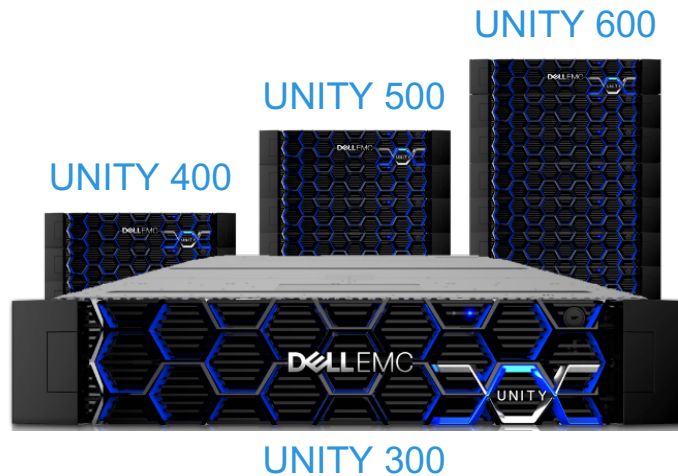


# DELL EMC UNITY HYBRID STORAGE



## THE ULTIMATE IN STORAGE SIMPLICITY & VALUE

Dell EMC Unity™ is the only storage system that successfully meets all 4 requirements of today's IT professionals.

- **Unity is Simple:** Unity Hybrid solutions sets new standards for storage systems with compelling simplicity, modern design, affordable prices, and flexible deployments – to meet the needs of resource-constrained IT professionals in large or small companies.
- **Unity is Modern:** Unity has a modern 2U architecture designed for all-flash, designed to support the high density SSD's including 3D NAND TLC (triple level cell) drives. Unity includes automated data lifecycle management to lower costs, inline compression\*, built-in encryption, local point-in-time copies and remote replication, data-in-place conversions, and deep ecosystem integration with VMware and Microsoft.
- **Unity is Affordable:** Our dual-active controller system was designed to optimize the performance, density, and cost of your storage to deliver all-flash or hybrid configurations for much less than you thought possible.
- **Unity is Flexible:** Unity is available as a virtual storage appliance, purpose-built all flash or hybrid configurations, or as converged systems – with one Unity operating environment that connects them all together.

## Specifications

### ARCHITECTURE

Based on the powerful new family of Intel E5-2600 processors, EMC's Unity Hybrid storage systems implement an integrated architecture for block, file, and VMware VVols with concurrent support for native NAS, iSCSI, and Fibre Channel protocols. Each system leverages dual storage processors, full 12 Gb SAS back end connectivity and EMC's patented multi-core architected operating environment to deliver unparalleled performance & efficiency. Additional storage capacity is added via Disk Array Enclosures (DAEs).

