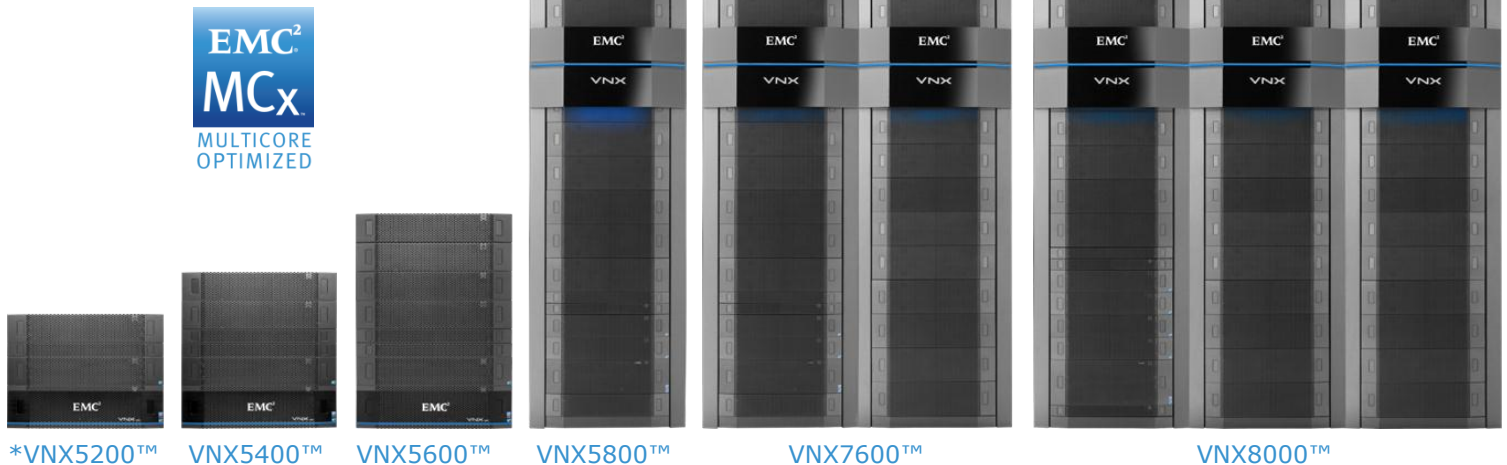# EMC VNX SERIES UNIFIED STORAGE SYSTEMS

EMC® VNX® series unified storage systems deliver uncompromising scalability and flexibility for the mid-tier while providing market-leading simplicity and efficiency to minimize total cost of ownership.

*VNX5200™   VNX5400™   VNX5600™   VNX5800™   VNX7600™   VNX8000™

*Available Q4 2013

Specifications

ARCHITECTURE

Based on the powerful new family of Intel Xeon-5600 (Sandy Bridge) processors, the EMC VNX implements a modular architecture that integrates hardware components for block, file, and object with concurrent support for native NAS, iSCSI, Fibre Channel, and FCoE protocols. The series delivers file (NAS) functionality via two-to-eight X-blade data movers and block (iSCSI, FCoE, and FC) storage via dual storage processors leveraging full 6 Gb SAS disk drive topology. The system leverages the *patented MCx™ multi-core storage software operating environment* that delivers unparalleled performance efficiency. You can start with block or file functionality and easily upgrade to unified when needed. The unified configuration includes the following rack-mounted enclosures:

- **Block Services:** Disk processor enclosure (includes disk drives) or storage processor enclosure (no drives included) plus standby power system. Capacity for Block or File use cases is added via Disk Array Enclosures (DAEs)

- **File and Unified Services:** One or more data mover enclosures and a control station to deliver file protocols.

