

### Overview

## HPE D8000 Disk Enclosure

### **Need an ultra-dense, cost-effective high capacity direct attach storage (DAS) option?**

Reduce enclosure costs and minimize rack footprint for your HPE ProLiant server storage expansion needs with the HPE D8000 Disk Enclosure.

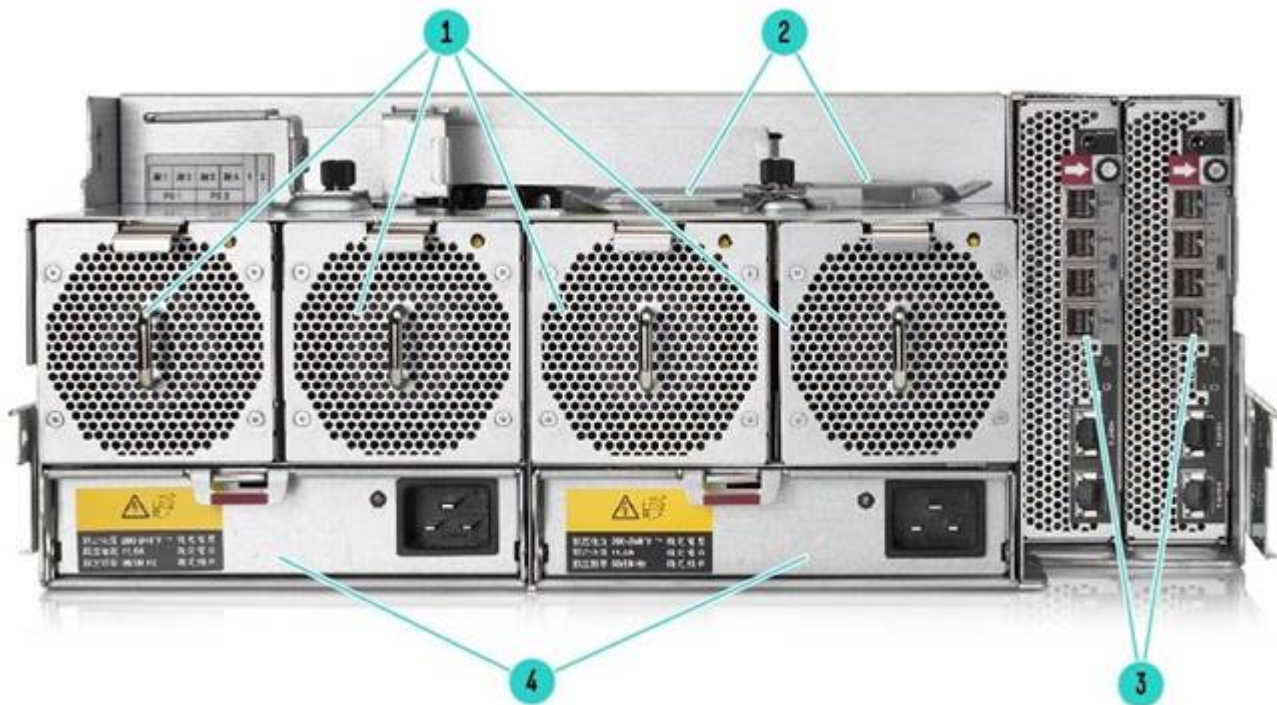
With the 12 Gb/s SAS HPE D8000 Disk Enclosure, Hewlett Packard Enterprise extends and redefines direct-attached storage for ProLiant servers, combining the simplicity and cost effectiveness of direct-attached storage without sacrificing flexibility or performance. The HPE D8000 Disk Enclosure, designed for data-intensive environments, is a storage enclosure for dense, cost-effective external storage expansion for massive data capacity applications. The HPE D8000 can be used not only as a standalone Direct Attach Enclosure, but can also be used for dense, high capacity expansion in storage applications like Cloud Backup, Data Protection or Big Data environments (Unstructured and Structured).

The D8000 Disk Enclosure can be connected to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller or the P408e-p SR Gen10 Controller, which includes HPE Apollo and HPE StoreEasy. Two D8000 enclosures can be daisy-chained together to provide support for up to 212 drives.



