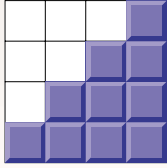# High reliability, low operating costs, and manageability to defend your datacenter *and* your bottom line

When mission-critical datacenter applications such as fileservers, midrange systems and telecom equipment are on the line, you need a UPS that can take care of your loads and take care of itself.
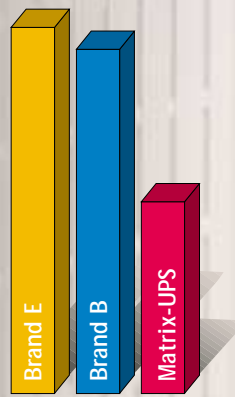
Matrix-UPS, from APC, provides advanced modular UPS protection and award-winning, customizable management features.

With an innovative, high-availability design, and included software, Matrix means high reliability, low operating costs, and manageability that will defend both your datacenter and your bottom line.

The Line-Interactive Advantage

Low lifecycle cost

Over five years, a 5kVA Matrix-UPS will cost approximately $900* in electricity to run, while competitive brands approach $2,800. Matrix-UPS' high efficiency means minimal wasted energy, dramatically reduced lifetime costs, and long battery life.

Brand E **Brand B** **Matrix-UPS**

5kVA 5-year Lifecycle Costs*

Optimized design

Matrix-UPS' line-interactive design delivers zero-transfer time with computer loads and deep brownout protection with 75% fewer components in the power path than traditional double-conversion designs. Fewer components means better efficiency, and far greater reliability. There is also no need to oversize for inrush current, so you pay for only the power rating you need.

High efficiency

Moreover, Matrix-UPS is 93% efficient at full load, while some UPSs are only 70% to 80% efficient. The excess heat generated by these units not only wastes energy and reduces battery life, it may also create a need for special air conditioning.

Chosen by today's leading companies

Internetworking equipment
at Bay Networks

Telecom equipment
at Ricard International

Midrange and network systems
Microsoft Corporation South Pacific Region

Multiple fileservers
at Harley Davidson

Matrix-UPS™

"The first modular UPS with SNMP support... The modular configuration allows the possible points of failure... to be hot swappable without affecting the protection afforded the fileservers... If you need managed power protection today and the flexibility to increase your coverage tomorrow, APC's modular Matrix-UPS provides fully paid insurance..."
– PC Magazine, 1/94

* Lifecycle costs are based on third party testing under the following conditions:
1. Electricity cost = $0.1/kWhr 2. System operates 24 hours per day 3. UPS loaded to 50% capacity.

Matrix is Modular…
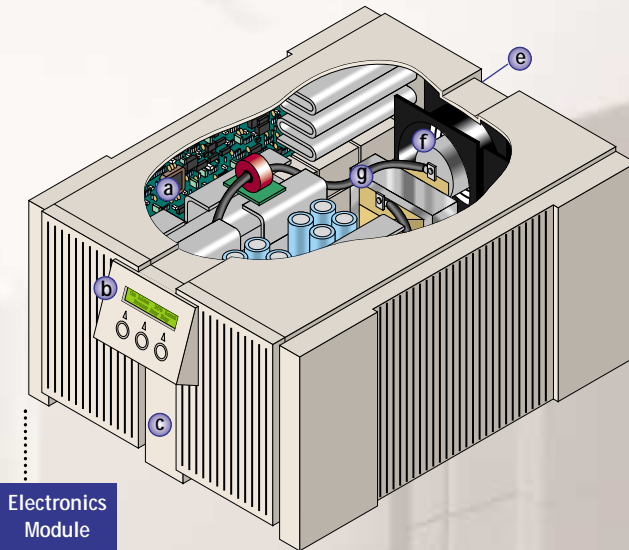
Hot-Swappable modularity means high availability

A basic Matrix unit is made up of an isolation module, an electronics module, and external SmartCell battery packs. The isolation unit and the electronics unit mated together are called the Power Electronics (PE). In the Matrix modular design, the SmartCell battery packs and the electronics module can easily be swapped-out or repaired on-site by even an untrained employee without load interruption. This reduces Mean Time to Repair (MTTR) from a matter of days or weeks to a matter of minutes.