EMC²

VNX PHYSICAL SPECIFICATIONS

BLOCK COMPONENTS	VNX5200****	VNX5400	VNX5600	VNX5800	VNX7600	VNX8000
Min/Max Drives	4/125	4/250	4/500	4/750	4/1000	4/1500**
Max FAST Cache	600GB	1TB	2TB	3TB	4.2TB	4.2TB
Array Enclosure	3U Disk Processor Enclosure (Holds 25x2.5" SAS/Flash drives)	3U Disk Processor Enclosure (Holds 25x2.5" SAS/Flash drives)	3U Disk Processor Enclosure (Holds 25x2.5" SAS/Flash drives)	3U Disk Processor Enclosure (Holds 25x2.5" SAS/Flash drives)	3U Disk Processor Enclosure (Holds 25x2.5" SAS/Flash drives)	4U Storage Processor Enclosure (No drives)
Drive Enclosure Options (DAE)	25x2.5" SAS/Flash drives–2U 15x3.5" SAS/Flash drives–3U	25x2.5" SAS/Flash drives–2U 15x3.5" SAS/Flash drives–3U	25x2.5" SAS/Flash drives–2U 15x3.5" SAS/Flash drives–3U 60x3.5" SAS/Flash drives–4U*	25 x 2.5" SAS / Flash drives–2U 15 x 3.5" SAS / Flash drives–3U 60 x 3.5" SAS/Flash drives–4U*	25x2.5" SAS/Flash drives–2U 15x3.5" SAS/Flash drives–3U 60x3.5" SAS/Flash drives–4U*	25x2.5" SAS/Flash drives–2U 15x3.5" SAS/Flash drives–3U 60x3.5" SAS/Flash drives–4U*
Standby Power System	Battery on board	Battery on board	Battery on board	Battery on board	Battery on board	2x 2U 2.2KW Li-Ion
Raid Options	0/1/10/3/5/6	0/1/10/3/5/6	0/1/10/3/5/6	0/1/10/3/5/6	0/1/10/3/5/6	0/1/10/3/5/6
CPU/Memory per Array	2 x Intel Xeon 4-Core 1.2 GHz /32 GB	2 x Intel Xeon 4-Core 1.8 GHz /32 GB	2 x Intel Xeon 4-Core 2.4 GHz /48 GB	2 x Intel Xeon 6-Core 2.0 GHz /64 GB	2 x Intel Xeon 8-Core 2.2GHz /128 GB	4 x Intel Xeon 8- Core 2.7GHz /256 GB
Max Block UltraFlex™ IO Modules per Array	6	8	10	10	10	22
Embedded IO Ports per Array	4 x 4 lane SAS ports (for BE Connection)	4 x 4 lane SAS ports (for BE Connection)	4 x 4 lane SAS ports (for BE Connection)	4 x 4 lane SAS ports (for BE Connection)	4 x 4 lane SAS ports (for BE Connection)	0
Base 6 Gb/s SAS BE Buses per Array	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	8 x 4 Lane
Max 6 Gb/s SAS BE Buses per Array	2 x 4 Lane	2 x 4 Lane	6 x 4 Lane or 2 x 4 Lane + 2 x 8 Lane	6 x 4 Lane or 2 x 4 Lane + 2 x 8 Lane	6 x 4 Lane or 2 x 4 Lane + 2 x 8 Lane	16 x 4 Lane or 8 x 8 Lane
Max Total Ports per Array	28	36	44	44	44	88
2/4/8 Gb/s FC Max Ports per Array	24	32	40	40	40	72
1 GBaseT iSCSI Max Total Ports per Array	16	16	16	16	16	16
10 GbE iSCSI Max Total Ports per Array	12	16	16	16	16	16
Max FCoE Total Ports per Array	12	16	20	20	20	36
FILE COMPONENTS*						
# File X-Blades	1-2	1-2	1-2	1-3	2-4	2-8
# Control Stations	1-2 x 1U Server	1-2 x 1U Server	1-2 x 1U Server	1-2 x 1U Server	1-2 x 1U Server	1-2 x 1U Server
X-Blade: CPU/Memory	Intel Xeon 5600 / 6 GB	Intel Xeon 5600 / 6 GB	Intel Xeon 5600 / 12 GB	Intel Xeon 5600 / 12 GB	Intel Xeon 5600 / 24 GB	Intel Xeon 5600 / 24 GB
Max File UltraFlex IO Modules per X-Blade	3	3	3	4	4	5
Min/Max 2/4/8 Gb/s FC Ports per X-Blade	4	4	4	4	4	4
Max IP Ports per X-Blade	8	8	8	12	12	16

