel) |
| | iSCSI optical | 10 Gbps (iSCSI optical) |
| | Copper iSCSI | 10 Gbps (copper iSCSI) |
| Number of ports | 8 Gbps Fibre Channel optical | 16 |
| | 16 Gbps Fibre Channel optical (2-port) | 8 |
| | 16 Gbps Fibre Channel optical (4-port) | 16 |

| Item | Component | Specification |
|---|---|---|
| | 32 Gbps Fibre Channel optical | 16 |
| | 10 Gbps optical iSCSI | 8 |
| | 10 Gbps copper iSCSI | 8 |
| Transferred block size | | 512 bytes |
| Maximum number of hosts using a Fibre Channel switch | | 255 |
| Maximum number of hosts using a network switch | | 255 |

### RAID specifications

D: Data drive, P: Parity drive.

Although the storage system with a configuration of RAID 1, RAID 5, or RAID 6 provides data reliability enhanced by redundancy, there is a chance that user data could be lost due to an unexpected host, storage system hardware, or software failure. Therefore, users are requested to back up all data.

| Item | Drive tray |
|---|---|
| RAID Level | SAS, SAS 7.2k, flash drives mounted |
| RAID 1 | 2D+2D, 4D+4D |
| RAID 5 | 3D+1P, 4D+1P, 6D+1P, 7D+1P |
| RAID 6 | 6D+2P, 12D+2P, 14D+2P |

| Item | Specification |
|---|---|
| Maximum number of parity groups | 88 |
| Maximum volume size | 3 TB (or 4 TB when using the LDEVs of other storage systems) |
| Maximum volumes/host groups and iSCSI targets | 2,048 |
| Maximum volumes/parity groups | 2,048 |

### Internal logic specifications

| Item | Component | Specifications |
|---|---|---|
| Shared memory | Flash memory | 32 MB |
| | L3 cache memory | 4 MB |
| | SDRAM | 1 GB |
| Data assurance method | Data bus | Parity |
| | Cache memory | ECC (1 bit for correction, 2 bits for detection) |

| Item | Component | Specifications |
|---|---|---|
| | Drive | Data assurance code |

## Physical specifications

| Item | Component | Specifications |
|---|---|---|
| Start-up time (min)[1] | Controller | Standard: 5 to 8 |
| | Drive trays | Standard: 5 to 8 |
| Chassis size | Controller | WxDxH: 19 x 32 x 3.5 inches (483 x 813 x 88 mm) |
| | SFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | LFF drive tray (VSP Gx00 models only) | WxDxH: 19 x 22.2 x 3.5 inches (483 x 565 x 88.2 mm) |
| | | |
| Mass (approximate)[2] | CBSSD | 97 lbs (44 kg) |
| | CBSLD | 101.4 lbs (46 kg) |
| | SFF drive tray (VSP Gx00 models only) | 51 lbs (23 kg) |
| | LFF drive tray (VSP Gx00 models only) | 59.5 lbs (27 kg) |
| Required height | CBSSD, CBSLD | 2 |
| | SFF drive tray (VSP Gx00 models only) | 2 |
| | LFF drive tray (VSP Gx00 models only) | 2 |
| | | |

**Notes**

1. The startup time might be longer in proportion to the number of drive trays connected. With a maximum configuration of 1 controller and 19 drive trays, startup time is approximately 8 minutes.
2. Value of maximum configuration when all controllers and drives are mounted.
3. Mixing DBSD and DBLD drive trays might affect the maximum number of drives that can be mounted.

## Cache specifications

| Item | Specifications |
|---|---|
| Capacity (GB) | 64 GB |
| Control method | Read LRU, Write after |
| Battery backup | Provided |
| Backup duration | Unrestricted (saving to a nonvolatile memory) |

Data in the cache memory is preserved against power failures. If a power outage occurs, data in cache memory is written to drives.

When the storage system enters Cache Backup mode, the amber WARNING LED goes on to when the system starts. This warning indicates that the battery charge has dropped significantly and the remaining battery capacity is not sufficient; the storage system will continue operating with the Write Cache function disabled.

