QLOGIC®
The Ultimate in Performance

DATA SHEET

UA5900 Converged Network Switch

QLogic Universal Access Point™: The New Fabric Foundation for Evolving Enterprise and Dynamic Cloud-Based Computing

Overview

Give your servers instant access to *all* of today's most advanced storage and converged networking capabilities with the UA5900, the revolutionary new multi-protocol switch from QLogic. Backed by over a decade of QLogic leadership in silicon design for high-performance switches, the UA5900 features QLogic's exclusive flexible port (hereafter referred to as "Flex Port") technology, allowing you to connect Fibre Channel, Fibre Channel over Ethernet (FCoE), data center bridging (DCB) Ethernet, standard Ethernet, or iSCSI devices to any port. From traditional or converged SANs to highly-virtualized Private Cloud deployments, point of delivery (POD) solutions and beyond, the UA5900 provides the highest levels of flexibility, cost savings, and solution longevity.

No matter how your infrastructure strategy evolves, the UA5900 helps you *move forward* with a powerful building-block investment that will facilitate any technology transition.

Highlights

QLogic Universal Access Point™: Fabric Freedom to Connect Any Server, Any Network, Any Storage—on Any Port

- **Mix and match Fibre Channel, FCoE, or traditional Ethernet ports in all groupings and combinations**
- Default Fibre Channel SAN setting also allows Converged Network Adapter attach for FCoE storage traffic—*no additional fees to begin your convergence*
- Affordable Converged Networking (CVN) license enables full FCoE switching functions, including LAN connect, when needed

Unprecedented Port Density and Scalability

- **Up to 68 device connections in 1U of rack space**
  - 24 to 52 standard SFP ports, plus 4 optional QSFP uplink ports
  - 16 additional SFP ports through an optional quad small form factor pluggable (QSFP) port breakout
- SFP ports support 16/8/4Gb Fibre Channel or 10/1Gb FCoE/Ethernet/iSCSI
- QSFP uplink ports support 64Gb Fibre Channel, 40Gb FCoE/Ethernet, or four lanes each of 16/8/4Gb Fibre Channel and 10/1GbE in breakout mode
- Stack six switches for over 340 high-performance device ports you can manage as a single switch
- Link multiple stacks for over 1000 device ports

Unmatched Ease of Use

- **Intuitive GUI management and wizard-based setup**
- Reduces cabling complexity by 75 percent or more

Maximum Interworking and Interoperability

- **Configure server/storage racks just once—connect to anything, even if your networks change**
- Hybrid Switch feature allows you to create both transparent and full-fabric Fibre Channel partitions on the same switch
- Virtual Ethernet port aggregator (VEPA) mode simplifies edge/core management, ensures policy consistency, and lowers overall costs

Industry's Top Performance and Reliability

- **Single-ASIC design—full line speed, zero contention on all 68 ports**
- Aggregate bandwidth: 2176Gbps
- Latency: < 200 nanoseconds
- Dual, hot-swappable power supplies and nondisruptive software upgrades

Best Value

- **Lowest switch cost per port**
- Lowest software lifecycle costs
- Lowest power cost per gigabit of bandwidth
- Most compact data center footprint
- No need to buy 16Gb optics for interswitch links (ISLs)
- Incremental, "no-regrets" investment for convergence at *your* pace

Start with the Most Evolved Fibre Channel Offering

Out of the box, the UA5900 operates in default Fibre Channel SAN mode, offering scalability, port density, and cost-per-port advantages not found in competing Fibre Channel products.

Entry configurations start with as few as 24 ports. As business needs change, activate additional ports through "pay as you grow" port licensing, up to an incredible 68 line-speed 16/8/4Gb SFP device ports per 1U switch.

Four optional 64Gb QSFP stacking/trunking ports provide dedicated bandwidth for inter-switch connections, keeping Fibre Channel performance high and eliminating cable complexity for SANs of all sizes. Stack up to six switches for over 340 device ports, manageable as a single entity. Link multiple stacks for blazing fast, highly available solutions rivaling the size, resiliency and convenience of chassis or director switch alternatives—at a fraction of the cost.

