HP Uninterruptible Power System
R3000 XR Models
User Guide

Part Number 192131-003
August 2002 (Third Edition)

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About This Guide

This guide provides information for operation, configuration, battery maintenance, and troubleshooting for the UPS.

Intended Audience

This guide is intended for individuals requiring information about the use of UPSs. No installation or service procedure should be carried out by someone other than a technician with specific experience with high-voltage equipment.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To prevent injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To prevent personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

WARNING: To prevent personal injury or damage to the equipment, verify that:

- **The leveling feet are extended to the floor.**
- **The full weight of the rack rests on the leveling feet.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together if it is a multiple-rack installation.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Text Conventions

This document uses the following conventions:

- *Italic type* is used for complete titles of published guides or variables. Variables include information that varies in system output, in command lines, and in command parameters in text.
- **Bold type** is used for emphasis, for onscreen interface components (window titles, menu names and selections, button and icon names, and so on), and for keyboard keys.
- `Monospace typeface` is used for command lines, code examples, screen displays, error messages, and user input.
- Sans serif typeface is used for uniform resource locators (URLs).

Related Documents

For additional information on the topics covered in this guide, refer to the following documents:

- *HP Uninterruptible Power System R3000 XR Models Installation Instructions*
- *HP UPS R3000 XR Models Extended Runtime Module Installation Instructions*
- *HP UPS XR Products Power Cord and Options Reference Guide*
- *Industry Standard Terminology Glossary*

Getting Help

If you have a problem and have exhausted the information in this guide, further information and other help is available in the following locations.

HP Technical Support

For telephone numbers of worldwide Technical Support Centers, go to www.hp.com.

Have the following information available before you call:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Power management software type and version

HP Website

For information on this product as well as the latest drivers, firmware, and service packs, go to www.hp.com.

HP Authorized Reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

To comment on this guide, send an email to `ServerDocumentation@hp.com`.

1

Overview

This chapter contains a general overview of the UPS, including power management software, available hardware options, and warranties. Read this chapter to become familiar with the features of the UPS.

UPS Features

The following features make the UPS versatile and easy to use:

- Industry-leading 2U design
- Modular design for reduced downtime and ease of battery replacement
- Communications port for data exchange with the host computer
- Support for power management software
- Support for hardware option cards
- Support for extended runtime modules (ERMs)
- Support for power distribution units (PDUs)
- Support for Remote Emergency Power Off (REPO)
- Power protection for loads up to 3000 VA/2700 W
- Load segment control

Communications Port

The UPS includes a communications port for data exchange with the host computer.

CAUTION: Use only the specific cable supplied with the UPS to connect the communications port to the host computer.

Overcurrent Protection

Certain models feature overcurrent protection provided through resettable circuit protectors located on the UPS rear panel.

HP UPS R3000 XR Models

The UPS models include the following.

Table 1-1: UPS R3000 XR Models

UPS Model	Part Number	Series Number	Comments
R3000 XR-NA	192186-001	EO3007	Domestic, low-voltage, rack-mountable UPS with non-detachable NEMA L5-30 plug
R3000 XR-JPN	192186-291	EO3007j	Japanese, low-voltage, rack-mountable UPS with non-detachable NEMA L5-30 plug
R3000h XR-NA	192186-002	EO3007h	Domestic, high-voltage, rack-mountable UPS with non-detachable NEMA L6-20 plug
R3000h XR-JPN	192186-292	EO3007h	Japanese, high-voltage rack-mountable UPS with non-detachable NEMA L6-20 plug
R3000e XR-INT	192186-B31	EO3007i	International, high-voltage, rack-mountable UPS with detachable country-specific plug
R3000i XR-EURO	192186-B32	EO3007e	International, high-voltage, rack-mountable UPS with non-detachable IEC-309 plug
R3000i XR-SCHUKO	192186-B33	EO3007e	International, high-voltage, rack-mountable UPS with non-detachable CEE 7/7 SCHUKO plug
R3000i XR-SA	192186-AR1	EO3007e	International, high-voltage, rack-mountable UPS with non-detachable BS-546 plug

Front Panel

The front panel of the UPS is shown in Figure 1-1.

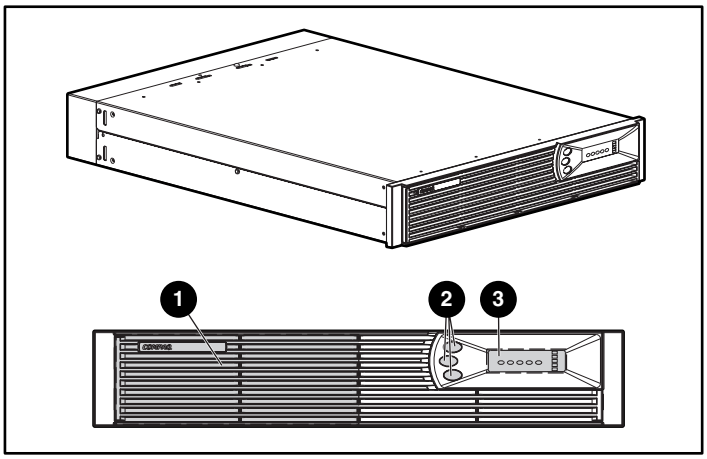

Figure 1-1: Front panel configuration

1 Battery compartment

2 Control buttons

3 LED display

For detailed information on using the control buttons and LED indicators, refer to the section, "Front Panel Controls and LED Indicators," in Chapter 2.

Rear Panels

The rear panels of the UPS models are shown in Figure 1-2 through Figure 1-7.

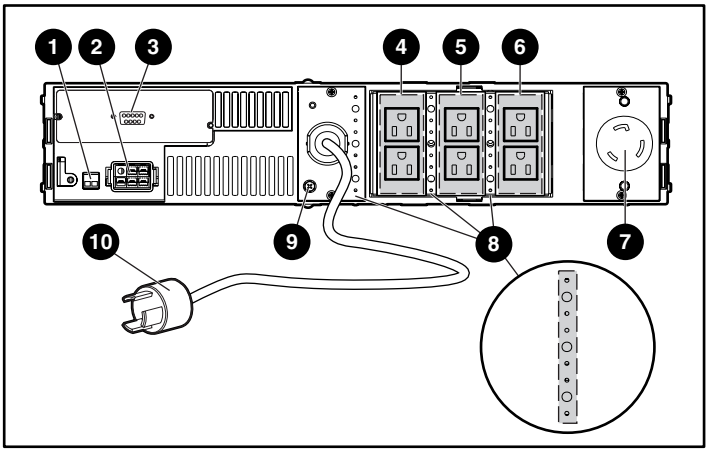

Figure 1-2: Rear panel of R3000 XR-NA and R3000 XR-JPN

1 REPO port
2 ERM connector
3 Communications port/option slot
4 Load segment 1 (two NEMA 5-15 receptacles)
5 Load segment 2 (two NEMA 5-15 receptacles)
6 Load segment 3 (two NEMA 5-15 receptacles)
7 Load segment circuit protectors
8 PDU output (L5-30) receptacle (load segment 1)
9 Cord retention clip attachment locations
10 Ground bonding screw

