

## UPS configuration and sizing

### Tower UPS models

	IBM UPS750TLV	IBM UPS1000TLV	IBM UPS 1500TLV
<b>UPS attributes</b>			
Part number	21301TX	21303TX	21305TX
Warranty <sup>1</sup>	3-year IBM limited onsite	3-year IBM limited onsite	3-year IBM limited onsite
Color	Black	Black	Black
Line input	Fixed NEMA 5-15P	Fixed NEMA 5-15P	Fixed NEMA 5-15P
Output receptacles	6 NEMA 5-15R	8 NEMA 5-15R	8 NEMA 5-15R

### Rackable UPS models

	APC Smart-UPS 1400RMB	IBM UPS3000XLV	APC Smart-UPS 5000RMB
<b>UPS attributes</b>			
Part number	32P1020	2130R30 (32P1681)	37L6861
Unit height	2U	2U	5U
Warranty	3-year <sup>2</sup>	3-year IBM limited onsite <sup>1</sup>	3-year <sup>2</sup>
Color	Black	Black	Black
Emergency power off cable	Yes	Yes	Yes
Rail kit	Yes	Yes	Yes
UPS expander card AP9607	No	Integrated Network Management Module for managing multiple servers	Yes
Line input	1 NEMA L5-15P	1 NEMA L5-20P	1 NEMA L6-30P
Output receptacles	6 NEMA 5-15R	6 IEC 320-C13 (10amp) 1 NEMA L5-20R (16amp)	8 IEC 320-C13 (10amp) 2 IEC 320-C19 (16amp)
Outlet expandability via NetBAY PDU	No	Yes	Yes
Support for external battery packs?	No	Yes	No

### xSeries Rack Configurator software

The variety of sizes, access, component cabling and power supply requirements of servers, accessories and storage components make configuring a complex networked system a challenge. The IBM @server xSeries Rack Configurator provides an easy-to-use tool that helps design the optimum layout. The configurator helps customers check, correct and report the following:

- Components by product number and position
- Infrastructure specifications, including weight, power, volt-amperes (VA), heat (BTU/hr), bays, EIA, outlets and console ports
- Width and depth; front, rear and side clearances; total weight and top clearance
- Cables and connectors by component position
- Download the configurator software from [ibm.com/pc/us/eserver/xseries/library/configtools](http://ibm.com/pc/us/eserver/xseries/library/configtools)

### Sizing guide for IBM UPS solutions

**Step 1:**

Identify the devices contained in the rack configuration

**Step 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.

Servers	# Power Cords	Power (Watts) Load Typical/Max
xSeries 200	1/1	350/245
xSeries 205	1/1	485/340
xSeries 220	1/1	350/245
xSeries 232 (one 385W power supply)	1/1	400/280
xSeries 232 (two 250W power supplies)	2/3	450/315
xSeries 235	1/2	800/560
xSeries 240	2/3	450/315
xSeries 250	2/4	475/350
xSeries 255	2/4	1000/530
xSeries 300	1/1	200/140
xSeries 305	1/1	200/140
xSeries 330	1/1	200/140
xSeries 335	1/1	340/245
xSeries 342	1/2	390/270
xSeries 345	1/2	500/350
xSeries 350	1/3	525/365
xSeries 360	2/3	740/520
xSeries 370	3/3	1450/1015
xSeries 380	2/2	2000/1400
xSeries 382	2/2	1000/700
xSeries 440	2/2	950/950
xSeries 445	2/2	950/800
xSeries 450	2/2	950/800
BladeCenter™ (two power supplies)	2/2	1500/1050
BladeCenter (four power supplies)	4/4	3000/2100
<b>Other Devices</b>		
RXE-100 (8684-1RX)	2/2	370/260
EXP300 Storage Expansion Unit (35311RU)	2/2	360/285
EXP400 Storage Expansion Unit (17331RU)	2/2	440/310
FASt200/200 HA Storage Server (35421RU/35422RU)	2/2	390/275
FASt500 Storage Server (35521RU)	2/2	200/140
FASt600 Storage Server (172260U)	2/2	557/390
FASt700 Storage Server (17421RU)	2/2	390/275
FASt 900 Storage Server (174290U)	2/2	200/140
FASt EXP500 Storage Expansion Unit (35601RU)	2/2	350/245
FASt EXP700 Storage Expansion Unit (17401RU)	2/2	350/245
SAN Fibre Channel Switch, 8-port (2109S08)	1/2	200/n/a
SAN Fibre Channel Switch, 16-port (2109S16, 2109F16)	1/2	200/n/a
TotalStorage SAN Switch F08, 8-port (3534F08)	1/1	50/n/a
SAN Data Gateway Router UltraSCSI LVD Port (2108R3L)	1/1	90/n/a
DLT Tape Autoloader and Library (3502)	1/1	135/n/a
Magstar® MP 3570 Tape Subsystem (C2x)	1/1	200/140
NetMEDIA Storage Expansion Unit EL (3551)	2/2	185/130
3600 Series Tape Autoloader and Library (3600xxx)	1/1	700/500
NetBAY Tape Enclosure (003B0X)	1/1	457/320
SDLT/LTO Modular Tape Library (4560SLX)	1/1	430/300

