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HP Uninterruptible Power System
T2200 XR Models
User Guide



August 2002 (Second Edition)
Part Number 215503-002

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HP Uninterruptible Power System T2200 XR Models User Guide

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Contents

About This Guide

Audience Assumptions vii
Important Safety Information vii
Symbols on Equipment vii
Symbols in Text viii
Related Documents viii
Getting Help viii
Technical Support ix
HP Website ix
Authorized Reseller ix
Reader's Comments ix

Chapter 1
Overview

UPS Features 1-1
Communications Port 1-1
Network Transient Protector 1-2
Overcurrent Protection 1-2
UPS T2200 XR Models 1-2
Front Panel 1-3
Rear Panels 1-4
Power Management Software 1-8
UPS Hardware Options 1-8
Warranties 1-9
$25,000 Computer Load Protection Guarantee 1-9
Pre-Failure Battery Warranty 1-9

Chapter 2
Operation

Front Panel Controls and LED Indicators 2-1
Modes of Operation 2-2
Charging the Batteries 2-3
Placing the UPS in Operate Mode 2-3
Returning to Standby Mode 2-4
Initiating a Self-Test 2-5
Audible Alarms 2-6
Silencing an Audible Alarm 2-6
Shutting Down the System 2-6

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Chapter 3
Configuration
Placing the UPS in Configure Mode 3-1
Configuration Parameters 3-2
Changing Configuration Parameters 3-3

Chapter 4
Battery Maintenance
Precautions 4-1
Charging Batteries 4-1
Determining When to Replace Batteries 4-2
Obtaining New Batteries 4-2
Replacing Batteries 4-3
Preparing the UPS 4-3
Removing the Battery Pack 4-4
Installing a New Battery Pack 4-5
Testing the New Battery Pack 4-6
Disposing of Used Batteries 4-6
Care and Storage of Batteries 4-6
Pre-Failure Battery Warranty 4-7

Chapter 5
Troubleshooting
Troubleshooting During Startup 5-1
Troubleshooting After Startup 5-2
Repairing the UPS 5-3

Appendix A
Regulatory Compliance Notices
Regulatory Compliance Identification Numbers A-1
Federal Communications Commission Notice A-1
Class A Equipment A-1
Class B Equipment A-2
Declaration of Conformity for Products Marked with the FCC Logo, United States Only A-2
Modifications A-2
Cables A-3
Canadian Notice (Avis Canadien) A-3
Class A Equipment A-3
Class B Equipment A-3
European Union Notice A-3
Japanese Notice A-4
China Taiwan Notice A-4
Battery Replacement Notice A-5

Appendix B
Electrostatic Discharge
Grounding Methods B-1

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Appendix C
Specifications

Physical Specifications C-1
Input Specifications C-2
Output Specifications C-3
Battery Specifications C-4
Environmental Specifications C-5

Index

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About This Guide

This guide provides step-by-step instructions for configuration, and reference information for operation, battery maintenance, and troubleshooting for the Uninterruptible Power System (UPS).

Audience Assumptions

This guide is intended for individuals requiring information about the use of HP UPSs. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the UPS.

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 reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



Weight in kg
Weight in lb

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

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

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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 essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Related Documents

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

- *HP Uninterruptible Power System T2200 XR Models Installation Instructions*
- *HP UPS T1500 XR / T2200 XR Models Extended Runtime Module Installation Instructions*
- *HP UPS XR Products Power Cord and Options Reference Guide*
- *Industry Standard Terminology Glossary*

These documents are located on the Power Products Documentation CD or at www.hp.com.

Getting Help

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

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Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. 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 updates, and service packs, go to www.hp.com.

Authorized Reseller

For the name of your nearest 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 e-mail to `ServerDocumentation@hp.com`.

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1

Overview

This chapter contains a general overview of the HP UPS, including an introduction to the model configurations, power management software, available hardware options, and warranties. Read this chapter to become familiar with the features of the UPS before operating the unit.

UPS Features

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

- Communications port for data exchange with the host computer
- Network Transient Protector
- Load segment control
- Load power protection up to 1920 VA/1600 W (T2200 XR-NA model) or 2080 VA/1600 W (T2200 XR-H NA, T2200 XR-JPN, and T2200 XR-H INT'L models)
- Support for UPS power management software
- Support for HP hardware option cards, extending the power management capabilities of the UPS
- Support for HP Extended Runtime Modules (ERMs), options that extend the available runtime of the UPS
- Ease of use and configuration

Communications Port

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



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

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Network Transient Protector

The UPS includes a Network Transient Protector (NTP) that provides surge protection for connected communication devices.

CAUTION: To avoid damaging the equipment, do not connect the Network Transient Protector to a digital PBX line. Connect either to an analog phone line or to a network.

Overcurrent Protection

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

UPS T2200 XR Models

The UPS models include the following.

Table 1-1: UPS T2200 XR Models

UPS Model	Kit Part Number	Unit Part Number	Series Number	Comments
T2200 XR NA	204451-001	204452-001	EO3019	Domestic, low-voltage tower with non-detachable NEMA 5-20 plug
T2200 XR JPN	204451-291	204452-191	EO3019j	Japanese, low-voltage tower with non-detachable NEMA L5-30 plug
T2200 XR H NA	204451-002	204452-003	EO3019h	Domestic, high-voltage tower with IEC-320 input power receptacle
T2200 XR H INT'L	204451-B31	204452-002	EO3019i	International, high-voltage tower with IEC-320 input power receptacle