When the battery is charged, the warning indication disappears, and the storage system continues the operation in the Write Cache function.

The warning indication disappears within six hours. Even when the warning is shown, normal operation is assured in Write-Through. Read and write performance is lowered because the Write Cache function is disabled.

If the storage system is not charged for more than six months, the battery can become overcharged and sustain unrecoverable damage. To avoid this situation, charge the battery more than 3 hours every six months.

### Insulation performance

| Item | Specifications |
|---|---|
| Insulation withstand voltage | AC 1,500 V (100 mA, 1 min) |
| Insulation resistance | DC 500 V, 10 M Ω or more |

## VSP G200 electrical specifications (DC power supply)

### Input power specifications

| Item | CBSSD | CBSLD | DBSD | DBLD |
|---|---|---|---|---|
| Rated input voltage (v) | DC -60 to -48 | | | |
| Input voltage fluctuation (v) | DC -72 to -40 | | | |
| Input voltage instant fluctuation (v) | DC -75 to -36 | | | |
| Inrush current (v) | 35 (Ta = 25°C, in the range of rated input voltage, except when voltage fluctuates) | | | |
| Input shape | Connection by connector. Connect the terminal by the dedicated cable with terminal. Connector: Positronic Industries Inc., PCS Series | | | |
| Heat value (kJ/h) | 1800 | 1550 | 1120 | 940 |

| Item | CBSSD | CBSLD | DBSD | DBLD |
|---|---|---|---|---|
| Steady-state power (W) | 760 | 760 | 460 | 350 |
| Power consumption (W) | 500 | 430 | 310 | 260 |
| Input current (A) | 15.9 | 15.9 | 9.6 | 7.3 |
| UPS | No connection | | | |
| Remote adapter | No connection | | | |

## VSP G200 environmental specifications (DC power supply)

| Item | | CBSSD/CBSLD/ DBSD/DBLD | Notes |
|---|---|---|---|
| Temperature | Operating | 41°F to 104°F<br>(5°C to 40°C) | |
| | Non-operating | 23°F to 131°F<br>(-5 to 55°C) in 16 hours | |
| | Transport/storage) | -22°F to 140°F<br>(-30°C to 60°C) | |
| Humidity | Operating | 5% to 85% (non-condensing) | |
| | Transportation/storage | 5% to 95% (non-condensing) | |
| Vibration | Operating (m/s2) | 2.5 or less (5 to 300 Hz) | Within 5 seconds<br>(Resonance point:10 Hz or less) |
| | Non-operating (m/s2) | 5.0 or less (5 to 300 Hz): No critical damage for product.<br>9.8 (1.0 G) Adopt fall-prevention safety measures. | |
| | Transport (packed) (m/s2) | 5.0 or less | |
| Impact | Operating (m/s2) | 20 or less | 10 ms, half sine wave |
| | Non-operating (m/s2) | 50 or less | |
| | Transport (packed) (m/s2) | 80 or less | |
| Angle at which the storage system turns over | | 15° or less | To be measured when installed on leveling bolts. |
| Altitude | Operating (m) | -60 to 1,800 above sea level | |

| Item | | CBSSD/CBSLD/ DBSD/DBLD | Notes |
|---|---|---|---|
| | | Environmental temperature: 41°F to 104°F (5°C to 40°C)<br><br>-1,800 to 4,000 above sea level<br><br>Environmental temperature: 41°F to 86°F (5°C to 30°C) | |
| Atmosphere | | No corrosive gas and salty air must be found. | |
| Acoustic Noise | Operating | 60 dB<br><br>Environmental temperature: 89.6°F (32°C) or less<br><br>The system's internal temperature controls the rotating speed of the fan. Therefore, this standard value might be exceeded if the maximum load continues under high-temperature environment or if a system failure occurs. | Measured at the position 1.5 meter away from the storage system, at a height of 1.5 meters. |
| | Standby | 55 dB | |

5

# Network, cabling, and connectivity

This chapter provides information about controller, SVP, and network connections and cabling when installing the storage system at a determined site.