**Advanced power protection solutions for high availability**

**Step 3:**  
Find the Total Configuration Load In the table to the right

**Step 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.

Model	IBM UPS750TLV	IBM UPS1000TLV	IBM UPS1500TLV	APC Smart-UPS 1400RM	IBM UPS3000XLV	APC Smart-UPS 5000RM
Part Number	21302TX	21304TX	21306TX	32P1022	32P1691	37L6862
Total Load (Watts)	Runtime Minutes <sup>9</sup>	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes	Runtime Minutes
200	17	40	52	45	144	240
250	14	29	37	34	84	200
300	10	23	28	25	84	166
350	8	19	24	22	58	145
400	7	17	21	18	52	125
450	6	15	18	15	45	110
500	5	12	15	13	38	97
550	-	11	13	11	38	87
600	-	9.5	12	10	31	76
650	-	9.2	11	9	29	68
700	-	8	10	8	26	63
750	-	-	9	8	25	59
800	-	-	8	7	22	55
850	-	-	7.6	7	20	51
900	-	-	7.4	6	18	47
950	-	-	6	5	18	43
1000	-	-	-	-	16	39
1100	-	-	-	-	14	34
1200	-	-	-	-	12	31
1300	-	-	-	-	12	28
1400	-	-	-	-	9	25
1500	-	-	-	-	9	22
1600	-	-	-	-	8	20
1700	-	-	-	-	7	18
1800	-	-	-	-	7	17
1900	-	-	-	-	7	14
2000	-	-	-	-	6	12
2100	-	-	-	-	6	11
2200	-	-	-	-	5	11
2300	-	-	-	-	5	10
2400	-	-	-	-	4	10
2500	-	-	-	-	4	9
2600	-	-	-	-	4	9
2700	-	-	-	-	4	8
2800	-	-	-	-	4	8

## Additional resources

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### Glossary

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#### **AC (alternating current)**

Used to indicate that voltage or current in a circuit is alternating in polarity at some frequency, as in “230 Volts AC.”

#### **Alarms**

Audible alarms alert you of changes in operating environment and battery conditions. Most can be suppressed or delayed to eliminate unwanted noise.

#### **Automatic voltage regulation (AVR)**

AVR automatically steps up or steps down voltage to safe output levels, allowing you to work through brownouts without unnecessary battery drain.

#### **AVR Boost**

AVR Boost automatically corrects brownout conditions. This feature automatically steps up voltage to safe output levels, allowing you to work through brownouts without unnecessary battery drain.

#### **AVR Trim**

AVR Trim automatically corrects over-voltage conditions. This feature automatically steps down high voltage to safe output levels and allows you to work through over-voltages without unnecessary battery drain.

#### **Battery**

A battery is an energy storage system that is used in a UPS. The battery used in a UPS is rechargeable. The UPS converts the DC power from the battery to AC power for use by the load.

#### **Battery management**

A term used by many UPS manufacturers to describe a suite of functions related to charging, testing and maximizing the life of a UPS battery. Battery management may include imminent battery failure diagnosis and indication, scheduled battery testing, hot-swappable user-replaceable batteries, high-speed battery charging, output regulation to reduce unnecessary battery usage and/or special battery charging techniques.

#### **Cell Guard**

This feature provides intelligent battery management that helps extend battery life.

#### **Distortion**

When used in relation to AC power distribution, this refers to deviations between the actual AC voltage waveform delivered to the user and the ideal sine wave of voltage.

#### **Efficiency**

A ratio of output to input power expressed in percent. UPS efficiency of less than 100% causes increased energy use.

#### **EMI (electro-magnetic interference)**

EMI usually refers to unwanted electrical noise present on a power line.

#### **Environmental monitoring capabilities**

Delivers temperature and humidity monitoring for enhanced peace of mind.

#### **Intelligent battery management**

Intelligent battery management delivers longer battery life, faster recharge and warning of battery wear.

#### **Joule**

The Joule is a measure of the amount of energy delivered by one WATT of power in one second or one million watts of power in one microsecond. The Joule rating of a surge protection device is the amount of energy that it can absorb before it becomes damaged.

#### **Multiple server support**

A single UPS and software should accommodate multiple servers and multiple operating systems. With multiple server support, a unit will be compatible even if the network configuration changes.

**Network grade line conditioning**

Full-time EMI/RFI filters prevent line noise from causing data errors.

**Network Management Module**

Built-in network capabilities available on the IBM UPS3000X, this feature takes the place of optional smart cards used on other UPS models. The module allows remote management and monitoring of the UPS itself plus attached servers.

**QuickSwap™**

QuickSwap is defined as a user-friendly, hot-swappable battery replacement system. It saves the time and expense of returning the UPS to the factory for battery service and allows safe and easy replacement of batteries while attached devices are up and running. Replacement battery kits ship in a reusable box for convenient return of exhausted batteries to a recycling center or to APC.