(a) Main processor with FineLine™ voltage regulator

(b) LED display/interface provides UPS status, UPS control, UPS test, UPS diagnostic info. Multilingual Matrix-UPS speaks French, German, Spanish or simple English

(c) Hot Swap electronic module is Matrix-UPS' primary electronic component

(d) UL-approved connectors

The modular Matrix-UPS can be safely swapped-out or repaired on-site by an untrained employee without interrupting power to the loads. This reduces Mean Time To Repair (MTTR) from a matter of days or weeks to a matter of minutes.

(e) SmartSlot accessory bay allows easy customization

(f) Silent fan ensures cool operation

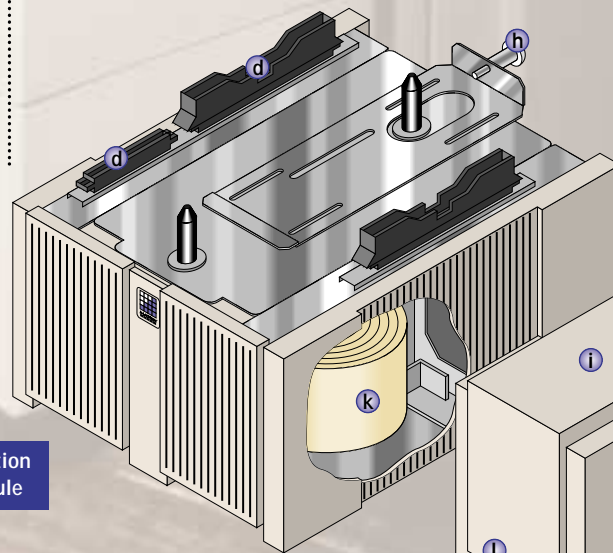(g) Line-interactive power path provides unmatched reliability and efficiency

(h) Hot swap screw

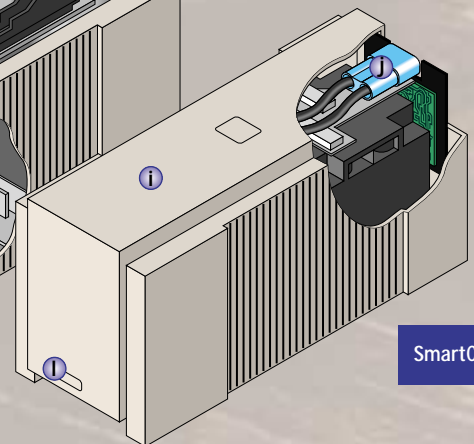(i) Zero-maintenance SmartCells. Add additional SmartCells for extended runtime

(j) Battery microprocessor provides on-board diagnostics

Electronics Module

Isolation Module

SmartCell

(k) Isolation transformer allows multiple output voltages in bypass mode

(l) "Replace SmartCell" LED

For more information, go to *www.apcc.com*

Matrix is Expandable…

With most large UPSs, battery replacement is neither quick nor easy. Special shipping is required for heavy batteries. Safe disposal procedures must be followed. Mean Time to Repair (MTTR) can be weeks or even months. In contrast, SmartCell replacement takes just minutes with no effect on system uptime. New SmartCells can be stored on-site or shipped by overnight courier upon request. Worn modules are simply returned to APC in the replacement SmartCell's packaging. In effect, an overnight courier can take the place of an expensive service contract.

SmartCells™ increase uptime and reduce costs

Increase runtime easily

Runtime can be increased without replacing the SmartCells or Matrix-UPS isolation and electronics modules. Additional runtime can be added simply by adding SmartCells or SmartCell XRs.

SmartCells provide fault tolerance

Matrix-UPS' SmartCell battery packs are connected in parallel for maximum security. In many other UPSs, batteries are connected in series: when one battery fails, all are rendered useless. Replacing a dead battery often means the hassle and expense of replacing the whole string.

