Decision and Solution Guide
February 2008

The IBM UPS 3000 offers choice of rackmount or tower installation.

Selecting 100V-240V Uninterruptible Power Supply (UPS) Options for IBM System x ® and BladeCenter™

Protecting data and systems with reliable, high-availability IBM power management solutions

Server availability depends on reliable power management. No solution built from IBM® System x™ and BladeCenter™ servers should be considered complete without a UPS solution. Today, UPS protection is more than a simple insurance policy; it is an integral component of any network.

IBM offers UPS products that have been tested and approved by IBM for compatibility with System x systems.

Contents

UPS products from IBM help protect your valuable investments in technology and data. The IBM lineup of tower and rack-ready UPS products are designed to provide:

- Battery backup to help provide continuous operation or graceful system shutdown in the event of a power failure or power supply interruption
- Surge protection to help prevent damage to sensitive equipment from voltage increases
- Power conditioning to help prevent glitches and errors caused by irregularities in the power supply.

Why Buy a UPS Solution from IBM

- There are compelling reasons for purchasing a UPS solution from IBM with every tower or rack-ready System x solution:
- All IBM UPS products have been tested by IBM under the IBM ServerProven® program and approved for operation with System x servers and options.
- A preconfigured, all-IBM solution can help speed implementation with one-stop shopping and provide peace of mind that you have purchased the right degree of protection.
- UPS products sold by IBM carry a three-year limited warranty[1].
- UPS products sold by IBM are color matched (black) to System x servers and rack products.
- PowerChute Business Edition® for IBM software and Powerware® Software Suite for advanced UPS power management and diagnostics provides easy integration with IBM Director server management software and with Tivoli® TME 10™ Network Management solutions for centralized control of UPS systems across monitored LANs.

The Need for Power Protection

Today, companies rely on computer systems to run almost every aspect of their business. In an ideal world, the electricity to power these systems would flow 24x7, without quality problems or interruption. However, no business is immune to power problems or occasional power outages.

- Just how big a problem is power quality? Consider the following findings:
- Power problems are the largest cause (45%) of data loss and server downtime[2].
- Power disturbances account for about one third of all server failures[3].
- Electrical interruptions cost U.S. companies an estimated $80 billion in 2000[4].

[1] IBM products include an IBM three-year limited warranty
[2] Source: Contingency Planning Research (2001), a Division of Eagle Rock Alliance.
[3] Source: IDC (2004).
[4] Source: Worldwatch Institute

The Cost of Downtime

What is the true cost of power problems—in other words, the cost of downtime? For many companies, their data is their business. Business-critical data can take the form of financial transactions, online purchases, customer demographics, correspondence, spreadsheets or any number of business applications.

When companies do not have reliable solutions for the continuing operation of their equipment, they lose money. If a Web server goes down due to blackout, for example, customers are apt to click over to a competitor's Web site—and not come back. Should mission-critical computers involved in manufacturing be damaged by a surge, inventory runs behind and schedules are missed. Data errors may occur when electronic noise penetrates a file server. In fact, network file servers that are constantly writing to disk are particularly susceptible to power-related problems.

How much is downtime worth to your business in lost revenue? Depending on the industry, the cost of downtime can vary dramatically, and could cost up to $6.5 million per hour. Examples of downtime costs[5] [are copies of all of these reports available online? If so, please post a link. If not, please post the name of the source, the name of the report and the date for each cited source] include:

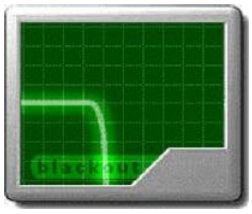
- Brokerage: $6.5M/hr
- Energy: $2.8M/hr
- Credit card operations: $2.6M/hr
- Telecommunications : $2M/hr
- Financial: $1.5M/hr
- Retail: $1M/hr
- Health care: $636K/hr

The Internet has further emphasized that availability equals viability. According to the Yankee Group[6] research firm, half of corporations surveyed rate their Internet downtime costs at more than $1,000 per hour, and nine percent rate Internet downtime costs at more than $50,000 per hour.

