SGI InfiniteStorage 4000 Series and 5000 Series Site Preparation Guide

(ISSM 10.86)

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The information in this document supports the SGI InfiniteStorage 4000 series and 5000 series storage systems (ISSM 10.86). Refer to the table below to match your specific SGI InfiniteStorage product with the model numbers used in this document.

SGI Model #	**NetApp Model**
TP9600H	6091
TP9700F	6091
IS4500F	6091
TP9600F	3994 and 3992
IS4000H	3994
IS350	3992
IS220	1932 1333 DE1300
IS4100	4900
IS-DMODULE16-Z	FC4600
IS-DMODULE60	DE6900
IS4600	7091
IS-DMODULE12 & IS2212 (JBOD)	DE1600
IS-DMODULE24 & IS2224 (JBOD)	DE5600
IS-DMODULE60-SAS	DE6600
IS5012	E2600
IS5024	E2600
IS5060	E2600
IS5512	E5400
IS5524	E5400
IS5560	E5400
IS5600	E5500

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Overview of the Site Preparation Guide 1

Use this document to prepare your site for the installation of controllers and drive trays into an industry-standard cabinet.

This Site Preparation Guide includes information about the supported controllers and drive trays listed in the table below as well as key specification information for each one.

Table 1 Summary Information for the Controllers and Drive Trays in this Document

Component	Max Current (100 VAC)	Max Current (240 VAC)	Power Factor	Max BTU/Hr	Max Weight
E2612 controller-drive tray	4.25 A	1.68 A	0.95	1366	27 kg (59.52 lb)
E2624 controller-drive tray	3.94	1.60	0.95	1127	26 kg (57.32 lb)
E2660 controller-drive tray	N/A	4.16 A	0.95	4180	105.2 kg (232 lb)
E5412 controller-drive tray	6.96 A	2.9 A	0.95	2016	27 kg (59.52 lb)
E5424 controller-drive tray	6.08	2.51	0.95	1935	26 kg (57.32 lb)
E5460 controller-drive tray	N/A	8.72	0.95	4180	105.2 kg (232 lb)
E5512 controller-drive tray	10.46	4.22	0.95	2293	27 kg (59.52 lb)
E5524 controller-drive tray	8.48	3.53	0.95	1896	26 kg (57.32 lb)
E5560 controller-drive tray	N/A	7.84	0.95	4032	105.2 kg (232 lb)
DE1600 drive tray	3.03 A	1.26 A	0.95	945	27 kg (59.52 lb)
DE5600 drive tray	3.03 A	1.26 A	0.95	821	26 kg (57.32 lb)
DE6600 drive tray	N/A	7.56 A	0.95	4180	105.2kg (232 lb)

Specifications of the Model 3040 40U Cabinet 2

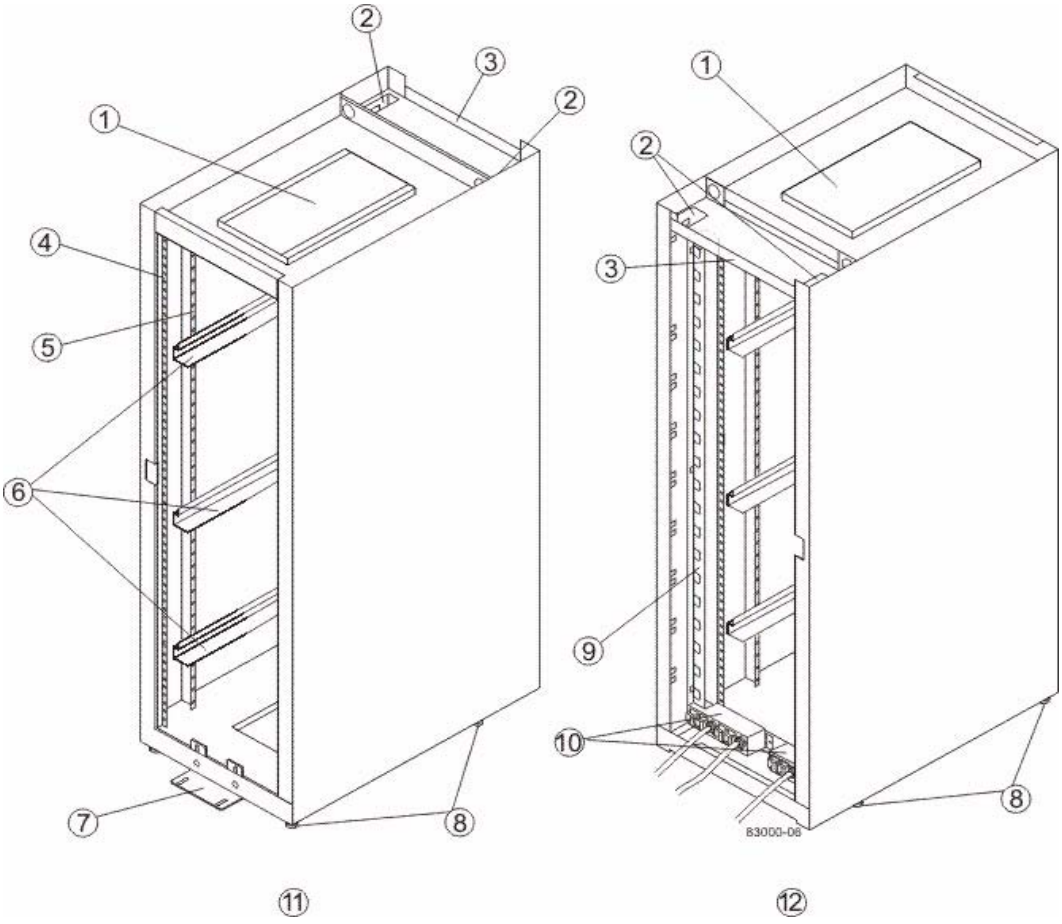
The Model 3040 40U cabinet has these standard features:

- A detachable rear door
- Standard Electronic Industry Association (EIA) support rails that provide mounting holes for installing devices into a standard 48.3-cm (19-in.) wide cabinet
- Four roller casters and four adjustable leveling feet that are located beneath the cabinet for moving the cabinet and then leveling the cabinet in its final location
- A stability foot that stabilizes the cabinet after it is installed in its permanent location
- Access openings for interface cables
- Two AC power distribution units (PDUs) that allow integrated power connection and power handling capacity for controller trays, controller-drive trays, and drive trays

WARNING (W05) **Risk of bodily injury** – If the bottom half of the cabinet is empty, do not install components in the top half of the cabinet. If the top half of the cabinet is too heavy for the bottom half, the cabinet might fall and cause bodily injury. Always install a component in the lowest available position in the cabinet.

WARNING (W07) **Risk of bodily injury** – Only move a populated cabinet with a forklift or adequate help from other persons. Always push the cabinet from the front to prevent it from falling over. A fully populated cabinet can weigh more than 909 kg (2000 lb). The cabinet is difficult to move, even on a flat surface. If you must move the cabinet along an inclined surface, remove the components from the top half of the cabinet, and make sure that you have adequate help.

Figure 1 Components of the Model 3040 40U Cabinet – Front View and Rear View



1. Ventilation Cover
2. Interface Cable Access Openings
3. Rear Plate
4. EIA Support Rails
5. Vertical Support Rails
6. Cabinet Mounting Rails
7. Stability Foot
8. Adjustable Leveling Feet
9. Power Strip
10. AC Power Distribution Units
11. Front of the Cabinet
12. Rear of the Cabinet

You can configure the cabinet to meet your data storage needs. Standard cabinet configurations consist of a combination of these types of trays:

- **Controller tray** – Contains one or two controllers, one interconnect-battery canister, and two power-fan canisters.
- **Controller-drive tray** – Contains drives, redundant cooling fans and power supplies, and, depending on the model, one or two controllers.
- **Drive tray** – Contains drives, redundant cooling fans and power supplies, and one or two environmental services modules (ESMs).

Model 3040 40U Cabinet Configurations

The following table lists the limitations when populating your cabinet with DE1600 drive trays.

Table 2 DE6600 Drive Trays That Can Be Installed in the Cabinet

Number of Controller Trays	Controller Tray
1	E2612 controller-drive tray or E2624 controller-drive tray
1	E2624 controller-drive tray (duplex configuration)
2	E2612 controller-drive tray (duplex configuration)
1	E5412 controller-drive tray
1	E5424 controller-drive tray
1	E5460 controller-drive tray
1	E5512 controller-drive tray
1	E5524 controller-drive tray
1	E5560 controller-drive tray

Table 3 DE6600 Drive Trays That Can Be Installed in the Cabinet

Number of Controller Trays	Controller Tray
1 (72A PDUs are required if you are installing DE6600 drive trays)	E2660 controller-drive tray

NOTE These configurations are based on the standard storage array configurations that are shipped from the factory. The number of controller trays, controller-drive trays, and drive trays in a cabinet can be modified at the customer site.

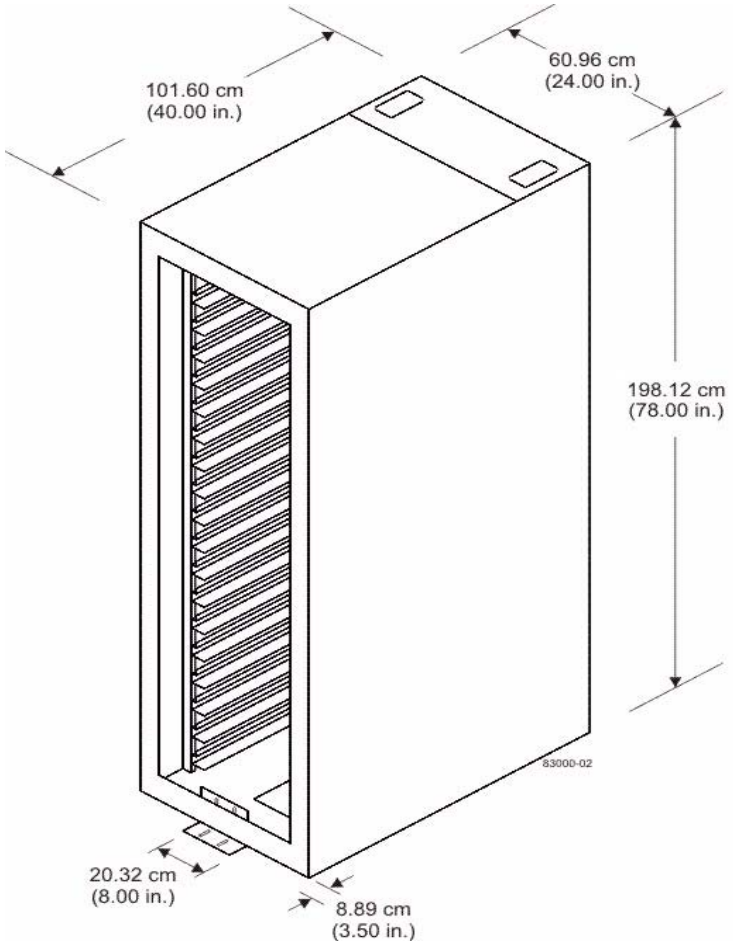
NOTE A 3040 40U Cabinet can hold a maximum of 20 12-drive trays or 24-drive trays. Of these trays, a maximum of 10 can be controller-drive trays, so the remaining 10 trays must be drive trays.

NOTE A 3040 40U Cabinet can hold a maximum of 10 60-drive trays. Of these trays, a maximum of 5 can be controller-drive trays, so the remaining 5 trays must be drive trays.

Model 3040 40U Cabinet Dimensions

Make sure that the area where you will place the cabinet has sufficient space to install and service the cabinet and the storage array component. For additional information, see Model 3040 40U Cabinet Airflow, Heat Dissipation, and Service Clearances.

Figure 2 Dimensions of the Model 3040 40U Cabinet – Front View



Model 3040 40U Cabinet Weights

ATTENTION Risk of damage to flooring – The weight of the cabinet might exceed the flooring load specifications. A fully-loaded 3040 40U cabinet weighs up to 1090 kg (2400 lb). Before you install your components, make sure that your flooring is strong enough to support the weight of the cabinet and its components.

Record the total weight of your cabinet and its components. Keep this information in a place where you can refer to it when you check for flooring load restrictions or elevator weight restrictions.

Table 4 Weights of the Model 3040 40U Cabinet, Trays, and Crate

Component	Weight	Notes
Cabinet	138.80 kg (306.0 lb)	Empty with the rear door installed
Power distribution unit (PDUs [pair])	19.96 kg (44.0 lb)	
Mounting rails (pair)	1.59 kg (3.50 lb)	
E2600 controller-drive tray	27 kg (59.52 lb)	Maximum configuration
E2660 controller-drive tray	105.2 kg (232.0 lb)	Maximum configuration
DE6600 drive tray	105.2 kg (232.0 lb)	Maximum configuration
Shipping crate (worldwide shipments only)	136.08 kg (300.0 lb)	Empty

Model 3040 40U Cabinet Temperature and Humidity

An air-conditioned cooling environment helps to make sure that the ambient temperatures surrounding the cabinet are maintained. This type of environment helps your storage array components to run at operating temperatures that will enhance the overall reliability of your storage.

Table 5 Temperature Requirements and Humidity Requirements for the Model 3040 40U Cabinet

Environment	Temperature Range	Temperature Change	Relative Humidity
Operating*	10°C to 35° C (50°F to 95°F)	10°C per hour (18°F per hour)	20% to 80%
Storage	–10°C to 45°C (14°F to 113°F)	15°C per hour (27°F per hour)	10% to 90%
Transit	–40°C to 65°C (–40°F to 149°F)	20°C per hour (36°F per hour)	5% to 95%
*If you plan to operate a storage array at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.3°F) for every 1000 m (3280 ft) above sea level.			

The maximum allowed dew point is 28°C (82°F), with a maximum humidity gradient of 10 percent per hour.

Model 3040 40U Cabinet Altitude Ranges

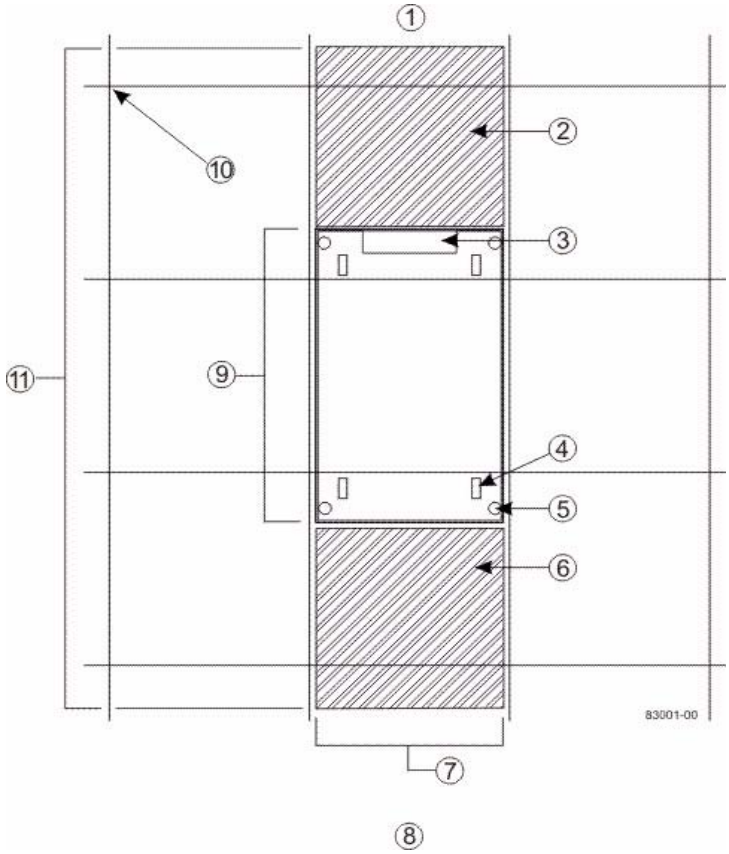
Table 6 Altitude Ranges for the Model 3040 40U Cabinet

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

Model 3040 40U Cabinet Airflow, Heat Dissipation, and Service Clearances

Air flows through the cabinet from the front to the rear. Allow at least 76 cm (30 in.) of clearance in front of the cabinet, and at least 61 cm (24 in.) of clearance behind the cabinet for service clearance, ventilation, and heat dissipation. The total depth required for the cabinet plus clearance is 240 cm (94 in.). The cabinet does not require side clearances.

Figure 3 Area Requirements for the Model 3040 40U Cabinet – Top View



1. Rear of the Cabinet
2. Required Rear Service Area – 61 cm (24 in.)
3. Cable Access
4. Roller Caster
5. Adjustable Leveling Foot
6. Required Front Service Area – 76 cm (30 in.)
7. Width of the Cabinet – 61 cm (24 in.)
8. Front of the Cabinet
9. Depth of the Cabinet – 102 cm (40 in.)
10. Computer Floor Grid – 61 cm x 61 cm (24 in. x 24 in.)
11. Total Clearance Depth – 240 cm (94 in.)

Do not place anything in front of the cabinet or behind the cabinet that would interfere with air flow. The cabinet's ventilation is essential to make sure that ambient air is available to correctly cool your storage array.

Total heat dissipation is a function of the number and type of trays that are installed in the cabinet. Use the table in Model 3040 40U Cabinet Power Requirements to calculate the total heat dissipation for your configuration. For the total Btu/Hr for the cabinet, add the value for each of the individual trays together.

Model 3040 40U Cabinet Site Wiring and Power

The AC power distribution units in the cabinet use common industrial wiring.

- **AC power source** – The AC power source must provide the correct voltage, current, and frequency that are specified on the tray and the serial number label.
- **Protective ground** – Site wiring must include a protective ground connection to the AC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. An external, independent AC power source that is isolated from large switching loads is recommended to run your storage array. The power going to the AC power distribution boxes and other components in the cabinet should not have air-conditioning motors, elevator motors, or factory loads on the same circuit.
- **Tray power distribution** – All units attached to the two individual power strip outlets inside the cabinet must be wide-ranging between 180 VAC and 264 VAC, 50–60 Hz.
- **Power interruptions** – The cabinet and trays can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Maximum frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the trays in the cabinet automatically perform a power-on recovery sequence without operator intervention.

Model 3040 40U Cabinet Power Requirements

Table 7 AC Power Requirements for the Model 3040 40U Cabinet

Parameter	Requirement
Nominal voltage	200 VAC to 240 VAC
Frequency	50 Hz to 60 Hz
Nominal current (typical) Varies depending upon the number and type of trays that are installed in the cabinet.	10.0 A to 24.0 A

The Model 3040 40U cabinet contains power strips that provide either 48A or 72A of usable power.

The 48A power strips provide up to 48A of usable power through four 12A banks of power. This power is provided to 21 power outlets that are located in the rear of the cabinet.

The 72A power strips provide up to 72A of usable power through six 12A banks of power. This power is provided by 24 ICE320 power outlets on each power distribution unit (PDU).