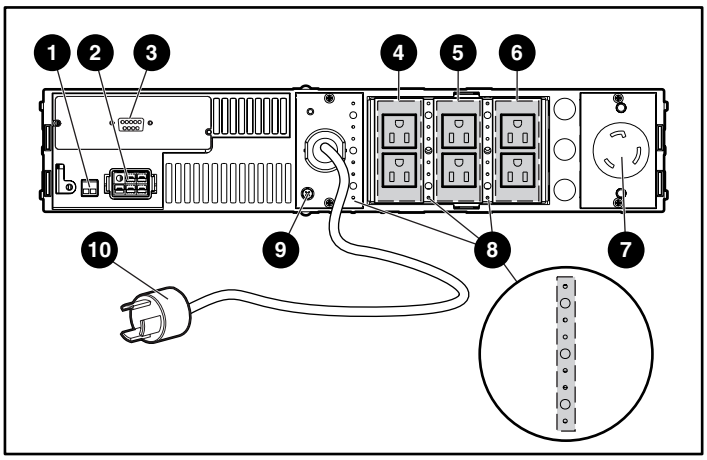

Figure 1-3: Rear panel of R3000h XR-NA and R3000h XR-JPN

1 REPO port

2 ERM connector

3 Communications port/option slot

4 Load segment 1 (three IEC-320-C13 receptacles)

5 Load segment 2 (three IEC-320-C13 receptacles)

6 Load segment 3 (three IEC-320-C13 receptacles)

7 PDU output (L6-20) receptacle (load segment 1)

8 Cord retention clip attachment locations

9 Ground bonding screw

10 Power cord with L6-20 plug

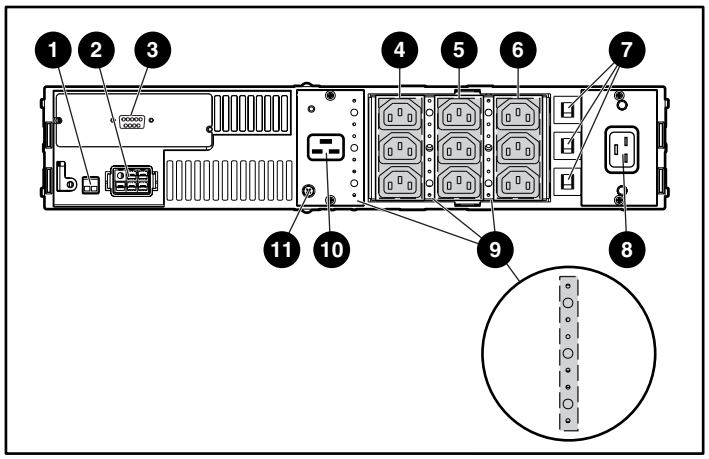

Figure 1-4: Rear panel of R3000e XR-INT

1 REPO port
2 ERM connector
3 Communications port/option slot
4 Load segment 1 (three IEC-320-C13 receptacles)
5 Load segment 2 (three IEC-320-C13 receptacles)
6 Load segment 3 (three IEC-320-C13 receptacles)
7 Load segment circuit protectors
8 PDU output (IEC-320-C20) receptacle (load segment 1)
9 Cord retention clip attachment locations
10 Input power receptacle (IEC-320-C19) for country-specific plug attachment
11 Ground bonding screw

WARNING: To prevent personal injury from electric shock, do not install this model where the total earth (ground) conductor leakage current for all connected devices exceeds 3.5 mA. If the total earth (ground) conductor leakage current exceeds 3.5 mA, use the UPS R3000i XR-EURO, R3000i XR-SCHUKO, or R3000i XR-SA model.

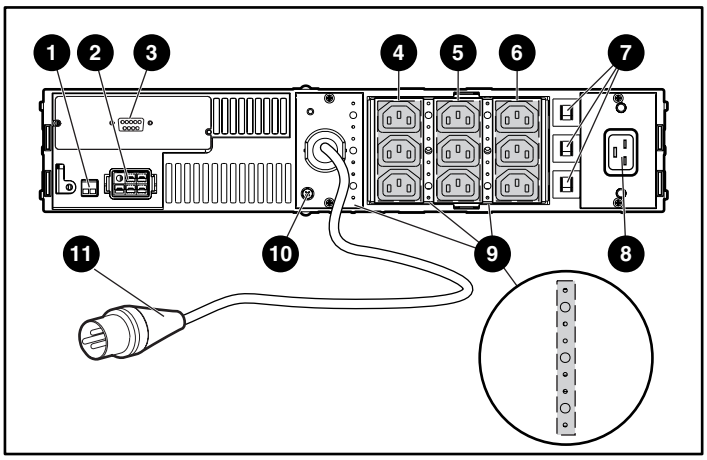

Figure 1-5: Rear panel of R3000i XR-EURO

1 REPO port
2 ERM connector
3 Communications port/option slot
4 Load segment 1 (three IEC-320-C13 receptacles)
5 Load segment 2 (three IEC-320-C13 receptacles)
6 Load segment 3 (three IEC-320-C13 receptacles)
7 Load segment circuit protectors
8 PDU output (IEC-320-C20) receptacle (load segment 1)
9 Cord retention clip attachment locations
10 Ground bonding screw
11 Power cord with IEC-309 plug

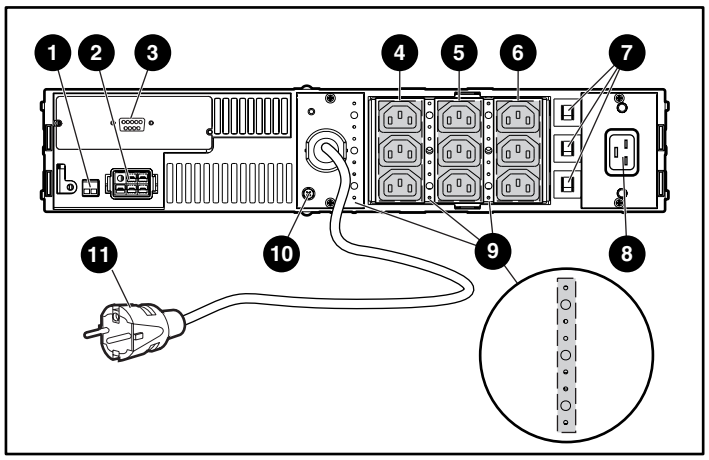

Figure 1-6: Rear panel of R3000i XR-SCHUKO

1 REPO port

2 ERM connector

3 Communications port/option slot

4 Load segment 1 (three IEC-320-C13 receptacles)

5 Load segment 2 (three IEC-320-C13 receptacles)

6 Load segment 3 (three IEC-320-C13 receptacles)

7 Load segment circuit protectors

8 PDU output (IEC-320-C20) receptacle (load segment 1)

9 Cord retention clip attachment locations

10 Ground bonding screw

11 Power cord with CEE 7/7 SCHUKO plug

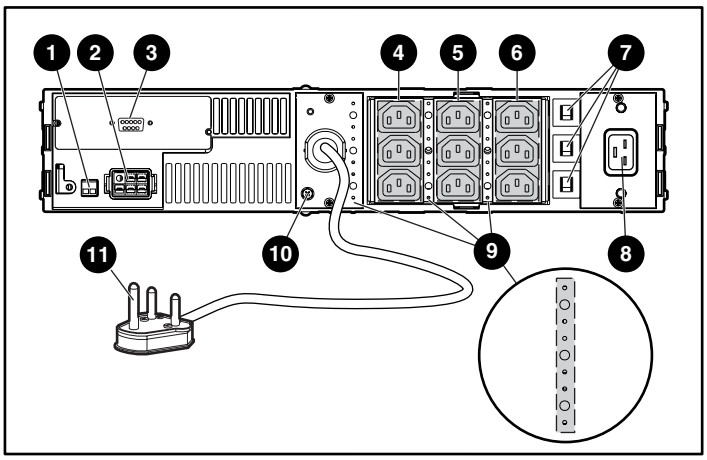

Figure 1-7: Rear panel of R3000i XR-SA

1 REPO port
2 ERM connector
3 Communications port/option slot
4 Load segment 1 (three IEC-320-C13 receptacles)
5 Load segment 2 (three IEC-320-C13 receptacles)
6 Load segment 3 (three IEC-320-C13 receptacles)
7 Load segment circuit protectors
8 PDU output (IEC-320-C20) receptacle (load segment 1)
9 Cord retention clip attachment locations
10 Ground bonding screw
11 Input power receptacle with BS-546 power cord

Power Management Software

Power management software ensures maximum power reliability of computer systems through comprehensive control of UPSs. Specifically, power management software performs the following:

IMPORTANT: Not all UPSs are equipped to support the entire feature set listed.

