

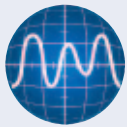
Powerware rack selection



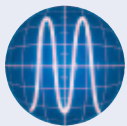
Powerware rack selection



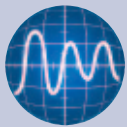
1. POWER FAILURE



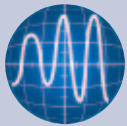
2. POWER SAG



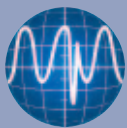
3. POWER SURGE



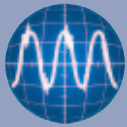
4. UNDERVOLTAGE



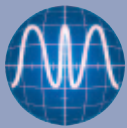
5. OVERVOLTAGE



6. SWITCHING TRANSIENT



7. LINE NOISE



8. FREQUENCY VARIATION



9. HARMONIC DISTORTION

All utility power suffers from power fluctuations. Sometimes these are so small you won't even notice, but sometimes they are substantial. Yet even the most advanced computer systems are very sensitive to disturbances in their power supplies. Effects of these fluctuations may be devastating for today's data systems like shutoffs, system lockups, corrupted files and data damage. Up to 45 per cent of data loss in unprotected systems are caused by bad power. To overcome the problems caused by bad power it is essential to use an Uninterruptible Power Supply.

Power protection as easy as 3–5–9

There are nine common types of power problems, shown here in the sidebar. The 3–5–9 concept clarifies what types of problems can be avoided with which solution, and in which environment each solution is the most useful.

Series 3 for non-critical applications

Basic solutions to protect non-critical hardware and data against three of the nine power problems. These UPSs operate in standby mode.

Series 5 for higher protection level

Intermediate solutions for office environment and servers featuring good communication options. These UPSs operate in line-interactive mode and provide protection against the five most common power problems.

Series 9 for full power protection

These double-conversion UPSs with excellent connectivity and communication features provide full protection against all nine types of power problems.

Different monitoring needs for different applications

The more protection you have in place the more accurately you need to keep tabs on what is happening with the UPS and in case of longer power outage you need to ensure that your system is shutdown systematically so that no data is lost.

Typically different UPSs have different capabilities to build up monitoring and shutdown systems that are needed to meet the requirements in different applications. As an example, in IT applications the shutdown and remote monitoring over network can be very important while in industrial applications relay based info on UPS status is the only information needed.

Superior technical expertise and support

Even 99,9 per cent availability leaves 9 hours annually when systems don't work. And this does not include the time needed to find the faults, fix them and get the system up again.

Powerware gives superior technical expertise and support. We have nearly 40 years experience in providing maximum uptime. Thousands of installed units in demanding industrial, aerospace, banking and IT systems are living proof of our success. We are Europe's leading mid-range (5–75 kVA*) UPS manufacturer and can now also offer full power protection solutions for rack systems that are becoming more common for housing different equipment.

Rack powering requirements

Power is required for IT, telecom, medical and industrial applications. As rack enclosures have in many cases become the standard means for housing and organizing these applications, the power distribution system for the rack enclosure must adapt to these changing requirements.

The rack environment is single-phase. The electrical circuits that deliver AC power to a rack enclosure are called “branch circuits”. The rackmounted equipment is plugged into receptacles that are fed by independent circuit breakers located in a distribution power panel. In Europe the branch circuit rating for a 230V AC receptacle is typically 16A which means that one independent circuit breaker can provide 3,7 kW.

Companies take different approaches as to how much equipment they pack into a rack enclosure. Some leave large amounts of space within the rack enclosure unused while others may pack equipment as tightly as possible. The mean value for rack power consumption in corporate computing environments is around 1kW however it is more and more common to load racks with power requirements between 1,5–3 kW. As density of rack-equipment get smaller and computer room space is limited it means that rack solutions with very high power needs will be more common in the future.

For server rooms where there are several racks it is common to choose a centralized solution instead of separate power protection for each rack as it is typically more cost-effective. These UPS solutions can either be 1-phase or 3-phase solutions.

Things to consider when choosing power backup for your rack

Most of the users might not think about having adequate power protection in place for their equipment before data or their system is down due to power problems. As the equipment in a rack can be extremely important for the business a reliable power protection for the system is highly recommended. When choosing the right UPS solution for your rack there are several things to consider to ensure you get a solution that meet your needs.

1. Load related, sizing you solution

- 1.1 How critical is the load, different UPS technologies offer different protection, Series 9 UPS offers the highest level of protection.
- 1.2 Power requirement both Watt and VA. As a lot of today's server use power factor corrected supplies it is important to look on both Watt and VA power need to avoid over sizing.
- 1.3 Backup time needed. Is it acceptable that your system goes smoothly down after a typical power outage of 5 minutes or do you want to keep the system up for 30 min or even one hour when a power outage happens? You might have different loads in your rack and you want some of them to stay on longer than others to preserve battery capacity for the most critical load.
- 1.4 Future power requirements. Should you oversize your UPS solution today to meet your future power requirements or can you add power or backup time later when needed.

