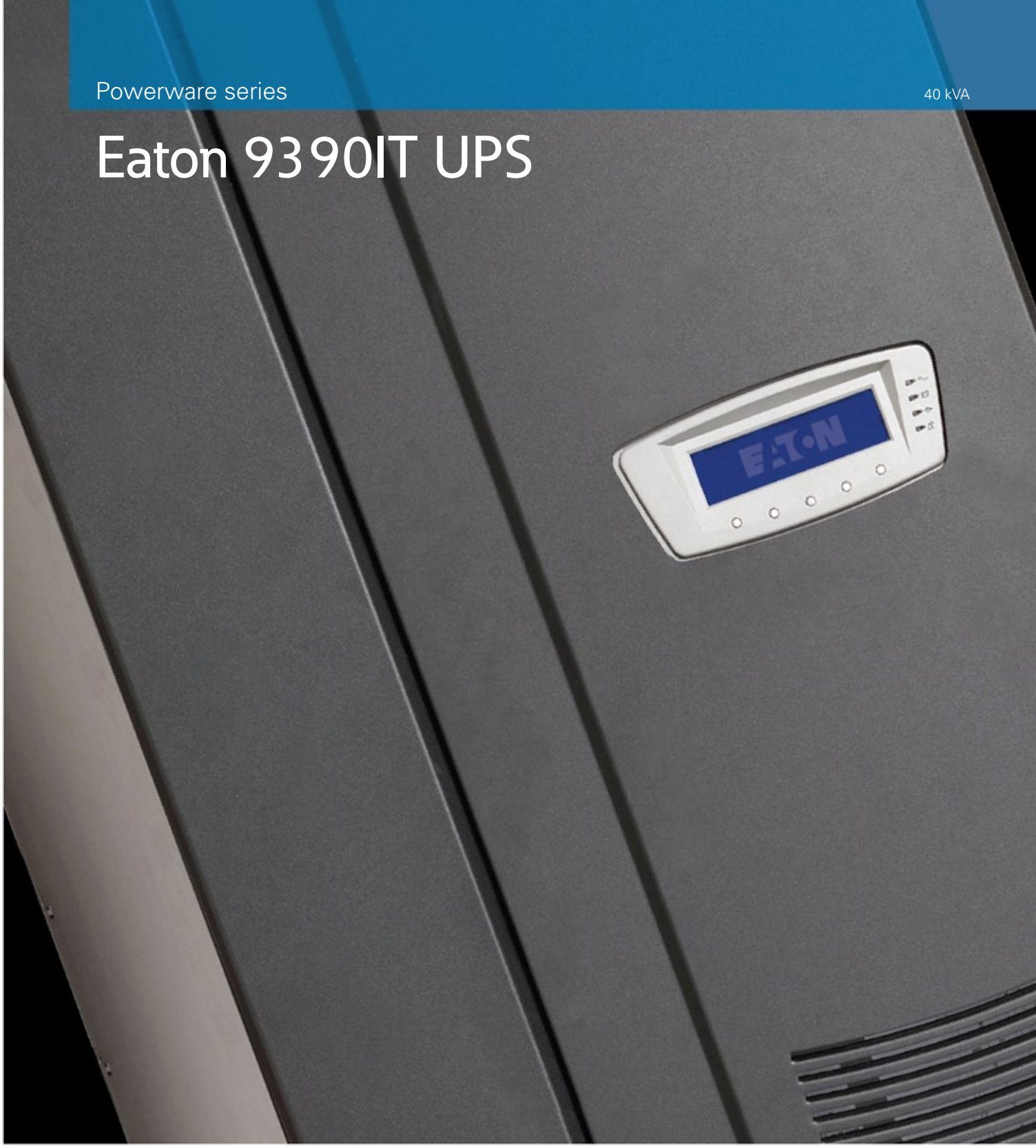
Powerware series

40 kVA

Eaton 9390IT UPS



Powering Business Worldwide

Eaton 9390IT.

Efficiency.

The Eaton 9390IT uninterruptible power system (UPS) is a double-conversion UPS that resolves all utility power problems and supplies clean, continuous, uninterruptible power to connected equipment – delivering superior power protection for the ever expanding loads in today's shrinking data centers.