Max 1 GBaseT Ports per X-Blade	8	8	8	12	12	16
Max 10 GbE Ports per X-Blade	4	4	4	6	6	8
Management	LAN 2x 10/100/1000 Copper GbE	LAN 2x 10/100/1000 Copper GbE	LAN 2x 10/100/1000 Copper GbE	LAN 2x 10/100/1000 Copper GbE	LAN 2x 10/100/1000 Copper GbE	LAN 2x 10/100/1000 Copper GbE
FUNCTIONAL LIMITS	**VNX5200******	**VNX5400**	**VNX5600**	**VNX5800**	**VNX7600**	**VNX8000**
Max Raw Capacity	375 TB	750 TB	1,500 TB	2,250 TB	3,000 TB	4,500 TB**
Max SAN Hosts	1,024	1,024	1,024	2,048	4,096	8,192
Max Number of Pools	15	15	20	40	40	60
Max Number of LUNs (Pool)	1,000	1,000	1,000	2,000	3,000	4,000
Max Number of LUNs (Classic)	2048	2048	2048	4096	4096	8192
Max Pool Based LUN Size	256 TB (Virtual Pool LUN)	256 TB (Virtual Pool LUN)	256 TB (Virtual Pool LUN)	256 TB (Virtual Pool LUN)	256 TB (Virtual Pool LUN)	256 TB (Virtual Pool LUN)
Max File System Size	16 TB	16 TB	16 TB	16 TB	16 TB	16 TB
Maximum Usable File Capacity per X-Blade	256 TB	256 TB	256 TB	256 TB	256 TB	256 TB
OS Support	Block OS's see EMC E-Lab™ Navigator and NAS Support Matrix on EMC Powerlink™	Block OS's see EMC E-Lab™ Navigator and NAS Support Matrix on EMC Powerlink™	Block OS's Plus File OS's see E-Lab Navigator and NAS Support Matrix on Powerlink	Block OS's Plus File OS's see E-Lab Navigator and NAS Support Matrix on Powerlink	Block OS's Plus File OS's see E-Lab Navigator and NAS Support Matrix on Powerlink	Block OS's Plus File OS's see E-Lab Navigator and NAS Support Matrix on Powerlink

* 60-Drive 4U DAE is a top-loading DAE and requires a high-density EMC rack.
** VNX8000 initial support is for 1000 drives, Max Raw Capacity = 3,000 TB
*** The File components are not required when ordering a block-only system.
**** Available Q4 2013
Note: In-family Data-in-Place conversions, i.e. converting from a smaller VNX platform to a large one, are also supported

VNX CONNECTIVITY

The VNX series provides flexible connectivity options via UltraFlex IO modules for both the file X-blades for NAS connectivity and the block storage processors for FC and iSCSI host connectivity (see above table for number of modules supported per blade or SP).

ULTRAFLEX IO MODULE OPTIONS (BLOCK)

IO Module	Description
Four-Port Fibre Channel Module	FC module with four ports auto-negotiating to 2/4/8 Gbps; uses optical SFP and OM2/OM3 cabling to connect directly to host HBA or FC switch
Four-Port 1 Gb/s iSCSI Module with TOE	iSCSI module with four 1 GBaseT RJ-45 copper connections to Cat 6 cabling to Ethernet switch; includes TCP offload engine
Two-Port 10 Gb/s Opt iSCSI Module with TOE	iSCSI module with two 10 Gb/s Ethernet ports and choice of SFP+ optical connection or active twinax copper connection to Ethernet switch; includes TCP offload engine
Two-Port 10 GBASE-T iSCSI Module with TOE	iSCSI module with two 10 GBaseT Ethernet ports with copper connection to Ethernet switch; includes TCP offload engine
Two-Port 10 GbE FCoE Module	FCoE module with two 10 Gb/s Ethernet ports and choice of SFP+ optical connection or active twinax copper connection to converged enhanced Ethernet switch
Four-Port 6Gb/s SAS V2.0 Module	SAS module, used for back-end storage (DAE) connectivity to Block Storage Processors. Each SAS port has 4x lane/port @ 6Gb, delivering 24Gb/s nominal throughput and connects to PCI-E Gen3. Can be configured as 4x4x6 or 2x8x6.

ULTRAFLEX IO MODULE OPTIONS (FILE)

IO Module	Description
Four-Port 1 GBASE-T IP Module	10/100/1000 BaseT module with four ports supporting RJ-45 copper connections to Cat 6 cabling to Ethernet switch
Four-Port 1 GBASE-T and 1 GbE Opt IP Module	IP module with two ports of 10/100/1000 BaseT and two ports 1 GbE optical
Two-Port 10 GbE Opt IP Module	IP module with two 10 Gb/s Ethernet ports and choice of SFP+ optical connection or active twinax copper connection to Ethernet switch
Two-Port 10 GBASE-T IP Module	IP module with two 10 GBaseT Ethernet ports with copper connection to Ethernet switch
Four-Port 8 Gb/s Fibre Channel Module	FC module with four ports auto-negotiating to 2/4/8 Gbps; uses optical SFP and OM2/OM3 cabling to connect directly to captive array and to provide NDMP tape connection

MAXIMUM CABLE LENGTHS

Shortwave optical OM2: 50 meters (8 Gb), 100 meters (4 Gb), and 300 meters (2 Gb)

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

BACK-END (DISK) CONNECTIVITY

Each storage processor connects to one side of each of two, four, eight or sixteen (depending on model) redundant pairs of four-lane x 6 Gb/s Serial Attached SCSI (SAS) buses, providing continuous drive access to hosts in the event of a storage processor or bus fault. VNX models require four "vault" drives (SAS or Near-line SAS) and support a platform specific maximum number of disks (see VNX physical specifications table above). 300 GB per vault drive is consumed by VNX operating environment software and data structures.

