BLACK BOX®
NETWORK SERVICES

Matrix-UPS®
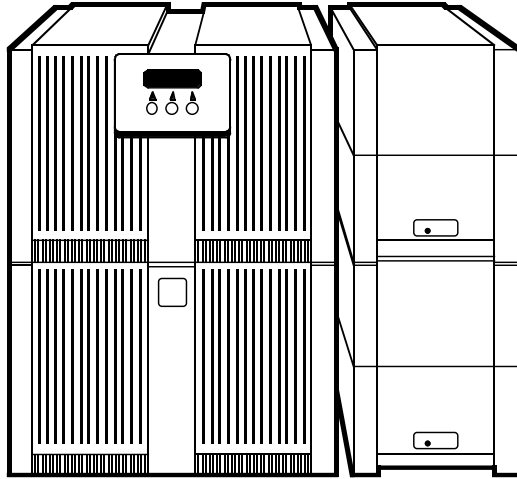
Premium power protection in a single modular unit for even heavy-duty loads.

Key Features

▶ *Provide uninterrupted power to loads of up to 3000 or 5000 Volt-Amps— enough for all but the most demanding equipment.*

▶ *Modular design is hot-swappable: If one component goes bad, it can be replaced without ever compromising the system's power protection.*

▶ *The design is also scalable: You can add as many battery packs as you need for your desired on-battery run time.*

▶ *Can be monitored locally or with optional datacomm or SNMP hardware and software.*

These days, power protection isn't an option, it's a necessity. Putting each of your servers, workstations, or other high-end devices on its own dedicated uninterruptible power supply would be really expensive, but where can you find a single UPS with the capacity and reliability to handle multiple or really large mission-critical loads?

The Matrix-UPS® series by American Power Conversion are the rock-solid powerhouses you need. The 3000 and 3000 XRW versions (our product codes SPU560AE and SPU561AE) can provide continuous 230-VAC battery power to total loads of up to 3000 volt-amps (as much as 2250 watts) if utility power fails or goes bad. The 5000 and 5000 XRW versions (our product codes SPU562AE and SPU563AE) can provide power to total loads up to 5000 volt-amps (as much as 3750 watts).

As shipped from the factory, the regular (non-XRW) versions can battery-power a maximum load for 8 to 10 minutes; the 5000 XRW (extended run) version, for about 54 minutes; the 3000 XRW, for about 108 minutes. (These "on-battery run times" rise as the load decreases or as extra SmartCell or SmartCell XRW battery packs are added—see "Run Times and Recharge Times" on page 5.)