Understanding Power Problems

While many businesses expect their electric power to always be available, in reality, power is far from perfect. Many events can impact power reliability, including:

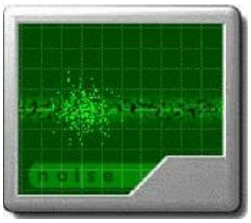
- Generating station problems, including fuel shortages, human error, plant shutdowns and earthquakes.
- Distribution network problems, including weather problems, trees, lightning, vehicular accidents, overloads and construction accidents.
- Local building power problems, including overloads, equipment failures, construction accidents and poor wiring connections.
- Each year a typical site averages 15 power outages that are sufficient to cause IT system malfunctions[5]. Ninety percent of the outages are less than five minutes in duration[5].
- While power outages are the most apparent type of power problems, other irregularities in power supply can affect computer operations and data integrity.



Blackout

A blackout results in total loss of utility power.

- **Cause:** Blackouts are caused by excessive demand on the power grid, lightning storms, ice on power lines, car accidents, construction equipment, earthquakes and other catastrophes.
- **Effect:** Current work in RAM or cache is lost. The hard disk drive File Allocation Table (FAT) may also be lost, which results in total loss of data stored on drive.



Noise

More technically referred to as electromagnetic interference (EMI) and radio frequency interference (RFI), electrical noise disrupts the smooth sine wave one expects from utility power.

- **Cause:** Electrical noise is caused by many factors and phenomena, including lightning, load switching, generators, radio transmitters and industrial equipment. It may be intermittent or chronic.
- **Effect:** Noise introduces malfunctions and errors into executable programs and data files.

[5] Sources: Network Computing, March 5, 2001; Contingency Planning Research, a Division of Eagle Rock Alliance.
[6] November 2003.

Sags

Also known as brownouts, sags are short term decreases in voltage levels. This is the most common power problem, accounting for 87% of all power disturbances according to a study by Bell Labs.

- **Cause:** Sags are usually caused by the startup power demands of many electrical devices (including motors, compressors, elevators and shop tools). Electric companies use sags to cope with extraordinary power demands. In a procedure known as rolling brownouts, the utility will systematically lower voltage levels in certain areas for hours or days at a time. Hot summer days, when air conditioning requirements are at their peak, will often prompt rolling brownouts.
- **Effect:** A sag can starve a computer of the power it needs to function, and cause frozen keyboards and unexpected system crashes which both result in lost or corrupted data. Sags also reduce the efficiency and life span of electrical equipment.

Spike

Also referred to as an impulse, a spike is an instantaneous, dramatic increase in voltage. A spike can enter electronic equipment through AC, network, serial or phone lines and damage or destroy components.

- **Cause:** Spikes are typically caused by a nearby lightning strike. Spikes can also occur when utility power comes back online after having been knocked out in a storm or as the result of a car accident.
- **Effect:** Catastrophic damage to hardware occurs. Data will be lost.

Surge

A surge is a short term increase in voltage, typically lasting at least 1/120 of a second.

- **Cause:** Surges result from presence of high-powered electrical motors, such as air conditioners and household appliances in the vicinity. When this equipment is switched off, the extra voltage is dissipated through the power line.
- **Effect:** Computers and similar sensitive electronic devices are designed to receive power within a certain voltage range. Anything outside of expected peak and RMS (considered the average voltage) levels can stress delicate components and cause premature failure.

Selection Considerations

Points to consider:	**Factors influencing purchase decisions:**
How mission-critical is the data on the servers you want to protect?	Power protection almost always nets out as “cheap insurance” when you understand the short- and long-term costs associated with data loss and application outages.
How long a period of application downtime can your business tolerate?	Even though most power outages last only a few minutes, you should consider having enough battery power to sustain operations for longer term outages. For this reason, many customers often oversize their UPS requirements by a factor of two.
What is the value of your equipment purchase? How much are you willing to spend to protect that hardware investment?	You can provide maximum protection to your systems by investing in an adequately sized UPS. Typically, the cost will be a small fraction of the total cost of your servers and server options—and a good value in added piece of mind.
In addition to server(s) you plan to purchase, what other equipment needs protecting? Remember that UPS products provide surge protection and power conditioning as well as battery backup.	Look beyond the server to identify all equipment that merits power protection. This could range from switches and routers for a small office to multiple servers, network switches and storage devices for larger enterprises. It’s easy to forget items like monitors, printers and other critical options when conducting an outlet count and a VA/Watt analysis.
What is the sum total power requirement of all the equipment you want to protect?	Proper sizing requires that you consider the power requirements for all devices that will be supported by a single UPS. Refer to the IBM System x and BladeCenter Power Configurator at: www.ibm.com/systems/bladecenter/resources/powerconfig/index.html
How many outlets do you need to cover your current requirements?	In addition to total voltage/wattage, the UPS must be able to support the appropriate number of devices. It is easy to exceed the total allowable number of outlets or the VA/Watt rating of the original solution when taking into account all items.