**Reboot**

A reset of a computer that is manually initiated or occurs due to a software crash or due to a power sag or surge. A reboot causes all the current work that was in process to be lost.

**Redundant**

An intentional repetition of a given function—usually intended to improve reliability.

**Redundant switch**

The redundant switch continuously monitors two AC circuits and automatically switches from the primary to the redundant power source, increasing overall system availability.

**RFI (radio frequency interference)**

This is electrical noise which is present in communications or computing equipment which results from some parts of the equipment or attached wiring acting as a radio antenna.

**Site wiring fault indicator**

Alerts users to potential problems, such as a missing ground and reversed polarity, two common wiring mistakes that usually require an electrician to diagnose.

**SNMP (Simple Network Management Protocol)**

Simple Network Management Protocol is a protocol that allows the management of networks that today is mainly used for managing TCP/IP networks.

**Surge suppressor**

A surge suppressor is a device used to protect equipment from transient over-voltages present on AC power, data or telephone circuits. The suppressor may operate by absorbing the surge, by blocking the surge from flowing or by a combination of the two.

**Transient**

A transient is a momentary variation that ultimately disappears. Most power problems are transient.

**VA (Volt-Amps)**

Volt-Amps is a form of power measurement. A VA rating is the Volts rating multiplied by the Amps (current) rating. The VA rating can be used to indicate the output capacity of a UPS or other power source or it can be used to indicate the input power requirement of a computer or other AC load.

**Watts**

This is a form of power measurement. For AC power systems, the Watts rating is the Volts rating multiplied by the Amps rating multiplied by the Power Factor. Watts represent actual delivered energy.

**PowerChute *plus* software configurable features:**

**UPS ID**

Users may assign any 8 character settings to assist in UPS identification.

**Low transfer**

Low transfer voltage may be moved downward to extend brownout range or upward to protect sensitive equipment.

**High transfer**

High transfer voltage may be moved lower to protect sensitive equipment, or higher to conserve battery during extended high line voltage conditions.

**Sensitivity**

Sensitivity to line noise may be adjusted for fuel-powered AC generator applications.

**Self-test**

The APC Smart-UPS automatically performs a self-test every two weeks, ensuring proactive detection of a weakening battery. Users can opt for weekly testing, testing at startup only or no automatic self-test.

**Alarm**

The audible alarm may be suppressed or delayed to eliminate nuisance alarms.

**Shutdown delay**

The delay between when the “shutdown signal” is sent from the CPU to UPS and when the UPS “shuts down” can be adjusted for special applications.

**Turn-on delay**

Allows multiple APC Smart-UPS on the same power grid or circuit to stagger or sequence their return from shutdown once the utility line returns.

**Low battery capacity**

The low battery warning may be moved from two minutes up to ten minutes before battery exhaustion. This allows plenty of time for safe shutdown of complex applications.

**Minimum battery capacity**

When the utility line returns after a shutdown, Smart-UPS can ensure that the batteries first recharge to allow for subsequent safe shutdown of file servers and CPUs.

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***For more  
information***

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**IBM @server xSeries Racks and rack options**

[ibm.com/pc/ww/eserver/xseries/rack](http://ibm.com/pc/ww/eserver/xseries/rack)

**IBM @server xSeries Options**

[ibm.com/pc/us/eserver/xseries/storage](http://ibm.com/pc/us/eserver/xseries/storage)

**IBM @server xSeries Rack Configurator**

[ibm.com/pc/us/eserver/xseries/library/configtools](http://ibm.com/pc/us/eserver/xseries/library/configtools)

**IBM @server xSeries Configuration and Options Guide**

[ibm.com/pc/us/eserver/xseries/library](http://ibm.com/pc/us/eserver/xseries/library)

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<http://www.apcc.com/go/machine/ibm/>

**APC software downloads**

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1) Visit [www.ibm.com/pc/safecomputing](http://www.ibm.com/pc/safecomputing) periodically for the latest information on safe and effective computing. Warranty Information: For a copy of applicable product warranties, write to: Warranty Information, P.O. Box 12195, RTP, NC 27709, Attn: Dept. JDJA/B203. IBM makes no representation or warranty regarding third-party products or services including those designated as ServerProven or ClusterProven.

2) APC offers a three-year limited warranty when the APC UPS is purchased through IBM.

3) Visit <http://www.contingencyplanningresearch.com> and <http://www.apcc.com> for more information on the findings.

4) Visit <http://www.worldwatch.org> for more information on the findings.

5) Visit <http://www.idc.com> for more information on the findings.

6) Visit <http://www.networkcomputing.com> for more information on the findings.

7) Visit <http://www.contingencyplanningresearch.com> and <http://www.eaglerockalliance.com> for more information on the findings.

8) Visit <http://www.yankeegroup.com> for more information on the findings.

9) Battery run times are estimates based on IBM testing, actual times will vary depending on many factors including battery age, temperature, maintenance, etc.

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