



**IBM 5000XHV  
Uninterruptible Power Supply  
Operation and Setup Guide**



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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information**  
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

### Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Systems Safety Notices* document.

For example, if a caution statement is labeled "D005," translations for that caution statement are in the *Systems Safety Notices* document under "D005."

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.



#### DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label.

(L001)



#### DANGER

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)



## **DANGER**

**When working on or around the system, observe the following precautions:**

**Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:**

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

### **To disconnect:**

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

### **To connect:**

5. Turn off everything (unless instructed otherwise).
6. Attach all cables to the devices.
7. Attach the signal cables to the connectors.
8. Attach the power cords to the outlets.
9. Turn on the devices.

(D005)



**DANGER**

**Uninterruptible power supply (UPS) units contain specific hazardous materials. Observe the following precautions if your product contains a UPS:**

- The UPS contains lethal voltages. All repairs and service must be performed only by an authorized service support representative. There are no user serviceable parts inside the UPS.
- The UPS contains its own energy source (batteries). The output receptacles might carry live voltage even when the UPS is not connected to an AC supply.
- Do not remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.
- The UPS is heavy because of the electronics and batteries that are required. To avoid injury, observe the following precautions:
  - Do not attempt to lift the UPS by yourself. Ask another service representative for assistance.
  - Remove the battery, electronics assembly, or both from the UPS before removing the UPS from the shipping carton or installing or removing the UPS in the rack. (D007)



**CAUTION**

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)



**CAUTION**

Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn.

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)



OR



OR



**CAUTION**

The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this unit. (C010)



**CAUTION**

To avoid personal injury, before lifting this unit, remove all appropriate subassemblies per instructions to reduce the system weight. (C012)



# 1: OVERVIEW

## Introduction

The IBM® 5000XHV model is a high-performance uninterruptible power supply designed to prevent blackouts, brownouts, sags, and surges from reaching your computer and other sensitive electronic equipment. The uninterruptible power supply filters small utility line fluctuations and isolates your equipment from large disturbances by internally disconnecting from the utility line. The uninterruptible power supply provides continuous power from its internal battery until the utility line returns to safe levels or the battery is fully discharged.

### Attention:

- Read the Safety Instructions before installing the battery pack.
- The uninterruptible power supply and battery modules are heavy. Select a location sturdy enough to handle the weight.
- Refer to the *Service* section in this manual for information on how to obtain service and support for the unit.

**Note:** Illustrations in this document might vary in appearance from the purchased unit.

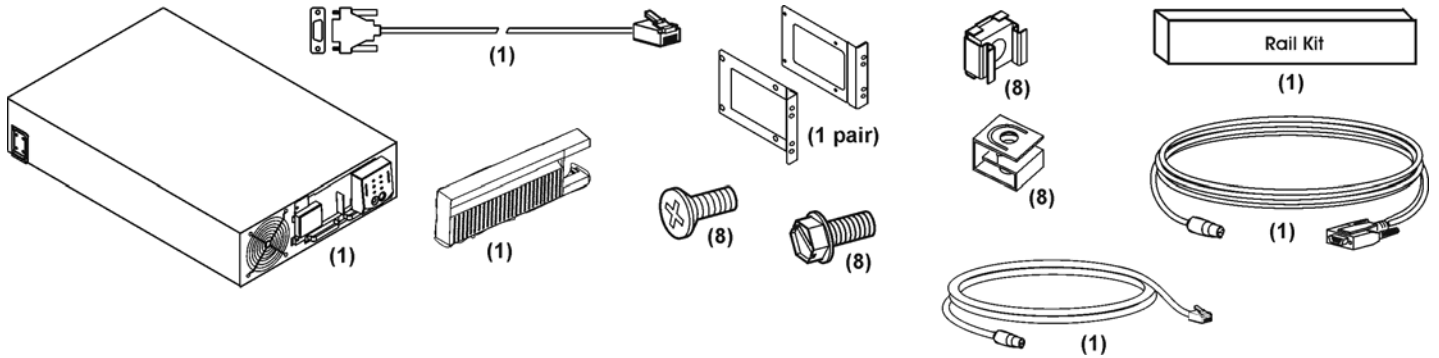
Inspect the unit upon receipt. Accidents and damage can occur during shipment. Notify the carrier and the IBM marketing representative or authorized reseller if there is damage.

The packaging is recyclable. Save it for reuse or dispose of it properly.

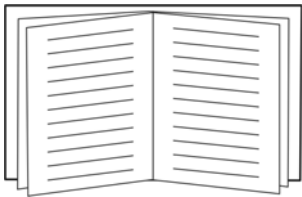
### The following tools will be needed for installing the uninterruptible power supply:

- Utility knife or scissors
- Two Phillips screwdrivers (#1 and #2)
- One wrench (10mm)
- Cage nut insertion tool or flat-blade screwdriver (for installing cage nuts in some rack cabinets)

## Inventory



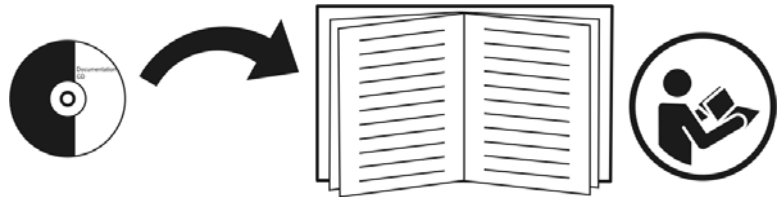
Quick Installation Guide



Important Notices Flyer



Documentation



Warranty Flyer



PowerChute®  
Business Edition  
software CD



Network Management Card documentation CD



## 2: INSTALLATION



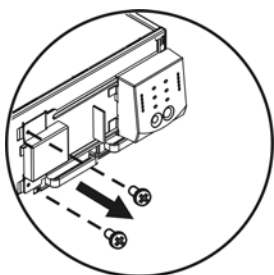
### DANGER

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

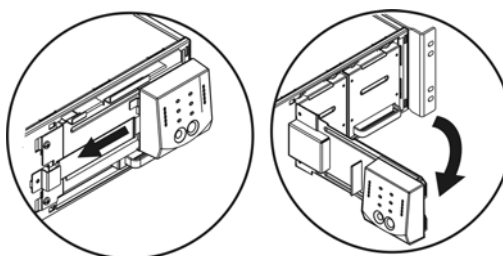
### Removing the Battery Modules

The uninterruptible power supply is heavy. Remove the battery modules to lighten the weight of the unit.