The 9390IT offers an industry-leading combination of flexibility, scalability and power density – with a sleek, end-of-row tower design. With a rating of 40 kVA and standard internal batteries eliminating the need for costly and space-consuming external battery cabinets, the 9390IT offers the smallest footprint of any comparable UPS.

9390IT 40 kVA

9390IT features and benefits

- All-in-one space efficient, completely integrated system with internal batteries and distribution delivers optimal end-of-row data center solution
- Double conversion topology protects equipment from all of the most common power problems
- Industry leading power density, providing up to 23 percent more power capacity in a compact all in one tower with internal batteries
- Industry's smallest footprint at 40 kVA, providing up to a 61 percent footprint reduction
- Up to 40 percent more standard runtime, eliminating the need for external battery cabinets.
- On-board pre-wired maintenance bypass and integrated distribution cabinets provide greater redundancy and reduce installation and maintenance costs
- Reduced footprint extended run modules for longer runtime applications
- Inherently 208 or 480V capable with no transformers
- Patented Powerware® Hot Sync paralleling technology enables paralleling of up to four 9390 UPSs for additional capacity or redundancy
- Power management software suite includes applications for remote UPS monitoring, management and shutdown to help insure system and data integrity
- Highest efficiency in its class

Product snapshot

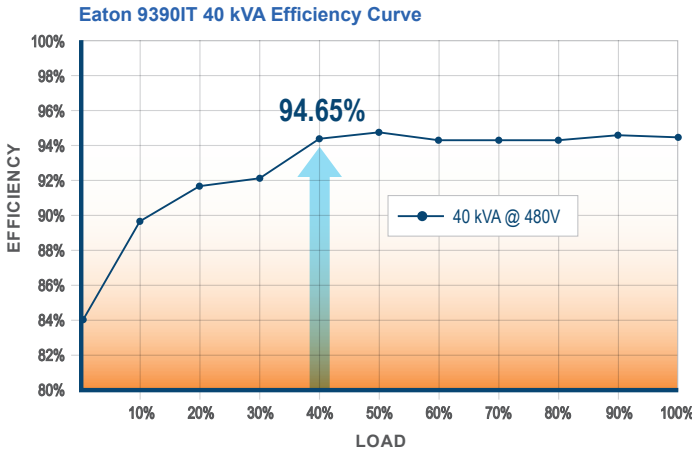
Power rating:	40 kVA at 0.9 power factor (three phase)
Form factor:	End-of-row tower, black
Topology:	Double conversion
Battery backup:	8 minutes at full load with internal batteries, expandable to 66 minutes
Voltage:	208, 480V
Frequency:	55-65 Hz
Dimensions:	73.7"H x 27.9"W x 31"D

Energy efficiency means substantial cost savings

All UPSs consume energy to operate, and some unused energy is dissipated as heat as it passes through the UPS—the more heat and dissipated energy, the higher cost of operation. The efficiency rating of a UPS measures how little energy is wasted. For example, a 90 percent efficient UPS delivers 90 kW of useful power for every 100 kW taken in. With a transformerless design and sophisticated sensing and control circuitry, the 9390IT delivers an efficiency of up to **94 percent** with double-conversion protection. In addition to the cost savings, this enhanced efficiency extends battery runtimes and produces cooler UPS operating temperatures, extending component life and increasing reliability and performance.

Consistent efficiency throughout UPS load range

Many UPSs cite greater than 90 percent efficiency without mention of low or no load range. Today's average system operates at only 55 percent of its rated load or capacity range. However, efficiency is usually reduced in this lower load operating status. Unlike conventional UPS models, the 9390IT reaches optimal efficiency rates at less than half load and maintains this optimal efficiency throughout the load range!



Green power performance

The 9390IT delivers the industry's best combination of low input current distortion and high power factor for maximum efficiency. Operating at greater than 90 percent efficiency at all load ranges, the 9390IT helps to reduce utility costs, extend battery runtimes and produce cooler operating conditions.

In addition, Eaton's use of sustainable materials and highly efficient manufacturing technology results in dramatic savings in carbon footprint as compared to competitive UPS products.

