

# Quantum<sup>®</sup>

## Site Planning Guide

Quantum StorNext  
QS1200/QS2400/QD6000/QD7000



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# About this guide

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This guide includes information about the supported controllers and drive trays as well as key specification information for each one. Use this guide to prepare your site for the installation of controllers and drive trays into an industry standard cabinet.

The storage products include:

- QS1200 (12-drive chassis)
- QS2400 (24-drive chassis)
- QD6000 (60-drive chassis)
- QD7000 (60-drive chassis)

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## Intended audience

This guide is intended for storage customers and technicians.

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**NOTE:** This guide is based on the assumption that your storage cabinet is already installed within your location.

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## Prerequisites

Prerequisites for installing and using this product include knowledge of:

- Servers and computer networks
- Network administration
- Storage system installation and configuration
- Storage area network (SAN) management and direct attach storage (DAS)
- Fibre Channel (FC) and Ethernet protocols

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# Document conventions and symbols

**Table 1** Document conventions


Convention	Element
Blue text	Cross-reference links and e-mail addresses
<u>Blue, underlined text</u>	Web site addresses
Bold text	<ul style="list-style-type: none"><li>• Key names</li><li>• Text typed into a GUI element, such as into a box</li><li>• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes</li></ul>
<i>Italic text</i>	Text emphasis
Monospace text	<ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Text typed at the command-line</li></ul>
<i>Monospace, italic text</i>	<ul style="list-style-type: none"><li>• Code variables</li><li>• Command-line variables</li></ul>
<b>Monospace, bold text</b>	Emphasis of file and directory names, system output, code, and text typed at the command-line

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 **CAUTION:** Indicates that failure to follow directions could result in damage to equipment or data.

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 **IMPORTANT:** Provides clarifying information or specific instructions.

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**NOTE:** Provides additional information.

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 **TIP:** Provides helpful hints and shortcuts.

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# QS1200 and QS2400 Systems

This chapter provides specifications for the QS1200 and QS2400 systems.

## QS1200 and QS2400 Base System Components

The QS1200 and QS2400 base systems use high-density SAS 2.0 (6-Gb/s) drive enclosure available in a rack-mount model. The QS1200 system has a capacity of twelve 3.5-in. SAS drives. The QS2400 system has a capacity of twenty-four 2.5-in. SAS drives.

The QS1200 and QS2400 base systems and expansion units provide high-capacity disk storage for Fibre Channel, Infiniband, SAS and iSCSI environments, depending on the choice of the host interface card.

### QS1200 Base System Front View

Figure 1 provides a front view of the QS1200 base system.

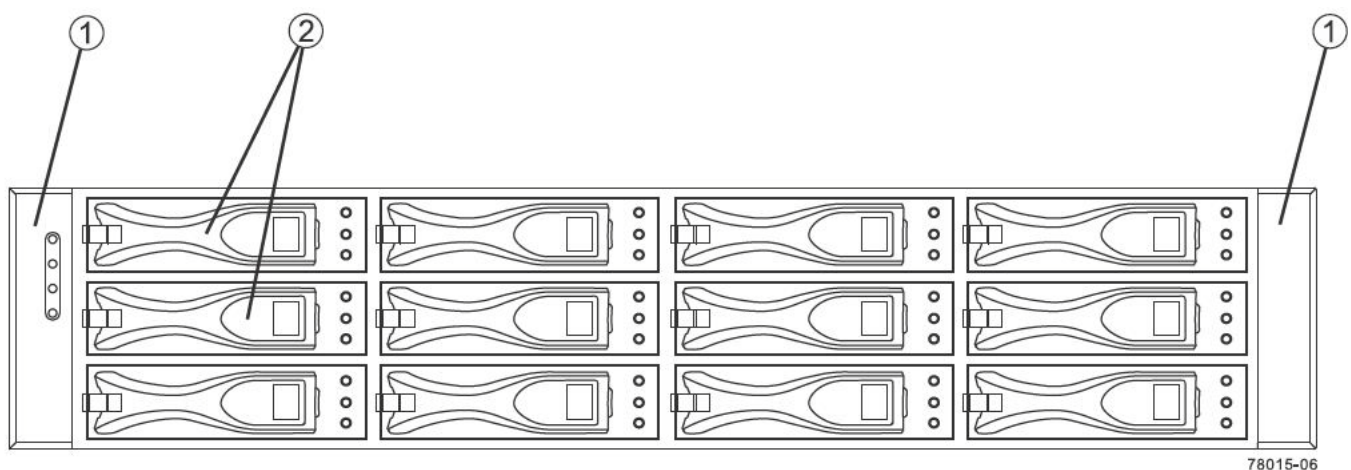


Figure 1 QS1200 Base System (front)

- 1 End caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
- 2 Disk drives

## QS2400 Base System Front View

Figure 2 provides a front view of the QS2400 base system.