**HPE D8000 Disk Enclosure Front View**

### Overview



**HPE D8000 Disk Enclosure Rear View**

- |                                                  |                                     |
|--------------------------------------------------|-------------------------------------|
| 1. System Fan Module (Quantity - 4)              | 3. I/O Module (Quantity - 2)        |
| 2. Cable Shelf and CMA bracket for coiled cables | 4. Power Supply Unit (Quantity - 2) |

**Notes:** CMA stands for Cable Management Arm

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### What's New

- Support for 18TB SAS and SATA HDDs

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### At A Glance

- 4U rackmount form factor
- Supports one hundred and six (106) 3.5" LFF hot pluggable SATA, SAS (Midline) MDL Hard drives and Solid State drives
- 1+1 daisy-chaining of D8000 enclosures allows support for up to 212 drives
- Innovative design supports top loading of hot pluggable large form factor low profile carrier dual-ported SATA, SAS MDL Hard drives and Solid State drives
- End-to-End 12 Gb/s direct connect to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller and/or the HPE Smart Array P408e-p SR Gen10 Controller, including HPE Apollo and HPE StoreEasy.
- Additional option kit with second dual port I/O module is added for SAS drives, creating a dual domain environment.
- 3-0-0 warranty

### Standard Features

#### Key Features

##### High density, low cost storage for ProLiant DL/ML servers

106 LFF SAS MDL, SATA Hard drives and Solid State drives in 4U form factor.

Design supports top loading of hot pluggable large form factor (LFF) low profile dual-ported SATA, SAS MDL Hard drives or Solid State drives

1+1 expansion allows up to two (2) D8000 enclosures which can be cascaded for a maximum of 212 drives.

Support for end-to-end 12 Gb/s direct connect to ProLiant Gen10 servers using the HPE Smart Array E208e-p SR Gen10 Controller and/or the HPE Smart Array P408e-p SR Gen10 Controller.

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#### HPE reliability

Familiar Smart Array technology of the Smart Array Controllers enables support for RAID levels

Keeps data available and server running while a failed drive is being replaced; two fault tolerance configurations are supported for the internal connections including:

RAID 0 (striping) provides no extra data protection.

RAID 1 (mirroring) protects against failure of one drive.

RAID 1+0 (mirroring and striping) protects against failure of one drive (and failure of particular multiple drives).

RAID 5 (distributed data guarding) protects against failure of one drive.

RAID 6 with ADG (Advanced Data Guarding): This is the highest level of fault tolerance.

RAID 50 (RAID 5+0) protects against failure of one drive (and failure of particular multiple drives).

RAID 60 (RAID 6+0) allows administrators to split the RAID 6 storage across multiple external boxes.

RAID 1 ADM (Advanced Data Mirroring) allows customers to create mirrored RAID set using 3 identical hard drives.

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#### Product Technology

##### SAS (internal protocol)

12 Gb/s SAS

##### Modular Chassis

4U, 106 Large Form Factor drive bays

##### Drives available

3.5" Large Form Factor Low Profile Carrier Serial Attached SCSI (SAS) Midline, SATA Hard Drive (HDD) and Solid State Drive (SSD). The D8000 can accommodate SAS MDL Hard drives and Solid State drives within the same enclosure but SAS and SATA drives cannot mixed in the same enclosure. Complete list of supported drives in the configuration information below.

##### Scalability

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### Standard Features

Up to 106 SAS, SAS MDL, SATA 3.5" hot plug hard drives and solid state drives can be supported per D8000 and can scale up to 212 drives maximum when two D8000's are daisy-chained together. For power and cooling reasons, every D8000 must be populated with 20 drives as a minimum requirement.

- **Power supplies**

Hot-pluggable redundant AC power supply unit (PSU)

- **Fans**

Four redundant hot plug fans

- **Configuration and Management Tools**

Smart Array Controller: Array Configuration Utility (ACU) provides configuration and management of hard drives, and supports online array capacity expansion, logical drive extension, assignment of online spares and RAID or stripe size migration.

- **Management/Health Utilities**

Active hardware management using HPE SIM: Manage the array with the highly refined HPE Systems Insight Manager. Smart Components are available to easily update firmware. A convenient Integrated Management Log records hundreds of events and stores them in an easy-to-view format.

