

**EAT•N**

**Powerware**

**Powerware® 9395 UPS**

Product Focus

225-825 kVA



Powerware 9395  
225-825 kVA

## Introduction and overview

With an unprecedented level of power performance, reliability, and energy savings, the state-of-the-art Powerware 9395 UPS has raised the bar in three-phase power protection technology. As IT managers, facility managers and CIOs feel increasing pressure to achieve zero downtime, and to scale the data center to meet ever-changing requirements, the search for the most reliable and efficient power protection system has become even more critical. But that search is now over. For more than 40 years, Eaton® has been dedicated to delivering the most technologically advanced products for our customers' mission-critical applications—a commitment exemplified by the new Powerware 9395. More than an innovative, cutting-edge UPS, it's a quantum leap in three-phase technology.

The Powerware 9395 delivers a wide scope of superior customer-driven benefits unmatched by competitor's UPS solutions, including:

### Leading Sustainability

- Highest efficiency ratings
- Lowest total cost of ownership and lifecycle carbon footprint
- Smallest footprint and weight
- Lowest transportation and installation costs

### Stronger Power Performance

- Lowest input THD enhances compatibility with upstream power systems
- Lowest output THD
- Optimum generator sizing
- PFC power supply compatible
- Highest efficiency

### Highest Reliability and Availability

- Hot Sync® wireless paralleling
- Superior battery management
- Inherent redundancy
- Scalable architecture adapts to increasing power requirements

### Robust Manageability

- Superior control monitor and connectivity

### Key applications

- Large data centers
- Server farms
- Telecommunication installations
- Internet service providers
- Transportation systems
- Security operations
- Broadcasting and entertainment
- Process control equipment
- Financial systems
- Credit card operations
- Healthcare
- Industrial systems
- Multiple medical imaging units

## The reliable solution

When it comes to reliability, the Powerware 9395 leaves competitor's UPSs in the dust. Providing high availability for your critical systems at all times, the Powerware 9395 was designed with numerous technological advancements that create an unprecedented level of reliability while emphasizing serviceability—lowering MTTR and enhancing availability.

### Double-conversion design offers the highest protection possible

Unlike some other commercially available UPS technologies, the double-conversion design completely isolates output power from all input power anomalies and delivers 100-percent conditioned, perfect sine-wave output—regulating both voltage and frequency. Even when presented with the most severe power disturbances, power output remains stable. Output voltage THD is held within two percent of nominal specification for linear loads, and within five

percent for nonlinear loads—making the Powerware 9395 ideal for supporting equipment that is sensitive to a distorted voltage input. Additionally, the Powerware 9395 excels at supporting leading power factor loads, which are becoming more prevalent in new or updated data centers. The Powerware 9395 handles down to 0.9 leading power factor without derating.

### Inherent redundancy option

Surveys focused on efficiency in data centers reveal that UPSs are often under-loaded—frequently at less than 50 percent. To capitalize on this trend and create even greater reliability, you have the option to configure the Powerware 9395 with inherent redundancy. Traditional UPS manufacturers cannot deliver this additional availability without adding a more costly second UPS module.

**Inherent redundancy option:**  
When at or below 50% capacity, the Powerware 9395's uninterruptible power modules (UPMs) automatically act as N+1 redundant systems



UPM #1

UPM #2

Powerware 9395 550 kVA

## Powerware Hot Sync technology: The culmination of power reliability and systems availability

In systems with multiple uninterruptible power modules (UPMs), the Powerware 9395 leverages the synchronization, load sharing and selective trip capabilities of Eaton's patented Powerware Hot Sync® technology. These capabilities are integral to the ultimate systems availability that is the primary requirement for any parallel UPS configuration.

### How does Eaton do it better?

Hot Sync utilizes a peer to peer control architecture, as opposed to the ubiquitous master/slave controls found in competitive systems. This unique architecture eliminates the need for a single UPM to depend on any outside source for its control. The multiple UPMs simply monitor their own internal metering, and use simple mathematical computations to remain synchronized, share the load equally, and detect and isolate malfunctions. This wireless architecture, eliminates huge bundles of control wiring, hundreds of electrical connections, and removes the need for a failure-prone central control.

Ultimate reliability in the implementation of parallel AC power systems has been proven over the past four decades to be a function of the following two key attributes: System autonomy and simple instrumentation.

The Hot Sync system functions automatically without any dependence on centralized, external control.

Furthermore, because Hot Sync systems do not require extra circuitry or added complex wiring in order to function in parallel, these designs significantly enhance reliability over other parallel systems that utilize elaborate sync control loop wiring, load share error loop wiring, selective trip detection loops, mechanical relays, multiple specialized PC boards, extra EMI isolation and specialized firmware. The failure of any of these complex controls results in an unstable system. Hot Sync eliminates this complexity, enhancing reliability.