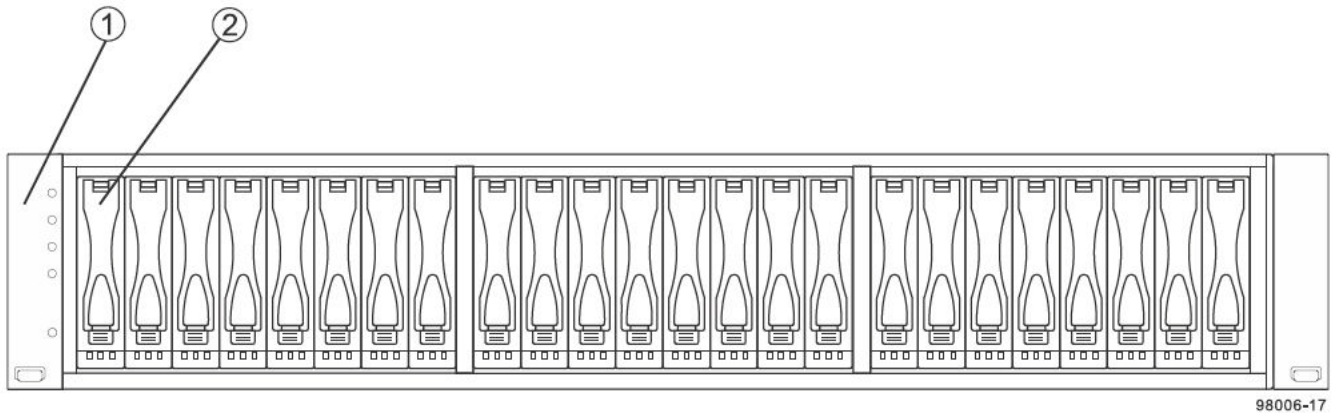


Figure 2 QS2400 Base System (front)

- 1 End caps (the Left End Cap Has the Controller-Drive Tray Summary LEDs)
- 2 Disk drives

## QS1200/QS2400 Base System Rear View

Figure 3 provides a rear view of the QS1200/QS2400 base system.

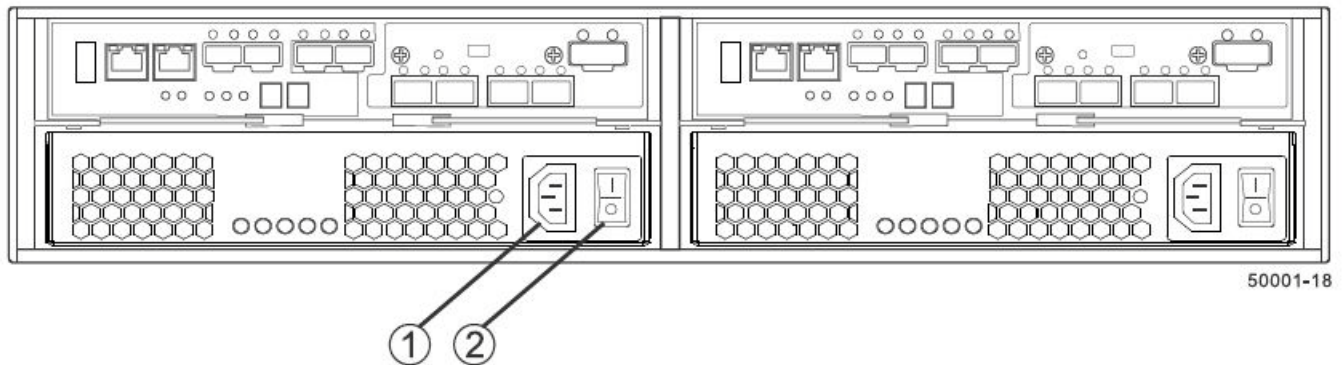


Figure 3 QS1200/QS2400 Base System (rear)

- 1 AC Power Connector on the AC Power-Fan Canister
- 2 AC Power Switch

# QS1200/QS2400 Base System Dimensions

This section provides dimensions for the QS1200 and QS2400 base system.

## QS1200 Base System Dimensions

Figure 4 provides the dimensions of the QS1200 base system. The QS1200 base system conform to the 48.3-cm (19.0-in.) rack standard.

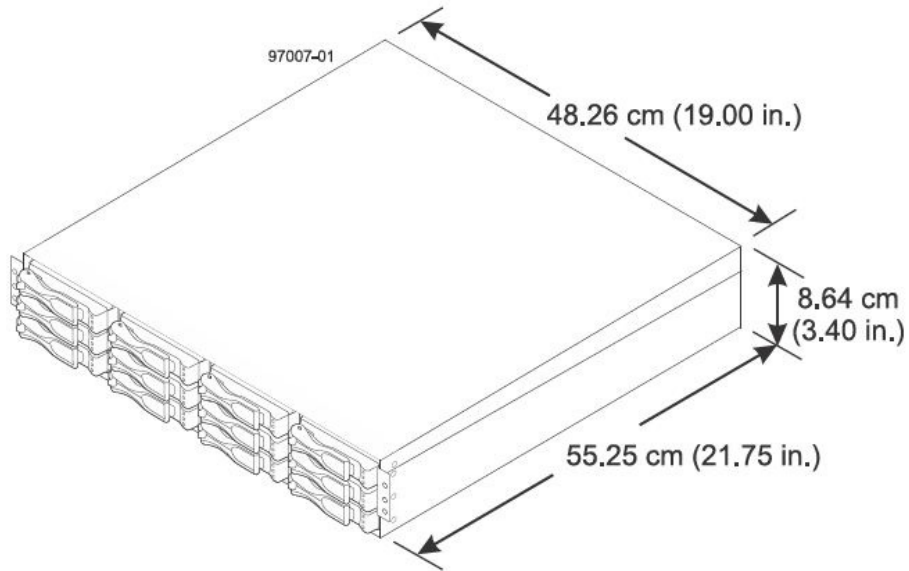


Figure 4 QS1200 Base System Dimensions

## QS2400 Base System Dimensions

Figure 5 provides the dimensions of the QS2400 base system. The QS2400 base system conform to the 48.3-cm (19.0-in.) rack standard.