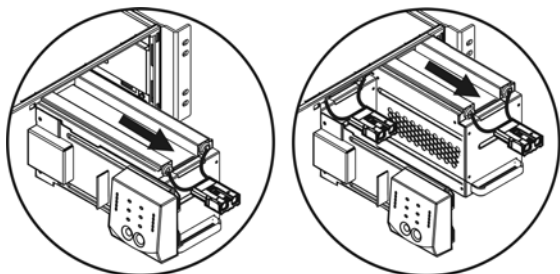
**1** Remove the two screws that secure the battery compartment door.



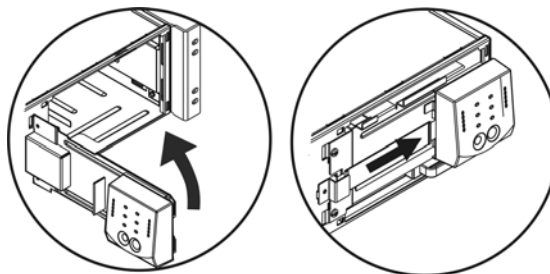
**2** Open the battery compartment door.



**3** Remove the battery modules.



**4** Close the battery compartment door.



### Specifications

Temperature	Operation	0° to 40° C (32° to 104° F)
	Storage	-15° to 30° C (5° to 86° F) charge the UPS battery every six months 30° to 45° C (86° to 113° F) charge the UPS battery every three months
Maximum Elevation	Operating	3,000 m (10,000 ft)
	Storage	15,000 m (50,000 ft)
Humidity		0 to 95% relative humidity

This unit is intended for indoor use only. Select a location sturdy enough to handle the weight.

Do not operate the unit where there is excessive dust or the temperature and humidity are outside the specified limits.

**Be sure that the air vents on the front and rear of the unit are not blocked. Allow adequate space for proper ventilation.**

Environmental factors impact battery life. High temperatures, poor utility power, and frequent, short duration discharges will shorten battery life.



OR



OR

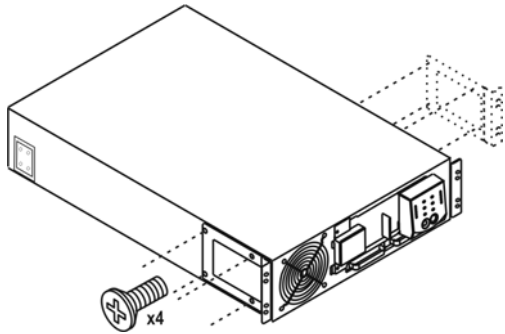


### CAUTION

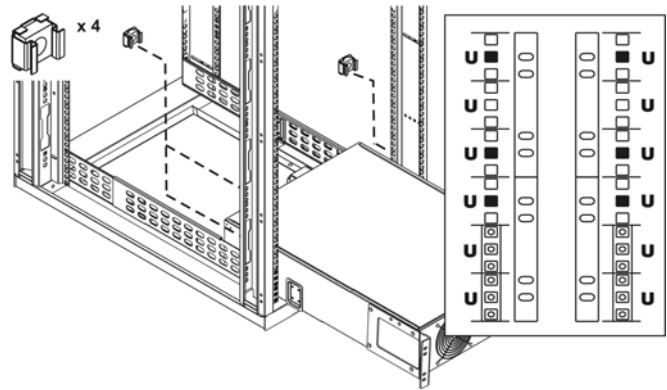
The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this unit. (C010)

## Installing the Uninterruptible Power Supply in a Rack

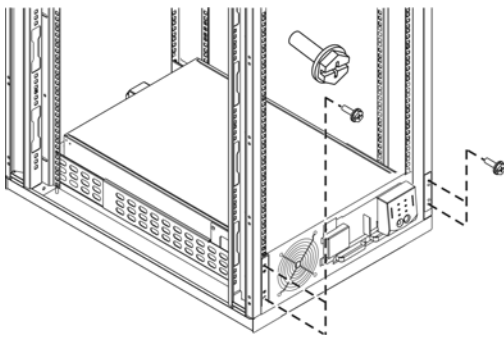
❶ Secure the rack-mount brackets to the uninterruptible power supply.



❷ Refer to the instruction sheet included in the rail kit for rail installation details. Refer to the diagram below for cage nut (clip nut) installation. The solid squares indicate the cage nut (clip nut) locations. Install the uninterruptible power supply at the bottom of the rack. **Note:** Leave 3 U of space below the uninterruptible power supply for each battery pack to be installed.



❸ Secure the uninterruptible power supply in the rack using four Phillips hex screws.



