IBM Netfinity 9308 Enterprise Rack

Planning Guide

IBM

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> **Note**
>
> Before using this information and the product it supports, please be sure to read the general information under Appendix D, "Product notices" on page 17.

First Edition (July 1999)

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Safety information

Before installing this product, read the Safety Information.

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)。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

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).

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.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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 pečítaje 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.

安裝本產品之前，請先閱讀「安全資訊」。

Introduction

This booklet contains information that will help you in planning for your IBM ® Netfinity® 9308 Enterprise Rack cabinet installation. Always refer to the documentation that comes with optional devices as well as the *IBM Netfinity 9308 Enterprise Rack Installation Guide* for detailed installation information. Also refer to the *IBM Netfinity 9308 Enterprise Rack Unpacking Instructions* for how to unpack and locate your rack.

The primary rack comes with side panels installed. You will need one primary rack per suite. The expansion rack comes without side panels, but includes the required hardware for attaching to a suite of racks.
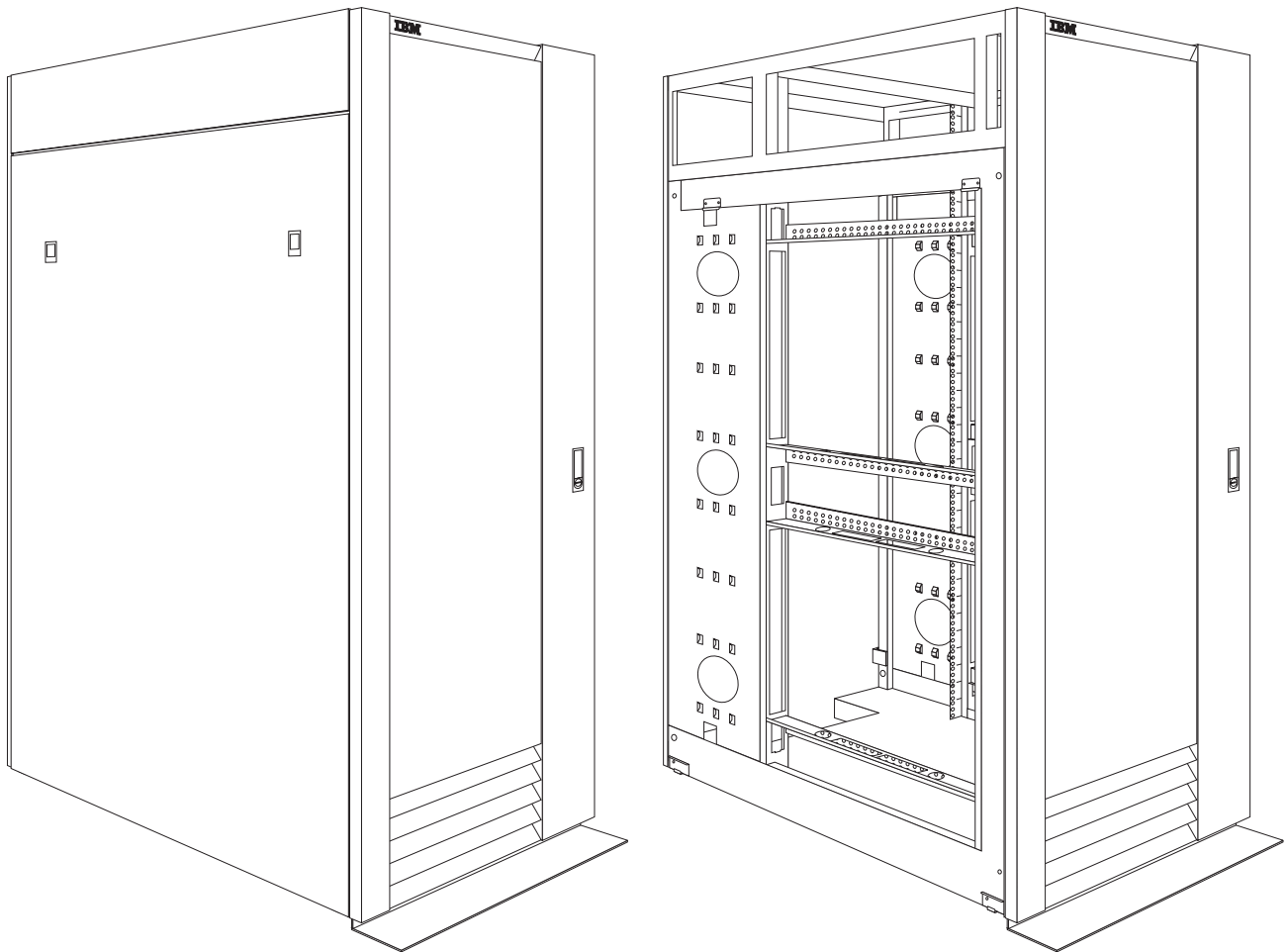