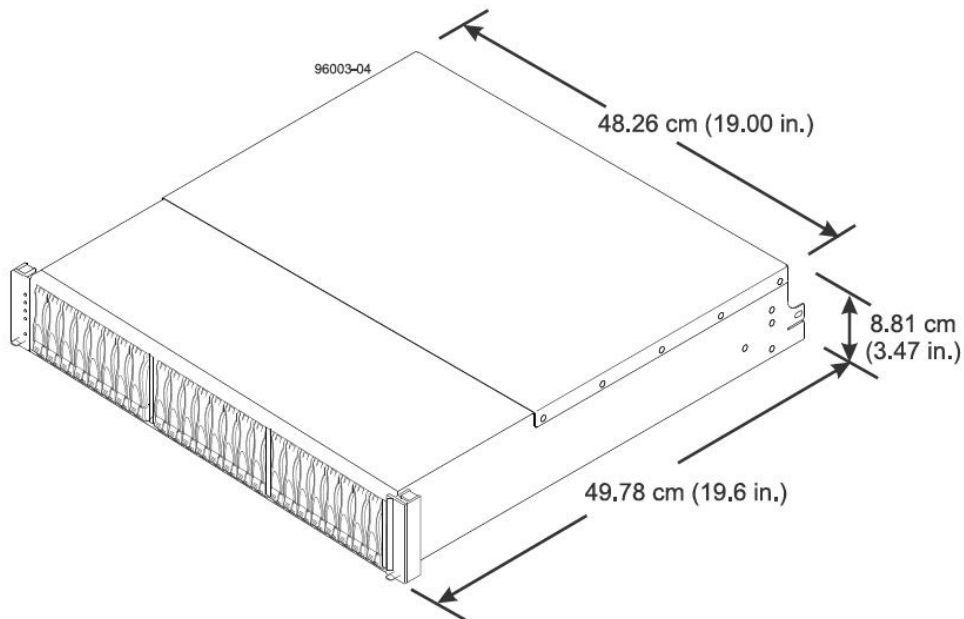


Figure 5 QS2400 Base System Dimensions

# QS1200/QS2400 Base System Weights

This section provides the weight of the QS1200 and QS2400 base system and their internal components.

## QS1200/QS2400 Base System Weight (Max/Shipping)

Table 2 provides the weight of the QS1200 and QS2400 base system.

**Table 2** QS1200/QS2400 Base System Weight

Unit	Maximum Weight <sup>1</sup>	Empty Weight <sup>2</sup>	Shipping Weight <sup>3</sup>
QS1200 Base System with twelve 8.89-cm (3.5-in.) SAS disk drives	27 kg (59.52 lb)	18.60 kg (41.01 lb)	31.75 kg (70.0 lb)
QS2400 Base System with twenty-four 6.35-cm (2.5-in.) SAS disk drives	26 kg (57.32 lb)	21.70 kg (47.84 lb)	31.75 kg (70.0 lb)

1. Maximum weight indicates a base system/expansion unit 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. SAS drives or 0.08 kg (0.18 lb) times the maximum number of drives per base system/expansion unit for 2.5-in. SAS drives.
2. Empty weight indicates a controller-drive tray with the controller canisters, the power-fan canisters, and the drives removed.
3. Shipping weight indicates the maximum weight of the controller-drive tray and all shipping material.

## QS1200/QS2400 Base System Component Weights

Table 3 provides the component weights of the QS1200 and QS2400 base system.

**Table 3** QS1200/QS2400 Base System Component Weights

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

# QS1200/QS2400 Base System Shipping Dimensions

Table 4 provides the shipping dimensions of the QS1200 and QS2400 base system.

Table 4 QS1200/QS2400 Base System Shipping Weights

Unit	Height	Width	Depth
QS1200 Base System with twelve 8.89-cm (3.5-in.) SAS disk drives	24.13 cm (9.5 in.)	63.50 cm (25 in.)	58.42 cm (23 in.)
QS2400 Base System with twenty-four 6.35-cm (2.5-in.) SAS disk drives	24.13 cm (9.5 in.)	68.58 cm (27 in.)	58.42 cm (23 in.)

# QS1200/QS2400 Base System Temperature and Humidity Requirements

Table 5 provides the temperature and humidity requirements of the QS1200 and QS2400 base system.

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

Table 5 QS1200/QS2400 Base System Temperature and Humidity Requirements

Condition	Parameter	Requirement
Temperature	Operating range (both cabinet and subsystem)	10°C to 40°C (50°F to 104°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

**Table 5** QS1200/QS2400 Base System Temperature and Humidity Requirements

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

**Note:** 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.

## QS1200/QS2400 Base System Altitude Ranges

Table 6 provides the altitude ranges of the QS1200 and QS2400 base system.