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Front Panel

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

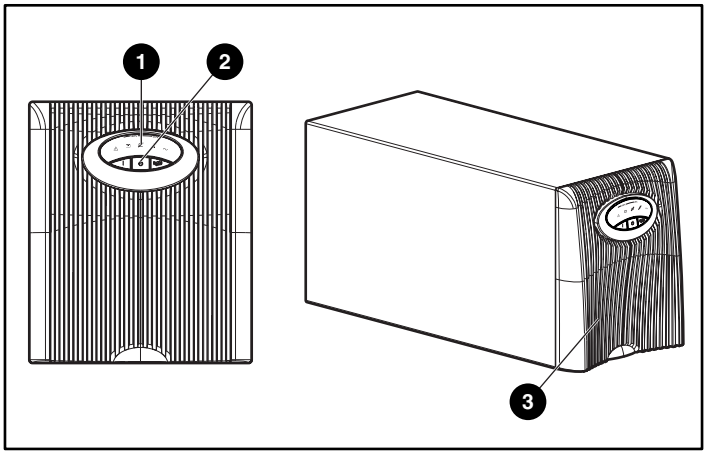


Figure 1-1: Front panel configuration

1 LED display

2 Control buttons

3 Battery compartment

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

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Rear Panels

The rear panel configurations of the UPS are shown in Figures 1-2, 1-3, 1-4, and 1-5.

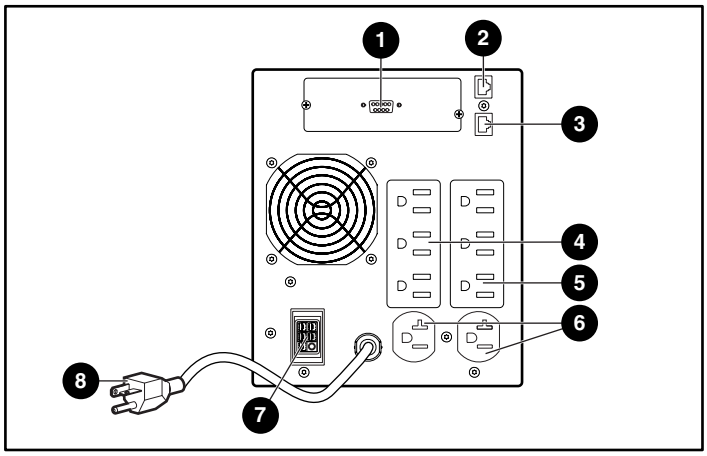


Figure 1-2: Rear panel of T2200 XR NA

1 Communications port/option slot

2 Network Transient Protector IN jack

3 Network Transient Protector OUT jack

4 Load segment 2 (three NEMA 5-15 receptacles)

5 Load segment 1 (three NEMA 5-15 receptacles)

6 Load segment 3 (two NEMA 5-20 receptacles)

7 ERM connector

8 Power cord with NEMA 5-20 plug

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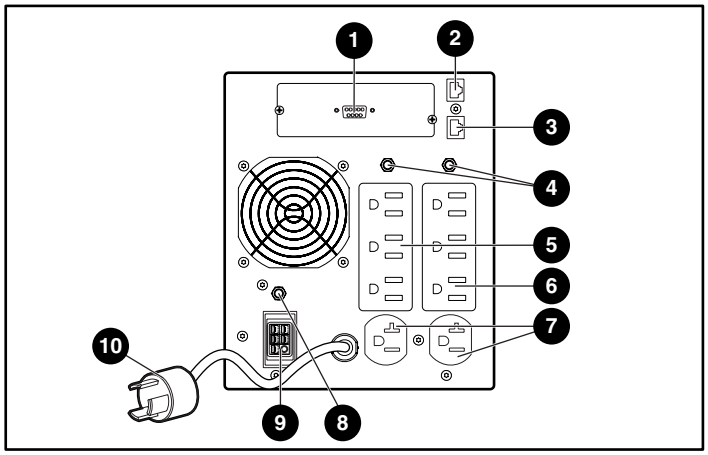


Figure 1-3: Rear panel of T2200 XR JPN

1 Communications port/option slot
2 Network Transient Protector IN jack
3 Network Transient Protector OUT jack
4 Circuit protectors
5 Load segment 2 (three NEMA 5-15 receptacles)
6 Load segment 1 (three NEMA 5-15 receptacles)
7 Load segment 3 (two NEMA 5-20 receptacles)
8 Circuit protector
9 ERM connector
10 Power cord with NEMA L5-30 plug

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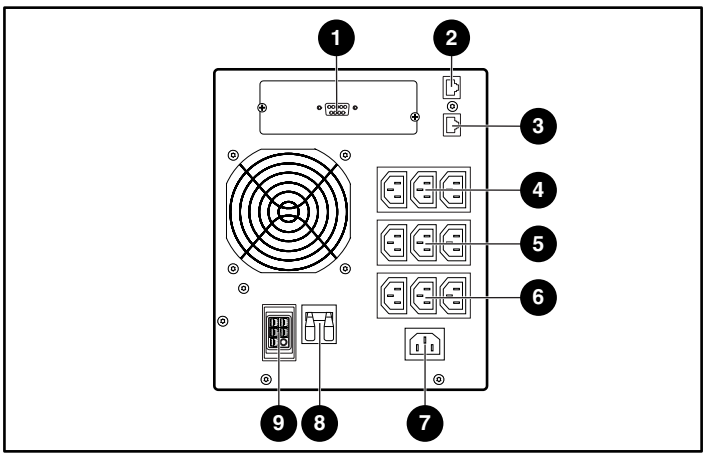


Figure 1-4: Rear panel of T2200 XR H NA

1 Communications port/option slot

2 Network Transient Protector IN jack

3 Network Transient Protector OUT jack

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

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

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

7 Input power receptacle (IEC-320-C14) for country-specific plug attachment

8 Circuit protector

9 ERM connector

WARNING: Risk of personal injury from electric shock. This model is not suitable for installation where the total earth (ground) conductor leakage current for all connected devices exceeds 3.5 mA.