Along with ground-breaking scalability, the UA5900 offers full virtualization support and a host of QLogic-exclusive, enterprise-class Fibre Channel features designed to make your SAN more useful and easier to deploy. Hybrid Switch, Enhanced Transparent Routing (ETR), intuitive Drag-and-Drop Zoning, Adaptive Trunking, I/O StreamGuard™, SANdoctor digital diagnostics, and Advanced Fabric Security are all included without extra fees or license hassles, keeping lifecycle costs low and ensuring the highest return on investment. Best of all, with switch latency at less than 200 nanoseconds, there is simply no higher-performing Fibre Channel switch available on the market.

When You Are Ready: Fast, Flexible FCoE

Despite its robust lineup of industry-leading Fibre Channel features, the UA5900 is far more than *just* a Fibre Channel switch. It also provides a comprehensive platform for convergence at the network edge, protecting your infrastructure investment through all phases of technology migration.

Even in its default SAN mode, shown in Figure 1, each SFP port on the UA5900 can be toggled individually to support either 16Gb Fibre Channel or 10Gb Ethernet/FCoE. This feature allows you to deploy Converged Network Adapters functioning in FCoE mode (storage traffic only) before making any other network changes—taking the first steps along your preferred convergence roadmap without paying a premium on the switch side.

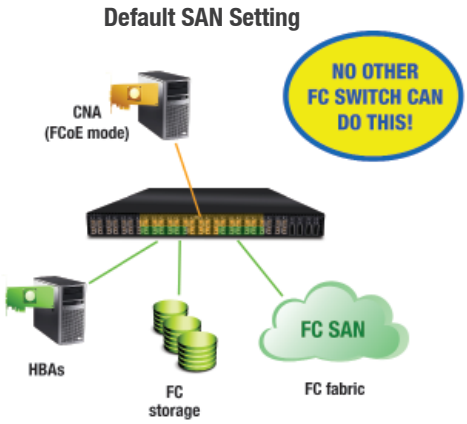

Figure 1. Roll Out Converged Network Adapters on Any Port with Zero Additional Network Investment

Later, when you want to run your Converged Network Adapters in NIC mode or to connect directly to Ethernet fabrics, a single Converged Networking (CVN) software license instantly and affordably converts the UA5900 into a full-function FCoE switch. This configuration, shown in Figure 2, provides switch-wide access to today's most advanced networking capabilities.

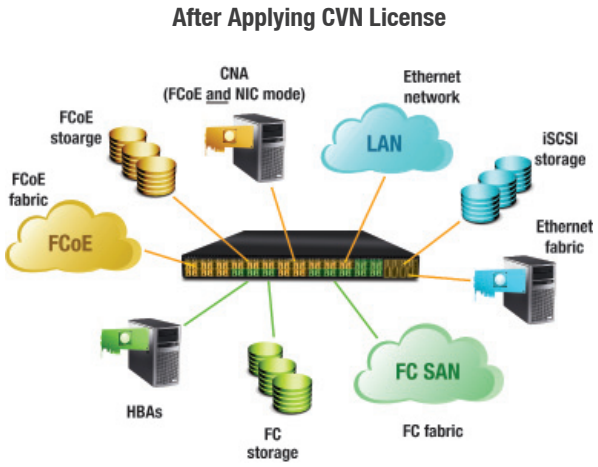

Figure 2. Connect to Any Host, Storage or Network—on Any Port

FCoE/Ethernet support includes compliance with current and emerging standards including data center bridging exchange protocol (DCBX), VLAN switching, FCoE/iSCSI storage attach, link aggregation control protocol (LACP), quality of service (QoS) (via S-tags), jumbo frames, NTP, FCoE forwarder (FCF), and EVB under VEPA.

QSFP Ports: New Bandwidth and Density Advantage

The UA5900 physical architecture includes 52 standard-format 16Gb SFP ports and four ultra-fast QSFP ports , as shown in the Figure 3. Both port types support Fibre Channel, FCoE, and iSCSI.