ATTENTION Risk of exceeding maximum amperage – You must calculate the load of the devices in the cabinet to make sure that you do not exceed the 24.0 A maximum. As an example, one controller tray (2.2 A) and four drive trays (1.8 A each) would draw approximately 9.4 A (2.2 + 1.8 + 1.8 + 1.8 + 1.8).

Table 8 Power Calculations and Heat Calculations for the Model 3040 40U Cabinet

Component	KVA	Watts	Btu/Hr	Amps (240 VAC)
Cabinet PDU (for 48A PDUs)	9.60*	9600*	32,784*	
Cabinet PDU (for 72A PDUs)	14.4	14400	49,176	
Cabinet PDU/12A bank (for both 48A and 72A PDUs)	2.40*	2400*	8196*	
E2612 controller-drive tray	0.400	399	1366	
E2624 controller-drive tray	0.331	329.6	1127	
E2660 controller-drive tray	1.268	1222	4180	6.30
E5412 controller-drive tray	0.589	589	2016	
E5524 controller-drive tray	0.567	567	1935	
E5460 controller-drive tray	1.246	1204	4180	
E5512 controller-drive tray	.674	670	2293	

Component	KVA	Watts	Btu/Hr	Amps (240 VAC)
E5524 controller-drive tray	0.561	554	1896	
E5560 controller-drive tray	1.191	1179	4032	
DE1600 drive tray	0.276	276	945	
DE5600 drive tray	0.241	240	821	
DE6600 drive tray (requires 72A PDUs)	1.268	1222	4180	6.30
*The maximum ratings at 200 VAC. The Btu/Hr calculation is based on the maximum current rating that the power distribution unit can provide.				

Model 3040 40U Cabinet Grounding

To prevent personal injury or electrostatic discharge (ESD), make sure that the cabinet is correctly grounded. The ground must have the correct low impedance so that there is no build-up of voltage on any equipment or on any exposed surfaces. Grounding is especially important to eliminate shock hazards, and to facilitate the operation of circuit-protective devices.

Consider a low impedance grounding and lightning protection when you plan for and install an electrical system. Your electrical contractor must meet local code requirements and national code requirements when installing an electrical system.

NOTE Local codes and local standards might have more stringent requirements. Always comply with local codes.

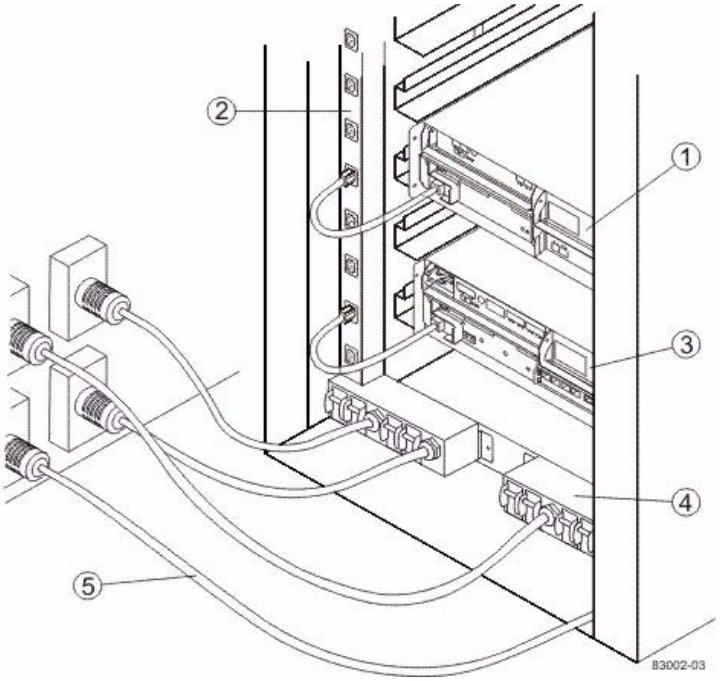
Model 3040 40U Cabinet Power Distribution

The Model 3040 40U cabinet has two identical AC power distribution units, each of which has a separate power cords for each side. Depending on your configuration, each AC power distribution unit supports either North American (USA and Canada) components or worldwide (excluding USA and Canada) components. Each AC power distribution unit includes these parts:

- Two cords per side, NEMA L6-30P or IEC 309, for 48A PDUs
- Three cords per side, for 78A PDUs
- Four circuit breakers per side, 15 A each, for 48A PDUs
- Six circuit breakers per side, 15 A each, for 72A PDUs
- Twenty IEC 320 power outlets per side, plus an additional outlet for the optional fan tray

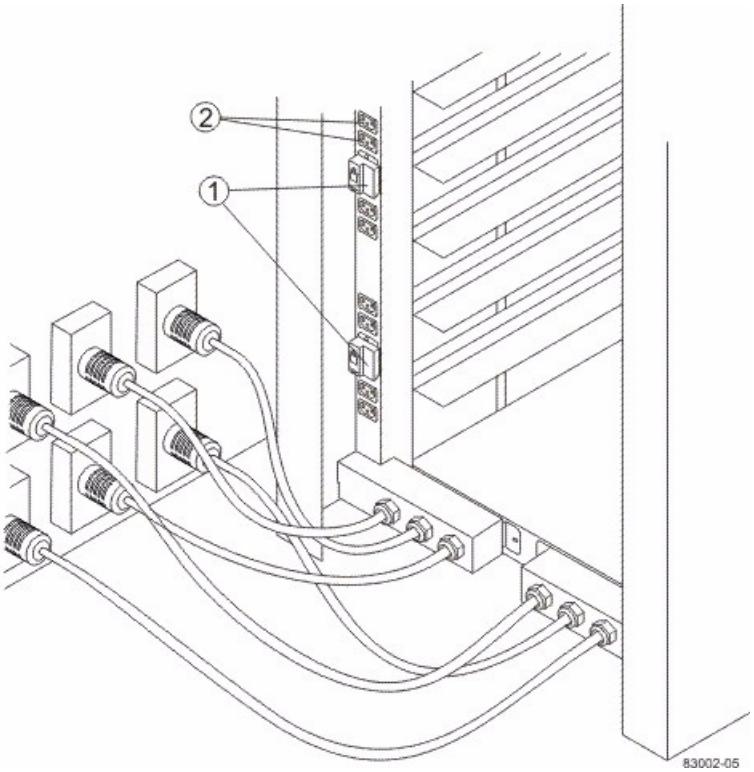
NOTE For pluggable equipment, the electrical outlet must be installed near the equipment and must be easily accessible.

Figure 4 Circuit Breakers and Electrical Outlets for 48A PDUs



1. Controller Tray
2. Power Strip
3. Drive Tray
4. AC Power Distribution Unit
5. AC Power Cords

Figure 5 Circuit Breakers and Electrical Outlets for 72A PDUs

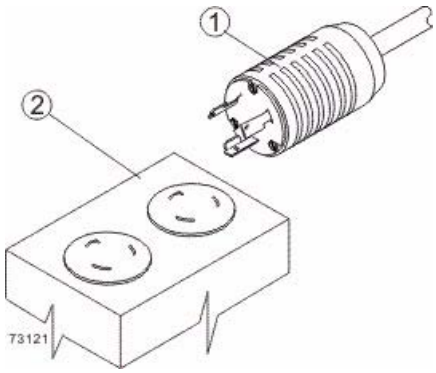


1. Circuit Breakers
2. Electrical Outlets

Model 3040 40U Cabinet Power Cords and Receptacles

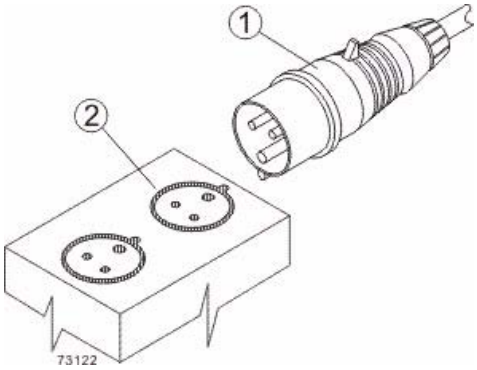
The cabinet is equipped with two AC power distribution units. Each AC power distribution unit contains four 15-A circuit breakers on each side. Depending on your installation, the AC power distribution units in your cabinet have either North American (USA and Canada) power cords or worldwide (except USA and Canada) power cords. Connect each AC power distribution unit power cord to an independent power source outside of the cabinet.

Figure 6 NEMA L6-30 Power Cord and Receptacle (North American)



1. 250-VAC, 30-A Plug (North American)
2. Receptacle

Figure 7 IEC 309 Power Cord and Receptacle (Worldwide, except USA and Canada)



1. 230-VAC, 32-A Plug (Worldwide, except USA and Canada)
2. Receptacle

Preparing the Network for the Controllers 3

If you plan to use Ethernet connections from the storage management station to the controllers, you will use the out-of-band management method. For this configuration, meet with your network administrator before you order and install the equipment so that you can prepare for the setup and management of the devices on the IP network. Each controller uses its Ethernet management ports to connect to the IP network and communicate with the other devices on the IP network (often requiring a special application to set up the protocol).

Your network administrator can pre-assign the addresses that you need to manage the communication between the devices on the IP network. Depending on your storage configuration, you will need the following addresses:

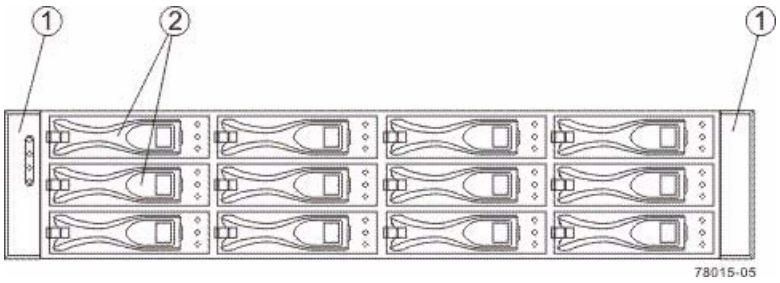
- Up to two network IP addresses for each controller
- Up to two subnet mask addresses for each controller
- Either two IPv4 addresses (one static and one dynamic) or one IPv6 address for each controller
- A Dynamic Host Configuration Protocol (DHCP) address for each controller

If switches are used in your storage environment, you must know if zoning will be used, and how it will be configured.

Specifications of the E2600 Controller-Drive Tray 4

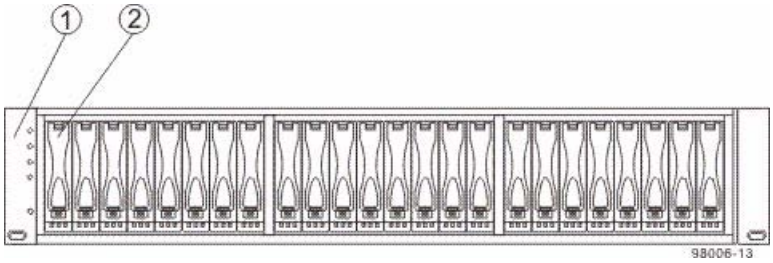
The E2600 controller-drive tray is available in a rackmount model, with a capacity of either 12 drives or 24 drives.

Figure 8 E2600 Controller-Drive Tray with 12 Drives – Front View



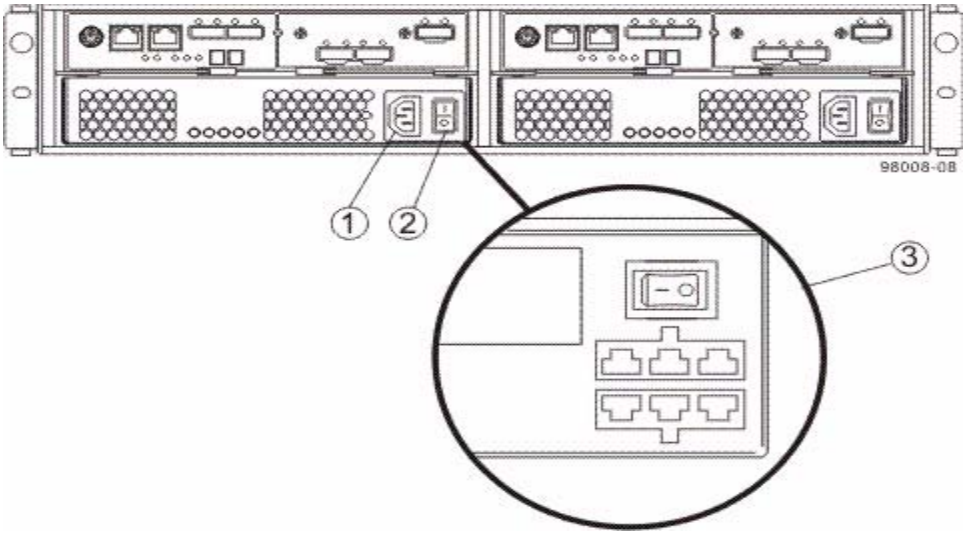
1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 9 E2600 Controller-Drive Tray with 24 Drives – Front View



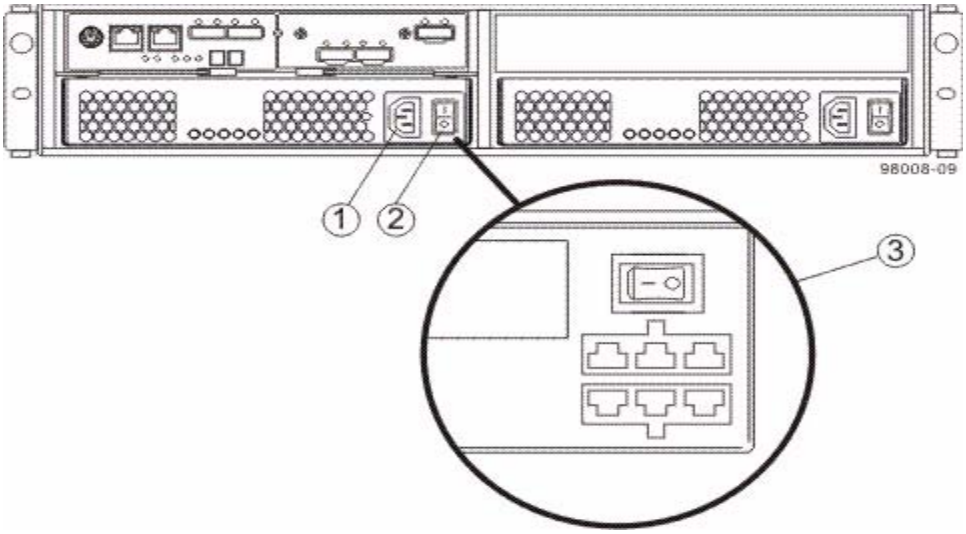
1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 10 E2600 Controller-Drive Tray Duplex Configuration – Rear View



1. AC Power Connector
2. AC Power Switch
3. Optional DC Power Connector and DC Power Switch

Figure 11 E2600 Controller-Drive Tray Simplex Configuration – Rear View



1. AC Power Connector
2. AC Power Switch
3. Optional DC Power Connector and DC Power Switch

E2600 Controller-Drive Tray Dimensions

The E2600 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 12 Dimensions of the E2600 Controller-Drive Tray (12-Drive Model) – Front View

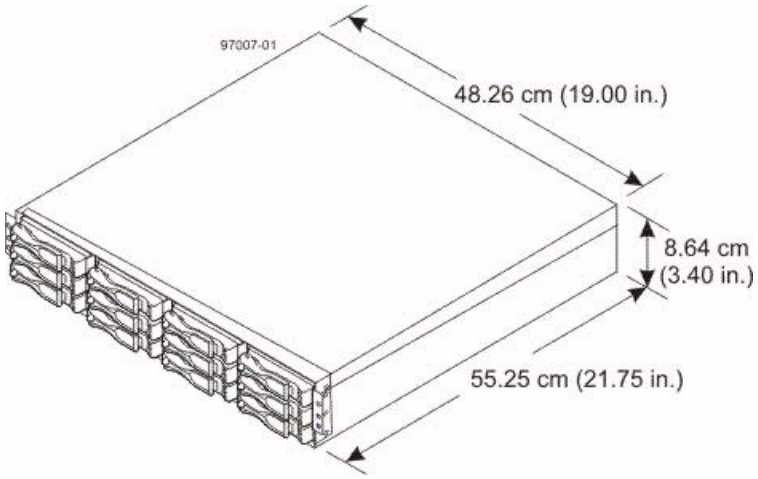
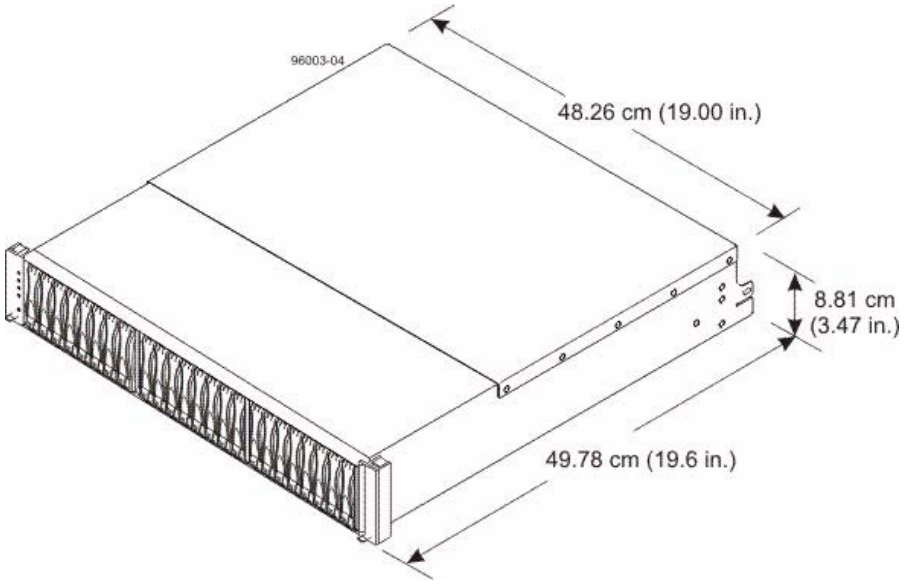


Figure 13 Dimensions of the E2600 Controller-Drive Tray (24-Drive Model) – Front View



E2600 Controller-Drive Tray Weight

Table 9 Weights of the E2600 Controller-Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
Controller-Drive Tray, with twelve 8.89-cm (3.5-in.) drives	27 kg (59.52 lb)	8.4 kg (18.52 lb)	31.75 kg (70.0 lb)
Controller-Drive Tray, with twenty-four 6.35-cm (2.5-in.) drives	26 kg (57.32 lb)	10.7 kg (23.59 lb)	31.75 kg (70.0 lb)
*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as either 0.3 kg (0.66 lb) times the maximum number of drives per controller-drive tray for 3.5-in. SATA drives or 0.08 kg (0.18 lb) times the maximum number of drives per controller-drive tray for 2.5-in. SATA drives. **Empty weight indicates a controller-drive tray with the controller canisters, the power-fan canisters, and the drives removed. ***Shipping weight indicates the maximum weight of the controller-drive tray and all shipping material.			

