

UPS Solutions & Services



Powering Business Worldwide

Contents



Power Quality Business.....	5
Global Markets and Diverse Customers.....	6
Sustainable by Design	7
Power Protection for Different Needs.....	8
Advanced Technologies.....	9
Transformer-free Technology	9
Powerware Hot Sync Technology	10
ABM Technology.....	12
Eaton 9155 and 9355 UPS.....	14
Eaton 9355 UPS	16
Eaton 9390 UPS	18
Eaton 9395 UPS	20
Eaton BladeUPS	22
Eaton ePDU.....	24
Eaton Enclosures.....	32
Software and Connectivity	34
UPS Runtime Tables	38



Powering Business Worldwide

Founded in 1911, Eaton Corporation is a diversified power management company which helps customers operating in a wide variety of industries and residential environments manage power and do more while consuming less energy. As an integrated global company, we are unified in our commitment to powering business worldwide.

Eaton® operates in two main sectors:

Electrical

The Electrical Sector is a leader in electrical power distribution, power quality systems, industrial automation and control products and services. The electrical sector provides technology-driven solutions that serve the mission-critical needs of the industrial, utility, commercial, residential and information technology markets.

Industrial

The Industrial Sector combines the Aerospace, Hydraulics, Trucks and Automotive business groups.

The Hydraulics and Aerospace businesses design and manufacture reliable, high-efficiency hydraulic systems and components for use in mobile and industrial applications.

The Truck business designs and delivers intelligent truck drivetrain systems that enable safety and fuel economy in commercial vehicles.

The Automotive business develops innovations that help the automotive industry to deliver improved fuel economy, safety and performance to car buyers.

With 2008 sales of 15.4 billion USD, Eaton employs 75 000 people worldwide and has customers in more than 150 countries. Eaton is headquartered in Cleveland (Ohio, USA).



Power Quality Business

Eaton Power Quality Division, a part of the Electrical Sector, has more than 45 years of experience in designing and producing innovative power quality products. The result is an expansive portfolio of products, which help to protect our customer's business processes, critical applications and systems from all power problems and failures.



Eaton product and service range

- AC UPS from 350 VA up to 4000 kVA
- DC systems of all sizes
- A broad portfolio of rack-based power distribution units (ePDU®)
- Software and connectivity products for power management and remote control
- Technical support and maintenance
- Complete power quality solutions

Eaton products are manufactured in Finland, USA, China, Taiwan, India, Brazil, UK and New Zealand.

Global Markets and Diverse Customers

Our customers can be confident that they will receive the best products and solutions available on the market as well as a comprehensive range of services, professional personnel, Eaton's commitment to the high standards of business ethics and a customer-oriented business approach.

Eaton serves customers in any business where a high level of power quality is critical for success:

- IT and data centres
- Electrical
- Industry
- Financial institutions
- Telecomms
- Government
- Healthcare
- Oil and Gas
- Security
- Media
- Retail
- Defence
- Transport



Sustainable by Design



Sustainability means meeting the current needs of our society in ways that enable future generations to meet their own needs. At Eaton, sustainability is an integral part of the design of our products and production processes right from the start and extends through to the end of the products' life.



An Eaton Green Solution

Eaton's commitment to being a leader in reducing its own ecological footprint covers green technologies, products and services that help our customers utilise electrical power more efficiently while improving environmental performance. In line with goals, we are also fully committed to decreasing our own greenhouse gas (GHG) emissions by 18 percent by 2012.

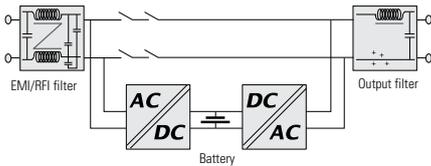
In recent years Eaton's internal environmental programmes have resulted in significant reductions in electricity and water consumption, waste generation and GHG emissions at our manufacturing sites. All Eaton Electrical sites throughout the world are ISO 14001 certified.

In addition, Eaton has developed a rigorous certification process based on the guidelines of international organisations such as the European Union, the US Federal Trade Commission and the International Organisation for Standardisation (ISO). As a result, the exceptional environmental performance is verified with widely accepted methods such as life cycle assessment (LCA). Eaton products and services meeting the environmental standards of this certification process earn the Eaton "Green Leaf" label. The label is our promise of exceptional, independently verified environmental performance to customers, consumers and our communities.

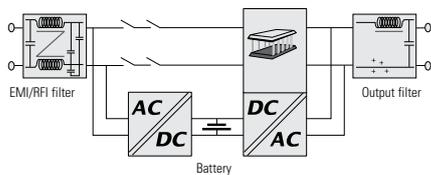
For more information on how Eaton is Sustainable by Design, please visit www.eaton.com/sustainability.

Power Protection for Different Needs

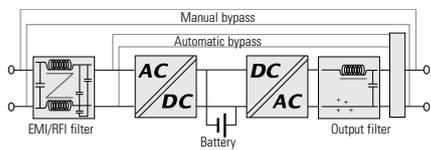
There are nine common types of power problems, including power failure, power sag, power surge, undervoltage, overvoltage, switching transient, line noise, frequency variation and harmonic distortion. Based on three UPS topologies, Eaton offers a wide range of UPS solutions to provide an appropriate level of power protection against different power problems and failures.



Passive standby topology (off-line) is the most frequently used UPS topology for protecting PCs against power failure, power sag and power surge. In normal mode, the UPS supplies power to the application directly from the mains, filtered but without active conversion. The battery is charged from the mains. In the event of a power cut or fluctuation, the UPS delivers stable power from the battery. The advantages of this topology are low cost and adequacy for office environments. Passive standby topology is not suitable if the power supply is of low quality (industrial sites) or subject to frequent disruptions.



Line interactive topology is used for protecting enterprise networks and IT applications against power failure, power sag, power surge, undervoltage and overvoltage. In normal mode, the device is controlled by a microprocessor that monitors the quality of the supply and reacts to fluctuations. A voltage compensation circuit is enabled to boost or reduce the supply voltage to compensate for the fluctuations. The main advantage of this topology is that it enables compensation of under and overvoltage without using the batteries.



Double conversion topology (on-line) is a basis for UPSs designed for continuous power protection of critical equipment against all nine power problems: power failure, power sag, power surge, undervoltage, overvoltage, switching transient, line noise, frequency variation and harmonic distortion. It ensures a consistent quality of power supply regardless of disturbances in the incoming mains. The output voltage is entirely regenerated by a sequence of AC to DC conversion followed by DC to AC conversion in order to create power supply without any electrical interference. Double conversion UPSs can be used with any type of equipment as there are no transients when changing over to battery power.



1. POWER FAILURE



2. POWER SAG



3. POWER SURGE



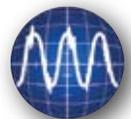
4. UNDERVOLTAGE



5. OVERVOLTAGE



6. SWITCHING TRANSIENT



7. LINE NOISE



8. FREQUENCY VARIATION



9. HARMONIC DISTORTION

Advanced Technologies

Eaton has been developing its innovative technical solutions in the power protection field since receiving its first patent in 1962. As a technology leader Eaton meets the customers' fast growing needs with advanced patented technologies.

Eaton's three-phase UPS products of Powerware® series are based on the same technical platform, including a similar internal topology, common control hardware and algorithms, standardized communications capabilities and a common user-interface.



Single platform benefits

- UPS units behave in a uniform way and carry similar features
- Product upgrades are easier as the process is identical
- Improved service capabilities due to usage of common spare parts and accessories across product families and standard service tools
- Similarity of service training and documentation guarantee that customers in all countries receive the same high level of service
- Lower total cost of ownership



Transformer-free Technology

The transformer-free technology used in Eaton UPSs with small and lightweight filter inductors, high performance IGBTs in both inverter and rectifier, and advanced control algorithm brings improved performance and value. Compared to legacy UPS topology designs, a transformer-free UPS is typically only 50% the weight and occupies just 60% the footprint. Low input THD (<4.5% at full load) and high input power factor (>0.99) are supported down to nearly 10% load without the need for an additional input filter. In addition, full load efficiency can reach 94.5% and above.

User benefits

- High efficiency up to 94.5%
- Less weight
- Smaller footprint

Powerware Hot Sync Technology



Paralleling UPS technology

The number one function of a UPS is to supply continuous conditioned, reliable electricity to a critical load. In case of a single unit, reliability can be increased by modular design, where redundant internal modules can take over each others' tasks, if one of the modules fails.

To further increase reliability, a true parallel configuration can be employed, where two or more units share the load. A failed unit is isolated while the remaining ones continue to support the critical load. Competitive UPS products on the market utilise centralised or distributed load-sharing technology with the master-slave principle, which introduces a risk of single point failure. The absolute reliability of a UPS system can be achieved with patented Powerware Hot Sync® parallel load-sharing technology. (Figure 1)

Hot Sync technology is designed for parallel redundant N+1 systems to satisfy 24/7 applications. It can also be used in parallel capacity systems to benefit from scalability for customers' ever-increasing load demands.

Hot Sync erases single point of failure, with an ability to synchronise and support critical loads independently of other UPS modules in the system. UPS modules can share loads without any communication wiring to the outside world.

User benefits

- Available for both single- and three -phase products to meet any mission-critical need up to 2.5 MVA (400V) systems
- Easy and modular parallel UPS system upgrade with additional capacity or redundancy
- Erases single point of failure

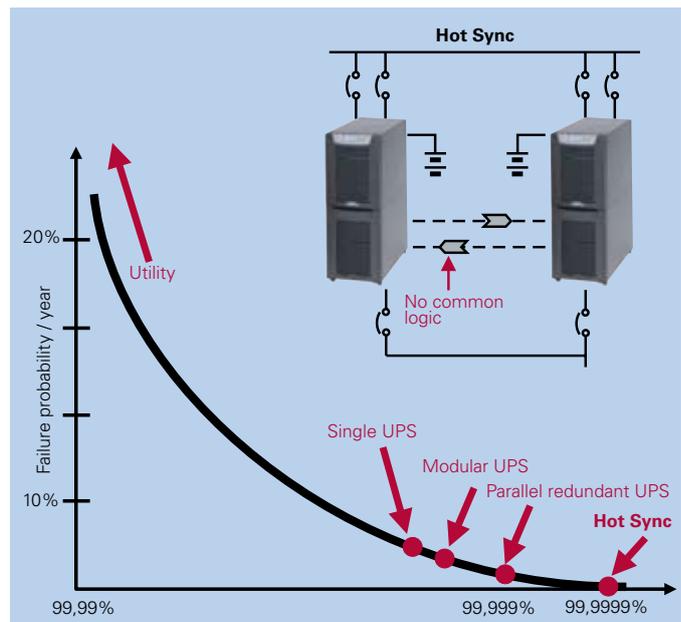


Figure 1. Power availability with various power supply configurations.

Powerware Hot Sync Technology

The secret here is a patented built-in digital signal processor (DSP) algorithm, running continuously in each unit. It drives the UPS outputs toward synchronisation and takes care of load sharing. If there is a common bypass available, it is used as valid synchronisation source for output. In the absence of a common bypass, the processor makes subtle adjustments to the inverter frequency on the basis of output power level measurement in order to find a common frequency and load balance among the units. There exists, as shown in Figure 2, a relationship between the power imbalance and the voltage phase difference.

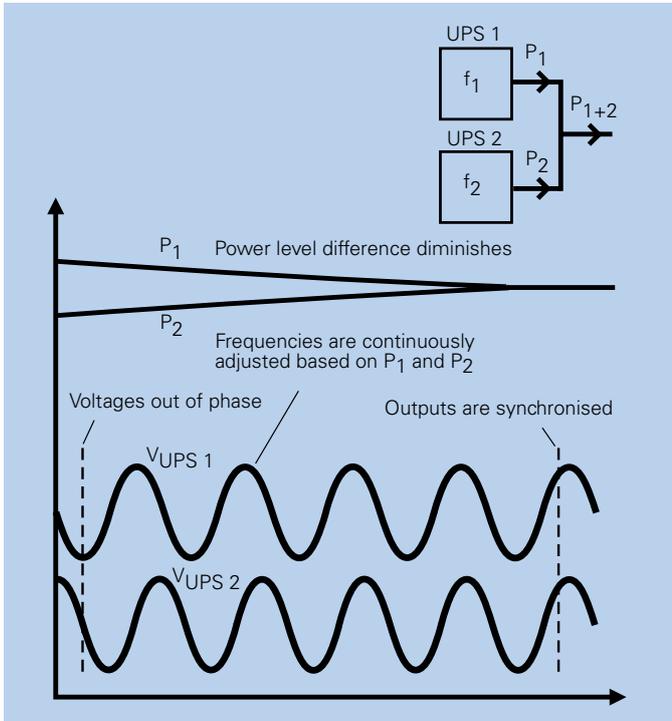


Figure 2. Well-balanced load share is achieved by adjusting output frequencies; thus the phase difference between parallel UPS output voltages is forced to zero.