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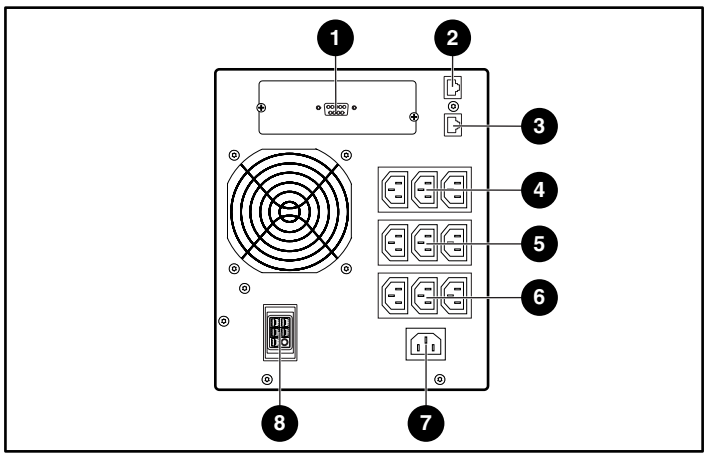


Figure 1-5: Rear panel of T2200 XR H INT'L

1 Communications port/option slot

2 Network Transient Protector IN jack

3 Network Transient Protector OUT jack

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

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

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

7 Input power receptacle (IEC-320-C14) for country-specific plug attachment

8 ERM connector

WARNING: Risk of personal injury from electric shock. This model is not suitable for installation where the total earth (ground) conductor leakage current for all connected devices exceeds 3.5 mA.

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Power Management Software

Power management software ensures maximum power reliability of HP computer systems through comprehensive control of HP 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 HP UPSs 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 popup dialog boxes, command execution, and email and broadcast messages
- Monitors the status of the UPS and performs UPS diagnostics
- Displays power logs for analysis

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

UPS Hardware Options

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

Table 1-2: Hardware Options

Option	Part Number
HP ERM	218969-B21
HP Six Port Card	192185-B21
HP SNMP / Serial Port Card	192189-B21

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 at www.hp.com.

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Warranties

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

$25,000 Computer Load Protection Guarantee

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

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

The $25,000 Computer Load Protection Guarantee applies only 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. Users must 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.

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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.

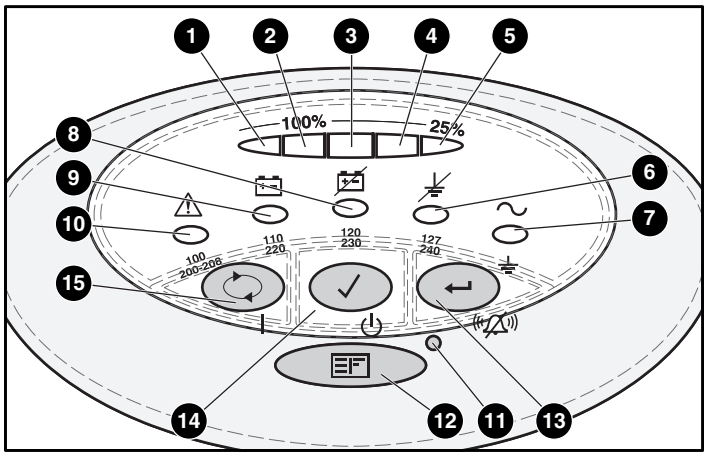


Figure 2-1: Front panel controls and LED indicators

Item	Description	Meaning/Function
1	Overload LED	Red—UPS load exceeds maximum power available.
2	76% to 100% load	Green—UPS load approximately 76% to 100% of maximum power.
3	51% to 75% load	Green—UPS load approximately 51% to 75% of maximum power.
4	26% to 50% load	Green—UPS load approximately 26% to 50% of maximum power.
5	0% to 25% load	Green—UPS load approximately 0% to 25% of maximum power.

continued

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continued

Item	Description	Meaning/Function
6	Site Wiring Fault Indicator (⚡)	Red—No ground connection exists between utility power and the UPS, the line and neutral connections between utility power and the UPS are reversed, or the UPS voltage configuration is incorrect.
7	Utility LED (∿)	Flashing Red—Utility input voltage is outside the +20% to -30% configured nominal range. Green—Utility voltage is present and output is on, or utility voltage has returned to the voltage range for which the UPS has been configured (UPS is supplying utility power and the audible alarm should be reset). Flashing Green—Utility voltage is present and the UPS is in Standby mode. Output is off. Batteries charge if needed.
8	Bad Battery/Low Battery (🔋)	Red—Battery is bad or low.
9	On Battery (🔋)	Red—UPS is running on battery power.
10	General Alarm (⚠)	Red—UPS detects a general alarm. Perform a self-test.
11	Configure Mode On LED	Green—UPS is in Configure mode (seen when front bezel removed).
12	Configure button	Places the UPS in Configure mode (seen when front bezel removed).
13	Test/Alarm Reset button	Resets alarms or initiates self-tests.
14	Standby button	Places the UPS in Standby mode (turns output load segments off).
15	On button	Starts UPS powering the load.

Modes of Operation

The UPS has three 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.

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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:

- 90 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 (2) until the Utility LED (1) 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 running on battery power (no utility power is present), press and hold the On button (2) until the audible alarm sounds.