Do you plan to add equipment to this UPS in the future? If so, what will the new outlet and load requirements be?	Consider both current and future requirements when selecting a UPS. Typically, it will be more cost-effective in the long run to purchase a unit that can accommodate growth rather than purchasing a smaller unit today and having to replace it at a later date.
In the event of a power failure, how much time do you need to save data, close applications and completely power down?	Be sure that the UPS you are considering will provide an adequate length of runtime for graceful shutdown of all equipment. At full load, most UPS products from IBM will provide five to seven minutes of battery-powered operation. This may not be adequate for some equipment. Even if you don't plan on adding more devices that will need power protection, buying a larger UPS can achieve longer battery operation and shutdown time in the event of a power failure.
What level of management do you require for your power protection?	All IBM UPS offerings include power management software which make it easy to manage and monitor your power at any time. The IBM UPS 3000 models are bundled with Powerware Software Suite. IBM UPS7500, UPS10000X include PowerChute Business Edition for IBM. The IBM UPS 3000, IBM UPS7500XHV, and IBM UPS10000XHV take manageability one step further by offering a suite of network management opportunities via built-in 10/100 Network Management Devices and power management software.
Have you deployed IBM Director systems management software?	The IBM suite of products easily integrates into IBM Director so customers can get the most out of their investment. Power management and power monitoring are all made easier with the IBM Director plug-ins available for IBM-offered UPS products.

IBM UPS Overview

IBM UPS Products and Solutions

Available only from IBM, IBM-branded UPS products are designed by IBM and manufactured to our demanding specifications by a worldwide leader in power management and our longtime power management providers. This means you get IBM service, support, warranty protection and years of experience.

IBM UPS750T, UPS1000T and UPS1500T Overview: Tower Deployment

- Available in 750VA, 1000VA, and 1500VA mode, each of these tower UPS models is offered in three varieties: 100V, 120V, and 230V.
- UPS1000T and UPS1500T include surge protection for LAN and telephone connections, offering a comprehensive power protection solution for the small office environment.
- Higher power factor than previous UPS tower products means power for more devices; also longer battery run times.

Battery module ***Electronics module***

IBM UPS 3000 Overview: Rack or Tower Deployment

- 2700 Watt/3000 VA model is offered in four varieties: 100V, 120V, 200V and 230V
- 2U rack-optimized form factor; convertible for use as a tower (using included hardware).
- Hot-swappable electronics.
- User-friendly hot-swap modules allow for safe and easy module replacement while systems are up and running; reduces downtime in the unlikely event of a UPS electronics module failure.
- Automatic bypass to input line on fault or power module removal.
- Load segments allows prioritized shutdown to extend runtime for critical equipment.
- Scalable runtime with the option of adding up to *four* IBM UPS Extend Run Battery Option external battery packs.
- Built-in network management Interface.
- An embedded Network Management module provides full management of the IBM UPS 3000 via multiple open standards such as Telnet, HTTP, FTP and SNMP and SSL and SSH encryption and authentication.

2130-1RX rear panel

2130-2RX rear panel & 2U UPS Extend Run External Battery Pack

- The network port can also be used in conjunction with power management software to provide a graceful shutdown of the OS over the network.
- Switchable outlets.
- Three outlet groups can be independently commanded, allowing the UPS to selectively switch off banks of outlets powering nonessential systems or non-intelligent devices, to increase run times for essential systems.
- High power factor: The 2130-1RX (110V - 127V) has 3000VA and 2700W rating. This means the UPS has a power factor of .90, at a lower price point than our previous 3000VA rack UPS products. The 2130-2RX (208V-240V) & 2130-2JX (200V) units power factor is .94, with a 2880VA and 2700W rating and the 2130-1JX (100V) power factor is 0.9, with a 2400VA and 2250W rating.