**Table 6** QS1200/QS2400 Base System Altitude Ranges

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



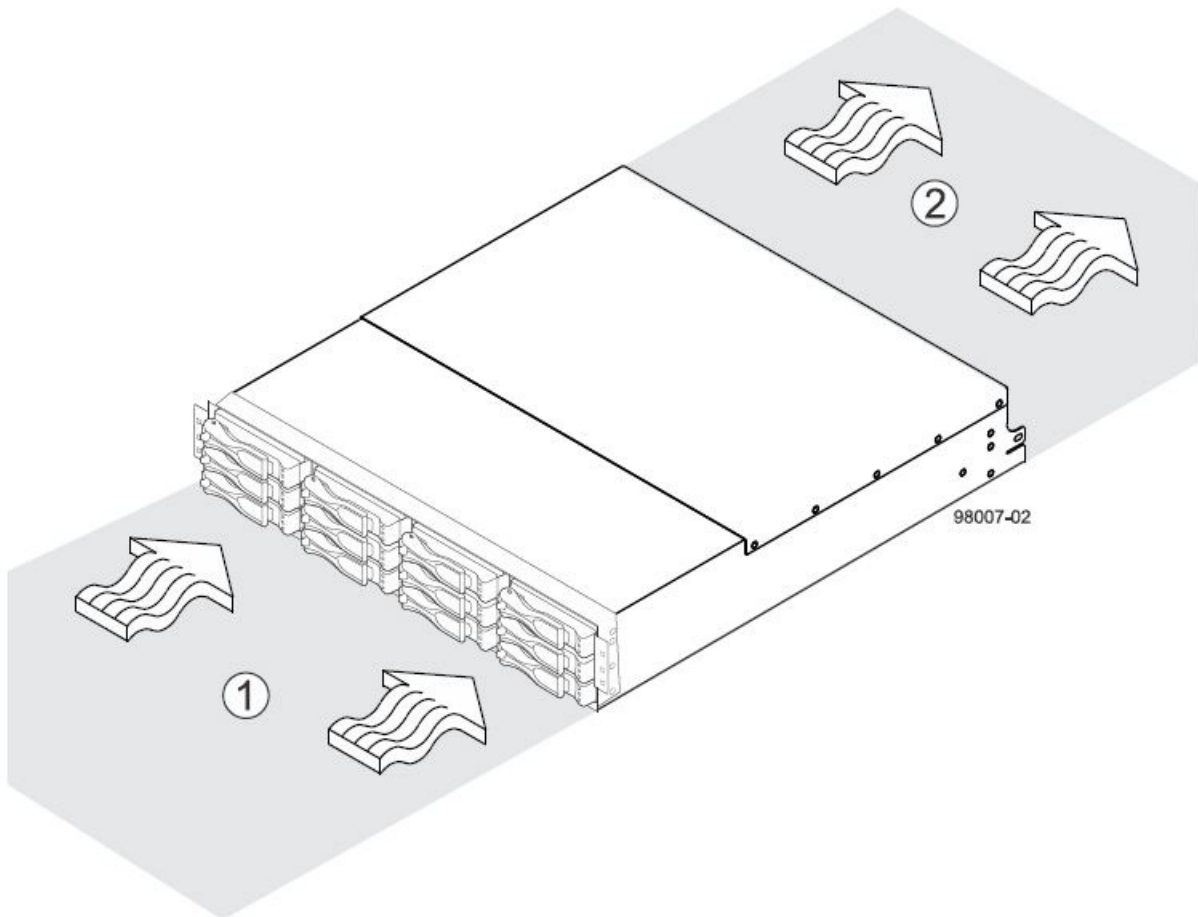
# QS1200/QS2400 Base System Airflow/Heat Dissipation and Power Requirements

This section provides airflow, heat dissipation and power requirements for the QS1200/QS2400 base system.

## Airflow and Heat Dissipation

Allow at least 76 cm (30 in.) of clearance in front of the QS1200/QS2400 base system and 61 cm (24 in.) behind the QS1200/QS2400 base system for service clearance, ventilation, and heat dissipation.

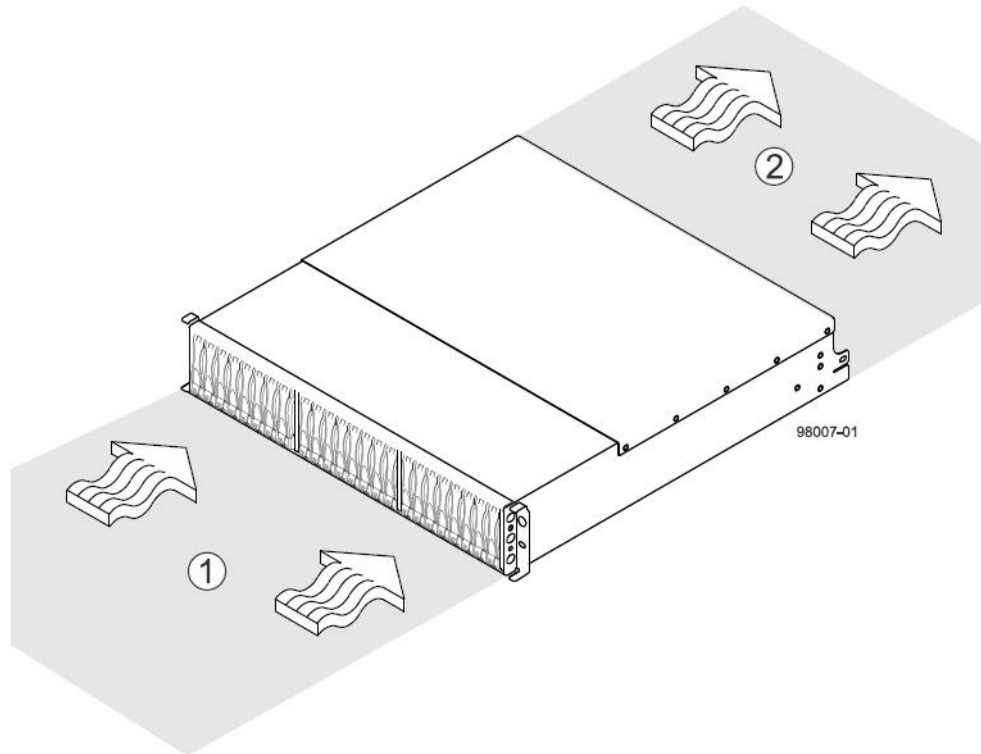
Figure 6 provides the airflow and heat dissipation of the QS1200 base system.