Front panel indicators warn you when it's time to replace batteries

A microprocessor in each SmartCell automatically monitors the operation of the battery and warns you of diminished capacity. Warnings are delivered via the front control panel, via indicators on each SmartCell, and via monitoring software.

Separate enclosures mean long battery life

Unlike UPS designs where batteries are packaged in the same enclosure as heat dissipating chargers and inverters which can cause early failure, SmartCells last longer because they are self-contained and operate at room temperature. Instead of two or three replacements, SmartCells may be replaced only once during the UPS' service life.

SmartCell XR provides extended-run applications with an affordable, fault-tolerant, intelligent solution

The SmartCell XR has all the functionality of the SmartCell with 4 times the runtime. It is microprocessor controlled and managed via Matrix's front panel and by PowerChute *plus* software. The innovative packaging of the XR allows it to be user serviceable and installable. The SmartCell XR will save you money by keeping your service contracts to a minimum and maximizing your runtime per dollar.

The SmartCell XR is ideal for telecom equipment and datacenters requiring an abundance of runtime.

Matrix is Flexible.

Matrix-UPS is designed for downsizing

Downsizing means managing a mixed bag of midrange, PC, and telecom equipment, so Matrix-UPS offers full capacity in every served voltage, as well as upgradeable options.

Downsizing means saying goodbye to the glasshouse, so Matrix-UPS provides full environmental monitoring capabilities which alert you whenever ambient conditions go out of bounds.

Downsizing means attention to the bottom line, so Matrix-UPS delivers lifecycle costs half that of competitive brands. And downsizing means a slew of new power problems to contend with, so Matrix-UPS eliminates threats from PC-induced harmonics, offers full compatibility with power-factor corrected PCs, and outperforms the competition in deep "rolling brownout" protection.

Matrix-UPS is strong enough to handle all the problems your equipment is likely to experience, smart enough to provide network management tools to make your job easier, and stingy enough to protect your investment with customizable product and service options. Contact APC for details.

(a) RJ-11 communication jacks allow each SmartCell to report its status to the electronics module.

(b) Circuit breaker overload protection means no fuse replacement hassles.

(c) Matrix-UPSs isolation module provides full line conditioning, meeting Novell's approval for network protection without the need for additional external conditioners.

(d) Master activation switch is protected against accidental power downs.

(e) Unlike competitive units which may require new, dedicated four-line wire service to your site, Matrix-UPS uses the L6-30P input plug as found on standard 208V equipment so there are no rewiring costs or hassles.

(f) Hand-pluggable connectors make installation and service quick and easy.

(g) Award-winning internal SmartSlot increases reliability and enhances performance by allowing you to customize your Matrix-UPS with a wide variety of optional SmartSlot Accessories. Accessories connect with and draw all necessary power from the UPS.

(h) Smart serial interface means your site's power quality can actually be monitored and events can be logged automatically. Using APC's PowerChute plus or SNMP adapter, you can get ongoing evidence of your ROI. Perform remote server reboots with PowerChute plus power management software for Novell, OS/2, Unix, and more.

(i) Emergency Power-off capability meets facility safety requirements.

(j) Matrix-UPS ships standard with the back plate as shown (one L14-30R, two L6-30R's and six 5-15R's). Hard wire options are available. Call for details.

Matrix-UPS' Neutral Regeneration design removes dangerous harmonic currents from the neutral wire and offloads them to the hot wires, eliminating overloaded neutral fire hazards as your installed base of PCs grows.
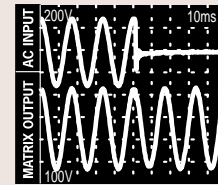
Power Distribution Units (PDU) make custom plug configurations simple and easy for Matrix-UPS users
Due to the wide range of applications for the Matrix-UPS product line, many customers have unique electrical outlet needs. To accommodate those needs, PDUs provide various quantities and types of electrical outlets. Contact APC for further details.