The Matrix-UPS consists of interconnecting "blocks": an Electronics Module, an Isolation Module, and one or more battery packs. If any component part in one module fails, the Matrix-UPS will indicate it (on its front-panel display or across optional management links) and continue operating. The failed module can be hot-swapped, and your system or network won't miss a beat.
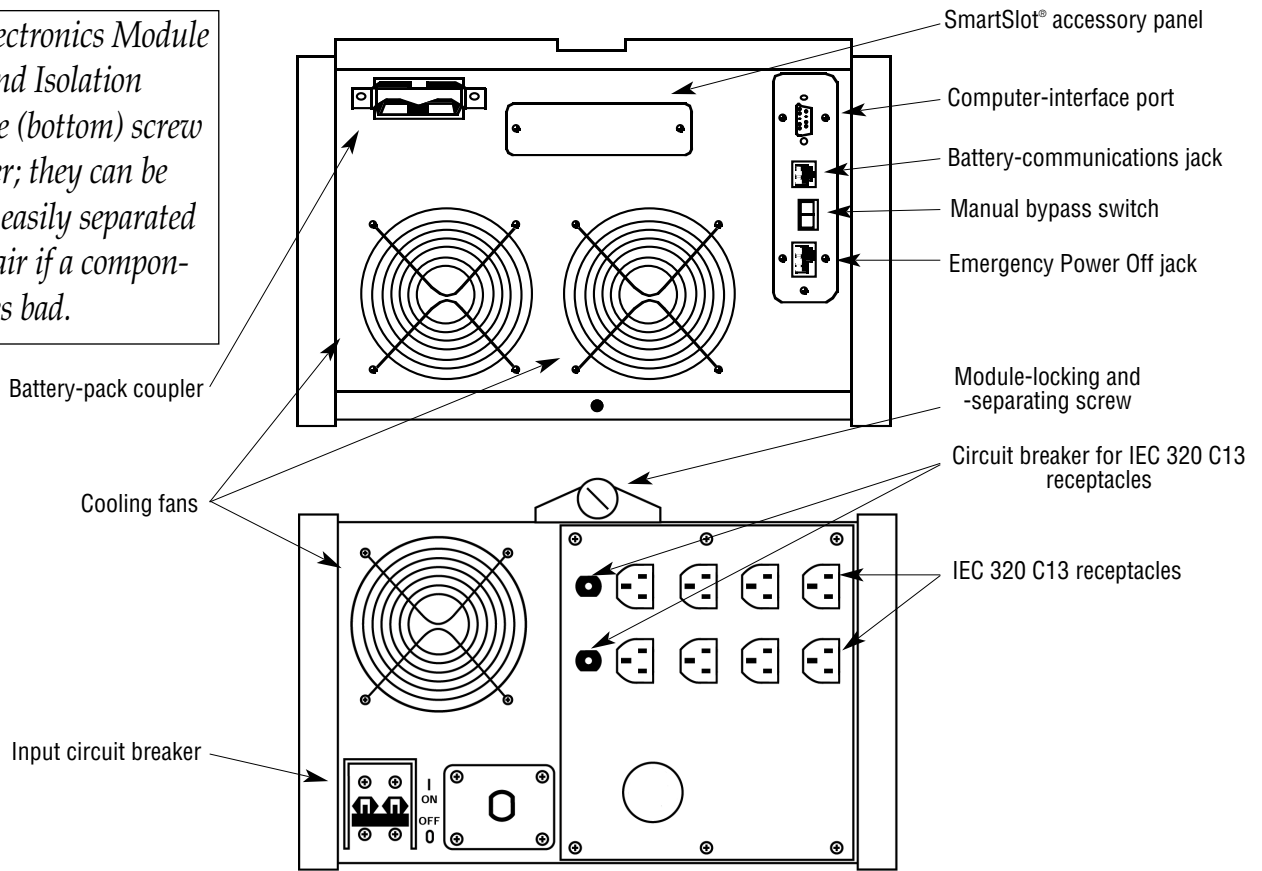
The Matrix UPS also cleans up dirty power (under- or overvoltages, etc.). It even performs surge protection.
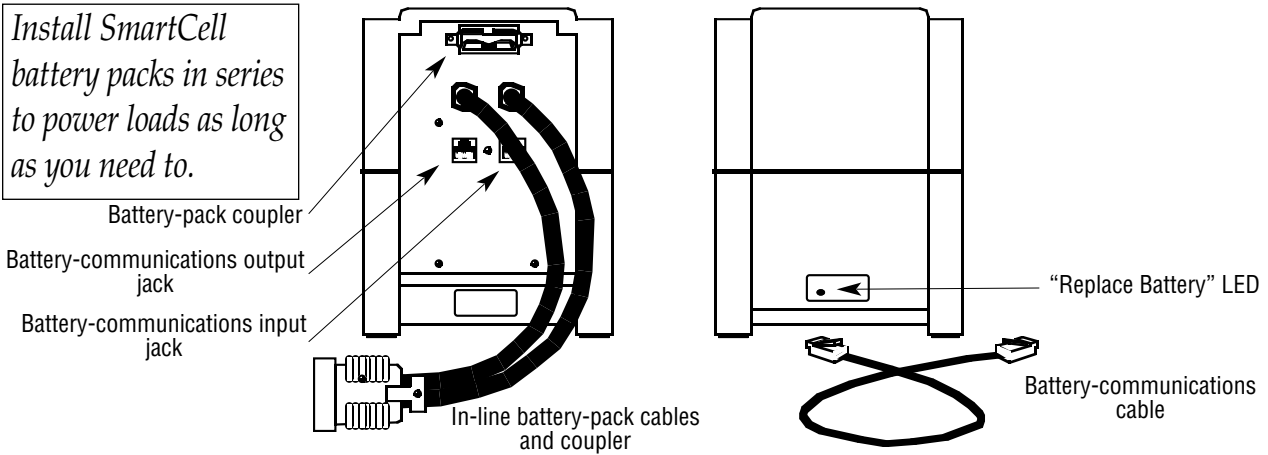
Typical Applications

Regular Matrix-UPS uninterruptible power supplies protect your large systems from surges, other AC irregularities, and especially total power loss—you can shut the systems down gracefully.

Keep your network nerve center alive long enough to do sophisticated pre-shutdown backup and diagnostics with our Extended Run Matrix-UPS units.

The Electronics Module (top) and Isolation Module (bottom) screw together; they can be just as easily separated for repair if a component goes bad.