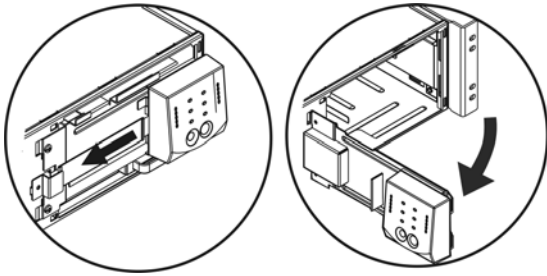
## Installing and Connecting the Batteries and Attaching the Bezel



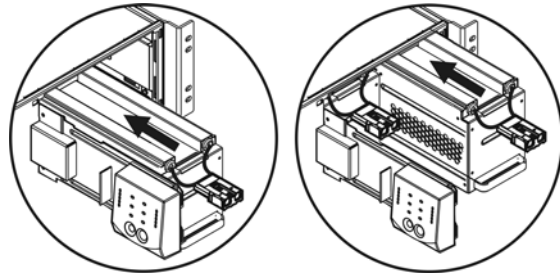
### CAUTION

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

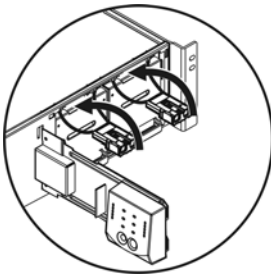
- 1** Open the battery compartment door.



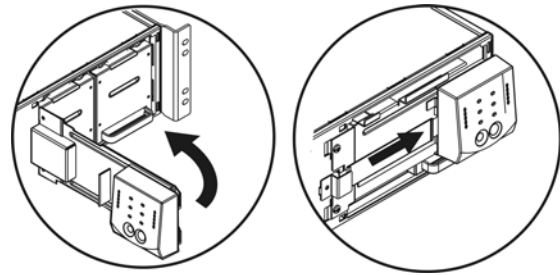
- 2** Install the battery modules.



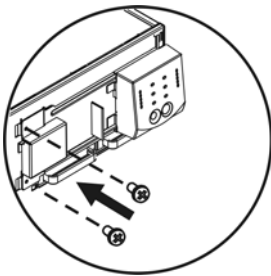
- 3** Connect the battery modules.



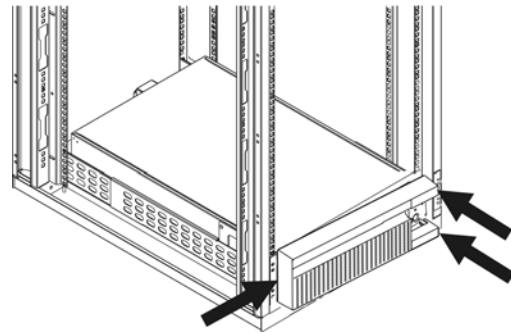
- 4** Close the battery compartment door.  
Be sure the battery cables are positioned so that they are not pinched.



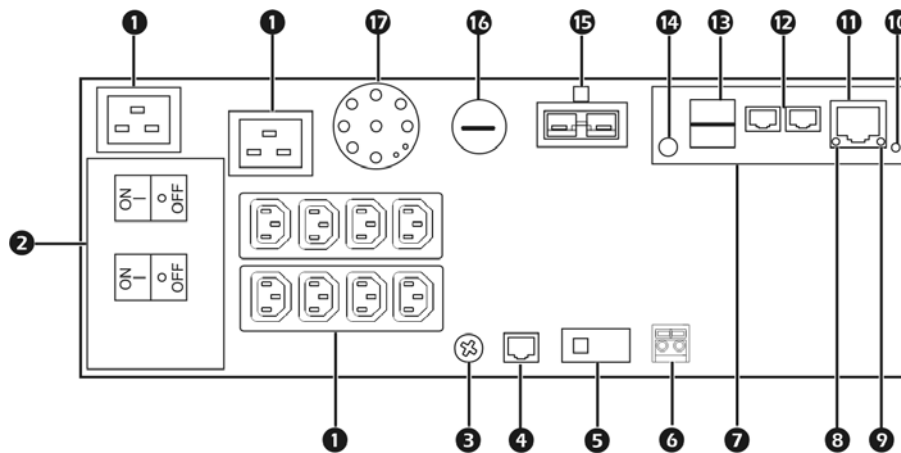
- 5** Secure the battery compartment door using the screws removed previously.



- 6** Attach the bezel.




## Rear Panel Components



INDEX	ITEM	DESCRIPTION
❶	Outlets	Connect equipment to the uninterruptible power supply.
❷	Output Circuit Breakers	Circuit breakers protect the UPS outlets from overload conditions.
❸	TVSS Screw	The uninterruptible power supply features a transient voltage surge-suppression (TVSS) screw for connecting the ground lead on surge suppression devices such as telephone and network line protectors. When connecting a grounding cable, disconnect the uninterruptible power supply from the utility power outlet.
❹	Serial Port	Power management software and serial port communication can be used with the uninterruptible power supply. Use only cables supplied or approved by IBM.  <b>Note:</b> Use the supplied serial cable to connect to the serial port. <i>Do not</i> use a standard serial interface cable because it is incompatible with the uninterruptible power supply connector.
❺	Bypass Switch	This switch will put the unit in bypass mode. See <i>Operation</i> .
❻	EPO Terminal	The optional Emergency Power Off (EPO) feature enables connected loads to be immediately de-energized from a remote location, without switching to battery operation. See <i>Emergency Power Off (EPO) Option</i> .
❼	Network Management Card	The Network Management Card (NMC) is factory installed in the uninterruptible power supply.
❽	Link-RX/TX (10/100) LED	Refer to the NMC documentation for details.
❾	Status LED	Refer to the NMC documentation for details.
❿	Reset on the NMC	Resets the NMC while the unit is connected to utility or battery power.
⓫	Ethernet Port on the NMC	Connects the uninterruptible power supply to the Ethernet network.
⓬	Universal Input/Output Connectors on the NMC	Connect temperature sensors, temperature/humidity sensors, or relay input/output connectors. Refer to the NMC documentation for details.
⓭	USB Connectors on NMC	Reserved for future use.
⓮	Console on the NMC	Connects the NMC to a local computer for initial configuration of network settings.  Provides access to the command line interface.
⓯	Optional Battery Pack Connectors	Optional battery packs provide extended runtime during power outages. See <i>3U Extend Run Battery Pack Operation and Setup Guide</i> .
⓰	Input Fuse	The input fuse provides protection for the uninterruptible power supply from extreme overloads.
⓱	Input power connector	Input power cord connects the uninterruptible power supply to utility power.