The internal output impedance of a UPS is inherently mainly inductive, i.e. it looks as a small inductor in series with a stiff alternating voltage source. So, if there is any difference between the output voltage phases, it means that there is a power flow from unit to unit, resulting in unequal load sharing. In the Figure 3, two units have equal output voltages with phase angle displacement.

The voltage V_{diff} and current I_{diff} between units exhibit a 90 degrees phase shift due to the inductive source impedance. The main voltage (V_1 and V_2) and the current between units I_{diff} are in phase resulting in active power flow.

The greater the phase shift, the heavier the power imbalance. If

we now introduce a controller to adjust the voltage phase by the output power, the phase difference can be forced to decrease. To adjust the phase difference to zero and to achieve accurate load sharing, we may integrate the measured phase thus arriving at power-controlled frequency. For the purpose of fast frequency locking and to enable synchronisation to external bypass, a term containing the power level change rate is added.

The flow diagram (Figure 4) shows how the load sharing proceeds.

The output power is monitored and the new frequency calculated at 3000 times per second. The measurements are also used for fast identification of a failed module. This feature is based on the computation of instantaneous output power. A negative value, even for a single instant, is an indication of an internal failure, e.g. a shorted inverter IGBT. In a response the UPS trips immediately off-line, causing minimal voltage disturbance. This feature is known as 'selective tripping'.

Hot Sync technology allows full maintenance to be performed one-by-one on redundant UPS modules without an external maintenance bypass switch. The critical load does not need to be disconnected from the conditioned power. Scheduled or unscheduled maintenance can be performed with the load supported continuously by the UPS-grade clean power.

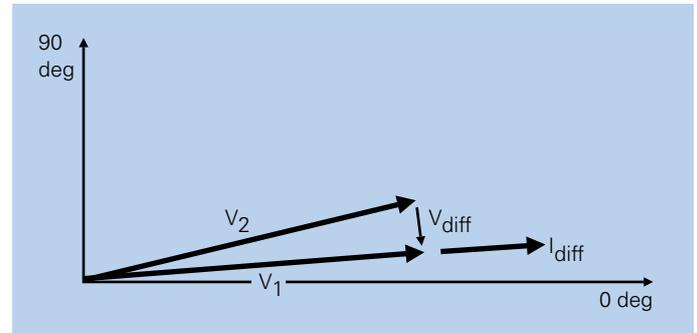


Figure 3. A phase displacement between parallel connected UPS voltages (V_1 and V_2) causes current flow between the units thus imbalances load share.

$$f_n = f_{n-1} - K_1(P_n) - K_2(\Delta P_n)$$

Where:

f_n = frequency

f_{n-1} = previous frequency

P_n = power to load

K_1 = frequency reduction factor

K_2 = power change rate factor

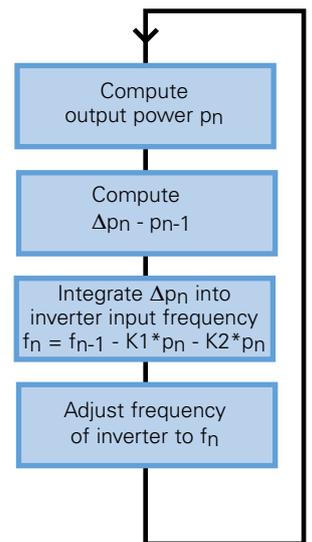


Figure 4. With HotSync algorithm, inverter phase angle is adjusted by output power and its change rate.

Accurate, equal load share is the number one characteristic to determine the integral quality and reliability of the parallel UPS system providing redundancy or increased capacity. With HotSync technology this is achieved without need for additional communications line between UPSs thus no single point of failure is added when introducing parallel modules to a system. From operational and also economical viewpoint, the achieved "close to perfect" reliability returns clear savings in the long run as every downtime incident is costly and might lead to unpredictable consequences.

ABM Technology



User benefits

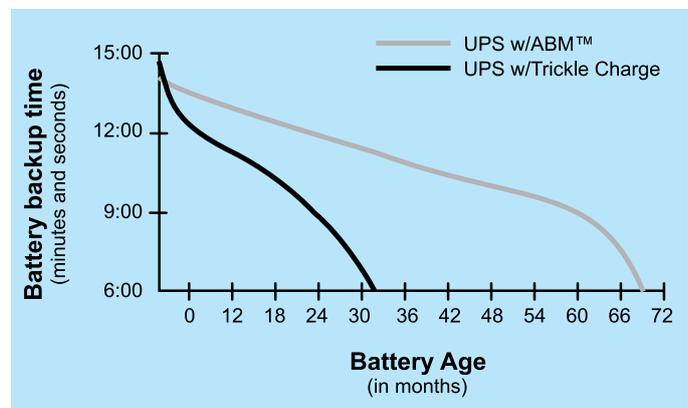
- Predictive and automatic diagnostics of battery health
- Significant extension of battery life compared to traditional charging method
- Optimisation of battery recharging time with dual mode charging method
- Automatic battery charge voltage compensation within 0 to +50°C temperature range

Superior battery management

Battery service life is a major contributor to UPS reliability. Since batteries are electrochemical devices, their performance gradually decreases over time. Premature wear-out means higher costs in terms of replacement labour and shorter service cycle. A worn battery entails a risk of unexpected load loss. In normal UPS operation, backup power is needed only occasionally and the battery 'wearing' rate depends strongly on how the full charge is being maintained. Excess charging is detrimental under any operating circumstances.

Significant extension of battery life

Eaton has created ABM® technology to extend the life of valve-regulated lead-acid batteries by applying sophisticated logic to the charging regime. Using the traditional trickle charge method, batteries become subject to electrode corrosion and electrolyte dry-out, especially in standby service use due to continuous float charging. ABM is essentially an addition of intelligence to the charging routine by preventing unnecessary charging, thus significantly retarding wear-out. ABM provides an additional feature for monitoring battery condition and advance warning about the end of battery life upon detection of a weak battery. It also optimises the recharge time, which is advantageous when there may be consecutive power outages within a short period. ABM has been used for over 15 years in our UPSs ranging from 1 to 160 kVA and is now applied in UPSs up to 1100 kVA.



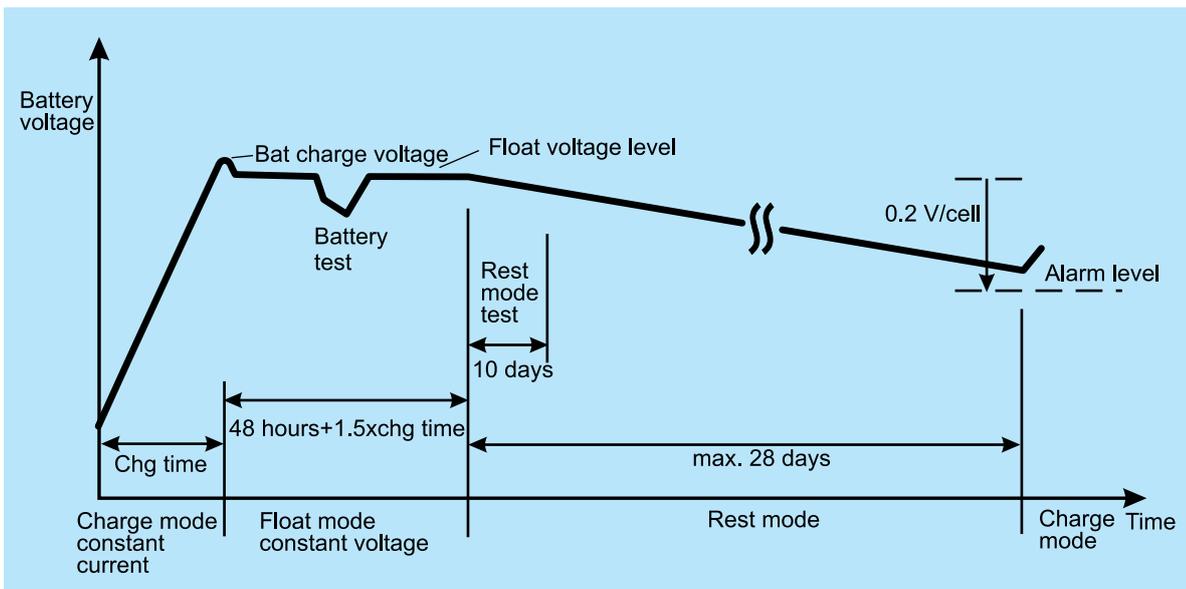
ABM technology significantly increases battery service life.

ABM Technology

ABM cycle and operation – how does it work?

The basic idea of ABM is to leave a fully charged battery in rest mode for most of the time, and then apply charge current only at certain intervals. Initially, in order to charge up a fully or partly discharged battery, the charger starts at a constant current appropriate for the battery type used. When the battery voltage reaches a set level, the operation is changed to float mode using a constant but lower voltage, thus providing an optimum recharge time. The battery is kept at this voltage for 24 hours until it comes to the first test point. This takes approximately one minute, and during this period voltage drop measurements are taken while loading the battery, giving an indication of battery condition. The float charging is continued for an additional 24 hours, plus a period equal to 1.5

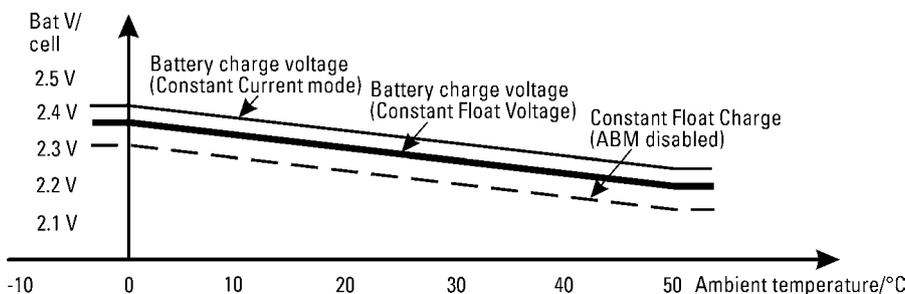
times the constant current charging time, before the rest mode is initiated. At this point, charging is discontinued for a maximum of 28 days – as if the batteries were disconnected. During the first 10 days the battery voltage is continuously monitored, and if it drops below 2.1 V/cell, the ABM restarts in charge mode and the user gets a notification of improper battery operation. If it drops below this limit after the 10-day period, charging is resumed without an alarm being raised. In short, the algorithm uses three charging stages in its operation. Thus, the batteries experience much less stress than in the case of traditional charging. A typical battery charging cycle without power interruptions is shown in the graph below.



Battery voltage during one ABM charging cycle.

For convenience, the user has the facility to disable the ABM and instead select continuous 'constant voltage' charging whereby the charger uses a constant float voltage. 'ABM enabled' is the default setting. The charger voltage levels are (by default setting) programmed to be dependent on an internal temperature sen-

sor measurement, thus providing further enhancement to battery health. The external batteries can be also provided with temperature dependent charger voltage. For this purpose a Web/SNMP card with Environmental Monitoring Probe (EMP) is required.



Temperature compensated charger between ±0°C...+50°C internal/external measurements.



Optional Web/SNMP card with EMP probe for temperature measurement of an external battery cabinet or rack.

Eaton 9155 and 9355 UPS

8 - 15 kVA



Advanced power protection for:

- Banking
- Small server and computer rooms
- Healthcare
- Network communications
- Security systems
- Automation systems



Double conversion UPS

Premium power performance

- Double conversion topology provides the highest level of protection available by isolating the output power from all input anomalies.
- With a transformer-free design and sophisticated sensing and control circuitry the 9155/9355 delivers an efficiency of up to 92%.
- Active power factor correction (PFC) provides unbeatable 0,99 input power factor and less than 4,5% ITHD, thus eliminating interference with other critical equipment in the same electrical network and enhancing compatibility with generators.
- With 0.9 output power factor, UPS is optimized to protect modern IT equipment without need to oversize.

