APC™

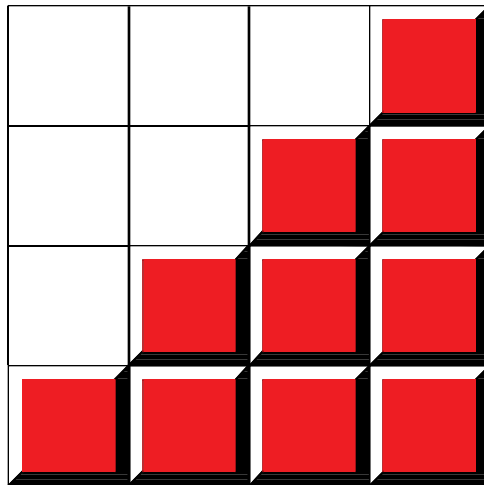## AMERICAN POWER CONVERSION

SmartCell™ XR

Extended Run Battery Pack for Matrix UPS™ systems

User's Manual

▦ *Important safety instructions!*

Please read this manual!
Veuillez lire ce manuel!
Bitte lesen Sie dieses Anleitungshandbuch!
¡Se ruega leer este manual de instrucciones!

This manual provides safety, installation, and operating instructions to help you get the fullest performance and service life from your SmartCell XR.

PLEASE SAVE THIS MANUAL! It includes important instructions for the safe use of this SmartCell XR and for obtaining factory service should the proper operation of the UPS come into question. Down the road, service or storage issues may arise and require reference to this manual.

CONSERVER CES INSTRUCTIONS! Cette notice contient des instructions importantes concernant la sécurité.

Table of Contents

1. Introduction

The Matrix UPS uninterruptible power source is a high-power, enhanced, line-interactive system designed to provide clean, reliable AC power to your computer, data handling, and telecommunications loads.

The Matrix UPS **XR Battery Pack** is a large Battery Pack module designed to be used with a Matrix UPS system to provide a significant increase in on-battery runtime for your protected equipment.

For complete information on the Matrix UPS system, refer to the Owner's Manual that came with your UPS.

Note: *If you are installing your Matrix UPS system for the first time, be sure to read the Matrix UPS Owner's Manual first. Set up your UPS system before installing the XR battery Pack.*

2. Safety!

Caution!

CAUTION!

• Use the XR Battery Pack only with a UPS that is properly installed according to the UPS Owner's Manual and connected only to a two-pole, three-wire grounding mains receptacle. The receptacle must be connected to appropriate branch protection (fuse or circuit breaker). Connection to any other type of receptacle may result in a shock hazard and may violate local electrical codes.

• Avoid installing the XR Battery Pack in locations where there is water or excessive humidity.

• Do not allow water or any foreign object to get inside the XR Battery Pack. Do not put objects containing liquid on or near the unit.

• To reduce the risk of overheating the XR Battery Pack, avoid exposing the unit to the direct rays of the sun. Avoid installing the unit near heat emitting appliances such as a room heater or stove.

• Do not move the XR battery Pack with its batteries installed. Doing so may result in damage to the Battery Pack and/or a shock hazard.

• Install only factory-authorized batteries in the XR Battery Pack. Improper batteries may result in a hazardous chemical spill and/or a shock hazard.

3. Presentation

3.1 XR battery Pack front

Front view   **Front view (panel removed)**
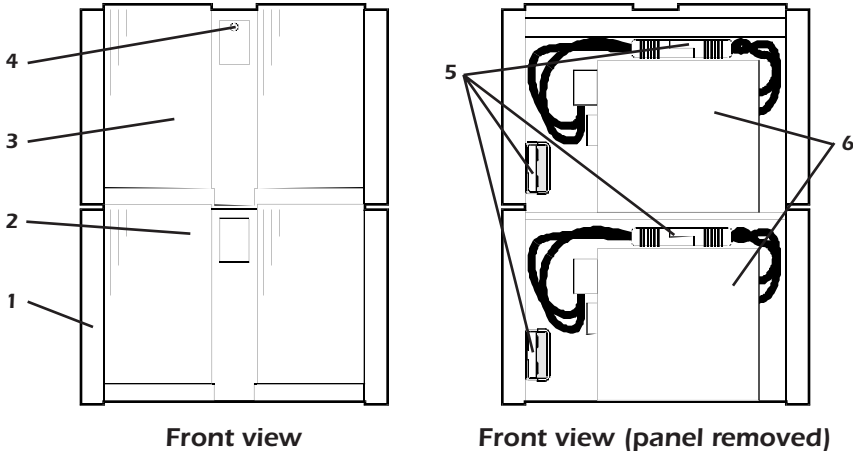
1. XR battery Pack
The XR Battery Pack contains the four user-replaceable, sealed lead-acid batteries, and monitoring electronics that report the Pack's status to the UPS. The internal electronics are shut down when the battery communications cable is not connected to the UPS, or when the UPS is not running.