## Controller connections

The controllers provide the ports that are required to connect to the SVP, external drive trays, systems, and other devices.

A controller contains Fibre Channel ports, iSCSI ports, or both. The number and type of ports available for host connections vary based on the controller model.

- Fibre Channel SFP adapters are used to connect to the customer Fibre Channel switch and hosts.
- iSCSI ports come in optical and copper (RJ-45) interfaces, and are used to connect to the customer's Ethernet switch and hosts.

Each controller also has:

- A SAS port for connection to am external drive tray.
- An RJ-45 10/100/1000 bps user LAN port for performing management activities.
- An RJ-45 10/100/1000 bps maintenance LAN port for diagnostics.

## Required cables

The quantities and lengths of the cables required for storage system installation vary according to the specific storage system and network configuration. Fibre Channel and iSCSI cables are used to connect the controllers to a customer switch or host. Serial Attached SCSI (SAS) cables are used to connect drive trays to controllers and other drive trays.

The following table describes the cables required to perform storage system connections at the time of installation.

| Interface type | Connector type | Cable requirements |
|---|---|---|
| Fibre Channel | LC-LC | Use a Fibre Channel cable to connect the Fibre Channel ports on each controller to a host computer (direct connection), or to or several host computers via a Fibre Channel switch. See the note and table below. |
| iSCSI (optical) | LC-LC | Use an optical Ethernet cable to connect the iSCSI 10 Gb SFP ports on each controller to a host computer (direct connection), or to several host computers via an Ethernet switch. |
| iSCSI (copper) | RJ-45 | Use a shielded Category 5e or 6a Ethernet cable to connect the iSCSI 10 Gb RJ-45 ports on each controller to a host computer (direct connection), or to several host computers via an Ethernet switch. |
| SAS | SAS optical | Connects the controller to a drive tray or a drive tray to another drive tray. Two SAS cables are |

| Interface type | Connector type | Cable requirements |
|---|---|---|
| | | provided with each drive tray. SAS cables are also used to connect NAS modules to switches. |
| Ethernet | RJ-45 | Four shielded Category 5e or 6a Ethernet cables are required for connecting the SVP to the controllers, management console PC, and network switch. |

**Note:** The maximum distances in a typical Fibre Channel SAN depend on the kind of optical fiber used and its diameter. The following table lists the maximum supported Fibre Channel cable length based on cable size and port speed.

| Cable size | Speed | Maximum cable length |
|---|---|---|
| 9 micron | 1 Gbps | 3281 feet (1 km) |
| | 2 Gbps | 6562 feet (2 km) |
| 50 micron | 2 Gbps | 984.2 feet (300 meters) |
| | 4 Gbps | 492.1 feet (150 meters) |
| | 8 Gbps | 164 feet (50 meters) |
| | 16 Gbps | 115 feet (35 meters) |
| 62.5 micron | 2 Gbps | 328.1 feet (100 meters) |
| | 4 Gbps | 230 feet (70 meters) |
| | 8 Gbps | 69 feet (21 meters) |

## Managing cables

Organize cables to protect the integrity of your connections and allow proper airflow around your storage system.

### Observing bend radius values

Never bend cables beyond their recommended bend radius. The following table provides general guidelines for minimum bend radius values, but you should consult the recommendation of your cable manufacturer.

| Cable type | Minimum bend radius values |
|---|---|
| Fibre Channel | 1.73 inch (40 mm) |
| iSCSI optical | 1.73 inch (40 mm) |
| Category 5 Ethernet | Four times the outside diameter of the cable |
| SAS | 1.73 inch (40 mm) |

