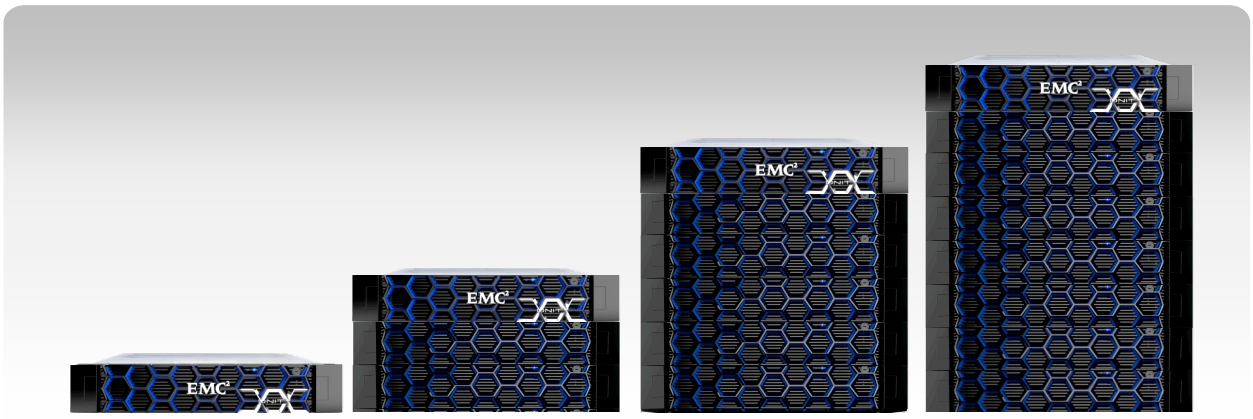
# EMC UNITY ALL FLASH STORAGE




## THE ULTIMATE IN STORAGE SIMPLICITY & VALUE

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

- **Unity is Simple:** Unity All Flash 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, integrated copy data management to control local point-in-time snapshots, built-in encryption and remote replication, 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 configurations for much less than you thought possible.
- **Unity is Flexible:** Unity is available as a virtual storage appliance, purpose-built all flash 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 All Flash 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).

## UNITY PHYSICAL SPECIFICATIONS

| | UNITY 300F | UNITY 400F | UNITY 500F | UNITY 600F |
|---|---|---|---|---|
| **Min/Max Drives** | 4/150 | 4/250 | 4/500* | 4/1000** |
| **Array Enclosure** | A 2U Disk Processor Enclosure (DPE) with twenty five 2.5" drives | | | |
| **Drive Enclosure (DAE - Disk Array Enclosure)** | All models support 2U twenty five drive trays for 2.5" drives | | | |
| **Standby Power System** | 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) | | | |
| **RAID Options** | 0/1, 5, 6 | | | |
| **CPU per Array** | 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 |
| **Memory per Array** | 48 GB | 96 GB | 128 GB | 256 GB |
| **Max Block UltraFlex™ IO Modules per Array** | 2 | 2 | 2 | 2 |
| **Embedded SAS IO Ports per Array** | 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 |
| **Base 12 Gb/s SAS BE Buses per Array** | 2 x 4 Lane | 2 x 4 Lane | 2 x 4 Lane | 2 x 4 Lane |
| **Max FE (front end) Total Ports per Array (all types)** | 24 | 24 | 24 | 24 |
| **Max Initiators per Array** | 1,024 | 2,048 | 2,048 | 4,096 |
| **Max FC Ports per Array** | 20 | 20 | 20 | 20 |
| **Embedded 10GbaseT Ports per Array** | 4 ports | 4 ports | 4 ports | 4 ports |
| **Embedded CNA ports per Array** | 4 ports: 8/16 Gb FC or 10Gb IP/iSCSI | 4 ports: 8/16 Gb FC or 10Gb IP/iSCSI | 4 ports: 8/16 Gb FC or 10Gb IP/iSCSI | 4 ports: 8/16 Gb FC or 10Gb IP/iSCSI |
| **1 GbaseT/iSCSI Max Total Ports per Array** | 16 | 16 | 16 | 16 |
| **10 GbE/iSCSI Max Total Ports per Array** | 24 | 24 | 24 | 24 |
| **Max Raw Capacity*** ** | 1.5 PBs | 2.5 PBs | 3.5 PBs | 5.0 PBs |
| **Max SAN Hosts** | 512 | 1,024 | 1,024 | 2,048 |
| **Max Number of Pools** | 20 | 30 | 40 | 100 |
| **Max Number of LUNs Per Array** | 500 | 750 | 1,000 | 4,000 |
| **Max LUN Size** | 256 TB | 256 TB | 256 TB | 256 TB |
| **Max File System Size** | 64 TB | 64 TB | 64 TB | 64 TB |
| **OS Support** | See EMC Simple Support Matrix on emc.com | | | |