## Startup

1. Connect equipment to the uninterruptible power supply.
2. Turn on all connected equipment. To use the uninterruptible power supply as a master on/off switch, be sure all connected equipment is turned on.
3. Press the  button on the front panel to turn on the uninterruptible power supply.
4. Select the output voltage (default is 230 V). Refer to *Setting the Output Voltage through Terminal Mode*.  
**Note:** For setting the number of external battery packs through Terminal Mode, see the *3U Extend Run Battery Pack Operation and Setup Guide*.
5. Configure the Network Management Card (optional).

## Selecting the Output Voltage through Terminal Mode

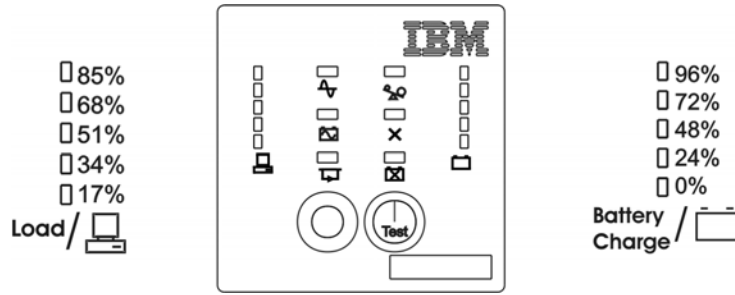
Terminal Mode is a menu driven interface that enables enhanced configuration of the uninterruptible power supply through a serial connection.







Connect the serial cable to the serial port on the rear side of the uninterruptible power supply.




1. When using the PowerChute<sup>®</sup> Business Edition or Network Shutdown software, stop the PowerChute Business Edition agent and server services using the following steps:
  - a. From the desktop, click **Start=> Settings=> Control Panel=> Administrative Tools=> Services**.
  - b. Select **PCBE Server** and **PCBE Agent** or **APC PBE Agent**, then, right click the mouse and select **Stop**.
2. The Network Management Card (NMC) is factory installed in the IBM 5000XHV SmartSlot located on the rear panel. The NMC must be removed from the SmartSlot prior to uninterruptible power supply terminal mode configuration. Remove the two screws that secure the NMC to the uninterruptible power supply chassis. Carefully remove the NMC.
3. Open a terminal program, for example HyperTerminal.  
From the desktop, click **Start => Programs => Accessories => Communication =>HyperTerminal**.
4. Double-click on the **HyperTerminal** icon.
  - a. Follow the prompts to choose a name and select an icon. Disregard the message, must install a modem, if it is displayed. Click **OK**.
  - b. Select the **COM** port that is connected to the uninterruptible power supply. The port settings are:
    - ✓ **bits per second - 9600**
    - ✓ **data - bits 8**
    - ✓ **parity - none**
    - ✓ **stop bit - 1**
    - ✓ **flow control - none**
  - c. Click Enter.
5. Once the blank terminal window is open, follow these steps to configure the output voltage:
  - a. Press **Enter** to initiate terminal mode.
  - b. Press **1** to select uninterruptible power supply **Settings**. Wait for the uninterruptible power supply **Settings** menu to appear on the screen.
  - c. Press **1** to select **Output Voltage**.
  - d. Press the number corresponding to the desired voltage setting and press **Y** to confirm.
  - f. Press **Esc** multiple times until logged out.
6. Reinstall the NMC using the two screws previously removed.
7. Start the PowerChute Business Edition agent and server services using the following steps:
  - a. From the desktop, click **Start=> Settings=> Control Panel=> Administrative Tools=> Services**.
  - b. Select **PCBE Server** and **PCBE Agent** or **APC PBE Agent**; then, right click the mouse and select **Start**.

# 3: OPERATION

## Front Display Panel



INDICATOR	DESCRIPTION
	This LED is lit when the uninterruptible power supply is supplying utility power to the connected equipment and performing double conversion to supply power to the connected equipment. If not lit, the uninterruptible power supply is either not turned on, or is supplying battery power. When flashing, the uninterruptible power supply is running an internal self-test.
	This LED is lit when the uninterruptible power supply is supplying battery power to the connected equipment.
	This LED is lit when the unit is sending utility power directly to the connected equipment. Bypass mode operation is the result of an internal fault, an overload condition, or a user-initiated command (performed manually through the manual bypass switch). Battery operation is not available while the uninterruptible power supply is in bypass mode. See <i>Troubleshooting</i> .
	This LED is lit when the uninterruptible power supply detects an internal fault. See <i>Troubleshooting</i> .
	This LED is lit and the uninterruptible power supply emits a sustained alarm tone when the connected loads are drawing more than the uninterruptible power supply power rating. See <i>Troubleshooting</i> .
	Failure of a battery self-test causes the uninterruptible power supply to emit short beeps for one minute and this LED to be lit. See <i>Troubleshooting</i> .