\*All-Flash pools, block only



## UNITY PHYSICAL SPECIFICATIONS

	UNITY 300	UNITY 400	UNITY 500	UNITY 600
<b>Min/Max Drives</b>	5/150	5/250	5/500	5/1000
<b>Max FAST Cache</b>	800GB	1.2TB	3.2TB	6.0TB
<b>Array Enclosure</b>	There are 2 versions: A 2U Disk Processor Enclosure (DPE) with twenty five 2.5" drives and a 2U Disk Processor Enclosure with twelve 3.5" drives.			
<b>Drive Enclosure Options (DAE - Disk Array Enclosure)</b>	All models support 2U twenty five drive trays for 2.5" drives or 3U fifteen drive trays for 3.5" drives			
<b>Standby Power System</b>	Unity systems are powered by 2 power supplies (PS) per DPE/DAE. Each power supply can provide power to the entire module if the peer PS has been removed or is faulted. DPE power during a power failure is provided by a Battery Back Up (BBU) module. BBU is located within the SP enclosure and provides power to a single module (power zone)			
<b>RAID Options</b>	1/0, 5, 6			
<b>CPU per Array</b>	2 x Intel 6-core, 1.6GHz	2 x Intel 8-core, 2.4GHz	2 x Intel 10-core, 2.6GHz	2 x Intel 12-core, 2.5GHz
<b>Memory per Array</b>	48 GB	96 GB	128 GB	256 GB
<b>Max IO Modules per Array*</b>	4	4	4	4
<b>Embedded SAS IO Ports per Array</b>	4 x 4 lane 12Gb/s SAS ports for BE (back end) Connection	4 x 4 lane 12Gb/s SAS ports for BE Connection	4 x 4 lane 12Gb/s SAS ports for BE Connection	4 x 4 lane 12Gb/s SAS ports for BE Connection
<b>Optional SAS IO ports per Array</b>	NA	NA	8 x 4 lane 12Gb/s SAS ports (for BE Connection)	8 x 4 lane 12Gb/s SAS ports (for BE Connection)
<b>Base 12 Gb/s SAS BE Buses per Array</b>	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane
<b>Max 12 Gb/s SAS BE Buses per Array</b>	2 x 4 Lane	2 x 4 Lane	6 x 4 Lane	6 x 4 Lane
<b>Max FE (front end) Total Ports per Array (all types)</b>	24	24	24	24
<b>Max Initiators per Array</b>	1,024	2,048	2,048	4,096
<b>Max FC Ports per Array</b>	20	20	20	20
<b>Embedded 10GbaseT Ports per Array</b>	4	4	4	4
<b>Embedded CNA ports per Array</b>	4 ports: 8/16 Gb FC**, 10Gb IP/iSCSI, or 1Gb RJ45	4 ports: 8/16 Gb FC**, 10Gb IP/iSCSI, or 1Gb RJ45	4 ports: 8/16 Gb FC**, 10Gb IP/iSCSI, or 1Gb RJ45	4 ports: 8/16 Gb FC**, 10Gb IP/iSCSI, or 1Gb RJ45
<b>1 GbaseT/iSCSI Max Total Ports per Array</b>	20	20	20	20
<b>10 GbE/iSCSI Max Total Ports per Array</b>	24	24	24	24
<b>Max Raw Capacity***</b>	2.34 PBs	3.91 PBs	7.81 PBs	9.77 PBs
<b>Max SAN Hosts</b>	512	1,024	1,024	2,048
<b>Max Number of Pools</b>	20	30	40	100
<b>Max Number of LUNs Per Array</b>	1,000	1,500	2,000	6,000
<b>Max LUN Size</b>	256 TB	256 TB	256 TB	256 TB

<b>Max File System Size</b>	64 TB	64 TB	64 TB	64 TB
<b>OS Support</b>	See EMC Simple Support Matrix on EMC.com			

\*Two IO Modules per Storage Processor (SP), mirrored.

\*\*16Gb available in both single mode and multimode.

\*\*\*Maximum raw capacity will vary based on drive sizes available at time of purchase.

## UNITY CONNECTIVITY

The Unity series provides flexible connectivity options via IO modules for both the file for NFS/SMB connectivity and the block storage for FC and iSCSI host connectivity (see above table for number of modules supported per SP).

### IO MODULE OPTIONS

IO MODULE	DESCRIPTION
<b>Four-Port 16Gb/s Fibre Channel Module (Block only)</b>	Four port FC module with four ports auto-negotiating to 4/8/16 Gbps; uses single mode or multimode optical SFP and OM2/OM3/OM4 cabling to connect directly to host HBA or FC switch
<b>Four-Port 1 Gb/s Module (File &amp; Block)</b>	Four port 1GbaseT for IP/iSCSI module with four 1 GBaseT RJ-45 copper connections to Cat 5/6-cabling to Ethernet switch
<b>Four-Port 10 GBASE-T Module (File &amp; Block)</b>	Four port 10GbaseT Ethernet IP/iSCSI module with four 10 GBaseT Ethernet ports with copper connection to Ethernet switch
<b>Two-Port 10 Gb/s Optical Module (File &amp; Block)</b>	Two port 10GbE IP/iSCSI module with choice of SFP+ optical connection or active twinax copper connection to Ethernet switch; includes iSCSI offload engine
<b>Four-Port 10 Gb/s Optical Module (File &amp; Block)</b>	Four port 10GbE IP/iSCSI module with choice of SFP+ optical connection or active twinax copper connection to Ethernet switch
<b>Four-Port 12Gb/s SAS V3.0 Module*</b>	Four port SAS module, used for back-end storage (DAE) connectivity to Block Storage Processors. Each SAS port has 4 lanes/port @ 12Gbps, delivering 48Gbps nominal throughput