DISK ARRAY ENCLOSURES

	15x3.5" Drive DAE	60x3.5" Drive DAE	25x2.5" Drive DAE
Drive Types Supported	2.5" Flash (in 3.5" carrier) 2.5" 15K Rotating (in 3.5" carrier) 3.5" 15K Rotating 2.5" 10K Rotating (in 3.5" carrier) 3.5" Near-line Rotating	3.5" Flash 2.5" 15K Rotating (in 3.5" carrier) 2.5" 10K Rotating (in 3.5" carrier) 3.5" Near-line Rotating	2.5" Flash 2.5" 15K Rotating 2.5" 10K Rotating 2.5" Near-line Rotating
Drive Mixing	No limitations	No limitations	No limitations
Controller Interface	6 Gb SAS	6 Gb SAS	6 Gb SAS

DISK DRIVES FOR 15X3.5" AND 60X3.5" DRIVE DISK PROCESSOR ENCLOSURE / DISK ARRAY ENCLOSURE

Nominal Capacity	100 GB Solid State Drive*	200 GB Solid State Drive*	400 GB Solid State Drive*	300 GB 15K Drive	300 GB 15K Drive	600 GB 15K Drive	600 GB 10K Drive	900 GB 10K Drive	2 TB 7.2K Drive	3 TB 7.2K Drive
Supported in 15 drive DAE	√	√	√	√		√	√	√	√	√
Supported in 60 drive DAE	√	√	√		√		√	√	√	√
Formatted Capacity**	93.16 GB	186.31 GB	372.52 GB	272.59 GB	272.59 GB	545.19 GB	545.19 GB	820.6 GB	1,836.01 GB	2794.51 GB
Drive Form Factor	2.5"	2.5"	2.5"	3.5"	2.5"	3.5"	2.5"	2.5"	3.5"	3.5"
Rotational Speed	Solid State	Solid State	Solid State	15,000 rpm	15,000 rpm	15,000 rpm	10,000 rpm	10,000 rpm	7,200 rpm	7,200 rpm
Interface	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS
Data Buffer	N/A SSD	N/A SSD	N/A SSD	16 MB min	16 MB min	16 MB min	16 MB min	16 MB min	16 MB min	16 MB min
ACCESS TIME										
Average Read	N/A	N/A	N/A	3.4 msec	2.8 msec	3.4 msec	3.7 msec	3.7 msec	8.5 msec	8.5 msec
Average Write	N/A	N/A	N/A	3.9 msec	3.3 msec	3.9 msec	4.2 msec	4.2 msec	9.5 msec	9.5 msec
Rotation Latency	N/A	N/A	N/A	2.0 msec	2.0 msec	2.0 msec	3.0 msec	3.0 msec	4.16 msec	4.16 msec
NOMINAL POWER CONSUMPTION (WATTS)										
Operating Mode	4.97	4.97	4.97	12.92	9.07	16.35	5.6	5.6	12.2	12.2
Idle Mode	1.36	1.36	1.36	8.74	5.25	11.68	3.1	3.1	8.0	8.0

DISK DRIVES FOR 25X2.5" DRIVE DISK PROCESSOR ENCLOSURE / DISK ARRAY ENCLOSURE

Nominal Capacity	100 GB Solid State Drive*	200 GB Solid State Drive*	400 GB Solid State Drive*	300 GB 15K Drive	600 GB 10K Drive	900 GB 10K Drive	1 TB 7.2K Drive
Formatted Capacity**	93.1 GB	186.31 GB	372.52 GB	272.59 GB	545.19 GB	820.6 GB	931.51 GB
Form Factor	2.5"	2.5"	2.5"	2.5"	2.5"	2.5"	2.5"
Rotational Speed	Solid State	Solid State	Solid State	15,000 rpm	10,000 rpm	10,000 rpm	7,200 rpm
Interface	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS	6 Gb SAS
Data Buffer	N/A SSD	N/A SSD	N/A SSD	16 MB min	16 MB min	16 MB min	16 MB min
ACCESS TIME							
Average Read	N/A	N/A	N/A	2.8 msec	3.6 msec	3.6 msec	7.7 msec
Average Write	N/A	N/A	N/A	3.3 msec	4.2 msec	4.2 msec	8.7 msec
Rotation Latency	N/A	N/A	N/A	2.0 msec	3.0 msec	3.0 msec	4.16 msec
NOMINAL POWER CONSUMPTION (WATTS)							
Operating Mode	4.97	4.97	4.97	9.07	5.6	5.6	7.44
Idle Mode	1.36	1.36	1.36	5.25	3.1	3.1	4.84