Component	Weight
Controller canister	2.131 kg (4.70 lb)
Power-fan canister	2.500 kg (5.51 lb)
2.5-in. SATA drive	0.3 kg (0.66 lb)
3.5-in. SATA drive	1.0 kg (2.2 lb)

E2600 Controller-Drive Tray Shipping Dimensions

Table 10 Shipping Carton Dimensions for the E2600 Controller-Drive Tray

Height	Width	Depth
24.13 cm (9.5 in.)*	63.50 cm (25 in.)	58.42 cm (23 in.)
24.13 cm (9.5 in.)**	68.58 cm (27 in.)	58.42 cm (23 in.)
*Controller-Drive Tray with twelve 3.5-in. drives. **Controller-Drive Tray with twenty-four 2.5-in. drives.		

E2600 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 11 Temperature Requirements and Humidity Requirements for the E2600 Controller-Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F per hour)
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F per hour)
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F per hour)
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

E2600 Controller-Drive Tray Altitude Ranges

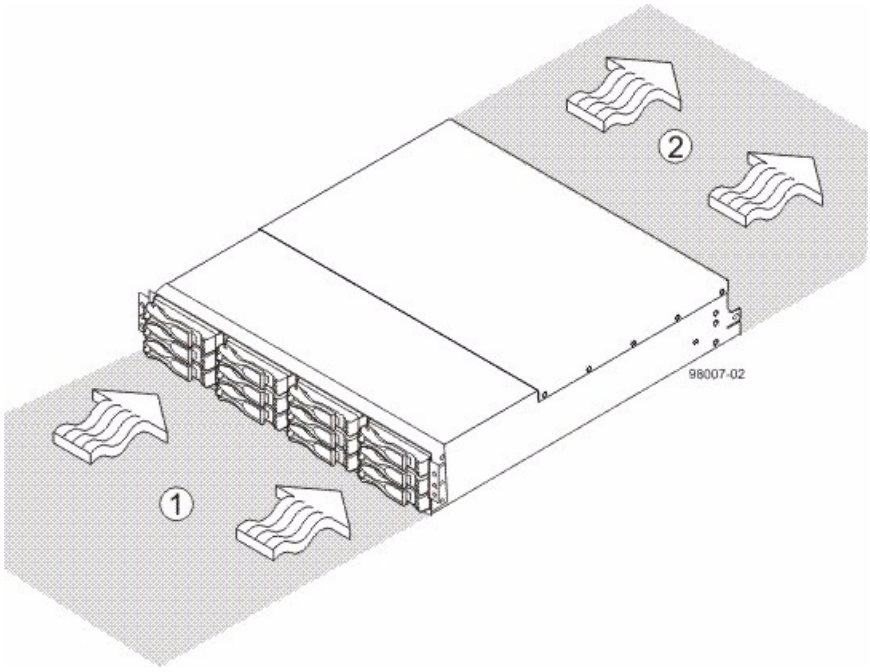
Table 12 Altitude Ranges for the E2600 Controller-Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E2600 Controller-Drive Tray Airflow and Heat Dissipation

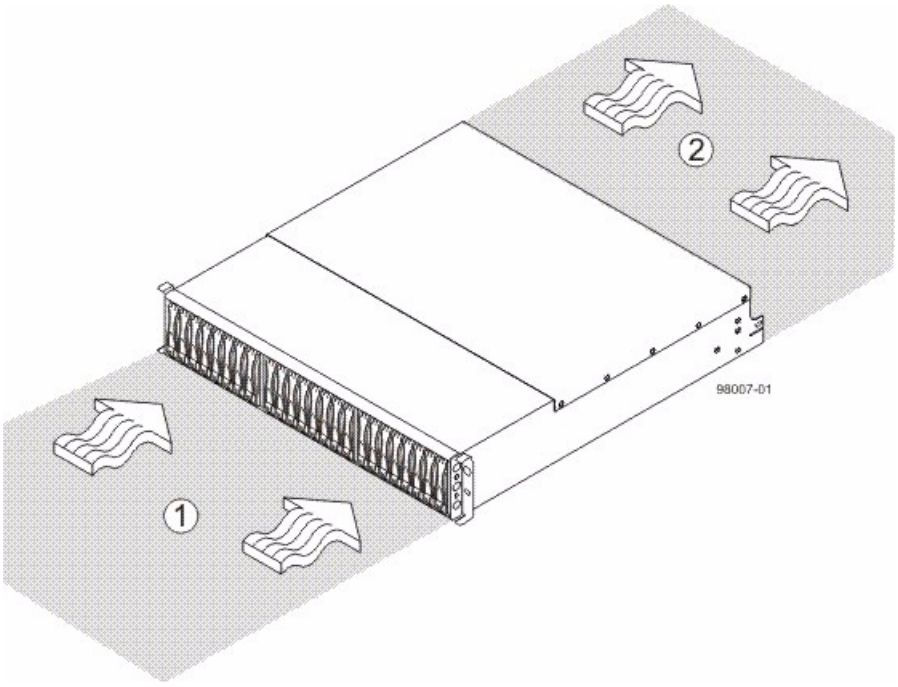
Allow at least 76 cm (30 in.) of clearance in front of the controller-drive tray and 61 cm (24 in.) behind the controller-drive tray for service clearance, ventilation, and heat dissipation.

Figure 14 Airflow Through the Controller-Drive Tray with 12 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

Figure 15 Airflow Through the Controller-Drive Tray with 24 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

Table 13 Power and Heat Dissipation for the E2600 Controller-Drive Tray

Component	KVA	Watts (AC)	Btu/Hr
Controller canisters with two power-fan canisters and 12 drives	0.400	399	1366
Controller canisters with two power-fan canisters and 24 drives	0.331	330	1127

E2600 Controller-Drive Tray Acoustic Noise

Table 14 Acoustic Noise at 25°C for the E2600 Controller-Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels maximum
Sound pressure (normal operation)	65 dBA maximum

E2600 Controller-Drive Tray Site Wiring and Power

The E2600 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source or the optional –48-VDC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral or line-to-line power connections.

NOTE Power for the optional –48-VDC power configuration is supplied by a centralized DC power plant instead of the AC power source in the cabinet. Refer to the associated manufacturer's documentation for specific DC power source requirements.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source or the optional –48-VDC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the controller-drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the controller-drive tray automatically performs a power-on recovery sequence without operator intervention.

E2600 Controller-Drive Tray Power Input

AC Power Input

Each power supply contains one 10-A slow-blow fuse.

Table 15 AC Power Requirements for the E2600 Controller-Drive Tray

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Idle current	3.97 A*	1.63 A**

Parameter	Low Range	High Range
Maximum operating current	4.25 A*	1.68 A**
Sequential Drive Group Spin Up	4.27 A	1.76 A
Simultaneous Drive Spin Up	6.13 A	2.71 A
System Rating Plate Label	7.0 A	2.9 A
* Typical current: 100 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration. **Typical current: 240 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.		

DC Power Input

Nominal input voltages for the DC power source are as follows:

- Low range: –42 VDC
- High range: –60 VDC

The maximum operating current is 21.7 A.

E2600 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the controller-drive tray at greater than 0.95 with nominal input voltage.

E2600 Controller-Drive Tray AC Power Cords and Receptacles

Each E2600 controller-drive tray is shipped with two AC power cords. Each AC power cord connects one of the power supplies in a controller-drive tray to an independent, external AC power source, such as a wall receptacle or a UPS.

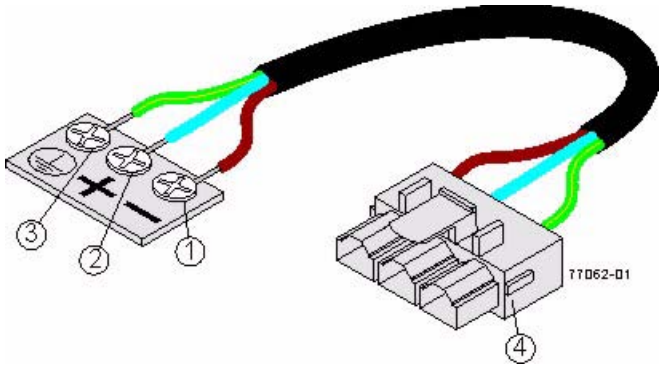
If you have a cabinet with internal power cabling, such as a ladder cord, you do not need the AC power cords that are shipped with the controller-drive tray.

DC power is an option that is available for use with your controller-drive tray and drive trays. For more information, see E2600 Controller-Drive Tray Optional DC Power Connector Cables and Source Wires.

E2600 Controller-Drive Tray Optional DC Power Connector Cables and Source Wires

The E2600 controller-drive tray is shipped with –48-VDC power connector cables if the DC power option is ordered. The –48-VDC power connector cable plugs into the DC power connector on the rear of the controller-drive tray. The three source wires on the other end of the power connector cable connect the controller-drive tray to centralized DC power plant equipment, typically through a bus bar above the cabinet.

WARNING (W12) **Risk of electrical shock** – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 below) from the power supplies.



1. Supply (Negative), Brown Wire, –48 VDC
2. Return (Positive), Blue Wire
3. Ground, Green and Yellow Wire
4. DC Power Connector

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

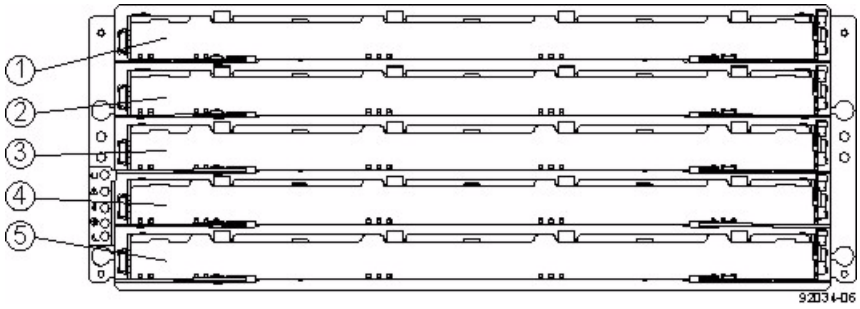
Two (or, optionally, four) DC power connector cables are provided with each controller-drive tray. Two DC power connectors are on the two DC power supplies on the rear of each controller-drive tray if additional redundancy is required.

NOTE It is not mandatory that you connect the second DC power connection on the DC power supplies of the controller-drive tray. The second DC power connection is provided for additional redundancy only and can be connected to a second DC power bus.

Specifications of the E2660 Controller-Drive Tray 5

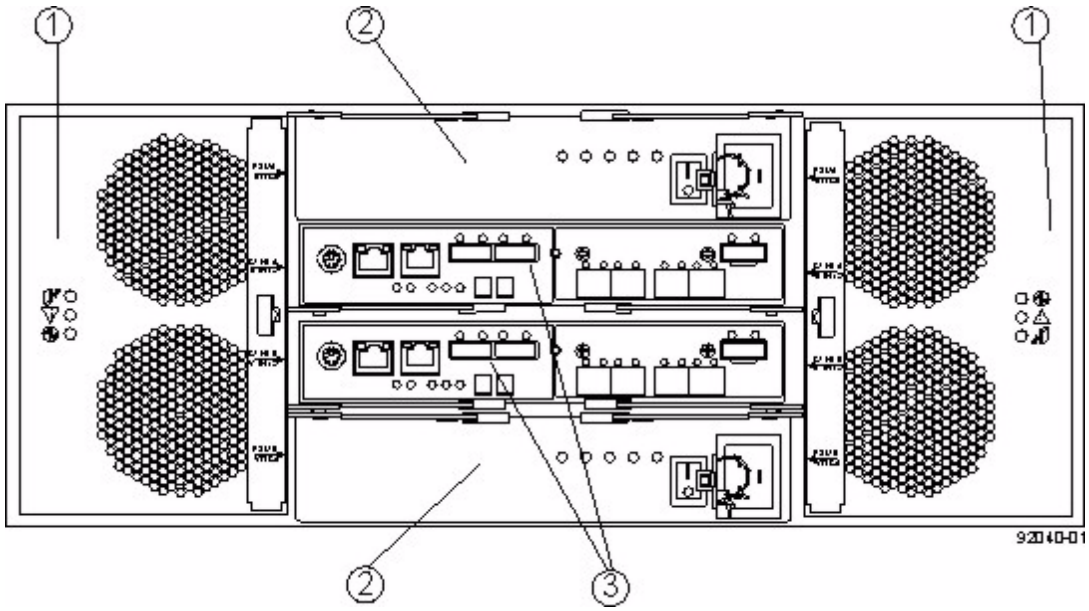
The E2660 controller-drive tray is a high-density SAS 2.0 (6-Gb/s) drive enclosure with 60 near-line 3.5” SAS drives, housed in five drawers with 12 drives each.

Figure 16 E2660 Controller-Drive Tray – Front View with Bezel Removed



1. Drive Drawer 1
2. Drive Drawer 2
3. Drive Drawer 3
4. Drive Drawer 4
5. Drive Drawer 5

Figure 17 E2660 Controller-Drive Tray – Rear View

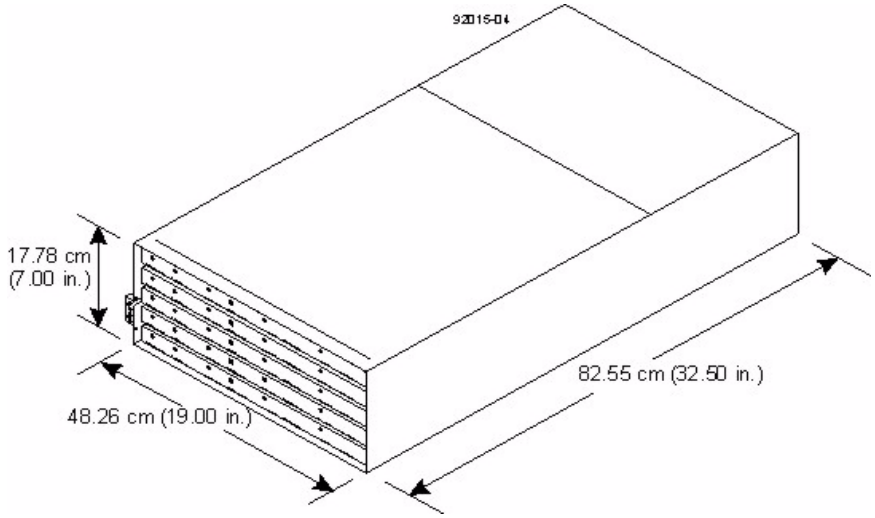


1. Fan Canisters
2. Power Canisters
3. Controller-Drive Tray Canisters

E2660 Controller-Drive Tray Dimensions

The E2660 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 18 Dimensions of the E2660 Controller-Drive Tray – Front View



E2660 Controller-Drive Tray Weight

Table 16 Weights of the E2660 Controller-Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
E2660 controller-drive tray	105.2 kg (232 lb)	19.5 kg (43 lb)	193.2 kg (426 lb)

*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.3 kg (0.6 lb) times the maximum number of drives per drive tray for drives weighing 0.725 kg (1.6 lb).

**Empty weight indicates a drive tray without the controller canisters, the power canisters, the fan canisters, and the drives.

***Shipping weight indicates the empty weight of a drive tray and all shipping material, as well as the weight of the 60 drives that are shipped separately in multipack cartons.

Table 17 Component Weights of the E2660 Controller-Drive Tray

Component	Weight
Controller canister	2.99 kg (6.60 lb)
Power canister	2.5 kg (5.5 lb)
Fan canister	Approximately 1 kg (2.16 lb)
Drive	0.74 kg (1.64 lb)

E2660 Controller-Drive Tray Shipping Dimensions

Table 18 Shipping Carton Dimensions for the E2660 Controller-Drive Tray

Height	Width	Depth
48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)

E2660 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 19 Temperature Requirements and Humidity Requirements for the E2660 Controller-Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F) per hour
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

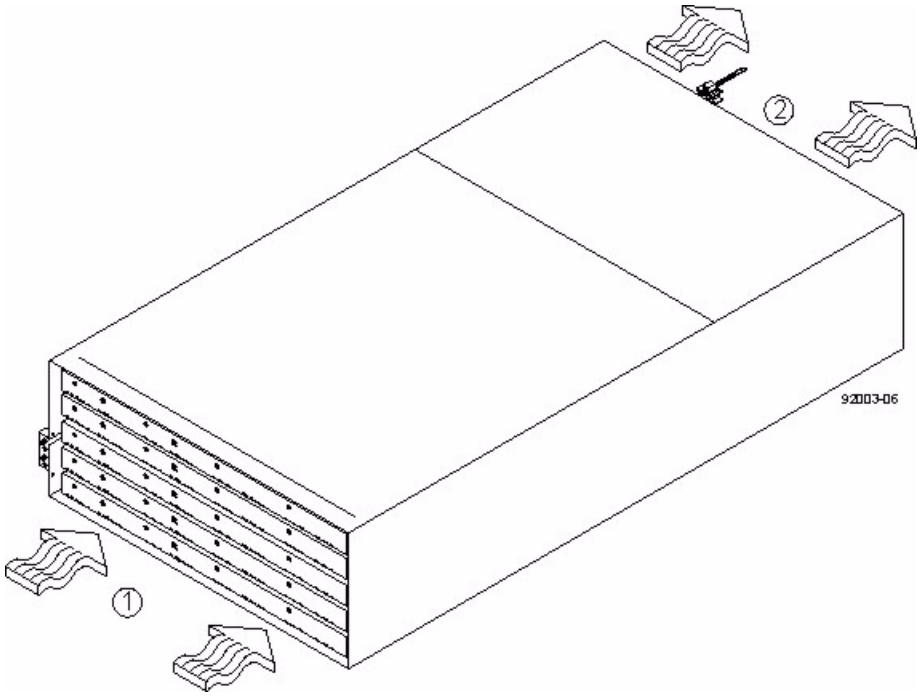
E2660 Controller-Drive Tray Altitude Ranges

Table 20 Altitude Ranges for the E2660 Controller-Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E2660 Controller-Drive Tray Airflow and Heat Dissipation

Figure 19 Airflow Through the E2660 Controller-Drive Tray – Front View



1. 81 cm (32 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table are the maximum measured operating power.

Table 21 Power Ratings and Heat Dissipation for the E2660 Controller-Drive Tray

Unit	KVA	Watts (AC)	Btu/hr
E2660 controller-drive tray with two power supplies, two controller trays, 60 drives (Seagate 2000-Gb SAS drives and controllers), and two fan canisters, full speed	1.268	1222	4180

E2660 Controller-Drive Tray Acoustic Noise

Table 22 Acoustic Noise at 25°C for the E2660 Controller-Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels
Sound power (normal operation)	6.8 bels
Sound pressure	68 dBA

E2660 Controller-Drive Tray Site Wiring and Power

The E2660 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral power connections or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

E2660 Controller-Drive Tray Power Input

Each power supply contains one 15-A slow-blow fuse.

Table 23 AC Power Requirements for the E2660 Controller-Drive Tray

Parameter	High Range
Nominal voltage	240 VAC
Frequency	50-60 Hz
Idle current	4.14 A
Maximum operating current	4.16 A
Maximum surge current	7.09 A

E2660 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the E2660 controller-drive tray at greater than 0.95 with nominal input voltage.