\*Only for Unity 500 and 600 models

### MAXIMUM CABLE LENGTHS

Shortwave optical OM3: 100 meters (16 Gb) 150 meters (8 Gb), 380 meters (4 Gb), and 500 meters (2 Gb)

Shortwave optical OM4: 125 meters (16 Gb) 190 meters (8 Gb), 400 meters (4 Gb), and 500 meters (2 Gb)

### BACK-END (DRIVE) CONNECTIVITY

Each storage processor connects to one side of each of two redundant pairs of four-lane x 12 Gb/s Serial Attached SCSI (SAS) buses, providing continuous drive access to hosts in the event of a storage processor or bus fault. For the Unity 500 and 600 models there is the option to connect an additional 4 redundant pairs of four-lane x 12Gb/s Serial Attached SCSI (SAS) Buses using an IO module. Unity models require four "system" drives and support a platform specific maximum number of disks (see Unity physical specifications table above). 107 GB per system drive is consumed by the Unity operating environment software and data structures.

### DISK ARRAY ENCLOSURES (DAE)

	15 x 3.5" Drive DAE	25 x 2.5" Drive DAE
<b>Drive Types Supported</b>	FLASH, SAS and NL-SAS	FLASH and SAS
<b>Controller Interface</b>	12 Gb SAS	12 Gb SAS

## SOLID STATE DISK DRIVES

Nominal Capacity	200 GB SSD	400 GB SSD	800 GB SSD	1.6 TB SSD	3.2TB SSD
<b>FAST Cache</b>	√	√	Unity 600 only	no	no
<b>FAST VP</b>	√	√	√	√	√
<b>All-Flash Pool</b>	√	√	√	√	√
<b>Formatted Capacity (GB)*</b>	183.4	366.7	733.5	1467.45	2919.9
<b>Supported in 15 drive DAE and 12 drive DPE</b>	√	√	√	√	no
<b>Supported in 25 drive DAE/DPE</b>	√	√	√	√	√
<b>Interface</b>	12 Gb SAS				

## NOMINAL POWER CONSUMPTION (WATTS)

<b>Operating Mode</b>	4.25	4.25	4.25	4.25	4.25
<b>Idle Mode</b>	2.0	2.0	2.0	2.0	2.0

\*GB = Base2 GiB (GB = 1024x1024x1024)

## ROTATING DISK DRIVES

Nominal Capacity	600 GB 15K Drive	600 GB 10K Drive	1.2 TB 10K Drive	1.8TB 10K Drive	2 TB 7.2K Drive	4 TB 7.2K Drive	6 TB 7.2K Drive
<b>Formatted Capacity (GB)</b>	536.7	536.7	1100.5	1650.8	1834.3	3668.6	5505.0
<b>Supported in 15 drive DAE and 12 drive DPE</b>	√	√	√	√	√	√	√
<b>Supported in 25 drive DAE/DPE</b>	√	√	√	√	no	no	no
<b>Rotational Speed</b>	15,000 rpm	10,000 rpm	10,000 rpm	10,000 rpm	7,200 rpm	7,200 rpm	7,200 rpm
<b>Interface</b>	12 Gb SAS						
<b>Data Buffer</b>	128 MB						

## ACCESS TIME

<b>Average Read</b>	2.9 msec	3.7 msec	3.7 msec	3.7 msec	8.5 msec	8.5 msec	8.5 msec
<b>Average Write</b>	3.1 msec	4.2 msec	4.2 msec	4.2 msec	9.5 msec	9.5 msec	9.5 msec
<b>Rotation Latency</b>	2.0 msec	3.0 msec	3.0 msec	3.0 msec	4.16 msec	4.16 msec	4.16 msec

## NOMINAL POWER CONSUMPTION (WATTS)

<b>Operating Mode</b>	7.8	5.6	5.6	5.6	12.2	12.2	12.2
<b>Idle Mode</b>	5.8	3.1	3.1	3.1	8.0	8.0	8.0

## UNITY OE PROTOCOLS AND SOFTWARE FACILITIES

Unity offers support for a wide variety of protocols and advanced features available via various software suites, plug-ins, drivers and packs.