**Figure 6** QS1200 Base System Airflow

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

Figure 7 provides the airflow and heat dissipation of the QS2400 base system.



**Figure 7** QS2400 Base System Airflow

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

## Power Requirements

Table 7 provides the power requirements for the QS1200 and QS2400 base system.

**Table 7** QS1200 and QS2400 Base System Power Requirements

Component	Typical Operating Power	Rated Power Requirement
Controller canisters with two power-fan canisters and 12 SAS HDD drives, each with 6-TB capacity	KVA: 0.408	KVA: 0.908
	Watts: 404	Watts: 900
	Btu/Hr: 1377	Btu/Hr: 3071
Controller canisters with two power-fan canisters and 24 SAS HDD drives, each with 1.2-TB capacity	KVA: 0.457	KVA: 0.908
	Watts: 453	Watts: 900
	Btu/Hr: 1545	Btu/Hr: 3071

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# QS1200/QS2400 Base System Acoustic Noise Levels

Table 8 provides the acoustic noise levels for the QS1200 and QS2400 base system.

**Table 8** QS1200/QS2400 Base System Acoustic Noise Levels

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

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# QS1200/QS2400 Base System Site Wiring and Power

This section provides site wiring and power information for the QS1200 and QS2400 base systems.

## Site Wiring

The QS1200 and QS2400 base systems use 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 or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the QS1200 and QS2400 base systems:

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

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

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- Circuit overloading – Power circuits and associated circuit breakers must provide enough power and overload protection.

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**NOTE:** To prevent damage to the base system, isolate its power source from large switching loads, such as air-conditioning motors, elevator motors, and factory loads.

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- Power interruptions – The base system 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 base system automatically performs a power-on recovery sequence without operator intervention.

## AC Power Input

Table 9 provides the AC power input for the QS1200 and QS2400 base systems.

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

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**Table 9** AC Power Input for the QS1200 and QS2400 Base Systems

Parameter	Low Range	High Range
Nominal voltage	100 VAC	240 VAC
Frequency	50 to 60 Hz	50 to 60 Hz
Typical operating current for 12 drives	4.08 A *	1.70 A **
Typical operating current for 24 drives	4.57 A *	1.90 A **
Maximum operating current for 12 drives	5.58 A *	2.33 A **
Maximum operating current for 24 drives	6.07A *	2.53 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.

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## Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the QS1200 and QS2400 base systems at greater than 0.95 with nominal input voltage.

## AC Power Cords and Receptacles

Each QS1200 and QS2400 base system ships 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 QS1200 and QS2400 base system.



# QD6000 and QD7000 Systems

This chapter provides specifications for the QD6000 and QD7000 systems.

## QD6000 and QD7000 Base System Components

The QD6000 and QD7000 base systems use high-density SAS 2.0 (6-Gb/s) drive enclosure available in a rack-mount model. The systems use either high-capacity 3.5-in. SAS drives or high-performance 2.5-in. 10K Hard Disk Drive (HDD) SAS drives.

### QD6000/QD7000 Base System Front View

Figure 8 provides a front view of the QD6000/QD7000 base system (no bezel installed).

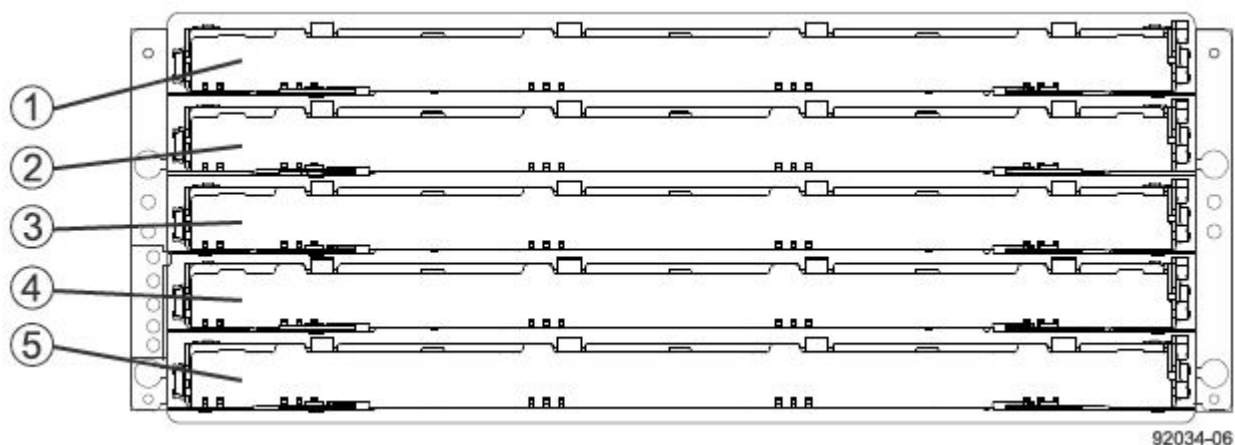


Figure 8 QD6000/QD7000 Base System (front)