True reliability

- HotSync technology enables paralleling of two or more UPS modules to increase availability or add capacity. The technology enables load sharing without any communication line, thus eliminating single point of failure.
- ABM technology charges batteries only when necessary, reducing batteries corrosion and prolonging batteries service life by up to 50%.
- Internal batteries in all standard configurations provide an extended runtime with the smallest footprint.

Extensive configurability

- Further runtime extension is possible with external battery cabinets.
- A multilingual graphical LCD display makes possible to monitor the UPS status easily.
- The 9155/9355 can also be integrated into network management, industrial automation and building management systems.
- Bundled Eaton Software Suite provides an orderly network shutdown in an event of extended power outage.

Cost savings and sustainability

- The 9155/9355 features high up to 92% efficiency, thus reducing utility costs, extending battery runtimes and producing cooler operating conditions.
- Compact space efficient tower design offers smaller footprint enabling easy data centre space-planning and preserving valuable raised-floor real estate.
- Included internal batteries eliminate the need for costly and space-consuming external battery cabinets.
- A single technical platform used in Eaton's three-phase UPS products guarantee easy upgrades and similarity in service, thus lowering total cost of ownership.
- A range of service agreement options can be easily customized for customers' needs and budget.
- Eaton uses sustainable materials and highly efficient manufacturing technology, thus generating dramatic savings in carbon footprint as compared to competitive UPS systems.

Eaton 9155/9355 UPS 8-15 kVA

TECHNICAL SPECIFICATIONS

UPS output power rating (0,9 p.f.)

kVA	8	10	12	15
kW	7,2	9	10,8	13,5

General

Efficiency in double conversion mode (full load)	92%
Efficiency in double conversion mode (half load)	90%
Efficiency in high efficiency mode	up to 98%
Distributed parallelling with Hot Sync technology	4
Field upgradeable	yes
Inverter/rectifier topology	transformer-free IGBT with PWM
Audible noise	<50 dB
Altitude (max)	1000 m without derating (max 2000 m)

Input

Input wiring	1 ph or 3 ph + N + PE
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz
Input voltage range	±20% from nominal at 100% load, 50%, +20% from nominal at 50% load
Input frequency range	45-65 Hz
Input power factor	0,99
Input ITHD	less than 4,5%
Soft start capability	Yes
Internal backfeed protection	Yes

Output

Output wiring	1 ph or 3 ph + N + PE
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz

Output UTHD	<3% (100% linear load); <5% (standard non linear load)
Output power factor	0,9 (e.g. 9 kW at 10 kVA)
Permitted load power factor	0,7 lagging - 0,8 leading
Overload on inverter	10 min 100-110%; 1 min 110-125%; 5 sec 125-150%; 300 ms >150%
Overload when bypass available	60 min 100-110%, 10 min 110-125%; 1 min >125-150%

Battery

Type	Maintenance free VRLA batteries, NiCD
Charging method	ABM technology or Float
Temperature compensation	Optional
Battery nominal voltage (lead-acid)	384 V (32x12 V, 192 cells)
Charging current / Model	Default 3 A *Max 30 A

*Limited by maximum UPS input current rating

Accessories

Isolation transformer, long-life batteries, external battery cabinets, UPS Center (input, bypass, distribution), X-Slot connectivity (Web/SNMP, ModBus/Jbus, Relay, Hot Sync, ViewUPS-X remote display), Hot Sync parallel tie cabinet, integrated manual bypass, external maintenance bypass switch

Communications

X-Slot	2 communication bays
Serial ports	1 available
Relay inputs/outputs	2/1 programmable

Compliance with standards

Safety (CB certified)	IEC 62040-1, IEC 60950-1
EMC	IEC 62040-2
Performance	IEC 62040-3

Stand-alone UPS with 1-phase input

Part number	Description	Rating	Back-up (pf. 0.7)	Dimensions (HxWxD)	Weight
1022532	9155-8-S-10-32x7Ah	8 kVA / 7.2 kW	10 min	817x305x702 mm	155 kg
1022533	9155-8-S-15-32x9Ah	8 kVA / 7.2 kW	15 min	817x305x702 mm	160 kg
1022534	9155-8-S-28-64x7Ah	8 kVA / 7.2 kW	28 min	1214x305x702 mm	250 kg
1022535	9155-8-S-33-64x9Ah	8 kVA / 7.2 kW	33 min	1214x305x702 mm	275 kg
1022536	9155-10-S-10-32x9Ah	10 kVA / 9 kW	10 min	817x305x702 mm	160 kg
1022537	9155-10-S-20-64x7Ah	10 kVA / 9 kW	20 min	1214x305x702 mm	250 kg
1022538	9155-10-S-25-64x9Ah	10 kVA / 9 kW	25 min	1214x305x702 mm	275 kg

Stand-alone UPS with 3-phase input

Part number 9155/9355	Description	Rating	Back-up (pf. 0.7)	Dimensions (HxWxD)	Weight
1022480	9155-8-N-10-32x7Ah	8 kVA / 7.2 kW	10 min	817x305x702 mm	155 kg
1022481/1023411	9155/9355-8-N-15-32x9Ah	8 kVA / 7.2 kW	15 min	817x305x702 mm	160 kg
1022482	9155-8-N-28-64x7Ah	8 kVA / 7.2 kW	28 min	1214x305x702 mm	250 kg
1022483/1023412	9155/9355-8-N-33-64x9Ah	8 kVA / 7.2 kW	33 min	1214x305x702 mm	275 kg
1022484/1023413	9155/9355-10-N-10-32x9Ah	10 kVA / 9 kW	10 min	817x305x702 mm	160 kg
1022485	9155-10-N-20-64x7Ah	10 kVA / 9 kW	20 min	1214x305x702 mm	250 kg
1022486/1023414	9155/9355-10-N-25-64x9Ah	10 kVA / 9 kW	25 min	1214x305x702 mm	275 kg
1022487/1023415	9155/9355-12-N-8-32x9Ah	12 kVA / 10.8 kW	8 min	817x305x702 mm	160 kg
1022488	9155-12-N-15-64x7Ah	12 kVA / 10.8 kW	15 min	1214x305x702 mm	250 kg
1022489/1023416	9155/9355-12-N-20-64x9Ah	12 kVA / 10.8 kW	20 min	1214x305x702 mm	275 kg
1022490/1023417	9155/9355-15-N-5-32x9Ah	15 kVA / 13.5 kW	5 min	817x305x702 mm	160 kg
1022491	9155-15-N-10-64x7Ah	15 kVA / 13.5 kW	10 min	1214x305x702 mm	250 kg
1022492/1023418	9155/9355-15-N-15-64x9Ah	15 kVA / 13.5 kW	15 min	1214x305x702 mm	275 kg

External battery cabinets

Part number	Description	Rating	Back-up (pf. 0.7)	Dimensions (HxWxD)	Weight
1022561	9X55-BAT5-64x7Ah	2x32x7 Ah	Check technical specifications	817x305x699 mm	195 kg
1022562	9X55-BAT5-96x7Ah	3x32x7 Ah	Check technical specifications	1214x305x699 mm	310 kg

Eaton 9355 UPS

20 - 40 kVA



Advanced power protection for:

- Financial services
- Medium size servers and computers
- ICT
- Critical building infrastructure
- Industrial applications



Double conversion UPS

Premium power performance

- Double conversion topology provides the highest level of protection available by isolating the output power from all input anomalies.
- With a transformer-free design and sophisticated sensing and control circuitry the 9355 delivers an efficiency of up to 93%.
- Active power factor correction (PFC) provides unbeatable 0,99 input power factor and less than 4,5% input ITHD, thus enhancing compatibility with generators and eliminating interference with other critical equipment in the same network.
- The UPS enables optimal power protection for modern 0,9 p.f. rated IT equipment without the need to oversize.
- The 9355 design is also available with 1-phase output (9155) at 20-30kVA power ratings.

True reliability

- HotSync technology makes possible to parallel two or more UPSs to increase availability or add capacity. The technology enables load sharing without any communication line, thus eliminating single point of failure.
- ABM technology charges batteries only when necessary, preventing batteries corrosion and prolonging batteries service life by up to 50%.
- Internal batteries in all standard configurations support more runtime than comparable UPS.

Extensive configurability

- Configurable and multilingual LCD control panel with back light and graphical mimic screen monitors the UPS status easily.
- Connectivity options guarantee a smooth integration with various application systems requirements.
- Bundled with Eaton Software Suite the 9355 provides an orderly network shutdown in an event of extended power outage. If required, the 9355 can also be integrated to network management, industrial automation and building management systems.

Cost savings and sustainability

- The 9355 features high up to 93% efficiency, thus reducing utility costs, extending battery runtimes and producing cooler operating conditions.
- Compact space efficient tower design offers smaller footprint enabling easy data centre space-planning and preserving valuable raised-floor real estate.
- Internal batteries often eliminate the need for costly and space-consuming external battery cabinets.
- A single technical platform used in Eaton's three-phase products guarantee easy upgrades and similarity in service, thus lowering total cost of ownership.
- A range of service agreement options can be easily customized for customers needs and budget.
- Eaton uses sustainable materials and highly efficient manufacturing technology, thus generating dramatic savings in carbon footprint as compared to competitive UPS systems.

Eaton 9355 UPS 20 - 40 kVA

TECHNICAL SPECIFICATIONS

UPS output power rating (0,9 p.f.)			
kVA	20	30	40
kW	18	27	36
General			
Efficiency in double conversion mode (full load)	93%		
Efficiency in double conversion mode (half load)	91%		
Distributed parallelling with Hot Sync technology	4		
Field upgradeable	yes		
Inverter/rectifier topology	transformer-free IGBT with PWM		
Audible noise	<50 dB		
Altitude (max)	1000 m without derating (max 2000 m)		
Input			
Input wiring	1 ph or 3 ph + N + PE		
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz		
Input voltage range	±20% from nominal at 100% load, 50%, +20% from nominal at 50% load		
Input frequency range	45-65 Hz		
Input power factor	0,99		
Input ITHD	less than 4,5%		
Soft start capability	Yes		
Internal backfeed protection	Yes		
Output			
Output wiring	1 ph or 3 ph + N + PE		
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz		
Output UTHD	<3% (100% linear load); <5% (standard non linear load)		

Output power factor	0,9 (e.g. 27 kW at 30 kVA)
Permitted load power factor	0,7 lagging - 0,8 leading
Overload on inverter	10 min 100-110%; 1 min 110-125%; 5 sec 125-150%; 300 ms >150%
Overload when bypass available	60 min 100-110%, 10 min 110-125%; 1 min >125-150%

Battery	
Type	Maintenance free VRLA batteries, NiCD
Charging method	ABM technology or Float
Temperature compensation	Optional
Battery nominal voltage (lead-acid)	432 V (36x12 V, 216 cells)
Charging current / Model	Default 3 A *Max 60 A

*Limited by maximum UPS input current rating

Accessories	
	Isolation transformer, long-life batteries, external battery cabinets, X-Slot connectivity (Web/SNMP, ModBus/Jbus, Relay, Hot Sync, ViewUPS-X remote display), Hot Sync parallel tie cabinet, integrated manual bypass, external maintenance bypass switch

Communications	
X-Slot	2 communication bays
Serial ports	1 available
Relay inputs/outputs	2/1 programmable

Compliance with standards	
Safety (CB certified)	IEC 62040-1, IEC 60950-1
EMC	IEC 62040-2
Performance	IEC 62040-3

Standard UPS with 3-phase input

Part number 9355	Description	Rating	Runtime (pf 0.7)	Dimensions (HxWxD)	Weight
1025061/1026598	9355/9155-20-N-5-1x9Ah-MBS	20 kVA / 18 kW	5 min	1684x494x762 mm	300 kg
1025062/1026599	9355/9155-20-N-13-2x9Ah-MBS	20 kVA / 18 kW	13 min	1684x494x762 mm	400 kg
1025063/1026600	9355/9155-20-N-22-3x9Ah-MBS	20 kVA / 18 kW	22 min	1684x494x762 mm	500 kg
1025064/1026601	9355/9155-20-N-31-4x9Ah-MBS	20 kVA / 18 kW	31 min	1684x494x762 mm	600 kg
1025065/1026602	9355/9155-30-N-7-2x9Ah-MBS	30 kVA / 27 kW	7 min	1684x494x762 mm	400 kg
1025066/1026603	9355/9155-30-N-13-3x9Ah-MBS	30 kVA / 27 kW	12 min	1684x494x762 mm	500 kg
1025067/1026604	9355/9155-30-N-20-4x9Ah-MBS	30 kVA / 27 kW	20 min	1684x494x762 mm	600 kg
1025795	9355-40-N-8-3x9Ah-MBS	40 kVA / 36 kW	8 min	1684x494x762 mm	517 kg
1025796	9355-40-N-12-4x9Ah-MBS	40 kVA / 36 kW	12 min	1684x494x762 mm	617 kg