- Manages a graceful shutdown of attached equipment during utility power failures
- Manages independent UPS load segments to provide separate power control of connected equipment
- Prioritizes the timing of equipment shutdowns, and reboots connected equipment by load segment
- Shuts down and reboots any UPS and attached equipment based on a user-specified schedule
- Delays restart by load segment after a power outage to sequence the startup of system components
- Customizes alert generation with modifiable pop-up dialog boxes, command execution, and email and broadcast messages
- Monitors the status of the UPS and performs UPS diagnostics
- Displays a power log for analysis

For more information, refer to the power management CD provided with the UPS. For the most current information, refer to www.hp.com.

UPS Hardware Options

Table 1-2 lists the available hardware options for this UPS.

Table 1-2: Hardware Options

Option	Part Number
HP ERM	192188-B21
HP Six Port Card	192185-B21
HP SNMP/Serial Port Card	192189-B21
Note: For a list of supported PDUs, go to www.hp.com.	

For more information on the supported hardware options, refer to the *HP UPS XR Products Power Cord and Options Reference Guide* included on the Power Products Documentation CD and on www.hp.com.

Remote Emergency Power Off Port

The UPS includes an isolated REPO port. When properly wired, the REPO feature allows the power at the UPS output receptacles to be switched off from a remote location. To use this feature, the REPO port must be connected to a remote, normally open switch (not supplied). When this switch is closed, the UPS immediately disconnects power from its loads. The REPO switch is used in conjunction with a main disconnect device that removes the AC source from the input of the UPS. To power down the entire network in the event of an emergency, the REPO ports of multiple UPS units can be connected to a single switch.

IMPORTANT:

- The REPO port meets the requirements of NFPA Articles 645-10 and 645-11 for a Disconnecting Means.
- If the remote switch is closed, the REPO feature immediately powers down protected devices and does not utilize the orderly shutdown procedure initiated by power management software.
- The REPO feature shuts down UPS units operating under either utility or battery power.
- If the UPS was operating on battery power when the remote switch was closed, no power is available to the devices until utility power is restored and the UPS has been manually powered up.
- To restore power to the load after the REPO feature is activated, press the On button after the AC source is reconnected to the UPS.
- Pressing and holding the On button **without** utility present normally initiates a battery start and the UPS assumes the load. However, if the On button is pressed and a REPO is detected, battery start is inhibited and the UPS is not able to assume the load. The electronic module fans spin and the Alarm LED and an audible alarm are active as long as the On button is held.

Warranties

To back up the wide range of features offered with the UPS, a three-year limited warranty is provided.

$25,000 Computer Load Protection Guarantee

In addition to the limited warranty, a $25,000 Computer Load Protection Guarantee (provided by the original equipment manufacturer) is offered.

IMPORTANT: The $25,000 Computer Load Protection Guarantee is offered only in North America.

The $25,000 Computer Load Protection Guarantee only applies if:

- The UPS is plugged into a suitably grounded and wired outlet using no extension cords, adapters, other ground wires, or other electrical connections.
- The UPS installation complies with all applicable electrical and safety codes specified by the National Electrical Code (NEC).
- The UPS is used under normal operating conditions and users comply with all instructions and labels.
- The UPS is not damaged by accident (other than a utility power transient), misuse, or abuse.

Pre-Failure Battery Warranty

For specific information on the battery warranty, refer to the section, “Pre-Failure Battery Warranty,” in Chapter 4.

2

Operation

This chapter contains information on operating the UPS. Topics include the front panel controls, LED indicators, and modes of operation. Knowledge of these features is helpful when configuring and troubleshooting the unit.

NOTE: For installation considerations and procedures, refer to the instructions included with the UPS. Copies of this document can be downloaded from www.hp.com.

Front Panel Controls and LED Indicators

The front panel controls and LED indicators provide an easy-to-use interface for UPS configuration and monitoring.

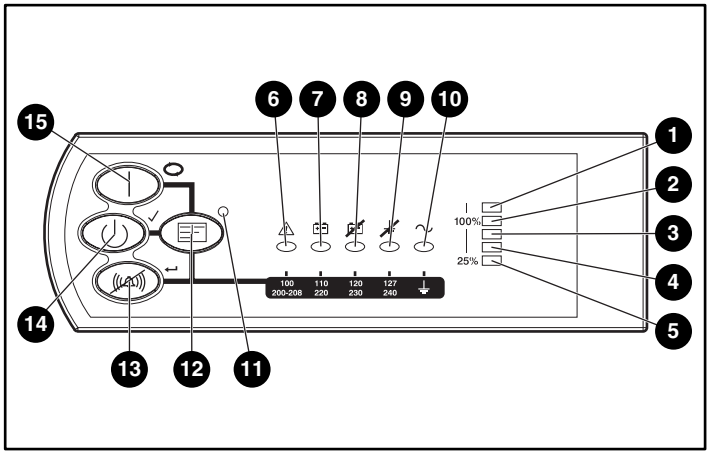

Figure 2-1: Front panel controls and LED indicators

Item	Description	Meaning/Function
1	Overload LED	Red—UPS load exceeds maximum power available.
2	76% to 100% load	Green—UPS load is approximately 76% to 100% of maximum power.
3	51% to 75% load	Green—UPS load is approximately 51% to 75% of maximum power.
4	26% to 50% load	Green—UPS load is approximately 26% to 50% of maximum power.
5	0% to 25% load	Green—UPS load is approximately 0% to 25% of maximum power.
6	General Alarm ⚠	Red—UPS detected a general alarm. Perform a self-test.

continued

continued

Item	Description	Meaning/Function
7	On Battery	Red—UPS is running on battery power.
8	Bad Battery/Low Battery	Red—Battery is bad or low. The UPS batteries may need to be replaced in 30 to 60 days.
9	Site Wiring Fault Indicator	Red—No ground connection exists between utility power and UPS, the line and neutral connections between utility power and UPS are reversed, or UPS voltage configuration is incorrect.
10	Utility LED	Red—Unit is in Auto-Bypass mode.
		Flashing Red—Utility input voltage is outside the ±12% configured nominal range.
		Green—Utility voltage is present and output is on or utility voltage has returned to the voltage range that was configured (UPS is supplying utility power and audible alarm should be reset).
		Flashing Green—Utility voltage is present, and output is off. UPS is in Standby mode. Batteries charge if needed.
11	Configure Mode On LED	Green—UPS is in Configure mode (seen when front bezel is removed).
12	Configure button	Places UPS in Configure mode (seen when front bezel is removed).
13	Test/Alarm Reset button	Resets alarms or initiates self-test.
14	Standby button	Places UPS in Standby mode (turns output load segments off).
15	On button	Starts UPS powering the load.

Modes of Operation

The UPS has four modes of operation:

- **Standby Mode**
  - — No power is available at the UPS output receptacles.
  - — The UPS charges the batteries as necessary.
- **Operate Mode**
  - — Power is available at the UPS output receptacles.
  - — The UPS charges the batteries as necessary.
- **Configure Mode**
  - — Power is available at the UPS output receptacles.
  - — The UPS charges the batteries as necessary.
  - — The UPS configuration can be updated.

- **Auto-Bypass Mode**
  - — The power to the UPS reaches a percentage greater than 110 percent for 10 cycles or 103 percent for 30 seconds.
  - — The UPS power module fails or is removed.

Charging the Batteries

When the UPS is in Standby mode, allow the batteries to charge before putting the UPS into service.

IMPORTANT: The batteries charge to:

- 80 percent of their capacity within 3 hours
- 100 percent of their capacity within 24 hours

Charge the batteries for at least 24 hours before supplying backup power to devices.

Placing the UPS in Operate Mode

The UPS can be placed in Operate mode if either of the following conditions apply:

- The UPS is powered up and in Standby mode (the Utility LED is flashing green).
- The UPS is powered down and no utility power is available.

Press and hold the On button (1) until the Utility LED (2) turns solid green, indicating that power is available at the UPS output receptacles. The UPS acknowledges compliance with a short beep.