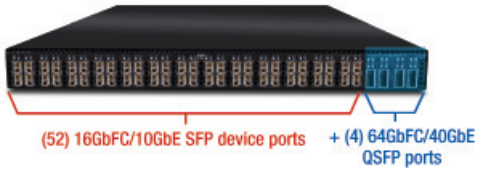

Figure 3. UA5900 SFP and QSFP Ports

Already accepted in leading Ethernet and high performance computing (HPC) solutions, the multi-channel QSFP format offers the bandwidth equivalent of four SFP ports, and may be deployed in either integrated single-cable mode or "breakout" mode:

- Single-cable mode: 64Gb Fibre Channel or 40GbE
- Breakout mode: 4 × 16Gb Fibre Channel or 4 × 10GbE

64Gb Fibre Channel for Turbocharged Interswitch Links (ISLs)

When deployed in single-cable mode, QSFP ports can interconnect multiple UA5900 switches with 64Gb Fibre Channel stacking connections—the fastest SAN speed currently available. This dedicated, concentrated bandwidth eliminates wasting SFP device ports on ISLs, allowing customers to build large SANs with fewer switches, and providing a 75% reduction in cabling cost and complexity. QLogic Adaptive Trunking automatically load balances traffic among redundant stacking links, creating over 500Gb of bidirectional bandwidth potential between switches with no extra trunking fees required.

Past customers will enjoy all the benefits of QLogic's previous-generation stackables, plus an increase of more than 240% in device port density, making the UA5900 an affordable alternative to modular chassis switches and directors for "core" deployments. Like a traditional core switch, the UA5900 supports modular, non-disruptive expansion, predictable performance during expansion, and convenient centralized management of very large port counts. Figure 4 shows a stack of UA5900 switches providing direct connections for devices located in multiple nearby or remote racks.

Fibre Channel "Virtual Core": 64Gb Fibre Channel stacking

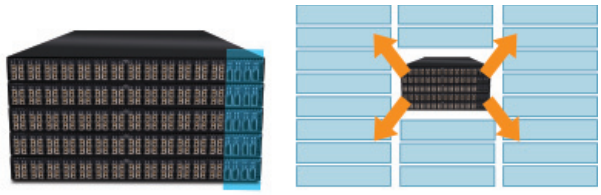

Figure 4. Expandable Centralized Switching Topology

40GbE Uplink Ports

With the CVN license enabled, QSFP ports on the UA5900 will support industry-standard 40Gb Ethernet/FCoE connections to core, end-of-row, or director LAN switches. The UA5900 can now be deployed as a true FCoE top of rack (TOR) switch, as shown in Figure 5, aggregating Ethernet, FCoE, Fibre Channel, or iSCSI "downstream" connections within a rack to a smaller number of easy-to-manage, high-performance "upstream" links. This capability saves valuable core switch ports and reduces overall management complexity.

FCoE TOR: 40Gb DCB Ethernet Uplinks

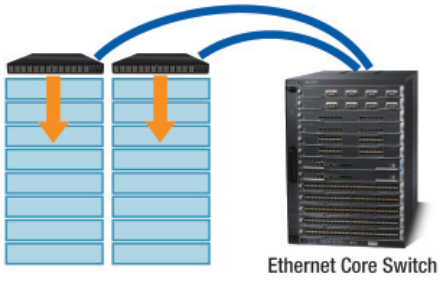

Figure 5. 40GbE Connections to Ethernet/FCoE Core Switches and Directors

QSFP-to-SFP Breakout Expansion

For the ultimate in device port density, each QSFP port may be split into 4 additional SFP connections (up to 16 per switch) using QSFP-to-SFP breakout cables, as shown in Figure 6. Breakout ports have full Flex Port capability and may be configured for either 16/8/4Gb Fibre Channel or 10/1Gb FCoE/Ethernet on an individual basis.

Per-port management is provided by the GUI and CLI, and the switch includes a dedicated hardware LED for each potential breakout port. (In single-cable QSFP mode, these extra LEDs are not lit.) Industry-standard breakout cables are available in copper and optical formats and may run directly to servers and storage, or to a separate distribution patch panel.

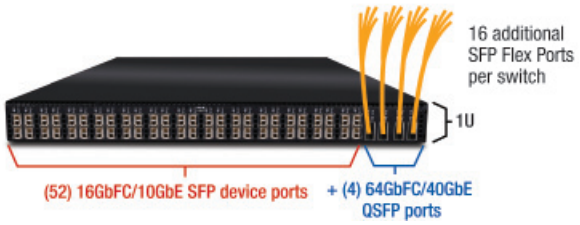

Figure 6. UA5900 Deployed with QSFP-to-SFP Breakout Cables

Simultaneous Transparent and Full-Fabric Services

In both Fibre Channel and Ethernet modes, the UA5900 can connect *transparently* to remote fabrics over any format port, ensuring universal interoperability and reducing management complexity in heterogeneous, multi-vendor environments. However, unlike other products, the UA5900 can provide transparent remote links while maintaining full-fabric Fibre Channel services for locally attached servers and storage.

