

Powerware series

Eaton 9155/9355 UPS
8 - 40 kVA

Scalable.
Flexible.
Compact.



EATON

Powering Business Worldwide

Introduction and overview

The Eaton® 9155/9355 uninterruptible power systems (UPS) are mid-size double-conversion UPSs that resolve all utility power problems and supply clean, continuous, uninterruptible power for the ever-expanding loads in today's space-constrained server rooms. The 9155/9355 also offers an industry-leading combination of flexibility, scalability and power density – all in one high-efficiency package. The product family consists of single- and three-phase UPS models with a power range of 8-40 kVA.

Benefits

Premium power performance

- Double conversion topology provides the highest level of protection
- With a transformer-free design and sophisticated sensing and control circuitry, the 9155/9355 delivers up to 93 percent efficiency
- Active power factor correction (PFC) provides unbeatable 0,99 input power factor and less than 4.5 percent 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

True reliability

- Hot Sync® technology allows two or more UPSs to be paralleled to increase availability or add capacity
- ABM® technology charges batteries only when necessary, preventing corrosion and prolonging battery service life by up to 50 percent
- Internal batteries in all standard configurations support up to 20 min runtime

Extensive configurability

- Configurable and multilingual LCD control panel with back light and graphical mimic screen makes it easy to monitor UPS status
- A wide range of connectivity options guarantees smooth integration with the requirements of various application systems
- Bundled with Eaton Software Suite, the UPS provides an orderly network shutdown in the event of an extended power outage. If required, the 9155/9355 can also be integrated with network management, industrial automation and building management systems

Cost savings and sustainability

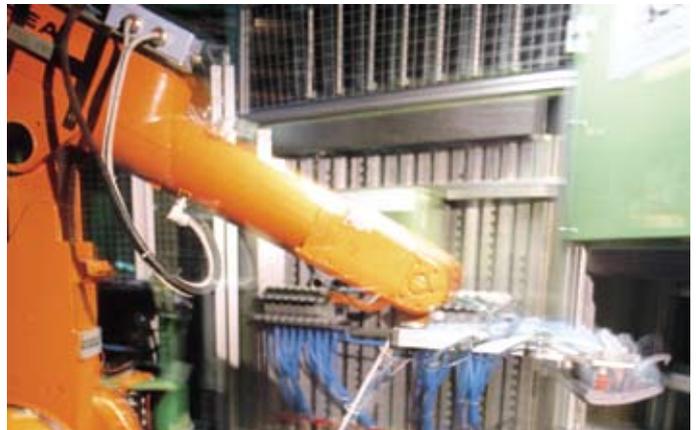
- The UPS features high efficiency, thus reducing utility costs, extending battery runtimes and producing cooler operating conditions
- The compact tower design offers a smaller footprint, thus enabling easy space planning and preserving valuable floor space
- Internal batteries often eliminate the need for costly and space-consuming external battery cabinets
- The single technical platform used in Eaton's three-phase products guarantees easy upgrades and consistent in service, thus lowering total cost of ownership
- Eaton uses sustainable materials and highly efficient manufacturing technology, thus generating savings in carbon footprint

Customised solutions

- Eaton solutions can be customised to meet the requirements of even the most demanding applications
- A range of service agreement options can be easily customised to meet customers' needs and budget

Key applications

- Server and computer rooms, small data centres
- Financial services
- Healthcare
- Building management
- Industrial automation equipment
- Security systems



Premium power performance

Double-conversion design for highest power protection

Unlike some other commercially available UPS technologies, the double-conversion design used in the 9155/9355 completely isolates output power from input power anomalies and delivers 100-percent conditioned, perfect sine wave output, regulating both voltage and frequency. Even when presented with the most severe power disturbances, power output remains stable.

The 9155/9355 continually monitors incoming electrical power and removes all power irregularities that are inherent in commercial utility power. During power outages and other interruptions, internal batteries provide emergency power to safeguard operation.