SmartSlot® accessory panel

Computer-interface port

Battery-communications jack

Manual bypass switch

Emergency Power Off jack

Battery-pack coupler

Module-locking and -separating screw

Cooling fans

Circuit breaker for IEC 320 C13 receptacles

IEC 320 C13 receptacles

Input circuit breaker

I ON
OFF 0

Install SmartCell battery packs in series to power loads as long as you need to.

Battery-pack coupler

Battery-communications output jack

Battery-communications input jack

"Replace Battery" LED

In-line battery-pack cables and coupler

Battery-communications cable

A completely assembled Matrix-UPS system with four battery packs and full battery communication.
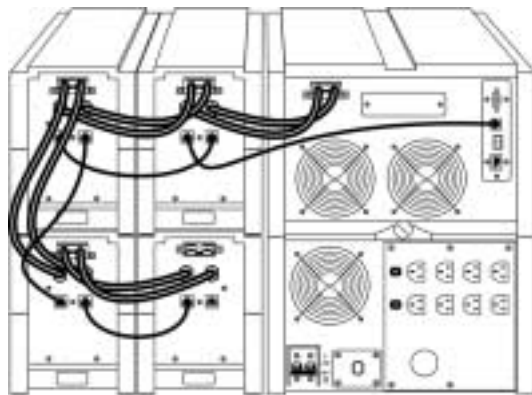
Technically Speaking

- If it ever becomes necessary to replace any component of the Matrix-UPS, you can temporarily switch the unit to "bypass mode." While it is in this mode, the Matrix-UPS powers the attached loads directly through its Isolation Module (but the loads are *not* protected from utility-power problems or blackouts). The Matrix-UPS automatically switches to bypass mode when it senses any of a number of failures, including fan blockage, overheating, or charger or relay problems; it alerts users to this condition with visual and audible alarms and messages sent out the computer-interface port.

- When its batteries have been almost completely discharged, the Matrix-UPS will automatically switch to "sleep mode": It will blank its displays and stop providing power to its outlets in order to conserve its remaining energy. You can "awaken" it by pressing any of its front-panel pushbuttons.

- Speaking of the front panel, this versatile little display/control is the main "nerve center" of the Matrix-UPS. When left to itself, the unit displays default information screens. But you can have it display selections from any of five menus:
  – *Control* (UPS on/off/bypass options);
  – *Status* (figures for input and output voltage, load, run time, battery capacity, etc.),
  – *Diagnostics* (reports ranging from firmware-revision level to cause of latest transfer to battery);
  – *Setup* (preferences for input-power sensitivity, transfer, alarms, etc.); and
  – *Tests* (alarm, battery-readiness, and run-time calibration tests).

- If you need to be able to immediately kill power to your loads from a central location for safety reasons, the Matrix-UPS has an Emergency Power Off (EPO) interface compatible with the closure-type kill-switch circuitry found in many computer rooms and laboratories.

- For serial communication with, and UPS monitoring from, a remote location, the Matrix-UPS features a DE9 (often called "DB9") female computer-interface port. Although this connector is similar to the serial ports on IBM PC compatible computers, and carries EIA RS-232 voltage levels, the signals are not RS-232 signals. Interface kits are available, on a quote basis, for connecting the Matrix-UPS to computers running a wide variety of network operating systems, including Microsoft® Windows® NT, Novell® NetWare®, Banyan® VINES®, Artisoft® LANtastic®, and IBM® LAN Manager® and OS/400®.

- For virtually complete power protection, APC's PowerChute® *plus* software adds UPS monitoring, as a background process, to many operating systems, including NetWare® (Black Box product code LSU780V-AE), UNIX® (LSU781V-AE), Windows® 95 (LSU782V-AE), Windows® NT (LSU783V-AE), and HP-UX® (LSU784V-AE). (Versions for some other platforms are available as special quotes.)

- The Matrix-UPS even has an award-winning "accessory bay" called SmartSlot that accommodates any one of a variety of special-quote, special-purpose accessory cards, including an SNMP adapter, a modem-control card, or an environment monitor, among others. Call for details.

The complete package:

- The main unit.
- One (SPU560AE, SPU561AE) or two (SPU562AE, SPU563AE) battery packs
- A users' manual.

Additional equipment you might need:

- Extra battery packs.
- Also available are many other optional items that you might require for your application, such as: PowerChute® *plus* software; SmartSlot accessory cards; or kits and cables for the computer and EPO interfaces (see **Technically Speaking** at left). These other, special items are actually listed on a reply card that ships with new units in their boxes; simply select what you need and return the card!