IMPORTANT: If the UPS is using battery power (no utility power present), press and hold the On button (1) until the audible alarm sounds.

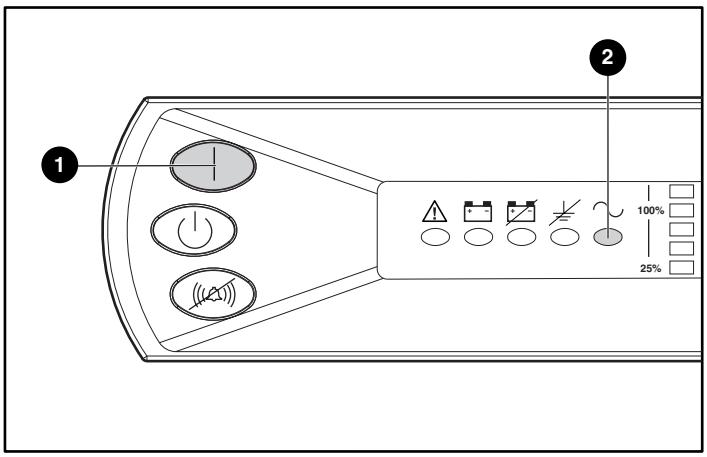

Figure 2-2: Placing the UPS in Operate Mode

Returning to Standby Mode

When the UPS is in Operate mode (the Utility LED is solid green), press and hold the Standby button (1) until the audible alarm sounds. The Utility LED (2) flashes, and power to the load ceases.

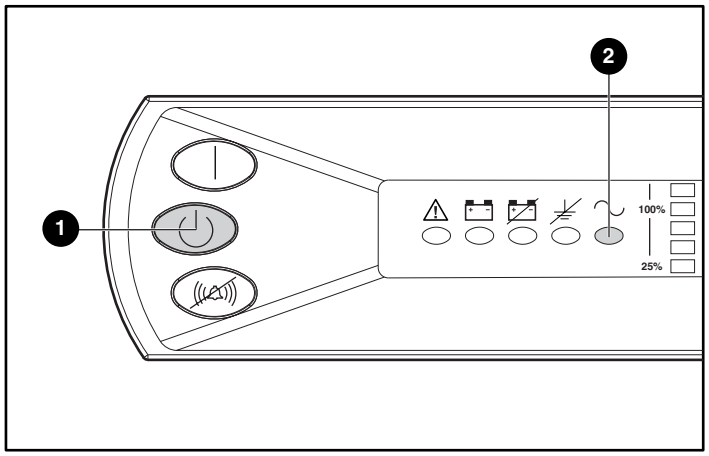

Figure 2-3: Placing the UPS in Standby mode

IMPORTANT:

- While in Standby mode, the UPS maintains the charge on the batteries, but no power is available at the output receptacles.
- The UPS remains in Standby mode until an alternate mode is selected or until utility power is removed.

Initiating a Self-Test

To initiate a self-test, press and hold the Test/Alarm Reset button (1) for three seconds.

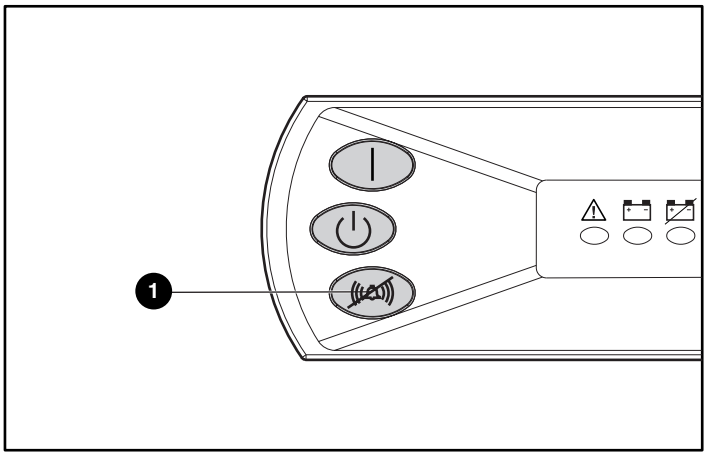

Figure 2-4: The Test/Alarm Reset button

Because a portion of the self-test requires battery power, the self-test cannot be initiated if the batteries are less than 90 percent charged. If the UPS detects a problem, the appropriate LED illuminates and an audible alarm may sound.

WARNING: To prevent electric shock from earth (ground) conductor leakage current, use the self-test procedure to check the UPS batteries (rather than unplugging the UPS).

- For the meaning of individual LEDs, refer to the section, “Front Panel Controls and LED Indicators,” in this chapter.
- For information on what to do if the self-test detects a problem, refer to the section, “Alarm Troubleshooting,” in Chapter 5.

Audible Alarm

The UPS sounds an audible alarm to warn of a problem. For information on what to do if the UPS detects an alarm condition, refer to Chapter 5, "Troubleshooting."

IMPORTANT: Certain audible alarms can be disabled. For more information, refer to Chapter 5, "Troubleshooting."

Table 2-1: Audible Alarm Conditions

Alarm	Condition	Audible Alarm	Can be disabled?
General Alarm	Activated on ambient over-temperature, REPO, fan failure, heatsink over-temperature, self-test failure, charger failure, or any other transient condition.	On—Steady	Yes
Site Wiring Fault Indicator	Earth (ground) connection is lost.	On—5 second beep	Yes
UPS on Auto-Bypass	Load unprotected; UPS transferred to Auto-Bypass due to inverter problems or general alarm.	On—5 second beep	Yes
Normal	Operating from utility.	No audible alarm	N/A
UPS on Battery	Operating from battery.	On—5 second beep	Yes
Battery Problem	Battery disconnected. Low battery.	On—5 second beep On—5 second beep	Yes No

Silencing an Audible Alarm

To silence an alarm, press the Test/Alarm Reset button (1).

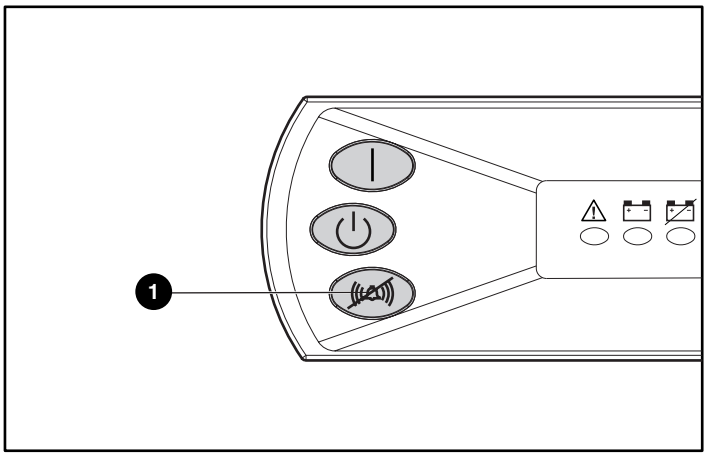

Figure 2-5: Test/Alarm Reset button

IMPORTANT:

- Although an audible alarm silences, the condition that caused the alarm may still exist. For information on what to do if the UPS detects an alarm condition, refer to Chapter 5, “Troubleshooting.”
- If a utility power failure caused the alarm (Utility LED or General Alarm LED illuminates red), the alarm will be silenced after utility power is restored.

Shutting Down the System

To shut down the system:

1. Shut down all load devices.
2. Press the Standby button to take the UPS out of Operate mode. Power to the load receptacles ceases.
3. Disconnect the UPS from utility power.
4. Wait at least 60 seconds while the UPS internal circuitry discharges.

3

Configuration

This chapter contains information on configuring the UPS. Proper configuration of the UPS is important in performing other functions on the unit, such as maintaining the battery and troubleshooting alarms.