With the 9155/9355 UPS, data centre and facility managers can rest assured that their systems and equipment are fully protected from the effects of mains disturbances.

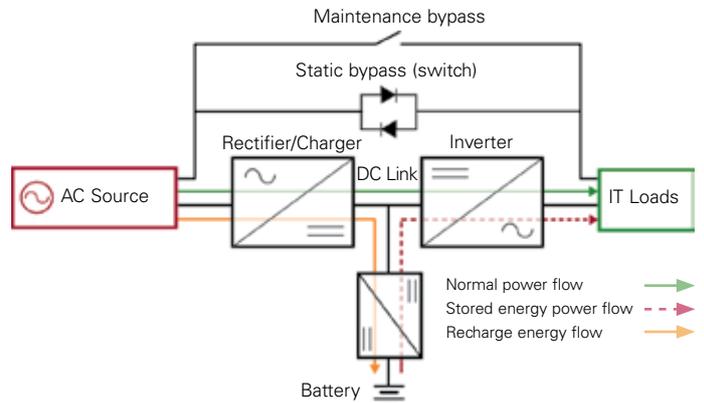
Self-diagnosis

The 9155/9355 constantly monitors its own operation – including voltage, temperature and function of internal components – and sends an alarm or takes action if it detects a potential problem.

Self-correction

If it senses a problem, the 9155/9355 instantly transfers the power path to a bypass source with zero interruption in power. When the alarm condition passes, the 9155/9355 automatically reverts from bypass to normal power.

The 9155/9355 features a graphical LCD that provides useful information such as load status, events, measurements and settings.



Efficiency and cost savings

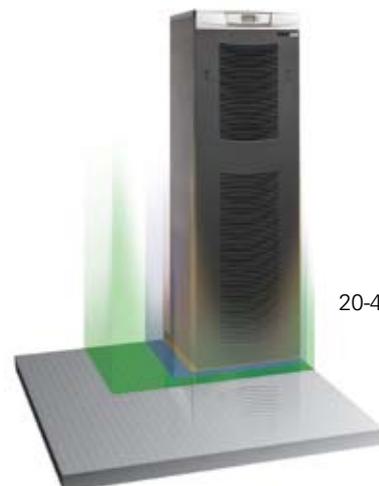
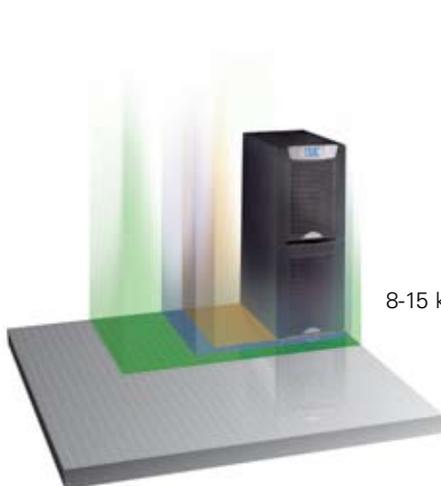
The 9155/9355 delivers a robust combination of low input current distortion and high power factor for maximum efficiency. Operating at greater than 90 percent efficiency across all load ranges, the 9155/9355 helps to reduce utility costs, extend battery runtimes and produce cooler operating conditions.

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

The 9155/9355 UPS provides industry-leading power density and a 10-40 percent footprint reduction versus comparable UPS solutions.

All standard 9155/9355 configurations incorporate internal batteries to provide significantly more runtime and offer 13 percent more capacity at equivalent VA ratings. Extended runtime allows the 9155/9355 to power this extra capacity for nearly four times longer without requiring additional hardware, eliminating the need for costly and space-consuming external battery cabinets.

Standard 10 kVA and 20 kVA capacity models can also be upgraded to 15 kVA and 30 kVA respectively, providing 50 percent more power with no additional hardware and no increase in footprint. The small footprint of the 9155/9355 enables easy space planning for data centres and saves valuable floorspace.