IBM 2U UPS Extend Run External Battery Pack

- Designed for use with IBM UPS 3000.
- 2U rack-mountable.
- Supports *four* hot-swappable battery units per Extend Run Battery Pack.
- Each additional Extended Run Battery Pack supports run times of up to 20 minutes at full load.
- Up to *four* Extended Run Battery Packs can be used per UPS.

IBM UPS7500 and UPS10000 Overview: Rack or Tower Deployment

Common features:

- Designed by IBM to meet customer requirements for high-density and cost-effective power management.
- Space-saving 6U form factor for rack mounting or tower.
- Hot-swappable batteries help maximize uptime and availability.
- Support for up to *four* IBM Run Online External Battery Packs; this can add more than 52 (UPS1000) or 37 minutes (UPS7500) of battery operation at full load.
- Available in a high-voltage version only; supports up to four devices and provides selectable nominal output at 200, 208, 220, 230 and 240V.
- Choice of serial, USB or LAN connectivity for management, using the built-in 10/100baseT Network Management Card.
- Support for 7500VA and 6000W (UPS7500) or 10000VA and 8000W (UPS1000) translates into up to a .8 power factor.
- More features and better performance at a lower price per watt than previous UPS models offered by IBM.
- Full-time surge suppression, automatic voltage regulation and noise filtering.
- Includes a suite of easy-to-use software that allows management of the UPS either locally or remotely.

IBM 3U UPS Extend Run External Battery Pack

- Designed for interchangeable use with IBM UPS7500 and UPS10000.
- 3U rack-mountable.
- Supports *four* hot-swappable battery units per Extend Run External Battery Pack.
- With the addition of Extend Run External Battery Packs, run times of up to 52 minutes at full load can be supported.
- Up to *four* Extend Run External Battery Packs can be used per UPS.

Product Family at a Glance

Technical Specifications

IBM P/N	Product	Description	Voltage
IBM UPS products			
2130R1X	IBM UPS750TLV	750VA, 500W	120V
2130R2X	IBM UPS750THV	750VA, 500W	230V
2130R7X	IBM UPS750TJV	750VA, 500W	100V
2130R3X	IBM UPS1000TLV	1000VA, 700W	120V
2130R4X	IBM UPS1000THV	1000VA, 700W	230V
2130R8X	IBM UPS1000TJV	1000VA, 700W	100V
2130R5X	IBM UPS1500TLV	1500VA, 1050W	120V
2130R6X	IBM UPS1500THV	1500VA, 1050W	230V
2130R9X	IBM UPS1500TJV	1500VA, 1050W	100V
21301RX	IBM UPS3000 LV	2880VA, 2700W	110V-127V
21301JX	IBM UPS3000 JLV	2400VA, 2250W	100V
21302RX	IBM UPS3000 HV	3000VA, 2700W	208V-240V
21302JX	IBM UPS3000 JHV	3000VA, 2700W	200V
21303RX	IBM UPS7500XHV	7500VA, 6000W	200V-240V
21303JX	IBM UPS7500JHV	7500VA, 6000W	200V
21304RX	IBM UPS10000XHV	10,000VA, 8000W	200V-240V
21304JX	IBM UPS10000JHV	10,000VA, 8000W	200V
Options for IBM UPS 3000 / UPS7500 / UPS10000			
40K9620	2U UPS Extend Run Battery Pack	4 hot-swappable battery units	For IBM UPS 3000 (21301RX/2RX)
40K9788	2U UPS Extend Run Battery Pack	4 hot-swappable battery units	For IBM UPS 3000 (21301JX/2JX)
39Y8857	3U UPS Extend Run Battery Pack	4 hot-swappable battery units	For UPS7500 (21303RX) and UPS10000 (21304RX)
40K9783	3U UPS Extend Run Battery Pack	4 hot-swappable battery units	For UPS7500 (21303JX) and UPS10000 (21304JX)

IBM UPS750TLV

(also available International Models: IBM UPS750THV and IBM UPS750TJV)