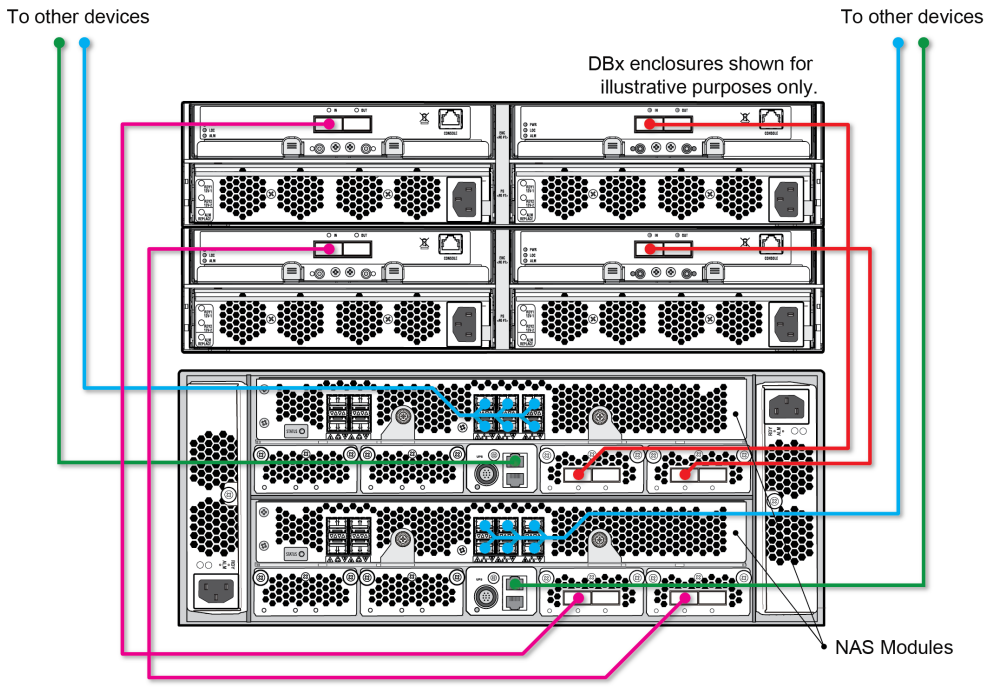
### Protecting cables

Damage to your Fibre Channel and Ethernet cables can affect the performance of your storage system. Observe the following guidelines to protect cables

- Keep cables away from sharp edges or metal corners.
- When bundling cables, do not pinch or constrict the cables.
- Do not use zip ties to bundle cables. Instead, use velcro hook-and-loop ties that do not have hard edges and which you can remove without cutting.
- Never bundle network cables with power cables. If network and power cables are not bundled separately, electromagnetic interference (EMI) can affect your data stream.
- If you run cables from overhead supports or from below a raised floor, include vertical distances when calculating necessary cable lengths.
- If you use overhead cable supports:
  - Verify that your supports are anchored adequately to withstand the weight of bundled cables.
  - Gravity can stretch and damage cables over time. Therefore, do not allow cables to sag through gaps in your supports.
  - Place drop points in your supports that permit cables to reach racks without bending or pulling.

### Cabling full-width modules

When cabling full-width modules, such as NAS modules as shown in the following figure, route the cables horizontally, so that they do not interfere when replacing a module.




### Ensuring adequate airflow

Bundled cables can obstruct the movement of conditioned air around your storage system.

- Secure cables away from fans.
- Keep cables away from the intake holes at the front of the storage system.
- Use flooring seals or grommets to keep conditioned air from escaping through cable holes.

### Preparing for future maintenance

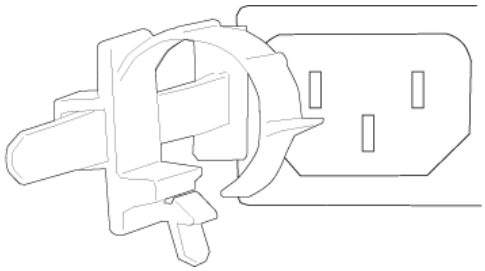
Design your cable infrastructure to accommodate future work on the storage system. Give thought to future tasks that will be performed on the storage system, such as locating specific pathways or connections, isolating a fault, or adding or removing components.

- Purchase colored cables or apply colored tags.
- Label both ends of every cable to denote the port to which it connects.

## Cable retention

Unintentional unplugging or unseating of a power cable can have a serious impact on the operation of an enterprise storage system. Unlike data cables, power connectors do not have built-in retention mechanisms to prevent this from happening.