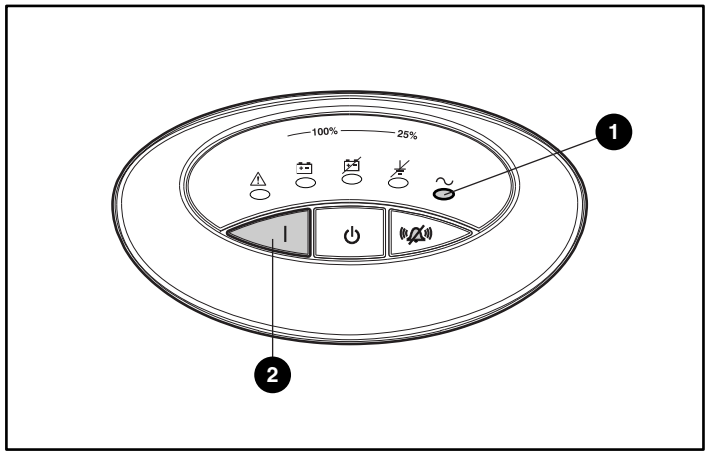


Figure 2-2: Placing the UPS in Operate mode

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Returning to Standby Mode

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

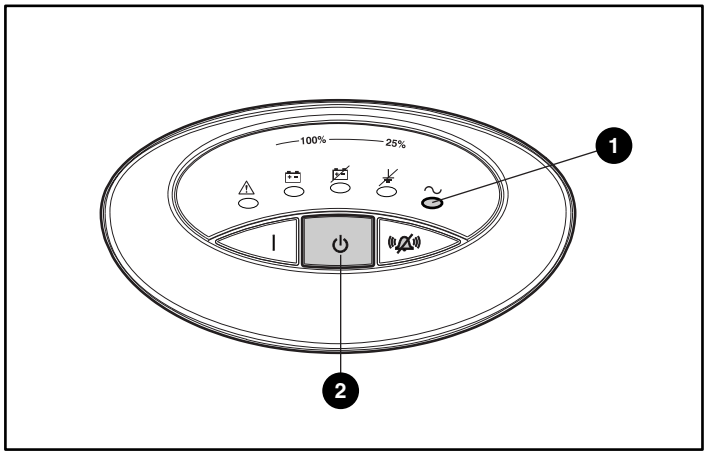


Figure 2-3: Placing the UPS in Standby mode

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.

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Initiating a Self-Test

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

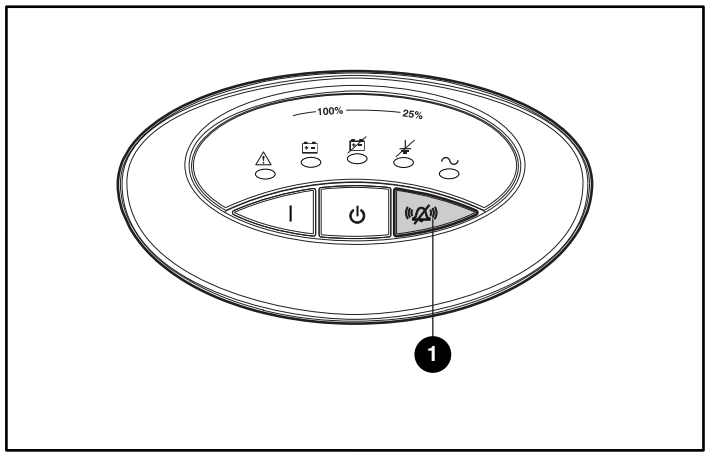


Figure 2-4: Test/Alarm Reset button

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 reduce the risk of 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 "Front Panel Controls and LED Indicators," in this chapter.
- For information on what to do if the self-test detects a problem, refer to Chapter 5, "Troubleshooting."

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Audible Alarms

The UPS may sound 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.”

Silencing an Audible Alarm

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

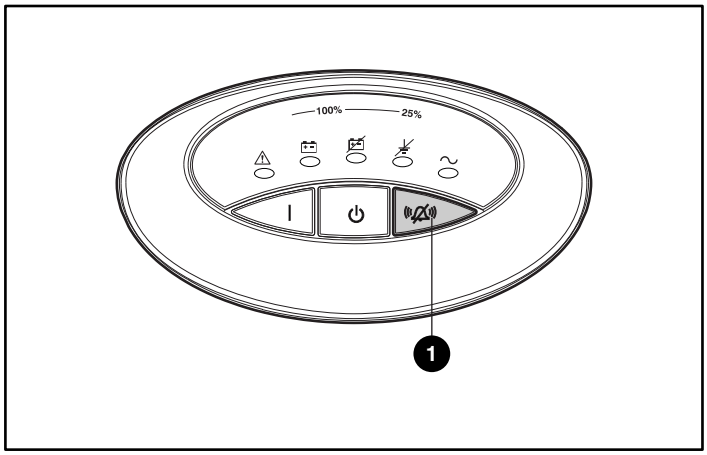


Figure 2-5: Test/Alarm Reset button

IMPORTANT:

- Although an audible alarm silences, the condition that caused the alarm still exists. 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 (the Utility LED or the General Alarm LED illuminates red), the alarm silences 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.
3. Disconnect the UPS from utility power.
4. Wait at least 60 seconds while the UPS internal circuitry discharges.

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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 front bezel by snapping the bezel off (1).