Hybrid Fabrics and Enhanced Transparent Routing (ETR)

When required, the UA5900 uses standard N_port ID virtualization (NPIV) to present storage and physical or virtual hosts directly to a core fabric without consuming a domain ID or introducing an additional management point on that fabric.

The new QLogic Hybrid Switch and ETR features let users partition the UA5900 to provide load balanced, transparent NPIV links on user-designated groups of ports, while simultaneously delivering fabric services on the remaining ports. Ports in the fabric partition can directly connect storage/host devices within the rack, while ports in transparent partitions establish high-performance, "lightly managed" conduits to one or more remote networks.

Traditional E_port interoperability challenges are bypassed as the UA5900 instead uses transparent fabric (TF) ports to connect to the remote fabric. As shown in Figure 8, the remote fabric does not see the UA5900 from a management perspective—only the attached N_port devices are presented. Transparent and fabric partitions on the UA5900 can be any size, and partitioned ports do not need to be contiguous.

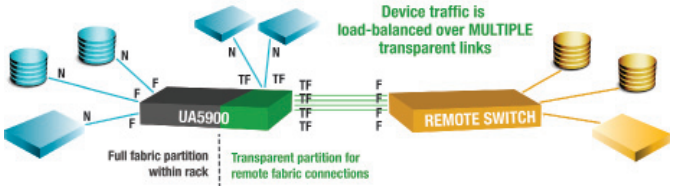

Figure 7. Remote Fabric Only Sees N_Port Devices

Simplify Your Network Edge with VEPA

The UA5900's VEPA service offers similar transparent deployment benefits for Flex Ports in Ethernet mode, providing a simpler, more cost-effective alternative to TOR devices with full Layer 2/3 capabilities. Critical Layer 2 functions such as QoS (via S-tags), link aggregation and VLANs are maintained—however, users are not required to configure the large spanning tree domains (STDs) and complex ACLs required for local Ethernet switching and independent security at the edge. With VEPA, networks become easier to manage centrally using familiar core switch tools, ultimately reducing the possibility for errors, glitches in network policy enforcement, and costly security lapses.

VEPA also simplifies virtual machine (VM) environments by sending all VM Ethernet traffic to a network-based switch, allowing VMs to be monitored and managed directly using core switch tools.

Dynamic Network Connections for Private Cloud, PODs, and Other Solutions

Together, the Hybrid Switch and VEPA features described earlier allow the UA5900 to serve as a unique and flexible building block for modular, highly portable rack solutions. As shown in Figure 8, the combination of local fabric services and transparent access to any Fibre Channel, FCoE, or Ethernet network ensures that you will never need to rewire your rack when external conditions change. Solution providers can tune and "lock down" robust, self-contained configurations while maintaining high-performance access to enterprise resources with any ratio of port aggregation. This makes Universal Access Point solutions easy to replicate as deployment templates in diverse customer environments—a key prerequisite for scalable POD and cloud strategies.

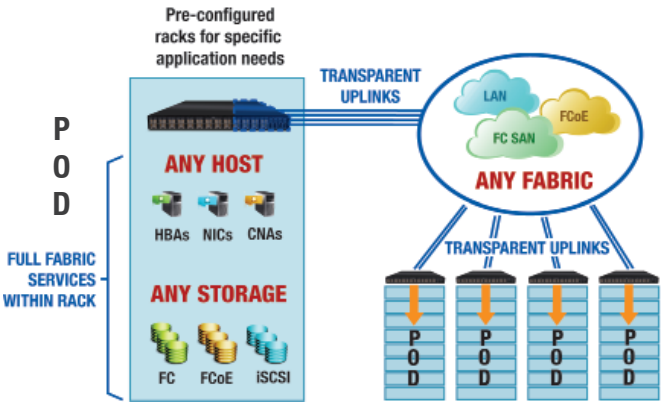

Figure 8. "Wire-Once" Simplicity: No Need to Reconfigure Rack as External Network Evolves

Easy, Affordable Management

Hybrid Fabrics and VEPA settings are conveniently accessible via the onboard QuickTools GUI, along with a host of other capabilities, including Setup Wizards, Port/Device Statistics and intuitive Drag-and-Drop Zoning administration. There is no software to install—simply point a web browser at any switch, and manage the entire fabric securely from that location.