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### Supported HPE Smart Array Controllers

#### HPE Smart Array E208e-p SR Gen10 Controller

- Storage interface (SAS/SATA)
  - 8 SAS lanes across 2 x4 external Mini-SAS HD ports
  - 12Gb/s SAS, 6Gb/s SATA technology
  - Support for SAS tape drives
  - PCI Express 3.0 x8 link
  - RAID 0, 1, 5, 10
  - Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
  - Legacy and UEFI boot operation
  - UEFI System Utilities (storage configuration)
  - Up to 238 physical drives
  - Up to 64 logical drives
  - HPE Smart Array SR Secure Encryption (optional license)
  - HPE SSD Smart Path
  - Rapid Parity Initialization (RPI)
  - Rapid rebuild
  - Drive Sanitize
  - Performance Optimization-Degraded Reads and Read Coalescing
  - Power efficiency
  - Seamless upgrades from HPE Smart Array Software RAID
  - Seamless upgrades to HPE Smart Array P-class Controllers
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#### HPE Smart Array P408e-p SR Gen10 Controller

- Storage interface (SAS/SATA)
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### Standard Features

- 8 SAS lanes across 2 x4 external Mini-SAS HD ports
  - 12Gb/s SAS, 6Gb/s SATA technology
  - Support for SAS tape drives, SAS tape autoloaders and SAS tape libraries
  - 4 GB Flash-Backed Write Cache (FBWC)
  - PCI Express 3.0 x8 link
  - RAID 0, 1, 5, 6, 10, 50, 60, 1 ADM, 10 ADM (Advanced Data Mirroring)
  - Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
  - Legacy and UEFI boot operation
  - UEFI System Utilities (storage configuration)
  - Up to 238 physical drives
  - Up to 64 logical drives
  - HPE Smart Array SR SmartCache (optional license)
  - HPE Smart Array SR Secure Encryption (optional license)
  - HPE SSD Smart Path
  - Rapid Parity Initialization (RPI)
  - Rapid rebuild
  - Drive Sanitize
  - Performance Optimization-Degraded Reads and Read Coalescing
  - Power efficiency
  - Seamless upgrades from HPE Smart Array S-class and E-class controllers
  - FIPS 140-2 Level 1 Implementation Under Test (expected validation complete in 2018)
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### HPE Smart Array

For latest information on E208i-a, E208i-p, E208e-p, P408i-a, P408i-p, P408e-p, and P816i-a, please refer to their QuickSpecs:

**HPE Smart Array Gen10 Controllers** for HPE ProLiant DL, ML and Apollo Servers and HPE StoreEasy.

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### Supported OS

- HPE ProLiant Gen10 Servers
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### Power Supply

- The HPE D8000 Enclosure uses 2 Power Supply Units (PSUs). PSU operates in the voltage range of 200-240 VAC.
  - HPE D8000 PSU meet the following harmonics:  
EN61000-3-2 (EU), EN 31000-3-3 (EU), EN 55024 (EU), KN 24/KN 35 (S. Korea)
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### Service and Support

#### Warranty

3-0-0 warranty

Three-year parts exchange, next business day delivery

**Notes:** The warranties of the various media options purchased for the D8000 are different for SAS Midline (MDL), SATA hard drives and Solid State drives.

- SAS MDL hard drive options have a one year warranty
- SATA hard drives have a one year warranty
- Solid State Drives have a three year warranty

Solid State Drives (SSD) have 3/0/0 warranty; Customer Self Repair (CSR) subject to maximum usage and or maximum supported lifetime limitations, whichever occurs first. Maximum Supported Lifetime is the period in years set to equal the warranty for the device. Maximum usage limit is the maximum amount of data that can be written to the device before reaching the device's write endurance limit.

#### Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4-hour response or 6 Hour Call To Repair
- Coverage - Extend hours of coverage from next business day to 9 hours x 5 days to 24 hours x 7 days
- Duration Select duration of coverage for a period of 1, 3, 4 or 5 years

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### Service and Support

#### Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new storage solution, giving you full entitlement for the support for need for your IT and business.

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### HPE Pointnext - Service and Support

**Get the most from your HPE Products.** Get the expertise you need at every step of your IT journey with **HPE Pointnext Services**. We help you lower your risks and overall costs using automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. HPE Pointnext **Advisory Services**, focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional and Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, and creative configurations that get the most out of software and hardware alike.

#### Consume IT on your terms

**HPE GreenLake** brings the cloud experience directly to your apps and data wherever they are-the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

### Service and Support

#### **Managed services to run your IT operations**

**HPE GreenLake Management Services** provides services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

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#### **Free up resources with Operational Services from HPE Pointnext**

HPE delivers services for IT by using proven best practices as well as automation and methodologies that have been tested and refined by HPE experts and artificial intelligence through thousands of deployments globally. Choose from the recommended services for customers purchasing from Hewlett Packard Enterprise or an authorized reseller. Services are quoted using Hewlett Packard Enterprise order configuration tools.

#### Recommended Services

HPE Pointnext Tech Care.