2. Front panel/Battery door
The front panel of the Battery Pack provides access for battery installation and replacement. Refer to Section 5 when installing or replacing batteries.

3. Battery door fastener cover
This panel is removable for access to the battery door fasteners (see Sec. 5).

4. Replace Battery indicator
This indicator lights when the XR Battery Pack can no longer sustain a charge. Refer to Section 9 if this indicator is lit.

5. Battery internal coupler
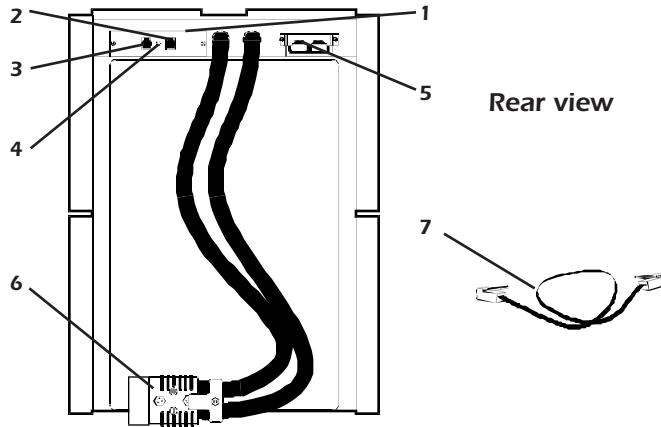These four couplers connect the XR Battery Pack's replaceable internal batteries. See Section 5.

6. Batteries
The Battery Pack contains four nominal 12 Vdc sealed lead-acid batteries.
Use only factory-authorized batteries in the XR Battery pack!

3. Presentation

3.2 XR battery Pack back

Rear view

1. Electronics module
The Processor Module contains the Battery Pack's electronics, and is removable for upgrades or replacement (see Sec. 6).

2. Input battery communications jack
This connector accepts battery status signals from the Output of another Battery Pack in the system. No connection is made to this jack in a single-battery application.

3. Output battery communications jack
The Battery Pack sends status signals to the UPS or to the Input of another Battery Pack (in a multiple Battery Pack application) from this connector.

4. Reset button
This button resets the Battery Pack. The battery Pack must be reset after batteries are installed or replaced.

5. Battery Pack panel coupler
Additional XR or standard Battery Packs are connected to this coupler. Refer to Section 4.5 for information on making connections with this coupler.

6. In-line Battery Pack coupler
This coupler connects the Battery Pack to the UPS or to the panel coupler on another Battery Pack.

7. Battery communications cable
Each battery Pack is supplied with a battery communications cable.

4. Installation

4.1 Receiving inspection

When you remove the XR Battery Pack from its shipping container, inspect it for damage that may have occurred in transit. Immediately notify the carrier and place of purchase if any damage is found. The packing materials are made from recyclable materials and should be saved for reuse or disposed of properly.
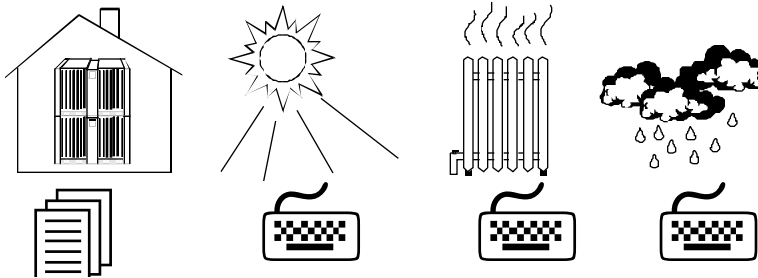
4.2 Moving the XR Battery Pack