### Key design features of Hot Sync systems

- No system-level single point of failure
- Paralleled UPMs operate completely independently. One module cannot affect or interfere with the others – no domino effect scenario
- No added circuitry is required for parallel operation. Any standard UPS can be used in a parallel system without modification
- This patented and proven technology, has been successfully deployed in thousands of systems around the world.

## Powerware Sync Control technology

Powerware Sync Control ensures that the output of two (or more) separate UPSs (single modules or parallel systems) remain in phase with one another so static transfer switches connected between the separate distribution paths may change state seamlessly when necessary.

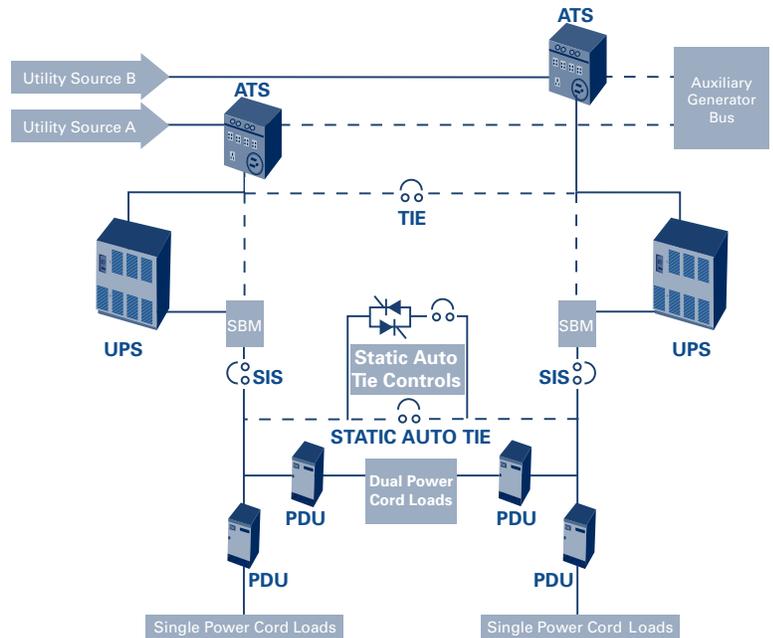
## Powerware Static Auto Tie

The Powerware Static Auto Tie (SAT) system enhances reliability even further so full load transfers can be made autonomously. The Powerware SAT system adds a single wrap-around static switch to the tie breaker in the Powerware Hot-Tie system, then adds intelligent controls so a power protection system made up of two or more separate UPS systems can **automatically transfer entire** loads in the event of failure of one side of an A/B distribution system. This eliminates the need for numerous downstream static switches and costly wiring.

In the SAT configuration displayed in the diagram below, there is a static auto tie circuit between the outputs of the two UPS modules that automatically transfers the loads from one to the other as necessary. This less complex, dual-path architecture streamlines the distribution system to eliminate series switching elements and reduce the potential downtime of single power cord loads by up to 50 percent. As a result, the SAT architecture offers a number of benefits, including:

- Reduced capital expenses and installation costs
- Eliminates need for traditional downstream static transfer switches
- Increased system reliability and efficiency
- Decreased maintenance requirements
- Reduced raised floor space requirements

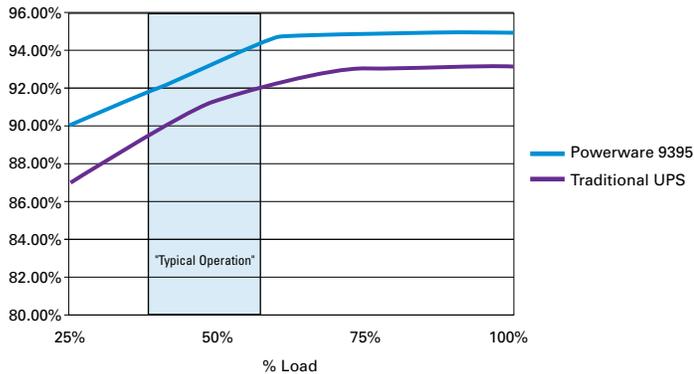
### Fully Deployed Static Auto Tie Configuration



## The importance of system efficiency

To demonstrate the importance of total system efficiency in relation to load level, the graph below shows how efficiency generally dips as load level decreases. In general, manufacturers list an optimal efficiency rating at full load. In reality, however, most three-phase UPSs operate in the range of 30-50% load. As a result, it is extremely important to evaluate the efficiency of a UPS at lighter loads as this graph depicts.

