

Powerware[®] 9104 UPS



Product Snapshot	
Power Rating:	3.1-6.0 kVA
Input/Output Voltage:	See model selection guide on back page
Frequency:	50/60 Hz (auto sensing)
Configuration:	Cabinet and rack-mounts available; external battery packs available

For premier online power protection, the Powerware 9104 offers a compact, cost-effective solution for mid-sized computer networks, professional workstations, servers and other sensitive electronic equipment.

The Powerware 9104 uninterruptible power system (UPS) provides quality power protection ranging from 3.1 to 6 kVA. Using dual-conversion online technology, this UPS delivers excellent voltage regulation, bi-directional filtering to eliminate power line noise, and low input current distortion. Furthermore, the system assures quiet operation along with powerful performance.

With the smallest footprint available in its power range, the Powerware 9104 still

provides large system benefits.

This feature-rich UPS comes standard with exclusive Advanced Battery Management (ABM™) that doubles battery service life and optimizes recharge time. For optimum management and control, the system's standard communications interface consists of an RS-232 port and a six-foot cable that connects to a host computer to monitor the entire system operation, using the Power Management software included. The front display panel offers sophisticated user-friendly controls and indicators that monitor the operational status, AC line condition, battery capacity, load level, and service requirements.

Reliable, versatile, and competitively priced, the Powerware 9104 is the logical choice for users who can't afford downtime.

Features

- ▶ Advanced Battery Management (ABM™) doubles battery service life
- ▶ Dual Conversion Online Technology for reliable operation
- ▶ Standard Automatic Bypass Switch prevents your equipment from crashing
- ▶ Advanced Power Isolation for clean output voltage
- ▶ Power Management Software compatibility to ensure data integrity
- ▶ Engine Generator Compatible
- ▶ Expandable Power Levels for future system expansion
- ▶ Remote Emergency Power Off (REPO)
- ▶ Full Two-Year Coverage on Advance Exchange Basis
- ▶ Wide Selection of System Enhancing Options



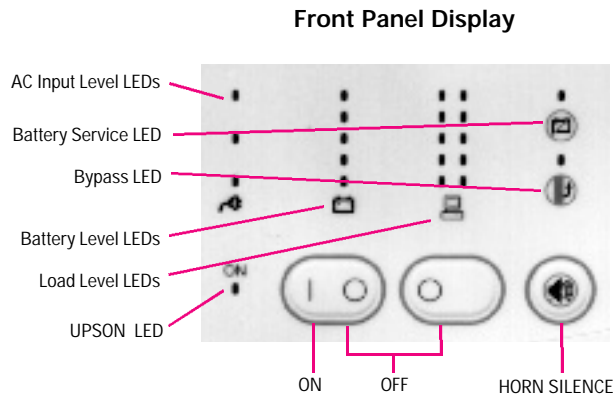


Technical Specifications

Powerware 9104/9104(i) Series Features

User-Friendly Front Panel Controls and Indicators

The front panel (photo below) displays information with easy-to-read icons and LEDs about the unit's operational status, input voltage, battery charge/discharge levels as well as the percent of full load the UPS is supporting. Users are also notified in advance of pending battery failure, bypass condition and overload conditions.



Dual Conversion Online Technology

- ▶ Designed for quiet operation and high power performance
- ▶ Bidirectional filter eliminates normal and common mode voltage noise
- ▶ Active filtering provides low input current distortion
- ▶ Conditions AC power before it reaches sensitive electronic equipment
- ▶ High degree of tolerance for input line voltage and frequency variations

Two-Phase Flexibility Enhances System Stability

- ▶ Simultaneous multiple output of 120 and 208 volts or 120 and 240 volts
- ▶ Improves utility load balance
- ▶ Auto self configuration for 120/208 volt or 120/240 volt output
- ▶ Automatic 50 or 60 Hz frequency selection
- ▶ Optional voltage parameters are easily set via front panel buttons

POWER

Ratings (PW9104)	3.1/5.0/6.0 kVA (5.0 units upgradeable)
Ratings (PW9104i)	3.1, 5.0, and 6.0 kVA