Power factor performance maximizes compatibility and meets high power factor load requirements

Power factor (PF) describes the slight phase shift between voltage applied to a circuit and current that the circuit draws in response to the applied voltage. The maximum power factor possible is unity (1.0), or no phase shift between the voltage applied and the circuit current response maximum transfer of power between source and load. However, in the real world, the UPS must be able to accept power from and deliver power to circuits that have a wide range of power factors. Older or worn equipment often results in lower power factor readings. Some new servers operate at unity power factor. Lightly loaded facilities such as brand new data centers, can often show leading power factor readings. On output, the ultra high-speed switching pulse width modulation (PWM) inverter enables the 9390IT to provide its full rated power capability to the load, down to 0.9 leading power factor without de-rating.

Double-conversion design offers highest available protection

Unlike 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, providing protection from all nine common power problems. Due to the 9390's built in high efficiency capability, it operates in a consistent, efficient status without compromising power protection. Even when presented with the most severe power problems, power output remains stable with the 9390IT. Output voltage THD is held within two percent of nominal specification for linear loads, within five percent for non-linear loads—making the 9390IT ideal for supporting equipment that is sensitive to a distorted voltage input as a result of harmonic loads. In the event of a utility power failure, there is no delay transferring to backup power.

Comparison of 90% versus 94% efficient 40 kVA UPS

Efficiency	kW	Utilized kW	Wasted kW hours*	Annual hours	Annual wasted kW	Cost per kWh and demand	Extra energy cost	Air conditioning cost	Total	Annual savings
94	**36**	**33.84**	**2.16**	**8760**	**18922**	**$0.13**	**$2460**	**$1722**	**$4182**	**$2788**
90	36	32.40	3.6	8760	31536	$0.13	$4100	$2870	$6969	

* Mostly dissipated as heat.

The culmination of power reliability

Powerware Hot Sync technology

Eaton's patented Powerware Hot Sync technology enables multiple UPSs to share the load equally, eliminating the transfer time when shifting the load from one module to the other. The load share control algorithms maintain adjustments to variations in the output power requirements. When two or more UPSs operate in parallel for capacity and redundancy, Hot Sync addresses the two primary concerns of load sharing and selective tripping. To address these concerns for reliability – the degree of autonomy and the complexity of implementation – Hot Sync combines digital signal processing and an advanced control algorithm to provide automatic load sharing and selective tripping in a parallel system, as well as complete autonomy of the modules and a skillfully simple implementation. The 9390IT achieves optimum reliability and flexibility with the following design features:

- Unlike other paralleling techniques, there is no system level single point of failure
- Hot Sync systems are capable of paralleling for both redundancy and capacity
- By using a peer configuration as opposed to a master-slave configuration, Hot Sync ensures that each module is operating independently
- No added circuitry or components are required to be switched in to operate in parallel
- With thousands of successful systems installed globally, Hot Sync is a proven technology
- The output of multiple UPSs remains in phase so that static transfer switches connected between the separate distribution paths may change state seamlessly when necessary

Each parallel unit operates with its own battery string – if any unit goes offline or is taken down for maintenance, the remaining units support the load fully with their battery capabilities. If any battery string fails, the remaining strings continue to support the load – thus eliminating a key potential single point of system failure.

Flexible installation: expedite deployment, save valuable space and simplify service

The 9390IT offers the smallest footprint of any UPS in its class—up to 80 percent smaller than competitive units. Being a pre-wired, integrated module, the 9390IT saves time, installation cost and cabling expenses because of standard top or bottom entry design. The 9390IT provides front panel access for all services and operation, increasing serviceability and reducing mean time to repair (MTTR). And since the compact 9390IT cabinet can be installed in a corner or against a wall, you have more location options, installation is fast and easy, deployment cost is lower and you save valuable data center space.

Weight

At $.30 per pound, the 9390IT averages a cross-country freight savings of over $550 compared to conventional UPS. With a transformerless design, Eaton UPS solutions meet or exceed virtually all floor loading standards. And with this lower weight, units can be moved without heavy capital equipment and can fit in all standard freight elevators.

Space savings

With a footprint of 864 square inches, the 9390IT is a fraction of the 2238 square inches that the competition takes up. With a manageable size, including a compact 72-inch height, the 9390IT fits through most doors with ease and requires no dismantling to get it to its final installation location.