E2660 Controller-Drive Tray AC Power Cords and Receptacles

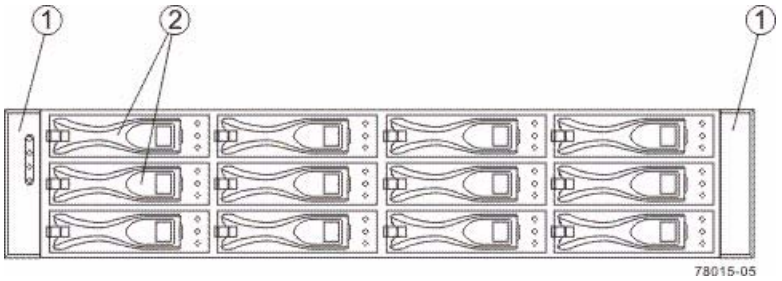
Each E2660 controller-drive tray is shipped with two AC power cords, which fit the standard AC outlets in the destination country. Each AC power cord connects one of the power canisters in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

NOTE Possible risk of equipment failure – To ensure proper cooling, the E2660 controller-drive tray always uses two power supplies.

Specifications of the E5400 Controller-Drive Tray 6

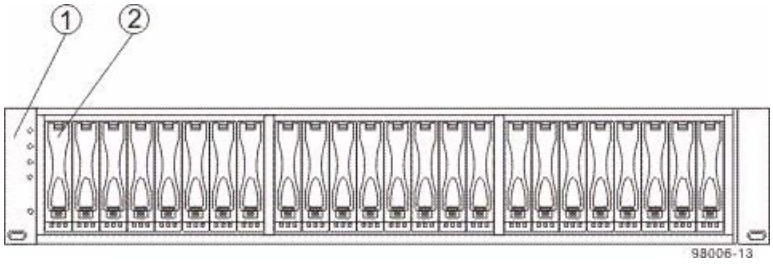
The E5400 controller-drive tray is available in a rackmount model, with a capacity of either 12 drives or 24 drives. The E5400 controller-drive tray is a compact, rackmounted unit that provides high-capacity disk storage for Fibre Channel, Infiniband, and iSCSI environments, depending on the choice of the host interface card.

Figure 20 E5400 Controller-Drive Tray with 12 Drives – Front View



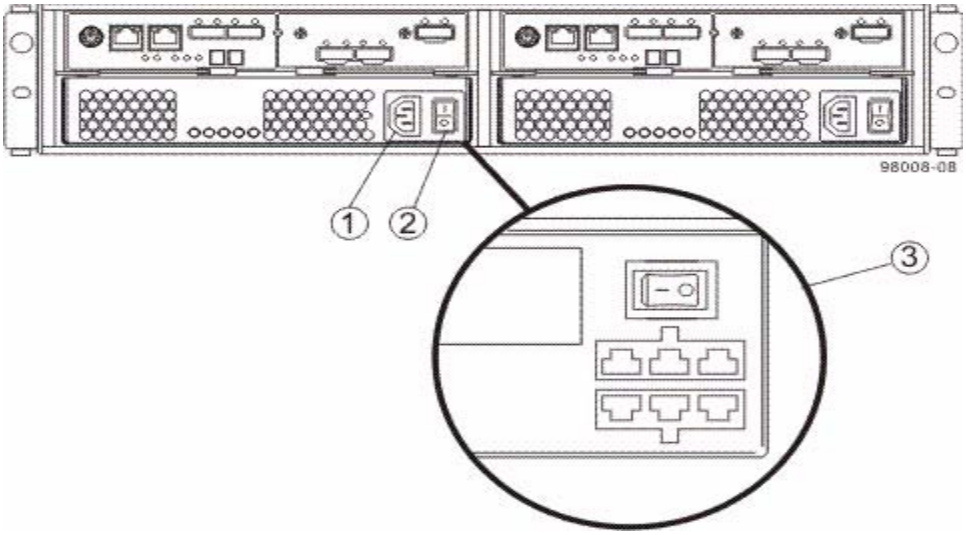
1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 21 E5400 Controller-Drive Tray with 24 Drives – Front View



1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 22 E5400 Controller-Drive Tray – Rear View



1. AC Power Connector on the AC Power-Fan Canister
2. AC Power Switch
3. DC Power Connector and DC Power Switch on the Optional DC Power-Fan Canister

E5400 Controller-Drive Tray Dimensions

The E5400 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 23 Dimensions of the E5400 Controller-Drive Tray (12-Drive Model) – Front View

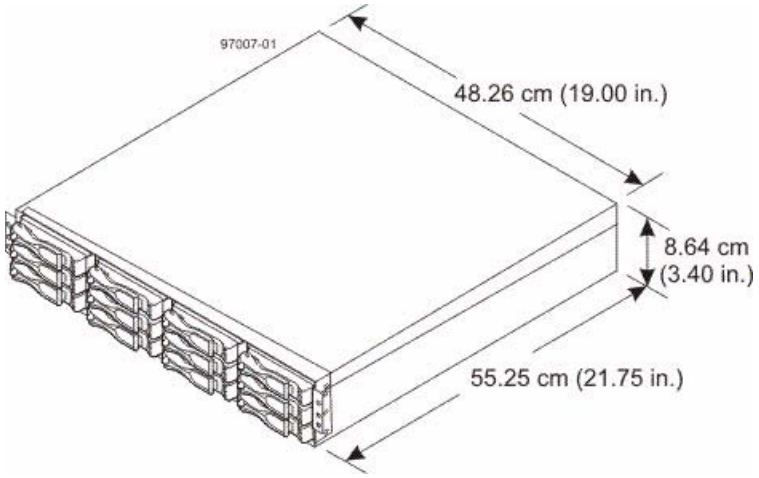
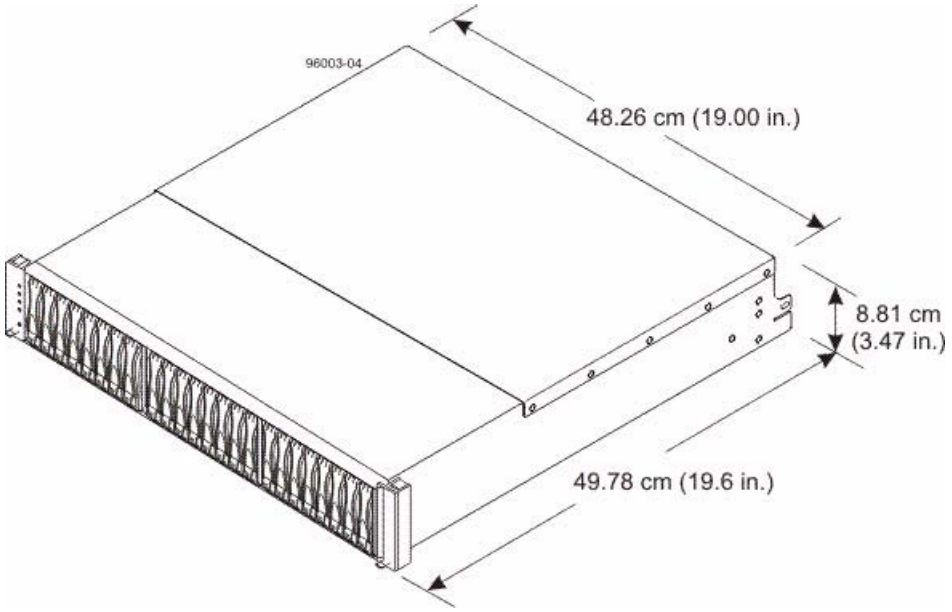


Figure 24 Dimensions of the E5400 Controller-Drive Tray (24-Drive Model) – Front View



E5400 Controller-Drive Tray Weight

Table 24 Weights of the E5412 and E5424 Controller-Drive Trays

Unit	Weight		
	Maximum*	Empty**	Shipping***
E5412 controller-drive tray, with twelve 8.89-cm (3.5-in.) drives	27 kg (59.52 lb)	8.4 kg (18.52 lb)	31.75 kg (70.0 lb)
E5424 controller-drive tray, with twenty-four 6.35-cm (2.5-in.) drives	26 kg (57.32 lb)	10.7 kg (23.59 lb)	31.75 kg (70.0 lb)

*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as either 0.3 kg (0.66 lb) times the maximum number of drives per controller-drive tray for 3.5-in. SATA drives or 0.08 kg (0.18 lb) times the maximum number of drives per controller-drive tray for 2.5-in. SATA drives.

**Empty weight indicates a controller-drive tray with the controller canisters, the power-fan canisters, and the drives removed.

***Shipping weight indicates the maximum weight of the controller-drive tray and all shipping material.

Component	Weight
Controller canister	2.131 kg (4.70 lb)
Power-fan canister	2.500 kg (5.51 lb)
2.5-in. SATA drive	0.3 kg (0.66 lb)
3.5-in. SATA drive	1.0 kg (2.2 lb)

E5400 Controller-Drive Tray Shipping Dimensions

Table 25 Shipping Carton Dimensions for the E5412 and E5424 Controller-Drive Trays

Controller-Drive Tray	Height	Width	Depth
E5412 controller-drive tray with twelve 3.5-in. drives	24.13 cm (9.5 in.)	63.50 cm (25 in.)	58.42 cm (23 in.)
E5424 controller-drive tray with twenty-four 2.5-in. drives	24.13 cm (9.5 in.)	68.58 cm (27 in.)	58.42 cm (23 in.)

E5400 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 26 Temperature Requirements and Humidity Requirements for the E5412 and E5424 Controller-Drive Trays

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F) per hour

Condition	Parameter	Requirement
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

E5400 Controller-Drive Tray Altitude Ranges

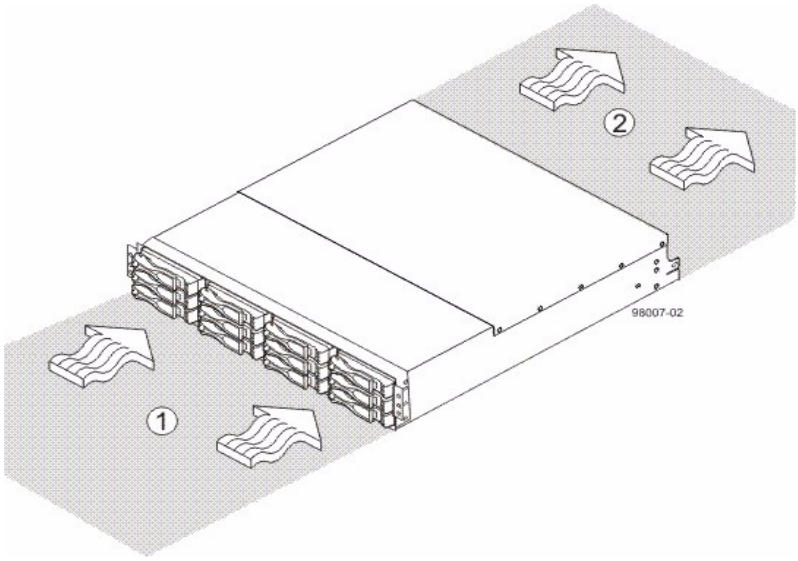
Table 27 Altitude Ranges for the E5412 and E5424 Controller-Drive Trays

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E5500 Controller-Drive Tray Airflow and Heat Dissipation

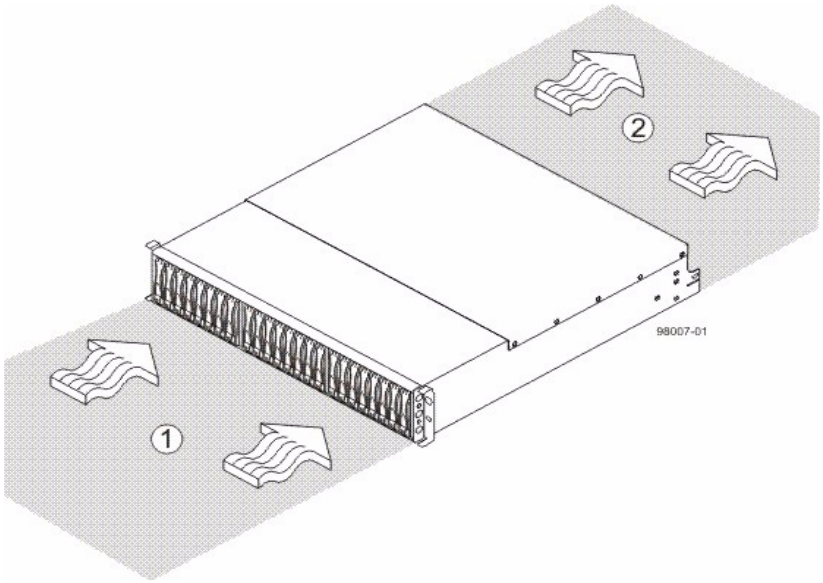
Allow at least 76 cm (30 in.) of clearance in front of the controller-drive tray and 61 cm (24 in.) behind the controller-drive tray for service clearance, ventilation, and heat dissipation.

Figure 25 Airflow Through the E5512 Controller-Drive Tray with 12 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

Figure 26 Airflow Through the E5524 Controller-Drive Tray with 24 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet

2. 61 cm (24 in.) clearance behind the cabinet

Table 28 Power and Heat Dissipation for the E5512 and E5524 Controller-Drive Trays

Component	KVA	Watts (AC)	Btu/Hr
Controller canisters with two power-fan canisters and 12 drives	0.589	589	2016
Controller canisters with two power-fan canisters and 24 drives	0.567	567	1935

E5400 Controller-Drive Tray Acoustic Noise

Table 29 Acoustic Noise at 25°C for the E5412 and E5424 Controller-Drive Trays

Measurement	Level
Sound power (standby operation)	6.5 bels maximum
Sound pressure (normal operation)	65 dBA maximum

E5500 Controller-Drive Tray Site Wiring and Power

The E5400 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source or the optional –48-VDC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral or line-to-line power connections.

NOTE Power for the optional –48-VDC power configuration is supplied by a centralized DC power plant instead of the AC power source in the cabinet. Refer to the associated manufacturer's documentation for specific DC power source requirements.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source or the optional –48-VDC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the controller-drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.

- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the controller-drive tray automatically performs a power-on recovery sequence without operator intervention.

E5400 Controller-Drive Tray Power Input

AC Power Input

Each power supply contains one 10-A slow-blow fuse.

Table 30 AC Power Requirements for the E5412 and E5424 Controller-Drive Trays

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Idle current	4.16 A *	1.73 A **
Maximum operating current	6.96 A *	2.9 A **
Sequential Drive Group Spin Up	4.27 A	1.76 A
Simultaneous Drive Spin Up	6.81 A	2.71 A
System Rating Plate Label	9.0 A	3.6 A

* Typical current: 100 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.

**Typical current: 240 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.

E5400 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the E5412 and E5424 controller-drive trays at greater than 0.95 with nominal input voltage.

E5400 Controller-Drive Tray AC Power Cords and Receptacles

Each E5400 controller-drive tray is shipped with two AC power cords, which use the standard AC outlets in the destination country. Each AC power cord connects one of the power supplies in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

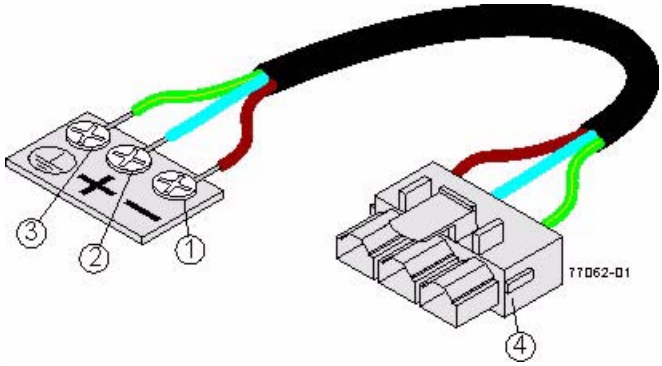
If you have a cabinet with internal power cabling, such as a ladder cord, you do not need the AC power cords that are shipped with the controller-drive tray.

DC power is an option that is available for use with your controller-drive tray and drive trays.

E5400 Controller-Drive Tray Optional DC Power Connector Cables and Source Wires

The E5412 controller-drive tray and the E5424 controller-drive tray is shipped with –48-VDC power connector cables if the DC power option is ordered. The –48-VDC power connector cable plugs into the DC power connector on the rear of the controller-drive tray. The three source wires on the other end of the power connector cable connect the controller-drive tray to centralized DC power plant equipment, typically through a bus bar above the cabinet.

WARNING (W12) **Risk of electrical shock** – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 below) from the power supplies.



1. Supply (Negative), Brown Wire, –48 VDC
2. Return (Positive), Blue Wire
3. Ground, Green and Yellow Wire
4. DC Power Connector

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

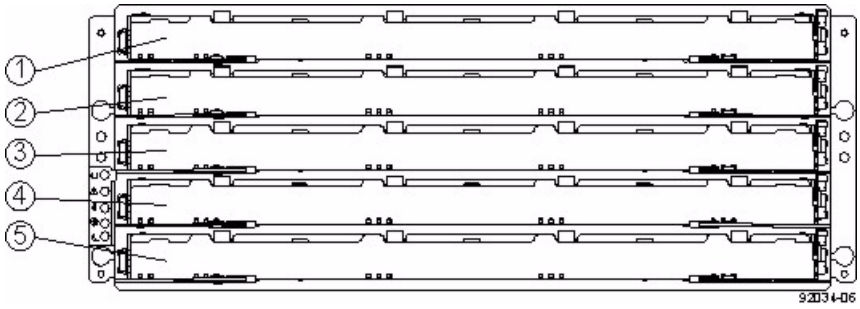
Two (or, optionally, four) DC power connector cables are provided with each controller-drive tray. Two DC power connectors are on the two DC power supplies on the rear of each controller-drive tray if additional redundancy is required.

NOTE It is not mandatory that you connect the second DC power connection on the DC power supplies of the controller-drive tray. The second DC power connection is provided for additional redundancy only and can be connected to a second DC power bus.

Specifications of the E5460 Controller-Drive Tray 7

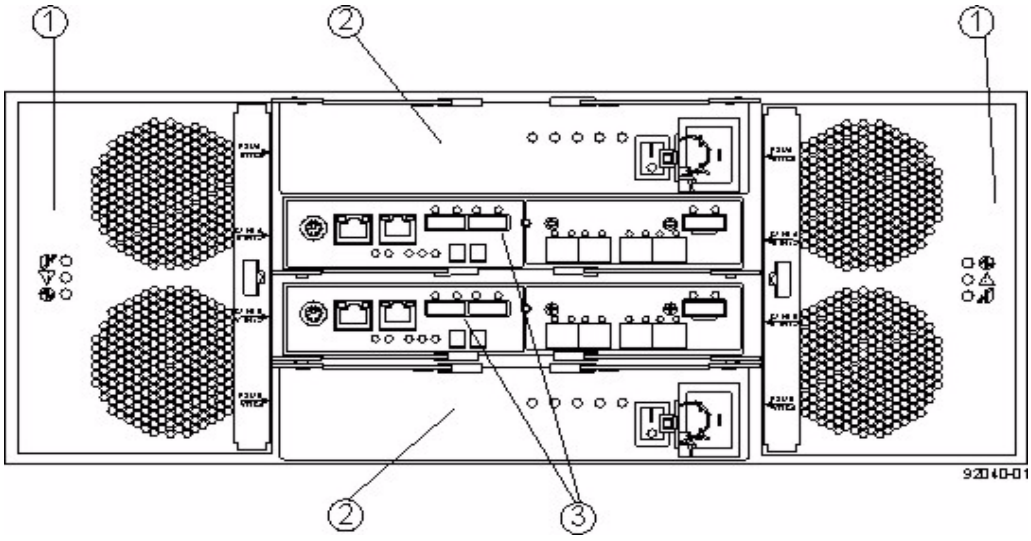
The E5460 controller-drive tray is a high-density SAS 2.0 (6-Gb/s) drive enclosure with 60 near-line 3.5 in. SAS drives, housed in five drawers with 12 drives each.