**Efficiency vs. Load**



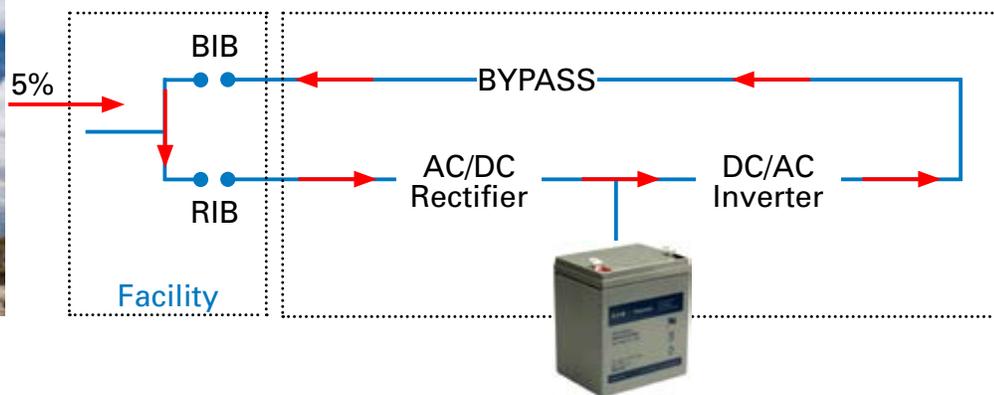
## Easy capacity load testing

The Powerware 9395 has the unique ability test its entire power train under full load stress without the requirement of an external load. With no load connected, the Powerware 9395 is able to test all of its power handling components, including the rectifier, inverter, contactors, fuses, power busses, cabling, batteries, bypass (static switch), magnetics, and filter capacitors. The net result of this innovative load test is that there are no load banks to rent, no temporary load connections to make, and no wasted energy. Furthermore, the Powerware 9395 has the ability to test the upstream bypass input breaker (BIB), the rectifier input breaker (RIB), and all of the electrical cables between them. This load test feature can take the place of most traditional load bank tests to save you time and money during startup and commissioning.

Eaton field technicians are trained to use this load testing capability during a startup service to ensure optimum calibration and, maximum efficiency, and inherent redundancy. As a result, they can produce a report that verifies these tests and overall performance of the UPS. All preventive maintenance visits included with PowerTrust Service Plans for the Powerware 9395 include this unique load testing feature to ensure that the UPS is operating optimally. It also validates the performance of an installed UPS and can simulate various operations and power transfers.

## An Eaton field technician applies full load, tests and calibrates

- Rectifier
- Inverter
- Battery – with option full battery discharge test
- BIB
- RIB
- Static bypass switch
- Fuses
- Contractors
- Conductors



**No Output Connection And Load Bank Needed**

## Scalable, redundant architecture meets current and future requirements

The Powerware 9395 combines the reliability and redundancy of a multi-module UPS into an integrated, pre-wired solution. With a unique, flexible design that provides scalability, the UPS can adapt to future changes in load demands and new requirements for higher reliability without requiring the purchase of an additional UPS. For example, the Powerware 9395 UPS enables you to add a 275 kVA UPM in the field for N+1 redundancy or capacity.