### PROTOCOLS AND FACILITIES SUPPORTED

Access-based Enumeration (ABE) for SMB protocol	Address Resolution Protocol (ARP)	Block Protocols: iSCSI, Fibre Channel (FCP SCSI-3)
Controller based Data at Rest Encryption (D@RE)*	DFS Distributed File System (Microsoft) as Leaf node or Standalone Root Server	Direct Host Attach for Fibre Channel and iSCSI
Dynamic Access Control (DAC) with claims support	Internet Control Message Protocol (ICMP)	Kerberos Authentication
LDAP (Lightweight Directory Access Protocol)	LDAP SSL	Link Aggregation for File (IEEE 802.3ad)
Lock Manager (NLM) v1, v2, v3, and v4	Management & Data Ports IPv4 and/or IPv6	NAS Servers Multi-protocol for UNIX and SMB clients (Microsoft, Apple, Samba)
Network Data Management Protocol (NDMP) v1-v4	Network Information Service (NIS) Client	Network Status Monitor (NSM) v1
Network Time Protocol (NTP) client	NFS v3/v4 Secure Support	NT LAN Manager (NTLM)
Portmapper v2	REST API: Open API that uses HTTP requests to provide management	Restriction of Hazardous Substances (RoHS) compliance
RSVD v1 for Microsoft Hyper-V	Simple Home Directory access for SMB protocol	SMI-S v1.6.0 compatible Unity File client
Simple Mail Transfer Protocol (SMTP)	Simple Network Management Protocol V3 (SNMP)	Virtual LAN (IEEE 802.1q)

\*Controller based D@RE has been submitted for FIPS 140-2 validation

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**UNITY 300, UNITY 400, UNITY 500, AND UNITY 600**

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**All Inclusive Base Software**

## Management Software:

- Unisphere: Element Manager
- Unisphere Central: Consolidated dashboard and alerting
- CloudIQ: Cloud-based storage analytics
- Thin Provisioning
- Compression (All-Flash pools, block only)
- Proactive Assist: Configure remote support, online chat, open a service request, etc.
- Quality of Service (for Block)
- EMC Storage Analytics Adapter for VMware® vRealize™
- File Tiering (Cloud Tiering Appliance)

## Unified Protocols:

- File
- Block
- VVols

## Local Protection:

- Controller Based Encryption (optional)
- Local Point-In-Time Copies
- AppSync Basic
- Anti-virus

## Remote Protection:

- Native Asynchronous Block & File Replication
- Native Synchronous Block Replication
- EMC RecoverPoint Basic
- EMC RecoverPoint for VMs

## Performance Optimization:

- FAST Cache
- FAST VP

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**Interface Protocols**

NFSv3, NFSv4, NFSv4.1; CIFS (SMB 1), SMB 2, SMB 3.0 and SMB 3.02; FTP and SFTP; FC, iSCSI included

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**Optional Software**

- AppSync Advanced
- Data Protection Suite: Backup, Archive and Collaboration Software
- EMC RecoverPoint Advanced
- PowerPath Migration Enabler
- PowerPath Multipathing
- VPLEX

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Note: For more details on software licensing, please contact your sales representative

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**VIRTUALIZATION SOLUTIONS**

Unity offers support for a wide variety of protocol and advanced features available via various software suites and packs including but not limited to:

- EMC Storage Integrator (ESI): For provisioning within the Microsoft management context (Systems Center) for Hyper-V and SharePoint
- EMC Virtual Storage Integrator (VSI) for VMware vSphere™ : For provisioning, management, and cloning
- OpenStack Cinder Driver: For provisioning and managing block volumes within an OpenStack environment
- OpenStack Manila Driver: For managing shared file systems within an OpenStack environment
- VMware Site Recovery Manager (SRM) Integration: Managing failover and failback making disaster recovery rapid and reliable
- Virtualization API Integration: VMware: VAAI and VASA. Hyper-V: Offloaded Data Transfer (ODX) and Offload Copy for File

## UNITY ELECTRICAL SPECIFICATIONS

All power figures shown represent a worst case product configuration with max normal values operating in an ambient temperature environment of 20°C to 25°C. The chassis power numbers provided may increase when operating in a higher ambient temperature environment.