*350 drives available at initial release. 500 drive support will come within a year.
**500 drives available at initial release. 1000 drive support will come within a year.
*** Maximum raw capacity will vary based on drive sizes available at time of purchase.

# UNITY CONNECTIVITY

The Unity series provides flexible connectivity options via UltraFlex 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).

### ULTRAFLEX IO MODULE OPTIONS

| IO MODULE | DESCRIPTION |
|---|---|
| **Four-Port 16Gb/s Fibre Channel Module (Block only)** | Four port FC module with four ports auto-negotiating to 4/8/16 Gbps; uses optical SFP and OM2/OM3 cabling to connect directly to host HBA or FC switch |
| **Four-Port 1 Gb/s Module (File & Block)** | Four port 1GbaseT for IP/iSCSI module with four 1 GBaseT RJ-45 copper connections to Cat 5/6-cabling to Ethernet switch |
| **Four-Port 10 GBASE-T Module (File & Block)** | Four port 10GbaseT Ethernet IP/iSCSI module with four 10 GBaseT Ethernet ports with copper connection to Ethernet switch |
| **Two-Port 10 Gb/s Optical Module (File & Block)** | Two port 10GbE IP/iSCSI module with choice of SFP+ optical connection or active twinax copper connection to Ethernet switch; includes iSCSI offload engine |
| **Four-Port 10 Gb/s Optical Module (File & Block)** | Four port 10GbE IP/iSCSI module with choice of SFP+ optical connection or active twinax copper connection to Ethernet switch |

# MAXIMUM CABLE LENGTHS

Shortwave optical OM3: 100 meters (16 Gb) 150 meters (8 Gb), 380 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. 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)

| | 25 x 2.5" Drive DAE |
|---|---|
| **Drive Types Supported** | FLASH |
| **Controller Interface** | 12 Gb SAS |

### SOLID STATE DISK DRIVES

| Nominal Capacity | 400 GB SSD | 800 GB SSD | 1.6 TB SSD | 3.2TB SSD |
|---|---|---|---|---|
| **Type** | TLC | TLC | TLC | eMLC |
| **Formatted Capacity (GB)*** | 366.7 | 733.5 | 1467.45 | 2919.9 |
| **Supported in 15 drive DAE and 12 drive DPE** | √ | √ | √ | √ |
| **Supported in 25 drive DAE/DPE** | √ | √ | √ | √ |
| **Interface** | 12 Gb SAS | | | |

### NOMINAL POWER CONSUMPTION (WATTS)

| | | | | |
|---|---|---|---|---|
| **Operating Mode** | 4.25 | 4.25 | 4.25 | 4.25 |
| **Idle Mode** | 2.0 | 2.0 | 2.0 | 2.0 |

*Flash drives are formatted to 520 bytes/sector, 1 MB = 1,048,576 bytes.