To prevent accidental unplugging or unseating of power cables, the storage system includes a rubber cable-retention strap near the AC receptacle on each controller. These straps, shown in the following image, loop around the neck of a power cable connector, and the notched tail is slipped over the hook of the restraining bar fixed to the storage system.



## Using the BECK tool

The Backend Configuration Kit (BECK) tool is a graphical application for checking the cabling paths between controllers and drive trays. The BECK tool is available as a download from Hitachi.

## Physical service processor connections

The SVP is available as a physical device provided by Hitachi, or as a virtual guest host running on customer-supplied ESX servers and VM/OS licenses and media. The SVP provides error detection and reporting, and supports diagnostic and maintenance activities involving the storage system.

In a Hitachi VSP configuration, both the storage system and the SVP reside on the same private network segment of the customer's local-area network. The management console PC used to administer the system must also reside on the same private network segment.

Physical SVP connectivity requires all of the following:

- A static IP address for the SVP that is on the same network segment as the storage system.
- One Ethernet connection from each controller to separate LAN ports on the SVP.
- One Ethernet connection to the customer's network switch.
- At least one management console PC on the same network segment as the SVP and storage system.

Virtual SVP connectivity requires all of the following:

**ESX Server**

- VMware ESXi server 6.x

- 2 quad core processors, Intel Xeon 2.29 GHz
- 1-port NIC
- SVP guest OS (2 DKCs)
- 32 GB RAM

**SVP Guest OS (1 DKC)**

- Windows 7 Professional x64 Service Pack 1
- 2 x vCPU
- 1 virtual network adapter
- 4 GB RAM
- 120 GB disk space

## Network access

External Fibre Channel, iSCSI, or Ethernet cable connections are completed at the time of installation.

These connections are required to:

- Establish connections from the controllers to the host computers.
- Connect the storage system to the network, enabling storage system management through Hitachi Command Suite or Hitachi Storage Advisor.
- Allow communication to the storage system from the SVP.

## TCP/IP port assignments

When you install your storage system, default ports must be opened to allow for incoming and outgoing requests.

Review the following ports before you install the storage system to avoid conflicts between the TCP/IP port assignments used by the storage system and those used by other devices and applications.

**Note:** Hitachi Command Suite has additional port considerations. For more information, refer to the *Hitachi Command Suite Administrator Guide.*

| Port number | Usage description |
|---|---|
| 80 | Used by the SVP, Hitachi Storage Advisor, and Device Manager - Storage Navigatorto communicate through the HTTP protocol. |
| 161 | UDP (SNMP uses this port to send traps from the storage system) . |
| 427 | Used by SMI-S. |

| Port number | Usage description |
|---|---|
| 1099 | Used by Hitachi Command Suite products JAVA RMI Registry server. |
| 2000 | TCP (Device Manager - Storage Navigator: Nonsecure)<br><br>Cisco Skinny Client Control Protocol (SCCP) uses port 2000 for TCP. If you use Device Manager - Storage Navigator in a network with SCCP, change the TCP port that Device Manager - Storage Navigator uses (refer to the Device Manager - Storage Navigator online help). |
| 5989 | Used by SMI-S. |
| 10995 | TCP Device Manager - Storage Navigator and Hitachi suite components) |
| 23015 | Used for Web browser communications. |
| 23016 | Used for Web browser communications via SSL. |
| 28355 | TCP (Device Manager - Storage Navigator: Secure) |
| 31001 | Used for communication by Hitachi Command Control Interface (CCI) data collection procedures. |
| 34001 | Used by RAID Manager. |
| 51099 | Used by Device Manager - Storage Navigator for communication. |
| 51100 | Used by Device Manager - Storage Navigator for communication. |

# A

# Site preparation checklist

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

The following tasks might require several weeks to complete:

- Acquiring required power outlets.
- Arranging for an electrician.
- 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 computers to support the Hitachi VSP storage system.