* 100GB and 200GB SSDs are available in SLC or eMLC technology. 400GB SSD is eMLC technology. eMLC can only be used for FAST VP use cases.
** 520 bytes/sector, 1 MB = 1,048,576 bytes

VNX OE PROTOCOLS AND SOFTWARE FACILITIES

The VNX series offers support for a wide variety of protocols and advanced features available via various software suites and packs.

PROTOCOLS AND FACILITIES SUPPORTED

- Access-based Enumeration (ABE) for Microsoft Windows Server 2003

- Address Resolution Protocol (ARP)

- Automated Volume Management (AVM): file system provisioning

- Block Protocols: iSCSI, Fibre Channel (FCP SCSI-3), and FCoE

- Common Criteria Certification: EAL 3+ Assurance Level

- DFS Distributed File System (Microsoft) as Leaf node or Root Server

- Ethernet Trunking

- File Protocols: NFSv2, v3, v4, and v4.1 with pNFS; CIFS (SMB 1, SMB 2 and SMB 3); FTP (including SFTP and FTPs)

- FileMover API: Open API for automated, transparent data movement between tiers of the storage network

- Lock Manager (NLM) v1, v3, and v4

- Failsafe Networking

- Internet Control Message Protocol (ICMP)

- Kerberos Authentication

- Lightweight Directory Access Protocol (LDAP)

- LDAP signing for Windows

- Link Aggregation (IEEE 802.3ad)

- Network Data Management Protocol (NDMP) v1-v4

- Network Information Service (NIS) Client

- Network Status Monitor (NSM) v1

- Network Time Protocol (NTP) client

- NT LAN Manager (NTLM)

- Object support via EMC Atmos™ Virtual Edition

- Portmapper v2

- Restriction of Hazardous Substances (RoHS) compliance

- Routing Information Protocol (RIP) v1-v2

- Simple Network Management Protocol V1-V3 (SNMP)

- Simple Network Time Protocol (SNTP)

- UNIX archive utilities (tar/cpio)

- Virtual Data Movers for Microsoft Windows clients

- Virtual LAN (IEEE 802.1q)

VNX SOFTWARE

	VNX5200, VNX5400, VNX5600, VNX5800, VNX7600 AND VNX8000
Unisphere™ Management Suite: Simple, intuitive management, monitoring and troubleshooting for VNX	Management Software includes: Unisphere element manager (Block / File / Unified) Unisphere Remote (consolidated dashboard and alerting) Unisphere Analyzer (monitoring and troubleshooting) Unisphere QoS Manager (Quality of Service) VNX Monitoring and Reporting (Watch4Net technology)
Protocols	CIFS, NFS, pNFS, FC, FCoE, iSCSI included
Base Software (VNX OE) Core storage capabilities (connectivity, efficiency and migration) included at no extra cost	*Per TB charge, drive type dependent, includes:* All Protocols (See above) Thin Provisioning Block Deduplication Block Compression File Deduplication and Compression SAN Copy
FAST™ Suite: Automatically optimize for the highest system performance and the lowest storage cost simultaneously	Optimize performance and cost concurrently with: - Dynamic tiering of data across drives - Extendable cache for performance boost
Security and Compliance Suite: Keep data safe from changes, deletions, and malicious activity	Encrypt data where it is created Disk-based WORM functionality Anti-virus integration and alerting
Local Protection Suite: Practice Safe Data Protection and Repurposing	Block storage snaps and clones Continuous Data Protection for DVR-like recovery for block storage File system snaps
Remote Protection Suite: Protect data against localized failures, outages, and disasters	Unified storage replication with DVR-like recovery Integrated WAN deduplication and bandwidth reduction Granular file system level replication and recovery
Application Protection Suite: Automate application copies and prove compliance	Self-service application copy management Prove protection compliance Includes Replication Manager and AppSync™
Storage Analytics for VNX	VMware® vCenter™ Operations Manager for VNX, EMC Adapter for VNX
Total Protection Pack	Local Protection Suite + Remote Protection Suite + Application Protection Suite
Total Efficiency Pack	FAST Suite + Security & Compliance Suite+ Local Protection Suite + Remote Protection Suite + Application Protection Suite