# 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 | Dynamic Access Control (DAC) with claims support |
| Ethernet Trunking | Failsafe Networking | Internet Control Message Protocol (ICMP) |
| Kerberos Authentication | LDAP (Lightweight Directory Access Protocol) | LDAP SSL |
| Link Aggregation (IEEE 802.3ad) | Lock Manager (NLM) v1, v2, v3, and v4 | Management Port 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 for automated, transparent data movement between tiers of the storage network |
| 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 Network Management Protocol v1-v3 (SNMP) | Simple Network Time Protocol (SNTP) |
| Virtual LAN (IEEE 802.1q) | | |

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

## UNITY SOFTWARE

| | UNITY 300F, UNITY 400F, UNITY 500F, AND UNITY 600F |
|---|---|
| **Unity All Flash Base Software Package:**<br>All inclusive for the simple, intuitive management, monitoring and troubleshooting for Unity All Flash systems | Management Software:<br>• Unisphere: Element Manager<br>• Unisphere Central: Consolidated dashboard and alerting<br>• Thin Provisioning<br>• Proactive Assist: Configure remote support, online chat, open a service request, etc.)<br>• Quality of Service (for Block)<br>• EMC Storage Analytics Adapter for VMware® vRealize™<br>Unified Protocols:<br>• File<br>• Block<br>• VVols<br>Local Protection:<br>• Controller Based Encryption (optional)<br>• Local Point-In-Time Copies<br>• Anti-virus<br>Remote Protection:<br>• Native Asynchronous Block & File Replication<br>• Native Synchronous Block Replication<br>• RecoverPoint Basic<br>• RecoverPoint for VMs |
| **Interface Protocols** | NFSv3, NFSv4, NFSv4.1; CIFS (SMB 1), SMB 2 and SMB 3; FTP and SFTP; FC, iSCSI included |
| **Optional Software** | • RecoverPoint Advanced<br>• PowerPath Multipathing<br>• PowerPath Migration Enabler<br>• VPLEX<br>• Data Protection Suite: Backup, Archive and Collaboration Software |

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

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

| | **Unity 300F DPE 25 2.5"SFF drives and two IO modules** | **Unity 400F DPE 25 2.5"SFF drives and two IO modules** | **Unity 500F DPE 25 2.5"SFF drives and two IO modules** | **Unity 600F DPE 25 2.5"SFF drives and two IO modules** |
|---|---|---|---|---|
| **POWER** | | | | |
| **AC Line Voltage** | 100 to 240 VAC ± 10%, single phase, 47 to 63 Hz | | | |
| **AC Line Current (operating maximum)** | 9.04 A max at 100 VAC; 4.48 A max at 200VAC | 9.09 A max at 100 VAC; 4.55 A max at 200VAC | 9.55 A max at 100 VAC; 4.78 A max at 200VAC | 9.89 A max at 100 VAC; 4.89 A max at 200VAC |
| **Power Consumption (operating maximum)** | 907.5 VA (903.5 W) max at 100 VAC; 907.5 VA (895.5 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 | 955.0 VA (951.0 W) max at 100 VAC; 955.0 VA (943.0 W) max at 200 VAC | 9.89.0 VA (985.0 W) max at 100 VAC; 989.0 VA (977.0 W) max at 200 VAC |
| **Power Factor** | 0.95 mi at full load 100/ 200 VAC | | | |
| **Heat Dissipation (operating maximum)** | $3.25 \times 10^6$ J/hr, (3,083 Btu/hr) max at 100 VAC; $3.22 \times 10^6$ J/hr, (3,056 Btu/hr) max (100V*) | $3.26 \times 10^6$ J/hr, (3,088 Btu/hr) max at 100 VAC; $3.23 \times 10^6$ J/hr, (3,061 Btu/hr) max (100V*) | $3.42 \times 10^6$ J/hr, (3,245 Btu/hr) max at 100 VAC; $3.40 \times 10^6$ J/hr, (3,218 Btu/hr) max (100V*) | $3.55 \times 10^6$ J/hr, (3,361 Btu/hr) max at 100 VAC; $3.55 \times 10^6$ J/hr, (3,334 Btu/hr) max (100V*) |
| **In-rush Current** | 45 Apk "cold" per line cord, at any line voltage | 45 Apk "cold" per line cord, at any line voltage | 45 Apk "cold" per line cord, at any line voltage | 45 Apk "cold" per line cord, at any line voltage |
| **Startup Surge Current** | 120 Apk "hot" per line cord, at any line voltage | | | |
| **AC Protection** | 15 A fuse on each power supply, single line | | | |
| **AC Inlet Type** | IEC320-C14 appliance coupler, per power zone | | | |
| **Ride-through Time** | 10 ms min | | | |
| **Current Sharing** | ± 5 percent of full load, between power supplies | | | |
| **DIMENSIONS** | | | | |
| **Weight kgs/lbs** | empty 24.60/54.11 | empty 24.60/54.11 | empty 24.60/54.11 | empty 24.60/54.11 |
| **Vertical size** | 3 NEMA units | 3 NEMA units | 3 NEMA units | 3 NEMA units |
| **Height cm/inches** | 8.88/3.5 | 8.88/3.5 | 8.88/3.5 | 8.88/3.5 |
| **Width cm/inches** | 44.76/17.62 | 44.76/17.62 | 44.76/17.62 | 44.76/17.62 |
| **Depth cm/inches** | 60.9/24.0 | 60.9/24.0 | 60.9/24.0 | 60.9/24.0 |