### DISK PROCESSOR ENCLOSURES

	<b>Unity 300 DPE 12 3.5" LFF drives and two IO modules</b>	<b>Unity 300 DPE 25 2.5"SFF drives and two IO modules</b>	<b>Unity 400 DPE 12 3.5" LFF drives and two IO modules</b>	<b>Unity 400 DPE 25 2.5"SFF drives and two IO modules</b>	<b>Unity 500 DPE 12 3.5" LFF drives and two IO modules</b>	<b>Unity 500 DPE 25 2.5"SFF drives and two IO modules</b>	<b>Unity 600 DPE 12 3.5" LFF drives and two IO modules</b>	<b>Unity 600 DPE 25 2.5"SFF drives and two IO modules</b>
<b>POWER</b>								
<b>AC Line Voltage</b>	100 to 240 VAC ± 10%, single phase, 47 to 63 Hz							
<b>AC Line Current (operating maximum)</b>	6.94 A max at 100 VAC; 3.59 A max at 200VAC	9.04 A max at 100 VAC; 4.48 A max at 200VAC	6.95 A max at 100 VAC; 3.60 A max at 200VAC	9.09 A max at 100 VAC; 4.55 A max at 200VAC	7.41 A max at 100 VAC; 3.83 A max at 200VAC	9.55 A max at 100 VAC; 4.78 A max at 200VAC	7.80 A max at 100 VAC; 4.00 A max at 200VAC	9.89 A max at 100 VAC; 4.89 A max at 200VAC
<b>Power Consumption (operating maximum)</b>	693.5 VA (678.5 W) max at 100 VAC; 718.5 VA (678.5 W) max at 200 VAC	907.5 VA (903.5 W) max at 100 VAC; 907.5 VA (895.5 W) max at 200 VAC	695.0 VA (681.0 W) max at 100 VAC; 720.0 VA (680.0 W) max at 200 VAC	909.0 VA (905.0 W) max at 100 VAC; 909.0 VA (897.0 W) max at 200 VAC	741.0 VA (727.0 W) max at 100 VAC; 766.0 VA (726.0 W) max at 200 VAC	955.0 VA (951.0 W) max at 100 VAC; 955.0 VA (943.0 W) max at 200 VAC	775.0 VA (761.0 W) max at 100 VAC; 800.0 VA (760.0 W) max at 200 VAC	989.0 VA (985.0 W) max at 100 VAC; 989.0 VA (977.0 W) max at 200 VAC
<b>Power Factor</b>	0.95 min at full load 100/ 200 VAC							
<b>Heat Dissipation (operating maximum)</b>	2.45 x 10 <sup>6</sup> J/hr, (2,319 Btu/hr) max at 100 VAC; 2.44 x 10 <sup>6</sup> J/hr, (3,313 Btu/hr) max (100V*)	3.25 x 10 <sup>6</sup> J/hr, (3,083 Btu/hr) max at 100 VAC; 3.22 x 10 <sup>6</sup> J/hr, (3,056 Btu/hr) max (100V*)	2.45 x 10 <sup>6</sup> J/hr, (2,324 Btu/hr) max at 100 VAC; 2.45 x 10 <sup>6</sup> J/hr, (2,320 Btu/hr) max (100V*)	3.26 x 10 <sup>6</sup> J/hr, (3,088 Btu/hr) max at 100 VAC; 3.23 x 10 <sup>6</sup> J/hr, (3,061 Btu/hr) max (100V*)	2.62 x 10 <sup>6</sup> J/hr, (2,481 Btu/hr) max at 100 VAC; 2.61 x 10 <sup>6</sup> J/hr, (2,477 Btu/hr) max (100V*)	3.42 x 10 <sup>6</sup> J/hr, (3,245 Btu/hr) max at 100 VAC; 3.40 x 10 <sup>6</sup> J/hr, (3,218 Btu/hr) max (100V*)	2.74 x 10 <sup>6</sup> J/hr, (2,597 Btu/hr) max at 100 VAC; 2.74 x 10 <sup>6</sup> J/hr, (2,593 Btu/hr) max (100V*)	3.55 x 10 <sup>6</sup> J/hr, (3,361 Btu/hr) max at 100 VAC; 3.52 x 10 <sup>6</sup> J/hr, (3,334 Btu/hr) max (100V*)
<b>In-rush Current</b>	45 Apk "cold" per line cord, at any line voltage							
<b>Startup Surge Current</b>	120 Apk "hot" per line cord, at any line voltage							
<b>AC Protection</b>	15 A fuse on each power supply, single line							
<b>AC Inlet Type</b>	IEC320-C14 appliance coupler, per power zone							
<b>Ride-through Time</b>	10 ms min							
<b>Current Sharing</b>	± 5 percent of full load, between power supplies							
<b>DIMENSIONS</b>								
<b>Weight kgs/lbs</b>	empty 26.60/58.51	empty 24.60/54.11	empty 26.60/58.51	empty 24.60/54.11	empty 26.60/58.51	empty 24.60/54.11	empty 26.60/58.51	empty 24.60/54.11
<b>Vertical size</b>	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units
<b>Height cm/inches</b>	8.88/3.5	8.88/3.5	8.88/3.5	8.88/3.5	8.88/3.5	8.88/3.5	8.88/3.5	8.88/3.5
<b>Width cm/inches</b>	44.76/17.62	44.76/17.62	44.76/17.62	44.76/17.62	44.76/17.62	44.76/17.62	44.76/17.62	44.76/17.62
<b>Depth cm/inches</b>	68.43/26.94	60.9/24.0	68.43/26.94	60.9/24.0	68.43/26.94	60.9/24.0	68.43/26.94	60.9/24.0