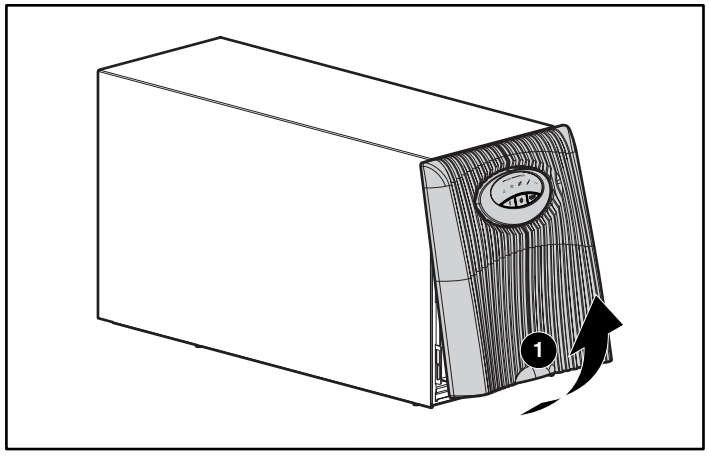


Figure 3-1: Removing the UPS front bezel

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

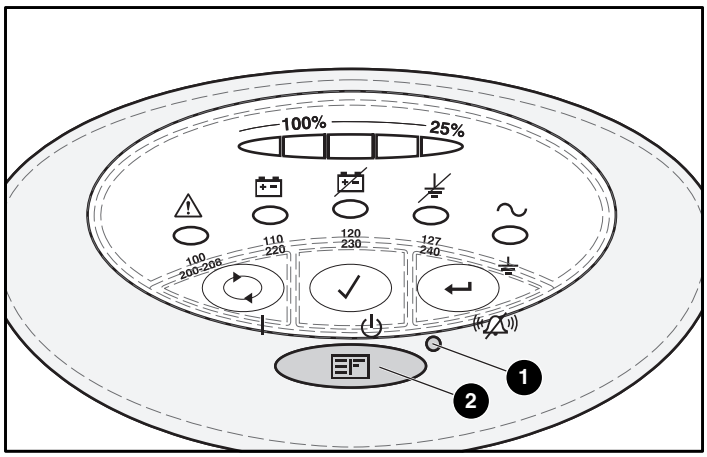


Figure 3-2: Placing the UPS in Configure mode

Configuration Parameters

In Configure mode, the front panel LED display changes function to allow UPS monitoring. The LED control buttons 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

Parameter (LED)	Parameter Name	Explanation (when illuminated)
General Alarm (⚠)	100/200-208 Nom	Nominal utility voltage level is selected to 100/208 VAC.
On Battery (🔋)	110/220 Nom	Nominal utility voltage level is selected to 110/220 VAC.
Bad Battery/Low Battery (🔋)	120/230 Nom	Nominal utility voltage level is selected to 120/230 VAC.
Site Wiring Fault Indicator (⏚)	127/240 Nom	Nominal utility voltage level is selected to 127/240 VAC.
Utility LED (∿)	Site Wiring Fault Indicator	Audible alarm is enabled if ground is missing, or if line and neutral connections are reversed.

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Table 3-2: Available Voltage Settings

UPS Model	Available Settings Utility Voltage (VAC)	Parameter (LED)
T2200 XR NA	110	On Battery ( )
	120 (default)	Bad Battery/Low Battery ( )
	127	Site Wiring Fault Indicator ( )
T2200 XR JPN	100	General Alarm ( )
T2200 XR H NA	208	General Alarm ( )
T2200 XR H INT'L	220	On Battery ( )
	230 (default)	Bad Battery/Low Battery ( )
	240	Site Wiring Fault Indicator ( )

Changing Configuration Parameters

Refer to Figure 3-3 when changing configuration parameters.

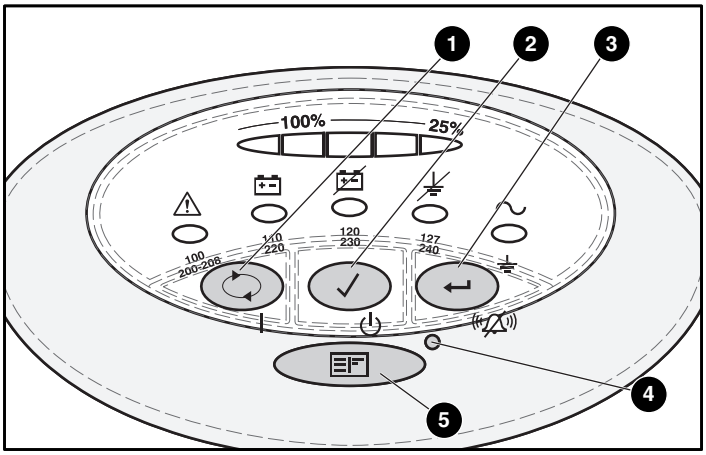


Figure 3-3: Changing configuration parameters

To change configuration parameters:

1. Place the UPS in Configure mode by pressing the Configure button (5) until the Configure Mode On LED (4) illuminates solid green.

   When you release the Configure button, the configurable LEDs flash briefly, then the LED associated with the current configuration illuminates.

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2. To advance to the appropriate voltage configuration (to the right), press the On button (1). The selected voltage configuration LED flashes. Activate the voltage configuration by pressing the Standby button (2). The previously selected configuration parameter LED turns off.

   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 (1) to advance to the Site Wiring Fault LED, then press the Standby button (2).
4. To accept the configuration settings and exit Configure mode, press the Test/Alarm Reset button (3).

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

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4

Battery Maintenance

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

Precautions

WARNING: There is a risk of personal injury from the hazardous energy levels associated with UPS batteries. The maintenance and replacement of batteries must be carried out by an authorized service representative.

WARNING: The UPS contains sealed lead-acid batteries. To reduce the risk of 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 reduce the risk of personal injury from hazardous energy, take the following 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.

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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.

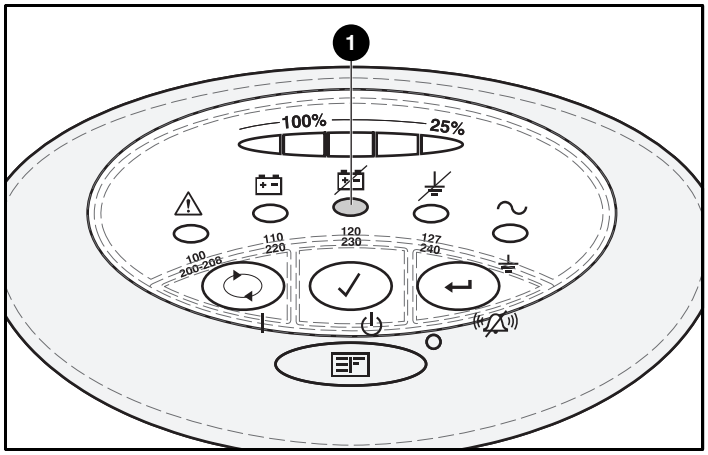


Figure 4-1: Bad Battery/Low Battery LED

To check a battery alarm, 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.

NOTE: Depending on usage and environmental conditions, the batteries should last three to six years.

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.