Watts	500 (750VA)
Line input	NEMA 5-15P
Input voltage	120V
Line output	NEMA 5-15R
No. of line outputs	6
Interface ports	DB-9 RS-232, USB
No. of SmartSlot™ bays	1
Form factor	Tower
Dimensions	21.6 x 17.0 x 43.9cm
Net weight	19.1 kg (42 lbs)
Warranty	3 years
Color	Black
General features	Hot-swap batteries, intelligent battery management, overload indicator, replace-battery indicator, site wiring fault indicator, SmartSlot, automatic voltage regulation (AVR), user-replaceable batteries.
Includes	Smart-UPS signaling RS-232 cable, USB cable, CD with software, user manual.

Best use

- Protection for a single tower server, such as the x3105, x3200, x3400, x3500.
- Well-suited for high-volume installations, with a single UPS750TLV purchased for each tower server installed.

Points to consider	Reasons to "buy up"
The UPS750TLV provides **six** outlets and can protect up to **750VA** (**500 watts**). Is this sufficient for your present and near-future needs?	A larger unit can support a higher total VA/wattage and protect more devices. The IBM UPS1000TLV provides two more line outputs, can cover up to 1000VA (700 watts). The next step up, the UPS1500TLV, provides protection for up to eight units; plus it can cover up to 1500VA (1050 watts).
The UPS750TLV does not provide surge protection for LAN and telephone connections. Will this be a problem?	LAN and telephone lines are a back door for surge damage to your system. The IBM UPS1000LTV and UPS1500TLV both offer protection against this type of surge.
In the event of a power failure, a loaded UPS750TLV will give you about **six** minutes to power everything down. Is that enough?	The UPS0100TLV provides up to 140% longer backup time at the same wattage. The UPS1500TLV provides up to 300% longer backup time at the same wattage.

IBM UPS1000TLV

(Also available International Models IBM UPS1000THV and IBM UPS1000TJV)

Watts	700 (1000VA)
Line input	NEMA 5-15P
Input voltage	120V
Line output	NEMA 5-15R
No. of line outputs	8
Interface ports	DB-9 RS-232, USB
No. of SmartSlot bays	1
Form factor	Tower
Dimensions	21.6 x 17.0 x 43.9cm
Net weight	19.1 kg (42 lbs)
Warranty	3 years
Color	Black
General features	Advanced battery monitoring, audible alarms, auto diagnostic testing, automatic voltage regulation (AVR), AVR Boost, AVR Trim, brownout correction, hot-swap batteries, CellGuard intelligent battery management, lightning and surge protection, line-interactive design, load meter, network-grade line conditioning, overload indicator, pager notification, programmable power event response, QuickSwap, replace-battery indicator, sine-wave output, site wiring fault indicator, SmartSlot, status indicator LEDs, USB compatibility, user-replaceable batteries , surge protection for LAN and telephone connections.
Includes	Smart-UPS signaling RS-232 cable, USB cable, 2M telephone line cable, CD with software, user manual.

Best use

- Can provide protection for larger groups of tower servers like the x3200, x3400, & x3500.

Points to consider	Reasons to "buy up"
The UPS1000TLV can protect up to **1000VA** (**700 watts**). Is this sufficient for your present and near-future needs?	A larger unit can support a higher total VA/wattage plus protect more devices. The next step up, the UPS1500TLV, also provides protection for up to eight units and can cover up to 1500VA (1050 watts).
In the event of a power failure, a loaded UPS1000TLV will give you about **one** minute to power everything down. Is that enough?	The UPS1500TLV provides up to 83% longer backup time than the 750TLV. The UPS 3000LV (rack or tower unit) provides up to 155% longer backup time at the same wattage than the 1500TLV. It allows even greater run time with the addition of IBM Extend Run Battery Packs.