FEATURE	FUNCTION
	Press this button to turn on the uninterruptible power supply. (Additional capabilities will be described later in the document.)
	Press this button to turn off the uninterruptible power supply.
Self-Test	<p><b>Automatic:</b> The uninterruptible power supply performs a self-test automatically when turned on, and every two weeks thereafter (by default). During the self-test, the uninterruptible power supply briefly operates the connected equipment on battery.</p> <p>If the uninterruptible power supply fails the self-test, the replace battery LED is lit and immediately returns to online operation. The connected equipment is not affected by a failed test. Allow the battery to recharge for 24 hours and perform another self-test. If it fails, the battery must be replaced.</p> <p><b>Manual:</b> Press and hold the  button for a few seconds to initiate the self-test.</p>

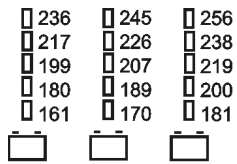
**FEATURE**

**FUNCTION**



Diagnostic Utility Voltage

The uninterruptible power supply has a diagnostic feature that displays the utility voltage.

**200 V**   **208 V**   **220 V**



**Note:** The uninterruptible power supply starts a self-test as part of this procedure. The self-test does not affect the voltage display.

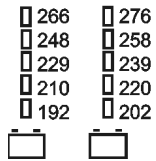
Press and hold the  button to view the utility voltage bar graph display. After a few seconds, the five-LED Battery Charge  display on the right of the front panel will show the utility input voltage.

Refer to the figure to the left for the voltage reading corresponding to the configured nominal output voltage.

The display indicates that the voltage is between the displayed value on the list and the next higher value.


If *three LEDs are lit*, the utility voltage is within the normal range. If *no LEDs are lit* and the uninterruptible power supply is plugged into a properly functioning utility power outlet, the line voltage is extremely low. If *all five LEDs are lit*, the line voltage is extremely high and should be checked by an electrician.

**230 V**   **240 V**



**On Battery Operation**

The uninterruptible power supply automatically switches to battery operation if the utility power fails. While running on battery, an alarm beeps four times every 30 seconds.

Press the  button to silence this uninterruptible power supply alarm. If the utility power does not return, the uninterruptible power supply continues to supply power to the connected equipment until the battery is fully discharged.

If you are not using PowerChute, shut down the operating system and turn off the computer before the uninterruptible power supply fully discharges the battery.

**Determining On Battery Runtime**

The uninterruptible power supply battery charges when connected to utility power. The battery charges to 90% capacity during the first three hours of normal operation. *Do not* expect full battery run capability during the initial charge period.

**Battery Runtime Table**

**Note:** The recharge time is the approximate time it takes to get to a 90% capacity from a complete discharge at a 50% load.

Load (W)	Number of Battery Packs			
	Internal	+1	+2	+4
50	6:49	18:03	31:32	59:56
100	4:50	12:51	22:29	42:46
200	3:00	8:03	14:06	26:50
300	2:09	5:47	10:10	19:22
400	1:39	4:30	7:54	15:04
500	1:20	3:39	6:26	12:17
600	1:07	3:04	5:24	10:20
700	0:57	2:38	4:39	8:54
800	0:50	2:18	4:04	7:48
900	0:44	2:02	3:37	6:56
1000	0:39	1:50	3:15	6:14
1200	0:32	1:30	2:41	5:11
1400	0:26	1:16	2:17	4:25
1600	0:22	1:06	1:59	3:50
1800	0:19	0:58	1:45	3:23
2000	0:17	0:52	1:33	3:01
2500	0:12	0:40	1:13	2:22
3000	0:09	0:32	1:00	1:57
3400	0:08	0:25	0:50	1:40
4000	0:06	0:23	0:43	1:25
4500	0:05	0:20	0:38	1:15
<b>Recharge Hours</b>	3	9	15	27



## Uninterruptible Power Supply Settings

Note: Settings are made through supplied PowerChute software, Network Management Card (NMC), or Terminal Mode.

FUNCTION	FACTORY DEFAULT	USER SELECTABLE CHOICES	DESCRIPTION
Automatic Self-Test	On start-up and every 14 days, thereafter	On start-up and every 7 days thereafter On start-up and every 14 days thereafter On start-up only No self-test	Set the interval at which the UPS will execute a self-test.
Date of Last Battery Replacement	Manufacture date	Date of battery replacement	Reset this date when you replace the battery modules.
Minimum Run time Before Return from Shutdown	0 seconds	0 to 3600 s of run time	Specify the minimum run time following a low battery shutdown, before powering connected equipment.
Audible Alarm Setting	ON	ON, OFF	Enable or disable all alarms permanently.
Simple Shutdown Delay	90 seconds	0 to 1800 s	Set the interval between the time when the uninterruptible power supply receives a simple shutdown command and the actual shutdown.
Simple Low Run Time Warning	150 seconds	0 to 1800 s	Change the warning interval default to a higher setting if the operating system requires a longer interval for shutdown.  The low battery warning beeps are continuous when 150 seconds of run time remain.
High Bypass Point	255 VAC	<i>Output Voltage Setting</i> 200 VAC: 210 - 280 VAC 208 VAC: 220 - 280 VAC 220 VAC: 235 - 280 VAC 230 VAC: 245 - 280 VAC 240 VAC: 255 - 280 VAC	Maximum voltage that the UPS will pass to connected equipment during internal bypass operation.
Low Bypass Point	160 VAC	<i>Output Voltage Setting</i> 200 VAC: 160 - 185 VAC 208 VAC: 160 - 190 VAC 220 VAC: 160 - 195 VAC 230 VAC: 160 - 200 VAC 240 VAC: 160 - 205 VAC	Minimum voltage that the UPS will pass to connected equipment during internal bypass operation.