HP supplies spare battery packs for this UPS. The UPS spare battery kit part number is 240796-001.

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

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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 is not protected in the event of a utility power failure.

Preparing the UPS

Batteries can 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.
3. Disconnect the UPS from utility power.
4. Wait at least 60 seconds while the UPS internal circuitry discharges.

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Removing the Battery Pack

To remove the battery pack:

1. Remove the front bezel by depressing the tab located under the front bezel and pulling from the bottom (1). The LED/control button pedestal remains attached to the UPS.
2. Gain access to the metal battery bracket by swinging the LED/control button pedestal to the right (2).

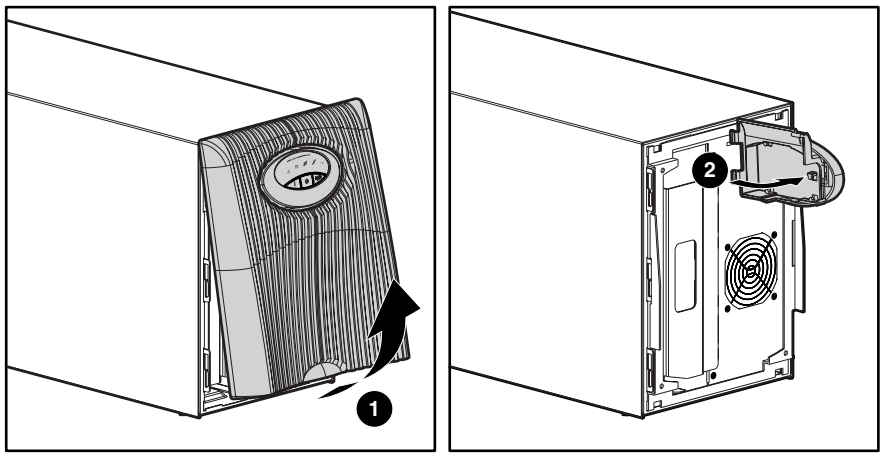


Figure 4-2: Removing the front bezel and LED/control button pedestal

3. Remove the metal battery bracket and set it to the side.

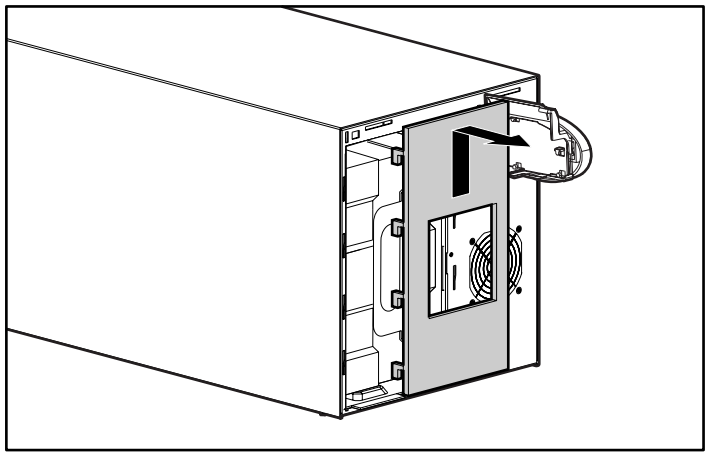


Figure 4-3: Removing the metal battery bracket

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4. Unfasten the plastic handle (1) and partially remove the battery pack (2).
5. Disconnect the battery cable by pressing the black tab on the connector (3) and pulling apart (4).

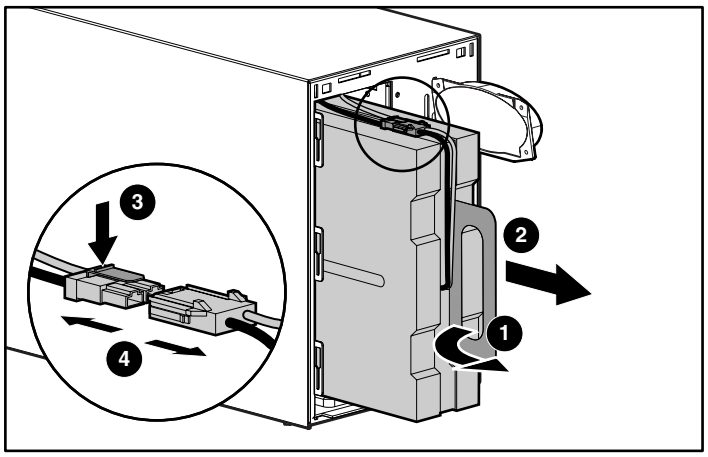


Figure 4-4: Disconnecting the battery connector cable

6. Remove the battery pack. Set aside the used battery pack for proper disposal. Refer to "Disposing of Used Batteries," in this chapter.

WARNING: If the UPS is not powered down, immediately replace the battery pack. Do not allow terminal connections to contact conductive materials. Do not touch or bring tools in close proximity to terminals.

Installing a New Battery Pack

To install a new battery pack, reverse the steps in the section, "Removing the Battery Pack," in this chapter.

IMPORTANT: Check clearance on battery terminal connections when reinserting the battery pack into the battery compartment.

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Testing the New Battery Pack

After installing the new battery pack, 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.

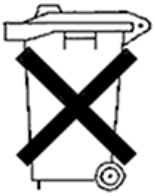
If the installation has been successful, the Bad Battery/Low Battery LED is not illuminated.

If the installation has not been successful, the Bad Battery/Low Battery LED illuminates red. If this occurs, remove and reinstall the battery pack, 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 90 percent of their capacity within less than 3 hours. Allow the batteries to charge for 24 hours before using the UPS to supply backup power to devices. The load may not be fully protected for 24 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 pack 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 the utility voltage. For more information, 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.

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Pre-Failure Battery Warranty

The Pre-Failure Battery Warranty, standard on all HP UPS units, extends the advantage of an HP 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 HP power management software that the battery may fail, the battery is replaced free of charge under the warranty.