IBM UPS1500TLV

(Also available International Models IBM UPS1500THV and IBM UPS1500TJV)

Watts	1050 (1500VA)
Line input	NEMA 5-15P
Input voltage	120V
Line output	NEMA 5-15R
No. of line outputs	8
Interface ports	DB-9 RS-232, USB
No. of SmartSlot bays	1
Form factor	Tower
Dimensions	21.6 x 17.0 x 43.9cm
Net weight	24.1 kg (53 lbs)
Warranty	3 years
Color	Black
General features	Advanced battery monitoring, audible alarms, auto diagnostic testing, automatic voltage regulation (AVR), AVR Boost, AVR Trim, brownout correction, hot-swap batteries, CellGuard intelligent battery management, lightning and surge protection, line-interactive design, load meter, network-grade line conditioning, overload indicator, pager notification, programmable power event response, QuickSwap, replace-battery indicator, sine-wave output, site wiring fault indicator, SmartSlot, status indicator LEDs, USB compatibility, user-replaceable batteries , surge protection for LAN and telephone connections.
Includes	Smart-UPS signaling RS-232 cable, USB cable, 2M telephone line cable, CD with software, user manual.

Best use

- A higher power tower unit perfect for small work groups of tower servers.

Points to consider	Reasons to "buy up"
The UPS1500TLV can protect up to **1500VA** (**1050 watts**). Is this sufficient for your present and near-future needs?	A larger unit can support a higher total VA/wattage plus protect more devices. The next step up, the UPS3000XLV, can protect substantially greater loads up to 3000VA (2850 watts).
In the event of a power failure, a loaded UPS1500TLV will give you about **six** minutes to power everything down. Is that enough?	The UPS3000 LV provides up to 200% longer backup time at the same wattage than the UPS1500.

Benefit comparison for different size models

A comparison of the UPS750TLV, the UPS1000TLV and the UPS1500TLV reveals:

	UPS750TLV	% Change, UPS750TLV to UPS1000TLV	UPS1000TLV	% Change, UPS750TLV to UPS1500T	UPS1500TLV
Backup minutes at 450W	5	2.4X	12	6.6X	33
Max. load (VA)	750	33%	1000	100%	1500
Telephone and LAN interface	No	—	Yes	—	Yes
Line outputs	6 NEMA 5-15	33%	8 NEMA 5-15	33%	8 NEMA 5-15

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Benefit comparison for different size models

A comparison of the UPS1000TLV, the UPS1500TLV and the UPS3000LV reveals:

	UPS1000TLV	% Change, UPS1000TLV to UPS1500TLV	UPS1500TLV	% Change, UPS1000TLV to UPS3000XLV	UPS3000LV
Backup minutes at 700W	6	83%	11	4.67X	28
Max. load (VA)	1000	1.5X	1500	3X	3000
Telephone and LAN interface	Yes	—	Yes	—	LAN
Line outputs	8 NEMA 5-15	—	8 NEMA 5-15	-25%	6 NEMA 5-15 & 1 NEMA L5-30R

IBM UPS 3000 LV 2130-1RX

Watts	2700 (2880VA)
Line input	NEMA L5-30P
Input voltage	110-127V
Line output	NEMA 5-15R (6) NEMA L5-30R (1)
No. of line outputs	6
Interface ports	RJ45 RS-232, integrated Network Management Module (RJ45)
No. of smart communication (X-Slot) bays	1
Form factor	2U rack-mount, convertible to tower with included hardware
Dimensions	8.9 x 48.3 x 62.2cm
Net weight	37 kg (82 lbs)
Warranty	3 years
Color	Black
General features	Emergency power off, hot-swap electronics, optional UPS Extend Run external battery packs (up to four), hot-swap batteries, controllable outlet groups, integrated network management, Advanced Battery Management which significantly increases battery service life, overload indicator, rack mount, replace-battery indicator, resettable output circuit breakers, status indicator LEDs, user-replaceable batteries.
Includes	UPS signaling RS-232 cable, rack-mounting support rails, CD with software, user manual.

Best use

- Provides enough power to protect and back up medium-size work groups of x3250, x3455, x3650, or x3655 servers.

Points to consider	Reasons to "buy up"
The UPS 3000 LV provides **six** and can protect up to **2880VA** (**2700 watts**). Is this sufficient for your present and near future needs?	A larger unit can support a higher total VA/wattage plus protect more devices. The next step up, the UPS7500XLV, provides protection for up to 13 units (using an optional Universal Rack PDU) and can cover up to 7500VA (6000 watts).
In the event of a power failure, a loaded UPS 3000 LV will give you about **five** minutes to power everything down. Is that enough?	The UPS7500XHV provides up to 475% longer backup time at the same wattage than the UPS1500. Optionally, adding up to four Extend Run battery packs provides up to 3 hours of backup time at the same wattage.