FUNCTION	FACTORY DEFAULT	USER SELECTABLE CHOICES		DESCRIPTION
Output Voltage	230 VAC	200, 208, 220, 230, 240 VAC		Allows the user to select the on-line output voltage.
Output Frequency	Automatic 50 ± 3 Hz or 60 ± 3 Hz	50 ± 3 Hz	60 ± 3 Hz	Sets the allowable uninterruptible power supply output frequency. Whenever possible, the output frequency tracks the input frequency.
		50 ± 1 Hz	60 ± 1 Hz	
		50 ± 0.1 Hz    60 ± 0.1 Hz		
		50 ± 3 Hz or 60 ± 3 Hz		
Number of External Battery Packs	0	0 to 10		Defines the number of external connected battery packs for proper run time prediction.
Bypass Acceptable	Not required	Required/ Not required		Phase and frequency lock required/not required before the UPS will switch to bypass.

### Emergency Power Off (EPO) Option

The output power can be disabled in an emergency by closing a switch connected to the EPO.

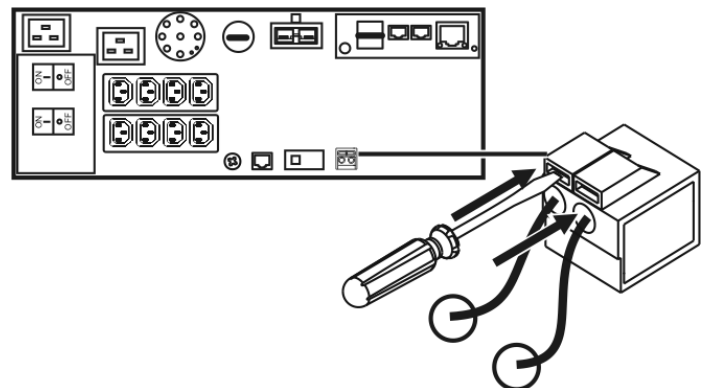
**Note:** Adhere to national and local electrical codes when wiring.

The switch should be connected in a normally open switch contact. External voltage is not required; the switch is powered by a 12 V internal power supply. A closed switch draws 2 mA of current.

The EPO switch is internally powered by the uninterruptible power supply for use with non-powered switch circuit breakers.

**Note:** The EPO circuit is considered a Class 2 circuit, (UL, CSA standards) and an SELV circuit (IEC standard).

- Strip the insulation from one end of each wire to be used for connecting the EPO.
- Insert a screwdriver into the slot above the terminal block to be used.
- Insert the stripped wire into the terminal.
- Remove the screwdriver to secure the wire in the terminal. Repeat for each terminal.



Both Class 2 and SELV circuits must be isolated from all primary circuitry. Do not connect any circuit to the EPO terminal block unless it can be confirmed that the circuit is Class 2 or SELV.

If the circuit standard cannot be confirmed, use a contact closure switch.

Use one of the following cable types to connect the uninterruptible power supply to the EPO switch:

- CL2: Class 2 cable for general use
- CL2P: Plenum cable for use in ducts, plenums, and other spaces used for environmental air
- CL2R: Riser cable for use in a vertical run in a floor-to-floor shaft
- CLEX: Limited use cable for use in dwellings and for use in raceways
- For installation in Canada: Use only CSA certified, type ELC (extra-low voltage control cable)
- For installation in other countries: Use a standard low-voltage cable according to local regulations

## 4: MAINTENANCE, SHIPPING, AND SERVICE



### CAUTION

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)



### CAUTION

Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn.

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)

### ***Replacing the Battery Modules***

#### **De-energizing Safety**

The uninterruptible power supply has an internal energy source, the battery. The output may be energized when the unit is not connected to a utility power outlet.

To de-energize the uninterruptible power supply, press the OFF button to shut the equipment off. Unplug the uninterruptible power supply from the utility power outlet. Disconnect the external batteries where applicable and disconnect the internal battery. Refer to the *Operation and Setup Guide* for details. Push the ON button to de-energize the capacitors.

**Once the batteries have been disconnected connected equipment is not protected from power outages.**

#### **Use caution when handling heavy battery modules.**

The uninterruptible power supply has replaceable, hot-swappable battery modules. Replacement is a safe procedure, isolated from electrical hazards. Leave the uninterruptible power supply and connected equipment on during the replacement procedure.

Contact your IBM marketing representative or authorized reseller for information about replacement battery modules.

Refer to *Removing the Battery Modules* for removal instructions. For battery replacement, refer to *Installing and Connecting the Batteries and Attaching the Front Battery Bezel*.

This product contains sealed lead acid batteries. The battery modules must be recycled or disposed of properly. IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed lead acid battery modules. For information on proper disposal of these modules, please contact IBM at 1-800-426-4333. Have the model number listed on the uninterruptible power supply available before you call.

For information about the disposal of sealed lead acid batteries outside of the United States, contact the local IBM service organization. Refer to the *Getting Help and Technical Assistance* and *Shipping and Service* sections in this manual.