Note: Power consumption values for DPEs and DAEs are based on fully populated enclosures (power supplies, drives and I/O modules)

## DISK ARRAY ENCLOSURES

	15 x 3.5" Disk Array Enclosure	25 x 2.5" Disk Array Enclosure
<b>POWER AC Line Voltage 100 to 240 VAC ± 10%, single phase, 47 to 63 Hz</b>		
<b>AC Line Current (operating maximum)</b>	2.90 A max at 100 VAC, 1.60 A max at 200 VAC	4.50 A max at 100 VAC, 2.40 A max at 200 VAC
<b>Power Consumption (operating maximum)</b>	287.0 VA/ 281.0 W max at 100 VAC 313.0 VA/ 277.0 W max at 200VAC	453.0 VA/ 432.0 W max at 100 VAC 485.0 VA/ 427.0 W max at 200VAC
<b>Power Factor</b>	0.90 minimum at full load, 100V/200V	0.95 minimum at full load, 100V/200V
<b>Heat Dissipation (operating maximum)</b>	1.01 x 10 <sup>6</sup> J/hr, (959 Btu/hr) max at 100 VAC 100.0 x 10 <sup>6</sup> J/hr, (945 Btu/hr) max at 200 VAC	1.56 x 10 <sup>6</sup> J/hr, (1,474 Btu/hr) max at 100 VAC 154.0 x 10 <sup>6</sup> J/hr, (1,457 Btu/hr) max at 200 VAC
<b>In-rush Current</b>	30 A max for ½ line cycle, per line cord at 240 VAC	30 A max for ½ line cycle, per line cord at 240 VAC
<b>Startup Surge Current</b>	25 Amps peak max per line cord, at any line voltage	40 Amps peak max per line cord, at any line voltage
<b>AC Protection</b>	10 A fuse on each power supply, both Line and Neutral	15 A fuse on each power supply, both Line and Neutral
<b>AC Inlet Type</b>	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone
<b>Ride-through Time</b>	30 ms minimum	12 ms minimum
<b>Current Sharing</b>	Droop Load Sharing	± 5 percent of full load, between power supplies
<b>WEIGHTS AND DIMENSIONS</b>		
<b>Weight kg/lbs</b>	Empty: 14.5/32 Full: 30.8/68	Empty: 10.0/22.1 Full: 20.23/44.61
<b>Vertical size</b>	3 NEMA units	2 NEMA units
<b>Height cm/inches</b>	13.33/5.25	8.46/3.40
<b>Width cm/inches</b>	44.45/17.5	44.45/17.5
<b>Depth cm/inches</b>	35.56/14	33.02/13