IBM UPS 3000 HV 2130-2RX

Watts	2700 (3000VA)
Line input	Varies. See table below for available line input options.
Input voltage	208-240V
Line output	IEC 320-C13 (9) IEC 320-C19 (1)
No. of line outputs	9 (plus up to 7 more with a DPI Rack PDU)
Interface ports	RJ45 RS-232, integrated Network Management Module (RJ45)
No. of smart communication (X-Slot) bays	1
Form factor	2U rack-mount, convertible to tower with included hardware
Dimensions	8.9 x 48.3 x 62.2cm
Net weight	37 kg (82 lbs)
Warranty	3 years
Color	Black
General features	Emergency power off, hot-swap electronics, optional UPS Extend Run external battery packs (up to four), hot-swap batteries, controllable outlet groups, integrated network management, Advanced Battery Management which significantly increases battery service life, overload indicator, rack mount, replace-battery indicator, resettable output circuit breakers, status indicator LEDs, user-replaceable batteries.
Includes	UPS signaling RS-232 cable, three IEC rack jumper cords, rack-mounting support rails, CD with software, user manual.

Best use

- Provides enough power to protect and back up medium-size work groups of x3250, x3455, x3550, x3650, or x3655 servers.

Points to consider	Reasons to "buy up"
The UPS 3000 HV provides **nine** outlets and the ability to protect up to **seven** additional outlets by using one Universal Rack PDU, for a total of up to **16** outlets, and can protect up to **3000VA** (**2700 watts**). Is this sufficient for your present and near future needs?	A larger unit can support a higher total VA/wattage plus protect more devices. The next step up, the UPS7500XLV, provides protection for up to 13 units (using an optional Universal Rack PDU) and can cover up to 7500VA (6000 watts).
In the event of a power failure, a loaded UPS 3000 HV will give you about **five** minutes to power everything down. Is that enough?	The UPS7500XHV provides up to 475% longer backup time at the same wattage than the UPS1500. Optionally, adding up to four Extend Run battery packs provides up to 3 hours of backup time at the same wattage.

2130-2RX Line Input Options	
40K9766	Line cord for Europe
40K9767	Line cord for United Kingdom
40K9768	Line cord for Italy
40K9769	Line cord for Denmark, Switzerland
40K9770	Line cord for South Africa
40K9771	Line cord for Israel
40K9772	Line cord for United States, Canada, Japan (NEMA L6-20)
40K9773	Line cord for Australia, New Zealand
40K9774	Line cord for China
40K9775	Line cord for Brazil
40K9776	Line cord for India
40K9777	Line cord for Argentina

IBM UPS7500XHV

Watts	6000W (7500VA)
Line input	Must be hard wired directly into room power supply
Input voltage	200V-240V
Line output	IEC 320-C19
No. of line outputs	4
Interface ports	DB-9 RS-232, USB, integrated Network Management Card (RJ45)
No. of SmartSlot bays	1
Form factor	6U rack-mount
Dimensions (H x W x D)	267 x 430 x 685 mm (10.5 x 16.9 x 26.9 in)
Net weight	109 kg (240 lbs)
Warranty	3 years
Color	Black
General features	Emergency power off, optional UPS Extend Run external battery packs, hot-swap batteries, integrated network management, intelligent battery management, overload indicator, rack mount, replace-battery indicator, resettable circuit breaker, status indicator LEDs.
Includes	Rail set, accessory kit, UPS serial cable, UPS cable, EPO cable, four rack jumper cords, documentation and software CDs.

Best use

- For BladeCenter®, Clusters
- Small racks of servers and storage devices

Points to consider	Reasons to "buy up"
The UPS7500XHV provides **4** outlets and can protect up to **7500VA** (**6000 watts**). Is this sufficient for your present and near future needs?	The next step up, the UPS10000XHV can cover up to 10,000VA (8000 watts).
In the event of a power failure, a fully loaded UPS7500XLV will give you about **seven** minutes (at **6,000 watts**) to power everything down. Is that enough?	Optionally, adding up to four Extend Run External Battery Packs provides up to 52 minutes of backup time at the same wattage.