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

VIRTUALIZATION FACILITIES AND TITLES

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

- EMC Virtual Storage Integrator (VSI) for VMware vSphere™ 5: For provisioning, management, cloning, and deduplication

- 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

- AppSync: Host-based, service oriented management of array-based copies of data

- EMC Storage Integrator (ESI) – For provisioning within the Microsoft management context (Systems Center) for Hyper-V and SharePoint

ADDITIONAL OPTIONAL EMC TITLES

- EMC ProSphere®: VNX integration with EMC Storage management infrastructure

- EMC PowerPath®: path management

- EMC Cloud Tiering Appliance (CTA and CTA/VE): policy-based cloud tiering, file archiving, and migration

VNX ELECTRICAL SPECIFICATIONS

(For specific power specifications please refer to the EMC Power Calculator at power.emc.comwith your Powerlink account.)

DPE / SPE / DAE ENCLOSURES

	VNX5200 DPE (25x2.5" drives)	VNX5400 DPE (25x2.5" drives)	VNX5600 DPE (25x2.5" drives)	VNX5800 DPE (25x2.5" drives)	VNX7600 DPE (25x2.5" drives)	VNX8000 SPE	15x3.5" Disk Array Enclosure *	60x3.5" Disk Array Enclosure *	25x2.5" Disk Array Enclosure *
POWER									
AC Line Voltage	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz
AC Line Current (operating maximum)	4.3 A max at 200 Vac	4.3 A max at 200 Vac	4.4 A max at 200 Vac	4.4 A max at 200 Vac	4.5 A max at 200 Vac	7.25 A max at 200 Vac	2.8 A max at 100 Vac, 1.4 A max at 200 Vac	12.0 A max at 100 Vac, 6.0 A max at 200 Vac	2.5 A max at 100 Vac, 1.3 A max at 200 Vac
Power Consumption (operating maximum)	860 VA (835 W) max	860 VA (835 W) max	870 VA (845 W)max	870 VA (845 W) max	905 VA (880 W) max	1,450 VA (1,380 W) max	280 VA (235 W) max	1,200 VA (1,130 W) max	250 VA (230 W) max
Power Factor	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage
Heat Dissipation (operating maximum)	3.01×10^6 J/hr, (2,850 Btu/hr) max	3.01×10^6 J/hr, (2,850 Btu/hr) max	3.04×10^6 J/hr, (2,890 Btu/hr) max	3.04×10^6 J/hr, (2,890 Btu/hr) max	3.17×10^6 J/hr, (3,010 Btu/hr) max	4.97×10^6 J/hr, (4,710 Btu/hr) max	8.46×10^5 J/hr, (800 Btu/hr) max	4.07×10^6 J/hr, (3,860 Btu/hr) max	8.28×10^5 J/hr, (785 Btu/hr) max
In-rush Current	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	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	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	50 A max for ½ line cycle, per line cord at 240 Vac; 25 A max for ½ line cycle, per line cord at 120 Vac	30 A max for ½ line cycle, per line cord at 240 Vac; 15 A max for ½ line cycle, per line cord at 120 Vac	50 A max for ½ line cycle, per line cord at 240 Vac; 25 A max for ½ line cycle, per line cord at 120 Vac
Startup Surge Current	29 A rms max for 50 ms, at any line voltage	29 A rms max for 50 ms, at any line voltage	29 A rms max for 50 ms, at any line voltage	29 A rms max for 50 ms, at any line voltage	29 A rms max for 50 ms, at any line voltage	29 A rms max for 50 ms, at any line voltage	10.6 A rms max for 100 ms, at any line voltage	27 A rms max for 100 ms, at any line voltage	10.6 A rms max for 100 ms, at any line voltage
AC Protection	10 A fuse on each power supply	10 A fuse on each power supply	10 A fuse on each power supply	10 A fuse on each power supply	10 A fuse on each power supply	10 A fuse on each power supply	10 A fuse on each power supply, both phases	12 A fuse on each line cord, both phases	10 A fuse on each power supply, both phases
AC Inlet Type	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, two per power zone	IEC320-C14 appliance coupler, per power zone
Ride-through Time	12 ms min	12 ms min	12 ms min	12 ms min	12 ms min	12 ms min	30 ms min	30 ms min	30 ms min
Current Sharing	± 5 percent of full load, between power supplies	± 5 percent of full load, between power supplies	± 5 percent of full load, between power supplies	± 5 percent of full load, between power supplies	± 5 percent of full load, between power supplies	± 5 percent of full load, between power supplies	± 10 percent of full load, between power supplies	± 10 percent of full load, between power supplies	± 10 percent of full load, between power supplies
DIMENSIONS									
Weight	41 kgs (90.395 lbs)	41 kgs (90.395 lbs)	41 kgs (90.395 lbs)	41 kgs (90.395 lbs)	41 kgs (90.395 lbs)	49.9 kgs (110 lbs)	Empty: 32/14.5	Empty: 81/36.7	Empty: 22.1/10.0
Vertical size	3 NEMA units	3 NEMA units	3 NEMA units	3 NEMA units	3 NEMA units	4 NEMA units	3 NEMA units	4 NEMA units	2 NEMA units
Height	13.33 cm (5.25 in)	13.33 cm (5.25 in)	13.33 cm (5.25 in)	13.33 cm (5.25 in)	13.33 cm (5.25 in)	17.78 cm (7.00 in)	13.33 cm (5.25 in)	17.78 cm (7.00 in)	8.76 cm (3.45 in)