| Checklist questions | Yes | No |
|---|---|---|
| **Safety** | | |
| Is the computer room free of any equipment servicing hazards, such as electrical or data cables that obstruct access? | | |
| Does the computer room have a fire-protection system? | | |
| **Computer room space planning** | | |
| Does the existing floor plan need to be revised to include the storage system? | | |
| Does the floor plan include the clearance required for the floor's load rating? | | |
| Does the floor plan include adequate space for airflow and servicing needs? | | |
| **Computer room infrastructure** | | |
| Is the computer room structurally complete (walls, floor, air conditioning system, and so on)? | | |
| If there is a raised floor, is the floor adequate for the equipment load? | | |

| Checklist questions | Yes | No |
|---|---|---|
| Is antistatic flooring or mats installed? | | |
| Are there cutouts or channels to route cables? | | |
| Does the room have access to the storage and IP networks? | | |
| Can the temperature be maintained between 50° to 104°F (10° to 40°C)? | | |
| Can the humidity level be maintained between 8% and 80%? | | |
| Is the computer room protected against dust, pollution, and metallic particulate contamination? | | |
| Does the computer room take into account environmental considerations, such as vibration and acoustics? | | |
| Is all equipment not supplied by Hitachi (for example, connectors, receptacles, and network switches) on site and ready for use? | | |
| **Computer room electrical requirements** | | |
| Is there a sufficient number of AC outlets for the equipment? | | |
| Are the AC outlets on different lines? | | |
| Does the input voltage correspond to the PDU rack specifications? | | |
| Are the input circuit breakers adequate for equipment loads? | | |
| Are uninterruptible power supplies (UPS) in place? | | |
| Have all sources of electrical interferences been addressed? | | |
| **Site access and security** | | |
| Does the site enforce access controls (for example, will Hitachi representatives need an escort)? | | |
| Are all floors, stairs, elevators, ramps, or ladders adequate to support the size and weight of the storage system? | | |
| Will the equipment fit through all doors and corridors and in elevators? | | |

| Checklist questions | Yes | No |
|---|---|---|
| If the site has a loading dock, enter the maximum access height: _____inches or m. | | |

# B

# Registration, resources, and checklists

This appendix contains instructions for registering your storage system and information about the available resources you can use to enhance your experience with your storage system. Also, included is a table where you can record your configuration settings for future reference.

- ☐ Register your storage system
- ☐ Support and documentation resources
- ☐ HDS Community
- ☐ Product interoperability
- ☐ Recording your configuration settings

## Register your storage system

Before you start using your storage system for the first time, use the HDS Support Connect website to register your storage system. You will need your product serial number to complete the registration.

**Procedure**

1. Open a web browser on your PC or mobile device.
2. In the browser address bar, type .
3. Follow the on-screen instructions to register your storage system.

## Support and documentation resources

Hitachi provides the following support and documentation resources for maximizing your experience.

- Support Connect:
- Documentation: :
- Customer Contact: https://support.hds.com/en_us/contact-us.html
- Self-Service: https://support.hds.com/content/hds/customer/en_us/selfservice.html

## HDS Community

The HDS Community lets you exchange information, questions, and comments about Hitachi Data Systems products, services, and support.

To visit the HDS Community, go to https://community.hds.com.

## Product interoperability

Hitachi Data Systems provides interoperability matrices of products that have been qualified by HDS to support seamless deployment of HDS storage systems.

To access the interoperability matrices, go to https://support.hds.com/en_us/interoperability.html.

# Recording your configuration settings

Make a copy of the following table and record your configuration settings for future reference.

