

Site Survey

4U60 Storage Enclosure G460-J-12

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Revision 1.1

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Revision History

Date	Revision	Comment
October 2015	Revision 1.0	Initial version
November 2015	Revision 1.1	Updates to content

1 Document Summary

The following chapter defines the *scope*, *intended audience*, and *references* related to the 4U60 Storage Enclosure Site Survey.

1.1 Scope

The following document provides the site specific requirements necessary to install the 4U60 Storage Enclosure.

1.2 Intended Audience

The following document is intended for users that require a better understanding of the site requirements involved in the delivery, unpacking, inspection, and care of the 4U60 Storage Enclosure.

1.3 References

- *Installation Guide*
- *Site Requirements Document*

2 For More Information

The following chapter identifies the contact information for support on the 4U60 Storage Enclosure.

2.1 Points of Contact

For further assistance with an HGST product, contact Cloud Infrastructure Business Unit (CIBU) support. Please be prepared to provide the following information: Serial Number (S/N), product name, model number, and a brief description of the issue.

Telephone:

Region	Telephone Numbers	Support Hours and Additional Information
United States/International	1-408-717-7766	24 hours a day, 7 days a week
North America	1-844-717-7766	24 hours a day, 7 days a week Toll-free

Email:

support@hgst.com

Website:

www.hgst.com/support

3 General Site Requirements

The following chapter provides a general site requirements for the 4U60 Storage Enclosure.

3.1 Introduction

The 4U60 Storage Enclosure is a 4U, high-density Hard Disk Drive (HDD) enclosure. The enclosure is designed to house up to a full configuration of 60 Ultrastar He8 helium drives and to maximize the performance of these drives, under all operating conditions.

The system contains the following high level features:

Table 1: High Level Features Specifications

Hardware	Details	Number of Component
4U Storage enclosure	4U rack-mounted storage enclosure with slide rail and cable management assembly	1
Canisters Slots	2U half-width SAS Expander Canister–JBOD application (12G version)	2
Power Interface Board	Connects the power supplies to the drive board	1
Drive Board	<ul style="list-style-type: none"> Connects the power supplies (with integrated fans) via power interface board, drives, and ESM. Fully compliant with SAS 3.0 specification for operation up to 12Gbps. 	1
3.5-inch HDD with carrier	<ul style="list-style-type: none"> Configuration: 60 disk drives contained within top accessible chassis. Hot swappable Two status LEDs per drive slot, Activity and Fault Ejector handle allows for easy installation and removal of HDDs 	60 Ultrastar He8 helium HDDs
Power Supply Unit (PSU)	<ul style="list-style-type: none"> 2U half-width dual 1+1 redundant, 1650W AC power supplies 200 ~ 240 VAC (1650W) input, 47Hz – 63Hz +12V and +5V outputs with +5V standby power 2 integrated fans powered by redundant power rail Compliant with 80 Plus efficiency Gold level +/- 5% Voltage margin control on 5V and 12V rails Trouble history implementation 5v and 12v DC output at 1650W 	2
Fans	<ul style="list-style-type: none"> N+1 redundant cooling any one fan can fail and the system will continue to operate 	4 (2 in each PSU)

3.2 Enclosure Environmental Requirements

The enclosure based upon the drive maximum environmental specifications will be designed around the following environmental requirements:

Table 2: Non-operating Environmental Requirements

Non-operating	4U60 Storage Enclosure
Temperature	-40°C to 70°C
Temperature Gradient	30°C per hour
Temperature De-rating	1°C per 300m above 3000m
Relative Humidity	8% to 90% non-condensing
Relative Humidity Gradient	30% per hour maximum
Altitude	-300m to 12,000m de-rated 300m per 1°C above 40°C
Altitude Gradient	22860m per hour maximum

Table 3: Operational Environmental Requirements

Operational	4U60 Storage Enclosure
Temperature	5°C to 40°C
Temperature Gradient	20°C per hour
Temperature De-rating	1°C per 125m above 950m
Relative Humidity	8% to 90% non-condensing
Relative Humidity Gradient	30% per hour maximum
Altitude	-300m to 3048m

3.3 Ground Shipping

The delivery of the 4U60 Storage Enclosure through ground shipping should be accomplished by a shipping company that has the following available:

- Air ride delivery truck to reduce the amount of vibration and impact shock during transit.
- Proper strapping methods to ensure the enclosure wont shift during transit.
- Proper padding to reduce damage from other shipping units within the delivery truck.
- A lift gate.