Width	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)	44.45 cm (17.5 in)
Depth	61.0 cm (24 in)	61.0 cm (24 in)	61.0 cm (24 in)	61.0 cm (24 in)	61.0 cm (24 in)	83.8 cm (33 in)	35.56 cm (14 in)	35 in + cable mgmt. arm (needs 44 in deep rack)	33.02 cm (13 in)

NOTE: Each SPE requires a Standby Power Supply (see the following information)

	Standby Power Supply
POWER	**2.2KW 2U SPS (Note all ratings assume fully configured systems)**
AC Line Voltage	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz
AC Line Current, Internal and Pass-through	0.1 A max at 200 Vac, internal power consumption (Up to 11 A max at 200 Vac, pass-through to AC outlets)
Internal Power Consumption	150 VA (135 W) pk in hi-charge mode, 20 VA (12 W) in float charge mode
Power Factor	N/A for pass-through load, internal 10 VA load is 0.60 power factor
Heat Dissipation	43.2 x 10^3 J/hr, (40 Btu/hr) steady state
In-rush Current	25 A max for ½ line cycle, per power supply at 240 Vac
AC Protection	20 A circuit breaker
AC Inlet Type	IEC320-C14 appliance coupler with switch
AC Outlet Type	IEC320-C13 appliance coupler, quantity four
Charge Times	5.5 hours max
AC Failure Detect Time	12 ms max
Transfer Time	25 ms max
Dimensions (H/W/L)	3.37 in/17.5 in/28 in or 8.56 cm/44.45 cm/71.1 cm
Weight	79 lb/35.9 Kg

	Standard 40U Cabinet	**Dense 40U Cabinet**
AC Line Voltage	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz	200 to 240 Vac ± 10%, single-phase, 47 to 63 Hz
Power Configuration	Two power domains (base and extended), each redundant	One, two, three or four power domains, each redundant
Power Inlet Count	Either two (for redundant base configuration) or four (for redundant extended configuration)	Two, four, six, or eight (two per domain)
Plug Types	NEMA L6-30P or IEC309-332 P6 or IP57 (Australia)	NEMA L6-30P or IEC309-332 P6 or IP57 (Australia)
Input Power Capacity	4,800 VA @ 200 Vac, 5,760 VA @ 240 Vac (base configuration) 9,600 VA @ 200 Vac, 11,520 VA @ 240 Vac (extended configuration)	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, 23,040 VA @ 240 Vac
AC Protection	30 A site circuit breakers on each power branch	30A site circuit breakers on each power branch (8 max)
40U Cabinet Dimensions	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)	Height – 75 in (190.8 cm); Width – 24.0 in (61.1 cm); Depth – 44 in (111.8 cm); Weight Empty – 435 lb (197.3 kg)