Matrix-UPS' line-interactive design delivers sine wave output and zero-transfer time with computer loads and deep brownout protection with 75% fewer components in the power path than traditional double conversion designs.

Matrix-UPS Worldwide version can be programmed to output 220, 225, 230, or 240 VAC at 50/60 Hz for international applications.

Matrix-UPS Japanese version has been specially designed to meet the voltage requirements in Japan.

Matrix includes PowerChute® *plus* software for advanced UPS power management and diagnostics

APC Matrix-UPS ship with APC's PowerChute® *plus* UPS power management and diagnostic software to provide network administrators with useful UPS information and great flexibility in configuring UPS reaction to power events. By tailoring each UPS to the network environment you can significantly enhance network performance and reliability. Use your APC Matrix-UPS in conjunction with PowerChute *plus* for maximum, custom protection. In addition to extensive unattended system shutdown, you'll get UPS testing/status, remote UPS management and environmental/power monitoring. (PowerChute *plus* support for Novell NetWare, Windows, Windows 95, Windows NT, Windows for Workgroups and SCO Unix included. PowerChute *plus* for use with other operating systems sold separately, see literature #996-0041.)

APC's PowerChute *plus* includes APC's PowerNet SNMP Agent (Windows NT and NetWare included with Matrix-UPS, OS/2 and AIX available separately) and also offers integration and compatibility with Compaq Insight Manager, IBM Netfinity and HP NetServer Assistant (Windows NT and NetWare only).

FlexEvents™ allow administrators to plan for and control crisis situations

New FlexEvents allow users to customize the APC Matrix-UPS reaction to all power events. For each possible power event the user has the option of choosing up to seven items from a list of possible UPS actions. Actions include: Log Event, Notify Administrator, Notify Users, Shut Down Server, Run Command File, Page, Send E-Mail. Customizing UPS actions allows you to plan for and control crisis situations before they can cause downtime or threaten data.

Software configurable features

Customize the operation of an APC Matrix-UPS to your environment and needs. With Power-Chute *plus* software as well as the PowerNet SNMP Adapter you can adjust eleven operating parameters. Settings are stored in APC Matrix-UPSs permanent memory (EEPROM). The following parameters are adjustable:

UPS ID

Users may assign any 8 character string to assist in UPS identification. For example, UPS ID may be server name or UPS location.

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

APC Matrix-UPS automatically performs a self-test every two weeks. This ensures a weakening battery will be detected before it's too late. Users can opt for weekly testing, testing at start up 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.

Return delay

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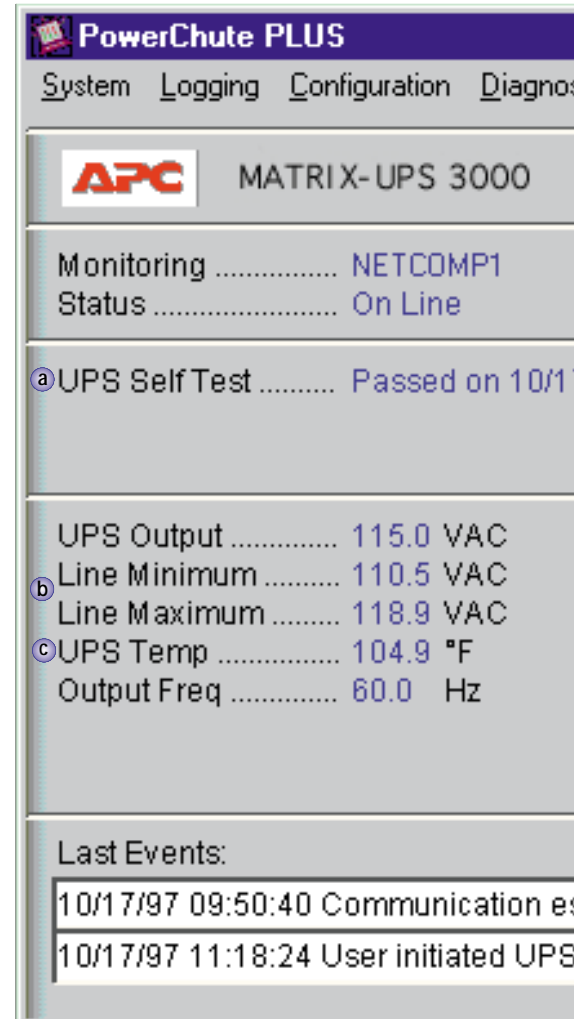
Output voltage