Specifications

Input:

Nominal Input Voltage — Single-phase 240 VAC

Input-Voltage Range for On-Line Operation — –25 to +15% of nominal

Nominal Input Frequency — 50/60 Hz (auto-sensing)

Input-Frequency Range for On-Line Operation — 57 to 63 Hz

On-Line Efficiency at Full Load — With fully charged batteries: Greater than 93%

On-Line Thermal Dissipation — SPU560AE, SPU561AE: 540 BTUs per hour; SPU562AE, SPU563AE: 900 BTUs per hour

Maximum Input Current (Input Circuit Breaker) — SP560A, SP561A: 20 Amps; SP562A, SP563A: 30 Amps

Transfer:

Transfer to/from Battery — Instantaneous with typical loads, 1.5 ms maximum; occurs in sync with utility-voltage phase

Transfer to/from Bypass — Typically instantaneous; occurs in sync with utility-voltage phase

Output:

Nominal Output Voltage — 240 VAC on all outlets

Output-Voltage Regulation — On-line: Either ±5% of nominal or –12 to +5% of nominal, user-selectable; On-battery: ±5%

On-Battery Output-Voltage Distortion — Less than 5% total harmonic distortion

Nominal Output Frequency — 50 Hz

Output-Frequency Regulation — On-line: 47 to 53 Hz, synchronized to utility; On-battery: 49.94 to 50.06 Hz unless synchronized to utility frequency during utility-power brownout

Load Capacity — SPU560AE, SPU561AE: 3000 VA (2250 watts at 0.75 power factor); SPU562AE, SPU563AE: 5000 VA (3750 watts at 0.75 power factor)

Overload Capacity— On-line: Will handle steady-state overloads of up to 125% of rated maximum load for at least 1 minute; On-battery: Will not handle steady-state overload, but can handle transient overloads of up to 150% of rated maximum load for at least 1 second

Load Power-Factor Range — 0.5 to 1.0

Maximum Crest Factor — 5

Protection — Overcurrent and short-circuit protected; latching shutdown on overload

Noise and Surge Isolation:

Isolation Type — Galvanic, output neutral bonded to ground

UL TVSS Rating — 300 Volts

EMI/RFI Filtering (Attenuation) from 100 kHz to 30 MHz — Normal mode: 60 to 80 dB; Common mode: 80 to 100 dB

Peak Let-Through Voltage — Measured as a percentage of applied ±6-kV IEEE 587 (ANSI C62.41) Category A or B ringwave test: Normal mode: < 0.7%; Common mode: < 1%

Clamping Response — Less than 5 ns

Batteries:

Battery Type — Spill-proof, maintenance-free sealed lead-acid

Nominal Battery-Pack Voltage — 48 VDC

Typical Battery Life — 3 to 6 years depending on the number of discharge cycles and ambient temperature

Replacement Method — Hand-plugging; hot-swappable by users

Packs Supplied with Base Unit — SPU560AE, SPU561AE: One; SPU562AE, SPU563AE: Two

Expandability — Unlimited

Physical:

User Controls — Front-mounted on Electronics Module: Three-pushbutton control panel featuring UPS Control, Status, Diagnostics, Setup, and Tests menus; Rear-mounted on Electronics Module: (1) Rocker switch for manual bypass; Remote control through computer-interface port or optional accessories; Remote shutdown through EPO jack; Rear-mounted on Isolation Module: (1) Input circuit-breaker reset switch; (2) Circuit-breaker reset switch for IEC320 C13 outlets; Inside Isolation Module: (1) Two-position tap bar for input-voltage selection

Diagnostics — Diagnostic information and tests available through control panel

Indicators — Front-mounted on Electronics Module: Control panel with backlit 2 x 16 LCD display; Front-mounted on each SmartCell: (1) Replace Battery LED; Audible on-battery and low-battery alerts

Other Connectors — Rear-mounted on Electronics Module: (1) DE9 ("DB9") male computer-interface port; (1) RJ-11 female battery-communications jack; (1) 6-position modular jack with offset latch for Emergency Power Off port; (1) Battery-pack coupler; (1) SmartSlot® accessory bay (covered with panel when shipped);

Other Connectors (cont'd) — Rear-mounted on each Smartcell: (1) Battery-pack coupler; (2) Battery-communication jacks (one input, one output)

Audible Noise — Less than 55 dBA at 1 m

Maximum Altitude — Operating: 3048 m; Storage: 15240 m

Temperature Tolerance — Operating: 0 to 40° C; Storage: –15 to 45° C ;