For advanced administration of the largest environments, the optional Enterprise Fabric Suite provides an unprecedented level of intuitive control with additional features such as Topology View, Fabric Tracker, Performance View, Port Threshold Alarms and Historical Trending. With Enterprise Fabric Suite, users can manage mixed stacks of 5000 Series products as a single device, loading firmware, applying security configuration changes, and handling user and SNMP administration for up to six switches simultaneously. These capabilities are bundled into a single site-licensed package, so you'll spend less time and money licensing individual per-switch features—or worrying about ballooning management costs as your SAN grows.

Fast, Reliable, Secure

The UA5900 offers over two terabits of aggregate bandwidth with uncontested "wire speed" performance at every port, plus the lowest switch latency in the industry. Performance remains high, even in multi-switch configurations, as built-in ISL capacity expands automatically with device port count, ensuring a consistent user experience. Bandwidth utilization is optimized between switches via the included Adaptive Trunking feature, which pools the capacity of multiple ISLs into a single high-speed pipeline. Trunks are employed automatically, eliminating the need for manual configuration. Unlike other trunking implementations, trunked ports need not be sequential, and may be distributed across multiple switches in any port combination. Switch-on-exchange design supports Intelligent Path Selection, Fabric Shortest Path First, and Virtual Trunking.

Reliability features include dual, hot-swappable power supplies, non-disruptive code load and activation (NDCLA), and I/O StreamGuard™, which guarantees bandwidth for time-sensitive applications such as video streaming, even when servers crash. These features give the UA5900 the ability to deliver overall system availability greater than 99.999 percent.

The included Fabric Security bundle provides a powerful mix of advanced protection features for user, connection, and device security. This includes support for remote authentication dial-in user service (RADIUS) authentication, and SSH and SSL encryption. Device connection security uses Fibre Channel Security Protocol (FC-SP), DH-CHAP, and FC-GS-4 CT.

Declare Fabric Freedom

QLogic Universal Access Point products are the perfect on-ramp for all existing and next-generation infrastructure strategies. Deploy Converged Network Adapters or Host Bus Adapters today with confidence, knowing the UA5900 will continue to connect them to whatever network or storage you choose to deploy in the future.

QLogic Universal Access Point is:

- The industry's most evolved Fibre Channel solution
- FCoE future-proofing—a comprehensive platform to converge the server edge at *your* pace
- Simple, transparent access to any SAN or LAN

Having 16Gb Fibre Channel opens new worlds of storage networking performance—but that is only the beginning. QLogic Universal Access Point goes beyond 16Gb to prepare your servers for the one constant of technology planning: *change*.

Once your servers are attached to the UA5900, you may never need to touch their network connections again. There will be more time to focus on other aspects of your environment, where QLogic Universal Access Point gives you the freedom to change, to innovate—and ultimately, to succeed.

Network Interfaces/Scalability

Port Configuration

- All ports are Flex Ports, and may be configured for either Fibre Channel (F, FL, E, G, GL, TR, TF, TH) or Ethernet

Ports per Chassis

- 24 to 52 SFP+ ports (activate via license key)
  - 16/8/4Gb Fibre Channel
  - 10/1Gb Ethernet
- 4 QSFP ports
  - Single-cable deployment
    - 64Gb Fibre Channel
    - 40Gb Ethernet
  - Using QSFP-to-SFP breakout cables
    - 4 additional individually-configurable lanes each of 16/8/4Gb FC and/or 10/1Gb Ethernet

Multiswitch Fabric Support

- Fibre Channel: Stack, cascade, cascaded loop, mesh
- FCoE/Ethernet: TOR topologies
- Adaptive trunking and intelligent path selection

Fibre Channel Specifications

Fibre Channel Protocols

- Physical Interface (FC-PI-5)
- Line Services (FC-LS-2)
- Framing and Signaling (FC-FS-3)
- Generic Services (FC-GS-6) except for enhanced zoning
- Switch Fabric (FC-SW-5)
- Arbitrated Loop-2 Rev. 7.0 (FC-AL-2)
- Tape Technical Report (FC-Tape)
- Virtual Interface Architecture Mapping (FC-VI)
- Fabric Element MIB Specification (RFC 2837)
- Fibre Alliance MIB Specification (Version 4.0)
- Methodologies for Interconnects (FC-MI-2)
- Device Attach (FC-DA; Security Protocols (FC-SP)