ELECTRICAL INPUT

Voltage (PW9104)	120 Vac for 3.1 kVA 120/208 or 120/240 Vac for 3.1/5.0/6.0 kVA
Voltage (PW9104i)	See Model Selection Guide
Voltage Range	-27 to +22%
Frequency Range	45 to 65 Hz (auto-sensing)
Current Distortion	Sinusoidal active correction
Power Factor	.96 (active correction)
Connections (PW9104)	Hardwire to terminal blocks on rear of unit is standard (line cord/plug options available)
Connections (PW9104i)	Terminal blocks

ELECTRICAL OUTPUT

Voltage (PW9104)	120 Vac for /3.1 kVA; 120/208 or 120/240 Vac for 3.1/5.0/6.0 kVA
Voltage (PW9104i)	See Model Selection Guide
Regulation	± 2%
Efficiency (PW9104)	92% @ typical load
Efficiency (PW9104i)	90% @ typical load
Wave Form	Sinusoidal, <2% THD; <5% non-linear load
Frequency	50 or 60 Hz; selectable sync window of ± 3, 1, or .5 Hz
Crest Factor	3:1
Isolation (PW9104)	Advanced Power Isolation
Isolation (PW9104i)	Full Magnetic Isolation
Connections (PW9104)	Hardwired, 5-15R duplex receptacles are standard (various receptacle options available)
Connections (PW9104i)	All models are hardwired

BATTERY

Type (PW9104)	Internal battery; valve regulated, sealed lead-acid type
Type (PW9104i)	No internal battery; external battery packs with valve regulated, sealed lead-acid type
Recharge Time	<3 hours to 90% capacity
Backup Time	10-15 minutes at typical load (standard internal battery pack or an RSi with one external mini battery pack)

SOPHISTICATED "USER-FRIENDLY" CONTROLS AND INDICATORS

Front panel LEDs monitor how the UPS is functioning

- ▶ Input Voltage Levels
- ▶ Operational Status/Bypass Mode
- ▶ Load Levels of Connected Equipment
- ▶ Battery Charge Level
- ▶ Service Requirements

Push Button Switches Control

- ▶ On/Off function
- ▶ Audio Alarm Reset
- ▶ Reconfiguration of Functionality
- ▶ Transfer to Bypass
- ▶ Start-On-Battery (optional)
- ▶ System Self-Test

Rear Panel Controls

- ▶ RS-232 interface port with cable
- ▶ Relay interface port supports utility input voltage failure, impending low battery summary, and load-on bypass alarms
- ▶ REPO Port UPS Code II Compliant Communication
- ▶ Feature-rich communication language
- ▶ Provides interface with LanSafe III and FailSafe III power management software



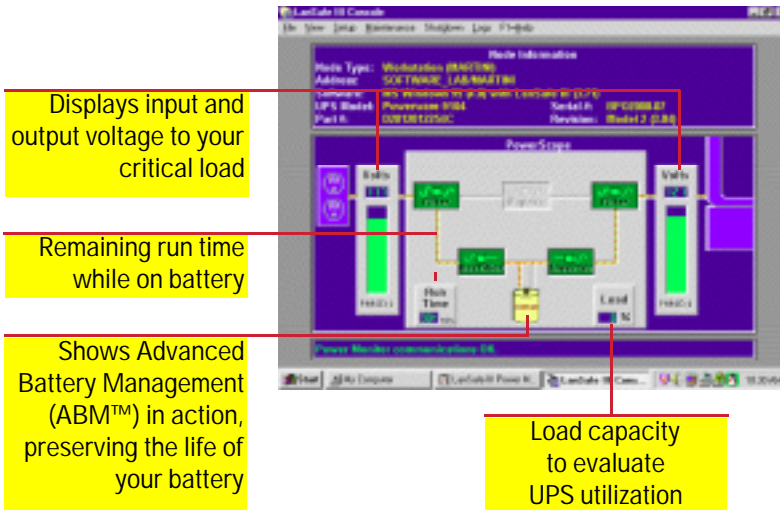
Power Management Software Capability

To ensure data integrity, Powerware's LanSafe III and FailSafe III power management software is available for all PW9104 models. During extended power failures, LanSafe III's exclusive SafetyNet™ enables administrators to establish a user-defined, sequential shutdown where the most critical equipment (such as database or file servers) is shut down last, after work-in-progress is saved from client workstations through hubs, switches, routers, and comm servers.