For 230V models only. On-battery output voltage may be adjusted between 225 and 240 volts to match local voltage.

Low battery capacity

The low battery warning may be moved from 2 minutes up to 10 minutes before battery exhaustion. This allows plenty of time for safe shutdown of complex applications.

Minimum battery capacity

When utility line returns after a shutdown, Matrix-UPS can ensure that the batteries first recharge to allow for subsequent safe shutdown for fileservers and CPUs. For telecom or hub applications APC Matrix-UPS can be set to reboot immediately.

SNMP compatibility for enterprise UPS power management

SNMP Ready for Servers

The APC Matrix-UPS series supports the Simple Network Management Protocol (SNMP) via APC's PowerNet® SNMP family of products. PowerNet SNMP products deliver warnings regarding power events and UPS status to any Network Management Station whether the UPS is located 20 feet or 2000 miles away.

APC's PowerNet SNMP Agent, included with PowerChute® *plus* permits you to monitor and control the APC UPSs protecting servers along your entire network data path.

This same worldwide power management capability for Matrix-UPS protecting multiple servers or internetworking equipment is available via the SmartSlot™ PowerNet SNMP Adapter (sold separately).

Look across the LAN at any Matrix-UPS from your keyboard and check important data such as UPS operation, power line status and environmental conditions using the real-time graphical display of UPS/power status.

(a) **UPS self test**
Unattended scheduled self-tests warn of faulty UPS or weak battery.

(b) **Min./Max. power line voltage**
Useful in determining power quality.

(d) (e) (f)

NEW! **for PowerChute *plus***

WebAgent™ Plug-in

WebAgent allows UPS monitoring utilizing a Web Browser. Users have access to their Web server UPS information from anywhere on the Internet or Intranet. It is no longer necessary for the administrator to be logged into the network in order to monitor the UPS/power information.

Microsoft BackOffice Compatible

APC's PowerChute *plus* earned Microsoft's approval for use with BackOffice. PowerChute *plus* functions properly in the BackOffice environment and avoids conflicts with Microsoft Windows NT.

Schedule UPS self tests and shutdowns

Use Powerchute *plus* to schedule unattended UPS self tests, server shutdowns, and UPS runtime calibrations. SmartScheduling™ (not available for all operating systems) provides a more powerful and easier to use interface for scheduling of these actions.

DMI Compliant

PowerChute *plus* is now manageable via the DMI protocol permitting seamless integration with DMI-based server management packages such as Intel's LANDesk Server Manager.

WorkSafe™ feature

In the event of a power outage, PowerChute *plus* will activate the WorkSafe feature which saves open files and gracefully closes open applications. Applications supported include Microsoft Office, PerfectOffice, and Lotus SmartSuite.

(c) **UPS temperature**
Monitoring for proper UPS temperature to extend battery life.

(d) **Battery runtime**
Minutes of battery time left for system use and subsequent outages.

(e) **Utility line voltage**
power quality display for fast problem diagnosis.

(f) **% UPS load**
Load capacity display to ensure correct UPS load.

Certification by operating system and application vendors

Since APC UPS software is tested and certified for operating systems such as Novell NetWare, IBM OS/2 and LAN Server, SunSoft Solaris, and Microsoft Windows, you are ensured of operating system vendor support, as well as compatible operation when using APC software.

PowerNet® SNMP Manager™ maximizes your management by presenting all UPS information in an intuitive graphical display. (sold separately, see literature #996-0325.)