HPE Pointnext Tech Care is the new operational service experience for HPE products. Tech Care goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Pointnext Tech Care is available in three response levels. Basic, which provides 9x5 business hour availability and a 2 hour response time. Essential which provides a 15 minute response time 24x7 for most enterprise level customers, and Critical which includes a 6 hour repair commitment where available and outage management response for severity 1 incidents.

<https://www.hpe.com/services/techcare>

#### **HPE Pointnext Complete Care**

HPE Pointnext Complete Care is a modular, edge-to-cloud IT environment service that provides a holistic approach to optimizing your entire IT environment and achieving agreed upon IT outcomes and business goals through a personalized and customer-centric experience. All delivered by an assigned team of HPE Pointnext Services experts. HPE Pointnext Complete Care provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

<https://www.hpe.com/services/complecare>

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#### For more information

- <http://www.hpe.com/services>
- <https://www.hpe.com/us/en/services/operational.html>

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"

<https://www.hpe.com/us/en/contact-hpe.html>

HPE Support Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

### Service and Support

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
  - Customers purchasing from a commercial reseller can find HPE Support Services at <https://ssc.hpe.com/portal/site/ssc/>
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### Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

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### Configuration Information

#### Step 1: HPE D8000 Disk Enclosure

Description	SKU
HPE D8000 Single I/O Module LFF (3.5in) Density Disk Enclosure	Q2R34A
<b>Notes:</b> Base model for SAS, SAS Midline (MDL), SATA Hard drives and Solid State drives. Add Q2R35A when using dual-ported SAS drives to create a dual domain environment. Includes two hot plug power supplies for redundancy and four hot plug fans for n+1 redundancy.	
HPE D8000 Dual I/O Module Option Kit	Q2R35A
<b>Notes:</b> Add Q2R35A option kit to Q2R34A when using dual-ported SAS drives to create a dual domain environment	

#### Step 2: Choose Supported Options

HPE D8000 Lift Handle	R0N98A
<b>Notes:</b> Lift handle helps in easier unboxing and rack mounting the HPE D8000 Enclosure	
<b>HPE ProLiant Gen10 Smart Array Controllers</b>	
HPE Smart Array E208e-p SR Gen10 (8 External Lanes/No Cache) 12G SAS PCIe Plug-in Controller	804398-B21
HPE Smart Array P408e-p SR Gen10 (8 External Lanes/4GB Cache) 12G SAS PCIe Plug-in Controller	804405-B21
<b>Step 2b - SAS Cable</b>	
Cables to be used for connecting D8000 with the HPE Smart Array P408e-p, E208e-p SR Gen10 Controllers	
HPE External 4.0m (13ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	716199-B21

#### Step 3 - D8000 Drive Options

##### 10-Pack SAS Hard Disk Drive Bundles

HPE D8000 6TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle	Q2S27A
<b>Notes:</b> Includes ten 6TB LFF Midline SAS drives	
HPE D8000 10TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle	Q2S29A
<b>Notes:</b> Includes ten 10TB LFF Midline SAS drives	
HPE D8000 12TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty 512e 10-pack HDD Bundle	Q2S30A
<b>Notes:</b> Includes ten 12TB LFF Midline SAS drives	
HPE D8000 14TB SAS 12G Midline 7.2K LFF (3.5in) LP 1yr Wty Helium 512e DS 10-pack HDD Bundle	R3B16A
<b>Notes:</b> Includes ten 14TB LFF Midline SAS drives	
<b>12G 3.5" SAS Midline (MDL) Hard Disk Drives</b>	
HPE 18TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e ISE Multi Vendor HDD	P37669-K21
HPE 16TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e ISE Multi Vendor HDD	P23608-K21
HPE 14TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e Multi Vendor HDD	P09155-K21

### Configuration Information

HPE 12TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e HDD	881781-K21
HPE 10TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e HDD	P09149-K21
HPE 6TB SAS 12G Business Critical 7.2K LFF LP 1-year Warranty 512e HDD	861746-K21

### Description

### SKU

#### 6G 3.5" SATA Hard Disk Drives

HPE 18TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e ISE Multi Vendor HDD	P37678-K21
HPE 16TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e ISE Multi Vendor HDD	P23449-K21
HPE 14TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e Multi Vendor HDD	P09165-K21
HPE 12TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e HDD	881787-K21
HPE 10TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty Helium 512e HDD	P09161-K21
HPE 8TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty 512e HDD	834028-K21
HPE 6TB SATA 6G Business Critical 7.2K LFF LP 1-year Warranty 512e HDD	861742-K21

#### 12G 3.5" SAS Solid State Drives (SSD) in Converter carriers

HPE 960GB SAS 12G Mixed Use LFF LPC Value SAS Multi Vendor SSD	P37009-K21
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#### Notes:

- Mix of SAS and SATA drives in the same enclosure is not supported.
- For power and cooling reasons, HPE D8000 needs to be filled with 20 drives as a minimum requirement.