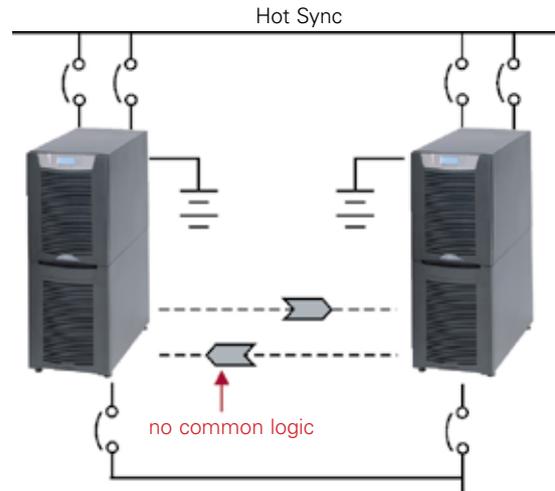


The 9155/9355 UPS provides a 10-40 percent footprint reduction versus comparable UPS solutions

True reliability

Powerware Hot Sync technology boosts power reliability

Eaton's 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 enable customers with ever-increasing load demands to take advantages of the scalability benefits it offers. Thanks to Hot Sync, up to four equivalent 9155/9355 modules can be paralleled for additional capacity or redundancy. Accurate, equal load share is the number-one characteristic determining the integral quality and reliability of a parallel UPS system. With Hot Sync technology this is achieved without the need for communication between the UPSs, thus no single point of failure is added when introducing parallel modules to a system. From an operational and economical viewpoint, the achieved "close to perfect" reliability brings clear savings in the long run, as every downtime incident is costly and might lead to unpredictable consequences.



The benefits of Hot Sync:

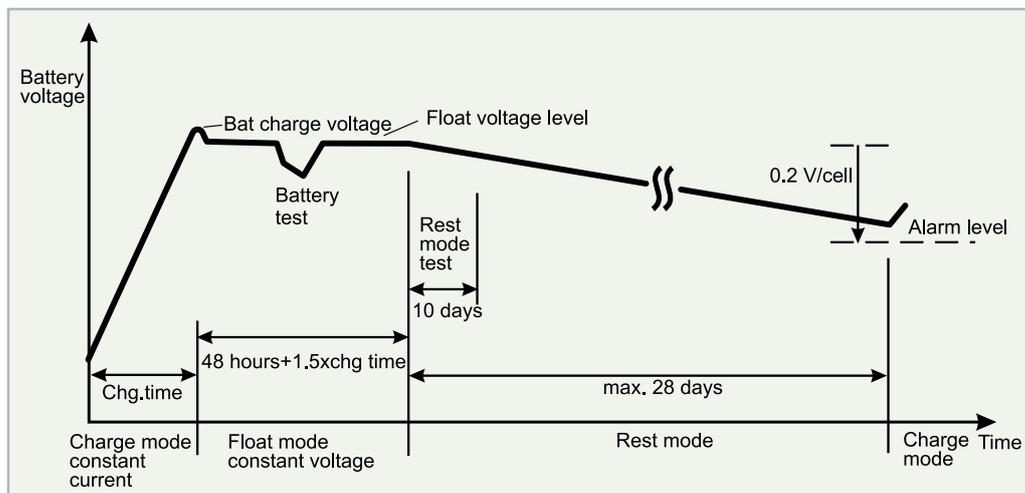
- Erases single point of failure
- Systems are capable of paralleling for both redundancy and capacity
- Ensures that each module is operating independently
- No added circuitry or components are required for standard UPS to be switched in to operate in parallel
- A proven technology – thousands of systems are operating successfully around the world

ABM optimises battery performance and service life

The ABM technology used in the 9155/9355 UPS maximises the health and service life of batteries:

- ABM technology uses a unique three-stage charging technique that significantly extends battery service life and optimises recharge time compared to traditional trickle charging

- Temperature-compensated charging monitors battery temperature and adjusts the charge rate accordingly, which properly charges the battery and greatly extends battery life
- An integrated battery management system tests and monitors battery health and remaining lifetime, providing user notifications to guide preventive maintenance