## CABINETS

### STANDARD 40U CABINET

<b>AC Line Voltage</b>	200 to 240 VAC ± 10%, single-phase, 47 to 63 Hz
<b>Power Configuration</b>	One, two, three or four power domains, each redundant
<b>Power Inlet Count</b>	Two, four, six, or eight (two per domain)
<b>Plug Types</b>	NEMA L6-30P or IEC309-332 P6 or IP57 (Australia)
<b>Input Power Capacity</b>	1 Domain: 4,800 VA @ 200 VAC, 5,760 VA @ 240 VAC 2 Domain: 9,600 VA @ 200 VAC, 11,520 VA @ 240 VAC 3 Domain: 14,400 VA @ 200 VAC, 17,280 VA @ 240 VAC 4 Domain: 19,200 VA @ 200 VAC, 20,040 VA @ 240 VAC
<b>AC Protection</b>	30 A site circuit breakers on each power branch
<b>40U Cabinet Dimensions</b>	Height - 75 in (190.8 cm); Width - 24.0 in (61.1 cm); Depth - 39.0 in (99.2 cm); Weight Empty – 380 lb (173 kg)



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## OPERATING ENVIRONMENT (MEETS ASHRAE EQUIPMENT CLASS A4)

<b>Recommended Range Operation</b>	The limits under which equipment will operate the most reliably while still achieving reasonably energy-efficient data center operation.	18°C to 27°C (64.4°F to 80.6°F) at 5.5°C (41.9°F) dew point to 60% relative humidity and 15°C (59°F) dew point
<b>Continuous Allowable Range Operation</b>	Data center economization techniques (e.g. free cooling) may be employed to improve overall data center efficiency. These techniques may cause equipment inlet conditions to fall outside the recommended range but still within the continuously allowable range. Equipment may be operated without any hourly limitations in this range.	10°C to 35°C (50°F to 95°F) at 20% to 80% relative humidity with 21°C (69.8°F) maximum dew point (maximum wet bulb temperature). De-rate maximum allowable dry bulb temperature at 1°C per 300m above 950m (1°F per 547 ft above 3117 ft).
<b>Expanded Allowable Range Operation</b>	During certain times of the day or year, equipment inlet conditions may fall outside the continuously allowable range but still within the expanded improbable range. Equipment operation is limited to ≤ 10% of annual operating hours in this range.	5°C to 10°C and 35°C to 40°C (with no direct sunlight on the equipment) at -12°C dew point and 8% to 85% relative humidity with 24°C dew point (maximum wet bulb temperature). Outside the continuously allowable range (10°C to 35°C), the system can operate down to 5°C or up to 40°C for a maximum of 10% of its annual operating hours. For temperatures between 35°C and 40°C (95°F to 104°F), de-rate maximum allowable dry bulb temperature by 1°C per 175m above 950m (1°F per 319 ft above 3117 ft).
<b>Exceptions to Expanded Allowable Range Operation</b>	During certain times of the day or year, equipment inlet conditions may fall outside the continuously allowable range but still within the expanded exceptional range. Equipment operation is limited to ≤ 1% of annual operating hours in this range.	5°C to 10°C and 35°C to 40°C (with no direct sunlight on the equipment) at -12°C dew point and 8% to 85% relative humidity with 24°C dew point (maximum wet bulb temperature). Outside the continuously allowable range (10°C to 35°C), the system can operate down to 5°C or up to 45°C for a maximum of 1% of its annual operating hours. For temperatures between 35°C and 45°C (95°F to 104°F), de-rate maximum allowable dry bulb temperature by 1°C per 125m above 950m (1°F per 228 ft above 3117 ft).
<b>Temperature Gradient</b>		20°C / hour (36°F / hour)
<b>Altitude</b>	Max Operating	3050m (10,000ft)

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## STATEMENT OF COMPLIANCE

This Information Technology Equipment is compliant with the electromagnetic compatibility (EMC) and product safety regulations/standards required by the countries in which the product is sold. EMC compliance is based on FCC part 15, CISPR22/CISPR24 and EN55022/EN55024 standards, including applicable international variations. EMC compliant Class A products are marketed for use in business, industrial, and commercial environments. Product Safety compliance is based on IEC 60950-1 and EN60950-1 standards, including applicable national deviations.

This Information Technology Equipment is in compliance with EU RoHS Directive 2011/65/EU.

The individual devices used in this product are approved under a unique regulatory model identifier that is affixed to each individual device rating label, which may differ from any marketing or product family name in this data sheet.

For additional information see <https://support.emc.com>, under the Safety & EMI Compliance Information tab.

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