DATA MOVER ENCLOSURES, AND CONTROL STATION

	VNX5200 DME with (2) Data Movers	VNX5400 DME with (2) Data Movers	VNX5600 DME with (2) Data Movers	VNX5800 DME with (2) Data Movers	VNX7600 DME with (2) Data Movers	VNX8000 DME with (2) Data Movers	Control Station
POWER							
AC Line Voltage	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz	100 to 240 Vac± 10%, single-phase, 47 to 63 Hz
AC Line Current (operating maximum)	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	5.3 A max at 100 Vac, 2.7 A max at 200 Vac	1.0 A max at 100 Vac, 0.5 A max at 200 Vac
Power Consumption (operating maximum)	530 VA (500 W) max	530 VA (500 W) max	530 VA (500 W) max	530 VA (500 W) max	530 VA (500 W) max	530 VA (500 W) max	100 VA (90 W) max
Power Factor	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.98 min at full load, low voltage	0.90 min at full load, low voltage
Heat Dissipation (operating maximum)	1.80×10^6 J/hr, (1,710 Btu/hr) max	1.80×10^6 J/hr, (1,710 Btu/hr) max	1.80×10^6 J/hr, (1,710 Btu/hr) max	1.80×10^6 J/hr, (1,710 Btu/hr) max	1.80×10^6 J/hr, (1,710 Btu/hr) max	1.80×10^6 J/hr, (1,710 Btu/hr) max	3.24×10^5 J/hr, (310 Btu/hr) max
In-rush Current	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac	15 A max for ½ line cycle, per line cord at 240 Vac
	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac	8 A max for ½ line cycle, per line cord at 120 Vac
Startup Surge Current	27 A rms max for 50 ms, at any line voltage	27 A rms max for 50 ms, at any line voltage	27 A rms max for 50 ms, at any line voltage	27 A rms max for 50 ms, at any line voltage	27 A rms max for 50 ms, at any line voltage	27 A rms max for 50 ms, at any line voltage	N/A
AC Protection	7.8 A fuse on each power supply, both phases	7.8 A fuse on each power supply, both phases	7.8 A fuse on each power supply, both phases	7.8 A fuse on each power supply, both phases	7.8 A fuse on each power supply, both phases	7.8 A fuse on each power supply, both phases	N/A
AC Inlet Type	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone	IEC320-C14 appliance coupler, per power zone
Ride-through Time	30 ms min	30 ms min	30 ms min	30 ms min	30 ms min	30 ms min	N/A
Current Sharing	± 15 percent of full load, between power supplies	± 15 percent of full load, between power supplies	± 15 percent of full load, between power supplies	± 15 percent of full load, between power supplies	± 15 percent of full load, between power supplies	± 15 percent of full load, between power supplies	N/A
DIMENSIONS							
Weight	23.8 kg (52.5 lb)	23.8 kg (52.5 lb)	23.8 kg (52.5 lb)	23.8 kg (52.5 lb)	23.8 kg (52.5 lb)	23.8 kg (52.5 lb)	10.5kg (23.3 lb)
Vertical size	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	1 NEMA units
Height	8.89 cm (3.50 in)	8.89 cm (3.50 in)	8.89 cm (3.50 in)	8.89 cm (3.50 in)	8.89 cm (3.50 in)	8.89 cm (3.50 in)	4.45 cm (1.75 in)
Width	44.45 cm (17.50 in)	44.45 cm (17.50 in)	44.45 cm (17.50 in)	44.45 cm (17.50 in)	44.45 cm (17.50 in)	44.45 cm (17.50 in)	43.8 cm (17.25 in)
Depth	61.0 cm (24.0 in)	61.0 cm (24.0 in)	61.0 cm (24.0 in)	61.0 cm (24.0 in)	61.0 cm (24.0 in)	61.0 cm (24.0 in)	55.37 cm (21.8in)

OPERATING ENVIRONMENT
(MEETS ASHRAE EQUIPMENT CLASS A3)

Recommended Range Operation	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
Continuous Allowable Range Operation	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).
Expanded Allowable Range Operation	During certain times of the day or year, equipment inlet conditions may fall outside the continuously allowable range but still within the expanded allowable 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).
Exceptions to Expanded Allowable Range Operation	When operating in the expanded allowable temperature range, system performance is guaranteed while the system is awaiting or being serviced.	Due to certain rare operational modes, it is recommended that service be deferred on 60x3.5" Disk Array Enclosures when temperatures exceed 35°C.
Temperature Gradient		20°C / hour (36°F / hour)
Altitude	Max Operating	3050m (10,000ft)

ELECTROMAGNETIC EMISSIONS AND IMMUNITY

FCC Class A EN55022 Class A

CE Mark VCCI Class A (for Japan)

ICES-003 Class A (for Canada) AS/NZS 3548 Class A (for Australia/New Zealand)

EN55024 Immunity, ITE BSMI Class A (for Taiwan)

QUALITY AND SAFETY STANDARDS

UL 60950; CSAC 22.2-60950, EN 60950

Manufactured under an ISO 9000-registered quality system

ETSI EN 300 386

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