### ***Replacing the Network Management Card***

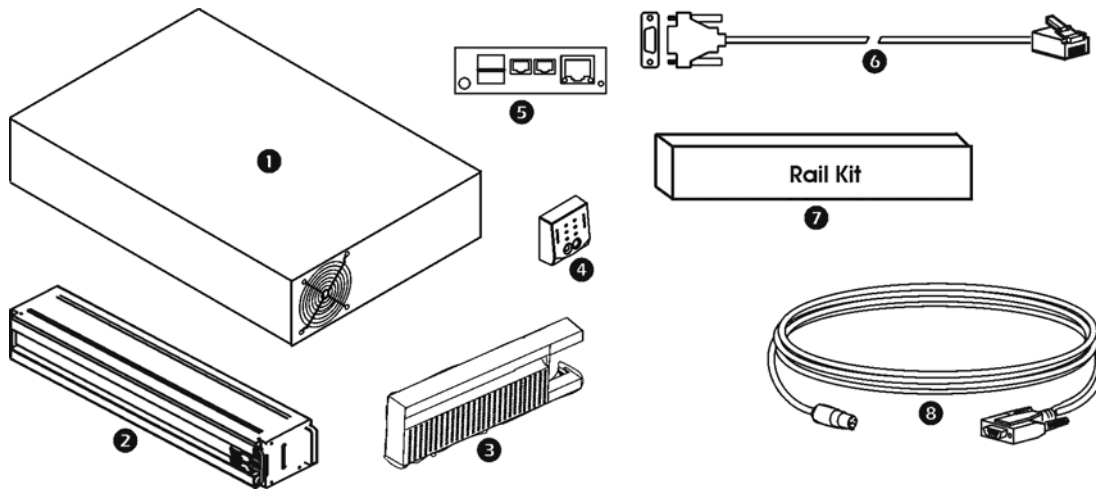
Refer to the *Network Management Card CD* for removal and replacement procedures.

## Hardware Maintenance Information

### Customer Replaceable Unit Part Numbers

IBM CRU part numbers are subject to change without notice.

This section contains a listing of the CRU part numbers available at the time this document was published.



INDEX	CRU PART #	DESCRIPTION
1	46M5359	Uninterruptible Power Supply 5000XHV Chassis
2	46M5386	Replacement Battery Module
3	25R5594	Front Bezel
4	46M5361	UPS 5000XHV Display Panel
5	46M5243	Network Management Card
6	46M5374	Serial Cable
7	73P5769	Rail Kit
8	46M5365	Cable NMC2 Console 2.5mm to DB9

### Shipping and Service

Prepare the uninterruptible power supply for shipping:

Shut down and disconnect any equipment attached to the uninterruptible power supply. Shut down the uninterruptible power supply, and disconnect the uninterruptible power supply from the utility power outlet. Remove the front bezel and disconnect the batteries.

If the uninterruptible power supply requires service, do not return it to the dealer. Follow these steps:

1. Review the problems discussed in *Troubleshooting* to eliminate common problems.
2. If the problem persists, contact IBM.
  - Note the model number of the uninterruptible power supply, the serial number, and the date purchased. If you call IBM Customer Service, a technician will ask you to describe the problem and attempt to solve it over the phone, if possible. If the uninterruptible power supply or one of its components is faulty, IBM will send you a replacement CRU for the uninterruptible power supply or the component.
  - If the uninterruptible power supply or the component is under warranty, repairs are free. If not, there is a repair charge.
3. Pack the uninterruptible power supply or the faulty component in packaging sent by IBM, and use the return label to ship back to IBM. Pack the uninterruptible power supply properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.

**ATTENTION: ALWAYS DISCONNECT THE BATTERY BEFORE SHIPPING. THE BATTERY MODULES MAY REMAIN IN THE UNINTERRUPTIBLE POWER SUPPLY, THEY DO NOT HAVE TO BE REMOVED.**

## 5: TROUBLESHOOTING

Use the chart below to solve minor uninterruptible power supply installation and operation problems. Contact IBM for assistance with complex uninterruptible power supply problems.

PROBLEM AND POSSIBLE CAUSE	SOLUTION
<b><i>UNINTERRUPTIBLE POWER SUPPLY WILL NOT TURN ON</i></b>	
The uninterruptible power supply is not connected to the utility power supply.	Check that the power cord from the uninterruptible power supply to the utility power supply is securely connected at both ends.
The batteries are not connected properly.	Check that the battery connectors are fully engaged.
There is very low or no utility voltage.	Check the utility power supply to the uninterruptible power supply by plugging in a table lamp. If the light is very dim, have the utility voltage checked.
<b><i>UNINTERRUPTIBLE POWER SUPPLY WILL NOT TURN OFF</i></b>	
There is an internal uninterruptible power supply fault.	Do not attempt to use the uninterruptible power supply. Unplug the uninterruptible power supply and have it serviced immediately.
<b><i>UNINTERRUPTIBLE POWER SUPPLY BEEPS OCCASIONALLY</i></b>	
The uninterruptible power supply beeps when running on battery during normal operation.	None. The uninterruptible power supply is protecting the connected equipment from occasional utility power irregularities.
<b><i>UNINTERRUPTIBLE POWER SUPPLY IS NOT PROVIDING EXPECTED BACKUP TIME</i></b>	
The uninterruptible power supply battery is weak due to a recent outage or is near the end of its service life.	Charge the battery. Batteries require recharging after extended outages, and wear faster when frequently put into service or when operated at elevated temperatures. If the battery is near the end of the service life, consider replacing the battery even if the replace battery LED is not yet lit.
<b><i>ALL LEDES ARE LIT AND THE UNINTERRUPTIBLE POWER SUPPLY EMITS A CONSTANT BEEPING</i></b>	
There is an internal uninterruptible power supply fault.	Do not attempt to use the uninterruptible power supply. Turn off the uninterruptible power supply and have it serviced immediately.
<b><i>FRONT PANEL LEDES FLASH SEQUENTIALLY</i></b>	
The uninterruptible power supply has been shut down remotely through software.	None. The uninterruptible power supply will restart automatically when utility power returns.
<b><i>ALL LEDES ARE OFF AND THE UNINTERRUPTIBLE POWER SUPPLY IS PLUGGED INTO A WALL OUTLET</i></b>	
The uninterruptible power supply is shut down or the battery is discharged from an extended outage.	None. The uninterruptible power supply will return to normal operation when the power is restored and the battery has a sufficient charge.