2. Installation

- 2.1 Depending on the power requirement, do you need a hardwired installation or not. Typically over 3 kVA solutions requires hardwired installations if the power supply is not split into two UPS systems.
- 2.2 Space, how high can the UPS solution be so that your load still fit into the rack.
- 2.3 Heat dissipation, Series 5 UPS have better efficiency, however Series 9 offers better protection.

3. Monitoring and management of your UPS

- 3.1 Do you want to monitor your system remotely or near your system?
- 3.2 Do you have access to a network?
- 3.3 Do you need a shutdown solution?
- 3.4 Do you want to integrate your UPS to other building management solutions or do you want the UPS solution to be independent?

For network and office environment

5



PW5115 RM
500–1500 VA

Customer requirements

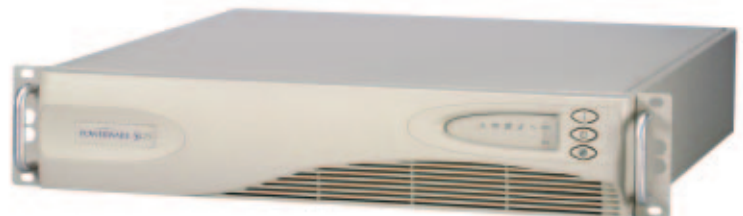
- Cost effective, reliable shutdown solution, no data losses
- Price effective solution for short rack backup power
- 1U rack height
- Typical backup 5–10 min depending on load
- Two load segments, battery power can be preserved for a particular load
- USB, RS232 as standard
- X-slot for communication card options



PW5125 RM
1000–1500 VA

Customer requirements

- Cost effective, reliable shutdown solution, no data losses
- Extended runtimes
- Price effective solution for longer backup power and power factor corrected loads
- 2U rack height
- Typical backup 5–10 min, extendable
- Powerfactor 0,9, more rackpower for powerfactor corrected loads
- Two load segments, battery power can be preserved for a particular load
- X-slot for communication card options



PW5125 RM
3000 VA

Customer requirements

- Reliable shutdown solution, no data lost
- Extended runtimes
- Rack space
- Solution for heigh density loads in racks
- Series 5 UPS with internal bypass and hot swappable electronic module
- Only 2U rack height
- Typical backup 5–10 min, extendable
- Poverfactor 0,9, more rackpower for powerfactor corrected loads
- Two load segments, battery power can be preserved for a particular load
- X-slot for communication card options

All Critical Applications: UNIX servers, e-commerce, banking and web applications

9

To ensure complete power protection from lost data or hardware damage, always recommend Powerware Series 9 double conversion UPS for critical applications. Minor additional costs are associated with complete power protection. However these costs will be recovered many times over when your customer's systems and data are protected from all 9 power problems.



PW9125 1000–3000 VA

Customer requirements

- Complete power protection
- Rack space
- Extended runtimes
- Connectivity options to build UPS management solutions
- Series 9, double conversion technology
- 2U high system with internal batteries
- Typical backup time 5 min, extendable to several hours with 2U high EBMs
- X-slot card communication options

PW9170+

Customer requirements

- Complete power protection with redundant solution
- Series 9, double conversion technology
- Modular and scalable, N+X design
- Optional 20 Amp charger for long backup time solutions



Building up solutions with Powerware Rackmount UPSs



CONNECTIVITY CARDS

ConnectUPS-X SNMP/Web card

- Monitoring and control through web browser (Netscape Navigator, MS Internet Explorer)
- Email notification of alarms
- SNMP connection for Network Management Systems (HP OpenView, IBM Tivoli NetView, Sun NetManager)
- Remote shutdown with NetWatch software
- Provides 3 additional 10/100 MB network connections with its built in switching hub
- Can be configured and upgraded remotely through network
- Possibility to monitor one relay contact (rack door open, over temperature, other alarms)

ConnectUPS SNMP Card

- Monitoring through PowerVision, Network Management Systems (HP OpenView, IBM NetView, Sun NetManager)
- Remote shutdown

Relay/AS400 cards

- Connections to automation and monitoring systems
- Integration to building management systems
- IBM AS/400 shutdown

X-Slot ModBus card

- Connections to automation and monitoring systems
- DB-9 RS-232 Configuration Port & ModBus Port
- Isolated DB-9 RS-485 Port
- Selectable 2-wire or 4-wire communications topology support
- Half-duplex or full-duplex communications
- Selectable Termination Resistance & Polarity Resistance

X-Slot USB module

- Provides USB (universal serial bus) interface
- Compatible with LanSafe for Windows

X-Slot MultiServer card

- 2–5 direct serial connections
- For systems with no network for UPS data transfer
- High security requirements (separate networks, firewalls etc.)
- For standardized installations where all server configurations have to be identical

SOFTWARE SUITE

Software Suite is a CD bundled with Powerware UPSs. It contains all Powerware UPS software distributions and documentation. Installation wizards help choose the right software for each case.