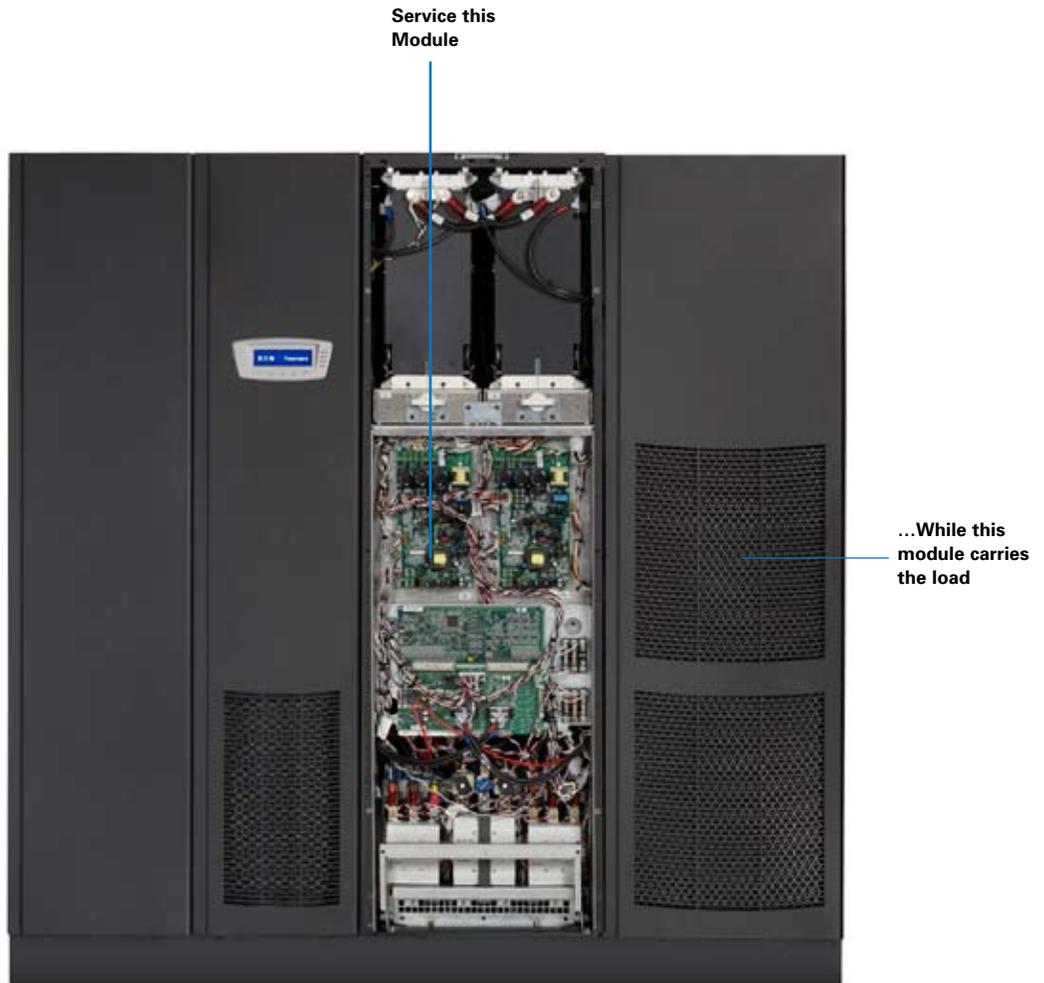
Powerware 9395 825 kVA

## Concurrent maintenance: Higher availability

With Powerware 9395 redundant models, Eaton field technicians can completely isolate and service a redundant module while the other module carries the load—*without going to bypass for service*. The Powerware 9395 also features a completely front-accessible design and can be installed against walls or back to back in multi-module configuration. This service-friendly design enhances maximum uptime and availability.

## Ease of installation

Traditional multi-module installations require up to three times the footprint for power modules and tie cabinets. In contrast, the Powerware 9395 is a completely integrated large system that incorporates multiple power modules and system switchgear on factory pre-wired bases. Since everything is pre-wired, cabling costs and installation time are significantly reduced.



Powerware 9395 550 kVA

## 825 kVA N+1: Powerware 9395 vs. Competitor

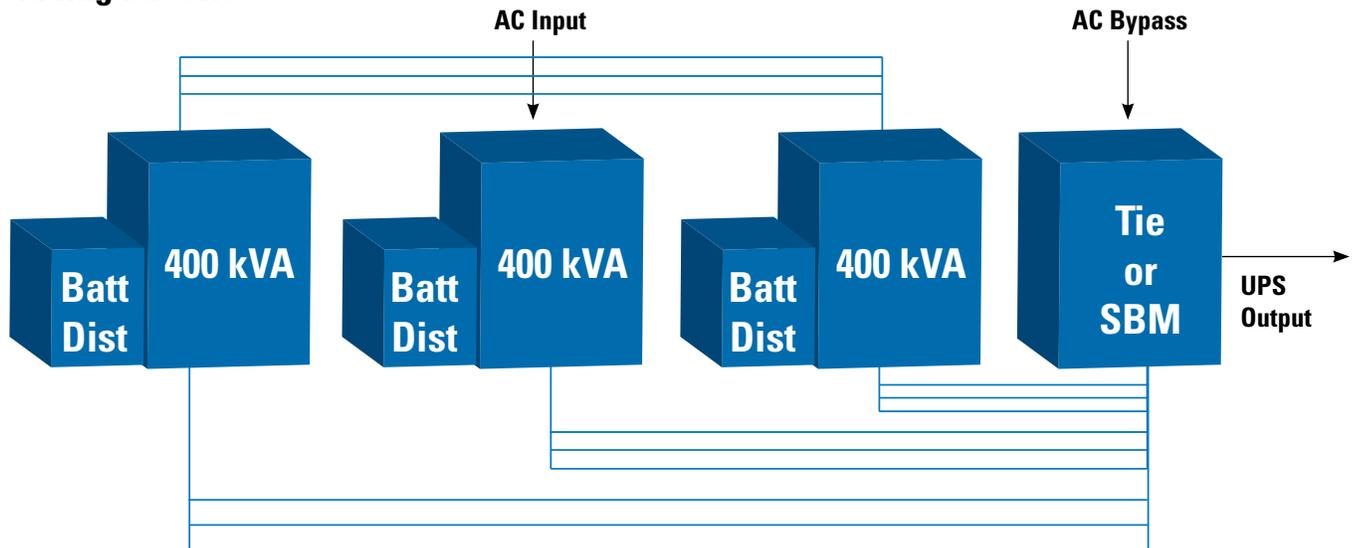
### Competitor Solution

125 sq. ft.

19,215 lb system weight\*

Extensive site wiring

\*Excluding batteries



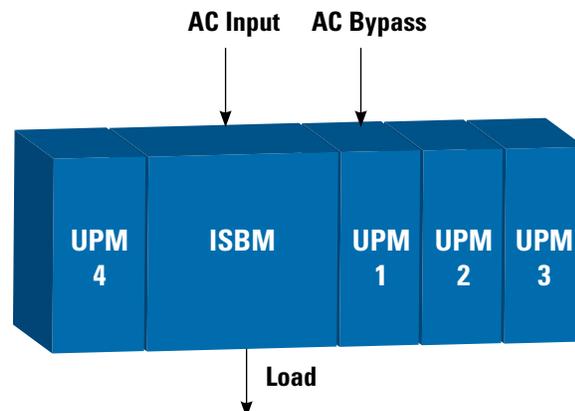
### Powerware 9395 Solution

39 sq. ft.