Retrofit applications

The 9390IT is perfect for retrofit operations. When an existing UPS is exceeding capacity but has no room to expand, or when the service contract is expiring, the existing UPS can be removed and replaced with a 9390IT that offers more power in less space.

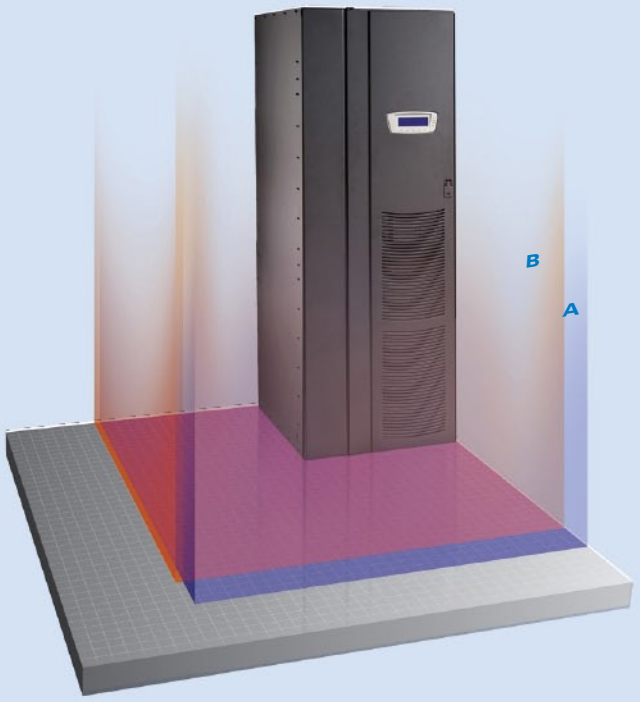
Scalability

With its convenient 40 kVA modular building block concept, the 9390IT provides a cost-effective solution for growth. For example, a unit can be upgraded from 40 to 80 kVA, then to 160 kVA—all performed onsite and without costly excessive cabinetry and connections. This feature allows you to plan electrically for growth and eliminate future cabling costs.

At 40 kVA, the 9390IT occupies

61% less footprint

than the competition



40 kVA Configurations

	H	*W*	*D*	
Competitor A 40 kVA	78.5	23.6	38	
Competitor A Battery Cabinet	78.7	35.3	38	
Total Footprint		58.9	76	2238*
9390IT	**73.7**	**27.9**	**31**	**864.9***
Footprint Reduction				**61%**

	H	*W*	*D*	
Competitor B 40 kVA	72.1	33.5	35.6	
Competitor B Battery Cabinet	72.1	26.5	33.5	
Total Footprint		60	69.1	2136*
9390IT	**73.7**	**27.9**	**31**	**864.9***
Footprint Reduction				**60%**

all dimensions are in inches
*** Square inches**

Service and support

Proven warranty and support services

Customers consistently rank Eaton services number one in quality. Eaton's comprehensive, world-class service solutions are designed to improve costs, uptime, reliability, power quality and safety. And with 240 customer service engineers in North America and 1,200 international authorized service providers, Eaton has more service personnel than any other UPS manufacturer.

The 9390IT standard factory warranty covers:

- System warranty: One year parts / 90 days labor
- Battery warranty: Two years parts / 90 days labor

Extensive service options for enhanced reliability

For support beyond the warranty period, Eaton offers enhanced service options including onsite startup, corrective and preventive maintenance, battery solutions, training, remote monitoring and factory spare parts and upgrades. Customizable three-phase UPS services packages allow customers to select the plan that provides the right combination of system uptime, convenience and value.

eNotify Remote Monitoring

Eaton's eNotify Remote Monitoring Service provides 7x24 real-time monitoring of the 9390IT and battery systems and alerts both service technicians and the customer when a problem is detected. Proactive monitoring enables technical experts to respond immediately to more than 40 alarm conditions and, in many cases, resolve issues remotely with minimal or no downtime. Additional eNotify benefits include:

- One-way outbound status and event e-mails for security and reliability
- Fast diagnosis and notification of critical alarms
- Monthly customer reports including power event logs andoverall UPS and battery health summaries