Figure 27 E5460 Controller-Drive Tray – Front View with Bezel Removed



1. Drive Drawer 1
2. Drive Drawer 2
3. Drive Drawer 3
4. Drive Drawer 4
5. Drive Drawer 5

Figure 28 E5460 Controller-Drive Tray – Rear View

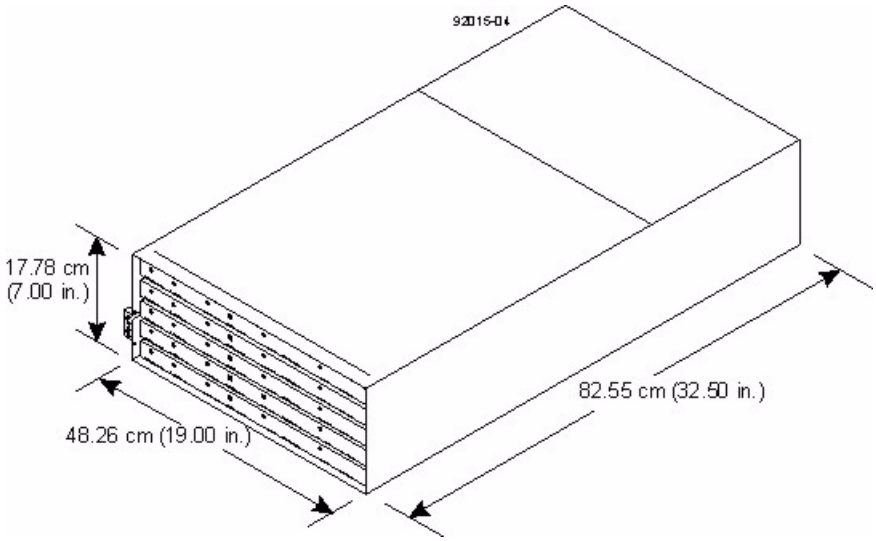


1. Fan Canisters
2. Power Canisters
3. Controller-Drive Tray Canisters

E5460 Controller-Drive Tray Dimensions

The E5460 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 29 Dimensions of the E5460 Controller-Drive Tray – Front View



E5460 Controller-Drive Tray Weight

Table 31 Weights of the E5460 Controller-Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
E5460 controller-drive tray	105.2 kg (232 lb)	19.5 kg (132 lb)	193.2 kg (426 lb)

*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.3 kg (0.6 lb) times the maximum number of drives per drive tray for drives weighing 0.725 kg (1.6 lb).

**Empty weight indicates a drive tray without the controller canisters, the power canisters, the fan canisters, and the drives.

***Shipping weight indicates the empty weight of a drive tray and all shipping material, as well as the weight of the 60 drives that are shipped separately in multipack cartons.

Table 32 Component Weights of the E5460 Controller-Drive Tray

Component	Weight
Controller canister	2.99 kg (6.60 lb)
Power canister	2.5 kg (5.5 lb)
Fan canister	Approximately 1 kg (2.16 lb)
Drive	0.74 kg (1.64 lb)

E5460 Controller-Drive Tray Shipping Dimensions

Table 33 Shipping Carton Dimensions for the E5460 Controller-Drive Tray

Height	Width	Depth
48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)

E5460 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 34 Temperature Requirements and Humidity Requirements for the E5460 Controller-Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F) per hour

Condition	Parameter	Requirement
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

E5460 Controller-Drive Tray Altitude Ranges

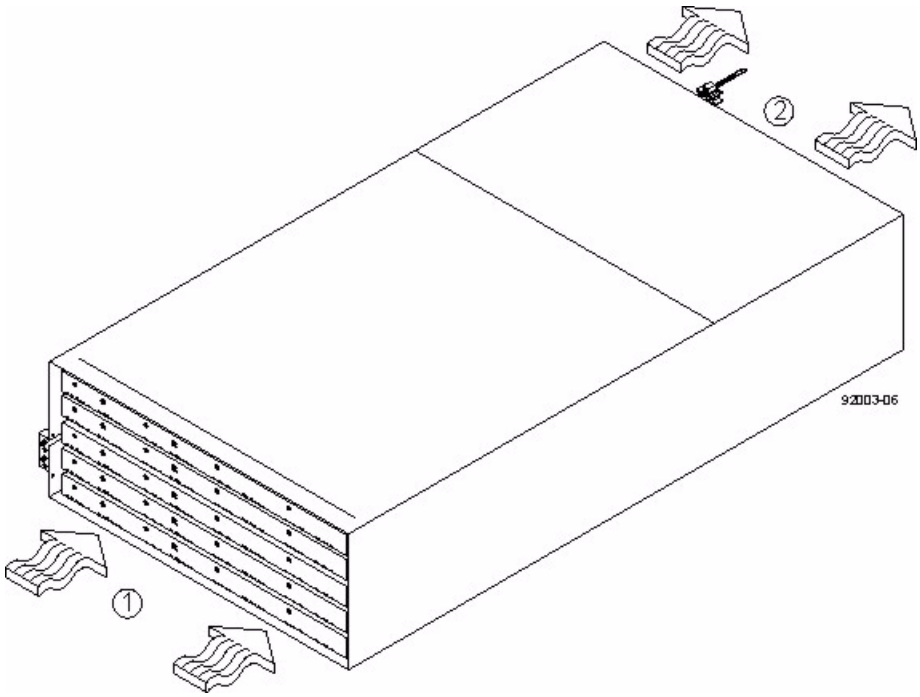
Table 35 Altitude Ranges for the E5460 Controller-Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E5460 Controller-Drive Tray Airflow and Heat Dissipation

Airflow goes from the front of the E5460 controller-drive tray to the rear of the controller-drive tray. Allow at least 81 cm (32 in.) of clearance in front of the E5460 controller-drive tray and at least 61 cm (24 in.) of clearance behind the controller-drive tray for service clearance, ventilation, and heat dissipation.

Figure 30 Airflow Through the E5460 Controller-Drive Tray – Front View



1. 81 cm (32 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table are the maximum measured operating power.

Table 36 Power Ratings and Heat Dissipation for the E5460 Controller-Drive Tray

Unit	KVA	Watts (AC)	Btu/hr
E5460 controller-drive tray with two power supplies, two controller trays, 60 drives (Seagate 2000-Gb SAS drives and controllers), and two fan canisters, full speed	1.268	1222	4180

E5460 Controller-Drive Tray Acoustic Noise

Table 37 Acoustic Noise at 25°C for the E5460 Controller-Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels
Sound power (normal operation)	6.8 bels
Sound pressure	68 dBA

E5460 Controller-Drive Tray Site Wiring and Power

The E5460 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral power connections or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

E5460 Controller-Drive Tray Power Input

Each power supply contains one 15-A slow-blow fuse.

Table 38 AC Power Requirements for the E5460 Controller-Drive Tray

Parameter	Low Range	High Range
Nominal voltage	200 VAC	240 VAC
Frequency	50 Hz	60 Hz
Typical Operating Current	4.9 A	5.75 A
System Nameplate Rating	6.3 A	7.56 A

E5460 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the E5460 controller-drive tray at greater than 0.95 with nominal input voltage.

E5460 Controller-Drive Tray AC Power Cords and Receptacles

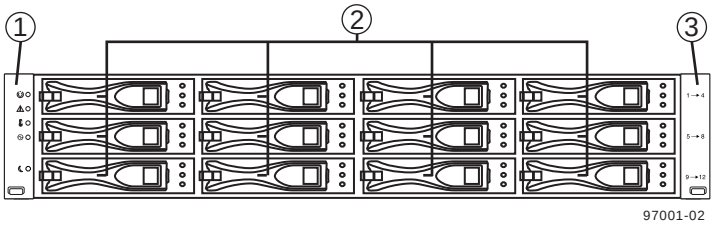
Each E5460 controller-drive tray is shipped with two AC power cords, which fit the standard AC outlets in the destination country. Each AC power cord connects one of the power canisters in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

NOTE Possible risk of equipment failure – To ensure proper cooling, the E5460 controller-drive tray always uses two power supplies.

Specifications of the E5500 Controller-Drive Tray 8

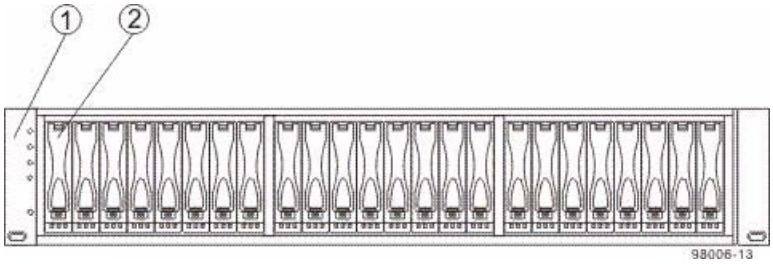
The E5500 controller-drive tray is available in a rackmount model, with a capacity of either 12 drives or 24 drives. The E5500 controller-drive tray is a compact, rackmounted unit that provides high-capacity disk storage for SAS and Infiniband environments, depending on the choice of the host interface card.

Figure 31 E5500 Controller-Drive Tray with 12 Drives – Front View



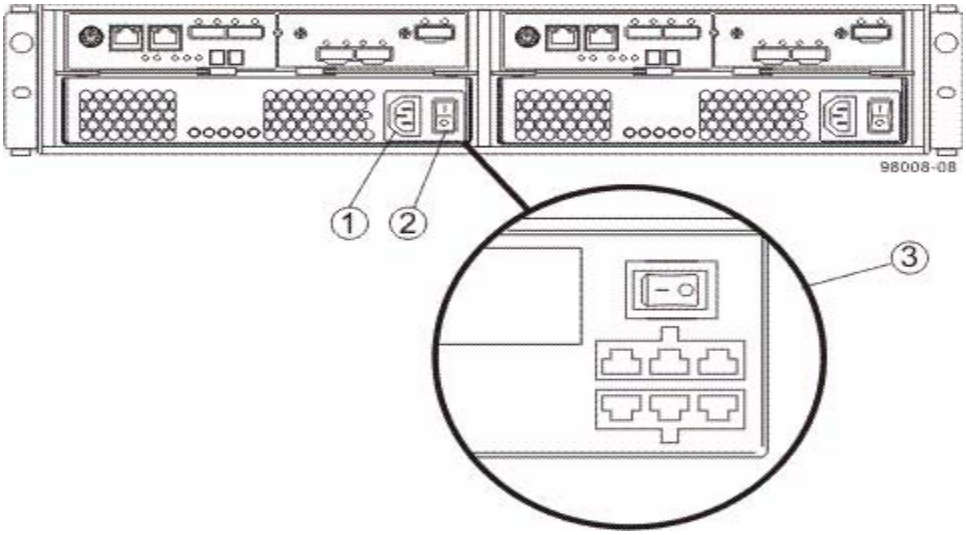
1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 32 E5500 Controller-Drive Tray with 24 Drives –Front View



1. End Caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
2. Drive Canisters

Figure 33 E5500 Controller-Drive Tray – Rear View



1. AC Power Connector on the AC Power-Fan Canister
2. AC Power Switch
3. DC Power Connector and DC Power Switch on the Optional DC Power-Fan Canister

E5500 Controller-Drive Tray Dimensions

The E5500 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 34 Dimensions of the E5500 Controller-Drive Tray (12-Drive Model) – Front View

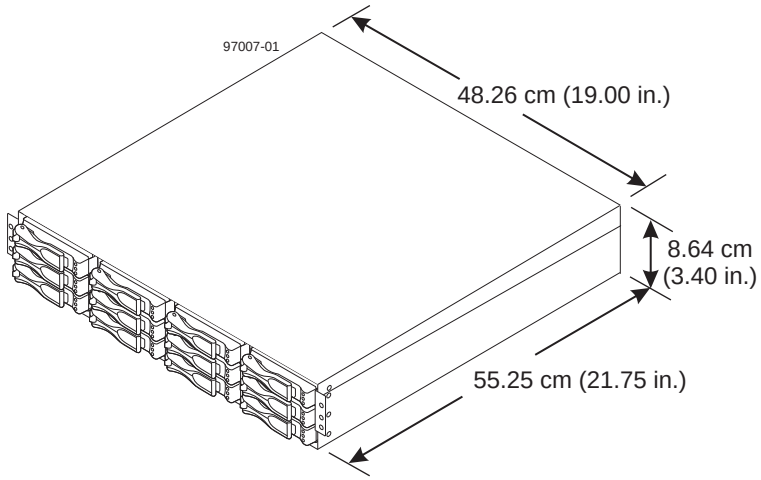
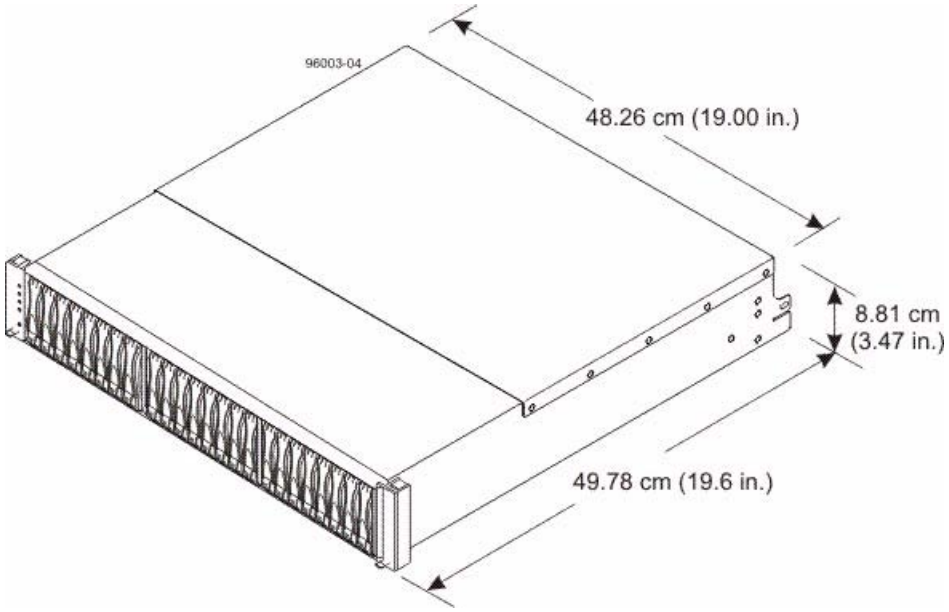


Figure 35 Dimensions of the E5500 Controller-Drive Tray (24-Drive Model) – Front View



E5500 Controller-Drive Tray Weight

Table 39 Weights of the E5512 and E5524 Controller-Drive Trays

Unit	Weight		
	Maximum*	Empty**	Shipping***
E5512 controller-drive tray, with twelve 8.89-cm (3.5-in.) drives	27 kg (59.52 lb)	8.4 kg (18.52 lb)	31.75 kg (70.0 lb)
E5524 controller-drive tray, with twenty-four 6.35-cm (2.5-in.) drives	26 kg (57.32 lb)	10.7 kg (23.59 lb)	31.75 kg (70.0 lb)
*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as either 0.3 kg (0.66 lb) times the maximum number of drives per controller-drive tray for 3.5-in. SATA drives or 0.08 kg (0.18 lb) times the maximum number of drives per controller-drive tray for 2.5-in. SATA drives. **Empty weight indicates a controller-drive tray with the controller canisters, the power-fan canisters, and the drives removed. ***Shipping weight indicates the maximum weight of the controller-drive tray and all shipping material.			

Component	Weight
Controller canister	2.131 kg (4.70 lb)
Power-fan canister	2.500 kg (5.51 lb)
2.5-in. SATA drive	0.3 kg (0.66 lb)
3.5-in. SATA drive	1.0 kg (2.2 lb)

E5500 Controller-Drive Tray Shipping Dimensions

Table 40 Shipping Carton Dimensions for the E5512 and E5524 Controller-Drive Trays

Controller-Drive Tray	Height	Width	Depth
E5512 controller-drive tray with twelve 3.5-in. drives	24.13 cm (9.5 in.)	63.50 cm (25 in.)	58.42 cm (23 in.)
E5524 controller-drive tray with twenty-four 2.5-in. drives	24.13 cm (9.5 in.)	68.58 cm (27 in.)	58.42 cm (23 in.)

E5500 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 41 Temperature Requirements and Humidity Requirements for the E5512 and E5524 Controller-Drive Trays

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F) per hour

Condition	Parameter	Requirement
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

E5500 Controller-Drive Tray Altitude Ranges

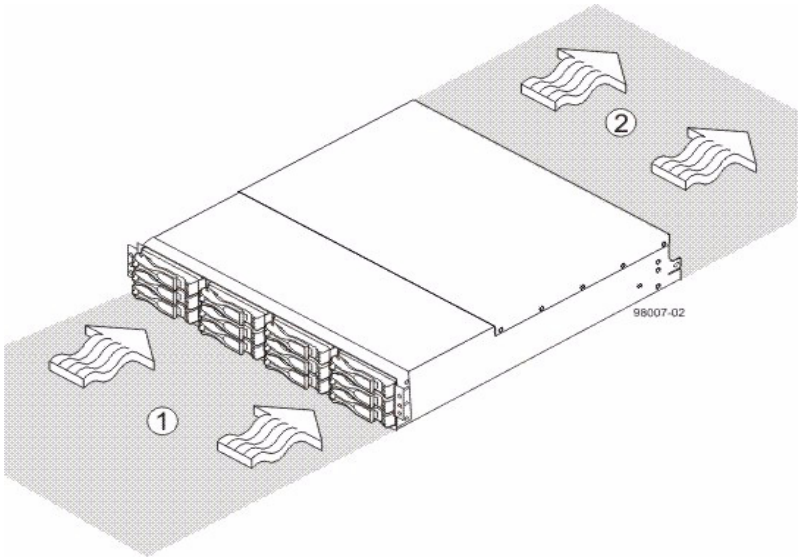
Table 42 Altitude Ranges for the E5512 and E5524 Controller-Drive Trays

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E5500 Controller-Drive Tray Airflow and Heat Dissipation

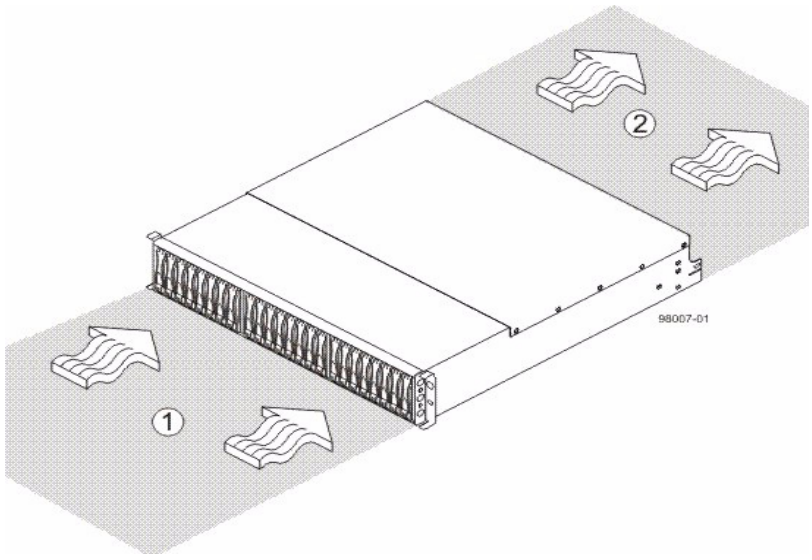
Allow at least 76 cm (30 in.) of clearance in front of the controller-drive tray and 61 cm (24 in.) behind the controller-drive tray for service clearance, ventilation, and heat dissipation.