### Step 4: Choose Rack Options

Choose HPE G2 Advanced or Enterprise series 1200mm depth Racks for the D8000.

[HPE G2 Enterprise Series Racks](#) or [HPE G2 Advanced Series Racks](#) QuickSpecs.

#### Notes:

- A D8000 fully loaded with drives weighs 321lbs.
- Hewlett Packard Enterprise has not tested or validated the D8000 with any third-party racks. Before installing the D8000 in a third-party rack, be sure to properly scope the limitations of the rack. Before proceeding with the installation, consider the following:

- o You must fully understand the static and dynamic load carrying capacity of the rack and be sure that it can accommodate the weight of the D8000.
- o Be sure sufficient clearance exists for cabling, installation and removal of the enclosure, actuation of the rack doors, and full articulation of the drive drawers

### Technical Specifications

#### Input Power (per power supply)

- **Rated Line Voltage**

200 to 240 VAC

- **Rated Input Frequency**

50 to 60 Hz

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#### Temperature and humidity ranges

- **Operating Temperature**

41° to 95° F (5° to 35° C)

**Notes:** Maximum Rated 10°C per/hr (50°F/hr)

- **Storage Temperature**

-40° to 158° F (-40° to 70° C)

**Notes:** Maximum Rated 20°C/hr (68°F/hr)

- **Operating Humidity**

-12° DP/10 to 80% (Max) relative humidity (Rh), non-condensing

- **Non-Operating Humidity**

-12° DP/5 to 100% (Max) relative humidity (Rh), non-condensing

- **Acoustic**

Sound power operating ≤ 8.5 Bels LWAd @ 23° C

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#### Physical

- **Depth (including handles, excluding cables)**

113.9 cm (44.84 in)

- **Width (excluding ears and rails)**

44.1 cm (17.36 in)

- **Height (including top cover)**

17.64 cm (6.94 in)

- **Chassis**

43.10 kg (95 lb) with no hard drives installed

- **Weight**

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### Technical Specifications

127 kg (280 lb) with hard drives installed

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### Power Consumption (maximum)

#### Power consumption at 208VAC

- **Drive Type**

7200 RPM SAS MDL

- **Typical**

1035W (3532 Btu/hr)

- **Service Position Maximum** (drawers being pulled out causing all fans to go to full speed)

1470W (5021 Btu/hr)

- **Upgradeable Firmware**

Offline

- **Disk Drives and Enclosure Protocol Support**

HPE 3.5" SAS and SAS MDL 6 Gb/s

#### Notes:

- Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.
  - Temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft.) to 3048 m (10,000 ft.) above 900m is applicable. No direct sunlight allowed. The upper limit may be limited by the type and number of options installed.
  - Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.
  - The "service position maximum" column is the test result with the drawers open.
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### I/O Module

- **Host Connector Type**

External mini-HD SAS connector

- **Host Number of Ports**

Two (each with 4 lanes of 6Gb/sec SAS)

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## Summary of Changes

<b>Date</b>	<b>Version History</b>	<b>Action</b>	<b>Description of Change</b>
01-Nov-2021	Version 11	Changed	Service and Support and Configuration Information sections were updated.
01-Feb-2021	Version 10	Changed	Overview and Configuration Information sections were updated.
07-Dec-2020	Version 9	Changed	Overview and Configuration Information sections were updated.
03-Aug-2020	Version 8	Changed	Overview and Configuration Information sections were updated.
06-Jul-2020	Version 7	Changed	QuickSpecs layout was updated and Branding Refresh was applied.
02-Dec-2019	Version 6	Changed	Configuration Information section was updated.
07-Oct-2019	Version 5	Changed	Added 14TB SAS 10 Pack Bundle
03-Sep-2019	Version 4	Changed	Added support for 14TB SAS and SATA HDDs.
06-May-2019	Version 3	Changed	Added support for Daisy Chaining
02-Apr-2019	Version 2	Changed	Standard Features and Configuration Information sections were updated.
04-Mar-2019	Version 1	New	New QuickSpecs

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.

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