External battery cabinets 9155/9355

Part number	Description	Rating	Runtime	Dimensions (HxWxD)	Weight
1025169	9355-BAT-1x24Ah (30 kVA)	1x36x24 Ah	See page 31	1684x494x758 mm	510 kg
1025170	9355-BAT-2x24Ah (30 kVA)	2x36x24 Ah	See page 31	1684x494x758 mm	870 kg

9355 20-40 kVA runtimes

Runtimes for UPS with internal batteries ...p.f. 0.7 (typical IT server/computer load)

Battery	Qty	5	10	15	20	25	30	35	40	kVA
7 Ah 12 V	1 x 36	24	8	5	-	-	-	-	-	min
9 Ah 12 V	1 x 36	30	12	7	5	-	-	-	-	min
7 Ah 12 V	2 x 36	60	24	14	10	6	-	-	-	min
9 Ah 12 V	2 x 36	70	28	18	13	10	7	5	-	min
7 Ah 12 V	3 x 36	103	41	26	17	12	10	7	5	min
9 Ah 12 V	3 x 36	115	46	31	22	16	13	10	8	min
7 Ah 12 V	4 x 36	152	55	40	26	18	15	11	9	min
9 Ah 12 V	4 x 36	158	63	42	31	23	20	15	12	min

Eaton 9390 UPS

40 - 160 kVA



Advanced power protection for:

- Data centers
- Financial services
- Building management
- Telecommunications
- Industrial automation equipment
- Healthcare



Double conversion UPS

Premium power performance

- Double conversion provides the highest level of protection available by isolating the output power from all input anomalies.
- With a transformer-free design and sophisticated sensing and control circuitry the 9390 UPS delivers an efficiency of up to 94%.
- Active power factor correction (PFC) provides unbeatable 0,99 input power factor and less than 4,5 percent ITHD, thus eliminating interference with other critical equipment in the same network and enhancing compatibility with generators.
- The UPS is optimized for protecting modern 0,9 p.f. rated IT equipment without the need to oversize.

True reliability

- HotSync technology makes possible to parallel up to four UPSs to increase availability or add capacity. The technology enables load sharing without any communication line, thus eliminating single point of failure.
- ABM technology charges batteries only when necessary, preventing batteries corrosion and prolonging batteries service life by up to 50%.
- Increased overall reliability of the UPS due to the high level of efficiency.

Extensive configurability

- The 9390 offers small footprint compared to competitive UPS offerings. Cabling can enter the UPS from either the top or bottom of the cabinet to provide easier and flexible installation.
- A multilingual graphical LCD display makes possible to monitor the UPS status easily.
- Wide software and connectivity options provide monitoring, management and shutdown capabilities over the network.
- Connectivity options are available to suit nearly any communication requirements, from standard serial communications to secure remote monitoring over the Web.

Cost savings and sustainability

- High level of system efficiency leads to utility cost saving, extension of battery run times and cooler operating conditions within the UPS, which extends the life of components.
- As the compact 9390 can be installed against back and side walls, customers have more location options, installation is faster and easier, deployment costs are lower and more valuable data centre space can be saved for future needs.
- A single technical platform used in Eaton's three-phase UPS products guarantee easy upgrades, similarity or service trainings and documentation, thus lowering total cost of ownership.
- A range of service agreement options can be easily customized for customers needs and budget.
- Eaton uses sustainable materials and highly efficient manufacturing technology, thus generating dramatic savings in carbon footprint as compared to competitive UPS systems.

Eaton 9390 UPS 40-160 kVA

TECHNICAL SPECIFICATIONS

UPS output power rating (0,9 p.f.)						
kVA	40	60	80	100	120	160
kW	36	54	72	90	108	144
General						
Efficiency in double conversion mode (full load)	94%					
Efficiency in double conversion mode (half load)	92,5%					
Efficiency in Energy Saver Mode (ESM)	up to 99%					
Distributed parallelling with Hot Sync technology	6					
Field upgradeable	yes					
Inverter/rectifier topology	transformer-free IGBT with PWM					
Audible noise	<65 dB					
Altitude (max)	1000 m without derating (max 2000 m)					
Input						
Input wiring	3 ph + N + PE					
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz					
Input voltage range	±15, +20% from nominal at 100% load, -30%, +20% from nominal at 50% load					
Input frequency range	45-65 Hz					
Input power factor	0,99					
Input ITHD	less than 4,5%					
Soft start capability	Yes					
Internal backfeed protection	Yes					
Output						
Output wiring	3 ph + N + PE					
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz					

Output UTHD	<3% (100% linear load); <5% (standard non linear load)
Output power factor	0,9 (e.g. 72 kW at 80 kVA)
Permitted load power factor	0,7 lagging - 0,8 leading
Overload on inverter	10 min 100-110%; 30 sec 110-125%; 10 sec 125-150%; 300 ms >150%
Overload when bypass available	Continuous 100-110%, 10 min 110-150%, 5 ms 1000% Note! Nypass fuses may limit theoverload capability

Battery	
Type	Maintenance free VRLA batteries, NiCD
Charging method	ABM technology or Float
Temperature compensation	Optional
Battery nominal voltage (lead-acid)	480 V (40 x 12 V, 240 cells)
Charging current / Model	40 60 80 100 120 160
Default A	10 20 20 30 30 40
Max* A	20 40 40 60 60 80

*May be limited by maximum UPS input current rating

Accessories	
External battery cabinets with long-life batteries, X-Slot connectivity (Web/SNMP, ModBus/Jbus, Relay, Hot Sync, ViewUPS-X remote display), Hot Sync parallel tie cabinet, integrated manual bypass up to 80 kVA, external maintenance bypass switch	

Communications	
X-Slot	4 communication bays
Serial ports	1 available
Relay inputs/outputs	5/1 programmable

Compliance with standards	
Safety (CB certified)	IEC 62040-1, IEC 60950-1
EMC	IEC 62040-2
Performance	IEC 62040-3

Standard UPS

Part number	Description	Rating	Dimensions (HxWxD)	Weight
1028510	9390-40-N-4x0	40 kVA / 36 kW	1879x519x808 mm	257 kg
1028511	9390-60-U-4x0	60 kVA / 54 kW	1879x519x808 mm	313 kg
1028512	9390-80-N-4x0	80 kVA / 72 kW	1879x519x804 mm	313 kg
1028513	9390-100-U-4x0	100 kVA / 90 kW	1879x944x804 mm	430 kg
1028514	9390-120-N-4x0	120 kVA / 108 kW	1879x944x804 mm	430 kg
1028515	9390-120-U-4x0	120 kVA / 108 kW	1879x944x804 mm	530 kg
1028516	9390-160-N-4x0	160 kVA / 144 kW	1879x944x804 mm	530 kg

Standard external battery

1025570	9390-BAT10-S-40x38Ah (250A)	38 Ah	1877x575x773 mm	700 kg
1025572	9390-BAT10-S-200 (250A)	200 W	1877x575x773 mm	1176 kg
1026327	9390-BAT10-S-205 (250A)	205 W	1879x1125x808 mm	1270 kg
1025467	9390-BAT10-280 (250A)	280 W	1879x1125x808 mm	1430 kg
1025468	9390-BAT10-500 (250A)	500 W	1879x1125x808 mm	1444 kg
1025469	9390-BAT10-280 (400A)	280 W	1879x1125x808 mm	1625 kg
1025470	9390-BAT10-330 (400A)	330 W	1879x1125x808 mm	2188 kg
1025471	9390-BAT10-500 (400A)	500 W	1879x1125x808 mm	2188 kg

Battery racks

1026273	9390-RACK10-1x40x200W	200 W	1714x566x1246 mm	985 kg
1026274	9390-RACK10-1x40x280W	280 W	1726x690x1246 mm	1228 kg
1026275	9390-RACK10-1x40x330W	330 W	1726x690x1546 mm	1431 kg
1026276	9390-RACK10-1x40x390W	390 W	1729x690x1546 mm	1587 kg
1026277	9390-RACK10-1x40x500W	500 W	1789x690x1546 mm	1995 kg
1026278	9390-RACK10-2x40x500W	500 W	1714x866x1856 mm	3879 kg
1026279	9390-RACK10-3x40x500W	500 W	1789x690x3666 mm	5865 kg

See runtime from the runtime specification

Standard accessories

1021887	External Bypass Switch 60-80kVA (wall-mount)	wall	840x380x130 mm	17 kg
1021888	External Bypass Switch 120 kVA (wall-mount)	wall	1040x560x130 mm	25 kg
1024626	External Bypass Switch 160 kVA (wall-mount)	wall	1040x560x130 mm	25 kg
1025476	SPM-60-2	wall	700x500x250 mm	50 kg
1023540	SPM-80-4	floor	1530x520x788 mm	230 kg
1024687	9390 Tie Cabinet 3x120 kVA	floor	1879x519x808 mm	217 kg
1024506	9390 Tie Cabinet 3x160 kVA	floor	1879x519x808 mm	217 kg

Eaton 9395 UPS

225 - 1100 kVA



An Eaton Green Solution

Due to outstanding green performance, the 9395 has earned the "An Eaton Green Solution"™ label

Advanced power protection for:

- Big data centers and server farms
- Financial services
- Building management
- Telecommunications
- Hospitals



Double conversion UPS

Premium power performance

- Double conversion provides the highest level of protection available by isolating the output power from all input anomalies.
- With a transformer-free design and sophisticated sensing and control circuitry the 9395 UPS delivers an efficiency of up to 94,5%.
- Active power factor correction (PFC) provides 0,99 input power factor and less than 4,5% ITHD, thus eliminating interference with other critical equipment in the same network and enhancing compatibility with generators.
- The UPS is optimized for protecting modern 0,9 p.f. rated IT equipment without the need to oversize.

True reliability

- HotSync technology makes possible to parallel up to four UPSs to increase availability or add capacity. The technology enables load sharing without any communication line, thus eliminating single point of failure.
- The multi-module 9395 can be configured with inherent redundancy – anytime the load is below 50%, the system becomes automatically redundant.
- ABM technology charges batteries only when necessary, preventing batteries corrosion and prolonging batteries service life by up to 50%.

Extensive configurability

- The 9395 is a completely integrated system than incorporates multiple power modules and system switchgear on factory pre-wired bases.
- A multilingual graphical LCD display makes possible to monitor the UPS status easily.
- Wide software and connectivity options provide monitoring, management and shutdown capabilities over network

Cost savings and sustainability

- High level of system efficiency enables to reduce utility cost, extend battery run times and ensure cooler operating conditions.
- Compared to traditional UPS design, a transformer-free UPS is only 50% the weight and occupies just 60% the footprint, thus reducing impact on shipping.
- The new design requires 50-80% less energy in manufacturing due to less energy required for testing and to the smaller configuration.
- Pre-wired configuration enables to reduce cabling busbar costs and installation time. Front accessible design minimizes installation costs and saves valuable data centre space.
- With Easy Capacity Test feature the 9395 can test its entire power train under full load stress without the requirement of an external load.
- A single technical platform used in Eaton's three-phase UPS products guarantee easy upgrades and similarity in service, thus lowering total cost of ownership.
- More than 90% of the materials can be recycled, further decreasing end-of-life impact.