Figure 36 Airflow Through the E5512 Controller Tray with 12 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

Figure 37 Airflow Through the E5524 Controller-Drive Tray with 24 Drives – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

Table 43 Power and Heat Dissipation for the E5512 and E5524 Controller-Drive Trays

Component	KVA	Watts (AC)	Btu/Hr
Controller canisters with two power-fan canisters and 12 drives	0.674	670	2293
Controller canisters with two power-fan canisters and 24 drives	0.561	554	1896

E5500 Controller-Drive Tray Acoustic Noise

Table 44 Acoustic Noise at 25°C for the E5512 and E5524 Controller-Drive Trays

Measurement	Level
Sound power (standby operation)	6.5 bels maximum
Sound pressure (normal operation)	65 dBA maximum

E5500 Controller-Drive Tray Site Wiring and Power

The E5500 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source or the optional –48-VDC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral or line-to-line power connections.

NOTE Power for the optional –48-VDC power configuration is supplied by a centralized DC power plant instead of the AC power source in the cabinet. Refer to the associated manufacturer's documentation for specific DC power source requirements.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source or the optional –48-VDC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the controller-drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.

- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the controller-drive tray automatically performs a power-on recovery sequence without operator intervention.

E5500 Controller-Drive Tray Power Input

AC Power Input

Each power supply contains one 10-A slow-blow fuse.

Table 45 AC Power Requirements for the E5512 and E5524 Controller-Drive Trays

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Idle current	4.16 A *	1.73 A **
Maximum operating current E5512	10.46 A *	4.22 A **
Maximum operating current E5524	8.48 A *	3.53 A **
Sequential Drive Group Spin Up	4.27 A	1.76 A
Simultaneous Drive Spin Up	6.81 A	2.71 A
System Rating Plate Label	9.0 A	3.6 A

* Typical current: 100 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.

**Typical current: 240 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.

E5500 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the E5512 and E5524 controller-drive trays at greater than 0.95 with nominal input voltage.

E5500 Controller-Drive Tray AC Power Cords and Receptacles

Each E5500 controller-drive tray is shipped with two AC power cords, which use the standard AC outlets in the destination country. Each AC power cord connects one of the power supplies in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

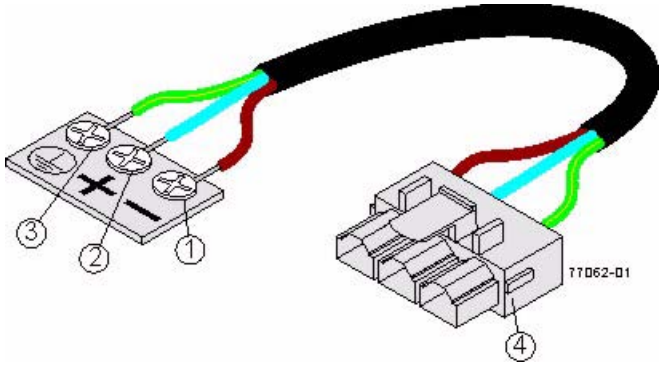
If you have a cabinet with internal power cabling, such as a ladder cord, you do not need the AC power cords that are shipped with the controller-drive tray.

DC power is an option that is available for use with your controller-drive tray and drive trays.

E5500 Controller-Drive Tray Optional DC Power Connector Cables and Source Wires

The E5512 controller-drive tray and the E5524 controller-drive tray is shipped with –48-VDC power connector cables if the DC power option is ordered. The –48-VDC power connector cable plugs into the DC power connector on the rear of the controller-drive tray. The three source wires on the other end of the power connector cable connect the controller-drive tray to centralized DC power plant equipment, typically through a bus bar above the cabinet.

WARNING (W12) **Risk of electrical shock** – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 below) from the power supplies.



1. Supply (Negative), Brown Wire, –48 VDC
2. Return (Positive), Blue Wire
3. Ground, Green and Yellow Wire
4. DC Power Connector

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

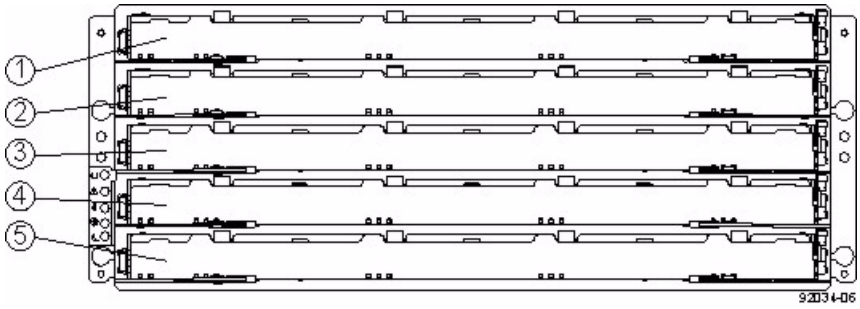
Two (or, optionally, four) DC power connector cables are provided with each controller-drive tray. Two DC power connectors are on the two DC power supplies on the rear of each controller-drive tray if additional redundancy is required.

NOTE It is not mandatory that you connect the second DC power connection on the DC power supplies of the controller-drive tray. The second DC power connection is provided for additional redundancy only and can be connected to a second DC power bus.

Specifications of the E5560 Controller-Drive Tray 9

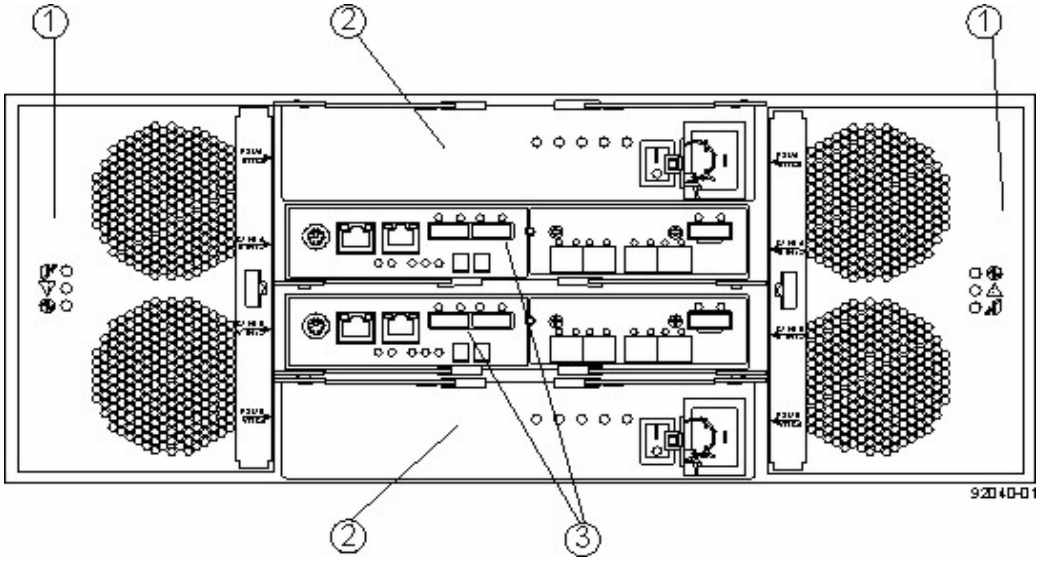
The E5560 controller-drive tray is a high-density SAS 2.0 (6-Gb/s) drive enclosure with 60 near-line 3.5 in. SAS drives, housed in five drawers with 12 drives each.

Figure 38 E5560 Controller-Drive Tray – Front View with Bezel Removed



1. Drive Drawer 1
2. Drive Drawer 2
3. Drive Drawer 3
4. Drive Drawer 4
5. Drive Drawer 5

Figure 39 E5560 Controller-Drive Tray – Rear View

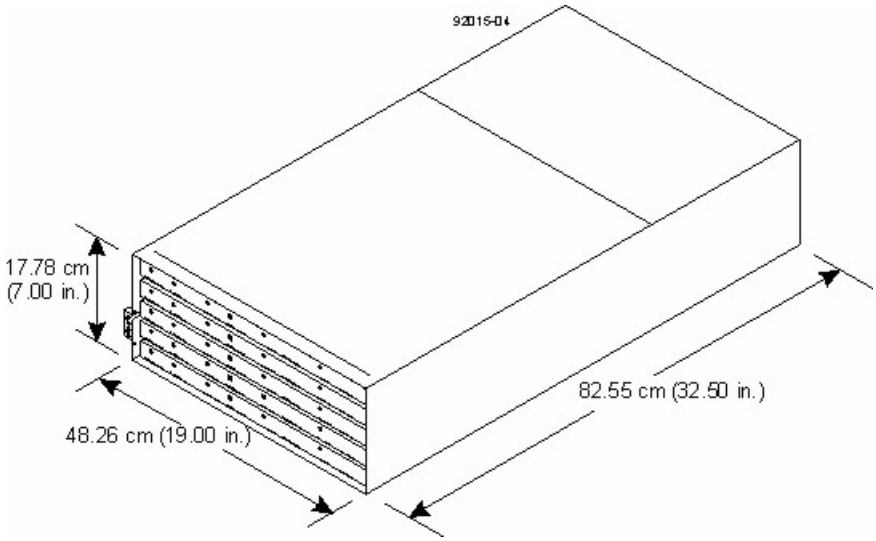


1. Fan Canisters
2. Power Canisters
3. Controller-Drive Tray Canisters

E5560 Controller-Drive Tray Dimensions

The E5560 controller-drive tray conforms to the 48.3-cm (19.0-in.) rack standard.

Figure 40 Dimensions of the E5560 Controller-Drive Tray – Front View



E5560 Controller-Drive Tray Weight

Table 46 Weights of the E5560 Controller-Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
E5560 controller-drive tray	105.2 kg (232 lb)	19.5 kg (43 lb)	193.2 kg (426 lb)

*Maximum weight indicates a controller-drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.3 kg (0.6 lb) times the maximum number of drives per drive tray for drives weighing 0.725 kg (1.6 lb).

**Empty weight indicates a drive tray without the controller canisters, the power canisters, the fan canisters, and the drives.

***Shipping weight indicates the empty weight of a drive tray and all shipping material, as well as the weight of the 60 drives that are shipped separately in multipack cartons.

Table 47 Component Weights of the E5560 Controller-Drive Tray

Component	Weight
Controller canister	2.99 kg (6.60 lb)
Power canister	2.5 kg (5.5 lb)
Fan canister	Approximately 1 kg (2.16 lb)
Drive	0.74 kg (1.64 lb)

E5560 Controller-Drive Tray Shipping Dimensions

Table 48 Shipping Carton Dimensions for the E5560 Controller-Drive Tray

Height	Width	Depth
48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)

E5560 Controller-Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 49 Temperature Requirements and Humidity Requirements for the E5560 Controller-Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 95°F)
	Maximum rate of change	10°C per hour (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C per hour (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C per hour (36°F) per hour

Condition	Parameter	Requirement
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour maximum
	Storage gradient	15°C (59°F) per hour maximum
	Transit gradient	20°C (68°F) per hour maximum
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.1°F) for every 1000 m (3280 ft) above sea level.		

E5560 Controller-Drive Tray Altitude Ranges

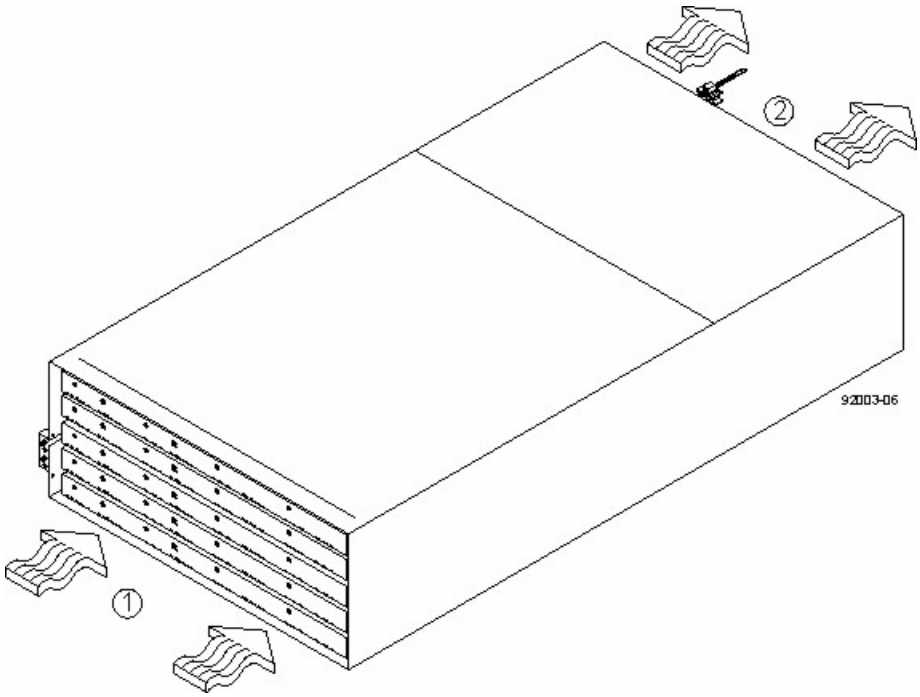
Table 50 Altitude Ranges for the E5560 Controller-Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

E5560 Controller-Drive Tray Airflow and Heat Dissipation

Airflow goes from the front of the E5560 controller-drive tray to the rear of the controller-drive tray. Allow at least 81 cm (32 in.) of clearance in front of the E5560 controller-drive tray and at least 61 cm (24 in.) of clearance behind the controller-drive tray for service clearance, ventilation, and heat dissipation.

Figure 41 Airflow Through the E5560 Controller-Drive Tray – Front View



1. 81 cm (32 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table are the maximum measured operating power.

Table 51 Power Ratings and Heat Dissipation for the E5560 Controller-Drive Tray

Unit	KVA	Watts (AC)	Btu/hr
E5560 controller-drive tray with two power supplies, two controller trays, 60 drives (Seagate 2000-Gb SAS drives and controllers), and two fan canisters, full speed	1.191	1179	4032

E5560 Controller-Drive Tray Acoustic Noise

Table 52 Acoustic Noise at 25°C for the E5560 Controller-Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels
Sound power (normal operation)	6.8 bels
Sound pressure	68 dBA

E5560 Controller-Drive Tray Site Wiring and Power

The E5560 controller-drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral power connections or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the controller-drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The controller-drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

E5560 Controller-Drive Tray Power Input

Each power supply contains one 15-A slow-blow fuse.

Table 53 AC Power Requirements for the E5560 Controller-Drive Tray

Parameter	Low Range	High Range
Nominal voltage	200 VAC	240 VAC
Frequency	50 Hz	60 Hz
Maximum Operating Current	N/A	7.84 A
System Nameplate Rating	6.3 A	7.56 A

E5560 Controller-Drive Tray Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the E5560 controller-drive tray at greater than 0.95 with nominal input voltage.

E5560 Controller-Drive Tray AC Power Cords and Receptacles

Each E5560 controller-drive tray is shipped with two AC power cords, which fit the standard AC outlets in the destination country. Each AC power cord connects one of the power canisters in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

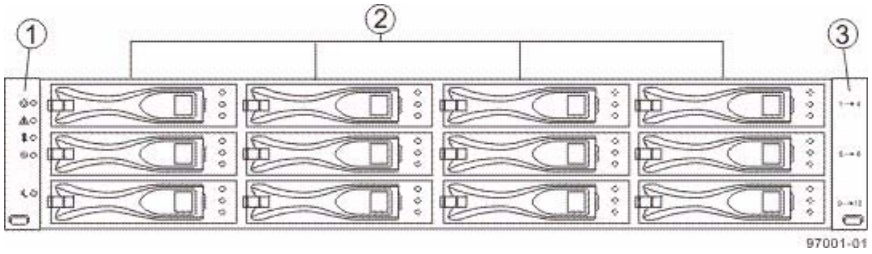
NOTE Possible risk of equipment failure – To ensure proper cooling, the E5560 controller-drive tray always uses two power supplies.

Specifications of the DE1600 Drive Tray 10

The DE1600 drive tray contains Serial Attached SCSI (SAS) drives. Each DE1600 drive tray contains these components:

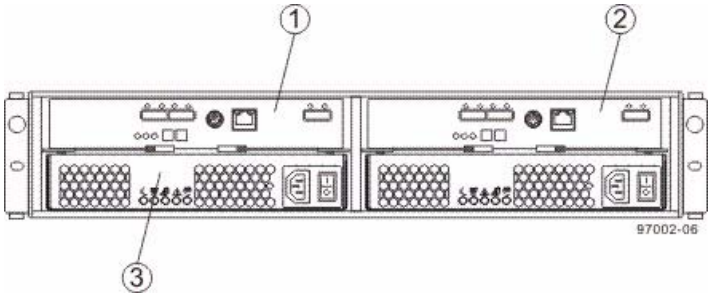
- A maximum of 12 drives
- One or two power-supply fan canisters
- One or two environmental services module (ESM) canisters

Figure 42 DE1600 Drive Tray – Front View



1. End Caps (the Left End Cap Has the Drive Tray LEDs)
2. Drives
3. Right End Cap

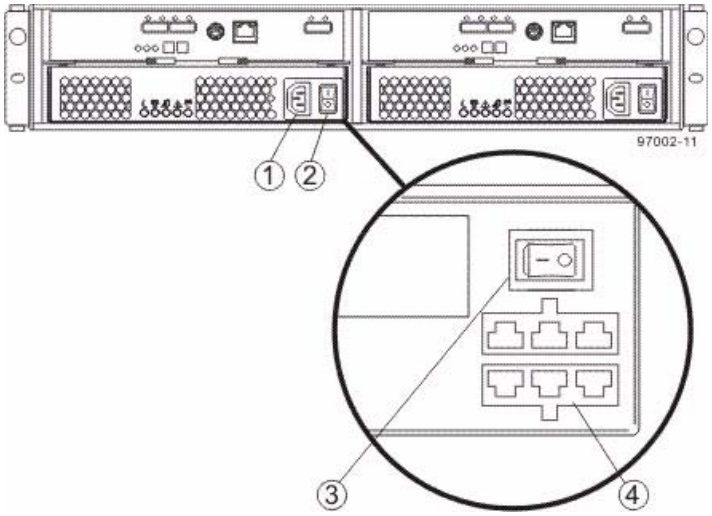
Figure 43 DE1600 Drive Tray – Rear View



1. ESM A Canister
2. ESM B Canister
3. Power-Fan A Canister

Usually, an AC power source supplies power to the power-fan canister. A DC poweroption is also available.