Figure 1. Primary and expansion racks

Note: The illustrations in this documentation might be slightly different from your hardware.

Planning for an installation

The IBM Netfinity Rack Configurator program is available to assist you in the planning and installation of your 9308 Enterprise Rack. This program provides an intuitive and user-friendly graphical interface to help you configure the rack and optional devices. The Rack Configurator program also provides the following information about the 9308 Enterprise Rack:

- Weight and stability limits

- Thermal and heat calculations

- Power requirements

- Internal space dimensions

- External space requirements

- Human factors considerations

1 **CAUTION:**
To ensure safety, all configurations of the rack must be Listed in the U.S.A. and Certified in Canada by a nationally recognized testing laboratory such as Underwriters Laboratory (UL), Canadian Standards Association (CSA), or ETL Testing Laboratories.

You can select components from the Component Catalog and place them in the picture of the Configuration Notebook to create a configuration. The Configuration Notebook also contains a parts list, specifications, and a top-view floor plan. You can configure a single rack or a suite of racks.

Functions such as **Auto Arrange**, **Validate**, and **Build** ensure proper placement of optional devices. The Rack Configurator program guides you in connecting optional devices and selecting the appropriate cables for connection. For additional assistance in creating a configuration, you can start **IBM ConfigPro** or **IBM Which Switch?** to configure individual devices. You can download the Rack Configurator program from the following Web site:

`http://www.ibm.com/pc/us/netfinity/index.html`

To download the Rack Configurator from the Web site:

1. Click **Accessories & Upgrades** on the left-hand column of the page.

2. Click **Software**.

3. Under the **Tools** section, click **Rack Configurator**.

4. Download the Rack Configurator program and the online documentation file.

Rack physical dimensions and clearances

The maximum weight of an empty 9308 Enterprise Rack is 261kg (575lbs). A fully loaded rack can weigh up to 928kg (2045lbs). The physical dimensions of the rack are 64.8cm x 110.5cm x 201.9cm (25.5in. x 43.5in. x 79.5in.) and it is an Electronic Industries Association (EIA) standard 42U rack cabinet.