Lotus Notes server shutdown is included with PowerChute plus for each platform Lotus Notes supports.

OPERATION

OPERATION	NORTH AMERICA		WORLDWIDE		JAPAN	
	MX3000	MX5000	MX3000W	MX5000W	MX3000J	MX5000J
Topology	Line Interactive					
Power Capacity	3000VA/2250W	5000VA/3750W	3000VA/2250W	5000VA/3750W	3000VA/2250W	5000VA/3750W
Galvanic Isolated Bypass	yes					
Compatible w/PFC	yes					
Nominal single phase input voltage, frequency:	208/240 Vac, 60 Hz		240 Vac, 50/60 Hz		200 Vac 50/60 Hz	
Input voltage range (% of nominal) for mains operation	-25% to +15%					
Input frequency range (% of nominal) for mains operation	±5%					
Efficiency at full load, on line thermal dissipation (BTU/hr)	>93%, 540	>93%, 900	>93%, 540	>93%, 900	>93%, 540	>93%, 900
Nominal output voltage	120/208/240 Vac		220-240 Vac		100/200 Vac or 120/208/240 Vac	
Output voltage regulation	±5%, adjustable					
Output voltage distortion (on-battery)	<5% THD					
Output frequency regulation	synchronized, 0.1% of nominal during mains failure					
Typical transfer time with computer load	0 ms					
Normal mode let-through voltage % of applied 6kV IEEE 587 (ANSI C62.41) Category A, B test surge	<,0.7%					
Common mode let-through voltage	<1.0%					
Normal mode (Common mode) EMI/RFI noise attenuation range over 100 kHz to 30 mHz range	60 - 80 dB (80 - 100 dB)					

SMARTCELL BATTERY SYSTEM

SMARTCELL BATTERY SYSTEM						
Individual pack voltage and current monitoring	self diagnostic, replace battery warning indicator					
Nominal battery system voltage	48 Vdc					
Method of replacement	hand-pluggable, hot swappable by user					
Number of packs supplied(1)	1 pack	2 packs	1 pack	2 packs	1 pack	2 packs
Expansion capacity	unlimited					
Run time with supplied packs (full/half load)	7/18 min	8/20 min	7/18 min	8/20 min	7/18 min	8/20 min
Recharge time with supplied packs	1.2 hr	2.7 hr	1.2 hr	2.7 hr	1.2 hr.	2.7 hr

FEATURES

FEATURES	
User display	programmable 2 x 16 character backlit LCD, 4 languages
Intelligent Bypass	automatic upon failure or user switchable
Intelligent Serial Interface	yes
SNMP Capability	via APC SNMP adapter
Multiple server/operating system shutdown	via Share-UPS or SmartSlot Interface Expander
Modem control	via SmartSlot Call-UPS II
Environmental monitoring	via SmartSlot Measure-UPS
Computer and network interface	OS/2, OS/400, VAX, Novell, UNIX, LAN Manager, etc.
Emergency Power Off (EPO) capability	input for external EPO closure
Worldwide version output voltage selection	user settable to 220, 225, 230, or 240 Vac; frequency selection is automatic
External Power Distribution Unit (PDU)	call for details
Software configurable options	yes
Automatic and requested self-tests	yes
Adjustable warnings	yes
Adjustable Sensitivity	High, low, or adaptive via FineLine
UPS-Link Control Language	yes
Load Power and Voltage Meters	yes
Intelligent Runtime meter	yes