Service Plans

Eaton 9390IT UPS Service Plans	PowerTrust™ Value	ProActive	PowerTrust	PowerTrust Preferred	Flex Contracts
Parts and Labor for Electronics	●	●	●	●	
Parts and Labor for Batteries	○	○	○	○	
5x8 On-Site Corrective Maintenance	●				
7x24 On-Site Corrective Maintenance		●	●	●	
Next Business Day Response	●				Custom
Eight-Hour Response		●	●	●	Service
Four-Hour Response		○	○	○	Contracts
Two-Hour Response		○	○	○	
5x8 UPS Preventive Maintenance Visit	One per year	○	One per year		
7x24 UPS Preventive Maintenance Visit	○	One per year	○	Two per year	
Battery Preventive Maintenance Visit	○	○	One per year	Two per year	
eNotify Remote Monitoring Service	●	●	●	●	
Discounted Spare Parts Kit, T&M, and Upgrades		30%	30%	30%	

● Included feature
○ Optional

Integrated Battery Cabinet (IBC)

In addition to the 8 minutes of runtime at full rated load provided by the standard internal batteries, Eaton offers two versions of external line-and-match battery cabinets for 9390IT.

The available IBC-S and the IBC-L can provide up to 66 minutes of run-time at full load in one integrated cabinet - providing industry leading power density and run-time in one compact footprint.

These integrated cabinets offer exceptional flexibility with standard integral, line-up-and-match configurations and available remote installation options. Serviceability is enhanced through the unit's front access design and the cabinets are UL 1778 listed with flame retardant batteries that meet UL 94V2 for computer room installation.

ACCESSORY CABINET DIMENSIONS AND WEIGHT

Accessory cabinet	IBC-S	IBC-L
40 kVA (H"xW"xD")	22.5 x 31.6 x 73.7	42.7 x 31.6 x 73.7
40 kVA (weight)	Up to 2445 lb	Up to 4835 lb

IBC-S

IBC-L

Integrated distribution cabinet (IDC)

Eaton's available integrated distribution cabinets make the 9390IT an optimal data center solution, providing a scalable 40KVA modular building block and providing cost-effective voltage transformation, maintenance bypass, and distribution options within one integrated cabinet.

Integrated and pre-wired distribution cabinets make the 9390IT the industry's most deployable 40 kVA UPS – with K-13 rated isolation and step-down transformers, 3-breaker maintenance bypass configurations, up to 84 poles of distribution, and sub-feed breakers in one cabinet. The Eaton IDC is specifically designed to complement the 9390IT, with the same look and finish to enhance the appearance of your data center.

40 kVA IDC Bypass

Parallel Tie Sidecar

Integrated Maintenance Bypass (IMB) and module tie-breakers

At the heart of the 9390IT's efficient design is the on-board, pre-wired and fully integrated maintenance bypass or parallel tie side-car. The fully-wired 3-breaker maintenance bypass allows the operator to isolate the UPS for maintenance

Additionally, the 9390IT can be equipped with 2 on-board module tie breakers to cost-effectively achieve modular N+1 redundancy or expand up to 80 kVA without any incremental site wiring.

The IMB parallel tie sidecar reduces installation time and total cost of ownership with all disconnects and breakers pre-wired, and also increases availability by allowing the UPS to be quickly isolated for service without any disruption to your critical loads.

In addition, optional 4 breaker wall-mount tie cabinets are available making the 9390IT scalable up to 160 KVA using all-in-one 40 kVA module building blocks. With internal batteries, on-board pre-wired maintenance bypass and module tie-breakers, the 9390IT is the most user-friendly and efficient data center solution up to 160 kVA.