The 9308 Enterprise Rack requires a minimal operational clearance on all sides to ensure proper ventilation and access to open the front and rear doors. An extended service clearance also provides easier access to the rack for installing and servicing optional devices. See Figure 2 and Figure 3 on page 4 for service and operational clearances.
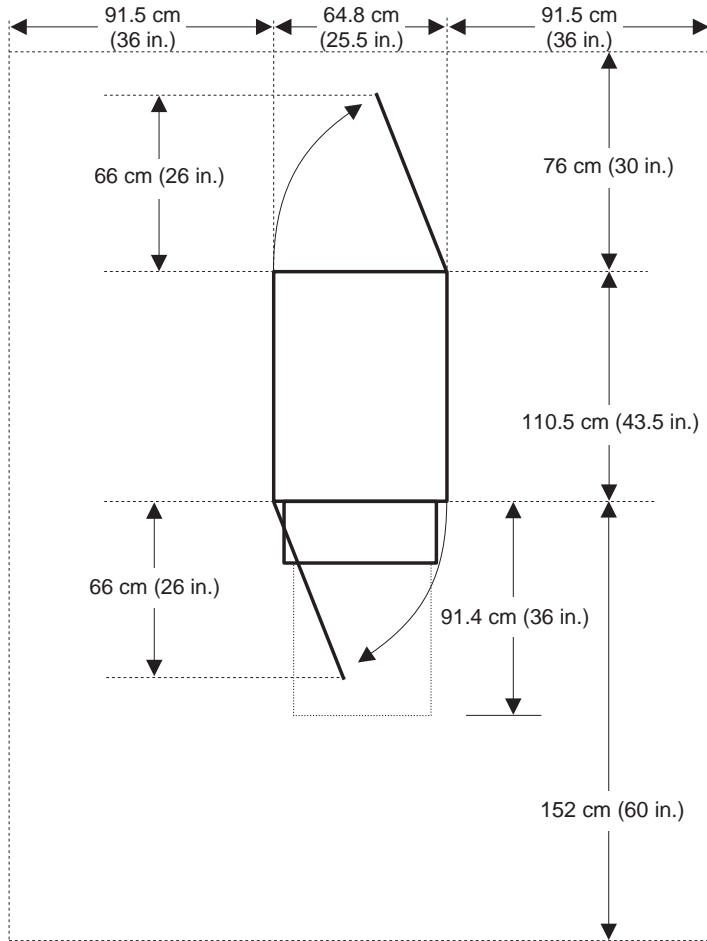
Figure 2. Service clearance for the rack
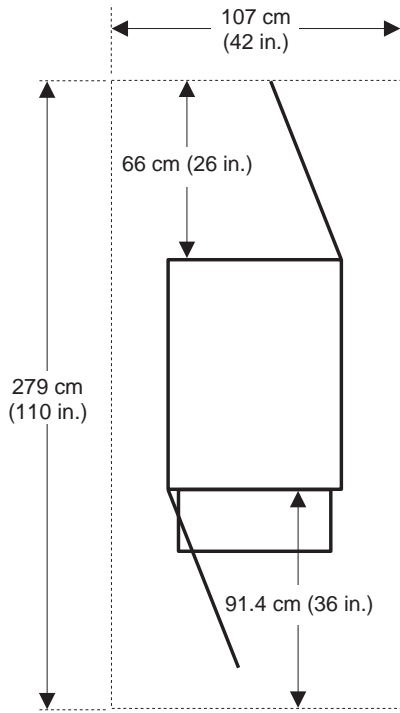
Figure 3. Operational clearance for the rack

When you attach primary and expansion racks together to form rack suites, you must leave 152cm (60in.) between suites in the same room. This provides proper ventilation and allows access for installing and servicing devices.
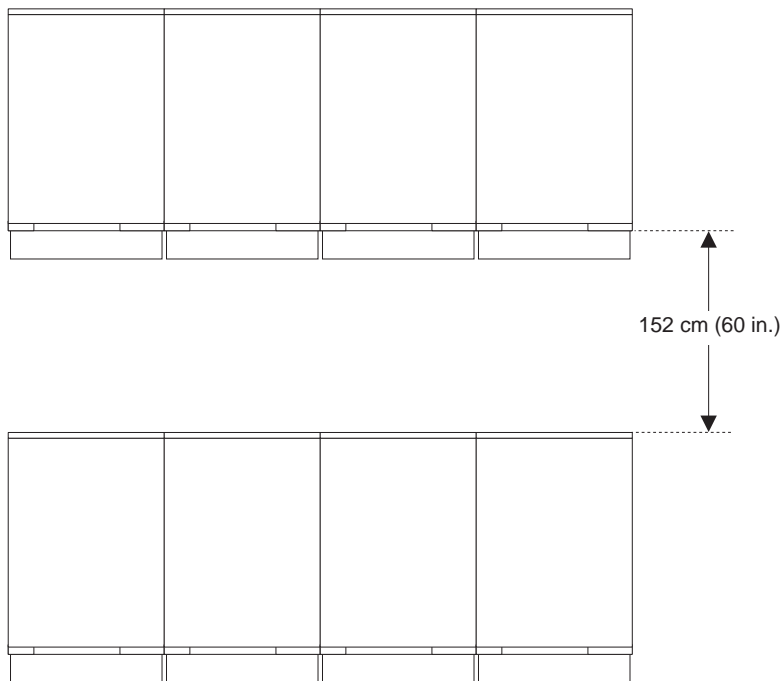
Figure 4. Clearance between rack suites

The internal dimensions of the 9308 Enterprise Rack conform to the EIA standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*. See Figure 5 for rack internal dimensions.