ENVIRONMENT AND PHYSICAL

ENVIRONMENT AND PHYSICAL						
Operating ambient temperature	0° C to +45°C (32°F to 113°F)					
Operating ambient relative humidity	0% to 95%, non condensing					
Electromagnetic immunity	IEC 801-2, 801-3, 801-4, 801-5; severity level IV					
Audible noise	<55 dBA					
UPS dimensions (Electronics and Isolation Modules mated)	17.8" H x 13.8" W x 17.8" D/(45.2 cm x 35.1 cm x 45.2 cm)					
UPS Electronics Module weight - all versions	40 lb (18.1 kg)	45 lb (20.4 kg)	40 lb (18.1 kg)	45 lb (20.4 kg)	40 lb (18.1 kg)	45 lb (20.4 kg)
UPS Isolation Module weight	104 lb (47.2 kg)	130 lb (59.0)	113 lb (51.3 kg)	146 lb (66.2 kg)	113 lb (51.3 kg)	146 lb (66.2 kg)
SmartCell dimensions	9.1" H x 6.9" W x 17.8" D/(23.1 cm 17.5 cm x 45.2 cm)					
SmartCell weight	each 64 lb (29.0 kg)					
SmartCell XR dimensions	17.8" H x 13.8" W x 17.8" D/(45.2 cm x 35.1 cm x 45.2 cm)					
SmartCell XR weight	each 302 lb (136.9kg)					
Safety approvals	UL per 1778, CSA per C22.2, TUV per IEC 950					
EMC verification	FCC, CDC, EN55022					
Warranty	2 years, $25,000 Lifetime Equipment Protection(2)		2 years		2 years	

RUNTIME vs LOAD

Number of packs:	SMARTCELL								SMARTCELL XR								
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
Recharge time(3)	1.2	2.8	2.7	3.8	4.9	6	7	8.1	3.8	8.1	12.5	16.9	21.3	25.7	30.1	34.5	All times are in
Load: 250 VA 3 kva only	3.07	7.20	11.56	15.93	20.29	24.65	29.02	33.38									hours. Run times are
500 VA 3 kva only	1.46	3.52	5.80	8.24	10.69	13.13	15.57	18.01									typical at 25 degrees
500 VA 5 kva only	n/a	3.07	5.02	7.20	9.38	11.56	13.75	15.93									Celsius (77°F).
1000 VA	0.57	1.46	2.46	3.52	4.58	5.8	7.02	8.24	3	6.75	10.75	14.75	18.75	22.75	26.75	30.75	Figures apply to
1500 VA	0.33	0.83	1.46	2.11	2.81	3.52	4.23	4.99	1.8	4.3	6.9	9.5	12.1	14.7	17.3	19.9	both 3000VA and
2000 VA	0.22	0.57	0.99	1.46	1.93	2.46	2.99	3.52	1.2	3	5	7	9	11	13	15	5000VA - except
2500 VA	0.17	0.46	0.78	1.18	1.59	1.99	2.45	2.90	0.9	2.4	4	5.6	7.2	8.8	10.4	12	where indicated.
3000 VA 3 kva only	0.13	0.36	0.62	0.92	1.25	1.59	1.92	2.30	0.75	1.8	3.25	4.7	6.15	7.6	9.05	10.5	(3) Recharge to 90%
3000 VA 5 kva only	n/a	0.39	0.67	1.00	1.36	1.71	2.08	2.48	0.75	1.8	3.25	4.7	6.15	7.6	9.05	10.5	capacity after dis-
4000 VA 5 kva only	n/a	0.24	0.42	0.62	0.83	1.08	1.33	1.59	0.53	1.25	2.25	3.25	4.25	5.25	6.25	7.25	charge into 50% of
5000 VA 5 kva only	n/a	0.17	0.31	0.46	0.62	0.78	0.98	1.18	0.37	0.9	1.6	2.4	3.2	4	4.8	5.6	rated full load.

Peripherals SurgeArrest® ProtectNet™ PowerManager™

WorkStations Back-UPS® Back-UPS Pro®

Servers Smart-UPS® Smart-UPS® RM Smart-UPS® XL

Datacenters Matrix-UPS® Symmetra®

Software and Accessories PowerChute® plus PowerNet® UPS Accessories

APC Legendary Reliability™

996-0454C

Matrix-UPS™

Advanced, modular power
management for datacenters
and mission-critical servers

APC®

Legendary Reliability™