The XR Battery Pack and its batteries are quite heavy and should be moved on the original shipping palette using a fork-type hand truck, or separately on a hand truck. *Never move the Battery Pack while its batteries are installed!*

Warning: *Do not move the XR Battery Pack with its internal batteries in-stalled! Doing so could result in severe physical damage to the Battery Pack and cause a shock hazard.*

4.3 Placement

The XR Battery Pack may be installed in any protected environment that is suitable for the UPS. Refer to the Owner's Manual that came with the UPS.

Locate the XR Battery Pack in a location convenient to the UPS. Leave enough room in front of and behind the unit for servicing. Leave at least XX cm (1 ft) clearance behind the XR Battery Pack. Leave enough clearance in front that you can comfortably access the battery compartment.

Caution: *Do not stack multiple XR Battery packs on top of each other or on top of other components of the UPS system. Damage to the unit could result.*

You may stack as many as two standard (non-XR) Battery Packs on the XR Battery Pack.

4. Installation

4.4 Installing the batteries

The XR Battery Pack is shipped with its batteries removed. You must follow the procedures in Section 5 to install the four batteries before you can use your Battery Pack. *Use only factory-authorized batteries in the Battery Pack!*

Warning: *Use only factory-authorized* **sealed** *batteries in the Battery Pack. Use of unsealed batteries may result in a hazardous chemical spill.*

Move the Battery Pack to the desired operating location before installing the batteries (see Sec. 4.3). *Do not move the Battery Pack with the batteries installed!*

To install the batteries, refer to Section 5 before proceeding with the module interconnections in Section 4.5.

4.5 Module interconnections

After you have positioned the Battery Pack and installed the batteries, you can connect the Battery Pack to the UPS or to other Battery Packs in the system. Refer to the following instructions to properly install the battery pack couplers and communications cables.

Remove clamp   **Connect couplers**   **Secure clamp**
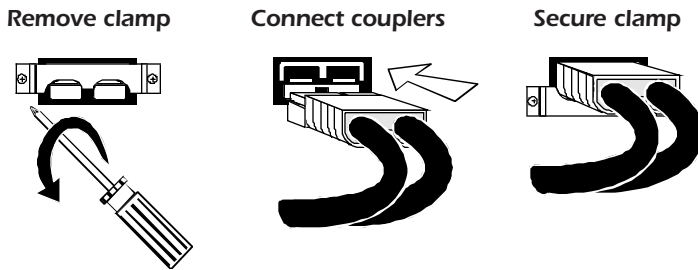
4.5.1 Use a phillips screwdriver to remove the battery pack coupler clamps from the UPS Electronics Unit (EU) and from all but the last Battery Pack.

4.5.2 Connect the blue battery pack couplers as shown. *Do not attempt to connect the blue battery pack couplers with the yellow battery couplers inside the XR Battery Pack.*

4.5.4 Fasten the battery pack coupler clamp to secure the couplers in place.

Repeat for any additional Battery Packs.

4.5.5 Next, plug one end of the battery communications cable into the OUTPUT jack on the rear of the Battery Pack.

4. Installation

4.5 Module interconnections (continued)

4.5.6 Plug the other end of the cable into either the UPS's BATT COMM input jack, or into the INPUT jack of another Battery Pack.