| Field | Enter Your Setting Below |
|---|---|
| **Initial Startup Wizard** | |
| Default Account Maintenance Password | |
| IP v4 Configuration: Storage System Address, Controller 1 | |
| IP v4 Configuration: Storage System Address, Controller 2 | |
| IP v4 Configuration: SVP Address | |
| IP v4 Configuration: Subnet Mask | |
| IP v4 Configuration: Default Gateway | |
| IP v4 Configuration: DNS Server 1 | |
| IP v4 Configuration: DNS Server 2 | |
| IP v4 Configuration: DNS Server 3 | |
| IP V6 Configuration Enabled or Disabled | |
| **Initial Setup Wizard** | |
| Storage System Name | |
| Contact | |
| Location | |
| UTC Time Zone | |
| Use NTP Server:<br>Yes - Specify NTP Server IP Address:<br>No - Specify Manually Entered Date and Time: | |
| Synchronizing Time | |
| **Email Alert Notifications** | |
| Notification Alert: Host Report, SIMs, or All | |
| Email Notice, Enable or Disable | |
| Email Address (To) | |
| Email Address (From) | |
| Email Address (Reply To) | |
| Description to Notify | |
| Mail Server Settings<br>Mail Server: Identifier, IPv4, or IPv6<br>IP address<br>SMTP Authentication: Enable or Disable | |

| Field | Enter Your Setting Below |
|---|---|
| If Enabled, Enter Account and Password | |
| **Syslog Notifications** | |
| Notification Alert: Host Report, SIMs, or All | |
| Transfer Protocol: TLS1.2/RFC5424 or UDP/ RFC3164 | |
| Primary Server | |
| Primary Server-Syslog Server: IPv4 or IPv6 address | |
| Primary Server- Port Number | |
| Primary Server-Client Certificate File Name | |
| Primary Server-Password | |
| Primary Server- Root Certificate File Name | |
| Secondary Server | |
| Location Identification Name | |
| Retry | |
| Retry Interval | |
| **SNMP Notifications** | |
| Notification Alert: Host Report, SIMs, or All | |
| SNMP Agent, Enable or Disable | |
| Trap Destination | |
| SNMP Manager | |
| System Group Information<br>Storage System Name<br>Contact<br>Location | |
| **Installing Licenses** | |
| Record each license installed on the storage system. You may want to include whether the license was installed by selecting a license key file or by typing a license key code. | |
| **Host Port Settings** | |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |

| Field | Enter Your Setting Below |
|---|---|
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| Fibre Channel Port: _____ | Port Address:<br>Transfer Rate:<br>Topology: |
| iSCSI Port: _____ | IP Address:<br>Subnet Mask:<br>Default Gateway: |
| iSCSI Port: _____ | IP Address:<br>Subnet Mask:<br>Default Gateway: |
| iSCSI Port: _____ | IP Address:<br>Subnet Mask:<br>Default Gateway: |
| iSCSI Port: _____ | IP Address:<br>Subnet Mask:<br>Default Gateway: |

C

# Regulatory compliance

This equipment has been tested and certified for compliance with the following standards.

| Standard | Specification | Mark on the product | Country regulation |
|---|---|---|---|
| Electronic emission controls | FCC part 15 Subpart B: 2013 | FCC | USA and Canada |
| | ICES-003 Issue 5:2012 | ICES-003 | USA and Canada |
| | AS/NZS CISPR 22:2009+A1 | RCM | Australia and New Zealand |
| | TP TC 020/2011 | EAC | Russia, Belarus, and Kazakhstan |
| | CNS 13438 | BSMI | Taiwan |
| | KN22 | KC | Korea |
| | KN24 | KC | Korea |
| Electronic emission certifications | EN5522: 2010 | CEmarking | EU |
| | EN5524: 2010 | CEmarking | EU |
| | EN61000-3.2:2006+A1 +A2 | CEmarking | EU |
| | EN61000-3.3:2008 | CEmarking | EU |
| Safety certifications | UL and CSA 60950-1:2007 | cTUVus | USA and Canada |
| | EN60950-1:2006+A1 | TUV | Germany |
| | IEC60950-1:2005+A1 | N/A | All CB countries |
| | IEC60950-1:2005+A1 | S_Mark | Argentina |
| | TP TC 004/2011 | EAC | Russia |
| | CNS 14336-1 | BSMI | Taiwan |
| | EN60950-1:2006+A1 | CEmarking | EU |
| Radio interference voluntary control | VCCI V-3/2013.04 | VCCI | Japan |

# Index

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Hitachi Data Systems

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