Humidity Tolerance — 0 to 95% noncondensing

Enclosure — High-impact plastic

Size — Mated Electronics Module and Isolation Module: 45.2 x 35.1 x 45.2 cm (17.8"H x 13.8"W x 17.8"D); SmartCell (SPU560AE, SPU562AE): 23.1 x 17.5 x 45.2 cm (9.1"H x 6.9"W x 17.8"D); SmartCell XR (SPU561AE, SPU563AE): 45.2 x 35.1 x 45.2 cm (17.8"H x 13.8"W x 17.8"D)

Weight — Electronics Module only (add 3.6 kg for shipping independently of Iso. Unit): SPU560AE, SPU561AE: 18.1 kg; SPU562AE, SPU563AE: 20.4 kg; Mated Electronics Module and Isolation Module: SPU560AE, SPU561AE: 65.8 kg; SPU562AE, SPU563AE: 79.8 kg; SmartCell (SPU560AE, SPU562AE): 29 kg; add 2.4 kg for shipping independently of UPS; SmartCell XR (SPU561AE, SPU563AE): 137.3 kg; add 15.9 kg for shipping independently of UPS; Total shipping weight: SPU560AE: 110.7 kg for both Modules, one SmartCell, and packaging; SPU561AE: Approx. 220.5 kg for both Modules, one SmartCell XRW, and packaging; SPU562AE: 156 kg for both Modules, two SmartCells, and packaging; SPU563AE: Approx. 388.6 kg for both Modules, two SmartCells XRW, and packaging

SmartCells (SPU560AE, SPU562AE)

Number of packs		1	2	3	4	5	6	7	8
Recharge time[1, 2, 3]		1.2	2.8	2.7	3.8	4.9	6	7	8.1
Run Time[1, 4] with Given Load	250 VA[5]	3	7.2	11.5	15.9	20.2	24.6	29	33.3
	500 VA[5]	1.4	3.5	5.8	8.2	10.6	13.1	15.5	18
	500 VA[5]	—	3	5	7.2	9.3	11.5	13.7	15.9
	1000 VA	0.57	1.4	2.4	3.5	4.5	5.8	7	8.2
	1500 VA	0.33	0.83	1.4	2.1	2.8	3.5	4.2	4.9
	2000 VA	0.22	0.57	0.99	1.4	1.9	2.4	2.9	3.5
	2500 VA	0.17	0.46	0.78	1.1	1.5	1.9	2.4	2.9
	3000 VA[5]	0.13	0.36	0.62	0.92	1.2	1.5	1.9	2.3
	3000 VA[6]	—	0.39	0.67	1	1.3	1.7	2	2.4
	4000 VA[6]	—	0.24	0.42	0.62	0.83	1	1.3	1.5
	5000 VA[6]	—	0.17	0.31	0.46	0.62	0.78	0.98	1.1

SmartCells XR (SPU561AE, SPU563AE)

Number of packs		1	2	3	4	5	6	7	8
Recharge time[1, 2]		3.8	8.1	12.5	16.9	21.3	25.7	30.1	34.5
Run Time[1, 4] with Given Load	1000 VA	3	6.7	10.7	14.7	18.7	22.7	26.7	30.7
	1500 VA	1.8	4.3	6.9	9.5	12.1	14.7	17.3	19.9
	2000 VA	1.2	3	5	7	9	11	13	15
	2500 VA	0.9	2.4	4	5.6	7.2	8.8	10.4	12
	3000 VA	0.75	1.8	3.2	4.7	6.1	7.6	9	10.5
	4000 VA[7]	—	1.2	2.2	3.2	4.2	5.2	6.2	7.2
	5000 VA[7]	—	0.9	1.6	2.4	3.2	4	4.8	5.6

[1]All times are measured in hours.　　[2]Recharge to 90% capacity after discharge into 50% of full rated load.

[3]When a Matrix-UPS detects the presence of one or two SmartCells, it recharges at 500 watts; when it detects three or more SmartCells, it recharges at 1000 watts.

[4]Run times are typical at 25° C　　[5]Applies to SPU560AE only.

[6]Applies to SPU562AE only.　　[7]Applies to SPU563AE only.

Ordering Information

PRODUCT NAME	APC PART REFERENCE	BLACK BOX ORDER CODE
Matrix-UPS® 3000	MX3000W	SPU560AE
Matrix-UPS® 3000 XRW (Extended Run)	MX3000XRW	SPU561AE
Matrix-UPS® 5000	MX5000W	SPU562AE
Matrix-UPS® 5000 XRW (Extended Run)	MX5000XRW	SPU563AE
Extra Battery Pack	SMARTCELL	SMU100AE
Extra Battery Pack XRW (Extended Run)	SMARTCELLXRW	SMU101AE