6,365 lb system weight\*

Minimal site wiring

\*Excluding batteries



#### Greatly reduced footprint

The Powerware 9395 UPS offers the smallest footprint and lowest weight of any UPS in its class—50 to 60 percent less than competitive units. In fact, the Powerware 9395 fits a redundant design into the same footprint as a traditional, non-redundant UPS. The Powerware 9395's smaller footprint not only reduces your total cost of ownership, but also provides a UPS that is approximately half the

weight of legacy and competitive systems. As a result, freight costs are much lower and the smaller size and weight of the UPS make it much easier to handle. In fact, the Powerware 9395 fits easily through all doors and can be transported on freight elevators. Unlike some larger and heavier systems, there is no need to dismantle it to fit it on elevators or through doorways, which can cause significant delays and increase costs.

#### Minimized cabling requirements and expense

In an integrated system such as the Powerware 9395, multi-module systems arrive pre-wired with no need to perform costly and time-consuming inter-unit cabling for power and communications between modules and the system bypass unit. Considering the increasing cost for raw materials such as copper, this savings can be

significant. Cabling enters the Powerware 9395 UPS from either the top or bottom of the cabinet to provide easier and more flexible installation.

#### Reliable Eaton components

The Powerware 9395 leverages reliable and proven electrical components manufactured by Eaton such as Cutler-Hammer circuit breakers and contactors.

## Eaton's total PowerChain Management solution

Eaton views your power system as a strategic asset—an approach we call PowerChain Management®. Eaton's PowerChain Management solutions can help transform complicated power systems into a single, integrated system easily visible and manageable as a strategic business asset, providing a significant competitive advantage.

If your company is like most, its power system was built over time. As the organization's needs changed, additional equipment was likely piece-mealed into the system, with a circuit breaker added here and a transformer replaced there. The result can be a power system that is a complicated mixture of old and new equipment from several different manufacturers. Because there is no common means of communicating across this varied equipment, gathering data across the enterprise can be quite challenging.

### Enhance your business visibility to see the entire picture

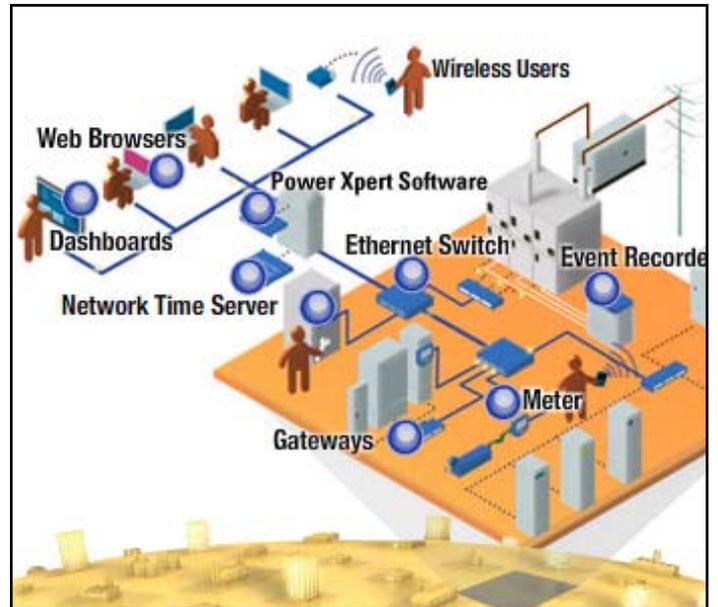
The complexity of gathering data among various devices makes it difficult to get a clear picture of what's happening inside your power system, which decreases your ability to manage your power system effectively. Consequently, business results suffer, because your enterprise depends on its power system.

Eaton's Power Xpert® Architecture, the backbone of our PowerChain Management solutions, enables you to monitor much more than your Powerware 9395 UPS; it transforms your power system into an integrated, agile system that delivers real competitive advantages. With the software and hardware components of Power Xpert Architecture, you can monitor, control, and manage your complete power system effectively and efficiently, including PDUs, batteries and other critical equipment. Using a simple, Web-based interface, the varied elements of your power system are integrated into a single view, with the ability to easily monitor the availability and reliability of electrical power, lower energy costs, extend equipment life, and more.

### Optimize your power system

PowerChain Management can also help you manage your power system for peak performance by integrating and optimizing your power assets and ensuring that they align with your business goals.

Once your power system is linked to an Ethernet network via the Power Xpert Architecture, you can connect to and share information with a variety of applications, such as the building management system monitoring your HVAC equipment, or your enterprise accounting system. Power Xpert Architecture's open standards and scalable approach make it easy for your power system to grow and adapt to a rapidly changing environment.