3.4 Site Environment

The 4U60 Storage Enclosure is intended to be installed in a rack. The location of your enclosure and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels, can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to both front and rear of the enclosure.

When planning your site layout and equipment locations, remember the precautions described in the [Site Configuration](#) on page 9 section to help avoid equipment failures and reduce the possibility of environmentally caused problems. If you

are currently experiencing problems or an unusually high number of errors with your existing equipment, these precautions may help you isolate the cause of the failures and prevent future problems.

3.5 Site Configuration

The following precautions will help you plan an acceptable operating environment for your enclosure and will help you avoid environmentally caused equipment failures:

- Ensure that the room where your enclosure operates has adequate air circulation. Electrical equipment generates heat. Without adequate air circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.
- To avoid damage to the enclosure, always follow ESD-prevention procedures described in the [Preventing Electrostatic Discharge Damage](#) section. Damage from static discharge can cause immediate or intermittent equipment failure.
- Once the enclosure is installed in the rack, ensure that the chassis cover and module rear panels are secure. The enclosure is designed to allow cooling air to flow within it through specially designed sleds.

3.6 Airflow Consideration

The user needs to ensure both the front and rear of the 4U60 Storage Enclosure stay clear of any materials that may block or disrupt the airflow in any way. Disrupting the airflow can cause the enclosure to run the fans at an excessive RPM, and in the worst case, start to shut down the system due to an overheating event.

The following rack airflow principles should be considered for best results:

- Controlled air conditioners that are located in the facility where the enclosure will be installed.
- The airflow in and out of the equipment must not be restricted.

3.6.1 Cooling the Enclosure

The 4U60 Storage Enclosure has an advanced thermal algorithm that monitors all of the temperature sensors in the system. The enclosure makes adjustments to the fan speeds based upon the thermal sensors. The fan algorithm takes into account the component and the warning and critical threshold limits set by SES. If any temperature sensor gets to the warning limit, the fans speeds will increase to cool the component. If the critical threshold is crossed for a determinate amount of time, the system will begin to shut down components in order to prevent damage. If the enclosure encounters low temperatures, the system will reduce fan speed in an attempt to conserve power and not over-cool the enclosure.

This algorithm is agnostic to effects of altitude and humidity. The algorithm simply works based on temperatures within the system with emphasis on reducing power consumption.

3.7 Rack Requirements

The rack mount requirements are based on the 4U standards. Rack spaces are equipped to give the enclosure ample power and connectivity allowing them to perform as expected. They also provide effective airflow, cooling for the devices, and allow for easy access for routine maintenance.