The RS-232 port on the rear panel of the Powerware 9104 is the communications link that provides an extensive range of control and diagnostic data to give computer users flexible, reliable, and comprehensive control of the Powerware 9104 Series in networked or stand alone environments.

Benefits

- ▶ Receive system-wide control via cross-platform functionality and support for other manufacturers' UPSs
- ▶ Test networked UPSs from one node
- ▶ Determine overall operating environment with extensive graphical displays
- ▶ Stay informed of power problems by pager and e-mail
- ▶ Analyze your conditions with voltage logging



BACKUP TIMES (IN MINUTES)¹

TYPICAL APPLICATIONS	LOAD	9104 w/STANDARD INTERNAL BATTERIES OR 9104i & MINI-PACK ²	9104i & ONE BATTERY PACK	9104 & MINI-PACK OR 9104 & ONE BATTERY PACK	9104i & TWO BATTERY PACKS
3.1 kVA Models					
RISC Workstation	1000 VA	37	93	135	180
Mini Computer	1500 VA	22	53	82	112
Telecom Equipment	2100 VA	14	30	48	66
Midrange Systems	2500 VA	10	25	41	57
Multiple Servers	3100 VA	8	18	31	44
TYPICAL APPLICATIONS	LOAD	9104 w/STANDARD INTERNAL BATTERIES OR 9104i & ONE BATTERY PACK ²	9104 & ONE BATTERY PACK OR 9104i & TWO PACKS	9104 & TWO BATTERY PACKS OR 9104i & THREE PACKS	9104 & THREE BATTERY PACKS
5.0 & 6.0 kVA Models					
Telecom Equipment	2000 VA	44	100	150	200
Multiple Servers	3000 VA	25	60	93	126
Multiple Servers	4000 VA	17	42	67	99
Multiple Servers	5000 VA	12	28	46	64
Small Computer Room	6000 VA ³	9	23	39	55

1. This guide provides typical application information. Battery times are approximate and may vary with equipment, configuration, disk access, battery age, temperature, etc. See the External Battery Packs table on the back page of this data sheet for more details. 2. RSi models do not contain internal batteries. 3. Backup times for 6.0 kVA units only.



Series 9 Power Protection

The Powerware 9104 is a Series 9 UPS, meaning it protects against all nine of the most common power problems (listed below). These nine power problems can cause extensive hardware damage, data loss and corruption, and downtime.

Power Failure

A total loss of utility power can be caused by events such as lightning strikes, grid over-demands, accidents, and natural disasters.

Power Sag

The opposite of surges, sags are triggered by startup of large loads, utility switching, utility equipment failure, lightning, and power service that's too small for the demand.

Power Surge

With voltages above 110% of nominal, surges can be triggered by rapid reduction in power loads, heavy equipment being turned off, or by utility switching.

Brownout

Brownouts are a reduction of line voltage for an extended period, from minutes to a few days. Can be caused by intentional utility voltage reductions to conserve power during high peak demand periods, or other heavy loads that exceed supply capability.

Electrical Line Noise

Higher frequency waveforms that piggyback on the line waveform create line noise. Can be caused by either RFI or EMI interference generated by transmitters, welding devices, SCR driven printers, lightning, etc.

High Voltage Spike

Spikes are instant and dramatic increases in line voltage. Can be caused by lightning strikes and can send line voltages to levels in excess of 6000 volts.

Frequency Variation

Frequency changes result from generator or small co-generation sites being loaded and unloaded.

Switching Transient

Power line transients are instantaneous high voltage increases impressed on the power line waveform. Normal duration is shorter than a spike and generally falls in the range of nano seconds.