TECHNICAL SPECIFICATIONS

UPS output power rating (0,9 p.f.)

kVA	225	275	450	550	675	825	1100
kW	202	247	405	495	606	742	990

General

Efficiency in double conversion mode (full load)	>94,5%
Efficiency in double conversion mode (half load)	94%
Efficiency in Energy Saver Mode (ESM)	up to 99%
Distributed parallelling with Hot Sync technology	5
Internal N+1 redundance capable	from 225 to 825 kVA
Field upgradeable	yes
Inverter/rectifier topology	transformer-free IGBT with PWM
Audible noise	<76 dB; <80 dB (825 and 1100 kVA)
Altitude (max)	1000 m without derating (max 2000 m)

Input

Input wiring	3 ph + N + PE
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz
Input voltage range	+10% / -15%
Input frequency range	45-65 Hz
Input power factor	0,99
Input ITHD	less than 4,5%
Soft start capability	Yes
Internal backfeed protection	Yes

Output

Output wiring	3 ph + N + PE
Nominal voltage rating (configurable)	220/380, 230/400, 240/415 V 50/60 Hz
Output UTHD	<3% (100% linear load); <5% (standard non linear load)
Output power factor	0,9 (e.g. 247 kW at 275 kVA)
Permitted load power factor	0,7 lagging - 0,8 leading
Overload on inverter	10 min 100-110%; 30 sec 110-125%; 10 sec 125-150%; 300 ms >150%
Overload when bypass available	Continuous <115%, 20 ms 1000% Note! Bypass fuses may limit the overload capability

Battery

Type	VRLA, AGM, Gel, Wet Cell			
Charging method	ABM technology or Float			
Temperature compensation	Optional			
Battery nominal voltage (lead-acid)	480 V (40 x 12 V, 240 cells)			
Charging current / Model	275	550	825	1100
Default A	38	76	114	152
Max* A	83	166	249	332

*Limited by maximum UPS input current rating

Dimensions and weights

225 kVA, 275 kVA	1350 x 880 x 1880 mm (wxdxh)	830 kg
225 kVA redundant, 275 kVA redundant	1890 x 880 x 1880 mm	1430 kg
450, 500, 550 kVA	1890 x 880 x 1880 mm	1430 kg
450, 550 kVA redundant	2520 x 880 x 1880 mm	2030 kg
Field upgrade module, 225 or 275 kVA	740 x 880 x 1880 mm	600 kg
675, 825 kVA	3710 x 880 x 1880 mm	2520 kg
675, 825 kVA + 1 redundant	4450 x 880 x 1880 mm	3120 kg
1100 kVA	4450 x 880 x 1880 mm	3120 kg

Accessories

External battery cabinets with long-life batteries, X-Slot connectivity (Web/SNMP, ModBus/Jbus, Relay, Hot Sync, ViewUPS-X remote display), integrated manual bypass for 225-550 kVA

Communications

X-Slot	4 communication bays
Serial ports	1 available
Relay inputs/outputs	5/1 programmable

Compliance with standards

Safety (CB certified)	IEC 62040-1, IEC 60950-1
EMC	IEC 62040-2
Performance	IEC 62040-3

Eaton BladeUPS

12 – 60 kW



An Eaton Green Solution

Due to outstanding green performance, the BladeUPS has earned the "An Eaton Green Solution"™ label

Advanced power protection for:

- Small, medium and large data centres
- Blade servers
- Network environment
- PBX and VoIP equipment
- Networking applications: IPTV, security
- Storage devices: RAID, SAN



High Efficiency UPS for Data Centres

Premium power performance

- BladeUPS provides scalable, flexible backup power optimized for high-density blade servers and IT equipment.
- A single module of BladeUPS provides 12 kW of power in only 6U of standard rack space, including batteries
- A scalable solution that delivers up to 60 kW of redundant power in a single rack enclosure.
- BladeUPS delivers an industry-leading 97% efficiency, resulting in cooler operating conditions and less heat dissipation.

True reliability

- Hot Sync technology makes possible to parallel six UPS modules for extra capacity or redundancy.
- ABM technology charges batteries only with necessary, preventing battery corrosion and prolonging battery service life by up to 50%.
- Replacing hot-swappable batteries and electronic modules can be done without interrupting the power, which dramatically improves the availability of the protected IT equipment.

Extensive configurability

- BladeUPS is extremely flexible and supports a variety of system architectures to fit to your specific requirements and desired levels of redundancy. BladeUPS also accommodates growth through its saleable building-block architecture.
- Due to the low heat dissipation, air conditioning requirement reduce by up to a third and BladeUPS can be located close to IT equipment.
- BladeUPS automatically detects parallel modules and self-configures for parallel operation.
- A module working in a parallel configuration can be separated and easily re-deployed as a stand-alone module.
- Each BladeUPS can be configured with its own external battery backup.
- BladeUPS is a scalable UPS with its own power distribution, courtesy of the Rack Power Module. The 3U RPM delivers single-phase power and can be deployed in the same rack as the UPS and IT equipment.
- The BladeUPS can be monitored over LAN or the Internet.

Cost savings and sustainability

- A high level of efficiency leads to utility cost saving, with a 60 kW N+1 solution paying for itself over a 5 year period through energy and cooling savings alone.
- The small footprint of BladeUPS allows extra space for IT equipment in the rack and data centre.
- Eaton uses sustainable materials and highly efficient manufacturing technology to dramatically reduce the carbon footprint when compared to UPS systems on the market.

TECHNICAL SPECIFICATIONS

General

Power Rating	12 kW per UPS module
Efficiency	Up to 97 per cent
Heat Dissipation	371W/1266 BTU/hr at 100% rated load
Cooling	Fan cooled, temperature microprocessor monitored; front air entry, rear exhaust
Audible Noise, Normal Operation	<60 dBA at 1 meter
Altitude Before Derating	1000 meters (3300 ft ASL)

Input

Input Voltage	400 Vac
Voltage Range	400V: 311 to 519 Vac, phase to phase
Frequency Range	50 or 60 Hz, ±5 Hz
Input Current Distortion	<5% with IT loads (PFC power supplies)
Input Power Factor	>0.99 with IT loads (PFC power supplies)
Inrush Current	Load dependent
Input Requirements	Three-phase, four-wire + ground
Bypass Source	Same as input (single feed)
Generator Compatibility	Fast sync slew rate for generator synchronisation

Output

Rated Output Voltage	400V: 180 to 240 Vac, Ph to N
Output Configuration	Three-phase, four-wire + ground
Output Frequency (nominal)	50 or 60 Hz auto-detection on startup
Frequency Regulation	0.1 Hz free running
Load Power Factor Range	Lagging: 0.7 Leading: 0.9
Total Output	<3% with IT loads (PFC power supplies)
Voltage Distortion	<5% non-linear or non-PFC power supplies

Battery

Battery Type	VRLA - AGM
Battery Runtime (Internal)	13 minutes at 50 per cent load 4.7 minutes at 100 per cent load
Battery String Voltage	240 Vdc
Battery Test	Automatic battery test standard (remote scheduling capable) Manual battery test from front display
Battery Recharge Profile	ABM three-stage charging technology
Battery Cut-off Voltage	Variable from 1.67 VPC at <5 min. runtime
Battery Low Condition	Announced with alarm
Extended Battery Capability	Yes, add up to four additional 3U battery enclosures (~34 min at 100 per cent load, >1 hour at 50 per cent load)

Physical

Dimensions (HxWxD) UPS	261 (6U) x 442 x 660 mm 132 (3U) x 437 x 660 mm
Note: Total Chassis Weight without batteries or electronics	46 kg
Total Chassis Weight with batteries or electronics	140 kg
Total UPS Weight without Batteries	61 kg
Total UPS Weight with Batteries	140 kg
EBM Weight	77 kg

Communications and User Interface

Software Compatibility	UPS ships with Software Suite CD containing LanSafe power management software and a trial version of PowerVision
X-Slot Bays	Two available for the cards listed below
Control Panel LCD	Two lines by 20 characters Four menu-driven interface buttons Four status at a glance LEDs
Multi-language Configuration Changes	English standard; 20 languages available User capable, firmware auto configures
Dry Contact Inputs	Two, user-configurable
Dry Contact Outputs	One, user-configurable

Service

Installation	User capable, located in the IT racks
Preventative Maintenance	User capable, optional factory service available
Corrective Maintenance	User capable, optional factory service available
Serviceability Features	Hot-swappable batteries Hot-swappable electronics module Automated internal maintenance bypass Auto-configure firmware Flash firmware upgradeable

Certifications

EMI	IEC 62040
Surge Protection	ANSI C62.41, Cat B-3
Hazardous Materials (RoHS)	EU Directive 2002/95/EC Category 3 (4 of 5)

Warranty

Standard	12 months
Warranty Repair	Factory depot repair or replace

Options and Accessories

Detachable input cord	
Detachable input/output cord assembly	
Detachable paralleling cord assembly	
Extended Battery Modules (EBMs)	
3U output sub-distribution module	
0U to 3U rack power strips	
60 kW Powerware BladeUPS Parallel Bar	
Four-post rail kit	

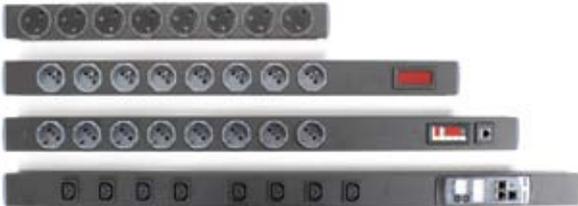
Optional X-Slot Communication Cards

Application	Card
Web SNMP	ConnectUPS-X Web/SNMP Card
Environment Monitoring	EMP Environmental Monitoring Probe (requires Web/SNMP card)
Modbus® RTU	Modbus Card
IBM eServer™ (i5™, iSeries™, or AS/400), industrial	Relay Interface Card
Parallel	Powerware Hot Sync Card
Remote Monitoring	Modem Card
Remote LCD Display	ViewUPS-X

Recommended ePDU:

Y032440CD100000	RPM - Rack Power Module (BladeUPS in, 12xC13 + 6xC19 out) 20 ft lead
PW107BA0UC08	ePDU - Basic (0U, Dual 16A C20 in, 24xC13+ 8xC19 out) use in addition to RPM
PW107MI0UC08	ePDU - IP Monitored (0U, Dual 16A C20 in, 24xC13+ 8xC19 out) use in addition to RPM

Eaton ePDU



User benefits:

- Eaton ePDUs are designed for Mission Critical reliability and server applications
- Support all enclosure power densities - Standard 0-4 to Ultra 15 kW and up
- Wide choice of outlets, including UK, Schuko, French, Nema, C13, C19
- Up to 3 types of outlet on a single zero U ePDU
- Solutions include Basic, Metered, Monitored and Managed technologies
- Vertical zero U, or horizontal 1U/2U configurations
- Custom product capabilities to meet the most demanding needs
- Integrated isolation mounting hardware provides maximum enclosure integrity
- High quality sockets ensure maximum reliability
- Multi-option mounting improves installation flexibility. Have confidence that the strip can be adapted to suit any on-site rack configuration.



Enclosure Power Distribution Units

With today's changing technology and the demand for reliability, data centre professionals need sophisticated equipment to monitor consumption at a server level as well as at the data center level to understand and control what is happening within their infrastructure.

Wide choice of models

Eaton ePDUs feature the broadest portfolio in the industry across all power densities and technologies to satisfy the needs of every data centre. This complete suite of power products is designed specifically to help data centre IT managers understand their rapidly escalating power requirements.

The ePDU family includes models with a variety of power inputs and outputs to fit your power requirements. You can select from UK, Schuko, French and IEC (C13 & C19) output sockets and local (UK or Schuko), EN 60309, IEC (C14 & C20) or unterminated cords for termination directly to the output terminals of the UPS.

The ePDU range includes an extensive range of vertical Zero U products that do not occupy server space in racks as well as 1U and 2U formats. Environmental Monitoring options are also available.

From single to dual corded, four technology options, the broadest power range and the ability to manufacture ePDUs with custom arrangement of outlets (number and type) for every region, Eaton ePDUs are distinguished for their quality, dependability and versatility. All products are designed for the specific application with an emphasis on safety and reliability.