Placing the UPS in Configure Mode

The UPS can enter Configure mode while in Operate or Standby mode. To place the UPS in Configure mode:

1. Remove the UPS front bezel by snapping it off (1).

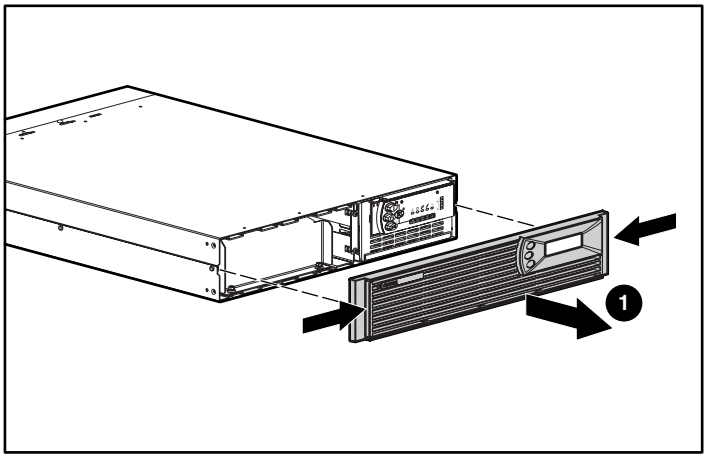

Figure 3-1: Removing the UPS front bezel

2. Press and hold the Configure button (1) for three seconds. When the button is released, the front panel configuration parameters flash in unison and the Configure Mode On LED (2) illuminates solid green.

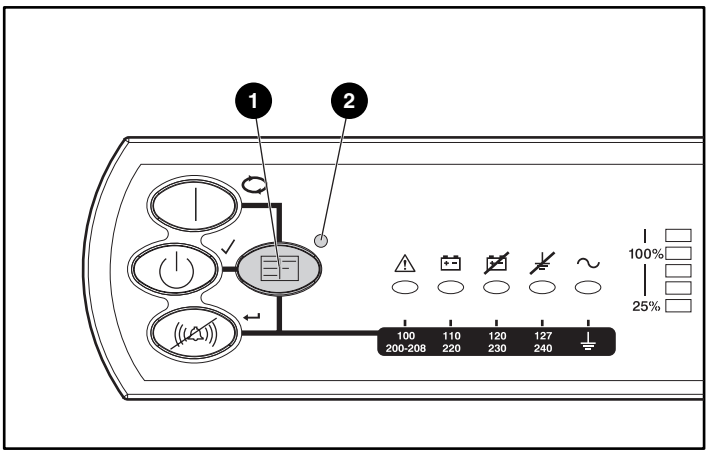

Figure 3-2: Placing the UPS in Configure mode

Configuration Parameters

In Configure mode, the front panel LED display changes function to allow UPS monitoring. The LED button controls allow modification of the UPS configuration parameters. The configuration parameters are defined in Table 3-1. Available voltage settings per model are listed in Table 3-2.

Table 3-1: Configuration Parameters/LED Indicators

Parameter (LED)	Parameter Name	Explanation (when illuminated)
General Alarm ⚠	100/200-208 Nom	Nominal utility voltage level is 100/200-208 VAC.
On Battery	110/220 Nom	Nominal utility voltage level is 110/220 VAC.
Bad Battery/Low Battery	120/230 Nom	Nominal utility voltage level is 120/230 VAC.
Site Wiring Fault Indicator	127/240 Nom	Nominal utility voltage level is 127/240 VAC.
Utility LED ∼	Wiring Fault	Audible alarm is enabled if ground is missing, or if line and neutral connections are reversed. (This option is not available on the R3000j XR-JPN, R3000h XR-NA, and R3000h XR-JPN models.)

Note: For units factory-configured for 200 V or 208 V, the Site Wiring Fault function has been disabled. If reconfiguring a 230 V to operate at 208 V, the Site Wiring Fault function must be manually disabled.

Table 3-2: Available Voltage Settings

UPS Model	Available Settings Utility Voltage (VAC)	Parameter (LED)
R3000 XR-NA	100	General Alarm ⚠
	110	On Battery
	120 (default)	Bad Battery/Low Battery
	127	Site Wiring Fault Indicator
R3000 XR-JPN	100 (default)	General Alarm ⚠
	110	On Battery
	120	Bad Battery/Low Battery
	127	Site Wiring Fault Indicator
R3000h XR-NA, R3000h XR-JPN	200/208 (default)	General Alarm ⚠
	220	On Battery
	230	Bad Battery/Low Battery
	240	Site Wiring Fault Indicator
R3000e XR-INT, R3000i XR-EURO, R3000i XR-SCHUKO, R3000i XR-SA	200/208	General Alarm ⚠
	220	On Battery
	230 (default)	Bad Battery/Low Battery
	240	Site Wiring Fault Indicator

Changing Configuration Parameters

To change configuration parameters:

1. Place the UPS in Configure mode by pressing and holding the Configure button until the Configure Mode On LED turns solid green.

   When the Configure button is released, the configurable LEDs flash and the configured LED illuminates.

2. To advance to the appropriate voltage configuration, press the On button. The selected voltage configuration LED flashes. Activate the voltage configuration by pressing the Standby button. The previously selected configuration parameter LED turns off and the selected LED is illuminated.

   NOTE: Only one nominal utility voltage can be configured. When setting voltage configuration parameters, selecting an On value for any one parameter automatically sets the other three possibilities to Off.

3. To toggle the Site Wiring Fault option from active to inactive, press the On button to advance to the Site Wiring Fault LED, then press the Standby button to disable.
4. To accept the configuration settings and exit Configure mode, press the Test/Alarm Reset button.

NOTE: If the unit remains idle for two minutes, Configure mode times out and the configuration settings are not stored.

4

Battery Maintenance

This chapter contains information for properly maintaining batteries for the UPS, including battery charging, replacement, disposal procedures, and warranties.

Precautions

WARNING: To prevent personal injury from the hazardous energy levels associated with UPS batteries, the maintenance and replacement of batteries must be carried out by an HP authorized service representative.

WARNING: The UPS contains a sealed lead-acid battery module. To prevent fire or chemical burns, take the following precautions:

- **Do not attempt to recharge batteries after removal from the UPS.**
- **Do not disassemble, crush, or puncture the batteries.**
- **Do not short the external contacts of the batteries.**
- **Do not immerse the batteries in water.**
- **Do not expose to temperatures higher than 60°C (140°F).**

WARNING: To prevent personal injury from hazardous energy, take these precautions:

- **Remove watches, rings, or other metal objects.**
- **Use tools with insulated handles.**

Charging Batteries

When connected to utility power, the UPS automatically charges the batteries. No user intervention is required while the UPS is in use. For information on keeping the batteries charged while the UPS is in extended storage, refer to the section, “Care and Storage of Batteries,” in this chapter.

Determining When to Replace Batteries

When the Bad Battery/Low Battery LED (1) illuminates red, batteries may need to be replaced within 30 to 60 days.

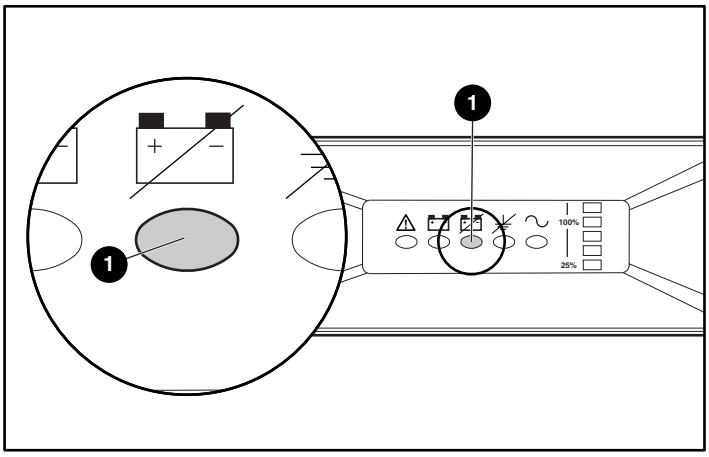

Figure 4-1: Bad Battery/Low Battery LED

When a battery alarm sounds, initiate a UPS battery self-test to verify that battery replacement is required. If the Bad Battery/Low Battery LED (1) remains red, replace the batteries as soon as possible.