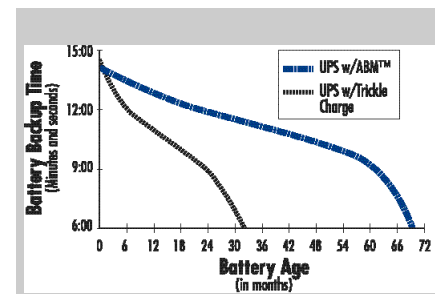
Harmonic Distortion

Distortions of the normal line waveform are generally transmitted into the line by nonlinear loads. Switch mode power supplies, variable speed motors and drives, copiers, and fax machines are examples of nonlinear loads.

Input and Output Configurations

Patented Advanced Battery Management (ABM™) Technology Doubles Battery Life

The lead-acid batteries typically used in a UPS are considered viable as long as they can maintain backup times of at least half that of new batteries. The illustration to the right shows that batteries which are constantly trickle charged (as are virtually all other UPSs on the market today) reach the end of their useful life in less than half the time of batteries charged using Advanced Battery Management (ABM™). ABM uses a three-stage charging technique that not only doubles battery service life, but also optimizes battery recharge time and provides up to a 60-day advanced notification of pending end of useful battery life.

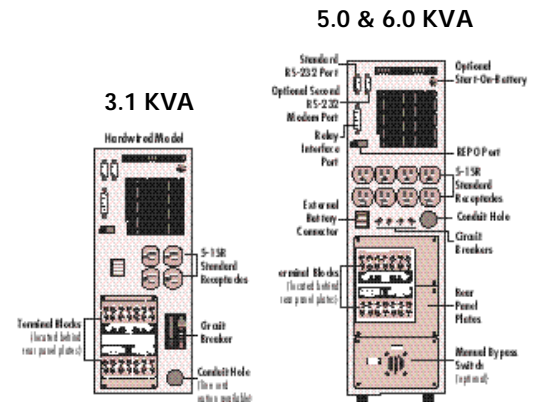


Data based upon tests performed by an independent battery manufacturer.

Input and Output Configurations

The standard Powerware 9104 UPS model is hardwired via terminal blocks on the rear panel for input and output connections. An optional input connection consists of a 15-foot line cord with the appropriate plug. The Powerware 9104 also provides a wide selection of output panel configurations shown in the table to the right. Preconfigured plug and play (NET) models come standard with ten 5-15R receptacles and a standard input plug. For more details see the Model Selection Guide.

The illustrations to the right display standard rear panel configurations. The smaller unit displays the standard configuration for 3.1 kVA models and the larger unit shows the standard rear panel for 5.0 and 6.0 kVA models.



NOTE: RSi models are hardwired only



Series Options

The Powerware 9104 UPS offers a wide range of options that complement performance and provide solutions to special requirements.

Extended Battery Packs housed in separate, matching cabinets provide extended backup time. Up to three battery cabinets may be daisy-chained with easy “plug and play” connections for extended backup time. Battery packs for the rack-mount models, like the main UPS units, fit in standard 19-inch equipment racks. To provide maximum flexibility, batteries for the international 9104i models come in separate battery packs.

Second RS-232 Interface on rear panel allows UPS to communicate to two different platforms independently.

Remote Power Warning Cable Interface Kits enable the UPS to initiate a shutdown in the event of a power failure. A 25-foot cable is provided. The interface accommodates AS/400 as well as other operating system platforms.

Start-On-Battery allows startup of the computer network from the UPS battery in the event of AC line failure.

Remote Distribution Receptacle is available with individually protected circuits and an eight-foot line cord that plugs directly into rear of UPS. An L14-30R receptacle plate must be installed on UPS to use this option.

Rack-Mount units are available for the North American 3.1 kVA models (PW9104) and all international models (PW9104i). The unit is supplied with mounting brackets for easy installation into a standard 19-inch electronic equipment rack. The front panel on the rack configuration is mounted horizontally with all the controls and functions identical to the standard tower models.

Maintenance Bypass Switch (Panel Option) means that input voltage bypasses the UPS and goes directly to the connected equipment if an abnormal condition prevents the UPS from supporting the load.