### Eaton delivers a new level of confidence

The culmination of 40 years of R&D excellence, the new Powerware 9395 UPS delivers the utmost in confidence—confidence that your organization's critical systems are protected by the most reliable, efficient, and full-featured protection solution available. Eaton will be there with you long term, with premium warranty coverage and expert technical support. **To find out more about the Powerware 9395 UPS, visit our Web site at [www.powerware.com/9395](http://www.powerware.com/9395) or contact us at 1.800.356.5794.**



The ConnectUPS-X Web/SNMP Card allows you to connect your Powerware 9395 directly to the Ethernet network and the Internet. This unique solution allows you to conveniently monitor and manage your UPS with a standard Web browser. The ConnectUPS Card is also used to take advantage of Eaton's 7x24 eNotify Remote Monitoring Service.

## Delivering Green Power and Savings

The innovative design of the Powerware 9395 delivers the industry's best performance combination of high efficiency, low input current distortion and high power factor. The Powerware 9395 operates at greater than 94 percent efficiency, reducing utility costs and extending battery runtimes. Higher system efficiency also results in cooler operating conditions, which reduces facility air conditioning cost, extends the life of UPS components, and increases overall reliability, availability, and performance. A new input circuit design within the Powerware 9395 keeps input current THD low and input power factor near unity without compromising overall efficiency. As a result, the UPS allows maximum transfer of power between the power source and the protected load and is exceptionally compatible with multiple power sources, especially auxiliary generators. On the output side, the ultra high-speed switching pulse width modulation (PWM) inverter enables the Powerware 9395 to provide its full rated power capability to the load whether the load power factor is 0.9 lagging, unity, or 0.9 leading.

The use of sustainable materials and highly efficient manufacturing technology results in dramatic savings in carbon footprint and operating dollars versus similar UPS products.

As an example, a large data center (2.2 MVA) would realize the following savings by using a Powerware 9395 in high efficiency mode compared to traditional N+1 systems:

- Additional energy savings: 2917 MW hours
- Additional carbon savings: 2523 tons
- Annual cost savings: \$315,708

### POWERWARE 9395 ANNUAL POWER SAVINGS VS. THE COMPETITION

Model	kVA Rating	Full Load Annual Power Savings	Half Load Power Savings	Cooling Power Savings at Full Load
Powerware 9395	825			
vs. Competitor A	750	\$11,530	\$3843	\$8071
vs. Competitor B	800	\$12,300	\$6149	\$8609

costs calculated at industry average of \$.13 per KWH

### POWERWARE 9395 POWER DENSITY VS. THE COMPETITION (N+2 SYSTEM)

Model	kVA Rating	KW Per Sq. Foot	Annual Space Cost Savings
Powerware 9395	825	19.4	
vs. Competitor A	750	10.5	\$8100
vs. Competitor B	800	9.4	\$9000

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***The innovative design of the Powerware 9395 delivers the industry's best performance combination of high efficiency, low input current distortion and high power factor.***

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## Batteries: Critical to every UPS

When a utility power outage causes a UPS to switch to battery power, it is imperative that those batteries are healthy, charged and up to the task. Improper battery management is the number one cause of downtime. Many UPS batteries on the market today are constantly trickle-charged—a process that degrades the battery's internal chemical composition over time, reducing potential battery service life by as much as 50 percent. To address this, the Powerware 9395 uses a sensing circuit and an innovative three-stage charging technique to significantly extend battery service life and optimize recharge time. In addition, temperature-compensated charging monitors temperature changes, and adjusts the rate of charge to prolong battery life.

### Monitor batteries for optimum readiness

Advances in firmware and digital technology enable the Powerware 9395 to offer sophisticated battery monitoring and management features that you might expect to find only on expensive add-on systems, including:

- Battery runtime remaining monitor uses system loading and trended battery discharge data plus internal sensing points for voltage and current data to calculate runtime remaining
- Battery circuit test performs a periodic full-load test of the battery string to ensure that there are no open circuits or weak cells that would jeopardize battery performance and system availability

In addition to these integrated monitoring features, we offer one year of secure, remote monitoring to provide 7x24 real-time monitoring of more than 100 UPS and battery alarms with eNotify. This real-time information is critical in helping you make management decisions, from scheduling preventive maintenance to determining the best way to reduce loads during an outage.

By ensuring optimal battery health and availability, battery monitoring features raise the reliability of the Powerware 9395 beyond any other UPS in its class.