HP maintains the highest standards in the industry, as evidenced by the HP 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 HP power management software

This warning provides ample time to order a spare battery. You can order a spare at 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 HP UPS model, then the entire UPS, including its battery, is replaced.

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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.

Troubleshooting During Startup

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

Table 5-1: Troubleshooting During Startup

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

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Troubleshooting After Startup

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

Table 5-2: Troubleshooting After Startup

Symptom	Possible Cause	Suggested Action
An audible alarm sounds.	An alarm condition exists.	Identify the red LED associated with this alarm condition. Check this troubleshooting guide to determine the cause of the alarm.
The 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 LED (∿) and On Battery LED (🔋) are flashing red.	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 LED (∿) and On Battery LED (🔋) are flashing red.	The utility frequency is out of tolerance.	Contact a qualified electrician to verify that the utility power is suitable for the UPS.
The Utility LED (∿) is flashing red.	The utility input voltage is outside the +20% to -30% nominal range.	If this happens repeatedly, check the input voltage and reconfigure the UPS.
		Contact a qualified electrician to verify that the utility power is suitable for the UPS.
The Utility LED (∿) is flashing green and the UPS is in Standby mode.	The utility power is within the acceptable range and the output is off.	Press the On button.
The UPS frequently switches between utility and battery power.	There are variations in utility power.	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.

continued

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Table 5-2: Troubleshooting After Startup *continued*

Symptom	Possible Cause	Suggested Action
The Overload LED is red.	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.
The On Battery LED (🔋) is flashing red.	The battery voltage is low.	If the UPS is supplying battery power, save your current work and power down the system. Allow the batteries to charge.
		If the UPS is supplying utility power, no user intervention is required. Allow the batteries to charge.
There is insufficient warning of low batteries.	Battery service is required.	Allow batteries to charge for 24 hours, then initiate a self-test. If the Bad Battery/Low Battery LED is red, replace batteries.
	The Shutdown Delay configuration is inappropriate.	Update the Shutdown Delay from 5 seconds to 3 minutes.
		Use HP power management software to specify a suitable delay.
The Bad Battery/ Low Battery LED (🔋) is flashing red.	A potential battery failure is detected.	Allow the batteries to charge for 24 hours, then initiate self-test. If the Bad Battery/Low Battery LED is red, replace the batteries.
	New batteries are improperly connected.	Verify that the batteries are connected properly.
All LEDs are flashing red and an audible alarm cannot be silenced.	An internal UPS fault condition exists.	Power down the UPS. Contact an authorized service representative.

Repairing the UPS

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

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A

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this series number. The 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 (for example, 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 the classification (A or B) of the equipment. 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.

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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 into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an 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 us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000
- 1-800-652-6672 (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 510101
  Houston, Texas 77269-2000
- 1-281-514-3333

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

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.

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Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order 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

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Japanese Notice

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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。

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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。

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Battery Replacement Notice

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

WARNING: The UPS contains a sealed lead-acid battery pack. There is risk of fire and burns if the battery pack is not properly handled. To reduce the risk of 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, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**



Batteries, battery packs, 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 HP, your authorized HP Partners, or their agents.

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B

Electrostatic Discharge

To prevent damaging the system, 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 ground, 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 authorized reseller install the part.

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

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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	206 mm	8.1 in
	Height	241 mm	9.5 in
	Depth*	483 mm	19.0 in
Weight		32 kg	70 lb
*With UPS front bezel installed			

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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
T2200 XR NA	50/60	120	110, 120, 127[1]	Non-detachable power cord with NEMA 5-20 plug
T2200 XR JPN	50/60	100	100[2]	Non-detachable power cord with NEMA L5-30 plug
T2200 XR H NA	50/60	208	208[3]	IEC-320-C14 input power receptacle
T2200h XR H INT'L	50/60	230	220, 230, 240	IEC-320-C14 input power receptacle

Note:
1 120 on battery
2 110 on battery
3 220 on battery

Before connecting devices, verify that the UPS will not overload by checking that the rating of the devices does not exceed the capacity of the UPS. Evenly distribute connected devices throughout all load segments. Do not exceed the rating of individual receptacles. Connect devices according to shutdown preference.

After checking that the UPS will not overload, connect the power cords from the devices to the appropriate output receptacles of the UPS.

WARNING: To prevent risk of personal injury from electric shock, the UPS T2200 XR H NA and T2200 XR H INT'L models are not suitable for installation where the total earth (ground) conductor leakage current for all connected devices exceeds 3.5 mA.

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Output Specifications

Table C-3: Output Specifications

UPS Model	Effective VA	Nominal Power Rating (W)	Load Segment #	Output Receptacles
T2200 XR NA	1920	1600	1	3 x 5-15R
			2	3 x 5-15R
			3	2 x 5-20R
T2200 XR JPN	2200	1600	1	3 x 5-15R
			2	3 x 5-15R
			3	2 x 5-20R
T2200 XR H NA	2200	1600	1	3 x IEC-320, C13
			2	3 x IEC-320, C13
			3	3 x IEC-320, C13
T2200 XR H INT'L	2080	1600	1	3 x IEC-320, C13
			2	3 x IEC-320, C13
			3	3 x IEC-320, C13

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Table C-4: Output Specifications

Characteristics	Configuration Setting (VAC)	Available Nominal Output Voltage (VAC)	Available Nominal Output Voltage (VAC) on Battery
Voltage	100	100	110*
	110	110	110
	120	120	120
	127	127	120
	208	208	220*
	220	220	220
	230	230	230
	240	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	On-line efficiency	95% nominal input voltage	
	Voltage wave shape	Sine wave; equivalent to input online	
	Surge suppression	High energy 6500 A peak	
	Noise filtering	MOVs and line filter for normal and common mode use	