OUTPUT
(BATT COMM OUT)   INPUT
(BATT COMM IN)
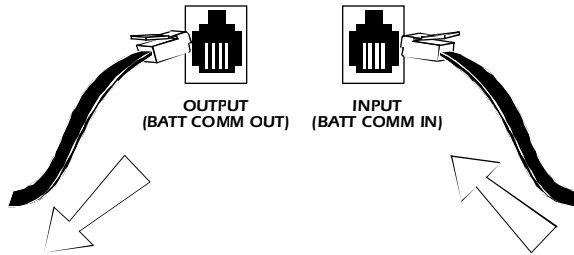
4.5.7 Installation the Battery Pack is complete. Refer to the UPS's Owner's Manual for information on starting up the system.
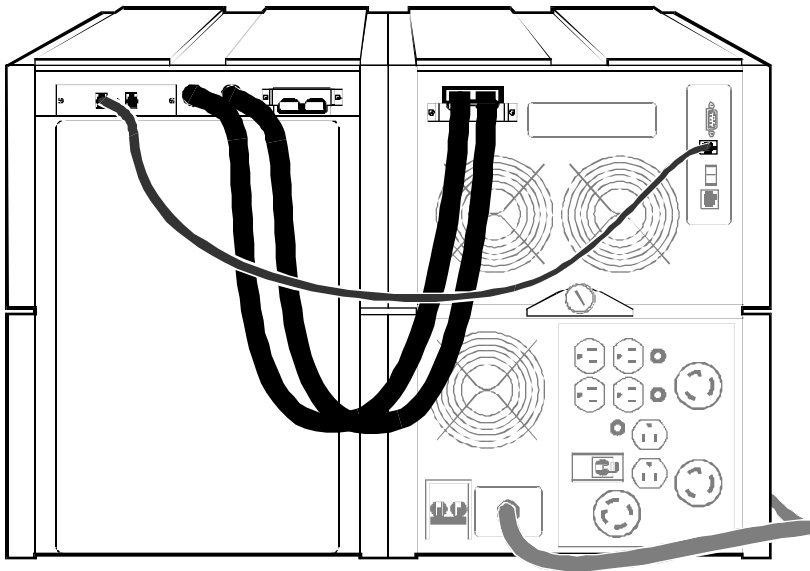
**Typical installation showing battery pack coupler and
battery communications connections to the UPS.**

5. Installing and replacing batteries

The XR Battery Pack features user-replaceable batteries. Please read the warnings in Section 5.1 before performing the procedure in Section 5.2.

5.1 Warning

- Only personnel familiar with the dangers of batteries and the required precautions should perform or supervise battery replacement. Keep unauthorized personnel away from batteries. Replace batteries with the same number and type of sealed lead acid batteries as originally installed in your XR Battery Pack.

- Use only factory-authorized batteries in the Battery Pack.

- Use only spill-proof, sealed batteries. Using unsealed batteries may cause a hazardous chemical spill

- **CAUTION**—Do not dispose of batteries in a fire. The batteries may explode.

- **CAUTION**—Do not open or mutilate batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.

- **CAUTION**—A battery can present a risk of electrical shock and high short circuit current. When replacing batteries, remove wrist watches and jewelry such as rings. Use tools with insulated handles.

- **The batteries in this UPS are recyclable. Dispose of the batteries properly. The batteries contain lead and pose a hazard to the environment and human health if not disposed of properly. Refer to local codes for proper disposal requirements or return the battery to a factory authorized Service Center.**

5. Installing and replacing batteries

## 5.2 Battery installation and replacement procedure

The XR Battery Pack features user installable batteries. Please read the warnings in Section 5.1 before performing the installation of the batteries. Failure to follow the proper installation can result in damage to the equipment.

Warning

Only personnel familiar with the dangers of batteries and the required precautions should perform or supervise battery installations. Keep unauthorized personnel away from batteries.