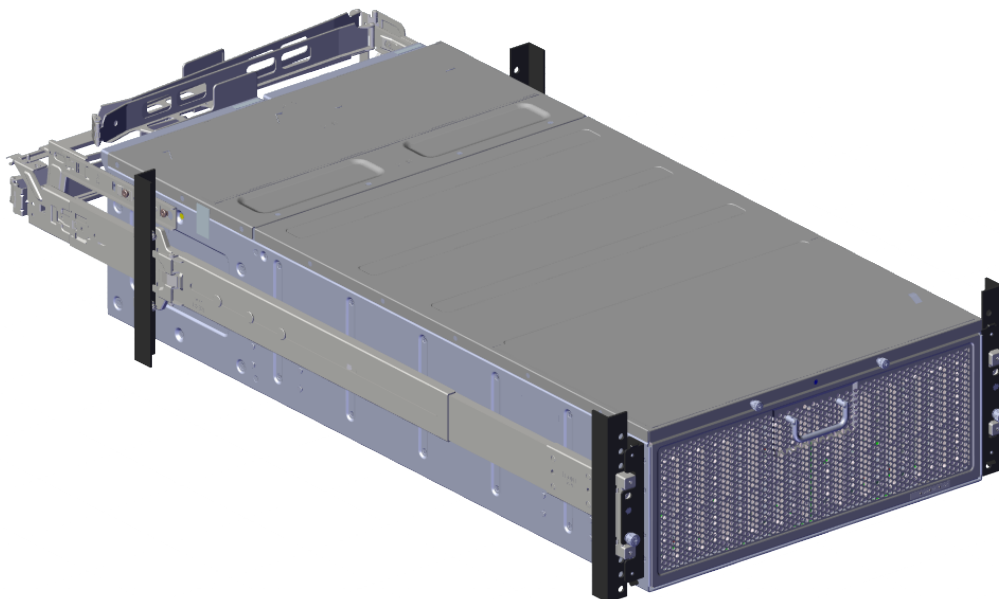
The following table displays the 4U standard measurement for mounting the 4U60 Storage Enclosure:

Table 4: Physical Specifications

Physical (Chassis)	
Height	6.88 inches (174.8 mm)
Width	16.69 inches (424 mm)
Depth	33.5 inches (850 mm)
Weight	198 lbs (89.81 Kg) (with drives installed)

For proper rack installation of the 4U60 Storage Enclosure, please mount the enclosure according to the following drawing:

Figure 1: Assembly in the Rack



3.8 Space Requirements

The space requirements for the 4U60 Storage Enclosure are based on a 4U rackmount space. For more information, see the [Rack Requirements](#) on page 9 section.

3.9 Alternating Current Input

The following table describes the A/C Input specification for the 4U60 Storage Enclosure enclosure.

Table 5: Power Specifications

Power	
Alternating Current (AC) Power Supply (per power supply, 2 total)	
Wattage	1650W 80 + Gold rated
Voltage	200–240VAC (1650W max), auto-ranging, 50/60 Hz
Maximum inrush current	After AC power is applied to the power supply, any initial inrush current surge or spike of 10 milliseconds or less must not exceed 45 amps peak.

3.10 Power Cord Specification

HGST products are provided with the power cord and user documentation suitable for the intended country of delivery. If a power cord is not provided, purchase an approved set for use in your country. Products that are relocated to other countries should use nationally certified power cords and plugs to ensure safe operation of the product.

The following table describes the power cord specifications for the 4U60 Storage Enclosure:

Table 6: Power Cord Specifications

Location	Specifications (V, A, length)	Part Number
North America Guidelines	125V, 15A, 6 feet	NEMA 5-15/C13
International Guidelines	250V, 10A, 2 Meters	IEC6320 C13/C14

Note: Country and region-specific power cord options are available, for assistance please contact your local HGST office. For contact information, see: [Points of Contact](#) on page 6.

3.11 Serial Attached SCSI Cable Specification

The SAS cables allow for the drives to communicate bidirectionally with the server. The flexibility of SAS facilitates system-level configurations such as, the flexibility of SAS facilitates system level connection to HBAs and RAID controllers.

3.12 Host Connectivity

Connect the 4U60 Storage Enclosure to the host, using high quality miniSAS HD cables.

The following table displays the list of power cables approved by HGST:

Table 7: Approved Power Cables

Type	Part Number	Dimension (overmold)	Length
BIZlink Technology Inc.	BC314-BC313-1.5M-UL	C13 to C14	1.5 meters
Celestica San Jose	R0893-C0011-01	C13 to C14	1.5 meters
Well Shin Technology CO LTD	0096-0011	C13 to C14	1.5 meters

The following table displays the list of SAS cables approved by HGST:

Table 8: Approved SAS Cables

Type	Part Number	Length
Elpeus HD Mini-SAS (SFF-8644) to QSFP+(SFF-8436)	SAS2-44361-2	2 meters
Elpeus HD Mini-SAS (SFF-8644) to QSFP+(SFF-8436)	SAS2-44361-3	3 meters
Elpeus HD Mini-SAS (SFF-8644) to QSFP+(SFF-8436)	SAS2-44362-5	5 meters

The following table displays the list of Expansion cables approved by HGST:

Table 9: Expansion Cables

Type	Part Number	Length
Elpeus SFP+(SFF-8436) to QSFP+(SFF-8436), 2m	CB22322-2	2 meters

3.13 Site Inspection Checklist

The following checklist is intended to be used for inspection of the enclosure:

Table 10: Inspection Checklist

No.		Yes	No	Comment or Date
Facility				
1.	Is floor protection available for delivery?			
Server Room				
2.	Is there adequate space for maintenance needs? Note: For more information, see: Rack Requirements on page 9.			
3.	Is access to the site or server room restricted?			
4.	Is there an A/C outlet near the installation area for servicing needs?			
5.	Are there channels or cutouts for cable routing?			
6.	Are customer supplied cables available and of the proper type?			
Power and Lighting				
7.	Are lighting levels adequate for maintenance?			
8.	Are A/C outlets available for servicing needs? (for example, vacuuming)?			
9.	Does the input voltage correspond to equipment specifications?			
10.	Does the input frequency correspond to equipment specifications?			

No.		Yes	No	Comment or Date
11.	Is power conditioning equipment installed?			
12.	Is there a dedicated branch circuit for equipment?			
13.	Are the input circuit breakers adequate for equipment loads?			
Safety				
14.	Is there an emergency power shut-off switch?			
15.	Is a fire protection system installed in the server room?			
16.	Is antistatic flooring installed?			
17.	Do any equipment servicing hazards exist (loose ground wires, poor lighting, or others)?			
Cooling				
18.	Can cooling be maintained?			
19.	Can temperature changes be maintained according to equipment specifications?			
20.	Can humidity levels be maintained?			
21.	Are air conditioning filters installed and clean?			

3.14 Delivery Survey

Special instructions or recommendations should be documented. The following list gives examples of special instructions or issues:

- Packaging restrictions at the facility (for example, size and weight limitations)
- Special delivery procedures
- Special equipment required for installation (for example, tracking or hoists)
- What time the facility is available for installation (after the equipment is unloaded)
- Special security requirements applicable to the facility

Table 11: Delivery Checklist

Preparation for Delivery		
1.	What are the hours the facility is open for deliveries?	a.m. or p.m.?
2.	Can delivery be done during the day during normal business hours?	Yes or No
3.	Are appointments required?	Yes or No

4.	Are there any security or building access requirements?	Yes or No
5.	On what floor in building will the equipment be installed?	
6.	If equipment is not going on the first floor, is there an elevator? Note: For elevator specifics, please see the Elevator section below.	Yes or No
7.	Is the path from the loading dock to the computer room or server room robust enough to support the weight of the configured system?	Yes or No
<u>Dock Delivery</u>		
8.	Is the dock large enough for a semitrailer?	Yes or No
9.	What is the location of the dock?	North, south, east, or west
10.	What is the street name if different than company address?	
<u>Street Delivery</u>		
11.	What is the location of the access door?	North, south, east, or west
12.	What is the street name, if different than company address? (cross street)	
13.	What is the height of access door?	
14.	What is the width of access door?	
15.	Are there any required special permits? Please list the type and agency obtained from.	
<u>Elevator</u>		
16.	What is the capacity of the elevator?	pounds or kilograms
17.	What is the depth of the elevator?	feet or meters
18.	What is the height of the elevator?	feet or meters
19.	What is the width of the elevator?	feet or meters
<u>Stairs</u>		
20.	How many flights of stairs are there?	
21.	What is the width of the stairwells?	feet or meters
<u>Installation Space</u>		
22.	Is there a delivery/unpacking/staging area?	Yes or No

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