SHUTDOWN SOFTWARE

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 saves all data and allows the shutdown of up to 64 computers protected by a single UPS.

OnliNet® Centro is SNMP shutdown software. It is ideal for situations where the load and the UPS are not located closely together and thereby not connected via a serial cable.

MONITORING SOFTWARE

OnliNet® Vista provides basic monitoring of large numbers of networked UPSs. An “at a glance” view shows all the UPSs located on the network on the computer screen.

PowerVision® is performance monitoring and trend analysis software for critical UPSs. It calculates trends and stores information about the operation of the UPS device in its database. Its simple traffic light colour scheme makes PowerVision very easy to follow. PowerVision optional modules include operating system shutdown, ModBus gateway and secure web server.

For 9170+ options see 9170+ data sheet

Backup time sizing guides for PW5115 RM, PW5125 RM and PW9125 RM

Load	250 VA	500 VA	750 VA	1000 VA	1500 VA	2000 VA	2500 VA	3000 VA
Powerware RM backuptime table								
PW5115 RM, Series 5, line interactive UPS								
PW5115 RM 500 VA	15	5						
PW5115 RM 750 VA	35	13	6					
PW5115 RM 1000 VA	38	15	8	5				
PW5115 RM 1500 VA	55	28	14	8	5			
PW5125 RM; Series 5, line interactive UPS								
PW5125 RM 1000 VA	36	19	13	7				
PW5125 RM 1000 VA + EBM cabinet	150	68	57	33				
PW5125 RM 1000 VA + 2 EBM cabinet	300	161	120	58				
PW5125 RM 1500 VA	36	19	13	7	5			
PW5125 RM 1500 VA + EBM cabinet	150	68	57	33	23			
PW5125 RM 1500 VA + 2 EBM cabinet	300	161	120	58	49			
PW5125 RM 3000 VA	70	55	40	25	15	10	7	5
PW5125 RM 3000 VA + EBM cabinet	280	200	140	100	61	45	33	25
PW5125 RM 3000 VA + 2 EBM cabinet	500	360	250	180	100	80	60	50
PW9125 RM; Series 9, double conversion UPS								
PW9125 1000 VA	32	15	8	5				
PW9125 1000 VA + 1 EBM cabinet	250	120	70	48				
PW9125 1000 VA + 2 EBM cabinet	500	250	150	100				
PW9125 1500 VA	60	35	22	16	8			
PW9125 1500 VA + 1 EBM cabinet	200	130	90	60	37			
PW9125 1500 VA + 2 EBM cabinet	360	240	160	115	70			
PW9125 2000 VA	60	35	22	16	8	5		
PW9125 2000 VA + 1 EBM cabinet	200	130	90	60	37	26		
PW9125 2000 VA + 2 EBM cabinet	360	240	160	115	70	49		
PW9125 3000 VA	100	45	30	21	13	9	7	5
PW9125 3000 VA + 1 EBM cabinet	320	160	110	80	55	35	28	25
PW9125 3000 VA + 2 EBM cabinet	640	330	240	160	72	60	48	38

Rackmount product list with part numbers

PW5115 RM 500 VA	(103003267-5501)
PW5115 RM 750 VA	(103003270-5501)
PW5115 RM 1000 VA	(103003273-5501)
PW5115 RM 1500 VA	(103003276-5501)
PW5125 RM 1000 VA	(05146667-5501)
PW5125 RM 1500 VA	(05146670-5501)
PW5125 RM 3000 VA	(05147641-5501)
EBM for PW5125 RM 1000/1500 VA	(05147148-5501)
EBM for PW5125 RM 3000 VA	(05147156-5501)
PW9125 RM 1000 VA	(05146011-5501)
PW9125 RM 1500 VA	(05146006-5501)
PW9125 RM 2000 VA	(05146003-5501)
PW9125 RM 3000 VA	(103002723-5501)
EBM for PW9125 RM 1000 VA	(05146502-5501)
EBM for PW9125 RM 1500/2000 VA	(05146074-5501)
EBM for PW9125 RM 3000 VA	(103002837-5501)

Options for Rackmount products

Rack-kit for PW5125 RM & PW9125 RM ..	(05141562-0021)
Service bypass for PW9125	(05146519-002)
X-slot USB card	(05146508-5501)
X-slot SNMP/WEB card	(103002974-5501)
X-slot Multiport card	(05146447-5502)
X-slot Relay interface card	(1018460)
X-slot ModBus card	(103002510-5501)

PW9170 product and option list on request

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