Installing batteries

The XR Battery Pack has been shipped with its batteries removed. To install the batteries, follow the procedure outlined below.
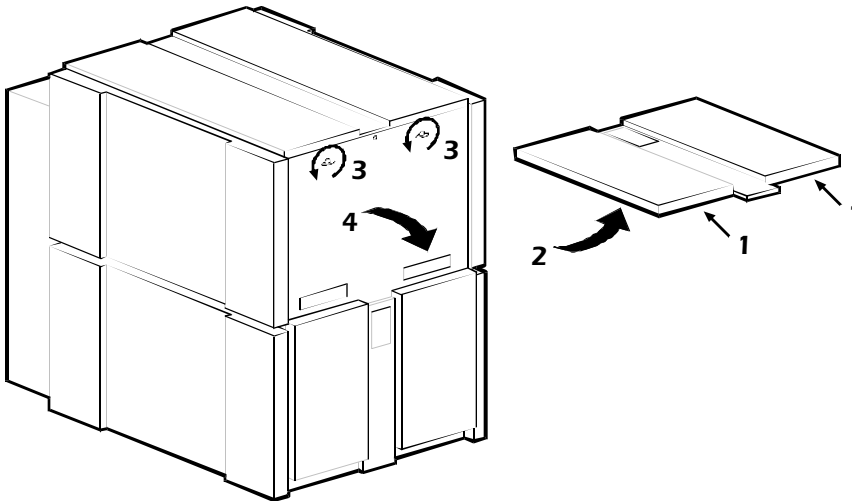
1. Grasp the lower edge of the plastic battery door fastener cover and pull the cover off with gentle, firm pressure.

2. Turn the battery door fasteners counterclockwise with your fingers to loosen them.

3. Tilt the battery door/front panel forward, then lift it away from the cabinet.

5. Installing and replacing batteries

5.2 Battery installation and replacement procedure (continued)
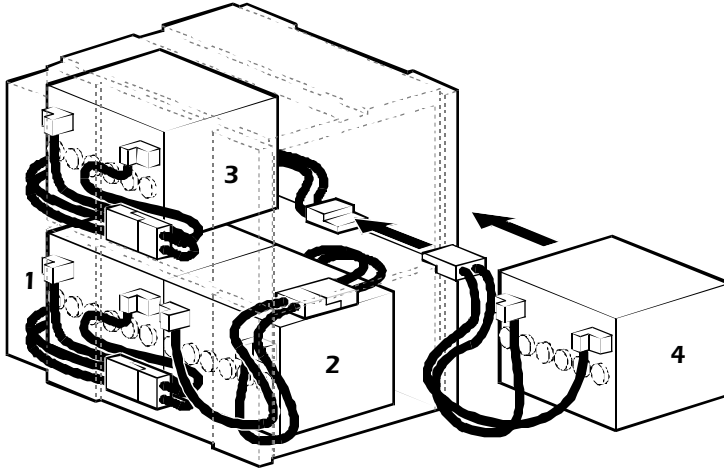
4. Position batteries on their side, terminals up and to the left of the cabinet. Note the yellow couplers (4) located inside the cabinet, one for each battery.

5. Begin with the lower pair by selecting a battery and, using firm pressure, sliding the battery all the way to the rear of the cabinet.

6. Connect the battery's coupler to the matching coupler located on the cabinet wall. **Warning! Do not connect the couplers mounted to the cabinet together.**

7. Select the second battery and move it into place. With firm pressure, slide it into the cabinet until it makes contact with the first battery.

8. Connect the second battery's coupler to the free hanging coupler and route the battery cable over the top of the battery. **Warning! Do not connect the batteries together.**

9. Check mounting position of the upper battery tray to verify proper installation.

10. Repeat steps 5 through 8 for the upper battery pair.

11. Refer to section 5.3 for **Test Instructions** before closing the XR cabinet.

12. Replace the battery door and tighten the fasteners by turning them clockwise.

5. Installing and replacing batteries

13. Replace the plastic battery door fastener cover.

14. Connect the XR Battery Pack's blue DC coupler to a Matrix or another battery pack.

15. Connect the XR Battery Pack's Communication cable to a Matrix or another battery pack.

16. Verify with the Matrix's Control Panel that the Matrix recognizes all of the batteries connected to the system and that the battery voltage status is within those described in Table I of the Test Procedure.