- |                  |                  |
|------------------|------------------|
| 1 Drive Drawer 1 | 2 Drive Drawer 2 |
| 3 Drive Drawer 3 | 4 Drive Drawer 4 |
| 5 Drive Drawer 5 |                  |

## QD6000/QD7000 Base System Rear View

Figure 9 provides a rear view of the QD6000/QD7000 base system.

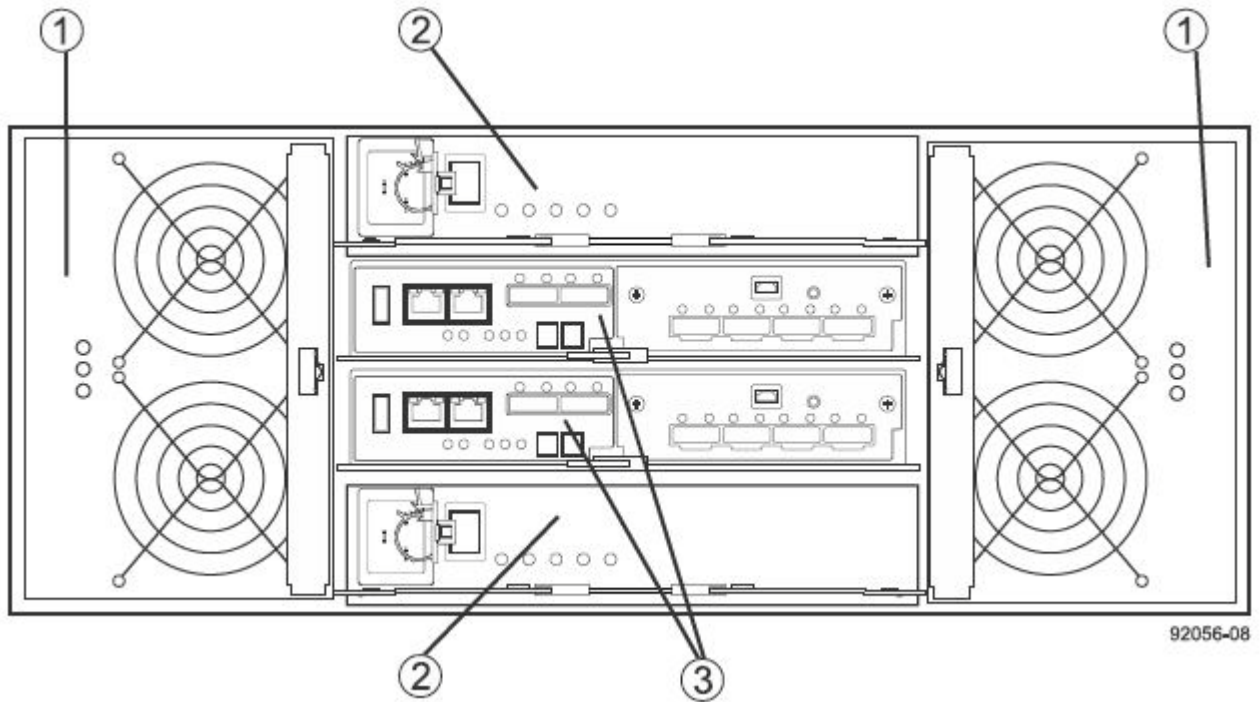


Figure 9 QD6000/QD7000 Base System (rear)

- 1 Fan Canisters
- 2 Power Canisters
- 3 Controller Canisters

## QD6000/QD7000 Base System Dimensions

Figure 10 provides the dimensions of the QD6000/QD7000 base system. The QD6000/QD7000 base system conform to the 48.3-cm (19.0-in.) rack standard.