71.7 cm (28.23 in.)
Inside of front rail to inside of rear rail

45.1 cm (17.75 in.)
46.5 cm (18.3 in.)
49 cm (19.3 in.)

45.1 cm (17.75 in.)
46.5 cm (18.3 in.)
49 cm (19.3 in.)
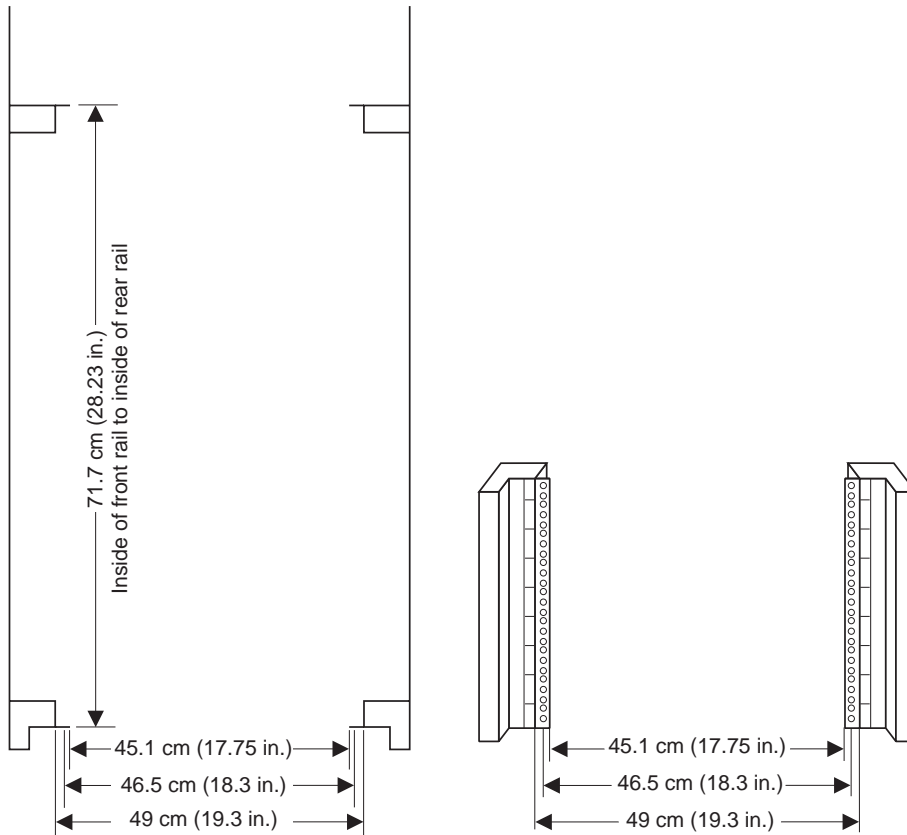
Figure 5. Rack internal dimensions

All vertical rack measurements are given in rack units (U), where one U is equal to 4.45cm (1.75in.). The U labels are marked on labels on the front and rear mounting rails of the rack.

21

20

19
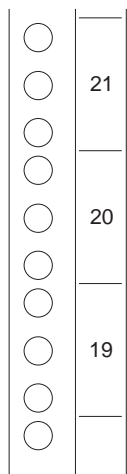
Figure 6. Vertical U markings on the rack rails

Rack electrical requirements

You might need to consult an electrician to assist you with planning for electrical requirements, such as:

- Each rack requires at least one power unit
- Each power unit (PDU or UPS) requires a separate ac power branch circuit
- The input voltage-selection switch on each device you install in a rack must match the output voltage of the rack power unit
- Rack power plugs must match the installed electrical outlets

4 **DANGER**

> **Plug rack power cords into electrical outlets that are located near the rack and are easily accessible.**

5 **DANGER**

> **Each rack might have more than one power cord. Be sure to disconnect all power cords in the rack before servicing any device in the rack.**

6 **DANGER**

> **Install an emergency power off (EPO) switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in one rack.**

7 **DANGER**

> **Connect all devices installed in a rack to power devices installed in the same rack. Do not plug the power cord from a device installed in one rack into a power device installed in a different rack.**

Rack and optional device limitations

As you prepare the physical site for the 9308 Enterprise Rack, be aware of its limitations. This is especially important if you plan to install non-IBM equipment in the rack. The rack has been tested under certain conditions for stability and safety. Be sure the rack and devices that you install meet these requirements.