Fibre Channel Classes of Service

- Class 2, Class 3, and Class F (inter-switch frames) connectionless

Modes of Operation

- Fabric, public loop, broadcast

Ethernet Specifications

Layer 2 Features

- Jumbo frames on all ports (up to 9216 bytes)
- Link Aggregation Control Protocol (IEEE 802.3ad)
- Support for up to 4096 VLANs
- MAC address table entries: 34,000

Compliance

- 10G Ethernet (IEEE 802.3ae)
- QinQ (IEEE 802.1ad)
- VLAN Tagging (IEEE 802.1Q)
- Pause Frames (IEEE 802.3x)
- 40Gb Ethernet (IEEE 802.3ba)
- VEPA (IEEE 802.1Qbg)

QoS

- Layer 2 (IEEE 802.1p (COS)
- Per port QoS configuration
- Four priority levels for QoS

Security

- VLAN-based ACLs

FCoE Specifications

Compliance

- Priority-based Flow Control (IEEE 802.1Qbb)
- Enhanced Transmission Selection (IEEE 802.1Qaz)
- Data Center Bridging Exchange (IEEE 802.1Qaz 1108-v1.01)
- FC-BB-F FCoE (Rev. 2.0)
- Bridging to Fibre Channel SANs
- Direct attach of FCoE devices

Performance Features

Fabric Port Speeds

- Full-duplex line rate on all ports
- Fabric latency less than 0.2µs
- Cut-through routing

Aggregate Bandwidth

- 2176Gbps per chassis; non-blocking architecture

Maximum Frame Sizes

- Fibre Channel: 2,148 bytes (2,112 byte payload)
- Ethernet: 9,216 bytes

Per-port Buffering

- ASIC-embedded memory (non-shared)
- Guaranteed 64-credit, multi-read port buffer

Media

- Hot-pluggable, industry-standard 3.3V SFP+ transceivers for 16GbFC/10GbE ports (compatible with 8/4Gb SFPs)
- Hot-pluggable, industry-standard QSFP optics or integrated copper cables for 64GbFC/40GbE ports

Supported SFP Types

- FC: Shortwave/longwave optic
- FCoE/Ethernet: Shortwave optic, active copper, Twinax

Supported QSFP Types

- FC: Shortwave optic, copper, breakout
- FCoE/Ethernet: Shortwave optic, copper, breakout

Cable Types

- 50/62.5 micron multimode fiber optic
- 9 micron single-mode fiber optic

Interoperability

- Compatible with FC-SW-2 compliant switches including Brocade®, Cisco®, and McDATA®
- NPIV-based Hybrid Switch and Transparent Router
- VEPA support
- Interoperable with leading SAN management applications

Management

Management Methods

- Separate SAN and LAN administration
- QuickTools Web applet
- CLI-based console for out-of-band-management
- Enterprise Fabric Suite (optional)
- API, GS-4 Management Server (including FDMI)
- SNMP, NTP, RADIUS, FTP, TFTP, and SMI-S

Access Methods

- 10/100/1000 Ethernet BaseT (RJ45), serial port
- (RS.232 with DB9) and inband (Fibre Channel)

Diagnostics

- Power on self test (POST), SYSLOG
- Included SANdoctor fabric diagnostics software

Fabric Services

- Simple name server, hardware-based zoning, RSCN, I/O StreamGuard, multi-chassis in-order delivery, automatic path selection, FDMI, NPIV support, IPv4/IPv6 support

User Interface

- LEDs, command line console, and Web utilities

Mechanical / Power / Cooling

- Dual, hot-swap power supplies/fans
- Optional rail mount kit
- Power-side to port-side air flow
- RoHS compliant

Dimensions

- H × W × D: 43.2 × 432 × 610mm (1.7 × 17 x 24in)

Weight

- 9.8kg (21.6lbs)

Electrical

- Power consumption: 192W typical maximum (full traffic on 52 SFP, plus 4 QSFP ports)
- Voltage: 100–240VAC; 50–60Hz
- Power load: 1.6A at 120VAC, 0.8A at 240VAC

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