For more information on initiating a self-test, refer to the section, “Initiating a Self-Test,” in Chapter 2.

Obtaining New Batteries

New batteries may be required within 30 to 60 days when the Bad Battery/Low Battery LED illuminates red. Obtain spare batteries for the UPS when this occurs.

Spare battery modules are supplied for this UPS. The UPS spare battery kit part number is 204503-001.

CAUTION: Because of the short shelf life of the battery, avoid storing a battery spare as a backup. Do not maintain an inventory of spare batteries onsite unless a procedure to keep these batteries charged while in storage is implemented.

Replacing Batteries

There are two options for replacing UPS batteries:

- Powering down the UPS before removing the batteries
- In certain circumstances, replacing the batteries without powering down the UPS

CAUTION: While replacing batteries without powering down the UPS, the UPS enters Auto-Bypass mode and is not protected in the event of a utility power failure.

Preparing the UPS

Batteries may be replaced without powering down the UPS if the UPS is not supplying battery power to devices (utility is present, indicating that the UPS is supplying utility power).

To replace batteries with the UPS powered down:

1. Shut down all load devices.
2. Press the Standby button to take the UPS out of Operate mode. Power to the load receptacles ceases.
3. Disconnect the UPS from utility power.
4. Wait at least 60 seconds while the UPS internal circuitry discharges.

Removing the Battery Module

WARNING: To prevent personal injury, prepare the area and observe all materials-handling procedures for removing the battery module, which weighs 19 kg (42 lb).

To remove the battery module:

1. Remove the front bezel (1) by pulling on both ends.

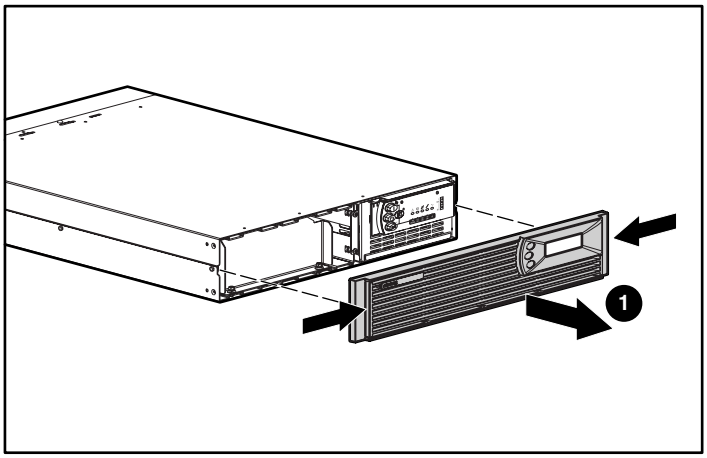

Figure 4-2: Removing the front bezel

2. Remove the two screws from the metal battery bracket (1) and remove the bracket (2).

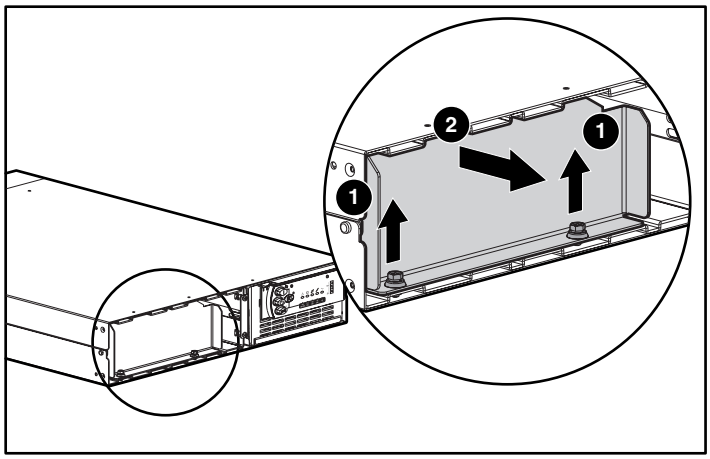

Figure 4-3: Removing the battery bracket

3. Remove the battery module.

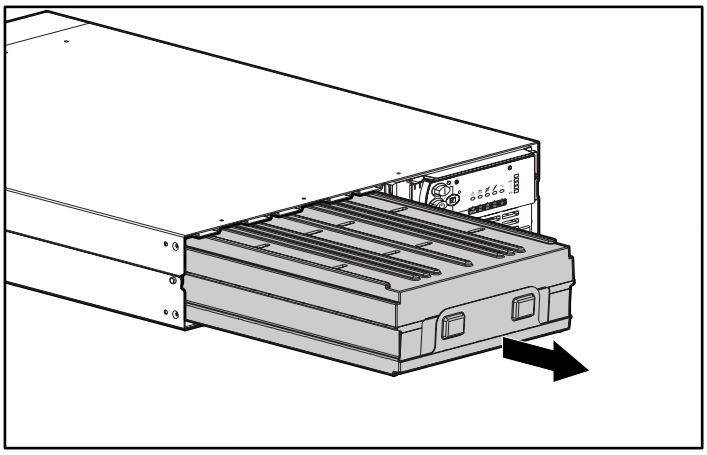

Figure 4-4: Removing the battery module

4. Set aside the used battery module for proper disposal. Refer to the section, "Disposing of Used Batteries," in this chapter.

Installing a New Battery Module

To install a new battery module, reverse the steps in "Removing the Battery Module" in this chapter.

Testing the New Battery Module

After installing the new battery module, press the Test/Alarm Reset button. For information on initiating a self-test, refer to the section, "Initiating a Self-Test," in Chapter 2.

IMPORTANT: The UPS does not execute a self-test until the batteries are 90 percent charged.

If the installation has been successful, the Bad Battery/Low Battery LED is not illuminated.

If the installation has not been successful, the Bad Battery/Low Battery LED illuminates red. If this occurs, repeat the procedures in "Replacing Batteries," and check the battery terminal connections. If the Bad Battery/Low Battery LED is still red, refer to Chapter 5, "Troubleshooting."

IMPORTANT: The batteries charge to 80 percent of their capacity within approximately three hours. Charge the batteries for 24 hours before using the UPS to supply backup power to devices. The load may not be fully protected for 48 hours.

Disposing of Used Batteries

The spare battery kit includes the instructions and packaging required to return used batteries to the appropriate location for disposal.

Do not dispose of used batteries with general office or household waste. Return the used module for proper disposal to either:

- HP, authorized HP Partners, or their agents
- A recycling center that meets all local environmental standards

Care and Storage of Batteries

To maximize the life of batteries:

- Minimize the amount of time the UPS uses battery power by matching the UPS configuration with utility voltage. For more information on configuring the nominal voltage, refer to Chapter 3, "Configuration."
- Keep the area around the UPS clean and dust-free. If the environment is very dusty, clean the outside of the UPS regularly with a vacuum cleaner.
- Maintain the ambient temperature at 25°C (77°F).
- If storing a UPS for an extended period, recharge the batteries every six months:
  a. Connect the UPS to utility power.
  b. Allow the UPS to remain in Standby mode.
  c. Allow the UPS to charge the batteries for 24 hours.
  d. Update the Battery Recharge Date label.

CAUTION: Because of the short shelf life of the battery, avoid storing a battery spare as a backup.

Pre-Failure Battery Warranty

The Pre-Failure Battery Warranty, standard on all UPS units, extends the advantage of a three-year limited warranty by applying it to the battery before it actually fails. Specifically, the Pre-Failure Battery Warranty ensures that when customers receive notification from power management software that the battery may fail, the battery is replaced free of charge under the warranty.

The highest standards in the industry are maintained, as evidenced by the Pre-Failure Battery Warranty. This warranty is beneficial in at least two significant ways:

- Reduced total cost of ownership
- Reduced downtime

A Pre-Failure Battery **warning** is given 30 days before a battery failure. The warning is indicated in one or both of the following ways:

- An LED showing the battery is low
- Notification from power management software

This warning provides ample time to order a spare battery. To order a spare, go to www.hp.com.