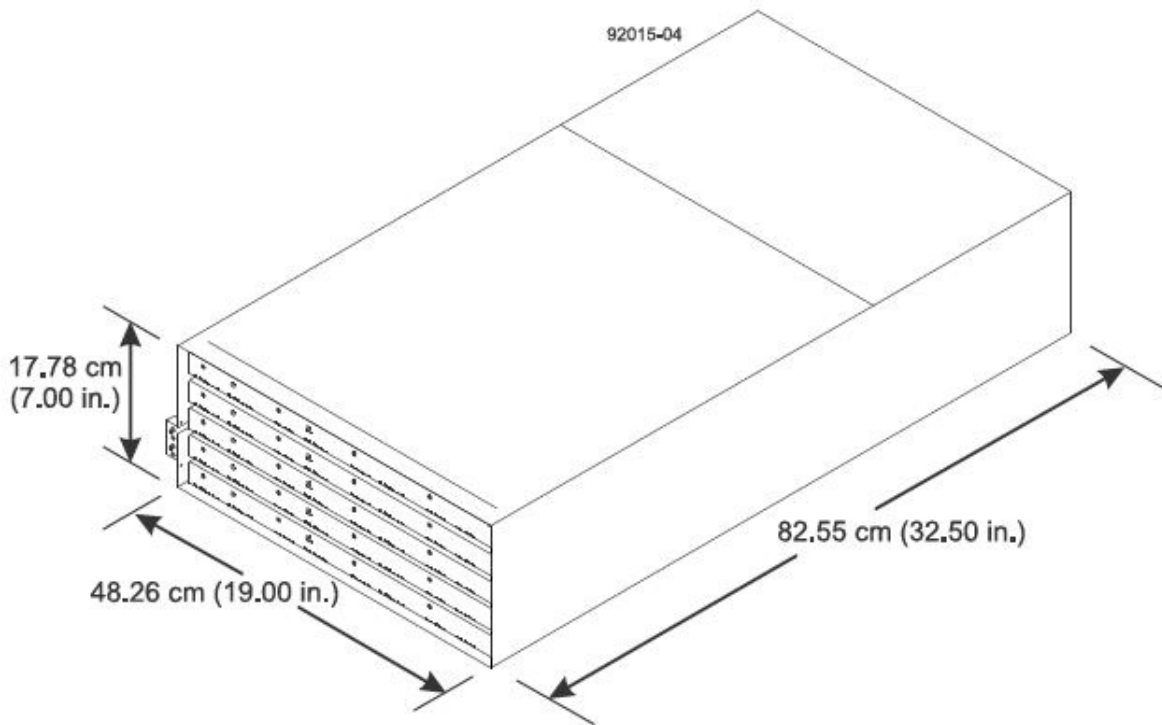


Figure 10 QD6000/QD7000 Base System Dimensions

## QD6000/QD7000 Base System Weights

This section provides the weight of the QD6000 and QD7000 base system and their internal components.

### QD6000/QD7000 Base System Weight (Max/Shipping)

Table 10 provides the weight of the QD6000 and QD7000 base system.

Table 10 QD6000/QD7000 Base System Weight

Unit	Maximum Weight <sup>1</sup>	Empty Weight <sup>2</sup>	Shipping Weight <sup>3</sup>
QD6000 Base System	88.2 kg (236.2 lb)	19.5 kg (43 lb)	105.3 kg (282 lb)
QD7000 Base System	88.2 kg (236.2 lb)	19.5 kg (43 lb)	105.3 kg (282 lb)

1. Maximum weight indicates a base system/expansion unit 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 (0.6 lb) times the maximum number of drives per drive tray for drives weighing 0.725 kg (1.6 lb).

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

3. 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.

## QD6000/QD7000 Base System Component Weights

Table 11 provides the component weights of the QD6000 and QD7000 base system.

Table 11 QD6000/QD7000 Base System Component Weights

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)

## QD6000/QD7000 Base System Shipping Dimensions

Table 12 provides the shipping dimensions of the QD6000 and QD7000 base system.

Table 12 QD6000/QD7000 Base System Shipping Weights

Unit	Height	Width	Depth
QD6000 Base System	48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)
QD7000 Base System	48.26 cm (19 in.)	60.96 cm (24.00 in.)	100.97 cm (39.75 in.)

## QD6000/QD7000 Base System Temperature and Humidity Requirements

Table 13 provides the temperature and humidity requirements of the QD6000 and QD7000 base system.

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

Table 13 QD6000/QD7000 Base System Temperature and Humidity Requirements

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



**Table 13** QD6000/QD7000 Base System Temperature and Humidity Requirements

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

**Note:** 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.

## QD6000/QD7000 Base System Altitude Ranges

Table 14 provides the altitude ranges of the QD6000 and QD7000 base system.

**Table 14** QD6000/QD7000 Base System Altitude Ranges

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

# QD6000/QD7000 Base System Airflow/Heat Dissipation and Power Requirements

This section provides airflow, heat dissipation and power requirements for the QD6000/QD7000 base system.

## Airflow and Heat Dissipation

Allow at least 81 cm (32 in.) of clearance in front of the QD6000/QD7000 base system and 61 cm (24 in.) behind the QD6000/QD7000 base system for service clearance, ventilation, and heat dissipation.

Figure 11 provides the airflow and heat dissipation of the QD6000/QD7000 base system.