* +0% to -10% at low battery

Battery Specifications

Table C-5: Battery Specifications

Feature	Specification
Type	Sealed lead-acid; maintenance-free
Voltage	48 V Battery String
Charging	HP recommends 24 hours to allow full charge
	Less than 3 hours to 90 percent capacity at default nominal utility voltage and no load

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Environmental Specifications

Table C-6: 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	-15°C to 55°C (5°F to 131°F)
Operating humidity	20% to 80% relative humidity (non-condensing)
Non-operating humidity	5% to 95% relative humidity (non-condensing); 38.7°C (101.7°F) maximum wet bulb temperature with no cosmetic damage
Operating altitude	Up to 2,000 meters (6,562 feet) above sea level
Non-operating altitude	Up to 9,144 meters (30,000 feet) above sea level
Audible noise	Less than 46 dBA

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Index

A

alarms *See* audible alarms
altitude specifications C-5
audible alarms
    enabling and disabling for Site Wiring Fault detection 3-2
    silencing 2-6
    troubleshooting 5-1
authorized reseller ix

B

Bad Battery/Low Battery LED 2-2
batteries
    battery connector cables 4-5
    care and storage 4-6
    charging 2-3, 4-1
    determining when to replace 4-2
    disposal methods 4-6
    installing 4-5
    obtaining 4-2
    precautions 4-1
    recycling or disposal A-5
    removing 4-4
    replacing 4-3
    spare pack part number 4-2
    specifications C-4
    testing 4-6
    warranty 4-7
battery bracket, removing 4-4
bezel, removing 3-1, 4-4
boot straps, using B-1
bracket, battery 4-4
buttons
    defined 2-2
    illustrated 2-1

C

cables
    battery connection 4-5
    FCC compliance statement A-3
    power 1-2
CE Marking A-3
charging batteries 2-3, 4-1
circuit protectors 1-2
Comm Port *See* communications port
communications port 1-1
computer, host 1-1
configuration parameters 3-2
configuration procedures 3-3
Configure button 2-2
Configure mode
    defined 2-2
    entering 3-1
Configure Mode On LED 2-2
configuring nominal voltage 3-2

D

data exchange 1-1
Declaration of Conformity A-2
diagnostics 2-5
dimensions C-1
disposal of batteries 4-6

E

electrostatic discharge *See* ESD
entering
    Configure mode 3-1
    Operate mode 2-3
    Standby mode 2-4
environmental specifications C-5
ESD (electrostatic discharge) B-1
exchanging data 1-1

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F

FCC notices
    Class A Equipment A-1
    Class B Equipment A-2
    classification label A-1
    Declaration of Conformity A-2
    device modifications A-2
features
    front panel 1-3
    power management software 1-8
    rear panels 1-4
    UPS 1-1
    warranty 1-9
Federal Communications Commission notices *See* FCC notices
front bezel, removing 3-1
front panel 1-3
front panel controls 2-1

G

General Alarm LED 2-2
grounding methods B-1
grounding straps B-1

H

hardware options 1-8
heel straps, using B-1
help, sources of viii
host computer 1-1
HP series number A-1
HP website ix
humidity specifications C-5

I

input specifications C-2
installing
    batteries 4-5
    UPS 2-1

K

kit part numbers 1-2

L

LEDs
    defined 2-1, 2-2
    illustrated 2-1
    troubleshooting 5-1
load level LEDs 2-1
load protection warranty 1-9

M

managing UPSs 1-8
models, UPS 1-2
modes of operation 2-2

N

Network Transient Protector 1-2
noise specifications C-5
nominal utility voltage 3-3
nominal voltage, configuring 3-2
NTP *See* Network Transient Protector

O

obtaining new batteries 4-2
On Battery LED 2-2
On button 2-2
Operate mode
    defined 2-2
    entering 2-3
options, hardware 1-8
output specifications C-3
overcurrent protection 1-2
Overload LED 2-1
overview
    power management software 1-8
    UPS 1-1

P

panels
    front 1-3
    rear 1-4
parameters, configuration 3-2
part numbers
    hardware options 1-8
    kit 1-2
    spare battery packs 4-2
    UPS 1-2
physical specifications C-1
port, communications 1-1
power cords 1-2
power management software 1-8
problems *See* troubleshooting
products, handling, storing, and transporting B-1
protection
    overcurrent 1-2
    surge 1-2

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R

rear panels 1-4
receptacles C-3
regulatory compliance notices
cables A-3
Canadian A-3
Class A equipment A-1
Class B equipment A-2
device modifications A-2
European Union A-3
HP series number A-1
identification number A-1
Japanese A-4
China Taiwan A-4
related documents viii
removing
batteries 4-4
battery bracket 4-4
front bezel 3-1, 4-4
repairing the UPS 5-3
replacing batteries 4-2, 4-3

S

safety information 4-1
self-test 2-5
serial port *See* communications port
series numbers 1-2, A-1
shutting down 2-6
Site Wiring Fault detection, enabling audible alarms 3-2
Site Wiring Fault Indicator 2-2
software *See* power management software
specifications
battery C-4
environmental C-5
input C-2
output C-3
physical C-1
Standby button 2-2
Standby mode
defined 2-2
entering 2-4
static-safe containers B-1
storing batteries 4-6
surge protection 1-2
system, preventing electrostatic damage to B-1

T

technical support ix
telephone numbers ix
temperature specifications C-5
Test/Alarm Reset button 2-2
testing batteries 4-6
tools, conductive field service type B-1
troubleshooting
after start 5-2
during start 5-1

U

Uninterruptible Power System
battery maintenance 4-1
configuring 3-1
installing 2-1
operating 2-1
overview 1-1
repairing 5-3
specifications C-1
UPS *See* Uninterruptible Power System
Utility LED 2-2

V

voltage, configuring 3-3

W

warranties
$25,000 Computer Load Protection Guarantee 1-9
pre-failure battery 4-7
website, HP ix
weight C-1
wrist straps B-1

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