IDC technical specifications[1]

9390IT Integrated Distribution Cabinet

General characteristics

Installation	Line up and match to UPS Front access only
Color	Same as UPS
Construction	NEMA 1 ventilated
Input voltage	208, 480V

Output voltage

Isolation	208, 208, 120V
Distribution	208, 120V

Dimensions and weight

73.7"H x 27.9"W x 31"D
1200 lb. (maximum)

Certification

Safety	UL 1778
Markings	UL, cUL

User interface

Cable entry	Top or bottom
Remote monitoring	Optional

Transformer option

Electrostatic shield	Standard
Insulation	150ºC Rise, Class H
Impedance	5% (maximum)
K-factor	K13
Compensation taps	2-FCAN, 4-FCBN standard
Overload protection	Standard

Power distribution option - Panelboard distribution

Quantity	2 (maximum)
Voltage	208, 120V
Main breaker	225A, 65 kAIC
Circuits	84 (maximum)
Distribution breakers	(in lieu of panelboards)
Quantity	1 (maximum)
Voltage	208, 120V
Size	250A, 65 kAIC, adjustable trip

Maintenance bypass option

Maintenance bypass	Optional; 3 or 4 breaker configuration

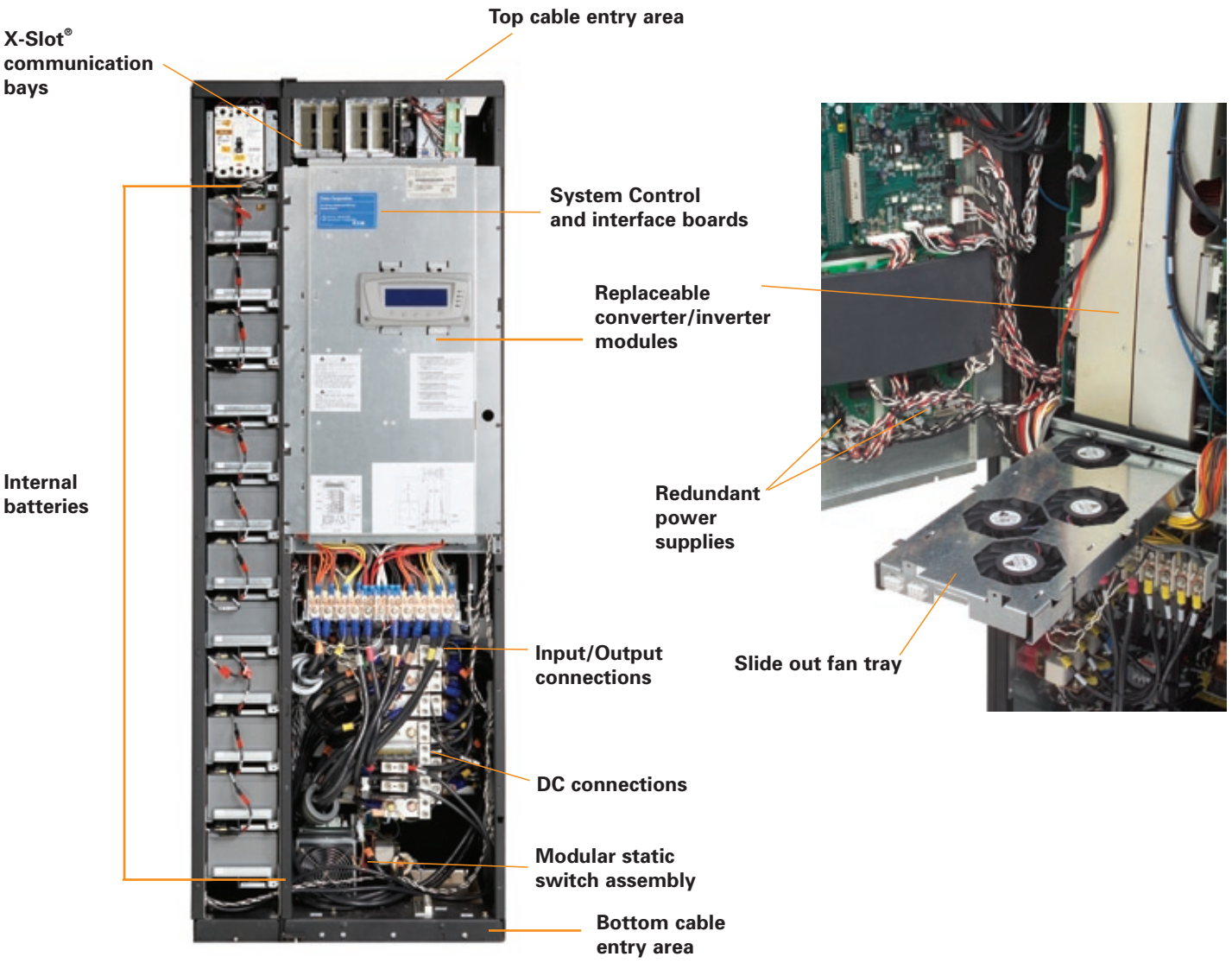
1. due to continuing product improvements, specifications are subject to change without notice.