PROBLEM AND POSSIBLE CAUSE	SOLUTION
<b>BYPASS AND OVERLOAD LEDS ARE LIT; UNINTERRUPTIBLE POWER SUPPLY EMITS A SUSTAINED ALARM TONE</b>	
The uninterruptible power supply is overloaded. The connected equipment is drawing more VA or more watts than the uninterruptible power supply can sustain.	<p>The connected equipment exceeds the specified maximum load.</p> <p>The alarm remains on until the overload is removed. Disconnect nonessential equipment from the uninterruptible power supply to eliminate the overload.</p> <p>The uninterruptible power supply continues to supply power as long as it is online and the circuit breaker does not trip; the uninterruptible power supply will not provide power from batteries in the event of a utility voltage interruption.</p> <p>If a continuous overload occurs while the uninterruptible power supply is on battery, the unit turns off output in order to protect the uninterruptible power supply from possible damage.</p>
<b>BYPASS LED IS LIT</b>	
The bypass switch has been turned on manually.	<p>If bypass is the chosen mode of operation, ignore the lit LED.</p> <p>If bypass is not the chosen mode of operation, move the bypass switch on the back of the uninterruptible power supply to the normal position.</p>
<b>FAULT AND OVERLOAD LEDS ARE LIT; UNINTERRUPTIBLE POWER SUPPLY EMITS A SUSTAINED ALARM TONE</b>	
The uninterruptible power supply has stopped sending power to connected equipment.	<p>The connected equipment exceeds the specified maximum load.</p> <p>Disconnect nonessential equipment from the uninterruptible power supply to eliminate the overload condition.</p> <p>Press the off button, then the on button to restore power to connected equipment.</p>
<b>FAULT LED LIT</b>	
There is an internal uninterruptible power supply fault.	Do not attempt to use the uninterruptible power supply. Turn off the unit and have it serviced immediately.
<b>REPLACE BATTERY LED IS LIT</b>	
The replace battery LED flashes and a short beep is emitted every two seconds to indicate the battery is disconnected.	Check that the battery connectors are fully engaged.
The battery is weak.	Allow the battery to recharge for 24 hours. Then, perform a self-test. If the problem persists after recharging, replace the battery.
A battery self-test has failed.	The uninterruptible power supply emits short beeps for one minute and the replace battery LED is lit. The uninterruptible power supply repeats the alarm every five hours. Perform the self-test procedure after the battery has charged for 24 hours to confirm the replace battery condition. The alarm stops and the LED no longer illuminates if the battery passes the self-test.
<b>UNINTERRUPTIBLE POWER SUPPLY OPERATES ON BATTERY ALTHOUGH NORMAL LINE VOLTAGE EXISTS</b>	
There is very high, low, or distorted line voltage.	Move the uninterruptible power supply to a different outlet on a different circuit. Inexpensive fuel powered generators might distort the voltage. Test the input voltage with the utility voltage display. See <i>Operation</i> .

## **6: GETTING HELP AND TECHNICAL ASSISTANCE**

If you need help, service, or technical assistance or just want more information about IBM<sup>(R)</sup> products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

### **BEFORE YOU CALL**

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

### **USING THE DOCUMENTATION**

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/systems/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

### **GETTING HELP AND INFORMATION FROM THE WORLD WIDE WEB**

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x<sup>(TM)</sup> and xSeries<sup>(R)</sup> information is <http://www.ibm.com/systems/x/>. The address for IBM BladeCenter<sup>(R)</sup> information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation<sup>(R)</sup> information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/systems/support/>.

## **SOFTWARE SERVICE AND SUPPORT**

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

## **HARDWARE SERVICE AND SUPPORT**

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

## **IBM TAIWAN PRODUCT SERVICE**

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台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation  
3F, No 7, Song Ren Rd.  
Taipei, Taiwan  
Telephone: 0800-016-888



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**First Edition (September 2009)**

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## **IMPORTANT NOTES**

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

## **PARTICULATE CONTAMINATION**

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the device, IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

**Table 1. Limits for particulates and gases**

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> <li>• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2<sup>1</sup>.</li> <li>• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.</li> <li>• The deliquescent relative humidity of the particulate contamination must be more than 60%<sup>2</sup>.</li> <li>• The room must be free of conductive contamination such as zinc whiskers.</li> </ul>
Gaseous	<ul style="list-style-type: none"> <li>• Copper: Class G1 as per ANSI/ISA 71.04-1985<sup>3</sup></li> <li>• Silver: Corrosion rate of less than 300 Å in 30 days</li> </ul>

<sup>1</sup> ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

<sup>2</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

<sup>3</sup> ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

## **ELECTRONIC EMISSION NOTICES**

### **Federal Communications Commission (FCC) statement**

**Note:** 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 instruction manual, 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 his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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.

### **Industry Canada Class A emission compliance statement**

This Class A digital apparatus complies with Canadian ICES-003.

### **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

### **Australia and New Zealand Class A statement**

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### **United Kingdom telecommunications safety requirement**

#### **Notice to Customers**

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

### **European Union EMC Directive conformance statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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## **Taiwanese Class A warning statement**

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。

## **Germany Electromagnetic Compatibility Directive**

### **Deutschsprachiger EU Hinweis:**

#### **Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

#### **Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten**

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

#### **Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A**

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

#### **Generelle Informationen:**

**Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

**People's Republic of China Class A warning statement**

声 明

此为 A 级产品。在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

**Japanese Voluntary Control Council for Interference (VCCI) statement**

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。

**Korean Class A warning statement**

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