## Service and support enhance performance

Eaton recognizes that superior power reliability requires flawless execution from its services team. Every Powerware 9395 includes an on-site startup from a factory-trained field technician to insure proper installation, operation, and customer training. In addition, we include a full year of on-site 7x24 parts and labor warranty and service protection plan coverage at no extra charge. Finally, our experts will remotely diagnose, trend, and proactively spot problems and expedite field technicians with appropriate parts when required during the first year with our advanced eNotify Remote Monitoring Service. Included at no extra charge with every Powerware 9395:

- 7x24x365 startup service and customer training
- One-year limited factory warranty<sup>1</sup>
- Service protection plan 7x24 coverage, eight-hour response (upgrade to four- or two-hour where available), parts and labor, unlimited on-site emergency response support
- eNotify Remote Monitoring Service: 7x24 critical alarm notification and monthly reports on UPS and battery health
- 7x24 technical support access



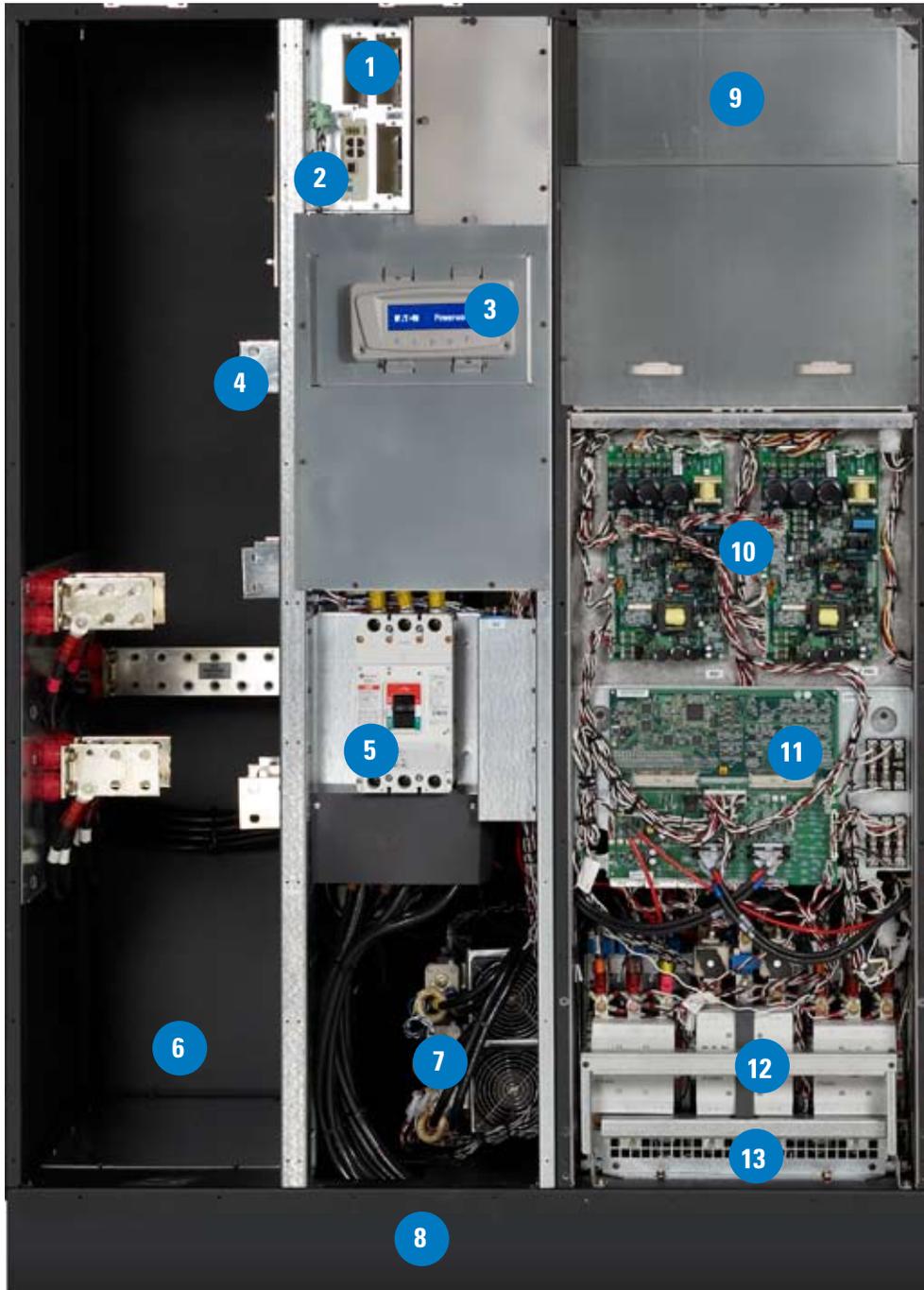
Sent via email to as many as six site contacts, the eNotify monthly Customer Monitoring Report provides a summary of the top 10 performance and environmental parameters, battery events, availability percentage, and comparative status against recommended specification.

In addition to the warranty and first year of on-site coverage, Eaton offers a wide variety of support agreements for continued preventive and emergency response maintenance. PowerTrust Service Plans include:

- UPS and battery scheduled preventive maintenance
- Parts and labor coverage for electronics and/or batteries
- Factory-trained technicians with genuine Powerware parts and diagnostic tools
- eNotify Remote Monitoring Service
- Available coverage: 7x24, eight/four/two-hour response, or 8x5 next business day response
- 7x24 technical support access

<sup>1</sup> Refer to the Eaton Electrical Inc. Limited Factory Warranty for Powerware three-phase UPS products for specifications, limitations, and terms. Service and support specifications may vary by country.