The battery warranty coverage is three years for parts. The warranty for the first year of ownership includes parts and labor. If battery spares are not available for a particular UPS model, then the entire UPS, including its battery, is replaced.

5

Troubleshooting

This chapter serves as a troubleshooting guide when problems occur with the UPS. Solutions for UPS problems that occur both during and after startup are covered.

Problems During Startup

If problems occur when starting the UPS, refer to Table 5-1 for possible causes and suggested actions.

Table 5-1: Troubleshooting Problems During UPS Startup

Symptom	Possible Cause	Suggested Action
UPS does not start.	There is no utility power, and the batteries are not charged.	Check the power at the utility power receptacle or contact a qualified electrician.
	The UPS power cord is disconnected.	Connect the power cord.
Site Wiring Fault LED ( ) is red.	The utility power receptacle is not grounded or there is no ground wire in the UPS power cord.	Contact a qualified electrician.
Bad Battery/Low Battery LED ( ) is flashing red.	Battery voltage is low because the UPS has been out-of-service for a long period of time.	Allow the UPS to charge the batteries for 24 hours. Initiate a self-test. If the LED does not turn off, replace the batteries.
	The battery test failed.	Allow the UPS to charge the batteries for 24 hours. Initiate a self-test. If the LED does not turn off, replace the batteries.
	The battery is disconnected.	Install the battery module. If the battery module is already installed, remove and re-insert.

Problems After Startup

If problems occur after starting the UPS, refer to Table 5-2 for possible causes and suggested actions.

Table 5-2: Troubleshooting Problems After UPS Startup

Symptom	Possible Cause	Suggested Action
Audible alarm sounds.	An alarm condition exists.	Identify the red LED associated with this alarm condition. Check this table to determine the cause of the alarm.
Utility LED (∿) and On Battery LED (▭) are flashing red.	The utility voltage is too high.	The utility voltage is higher than the UPS operating range. The UPS switches to battery power. If this happens repeatedly, update the configuration. Contact a qualified electrician to verify that the utility power is suitable for the UPS.
	The utility voltage is too low.	The utility voltage is lower than the UPS operating range. The UPS switches to battery power. If this happens repeatedly, update the configuration. Contact a qualified electrician to verify that the utility power is suitable for the UPS.
	The utility frequency is out of tolerance.	Contact a qualified electrician to verify that the utility power is suitable for the UPS.
Utility LED (∿) is flashing red.	The utility input voltage is outside ±12% nominal range.	If this happens repeatedly, check input voltage and reconfigure the unit. Contact a qualified electrician to verify that the utility power is suitable for the UPS.
Bad Battery/ Low Battery LED (▭) is flashing red.	The UPS detects a potential battery failure.	Allow batteries to charge for 24 hours, and initiate a self-test. If the LED is red, replace the batteries.
	New batteries are improperly connected.	Re-insert the battery module.

continued

Table 5-2: Troubleshooting Problems After UPS Startup *continued*

Symptom	Possible Cause	Suggested Action
Utility LED (⏦) is flashing green.	The utility power is within acceptable range, and output is off.	Press the On button.
UPS frequently switches between utility and battery power.	Utility power variations.	The utility voltage is frequently outside the UPS operating range. Update the configuration. Contact a qualified electrician to verify that the utility power is suitable for the UPS.
Overload LED is red.	The protected devices are exceeding the UPS power rating.	Remove one or more devices to reduce the power requirements.
	The UPS may switch from utility to battery power.	Verify that the devices are not defective.
On Battery LED (🔋) is flashing red.	Low battery voltage.	If the UPS is supplying battery power, save files and shut down the system. Allow the batteries to charge. If the UPS is supplying utility power, no action is required. Allow the batteries to charge.
Insufficient warning of low batteries.	Battery service is required.	Allow the batteries to charge for 24 hours, then initiate a self-test. If the LED is red, replace the batteries.
	Shutdown Delay configuration is inappropriate.	Update the Shutdown Delay from 5 seconds to 3 minutes. Use power management software to specify a suitable delay.
Utility LED (⏦) is solid red, General Alarm LED (⚠) is flashing red, there is an audible alarm and unit is in Auto-Bypass mode.	A potential for overload exists.	Reduce the load.
Utility LED (⏦) is flashing and unit is in Auto-Bypass mode.	Over-temperature condition may exist.	Verify that no blockage of airflow to the front bezel and rear panel exists.
	The power module may have failed.	Contact an HP authorized service representative.
All LEDs are flashing red and an audible alarm cannot be silenced.	An internal UPS fault condition exists.	Power down the UPS. Contact an HP authorized service representative.

Alarm Troubleshooting

Table 5-3 lists the possible alarms of the UPS. For each alarm listed in the table, an explanation of the cause is provided, as well as a recommended action to take to resolve the problem. For a detailed listing and location of each LED, refer to the section, "Front Panel Controls and LED Indicators," in Chapter 2.

Table 5-3: Alarm Troubleshooting

Alarm or Condition	Possible Cause	Recommended Action
The Utility LED (⏦) is not on, and the UPS does not start.	The power cord is not connected.	Check the power cord connections.
	The wall outlet is faulty.	Have a qualified electrician test and repair the outlet.
The Utility LED (⏦) is flashing, and power is not available at the UPS output receptacles.	The UPS is in Standby mode.	Press the On button to supply power to the connected equipment.
The UPS does not provide the expected backup time.	The batteries need charging or servicing.	Plug the UPS into a power outlet for 24 hours to charge the battery. After charging the battery, press and hold the Test/Alarm Reset button for 3 seconds, and check the On Battery LED (🔋). If the Bad Battery/Low Battery LED (🔋) is still on, the battery may need to be replaced.
The General Alarm LED (⚠) is red, and a continuous audible alarm sounds.	The self-test has failed.	Plug the UPS into a power outlet for at least 3 hours to charge the battery. After charging the battery, press and hold the Test/Alarm Reset button for 3 seconds, and check the Bad Battery/Low Battery LED (🔋). If the Bad Battery/Low Battery LED (🔋) is still on, contact an HP authorized service representative.
	The UPS internal temperature is too high.	The UPS switches to Bypass mode, allowing the UPS to cool. Turn off and unplug the UPS. Clear vents and remove any heat sources. Verify the airflow around the UPS is not restricted. Wait at least 5 minutes and restart the UPS. If the condition persists, contact an HP authorized service representative.

continued

Table 5-3: Alarm Troubleshooting *continued*

Alarm or Condition	Possible Cause	Recommended Action
The On Battery LED (🔋) is red, and there is an audible alarm every 5 seconds.	The UPS is on battery power.	The UPS is powering the connected equipment with battery power. Prepare your connected equipment for shutdown.
The On Battery LED (🔋) is flashing red, and there is an audible alarm every 5 seconds.	The battery is running low.	Prepare for a shutdown. Save files and turn off connected equipment. The alarm cannot be silenced.
The On Battery (🔋) and the Utility (∿) LEDs are flashing red, and there is an audible alarm every 5 seconds.	The UPS is running on battery power because the input voltage is either too high or too low.	Allow the UPS to continue to operate until the condition is corrected or the battery is completely discharged. If the condition persists, the input voltage may differ from the UPS nominal voltage.
	The utility line voltage and frequency are out of specification.	Have a qualified electrician check the wiring.
The Bad Battery/Low Battery LED (🔋) is flashing red, and there is an audible alarm every 5 seconds.	The battery may be fully discharged.	Plug the UPS into a power outlet for 24 hours to charge the battery. After charging the battery, press and hold the Test/Alarm Reset button for 3 seconds and check the Bad Battery/Low Battery LED (🔋). If the Bad Battery/Low Battery LED (🔋) is still on, the battery may need to be replaced.
	The battery is not connected properly.	Check the battery connections. Call an HP authorized service representative if the problem continues.
The Site Wiring Fault LED (⚡) is flashing red, and there is an audible alarm every 5 seconds.	The ground wire connection does not exist or the line and neutral wires are reversed in the wall outlet.	Have a qualified electrician correct the wiring.
The Utility LED (∿) is flashing red, and there is an audible alarm every 5 seconds.	Bypass is not available. Input voltage is not within ±12% of nominal or input frequency is not within ±3% of nominal.	The UPS is receiving utility power that may be unstable or in brownout conditions. The UPS continues to supply power to the connected equipment. If conditions worsen, the UPS may switch to battery power.