5.3 Installing and Replacing Batteries: Test Instructions

Before coupling the XR Battery Pack to a Matrix or another battery pack, a test must be performed to insure the batteries have been properly installed within the XR cabinet. A DC voltmeter is required to perform this simple test. **Warning! Do not install the XR Battery Pack until this test procedure has been performed.**

1. Locate the blue coupler at the end of the DC power bus cable.

2. Measure the DC voltage across the two conductors in the coupler. **Warning! Care must be taken not to short circuit the coupler with the test leads.**

3. Refer to the following table for the status of the XR Battery Pack:

Table I

Battery Pack Voltage	Battery Pack Status
45.0 Vdc - 57.0 Vdc	Ready to Install
0.0 Vdc - 44.9 Vdc	Miswired or Bad Battery

4. When the Battery Pack Status is "Ready to Install," complete the final steps of the installation. If the Battery Pack Status is "Miswired or Bad Battery," disconnect the internal battery connections. **Do not connect the XR Battery Pack to any other equipment.** Review the Installation and Test Procedures and if necesssary contact APC's Technical Support for additional help with the installation and troubleshooting. When calls are placed to the

Technical Support Line please have the following information ready when the representative answers:

1. The XR Battery Pack's serial number.

2. The battery pack voltage measured at the blue coupler.

3. Each of the individual battery voltages.

## 5.4 Resetting the Replace Battery indicator

Whenever you replace the batteries in the XR Battery Pack, the Replace Battery indicator remains lit until you reset it by following the procedure outlined below.

5.4.1 After you replace the batteries, disconnect the battery communications cable from the OUTPUT jack on the rear of the Battery Pack.

5.4.2 Use a pointed object such as a ballpoint pen to press *and hold* the reset button on the rear panel.

5.4.3 While pressing the reset button, reconnect the battery communications cable to the OUTPUT jack.

**5.4.4** Release the reset button. The Replace Battery indicator on the front of the Battery Pack will go out.

OUTPUT
(BATT COMM OUT)

Reset
button
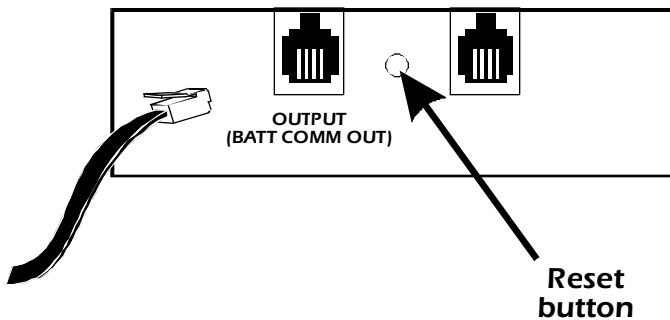
6. Replacing the processor module

The XR Battery Pack has a user-replaceable Processor Module that contains the monitoring and communications electronics for the Battery Pack. If you should need to replace this module because of a product upgrade or damage to the unit, follow the instructions below.

6.1 Disconnect any battery communications cables from the Battery Pack.

6.2 Use a phillips screwdriver to remove the two screws holding the Processor Module in place.

6.3 Pull the Processor Module gently out of its bay to expose the module connector.

6.4 Disconnect the module connector to separate the Processor Module from the Battery Pack.

6.5 Connect the module connector of the new Processor Module to the Battery Pack's module connector.

6.6 Slide the new Processor Module into the bay.

6.7 Insert and tighten the two screws to secure the Processor Module in place
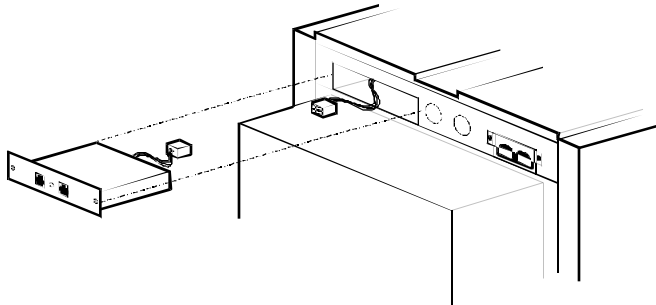
7. Storing the Battery Pack

The Battery Pack should be stored covered and with its batteries in a fully-charged state (reports 100% capacity to the UPS).

In extended storage, use the UPS to refresh the Battery Pack every six months in environments where the temperature is –15 to +30 °C (+5 to +86 °F). Refresh the Battery Pack every three months in environments where the temperature is +30 to +45 °C (+86 to +113 °F).

8. Difficulty

8.1 Battery life

You can expect to receive three to six years of service from the Battery Pack's batteries. When the batteries can no longer sustain a charge, the front-panel Replace Battery indicator lights. The UPS's display also shows the message "Battery packs need replacement." Refer to Section 5 to replace the batteries.