Battery Runtimes

12V, 9 Ah
String voltage = 480V (40 batteries, 240 cells)
2 strings = 80 batteries (480 cells)
3 strings = 120 batteries (720 cells)
5 minutes @full load with 2 strings
8 minutes @ full load with 3 strings

Load		2 strings	3 strings
VA	W	Minutes	Minutes
40000	36000	4.1	8.3
36000	32400	4.9	9.9
32000	28800	5.9	11.7
28000	25200	7.5	14.5
24000	21600	9.7	17.2
20000	18000	12.7	21.8
16000	14400	17.1	30.1
12000	10800	25.0	42.7
8000	7200	40.6	60.0
4000	3600	71.2	86.5

Inside the 9390IT UPS



40 kVA

Technical specifications[1]

UPS rating (0.9 power factor)

kVA	40
kW	36

General characteristics

Efficiency	Up to 94%
Parallel capability	4 modules with tie cabinet
Audible noise	<65 dBA @ 1 meter
Altitude (max)	2000m at 40ºC , 104ºF

Input characteristics

Voltage	208, 480, 600V[2]
Voltage range	+10% / -15%[3]
Frequency range	55-65 Hz
Power factor	0.99 (min)
Input current distortion	<4.5% (no input filter required)
Soft start capability	Yes
Internal backfeed protection	Yes
Broadcast global support	Yes

Output characteristics

Voltage	208, 480[4], 600V[5]
Regulation	±1%
Inverter	PWM with IGBT switching
Voltage THD	<2% (100% linear load); <5% (non-linear load)
Load power factor range	Down to 0.9 pf leading without de-rating
Heat dissipation (BTU @ full load)	208V: 23.6 480V: 21.9

Battery

Battery types	VRLA, 12V, 9Ah
Battery voltage	480V
Temperature compensation	Optional
Charging method	Advanced battery management

Dimensions and weights

73.7"H x 27.9"W x 31"D

Weight: 655 kg; 1445 lb.

Serviceability

Back/side against wall installation	Standard

Optional accessories

Module tie cabinet

External maintenance bypass

Integrated distribution cabinet

Isolation transformer

Certification

Safety	UL1778, cUL
EMC	IEC62040-2 EN50091 Class A (restricted access)
Surge	ANSI C62, 41 Cat, A&B

eNotify Remote Monitoring service

7x24 remote monitoring of UPS and battery alarms, daily heartbeat check and monthly report required. ConnectUPS-X Web/SNMP Card and Environmental Monitoring Probe are included with enrollment. Please visit www.powerware.com/enotify for more information.

Communications

Software compatibility - PowerVision, LanSafe, FORESEER, Power Xpert
Communications cards - Standard system includes one ConnectUPS Web/SNMP/-X Card with an Environment Monitoring Probe. Two communications bays standard. Maximum of four communication bays with the communication expansion option.
The following connectivity options can be installed at any time:
- Modus Card
- Relay Interface Card (Use for AS400s)
- Industrial Relay Card (5A@120V)
- Hot Sync CAN Bridge Card provides CAN communications, isolated RS-485 port
- Environmental Monitoring Probe (EMP)

Remote inputs/outputs - two building alarms inputs and on summary alarm contact (5A@120V) standard
Four more building alarm inputs available with the Communications Expansion Option Remote panel - eight backlit status indicator lamps plus an audible horn

*Requires the Parallel Card option (RS-485 port) and requires an external 120V power supply to drive the remote monitor panel.

1. Due to continuing improvements, specifications are subject to change without notice.
2. 600V applications require an input transformer.
3. At full load without battery discharge.
4. Output transformers are required if the desired output voltage is not the same as the input voltage.
5. 600V applications require an output transformer.

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Singapore/SEA: 65.6825.1668

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Printed in USA
7993_9390IT_FXA
March 2009