continued

Table 5-3: Alarm Troubleshooting *continued*

Alarm or Condition	Possible Cause	Recommended Action
The Utility LED (⏦) is red.	The UPS is in Bypass mode. The connected equipment is transferred to utility power. Battery mode is not available; however, the utility power continues to be passively filtered by the UPS.	Check for one of the following alarms: Over-temperature, Overload, UPS Failure, or Battery Service.
The Overload LED is red, and all load LEDs are green.	Power requirements exceed UPS capacity (103% to 110% for 30 seconds) or the load is defective.	Turn off and disconnect the UPS from the wall outlet. Remove some of the connected equipment from the UPS. Wait at least 5 seconds until all LEDs are off, and restart the UPS. A larger capacity UPS may be needed.
The General Alarm (⚠), On Battery (🔋), Bad Battery/Low Battery (🔋), Site Wiring Fault (⚡), and Utility (⏦) LEDs are flashing red, and there is a continuous alarm tone.	UPS fault condition.	Save all files and turn off all connected equipment. Turn off and disconnect the UPS from the wall outlet. Contact an HP authorized service representative. The alarm cannot be silenced.

Repairing the UPS

Repairs to the UPS must be carried out by HP or an HP authorized service representative. Other than battery replacement, there are no UPS user-serviceable parts.

A

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a series number. The series number can be found on the product nameplate label, along with the required approval markings and information. When requesting certification information for this product, always refer to this series number. This series number should not be confused with the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (that is, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. After the class of the device is determined, refer to the corresponding statement in the following sections.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult dealer or experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC Logo—United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

or call 1-800-652-6672[1].

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

or call (281) 514-3333.

To identify this product, refer to the part, series, or model number found on the product.

[1] For continuous quality improvement, calls may be recorded or monitored.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

- EN50091-1 – UPS Product Safety Requirements
- EN50091-2 – UPS EMC Requirements

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

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取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

China Taiwan Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Battery Replacement Notice

The UPS is provided with a sealed lead-acid battery module. There is a danger of explosion and risk of personal injury if the batteries are incorrectly replaced or mistreated. Replacement is to be done by an HP authorized service provider using the spare designated for the product. For more information about battery replacement or proper disposal, contact your HP authorized reseller or HP authorized service provider.

WARNING: The UPS contains a sealed lead-acid battery module. There is a risk of burns if the battery module is not handled properly. To prevent personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, or short external contacts, or dispose of in fire or water.**

Batteries, battery modules, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to your authorized HP Partners or their agents.

B

Electrostatic Discharge

To prevent damaging to the product, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your HP authorized reseller.

C

Specifications

This appendix provides the physical, input, and output specifications for the UPS. Topics also include battery descriptions, battery runtime estimates, and environmental requirements when operating the UPS.

Physical Specifications

Table C-1: Physical Specifications

Feature		Metric	U.S.
Dimensions	Width	440.7 mm	17.5 in
	Height	89 mm	3.5 in
	Depth	622 mm	25 in
Weight		37 kg	82 lb

Input Specifications

Table C-2: Input Specifications

UPS Model	Utility Voltage Frequency (Hz)	Default Settings Nominal Voltage (VAC)	Available Settings Utility Voltage (VAC)	Power Cord Supplied
R3000 XR-NA	50/60	120	100, 110 120, 127	Non-detachable power cord with NEMA L5-30 plug
R3000 XR-JPN	50/60	100	100, 110 120, 127	Non-detachable power cord with NEMA L5-30 plug
R3000h XR-NA	50/60	200/208[1]	200, 220 230, 240	Non-detachable power cord with NEMA L6-20 plug
R3000h XR-JPN	50/60	200/208[1]	200, 220 230, 240	Non-detachable power cord with NEMA L6-20 plug
R3000e XR-INT	50/60	230	200/208, 220, 230, 240	Detachable power cord with country-specific plug
R3000i XR-EURO	50/60	230	200/208, 220, 200, 240	Non-detachable power cord with 16 A IEC-309 plug
R3000i XR-SCHUKO	50/60	230	200/208, 220, 230, 240	Non-detachable power cord with 16 A CEE 7/7 SCHUKO plug
R3000i XR-SA	50/60	230	200/208, 220, 230, 240	Non-detachable power cord with 16 A BS-546 plug

[1] The output voltage is 204 for this setting.

Output Specifications

Table C-3: Output Specifications

UPS Model	Effective VA	Nominal Power Rating (W)	Load Segment #	Output Receptacles
R3000 XR-NA	2880	2700	1	2 x 5-15R 1 x L5-30R
			2	2 x 5-15R
			3	2 x 5-15R
R3000 XR-JPN	2400	2250	1	2 x 5-15R 1 x L5-30R
			2	2 x 5-15R
			3	2 x 5-15R
R3000h XR-NA and R3000h XR-JPN	3000	2700	1	3 x IEC-320, C13 1 x L6-20R
			2	3 x IEC-320, C13
			3	3 x IEC-320, C13
R3000e XR-INT	3000	2700	1	3 x IEC-320, C13 1 x IEC-320, C20
			2	3 x IEC-320, C19
			3	3 x IEC-320, C13
R3000i XR-EURO; R3000i XR-SCHUKO; R3000i XR-SA	3000	2700	1	3 x IEC-320, C13 1 x IEC-320, C20
			2	3 x IEC-320, C13
			3	3 x IEC-320, C13

Table C-4: Output Specifications

Characteristics	Configuration Setting (VAC)	Available Nominal Output Voltage (VAC)
Voltage	100	100
	110	110
	120	120
	127	127
	200	200
	208	208
	230	230
	240	240
	Source of Power	**Regulation**
Output tolerance	Utility power (normal range)	-10% to +6% of nominal output voltage rating (within the guidelines of the Computer Business Equipment Manufacturers Association)
	Battery power	±5% of nominal output voltage rating
	Feature	**Specification**
Other features	Online efficiency	94% nominal input voltage
	Voltage wave shape	Sine wave; 5% THD with typical PFC load
	Surge suppression	High-energy 6500 A peak
	Noise filtering	MOVs and line filter for normal and common mode use

Battery Specifications

Table C-5: Battery Specifications

Feature	Specification
Type	Each model contains maintenance-free, sealed, valve regulated lead-acid (VRLA) batteries with an eight-year minimum float service life at 25ºC (77ºF).
Voltage	The battery module has a battery string voltage of 120 V.
Charging	Complete charge takes no more than 24 hours.
	Approximately 3 hours to 80 percent capacity at default nominal utility voltage and no load.

Battery Runtime

Table C-6: Estimated Battery Runtime

Load (Percent)	Estimated Battery Runtime (Minutes)	UPS with ERM Runtime (Minutes)
20	40	120
50	12	45
80	6.5	30
100	5	20

Environmental Specifications

Table C-7: Environmental Specifications

Feature	Specification
Operating temperature	10°C to 40°C (50°F to 104°F) UL-tested at 25°C (77°F)
Non-operating temperature	-25°C to 55°C (-13°F to 131°F)
Relative humidity	20% to 80%; non-condensing
Operating altitude	Up to 2,000 m (6,600 ft) above sea level
Non-operating altitude	15,000 m (49,212 ft) above sea level
Audible noise	Less than 45 dBA
Note: UPS will be de-rated above 2,000 m (6,600 ft).	

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