## A closer look inside the Powerware 9395



### ISBM Section

### UPM Section

1. X-Slot® Communications (4 slots)
2. ConnectUPS-X Web/SNMP Card
3. 8-line Backlit LCD
4. AC Input and Output Connections
5. Input Circuit Breaker Option
6. Top or Bottom Entry
7. Static Bypass (continuous duty)
8. Base with Inter-unit Cabling
9. Double-conversion topology converter/inverter section
10. Redundant Power Supplies
11. Redundant Fans
12. Input and Output Contactors
13. UPM easy service disconnect

# Technical Specifications<sup>2</sup>

## UPS Rating (0.9 power factor)

kVA	225	275	450	500	550	650	750	825
kW	202	250	405	450	500	585	675	750

## General Characteristics

Efficiency	>94%
Parallel Capability	Up to 3 modules, 550 kVA , up to 4 modules, 825 kVA
Audible Noise	< 76dBA @ 1 meter
Altitude (max)	2000m at 40°C (104°F)
N+1 Redundancy Capable	Yes
Field Upgradeable	Yes, 275 kVA increments
System Bypass Module	Included

## Input Characteristics

Voltage	480V standard; 208V and 600V with isolation transformer options
Voltage Range	+10% / -15%
Frequency Range	45-65 Hz
Power Factor	0.99 (minimum)
Input Current Distortion	<3.5% (no input filter required)
Soft Start Capability	Yes
Internal Backfeed Protection	Yes

## Output Characteristics

Voltage	480V standard; and 600V with isolation transformer option
Regulation	±1%
Inverter	PWM with IGBT switching
Voltage THD	<2% (100% linear load); <5% (non-linear load)
Load Power Factor Range	Up to a .9 power factor leading without derating

## Battery

Battery Types	VRLA, AGM, Gel, Wet Cell
Battery Voltage	480V
Temperature Compensation	Optional
Charging Method	ABM technology or Float, Selectable

## Dimensions and Weights

225 kVA, 275 kVA	52.4" w x 32.7" d x 73.6" h	1786 lb
225 kVA redundant, 275 kVA redundant	73.7" w x 32.7" d x 73.6" h	2875 lb
450, 500, 550 kVA	73.7" w x 32.7" d x 73.6" h	2977 lb
450, 550 kVA redundant	95.4" w x 32.7" d x 73.6" h	4153 lb
Field upgrade module, 225 or 275 kVA	21.3" w x 32.7" d x 73.6" h	1176 lb
650, 750, 825 kVA	140.9" w x 32.7" d x 73.7" h	5065 lb
650, 750, 825 kVA +1 redundant	170.2" w x 32.7" d x 73.7" h	6365 lb

## General Characteristics

Control Panel (LCD)	8 lines x 40 characters
Battery Startup	Standard
Frequency Conversion	Standard
Multi-language	Standard
Building Alarm Inputs	5 (galvanic isolated)

## Options

External Maintenance Bypass	
Powerware PDU, RPP, and STS	
External Input Isolation Transformer	
External Output Transformer	
Maintenance Bypass Module, Matching cabinet, 2/3/4 breaker	
DC Disconnects	
65 or 100 kAIC Input Breakers	

## Certifications

Safety	UL1778, cUL
EMC	IEC 62040-2, EN50091 Class A (Restricted Access)

## eNotify Remote Monitoring

7x24 remote monitoring of UPS and battery alarms, daily heartbeat check and monthly report. eNotify requires the ConnectUPS-X Web/SNMP Card and Environmental Monitoring Probe.

## Communications

Software Compatibility: Power Xpert  
 Communications Cards: Four communication bays standard. The following connectivity options can be installed at any time:

- ConnectUPS-X Web/SNMP Card (included)
- ModBus RTU Card
- AS/400 Relay Card
- Industrial Relay Card
- Powerware HotSync CAN Bridge Card
- Environmental Monitoring Probe (included)
- Modem Card

Remote Inputs/Outputs: Five building alarm inputs and one summary alarm contact (5A @ 120V) standard  
 Remote Monitor Panel: Eight backlit status indicator lamps plus an audible horn

2. Due to continuing improvements, specifications are subject to change without notice.

Powerware 9395  
225-825 kVA

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Denmark: 45.3686.7910  
Finland: 358.94.52.661  
France: 33.1.6012.7400  
Germany: 49.7841.666.0  
Italy: 39.02.66.04.05.40  
Norway: 47.23.03.65.50  
Sweden: 46.8.598.940.00  
United Kingdom: 44.1753.608.700



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Management™  
Solutions**

ASIA PACIFIC  
Australia: 61.2.9693.9366  
New Zealand: 64.0.3.343.3314  
China: 86.21.6361.5599  
HK/Korea/Taiwan: 852.2745.6682  
India: 91.11.2649.9414 to 18  
Singapore/SEA: 65.6825.1668

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