IBM UPS10000XHV

Watts	8000W (10,000VA)
Line input	Must be hard wired directly into room power supply
Input voltage	200V-240V
Line output	IEC 320-C19
No. of line outputs	4
Interface ports	DB-9 RS-232, USB, integrated Network Management Card (RJ45)
No. of SmartSlot bays	1
Form factor	6U rack-mount
Dimensions (H x W x D)	267 x 430 x 685 mm (10.5 x 16.9 x 26.9 in)
Net weight	109 kg (240 lbs)
Warranty	3 years
Color	Black
General features	Emergency power off, optional UPS Extend Run external battery packs, hot-swap batteries, integrated network management, intelligent battery management, overload indicator, rack mount, replace-battery indicator, resettable circuit breaker, status indicator LEDs.
Includes	Rail set, accessory kit, UPS serial cable, UPS cable, EPO cable, four rack jumper cords, documentation and software CDs.

Best use

- For BladeCenter®, Clusters
- Small racks of servers and storage devices

Points to consider	Reasons to "buy up"
In the event of a power failure, a fully loaded UPS10000XHV will give you about four minutes (at 8,000 watts) to power everything down. Is that enough?	Adding up to four Extend Run External Battery Packs provides up to 37 minutes of backup time at the same wattage.

Sizing Guide for IBM UPS Solutions

1. Identify the devices contained in the rack configuration.
2. Sum the total load (watts) of all devices in the configuration, using either Maximum Load for minimum runtime or Typical Load for typical runtime.
3. Find the Total Configuration Load In the table below.
4. Select the most appropriate UPS model to achieve the desired runtime. If the Total Configuration Load is greater than the entries in the table, split the load across two or more UPS units.

	IBM UPS 750TLV	IBM UPS 1000TLV	IBM UPS 1500TLV	IBM UPS 3000 LV & 3000 HV	IBM UPS 7500XHV	IBM UPS 10000XHV
Total Load (W)	**Runtime[7]**					
100	28 min	1 hr	1 hr 16 min	1 hr 15 min	6 hr 0 min	6 hr 0 min
200	18 min	41 min	51 min	1 hr 6 min	4 hr 9 min	4 hr 9 min
300	9.7 min	23 min	28 min	55 min	3 hr 9 min	3 hr 9 min
400	7 min	17 min	20 min	48 min	2 hr 30 min	2 hr 33 min
500	5 min	13.5 min	16.5 min	42 min	2 hr 6 min	2 hr 6 min
600	-	10 min	12 min	37 min	1 hr 48 min	1 hr 48 min
700	-	8 min	11 min	31 min	1 hr 33 min	1 hr 33 min
800	-	-	9 min	26 min	1 hr 22 min	1 hr 22 min
900	-	-	7.4 min	23 min	1 hr 13 min	1 hr 13 min
1000	-	-	6.7 min	19 min	1 hr 6 min	1 hr 9 min
1200	-	-	-	14 min	55 min	55 min
1600	-	-	-	9 min	41 min	41 min
2000	-	-	-	7 min	32 min	32 min
2200	-	-	-	6 min	28 min	28 min
2500	-	-	-	6 min	24 min	24 min
2700	-	-	-	5 min	22 min	22 min
3000	-	-	-	-	19 min	19 min
5000	-	-	-	-	10 min	10 min
6000	-	-	-	-	7 min	7 min
7000	-	-	-	-	-	5 min
8000	-	-	-	-	-	4 min

[7] Battery run times are estimates based on IBM testing; actual times will vary depending on many factors including battery age, temperature, maintenance, etc.

For More Information

IBM System x Servers	**ibm.com**/systems/x
IBM System x Configuration and Options Guide	**ibm.com**/systems/x/hardware/configtools.html
IBM ServerProven Program	**ibm.com**/servers/eserver/serverproven/compat/us
IBM Technical Support	**ibm.com**/server/support
Other Technical Support Resources	**ibm.com**/servers/eserver/techsupport.html
Eaton Powerware /IBM Partnership	*www.powerware.com/ibm*
Powerware Software Suite downloads	*www.powerware.com/software/downloads.asp*
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