## DISK ARRAY ENCLOSURE

| | 25x2.5" Disk Array Enclosure |
|---|---|
| **POWER** | |
| **AC Line Voltage** | 100 to 240 VAC ± 10%, single phase, 47 to 63 Hz |
| **AC Line Current (operating maximum)** | 4.50 A max at 100 VAC,<br>2.40 A max at 200 VAC |
| **Power Consumption (operating maximum)** | 453.0 VA/ 432.0 W max at 100 VAC<br>485.0 VA/ 427.0 W max at 200VAC |
| **Power Factor** | 0.95 minimum at full load, 100V/200V |
| **Heat Dissipation (operating maximum)** | 1.56 x $10^6$ J/hr, (1,474 Btu/hr) max at 100 VAC<br>154.0 x $10^6$ J/hr, (1,457 Btu/hr) max at 200 VAC |
| **In-rush Current** | 30 A max for ½ line cycle, per line cord at 240 VAC |
| **Startup Surge Current** | 40 Amps peak max per line cord, at any line voltage |
| **AC Protection** | 15 A fuse on each power supply, both Line and Neutral |
| **AC Inlet Type** | IEC320-C14 appliance coupler, per power zone |
| **Ride-through Time** | 12 ms minimum |
| **Current Sharing** | ± 5 percent of full load, between power supplies |
| **WEIGHTS AND DIMENSIONS** | |
| **Weight kg/lbs** | Empty: 10.0/22.1<br>Full: 20.23/44.61 |
| **Vertical size** | 2 NEMA units |
| **Height cm/inches** | 8.46/3.40 |
| **Width cm/inches** | 44.45/17.5 |
| **Depth cm/inches** | 33.02/13 |

## CABINETS

| | STANDARD 40U CABINET |
|---|---|
| **AC Line Voltage** | 200 to 240 VAC ± 10%, single-phase, 47 to 63 Hz |
| **Power Configuration** | Two power domains (base and extended), each redundant |
| **Power Inlet Count** | Either two (for redundant base configuration) or four (for redundant extended configuration) |
| **Plug Types** | 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)<br>9,600 VA @ 200 VAC, 11,520 VA @ 240 VAC (extended configuration) |
| **AC Protection** | 30 A site circuit breakers on each power branch |
| **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) |

## OPERATING ENVIRONMENT (MEETS ASHRAE EQUIPMENT CLASS A4)

| | | |
|---|---|---|
| **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 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). |
| **Exceptions to 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 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). |
| **Temperature Gradient** | | 20°C / hour (36°F / hour) |
| **Altitude** | Max Operating | 3050m (10,000ft) |

### 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.





Published in the USA. 4/16 Specification Sheet H14957