8.2 Troubleshooting

Problem	Possible cause	Solution
Battery Pack's Replace Battery indicator is lit	Batteries need to be replaced	Replace batteries. Refer to Section 5.
	2. XR Battery Pack was not reset after battery replacement	2. Reset the Replace Battery indicator. Refer to Section 5.3.
UPS display reports "No battery communications"	1. One or more Battery Pack communications cables are not connected properly.	Check the battery communications connections to and from each Battery Pack and the EU. See Section 4.3
	2. Processor Module may be malfunctioning.	Test the Battery Pack as the only Pack connected to the EU. If the condition persists, replace the Processor Module (see Section 6).
Other problems occur.		Refer to the Difficulty section of the Owner's Manual that came with your UPS.

9. Specifications

9.1 Battery

Battery type: Four spill-proof, maintenance-free, sealed lead-acid.

Nominal battery pack voltage: 48 Vdc (4 × 12 Vdc batteries).

Typical battery life: 3 to 6 years, depending on environment and use.

Recharge time: See table on following page.

9.2 Environment

Operating temperature: 0 to +40 °C (+32 to +104°F).

Storage temperature: −15 to +45 °C (+5 to +113 °F).

Operating and storage relative humidity: 0 to 95%, non-condensing.

Operating elevation: 0 to 3,000 m (10,000 ft).

Storage elevation: 0 to 15,000 m (50,000 ft).

9.3 Physical

Size (H´W´D):   45.2 × 35.1 × 45.2 cm (17.8 × 13.8 × 17.8 in.).

XR Battery Pack weight: 137.3 kg (302.0 lbs).

Total Shipping weight: 153.2 kg (337.0 lbs).

9. Specifications

9.4 Runtime versus load

	Number of XR Battery Packs							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Recharge time*	3.8	8.1	12.5	16.9	21.3	25.7	30.1	34.5
Computer load								
1000 VA	3.0	6.75	10.75	14.75	18.75	22.75	26.75	30.75
1500 VA	1.8	4.3	6.9	9.5	12.1	14.7	17.3	19.9
2000 VA	1.2	3.0	5.0	7.0	9.0	11.0	13.0	15.0
2500 VA	0.9	2.4	4.0	5.6	7.2	8.8	10.4	12.0
3000 VA	0.75	1.8	3.25	4.7	6.15	7.6	9.05	10.5
4000 VA	0.53	1.25	2.25	3.25	4.25	5.25	6.25	7.25
5000 VA	0.37	0.9	1.6	2.4	3.2	4.0	4.8	5.6

All times are in hours. Run times are typical at 25 °C (77 °F). Figures apply to both 3000 VA and 5000 VA UPSs.

*Recharge to 90% capacity after discharge into 50% of rated full load.

▦ *Limited Warranty*

American Power Conversion (APC) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from APC or an APC service center. Products must be returned to APC or an APC service center with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment which has been damaged by accident, negligence, or mis-application or has been altered or modified in any way. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL APC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

▦ *Life Support Policy*

As a general policy, American Power Conversion (APC) does not recommend the use of any of its products in life support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. APC does not recommend the use of any of its products in direct patient care. APC will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to APC that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of American Power Conversion is adequately protected under the circumstances.

Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as "critical" by the U.S. FDA.

Hospital grade wiring devices and leakage current may be ordered as options on many APC UPS systems. APC does not claim that units with this modification are certified or listed as Hospital Grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

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AMERICAN POWER CONVERSION

Toll free technical support:

United States and Canada
1-800-800-4272
Ireland
1-800-702000
U. K.
0800-132990

In areas without toll free numbers, call:
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+353 91 702020 (Ireland)

Return shipment addresses:

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West Kingston, Rhode Island 02892
USA

American Power Conversion Corporation
(A. P. C.) b. v.
Ballybritt Business Park
Galway
Ireland

Please note: Before calling customer service, please have available your unit's serial number (see label at the rear of the unit).

Serial Number: _____

990-7503-A   Revision 2 Revised 2/95