Battery voltage during one ABM charging cycle

Extensive configurability

Enhanced communication capabilities

The 9155/9355 UPS is equipped with a variety of standard communications features for network connectivity and remote management applications, including:

- RS-232 serial port
- Two X-Slot® communication bays
- Relay output contacts
- Two programmable signal inputs
- Remote emergency power-off (REPO)

Easy network connectivity and monitoring

ConnectUPS-X Web/SNMP card

The ConnectUPS-X Web/SNMP X-Slot card connects the 9155/9355 directly to an Ethernet network and the Internet and enables graceful shutdown of multiple computers over the network. The ConnectUPS-X Web/SNMP also features a three-port switching hub.



ConnectUPS-X Web/SNMP X-Slot card



Environmental Monitoring Probe

Environmental Monitoring Probe

The Environmental Monitoring Probe (EMP) works with the 9155/9355 and ConnectUPS-X card to remotely monitor the ambient temperature and relative humidity of the remote environment. The EMP can also be configured to provide the status of two additional contact devices such as smoke detectors or open-door sensors.



Relay Interface cards

Modbus® card

The Modbus card is an X-Slot device that allows continuous, real-time monitoring of the 9155/9355 through a Building Management System (BMS) or industrial automation system.

Relay interface card

The X-Slot relay interface card provides four programmable isolated dry contact Form-C relay outputs (default setting: utility failure, low battery, UPS alarm/OK, on bypass) and one input.

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.



LanSafe

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 offering 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.



Intelligent Power Manager

UPS options

- 9155/9355 is available with an optional integrated or external MBS that provides wrap-around bypass for UPS maintenance or service without shutting down the load
- An integrated output isolation transformer
- Tie cabinets for parallel systems
- Wall-mountable UPS centre for single UPS input, output and bypass distribution
- External battery cabinets line up and match perfectly with 9155/9355 UPS cabinets, and provide extended runtimes



External maintenance bypass switch (MBS)

Customised solutions

Eaton has vast experience in delivering solutions for the most demanding applications. As an example, marine UPSs have special dependability requirements due to the harsh operational conditions they have to withstand and the critical nature of the equipment they protect. Eaton has supplied marine UPSs to hundreds of vessels over the years.

The 9155/9355 has been also tested and certified for use in medical imaging system applications by all major suppliers of X-ray, MRI and CT machines.

Eaton offers 9155/9355 based customised systems for different markets, including:

- Marine/offshore
- Healthcare/medical
- Oil & Gas
- Rail & Track/underground/traffic/tunnel/mines
- Aviation
- Industrial applications
- Defence/military
- Emergency lighting

Expertise and reliability through Eaton service

Eaton provides an extensive technical support network to cover the power protection needs of our customers. We offer a number of distinct service packages to match different types of maintenance needs and budgets. Whichever package you choose, you can rest assured that it will deliver power security and reliability to keep your core business running. For more information, please contact your local Eaton service organisation or authorised service partner.



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 | Low -20% at 100% load/-50% at 50% load without battery discharge; High +10%/max +20% |
| 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% (reference 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 |

*May be 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 (p.f. 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 (p.f. 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 (p.f. 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 |

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 | 3 ph + N + PE | | |
| Nominal voltage rating (configurable) | 220/380, 230/400, 240/415 V 50/60 Hz | | |
| Input voltage range | Low -20% at 100% load/-50% at 50% load without battery discharge; High +10%/max +20% | | |
| 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% (reference 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 |
| *May be 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 (p.f 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 | Dimensions (HxWxD) | Weight |
|-------------|--------------------------|------------|--------------------|--------|
| 1025169 | 9355-BAT-1x24Ah (30 kVA) | 1x36x24 Ah | 1684x494x758 mm | 510 kg |
| 1025170 | 9355-BAT-2x24Ah (30 kVA) | 2x36x24 Ah | 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 |

For assistance with your power quality needs, contact your local Eaton service and sales representatives.

www.eaton.com/powerquality



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