International Models (9104i)

The Powerware 9104i models are ideal for sensitive electrical equipment in countries that have multiple voltages and frequencies (see the Model Selection Guide). The flexibility of the Powerware 9104i enables users to provide advanced UPS protection in demanding environments for many standard and unique applications. Powerware 9104i models, in addition to all of the capabilities of the North 9104i UPS Series, feature the following:

- ▶ Isolation transformer
- ▶ Optional external battery packs to provide maximum flexibility
- ▶ Rack-mount models for equipment racks

Instant Backup Power

In the event of a power failure, your sensitive equipment is constantly provided with conditioned backup power — *no interruption in system operation!*

System Enhancing Options

- ▶ Extended backup time
- ▶ Plug and play power connections for external battery packs
- ▶ Second communication port
- ▶ Manual bypass switch (in addition to built-in automatic switch)
- ▶ Start-on-battery without AC
- ▶ Interface kits for wide variety of computers
- ▶ Numerous rear panel configurations

Low Profile Package

Smallest footprint available in its power range. Conserves space and is ideal for any office or computer room.

Remote Emergency Power Off (REPO)

Allows UPS shutdown from a remote location. Required by National Electric Code (NEC) for raised floor rooms.

Sophisticated Communication Interface

The RS-232 port with six-foot cable (included with UPS) can be connected to host computer and is compatible with Powerware’s LanSafe III and FailSafe III power management software. The relay interface port supports input voltage failure, low battery warning, load on-bypass, and summary alarms to give user total system monitoring.



Powerware® 9104 Model Selection Guide

MODEL NUMBER	kVA RATING	INPUT VOLTAGE (V _{AC})	OUTPUT VOLTAGE (V _{AC})	AC LINE CORD OPTION (15')	RECOMMENDED INPUT SERVICE	DIMENSIONS H x W x D (IN)	WEIGHT (LB/KG)
RS Standard Hardwired Models (Various input line cords and receptacles available)							
RST31 (Tower)	3.1	120	120	L5-30P	30 A	16 x 6.8 x 24	125/56.9
RST32 (Tower)	3.1	120/208 or 120/240	Same as input	L14-20P	20 A	16 x 6.8 x 24	125/56.9
RST52 (Tower)	5.0	120/208 or 120/240	Same as input	L14-30P	30 A	24 x 6.8 x 24	180/86
RST62 (Tower)	6.0	120/208 or 120/240	Same as input	L14-30P	30 A	24 x 6.8 x 24	180/86
RSR31 (Rack)	3.1	120	120	L5-30P	30 A	6.8 x 19 x 24	135/61.2
RSR32 (Rack)	3.1	120/208 or 120/240	Same as input	L14-20P	20 A	6.8 x 19 x 24	135/61.2
RSi International Models (Batteries sold separately)							
RST33i (Tower)	3.1	**Any	One of	Hardwired only	15 A	16 x 6.8 x 24	120/54
RST63i (Tower)	6.0	of the	the following:	Hardwired only	30 A	16 x 6.8 x 24	166/75
RSR33i (Rack)	3.1	following:	100/100 or 200	Hardwired only	15 A	6.8 x 19 x 24	120/54
RSR63i (Rack)	6.0	200/208/220/	110/110 or 220 120/120 or 240	Hardwired only	30 A	6.8 x 19 x 24	166/75

*All models are 50 and 60 Hz capable. †Default is 240V. User programmable for other output voltages. Various plug and play configurations available for standard hardwired North American models. Contact factory for details.

EXTERNAL BATTERY PACKS

MODEL NUMBER	STYLE	kVA RATING OF COMPATIBLE UPS	DIMENSION H x W x D (IN/CM)	WEIGHT (LB/KG)
RS3-RP1T	Mini-Pack	3.1	6.8 x 6.8 x 24 / 17.2 x 17.2 x 61	75/34
RS3-RP2T	Tower	3.1	16 x 6.8 x 24 / 40.6 x 17.2 x 61	166/75
RS6-RP1T	Tower	5.0/6.0	16 x 6.8 x 24 / 40.6 x 17.2 x 61	166/75
RS3-RP2R	Rack	3.1	6.8 x 19 x 24 / 17.2 x 48.3 x 24	166/75
RS6-RP1R	Rack	5.0/6.0 (RSi only)	6.8 x 19 x 24 / 17.2 x 48.3 x 24	166/75

RSi models do not have internal batteries. Batteries are sold separately.

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