Choose your Perfect Solution

Every data centre is unique – choose the right solution of enclosure power distribution units with three simple questions:

1. How much power do you need?

We have power solutions from Standard Power - 1 to 4 kW to Ultra High Power 15kW and up, including single phase 10A, 13A, 16A, 32A and 63A, 3 Phase 16A and 32A

2. Which inputs and outlets do you need?

ePDUs are highly configurable, allowing multiple outlet and plug configurations including 3 types of outlet on a single ePDU – UK, Schuko, French, Nema as well and C13 and C19

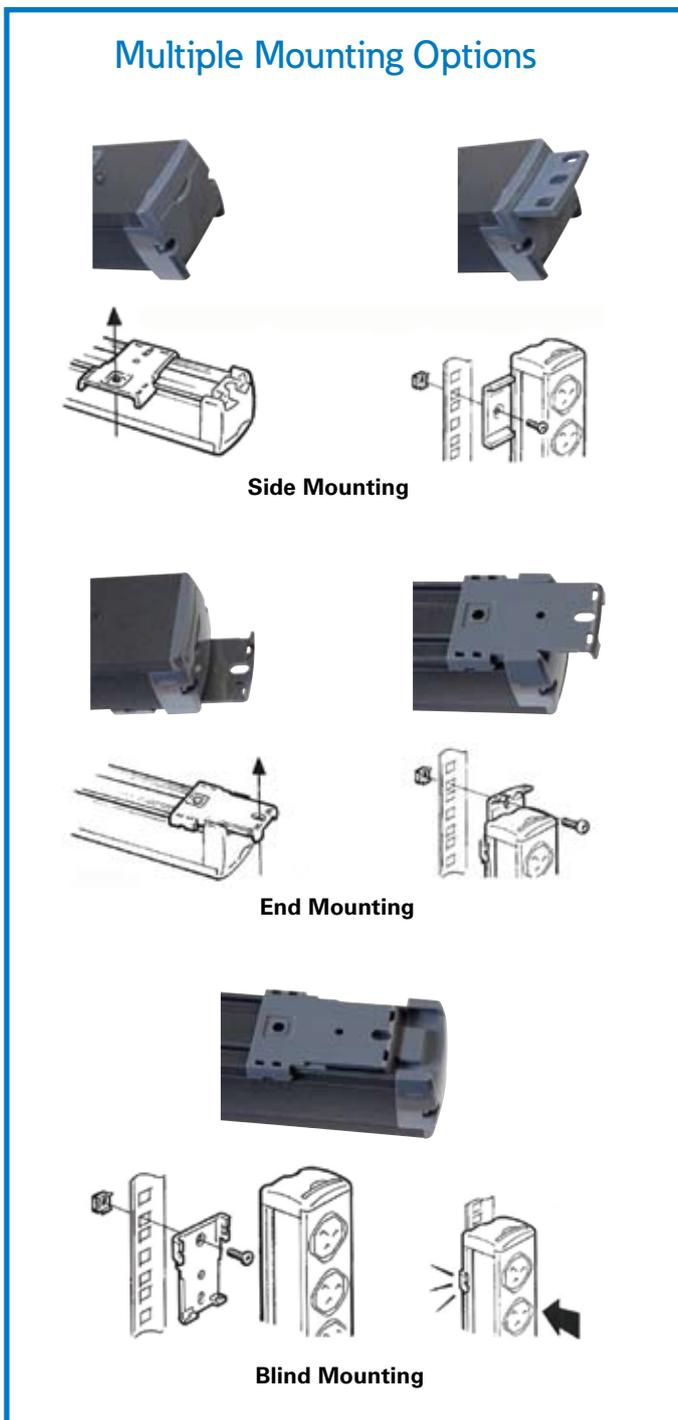
3. What functionality do you need?

We offer a broad range of functionalities including Basic, Metered, Monitored and Managed technologies

Basic ePDU

Designed for reliable and cost effective power distribution, Basic ePDUs have the form factor and outlet choices to meet your needs. All ePDUs, including basic ePDUs, are made of rugged aluminium chassis and incorporate fully shrouded circuit breakers and switches.

- Rugged construction
- Data centre grade components
- Multiple mounting options
- Fully shrouded circuit breakers and switches
- High-density units available to support blade servers and network switches



Basic ePDU

Metered ePDU

Metered ePDUs offer an easy-read digital ammeter for easy start-up and provisioning of servers. The display is large and bright and can be viewed from afar and through perforations in the cabinets. The ePDU assures easy management and monitoring for current requirements and future expansion.

- Local ammeter display enables load balancing and load segmentation
- Easy-read digital ammeter
- True RMS ammeter provides accurate power measurement



Example 1U and 2U configurations



Metered ePDU



High Density and dual input configurations available



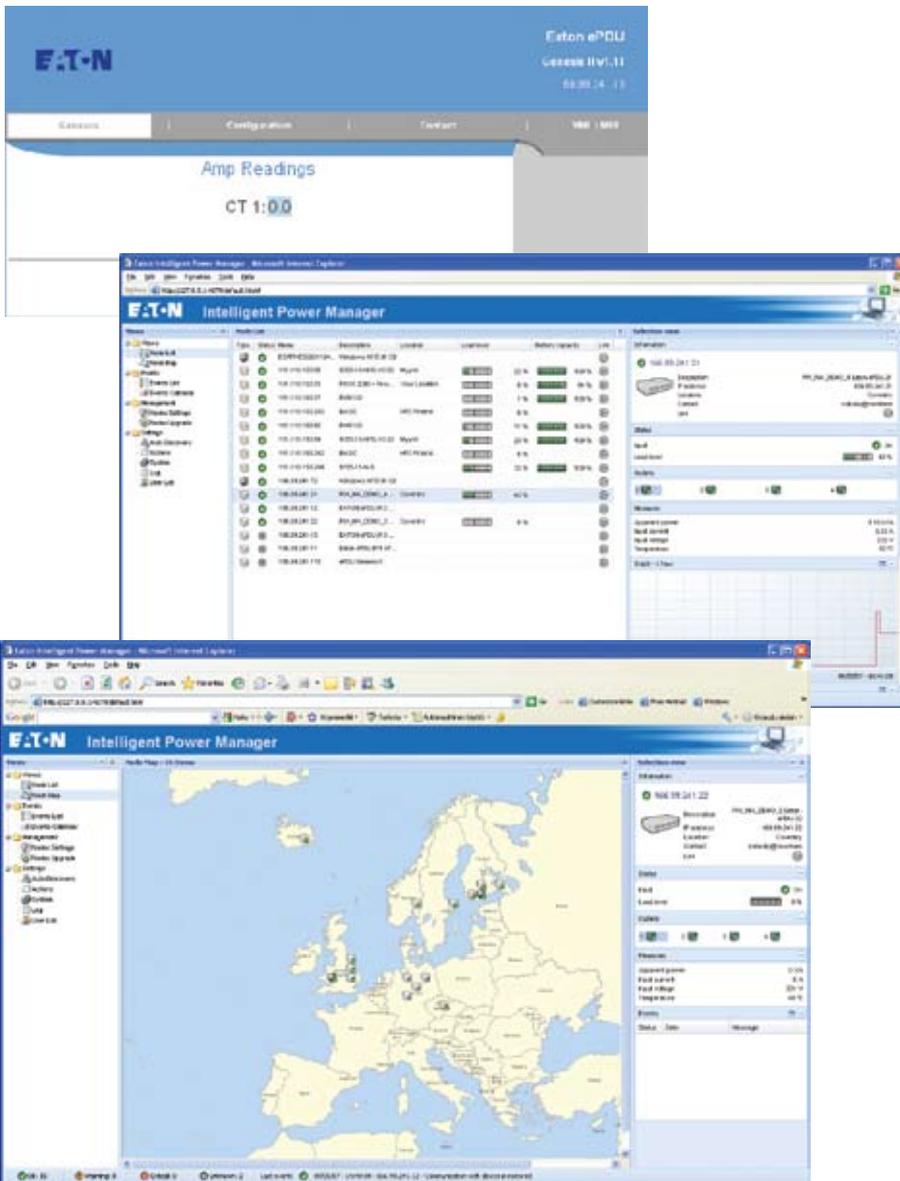
Appropriate Breaker protection, or individually fused sockets available

Monitored ePDU

Monitored ePDUs offer customers the ability to remotely monitor the current draw over an Ethernet connection. This allows the user to aggregate the information from thousands of ePDUs in one location. All monitored ePDUs also include an easy-read digital ammeter for local provisioning and load balancing of servers.

The multi-channel Ammeter allows the monitoring of current on input and each branch circuit to ensure accurate load balancing. The Ammeter can manually or automatically scroll through up to eight circuits. Eaton ePDU's offer a reliable, scalable solution for your current and future requirements.

- Monitor current draw over an Ethernet connection
- Easy-read digital ammeter with up to 8 circuits
- Accurate load balancing
- True RMS ammeter provides accurate measurement
- Manual or auto scrolling through circuits



Monitored ePDU

Managed ePDU

Manage your power consumption to the individual server level. Managed ePDUs have unprecedented management and monitoring capabilities.

You can even monitor your power down to the individual outlet level to gain a full understanding of your data centre. User-definable grouping and sequencing of outlets with time delays allow controlled remote boot-up of servers and equipment. 256-bit encryption ensures secure communication and IPMI and SMASH CLI capability provides harmonised user access to computer hardware and ePDUs.

- Monitor and control individual outlets to manage the efficiency of the Data Centre at server level
- Comprehensive monitoring to the outlet level (Amps, Volts, Watts)
- Individual outlet switching enables remote reboot of servers
- User defined grouping and sequencing of outlets over multiple ePDUs (for A&B feed)
- Communication using SSL, TELNET, http, https, SNMP, IPMI, SMASH CLI, Serial 256-bit encryption security and in-built firewall
- Email capability for instant alert notification
- SNMP network management protocol enables you to monitor thousands of ePDUs in the network
- Optional temperature and humidity sensors available



Eaton ePDU

In-Line Monitored ePDU

Retrofit for existing PDUs without power metering.

Designed for new or retrofit applications, our in-line monitoring units provide simple single and dual fed local and remote monitoring solutions. Available with IP connectivity, as well as the Easy-Read digital ammeter.

- Adds power distribution monitoring to existing or Legacy data centres
- Available in 16A & 32A, single & dual circuits
- 19" horizontal mounting or 0U vertical mounting
- Single or Dual fed – allows A and B feeds to be monitored
- Fuse-less and breaker-less design: no inline break



Supervise your ePDU power distribution with Intelligent Power Manager

Intelligent Power® Manager is a new power monitoring software product from Eaton. It supports Eaton Monitored and Managed ePDU products as well as UPS, so customers can monitor and manage their power distribution via one interface and one IP address.

Benefits:

- Monitor and manage multiple ePDUs and UPS systems over an IP network using a standard web browser
- IPM provides details of ePDU parameters, measurements and settings, from any point in the network, simply using the IP address of each ePDU
- Drill down to individual devices
- User-definable alarms including E-mail and SMS alerts through a single point
- Supervision and management of a whole system through a single user interface
- Configurable views
- Automatic discovery of devices
- Free of charge for up to 10 devices (ePDU or UPS)



Intelligent Power Manager Features and Benefits

Key Feature	Benefit
Browser Based	IE 6 and 7; Firefox 2 and 3; Safari. The system can be installed locally, or on a main server and browsed to.
Auto Discovery	Fast installation - automatically detect devices on your network.
Security	Application has multiple password protected access levels and support for secure communications.
Remote access	Interface is web-based which enables remote monitoring and access to systems.
User definable tree structure	Simplifies management of multiple devices over multiple locations through grouping.
User definable graphics view	Helps in visualising physical locations of devices on maps or schematic drawings.
Aggregation of device alarms	Single interface to view all alerts. Minimise response time, reduce time to repair, maximise uptime. Alerts via mobile phones & e-mail.
Aggregated device views	Grouping of multiple 'like' devices simplifies management. Single interface accessible from anywhere on the network through a web browser.
Device firmware management	Reduce set-up and maintenance time of Network Management Cards by mass-configuring parameters and mass-upgrading firmware (not currently functional with ePDU).
Shutdown agent management	Enables safe shutdown of servers.
Automatic updates	Keeps the software at the latest version level.
Support for many device types	UPS and ePDU with network interface devices are visible and their individual web interfaces accessible for editing / configuration from a single view.
Customisable views	Lets users select the most relevant data for fast viewing and sorting on the interface.

ePDU.com is Making Product Configuration as Easy as 1, 2, 3...

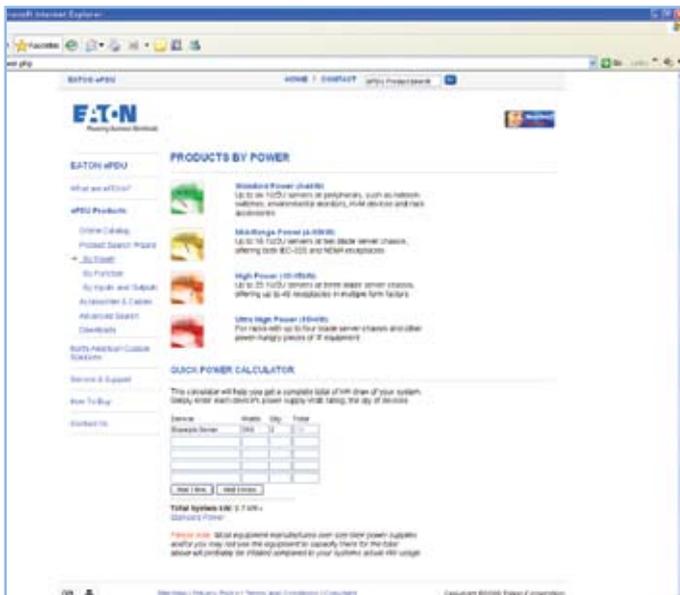
Making the right decisions from the start can make a difference in the dependability and efficiency of an infrastructure.

ePDU.com is helping make the selection of enclosure power distribution units, as easy as 1, 2, 3. This product configuration wizard is a simple interface that allows the customer to search over 1,000 products for the perfect solution.