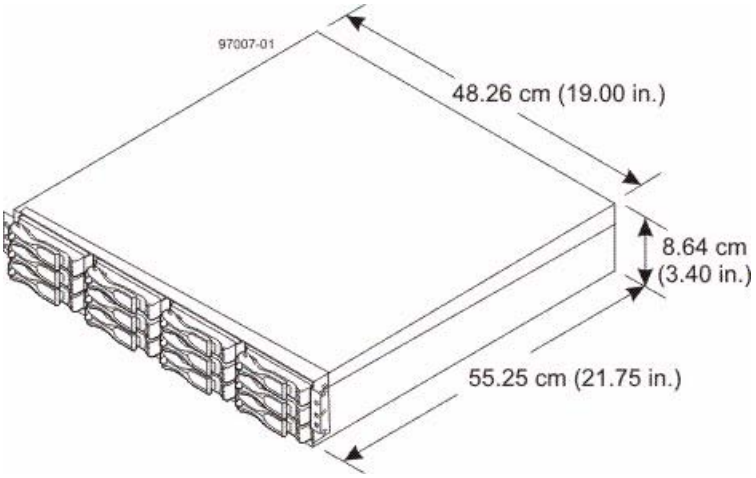
Figure 44 DE1600 Drive Tray – Power Source Options Rear View



1. AC Power Connector on the AC Power-Fan Canister
2. AC Power Switch
3. DC Power Switch on an Optional DC Power-Fan Canister
4. Optional DC Power Connector and DC Power Switch

DE1600 Drive Tray Dimensions

Figure 45 Dimensions of the DE1600 Drive Tray – Front View



DE1600 Drive Tray Weight

Table 54 Weights of the DE1600 Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
DE1600 drive tray	27 kg (59.52 lb)	8.4 kg (18.52 lb)	31.75 kg (70.0 lb)

*Maximum weight indicates a drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.3 kg (0.6 lb) times the maximum number of drives per drive tray for 3.5-in. SAS drives.

**Empty weight indicates a drive tray with the ESM canisters, the power-fan canisters, and the drives removed.

***Shipping weight indicates the maximum weight of a fully-populated drive tray and all shipping material.

Table 55 Component Weights of the DE1600 Drive Tray

Component	Weight
ESM canister	1.75 kg (3.86 lb)
Power-fan canister	2.5 kg (5.51 lb)
3.5-in. SAS drive	1.00 kg (2.20 lb)

DE1600 Drive Tray Shipping Dimensions

Table 56 Drive Tray and Shipping Carton Dimensions for the DE1600 Drive Tray

Height	Width	Depth
24.13 cm (9.5 in.)	58.42 cm (23.00 in.)	68.58 cm (27 in.)

DE1600 Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 57 Temperature Requirements and Humidity Requirements for the DE1600 Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35°C (50°F to 104°F)
	Maximum rate of change	10°C (18°F) per hour
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C (36°F) per hour
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour
	Storage gradient	15°C (59°F) per hour
	Transit gradient	20°C (68°F) per hour
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.3°F) for every 1000 m (3280 ft) above sea level.		

DE1600 Drive Tray Altitude Ranges

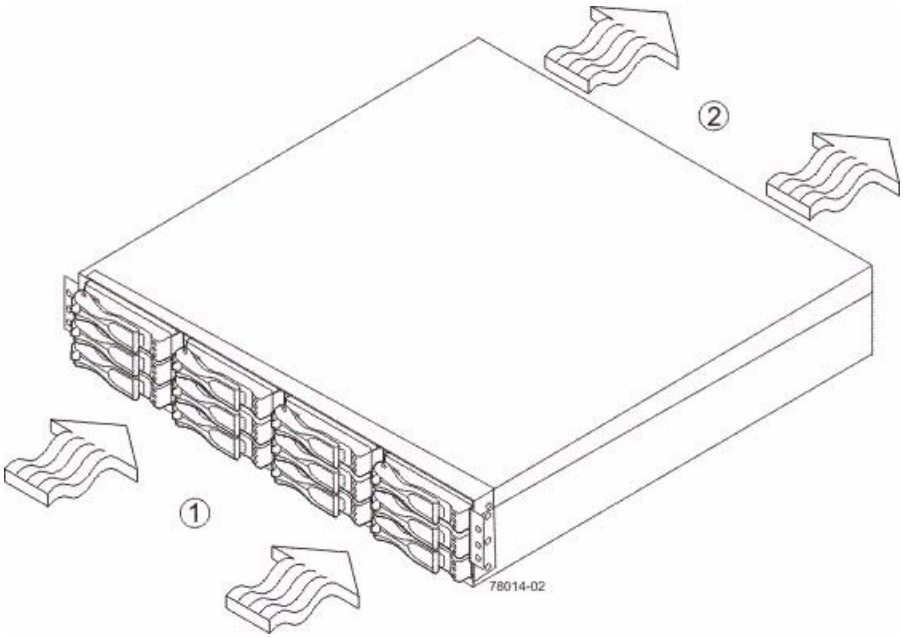
Table 58 Altitude Ranges for the DE1600 Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

DE1600 Drive Tray Airflow and Heat Dissipation

Airflow goes from the front of the drive tray to the rear of the drive tray. Allow at least 76 cm (30 in.) of clearance in front of the drive tray and at least 61 cm (24 in.) of clearance behind the drive tray for service clearance, ventilation, and heat dissipation.

Figure 46 Airflow Through the DE1600 Drive Tray – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table are the maximum measured operating power.

Table 59 Power Ratings and Heat Dissipation for the DE1600 Drive Tray

Unit	KVA	AC Watts	Btu/Hr
DE1600 drive tray	0.276	276	945

DE1600 Drive Tray Acoustic Noise

Table 60 Acoustic Noise at 25°C for the DE1600 Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels maximum
Sound power (normal operation)	6.8 bels maximum

DE1600 Drive Tray Site Wiring and Power

The DE1600 drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source or the optional –48-VDC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral or line-to-line power connections.

NOTE Power for the optional –48-VDC power configuration is supplied by a centralized DC power plant instead of the AC power source in the cabinet. Refer to the associated manufacturer's documentation for specific DC power source requirements.

Keep this information in mind when preparing the installation site for the drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source or the optional –48-VDC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Maximum frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

DE1600 Drive Tray Power Input

AC Power Input

The AC power sources must provide the correct voltage, current, and frequency specified on the tray and serial number label.

Table 61 AC Power Requirements for the DE1600 Drive Tray

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Idle current	2.96 A*	1.23 A**
Maximum operating current	3.03 A*	1.26 A**
Sequential Drive Group Spin Up	4.23 A	1.76 A
Simultaneous Drive Spin Up	4.43 A	1.83 A
System Rating Plate Label	7.0 A	2.9 A
* Typical current: 100 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration. **Typical current: 240 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.		

DC Power Input

Nominal input voltages for the DC power source are as follows:

- Low range: –42VDC
- High range: –60 VDC

The maximum operating current is 21.7 A.

DE1600 Drive Tray Power Factor Correction

Power factor correction is applied within the power supply of each DE1600 drive tray, which maintains the power factor of the drive tray at greater than 0.95 with nominal input voltage.

DE1600 Drive Tray AC Power Cords and Receptacles

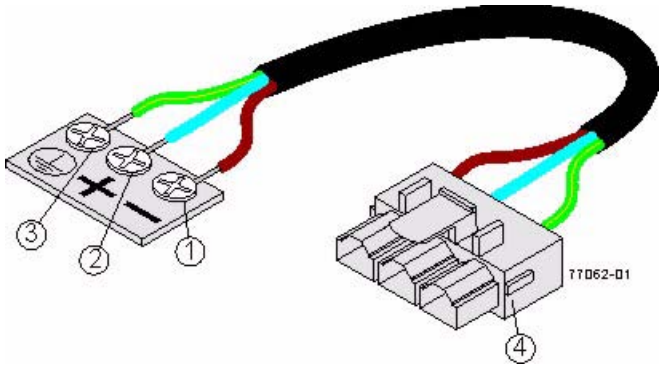
Each DE1600 drive tray is shipped with two AC power cords, which use standard AC outlets in the destination country. Each AC power cord connects one of the power supplies in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

DC power is an option that is available for use with your DE1600 drive tray. For more information, see "DE1600 Drive Tray Optional DC Power Connector Cables and Source Wires."

DE1600 Drive Tray Optional DC Power Connector Cables and Source Wires

The DE1600 drive tray is shipped with –48-VDC power connector cables if the DC power option is ordered. The –48-VDC power connector cable plugs into the DC power connector on the rear of the drive tray. The three source wires on the other end of the power connector cable connect the drive tray to centralized DC power plant equipment, typically through a bus bar above the cabinet.

WARNING (W12) **Risk of electrical shock** – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 below) from the power supplies.



1. Supply (Negative), Brown Wire, –48 VDC
2. Return (Positive), Blue Wire
3. Ground, Green and Yellow Wire
4. DC Power Connector

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

Two (or, optionally, four) DC power connector cables are provided with each drive tray. Two DC power connectors are on the two power-fan canisters on the rear of each drive tray if additional redundancy is required.

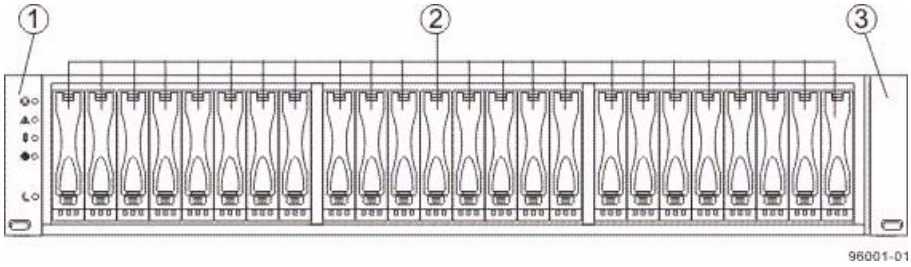
NOTE It is not mandatory that you connect the second DC power connection on the power-fan canister of the drive tray. The second DC power connection is provided for additional redundancy only and can be connected to a second DC power bus.

Specifications of the DE5600 Drive Tray 11

The DE5600 drive tray contains Serial Attached SCSI (SAS) drives. Each DE5600 drive tray contains these components:

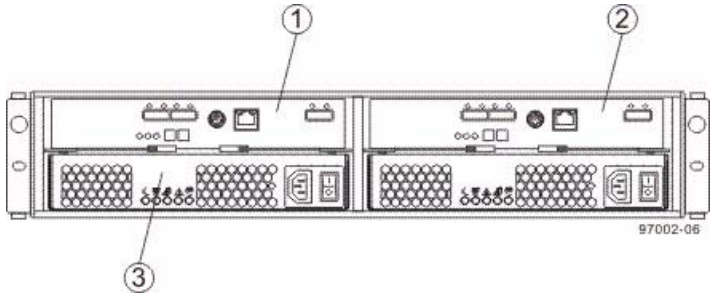
- A maximum of 24 drives
- One or two power-supply fan canisters
- One or two environmental services module (ESM) canisters

Figure 47 DE5600 Drive Tray – Front View



1. Left End Cap (Has the Drive Tray LEDs)
2. Drives
3. Right End Cap

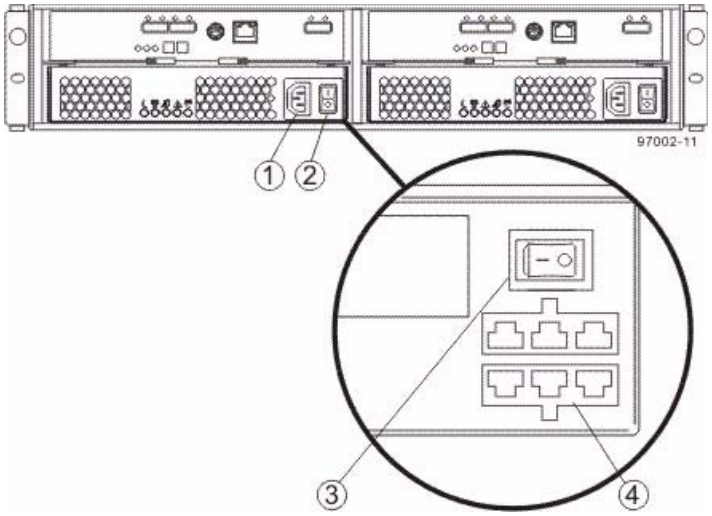
Figure 48 DE5600 Drive Tray – Rear View



1. ESM A Canister
2. ESM B Canister
3. Power-Fan Canister

Usually, an AC power source supplies power to the power-fan canister. A DC power option is also available.

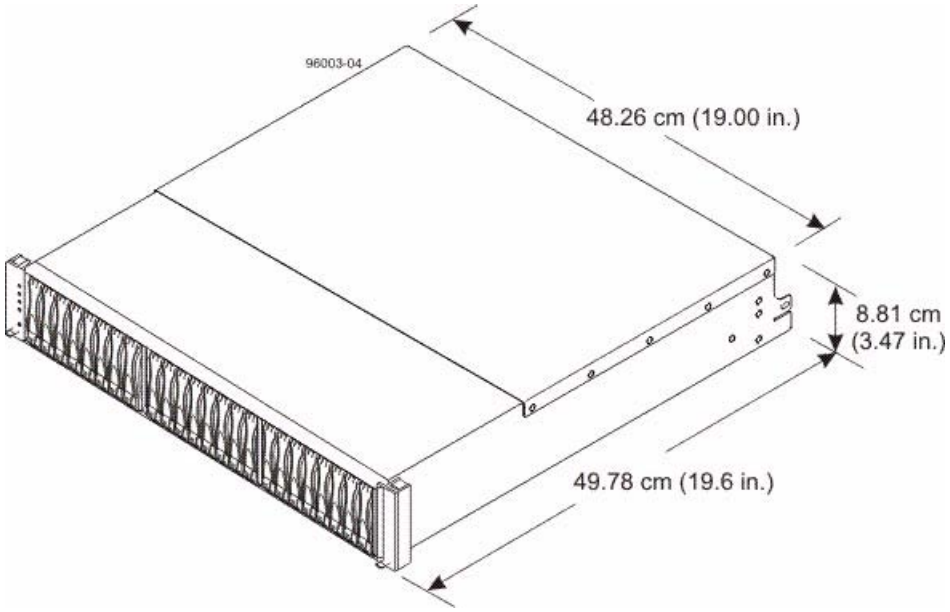
Figure 49 DE5600 Drive Tray Power Source Options – Rear View



1. AC Power Switch on the AC Power-Fan Canister
2. AC Power Connector
3. DC Power Switch on an Optional DC Power-Fan Canister
4. DC Power Connector

DE5600 Drive Tray Dimensions

Figure 50 Dimensions of the DE5600 Drive Tray – Front View



DE5600 Drive Tray Weight

Table 62 Weights of the DE5600 Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
DE5600 drive tray	26 kg (57.32 lb)	21.70 kg (47.84 lb)	31.75 kg (70.0 lb)
*Maximum weight indicates a drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.08 kg (0.18 lb) times the maximum number of drives per drive tray for 2.5-in. SAS drives. **Empty weight indicates a drive tray with the ESM canisters, the power-fan canisters, and the drives removed. ***Shipping weight indicates the maximum weight of a fully-populated drive tray and all shipping material.			

Table 63 Component Weights of the DE5600 Drive Tray

Component	Weight
ESM canister	0.907 kg (2.00 lb)
Power-fan canister	2.500 kg (5.51 lb)
2.5-in. SAS drive	0.3 kg (0.6 lb)

DE5600 Drive Tray Shipping Dimensions

Table 64 Drive Tray and Shipping Carton Dimensions for the DE5600 Drive Tray

Height	Width	Depth
24.13 cm (9.5 in.)	58.42 cm (23.00 in.)	63.50 cm (25 in.)

DE5600 Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 65 Temperature Requirements and Humidity Requirements for the DE5600 Drive Tray

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 35° C 50°F to 104°F)
	Maximum rate of change	10°C (18°F) per hour]
	Storage range	–10°C to 50°C (14°F to 122°F)
	Maximum rate of change	15°C (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140°F)
	Maximum rate of change	20°C (36°F) per hour
Relative humidity (no condensation)	Operating range (both cabinet and subsystem)	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 90%
	Operating gradient	10°C (50°F) per hour
	Storage gradient	15°C (59°F) per hour
	Transit gradient	20°C (68°F) per hour
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.3°F) for every 1000 m (3280 ft) above sea level.		

DE5600 Drive Tray Altitude Ranges

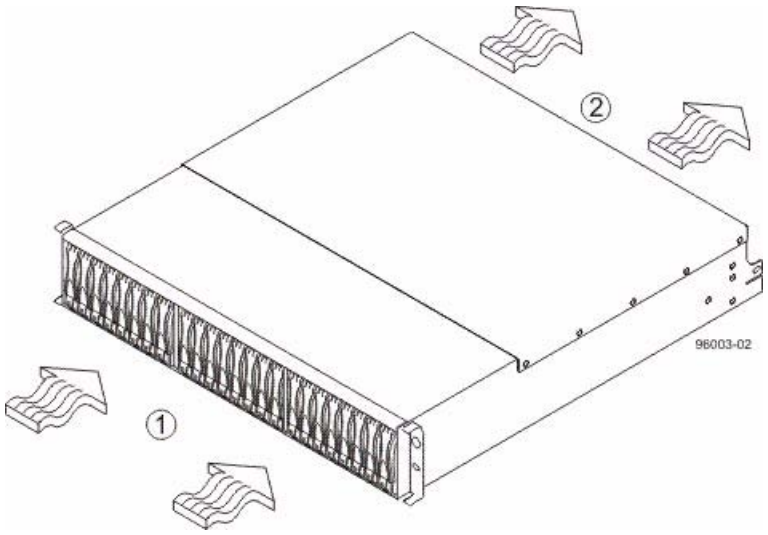
Table 66 Altitude Ranges for the DE5600 Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9840 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

DE5600 Drive Tray Airflow and Heat Dissipation

Airflow goes from the front of the drive tray to the rear of the drive tray. Allow at least 76 cm (30 in.) of clearance in front of the drive tray and at least 61 cm (24 in.) of clearance behind the drive tray for service clearance, ventilation, and heat dissipation.

Figure 51 Airflow Through the DE5600 Drive Tray – Front View



1. 76 cm (30 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table are the maximum measured operating power.