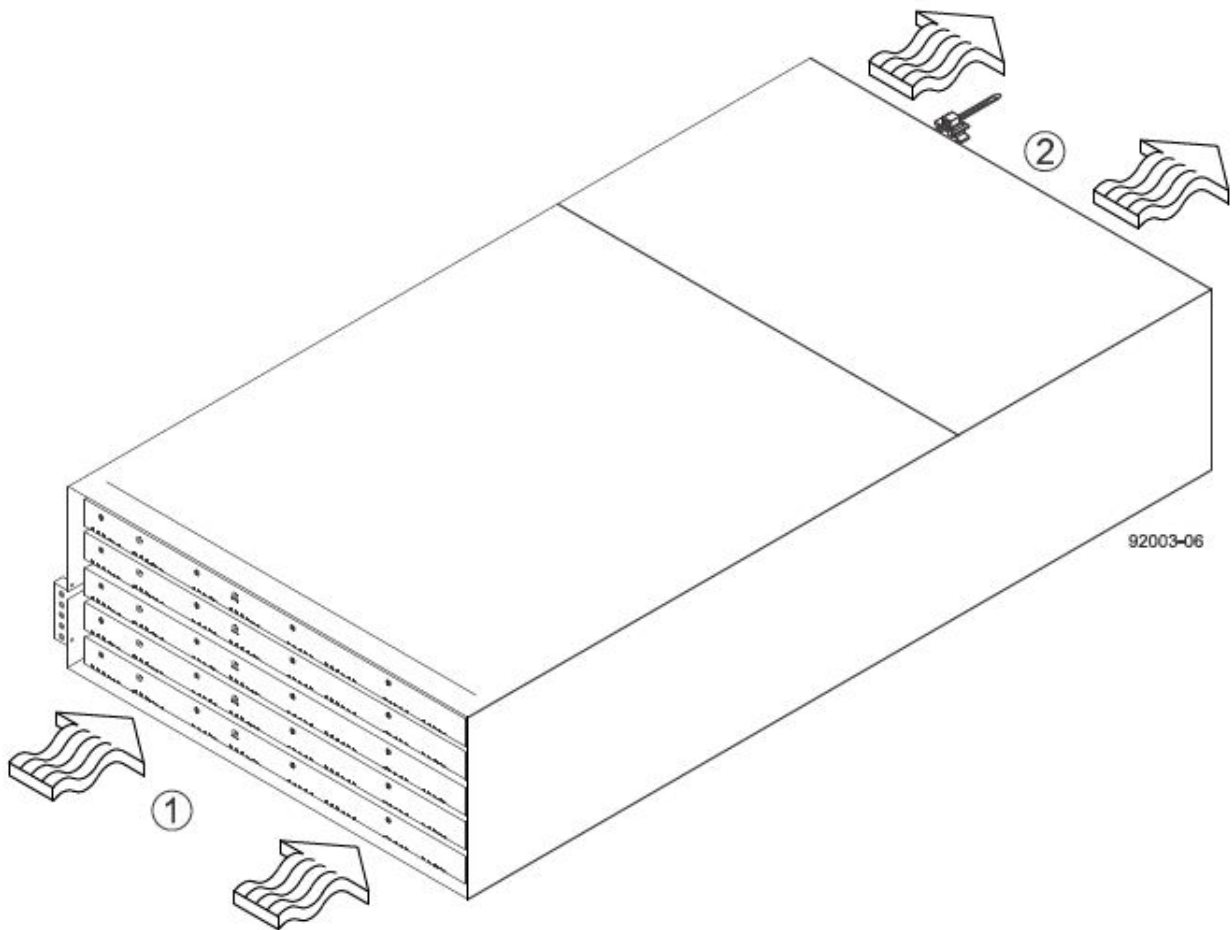


Figure 11 QS1200 Base System Airflow

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

## Power Requirements

Table 15 provides the power requirements for the QD6000 and QD7000 base system.

**Table 15** QD6000 and QD7000 Base System Power Requirements

Component	Typical Operating Power	Rated Power Requirement
QD6000 Base System with HIC (6-TB drives fully populated)	KVA: 1.075	KVA: 1.526
	Watts: 1064	Watts: 1512
	Btu/Hr: 3632	Btu/Hr: 5159
QD7000 Base System with HIC (6-TB drives fully populated)	KVA: 1.075	KVA: 1.526
	Watts: 1064	Watts: 1512
	Btu/Hr: 3632	Btu/Hr: 5159

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## QD6000/QD7000 Base System Acoustic Noise Levels

Table 16 provides the acoustic noise levels for the QD6000 and QD7000 base system.

**Table 16** QD6000/QD7000 Base System Acoustic Noise Levels

Measurement	Level
Sound power (standby operation)	7.2 bels
Sound pressure (normal operation)	7.2 bels
Sound pressure	72 dBA maximum

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## QD6000/QD7000 Base System Site Wiring and Power

This section provides site wiring and power information for the QD6000 and QD7000 base systems.

### Site Wiring

The QD6000 and QD7000 base systems use 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 or line-to-line power connections.

Keep this information in mind when you prepare the installation site for the QD6000 and QD7000 base systems:

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

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

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

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- Power interruptions – The base system 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 base system automatically performs a power-on recovery sequence without operator intervention.

## AC Power Input

Table 17 provides the AC power input for the QD6000 and QD7000 base systems.

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

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**Table 17** AC Power Input for the QD6000 and QD7000 Base Systems

Parameter	Low Range	High Range
Nominal voltage	200 VAC	240 VAC
Frequency	50 Hz	60 Hz
Typical operating current	5.38 A *	4.48 A **
Maximum operating current	6.43 A *	5.35 A **
System Rating Plate Label	7.56 A	6.3 A

## Power Factor Correction

Power factor correction is applied within the power supply, which maintains the power factor of the QD6000 and QD7000 base systems at greater than 0.95 with nominal input voltage.

## AC Power Cords and Receptacles

Each QD6000 and QD7000 base system ships 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 QD6000 and QD7000 base system.

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**NOTE:** Possible risk of equipment failure – To ensure proper cooling, the base system always uses two power supplies.

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