This site allows the customer to ask themselves three key questions about their power needs.

- 1. How much power do you need?**
- 2. What functionality do you need?**
- 3. What inputs and outputs do you need?**

This innovative site allows the customer to explore features, benefits and learn basic fundamentals of ePDUs, as well as allows them to demo the live interface.



Eaton ePDUs are covered by a two-year limited factory warranty.

Eaton Enclosures



Superior rack enclosures for IT equipment

IT availability and reliability are critical issues in today's demanding environments, so it is important to ensure stable conditions for your server and software systems.

Eaton introduces a range of enclosures and accessories for your network closets, computer rooms and data centres.

Designed specifically for IT applications, this 42U x 600 mm (w) x 1000 mm (d) modern enclosure offers strength, stability and a vendor-neutral environment to house IT equipment.

The Eaton Enclosure allows for ultimate buying flexibility to create additional space, and the 16-fold unique frame design delivers the highest dimensional stability and load bearing capability. The enclosure is complemented with a range of cable management, cooling and power distribution accessories to enable you to tailor your enclosures to your specific application.

Features

- Designed specifically for IT applications
- Universal server platform (EIA 310-D)
- Full line of accessories
- Excellent heat dissipation
- Strong frame structure

Reliable Power distribution for:

- Data centres
- MDC/IDC
- Wiring closets
- Office environments
- Central offices
- Co-location and application environments



Powering Business Worldwide

Eaton Enclosures

Specifications

- Frame system – multi-fold steel frame design for strength and rigidity
- No horizontal or vertical supports, keeping entire structure open for equipment and cable management
- Perforated roof with four 114 mm holes with grommets for overhead cable management
- Torsion-free structure
- Multiple internal surfaces and mounting points
- Maximum internal volume for footprint
- External access to all installation points for doors and walls
- Maximum load bearing capacity – 907 kg

External Surfaces – Doors and Walls

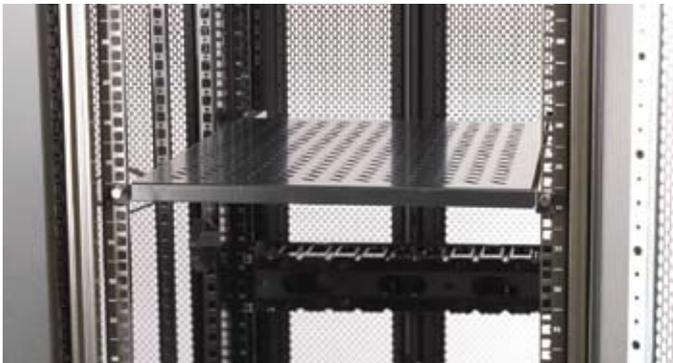
- Doors can be easily removed or reversed
- Sidewalls can be screwed on or locked in place
- Internal door hinge and lock points offer maximum security
- Door stiffener stabilizes door and provides additional mounting surfaces
- Maximum perforated door area meets or exceeds server manufacturer specifications for air flow
- Ground studs on all surfaces
- External surfaces do not affect load bearing capacity – same ratings with or without side walls
- Door handle provides customised locking solutions and simple ID tag capability
- Split rear doors to maximise floor space availability

Vertical Mounting Rails

- Designed to meet EIA-310-D standards
- Fully depth-adjustable to maintain load capacity regardless of rail positioning
- Floating isolation system – vertical rails are not secured to frame members or lateral support channels – can be adjusted independently
- “Z”-shaped, multi-fold profile offers high load-bearing capacity and multiple mounting surfaces
- “U” markings on front and rear near surfaces of each rail for ease of installation

Key Accessories

- Sidewalls - for security and thermal control
- Baying kits - for universal flexibility in joining enclosures together
- Shelves – (482 mm)
68 kg – 113 kg capacities
- Casters - for ease of movement on flat surfaces
- Tool-less cable management hardware reduces installation time and costs
- Bolt-down kits - for securing cabinets in place
- Tool-less blanking panels - to control airflow and improve cooling efficiency
- Plinths, roof fans and pull out stabilisers
- Compliment your Eaton rack enclosure with Eaton Enclosure Power Distribution Units - ePDUs
- For a full list of accessories and ePDUs please speak with your local Eaton representative



Description	Dimensions mm	Weight kg	Shipping Dimensions mm	Shipping Weight kg	Part Number
No Sides or Casters	2000x600x1000	99	2160x800x1200	116	1052734
With Sides, no Casters	2000x600x1000	116	2160x800x1200	133	1052735
No Sides, with Casters	2000x600x1000	104	2160x800x1200	121	1052736
With Sides and Casters	2000x600x1000	121	2160x800x1200	138	1052737

Power Management Solutions



Benefits of using Power Management Solutions

- Real-time notification makes it easy to prevent or analyse possible failures immediately
- Helps to prevent data losses by enabling controlled shutdown of servers and PC operating systems
- View and analyse power events and measured values from recorded logs
- Save time and money with remote equipment control, which removes the need for additional site visits to restart equipment. It also enables prolonged runtime of essential equipment during power outages by allowing orderly remote shutdown of non-critical systems and processes.

Minimize downtime and prevent data loss

In order to get full benefit out of a UPS it needs to communicate with the outside world. IT system administrators need to be informed if power supply is compromised, facility managers have to be notified if temperature rises in the UPS or battery room and service has to be alarmed if there is a component failure in the system. Having the ability to control power systems remotely or automatically opens up new opportunities and can bring huge savings in work effort, energy usage and response time. Controllable power distribution can be used to reboot equipment or turn it off when it is not needed.

Eaton's Power Management Solutions, including software and connectivity products, scale from homes to most mission-critical data centres and from largest factories to unmanned remote observation stations. They link to network, IT, facility, automation and building management systems delivering information to e-mail, mobile devices and Web among others.

In the optimum case sophisticated analysis in power devices themselves or software such as PowerVision® can prevent the risk of downtime. Even in the case where risk is present, a fast delivery of an alarm increases the likelihood that it can be dealt with before there are any consequences to the operation of the powered system. Even in case where power loss can't be avoided, software can help by automatically shutting down systems in a controlled and predefined manner, preventing data corruption on storage devices and databases. Eaton's offices and representatives have experts who can help in designing and installing these solutions.

Protection: shutting down servers

To ensure the integrity of the system and the data, a computer operating system must be shut down in the correct sequence. Dedicated shutdown software must be installed on the servers to execute various functions before the power supply is cut off. These functions include:

- executing a script to close applications running on the server;
- initiating a shutdown sequence or hibernation after a preset timeout or just before total battery discharge;
- rebooting the operating system automatically or manually when the mains power is restored;
- showing UPS alerts to the user.



Power Management Solutions

Software Suite

Eaton offers a full line of shutdown and monitoring software products to enhance the protection provided by its UPSs. The Software Suite, conveniently packed on one CD-Rom, follows every UPS free of charge.

NetWatch is a shutdown agent for the ConnectUPS Web/SNMP card. It is a very compact piece of software, but still features powerful configuration options for shutdown actions, timings and user notification.

LanSafe is a network shutdown software product that currently supports up to 20 operating systems. It ensures controlled sequential shutdown of the whole network across platforms in case of a prolonged power failure. LanSafe allows the shutdown of up to 64 computers protected by a single UPS.

Intelligent Power Manager is a software tool for managing networked UPS and PDU systems more easily and at lower cost than the major NMS platforms, and is dedicated to power management functions. Administrators have an overall, consolidated view of the main operating parameters of all UPS systems. The web-based interface is intuitive and easy to use while also having high configurability and powerful features.

Intelligent Power Manager centralises alarm management. It can collate several events into a single message and deliver the message via email or SMS.

Intelligent Power Manager is very easy and fast to install. Once running, the software discovers manageable power devices automatically and is operational in just a few seconds.

A version of Intelligent Power Manager limited to 10 monitored devices is available free with each networked Eaton UPS.

PowerVision is performance monitoring and trend analysis software for critical UPSs and multiple UPSs in a network. It stores information about the operation of the UPS device in its relational database where it can be retrieved for display and analysis. PowerVision's alert and notification behaviour is highly configurable, which makes it a great tool for system administrators.

Integrated shutdown controller module can host hundreds of shutdown clients and it can also be used in case of paralleled UPSs. PowerVision's shutdown logic is based on user definable script, which gives almost unlimited flexibility in deciding when to initiate operating system shutdown. The Software Suite CD offers a 30-day trial license of PowerVision Network Edition.

- **Network Edition**, which monitors multiple UPSs in the network.
- **Facility Edition**, which provides support for other equipment in the power chain and more options for parallel systems.
- **Enterprise Manager**, which adds a data view client and support for multiple PowerVision Facility or Network editions.



Linux and Eaton uninterruptible power supplies

For several years Eaton has been actively supporting the trend towards open source software by providing information on our products to the Network UPS Tools development community. For more information on this tool, please see www.networkupstools.org



Software Compatibility

LanSafe	Compatible with	Operating system support*
	3105	Windows 2000/XP/2003/Vista/2008
	5110	VMware ESX 3.5
	5115	Novell NetWare 5.0, 6.0, 6.5
	5125	AT&T SVR4 v.3.0
	5130**	HP UX 10.20, 11.0, 11i (PA RISC) 11i 1.6, 2 (Itanium)
	9120	AIX 4.x (RISC) 4.X, 5.1, 5.2, 5.3 (PowerPC)
	9125	SCO OpenServer 5.0.6, 5.0.7
	9130	Solaris 7, 8, 9, 10 (SPARC, Intel)
	9135**	SGE Irix 6.5 (MIPS)
	9140	Mac OS X 10.2.8, 10.3.X, 10.4.X (PowerPC)
	9155	Red Hat Enterprise Linux 3, 4, 5
	9355	SuSE 8, 9, 10
	9390	SuSe Enterprise Linux Server 8, 9, 10
	9395	Fedora Core 5, 6, 7, 8

Intelligent Power Manager	Compatible with	Operating system support*
	All UPS models with Eaton Web/SNMP card, managed and monitored ePDUs	Windows 2000/XP (Home or Pro) /2003 / Vista / 2008

PowerVision	Compatible with	Operating system support*
	Network Edition	PowerVision Editions
	5115	Windows
	5125	2000 Server, Advanced Server, Professional
	9120	XP Home Edition, Professional
	9125	Server 2003 Standard, Web, Enterprise
	9130	
	9140	PowerVision shutdown agent
	9155	Windows
	9355	2000 Server, Advanced Server, Professional
	9390	XP Home Edition, Professional
	9395	Server 2003 Standard, Web, Enterprise
	Generic third party UPS	
	Generic redundant units (1+1)	UNIX
		HP-UX v. 10.x and higher
		IBM AIX v. 4.x and higher
		Sun Solaris v. 6.x and higher
		SGI Irix v. 6.3 and higher
		Linux (kernel version 2.2 and higher)
		BSD OS v. 4.x and higher
		Novell NetWare
		Netware v. 4.11 and higher, requires TCP/IP

NetWatch OS Support	Compatible with	Operating system support*
	All models with ConnectUPS Web/SNMP card	Windows 2000, XP, 2003, Vista, 2008, VMware ESX 3.5, Novell NetWare, SGI IRIX, HP-UX, IBM AIX, Linux, BSD, SCO, Solaris, Mac OS X

* Check latest information at www.eaton.com/powerquality

** LanSafe v.6 or higher

Power Management Solutions

Connection Options to Manage and Monitor Your UPS

ConnectUPS Web/SNMP card is a complete UPS monitoring, control and shutdown solution in a networked IT environment. In case of alert the Web/SNMP card can notify users and administrators through e-mail and SNMP traps. In case of a prolonged power failure the protected computer systems can be shut down in a graceful manner with NetWatch and LanSafe software. The unique three-port switching hub on the X-Slot model provides additional network connections.

ConnectUPS-X

P/N 116750221-001 for Eaton 5115 RM, 5125, 5125 RM, 9125, 9140, 9155, 9355, 9390, 9395, BladeUPS.

ConnectUPS-BD

P/N 116750222-001 for Eaton 9120 and 9130.

ConnectUPS-E

P/N 116750223-001 is an external model that is connected to a serial port on a UPS.