Table 67 Power Ratings and Heat Dissipation for the DE5600 Drive Tray

Unit	KVA	Watts (AC)	Btu/Hr
DE5600 drive tray	0.241	240.1	821

DE5600 Drive Tray Acoustic Noise

Table 68 Acoustic Noise at 25°C for the DE5600 Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels maximum
Sound power (normal operation)	6.8 bels maximum

DE5600 Drive Tray Site Wiring and Power

The DE5600 drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source or the optional –48-VDC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral or line-to-line power connections.

NOTE Power for the optional –48-VDC power configuration is supplied by a centralized DC power plant instead of the AC power source in the cabinet. Refer to the associated manufacturer's documentation for specific DC power source requirements.

Keep this information in mind when preparing the installation site for the drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source or the optional –48-VDC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.
- **Power interruptions** – The drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Maximum frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

DE5600 Drive Tray AC Power Input

AC Power Input

The AC power sources must provide the correct voltage, current, and frequency specified on the tray and serial number label.

Table 69 AC Power Requirements for the DE5600 Drive Tray

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Idle current	2.96 A*	1.23 A**
Maximum operating current	3.03 A*	1.26 A**
Sequential Drive Group Spin Up	4.23 A	1.76 A
Simultaneous Drive Spin Up	4.43 A	1.83 A
System Rating Plate Label	7.0 A	2.9 A
* Typical current: 100 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration. **Typical current: 240 VAC, 60 Hz at 0.87 power supply efficiency and 0.99 power factor. These numbers can vary significantly, depending upon the drives tested in the particular configuration.		

DC Power Input

Nominal input voltages for the DC power source are as follows:

- Low range: –42 VDC
- High range: –60 VDC

The maximum operating current is 21.7 A.

DE5600 Drive Tray Power Factor Correction

Power factor correction is applied within the power supply of each DE5600 drive tray, which maintains the power factor of the drive tray at greater than 0.95 with nominal input voltage.

DE5600 Drive Tray AC Power Cords and Receptacles

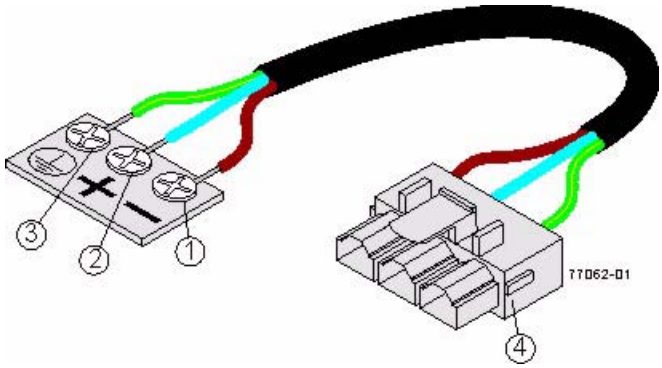
Each DE5600 drive tray is shipped with two AC power cords, which use the standard AC outlets in the destination country. Each AC power cord connects one of the power supplies in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

DC power is an option that is available for use with your DE5600 drive tray. For more information, see "DE5600 Drive Tray Optional DC Power Connector Cables and Source Wires."

DE5600 Drive Tray Optional DC Power Connector Cables and Source Wires

The DE5600 drive tray is shipped with –48-VDC power connector cables if the DC power option is ordered. The –48-VDC power connector cable plugs into the DC power connector on the rear of the drive tray. The three source wires on the other end of the power connector cable connect the drive tray to centralized DC power plant equipment, typically through a bus bar above the cabinet.

WARNING (W12) **Risk of electrical shock** – This unit has more than one power source. To remove all power from the unit, all DC MAINS must be disconnected by removing all power connectors (item 4 below) from the power supplies.



1. Supply (Negative), Brown Wire, –48 VDC
2. Return (Positive), Blue Wire
3. Ground, Green and Yellow Wire
4. DC Power Connector

WARNING (W14) **Risk of bodily injury** – A qualified service person is required to make the DC power connection according to NEC and CEC guidelines.

Two (or, optionally, four) DC power connector cables are provided with each drive tray. Two DC power connectors are on the two power-fan canisters on the rear of each drive tray if additional redundancy is required.

NOTE It is not mandatory that you connect the second DC power connection on the power-fan canister of the drive tray. The second DC power connection is provided for additional redundancy only and can be connected to a second DC power bus.

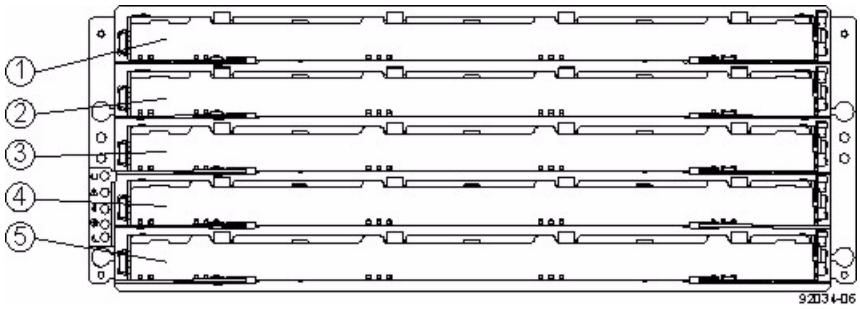
Specifications of the DE6600 Drive Tray 12

The DE6600 drive tray is a high-density SAS 2.0 (6Gb/s) drive enclosure with 60 near-line 3.5” SAS drives, housed in five drawers with 12 drives each.

The DE6600 drive tray contains these components:

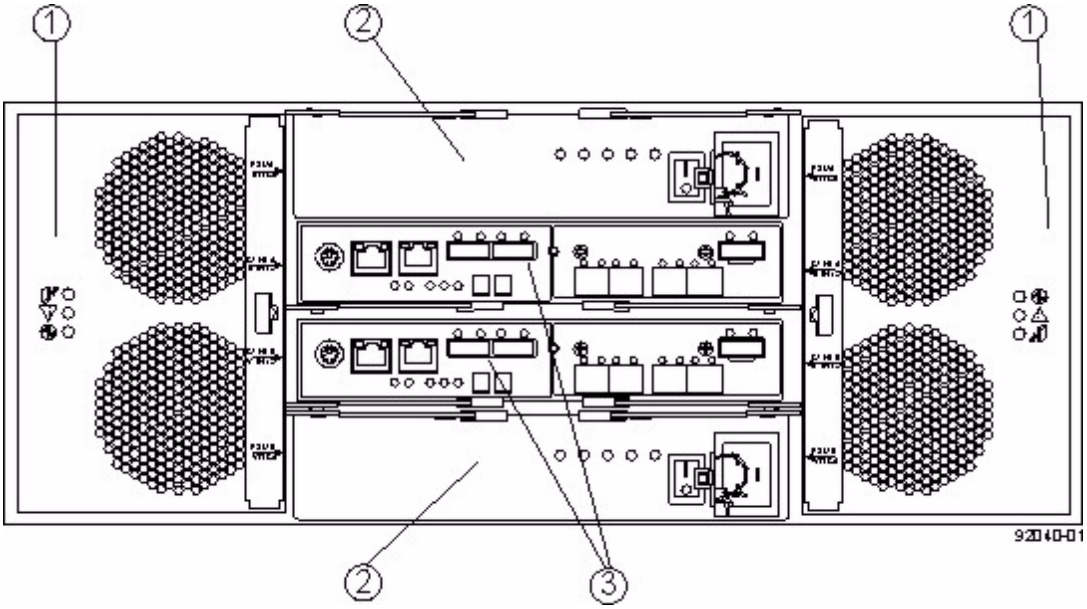
- Up to 60 SAS drives
- Two power canisters
- Two fan canisters
- Two environmental services module (ESM) canisters

Figure 52 DE6600 Drive Tray – Front View with Bezel Removed



1. Drive Drawer 1
2. Drive Drawer 2
3. Drive Drawer 3
4. Drive Drawer 4
5. Drive Drawer 5

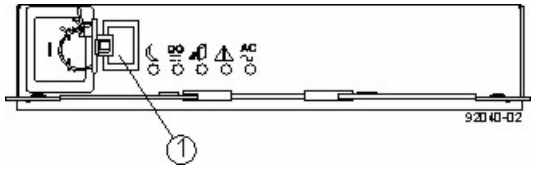
Figure 53 DE6600 Drive Tray – Rear View



1. Fan Canisters
2. Power Canisters
3. ESM Canisters

An AC power source supplies power to the power canister.

Figure 54 Power Source Options for the DE6600 Drive Tray – Rear View



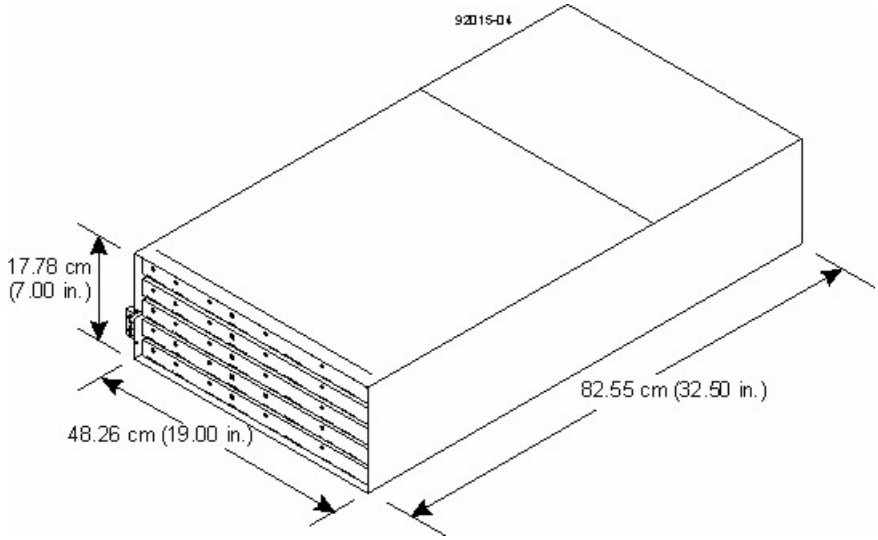
1. AC Power Switch on the Power Canister

The drive trays come with drive interface ports that enable you to establish up to four drive channels when using the CE7900 controller tray for your disk storage solution.

DE6600 Drive Tray Dimensions

The DE6600 drive tray is only available as a rackmount model that conforms to the 100-cm (40.0-in.) rack depth.

Figure 55 Dimensions of the DE6600 Drive Tray – Front View



DE6600 Drive Tray Weight

Table 70 Weights of the DE6600 Drive Tray

Unit	Weight		
	Maximum*	Empty**	Shipping***
DE6600 drive tray	105.2 kg (232 lb)	19.5 kg (43 lb)	193.2 kg (426 lb)

*Maximum weight indicates a drive tray with all of its drives and other components installed. Because drive weights can vary greatly, this value can vary from the value specified as much as 0.3 kg (0.6 lb) times the maximum number of drives per drive tray for drives weighing 0.725 kg (1.6 lb).

**Empty weight indicates a drive tray with the ESM canisters, the power canisters, the fan canisters, and the drives removed.

***Shipping weight indicates the empty weight of a drive tray and all shipping material, as well as the weight of the 60 drives that are shipped separately in multipack cartons.

Table 71 Component Weights of the DE6600 Drive Tray

Component	Weight
ESM canister	1.65 kg (3.64 lb)
Power canister	2.5 kg (5.5 lb)
Fan canister	Approximately 1 kg (2.16 lb)
Drive	0.74 kg (1.64 lb)

DE6600 Drive Tray Shipping Dimensions

Table 72 Shipping Carton Dimensions for the DE6600 Drive Tray

Height	Width	Depth
48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)

DE6600 Drive Tray Temperature and Humidity

NOTE Converting Maximum Rate of Change requires converting between Fahrenheit and Celsius first, and then subtracting the difference.

Table 73 Temperature Requirements and Humidity Requirements for the DE6600 Drive Tray

Condition	Parameter	Requirement
Temperature*	Operating range	0°C to 35°C (32°F to 95°F)
	Maximum rate of change	10°C (18°F) per hour
	Storage range	–10°C to 50°C (95°F to 122°F)
	Maximum rate of change	15°C (27°F) per hour
	Transit range	–40°C to 60°C (–40°F to 140° F) without the battery
	Maximum rate of change	20°C (32°F) per hour
Relative humidity (no condensation)	Operating range	20% to 80%
	Storage range	10% to 90%
	Transit range	5% to 95%
	Maximum dew point	26°C (79°F)
	Maximum gradient	10% per hour
*If you plan to operate a system at an altitude between 1000 m to 3000 m (3280 ft to 9842 ft) above sea level, lower the environmental temperature 1.7°C (3.3°F) for every 1000 m (3280 ft) above sea level.		

DE6600 Drive Tray Altitude Ranges

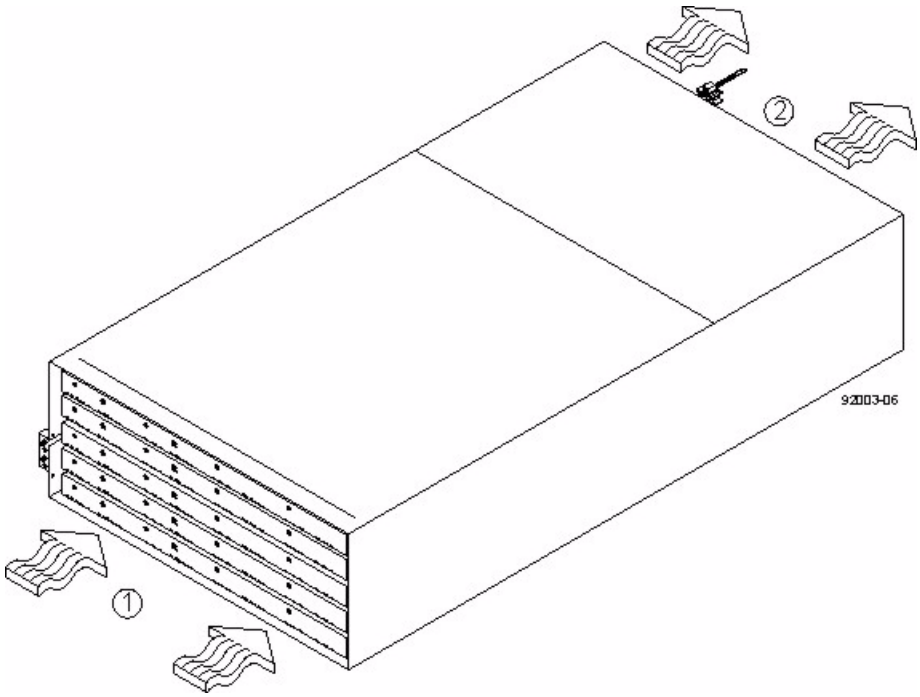
Table 74 Altitude Ranges for the DE6600 Drive Tray

Environment	Altitude
Operating	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3000 m (9842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level

DE6600 Drive Tray Airflow and Heat Dissipation

Airflow goes from the front of the drive tray to the rear of the drive tray. Allow at least 81 cm (32 in.) of clearance in front of the drive tray and at least 61 cm (24 in.) of clearance behind the drive tray for service clearance, ventilation, and heat dissipation.

Figure 56 Airflow Through the DE6600Drive Tray – Front View



1. 81 cm (32 in.) clearance in front of the cabinet
2. 61 cm (24 in.) clearance behind the cabinet

The tabulated power and heat dissipation values in the following table represent the maximum measured operating power.

Table 75 Power Ratings and Heat Dissipation for the DE6600 Drive Tray

Unit	KVA	Watts (AC)	Btu/hr
DE6600 drive tray with two power supplies, two ESMs, 60 drives (Seagate 2000-Gb SAS drives and controllers), and two fan canisters, full speed	1.268	1222	4180

DE6600 Drive Tray Acoustic Noise

Table 76 Sound Levels for the DE6600 Drive Tray

Measurement	Level
Sound power (standby operation)	6.5 bels
Sound power (normal operation)	6.8 bels
Sound pressure	68 dBA

DE6600 Drive Tray Site Wiring and Power

The agency ratings for the DE6600 drive tray are 7.56 A at 200 VAC and 6.3 A at 240 VAC. These ratings are the overall maximum AC currents for this system.

The DE6600 drive tray uses wide-ranging, redundant power supplies that automatically accommodate voltages to the AC power source. The power supplies meet standard voltage requirements for both North American (USA and Canada) operation and worldwide (except USA and Canada) operation. The power supplies use standard industrial wiring with line-to-neutral power connections or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the drive tray:

- **Protective ground** – Site wiring must include a protective ground connection to the AC power source.

NOTE *Protective ground* is also known as safety ground or chassis ground.

- **Circuit overloading** – Power circuits and associated circuit breakers must provide enough power and overload protection. To prevent damage to the drive tray, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.

- **Power interruptions** – The drive tray can withstand these applied voltage interruptions:
  - **Input transient** – 50 percent of the nominal voltage
  - **Duration** – One-half cycle
  - **Maximum frequency** – Once every 10 seconds
- **Power failures** – If a total power failure occurs, the drive tray automatically performs a power-on recovery sequence without operator intervention after the power is restored.

DE6600 Drive Tray Power Input

Each power supply contains one 15-A slow-blow fuse.

Table 77 AC Power Requirements for the DE6600 Drive Tray

Parameter	High Range
Nominal voltage	200 to 240 VAC
Frequency	50 to 60 Hz
Idle current	6.0 A
Maximum operating current	7.56 A
Maximum surge current	8.0 A

DE6600 Drive Tray Power Factor Correction

Power factor correction is applied within the power canister of each DE6600 drive tray, which maintains the power factor of the drive tray at no less than 0.95 with at all input voltage levels.

DE6600 Drive Tray AC Power Cords and Receptacles

Each DE6600 drive tray is shipped with two AC power cords, which fit the standard AC outlets in the destination country. Each AC power cord connects one of the power canisters in the drive tray to an independent, external AC power source, such as a wall receptacle, or to any uninterruptible power supply (UPS).

ATTENTION Possible risk of equipment failure – To ensure proper cooling, the DE6600 drive tray always uses two power supplies.

Regulatory Compliance Statements

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

NetApp, Inc. is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NetApp. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

Laser Products Statement

This equipment uses Small Form-factor Pluggable (SFP) optical transceivers, which are unmodified Class 1 laser products pursuant to 21 CFR, Subchapter J, Section 1040.10. All optical transceivers used with this product are required to be 21 CFR certified Class 1 laser products. For outside the USA, this equipment has been tested and found compliant with Class 1 laser product requirements contained in European Normalization standard EN 68025 1:2007. Class 1 levels of laser radiation are not considered to be hazardous and are considered safe based upon current medical knowledge. This class includes all lasers or laser systems which cannot emit levels of optical radiation above the exposure limits for the eye under any exposure conditions inherent in the design of the laser products.

NetApp, Inc. is not responsible for any damage or injury caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NetApp. It is the user's responsibility to correct interference caused by such unauthorized modification, substitution, or attachment.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classé A respecte toutes les exigences du Règlement sure le matèriel brouilleur du Canada.

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