ConnectUPS-MS

P/N 103006826 for Eaton 5130, 9135.



Environmental Monitoring Probe (EMP) adds temperature, humidity and two contact closure monitoring capability to ConnectUPS Web/SNMP cards. It is well suited for monitoring rack temperature and door status, as well as battery temperature. Operating system shutdown can be triggered if user defined thresholds are exceeded or contact closure status changes. P/N 116750224-001 for all UPSs with a Web/SNMP card installed.



Relay/AS400 cards are an easy connection to IBM AS/400 series computers as well as industrial and building management systems.

P/N 1018460 for Eaton 5115 RM, 5125, 5125 RM, 9125, 9140, 9155, 9355, 9390, 9395, BladeUPS.

P/N 1014018 for Eaton 9120 and 9130.



X-Slot ModBus card connects the UPS to industrial and building management systems using ModBus/JBUS RTU protocol. P/N 103002510-5501 for Eaton 5115 RM, 5125, 5125 RM, 9125, 9155, 9355, 9395.



ViewUPS-X remote display is an LCD panel that lets users view the status of the UPS from as far as 100 m. ViewUPS-X has also four status LEDs and an alarm sound. The display is bundled with a dedicated X-Slot card that also powers the display through the communication cable. In addition to the remote display connection the card has also a SELV isolated relay port for connection to monitoring systems and AS/400 computers.

P/N 1027020 for 5115 RM, 5125, 5125 RM, 9125, 9140, 9155, 9355, 9390, 9395, BladeUPS.



UPS Runtime Tables

BladeUPS

Load	#42U Racks	4 kW	8 kW	12 kW	24 kW	36 kW	48 kW	60 kW		
1 x BladeUPS (12 kW Internal battery)	6	6	1	23	8,7	4,7				
+ 1 External Battery Module	9	9	1	41	17,6	9,5				
+ 2 External Battery Module	12	12	1	65	28	17				
+ 3 External Battery Module	15	15	1	93	43	27				
+ 4 External Battery Module	18	18	1	119	55	34				
2 x BladeUPS (12 kW N+1 Internal battery)	12	18	1	44	23	13,6				
+ 1 External Battery Module	18	24	1	85	41	27				
+ 2 External Battery Module	24	30	1	137	65	41				
+ 3 External Battery Module	30	36	1	198	93	59				
+ 4 External Battery Module	36	42	2	257	119	76				
3 x BladeUPS (24 kW N+1 Internal battery)	18	24	1		34	23	8,7			
+ 1 External Battery Module	27	33	1		34	41	17,6			
+ 2 External Battery Module	36	42	2		102	65	28			
+ 3 External Battery Module	45	51	2		147	93	43			
+ 4 External Battery Module	54	60	2		190	119	55			
4 x BladeUPS (36 kW N+1 Internal battery)	24	30	1			30	13,6	7,3		
+ 1 External Battery Module	36	42	2			56	27	14,7		
+ 2 External Battery Module	48	54	2			89	41	24		
+ 3 External Battery Module	60	66	2			128	59	37		
+ 4 External Battery Module	72	78	2			165	76	47		
5 x BladeUPS (48 kW N+1 Internal battery)	30	36	1				19	10	6,6	
+ 1 External Battery Module	45	51	2				34	21	13,3	
+ 2 External Battery Module	60	66	2				54	31	23	
+ 3 External Battery Module	75	81	2				77	48	35	
+ 4 External Battery Module	90	96	3				98	61	44	
6 x BladeUPS (60 kW N+1 Internal battery)	36	42	2				23	13,5	8,7	6,2
+ 1 External Battery Module	54	60	2				41	27	17,6	12,6
+ 2 External Battery Module	72	78	2				65	41	28	21,6
+ 3 External Battery Module	90	96	3				93	59	43	33
+ 4 External Battery Module	108	114	3				119	76	55	42

* Note: each UPS requires the same number of external batteries

Time in minutes

9155 and 9355 8-15 kVA runtimes

Runtimes for UPS with internal batteries (UPS load with typical 0.7 p.f.)

Battery	Qty	3	4	5	6	7	8	9	10	11	12	13	14	15	kVA
7 Ah 12 V	1 x 32	36	26	20	15	12	10	7	6	-	-	-	-	-	min
9 Ah 12 V	1 x 32	42	32	24	21	16	15	12	10	9	8	7	6	5	min
7 Ah 12 V	2 x 32	86	66	46	38	33	28	23	20	16	15	13	12	10	min
9 Ah 12 V	2 x 32	95	74	61	44	38	33	29	25	22	20	18	16	15	min

Runtimes for UPS with external battery cabinet

Battery	Qty	3	4	5	6	7	8	9	10	11	12	13	14	15	kVA
7 Ah 12 V	3 x 32	130	100	81	68	57	44	39	35	27	24	22	20	18	min
7 Ah 12 V	4 x 32	200	133	108	91	78	69	61	47	40	35	32	29	27	min
7 Ah 12 V	5 x 32	250	182	141	114	95	81	70	61	53	47	43	39	36	min
7 Ah 12 V	6 x 32	316	230	178	144	120	102	89	78	67	60	54	50	45	min
7 Ah 12 V	7 x 32	385	280	217	176	146	124	106	93	82	73	66	60	55	min
7 Ah 12 V	8 x 32	458	333	258	209	174	147	126	110	97	87	79	72	66	min

UPS Runtime Tables

Runtimes for UPS with internal batteries (4 x 36 pcs 9 Ah) and external battery cabinet(s) with 24 Ah batteries (one external battery cabinet can fit 2 strings of 24 Ah batteries)

Internal Battery		External Battery										
Battery	Qty	Battery	Qty	5	10	15	20	25	30	35	40	kVA
9 Ah 12 V	4 x 36	24 Ah 12 V	1 x 36	268	113	77	56	43	34	25	20	min
9 Ah 12 V	4 x 36	24 Ah 12 V	2 x 36	402	175	115	84	69	57	47	38	min
9 Ah 12 V	4 x 36	24 Ah 12 V	3 x 36	555	243	154	121	90	75	63	54	min
9 Ah 12 V	4 x 36	24 Ah 12 V	4 x 36	> 10 h	318	197	147	123	100	77	66	min

External battery (Panasonic LC-X1224AP) with four internal strings back up table for UPS ratings 20-40 kVA, p.f. 0.7 (typical IT server/computer load).

Runtimes for UPS with internal batteries (4x 36pcs 9Ah) and external battery cabinet(s) with 110W batteries (one external battery cabinet can fit 2 strings of 24 Ah batteries)

Internal Battery		External Battery										
Battery	Qty	Battery	Qty	5	10	15	20	25	30	35	40	kVA
9 Ah 12 V	4 x 36	110 WPC12 V	1 x 36	318	132	82	62	47	41	32	25	min
9 Ah 12 V	4 x 36	110 WPC12 V	2 x 36	518	225	138	104	81	66	50	42	min
9 Ah 12 V	4 x 36	110 WPC12 V	3 x 36	> 10 h	318	204	147	114	95	77	66	min
9 Ah 12 V	4 x 36	110 WPC12 V	4 x 36	> 10 h	430	266	198	153	124	103	87	min

External battery (CSB HRL 12110W) with four internal strings back up table for UPS ratings 20-40 kVA, p.f. 0.7 (typical IT server/computer load).

9390 40-160 kVA, external battery capacity

Battery configuration	UPS load with typical load p.f.0,8							kVA
	40	60	80	100	120	160		
1xBAT (HR250)	30	17	10	-	-	-	min	
2xBAT (HR250)	73	44	30	22	15	10	min	
3xBAT (HR250)	128	72	51	35	30	21	min	
4xBAT (HR250)	180	106	75	54	41	30	min	
2xBAT (HR305)	39	22	15	-	-	-	min	
2xBAT (HR305)	96	57	40	25	22	15	min	
3xBAT (HR305)	160	96	64	45	37	26	min	
4xBAT (HR305)	220	136	96	72	55	40	min	
1xBAT (HRL12280)	40	24	15	10	7	-	min	
2xBAT (HRL12280)	100	57	33	30	24	15	min	
3xBAT (HRL12280)	144	96	69	50	30	28	min	
1xBAT (HRL12330)	47	30	20	13	10	6	min	
2xBAT (HRL12330)	116	72	50	36	30	20	min	
3xBAT (HRL12330)	163	105	84	60	48	35	min	
1xBAT (HRL12500)	80	49	35	24	18	12	min	
2xBAT (HRL12500)	196	121	81	60	48	34	min	
3xBAT (HRL12500)	266	178	121	92	80	57	min	
1xBAT (NSB125)	87	53	36	27	20	12	min	
2xBAT (NSB125)	200	128	91	69	55	38	min	
3xBAT (NSB125)	305	200	145	115	94	64	min	

9395 225-275 kVA, external battery capacity

Battery configuration	UPS load with typical load p.f. 0,9					kVA
	160	200	225	250	275	
1xBAT CSB HRL 500	9	5	-	-	-	min
2xBAT CSB HRL 500	29	20	17	14	12	min
3xBAT CSB HRL 500	49	37	32	28	24	min

*Load power factor 0,9

Battery configuration	UPS load with typical load p.f.0,8					kVA
	160	200	225	250	275	
1xBAT CSB HRL 500	12	7	5	3	-	min
2xBAT CSB HRL 500	34	25	20	17	15	min
3xBAT CSB HRL 500	57	43	37	33	28	min

The battery backup table is given with end voltage 1.70 VPC and temperature +25°C.
The batteries are fully charged and measured after minimum (5) full discharge cycles.

Europe, Middle East, Africa locations

Europe, Middle East & Africa

Headquarters

Route de la Longeraie 7
1110 Morges, Switzerland
Tel. +41 21 811 4600

Algeria

Tel. +213 21 69 40 07
Northafrica@eaton.com

Belgium

Tel. +32-2-348 44 10
Belgium-info@eaton.com

Tel. +32-15-44.55.00
UPSmuizenBE@eaton.com

Central Asia and Caucasus region

Tel. +7 727 3172543
MiddleEast@eaton.com

Czech Republic

Tel. +420 234 769 500
UPSinfoczech@eaton.com

Denmark

Tel. +45 368 67 910
UPSSalesdenmark@eaton.com

Egypt

Tel. +202 246 18 5 21
Northafrica@eaton.com

Finland

Tel. +358 9 452 661
Myynti@eaton.com

France

Tel. 0 800 33 68 58
onduleurfrance@eaton.com

Germany

Tel. +49 7841 604 0
infoGermany@eaton.com

Italy

Tel. +39 02 955 42 309
MarketingEmlp@eaton.com

Jordan

Tel. +962 6 53 714 29
MiddleEast@eaton.com

The Netherlands

Tel. +31 (0) 78 652 16 80
netherlands-info@eaton.com

Norway

Tel: +47 23 03 65 50
salesnorway@eaton.com

North Africa & French Dom-Tom

Tel. + 212 5 22 95 77 40
NorthAfrica@eaton.com

Martinique

Tel. +596 42 58 09
mea-area@eaton.com

Middle East, East Africa & Central Asia

Tel. +971 4 881 1933
MiddleEast@Eaton.com

Poland

Tel. +48 22 331 85 24
upssalespoland@eaton.com

Portugal

Tel. + 351 21 421 74 30
ritalourenco@eaton.com

Russia

Tel. +7 495 981 37 70
UPSRussia@eaton.com

Saudi Arabia

Tel. +966 1 2795215
MiddleEast@eaton.com

Slovakia

Tel. +421 244 637 046
UPSinfoSlovakia@eaton.com

Spain

Tel. +34 902 104 220
info.es@eaton.com

Sub-Saharan Africa

Tel. +225 212 415 12
SubSaharan@eaton.com

Sweden

Tel. +46 8 598 940 00
infosweden@eaton.com

Tunisia

Tel. +216 71205073
Northafrica@eaton.com

Turkey

Tel. +90 216 663 61 09
MiddleEast@eaton.com

UK and South Africa

Tel. +44 (0) 1753 608 700
acukpowerware@eaton.com

www.eaton.com/powerquality



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NEXTURECOM Inc.

Room 403, BI Center, G55C, Gwanggyo
Venture Valley, # 107 Gwanggyo-ro
Youngtong-gu, Suwon-si, Gyeonggi-do
443-766 Korea

Mobile 010 6210 1385
T 070 8774 7450 F 031 622 9809
E hcyoo@nexturecom.com
skype yoohyunchul
www.nexturecom.com