2 **DANGER**

> – **The maximum allowable weight for devices mounted on slides is 80kg (176lbs). Do not install sliding devices exceeding this weight.**
>
> – **The center of gravity for an extended unit cannot exceed 407mm (16in.) from the face of the rack. If an extended device exceeds this distance, the configured rack might be unstable.**

- You must install the front stabilizer bracket on all racks
- The maximum weight of the rack with devices installed is 928kg (2045lbs)
- The weight of devices that you mount on the four corner posts must not exceed 16kg (35lbs) per rack U level; cantilevered devices must not exceed 5kg (11lbs) per rack U level

Preparing the physical site for a rack

Before you unpack or install the 9308 Enterprise Rack, be sure you:

- Understand the rack specifications and requirements
- Prepare a layout for the racks
- Prepare the physical site
- Read the *IBM Netfinity 9308 Enterprise Rack Unpacking Instructions* and *IBM Netfinity 9308 Enterprise Rack Installation Guide* booklets

Physical site planning includes determining:

- Floor area required by the equipment
- Floor-load capacity
- Space needed for expansion
- Location of columns
- Power and environmental requirements

Create a floor plan to check for clearance problems. Make a full-scale template (if needed) of the rack and carry it along the access route to check for potential clearance problems through doorways and passageways, around corners, and in elevators.

Note: The top 6U portion of the 9308 Enterprise Rack can be temporarily removed so that the rack can be moved through some nonstandard doorways if required. This procedure is detailed in the *IBM Netfinity 9308 Enterprise Rack Installation Guide* booklet.

Remember to provide space for storage cabinets, card files, desks, communication facilities, daily storage of tapes, and other supplies. Store all spare materials that can burn in properly designed and protected areas.

Creating a floor plan

To be sure that you have enough space for the racks, create a floor plan before installing them. You might need to prepare and analyze several plans before choosing a final one. If you are installing multiple racks in two or more stages, prepare a separate plan for each stage. Consider the following when you prepare each plan:

- Flow of work and personnel within the area
- Operator access to units, as required
- If the placement will be on a raised floor:
  - Positioning over a cooling register
  - Leaving the bottom of the rack open to facilitate cooling
- If the placement will not be on a raised floor:
  - Maximum cable lengths
  - Need for cable guards, ramps, or other similar items to protect equipment and personnel
- Location of any planned safety equipment
- Future expansion

Begin with an accurate drawing of the installation area (blueprints and floor plans are appropriate). Be sure to include the following in the floor plan:

- Service clearances required for each rack or suite of racks
- If the placement will be on a raised floor:
  - Things that might obstruct cable routing
  - The height of the raised floor
- If the placement will not be on a raised floor:
  - The placement of cables to minimize obstruction
  - If the cable routing is indirectly between racks, such as along walls or suspended, the amount of additional cable required
- Location of:
  - Power receptacles
  - Air conditioning equipment and controls
  - File cabinets, desks, and other office equipment
  - Room emergency power-off controls
  - All entrances, exist, windows, columns, and pillars

Review the final floor plan to ensure that cable lengths are not too long and that the racks have enough clearance. Refer to the *IBM Netfinity 9308 Enterprise Rack Installation Guide* for additional rack information.

Installing optional devices

There are many optional devices that you can install in the 9308 Enterprise Rack. Always refer to the *IBM Netfinity 9308 Enterprise Rack Installation Guide* booklet or the documentation that comes with the device for detailed installation instructions.

1. Blank filler panel
2. Monitor shelf
3. Fibre channel RAID controller module
4. SP switch
5. Fibre channel hub
6. Small server
7. Keyboard tray
8. Storage expansion unit
9. Large server
10. Uninterruptible power supply (UPS)
11. Power distribution unit (PDU)
12. Console server selector switch

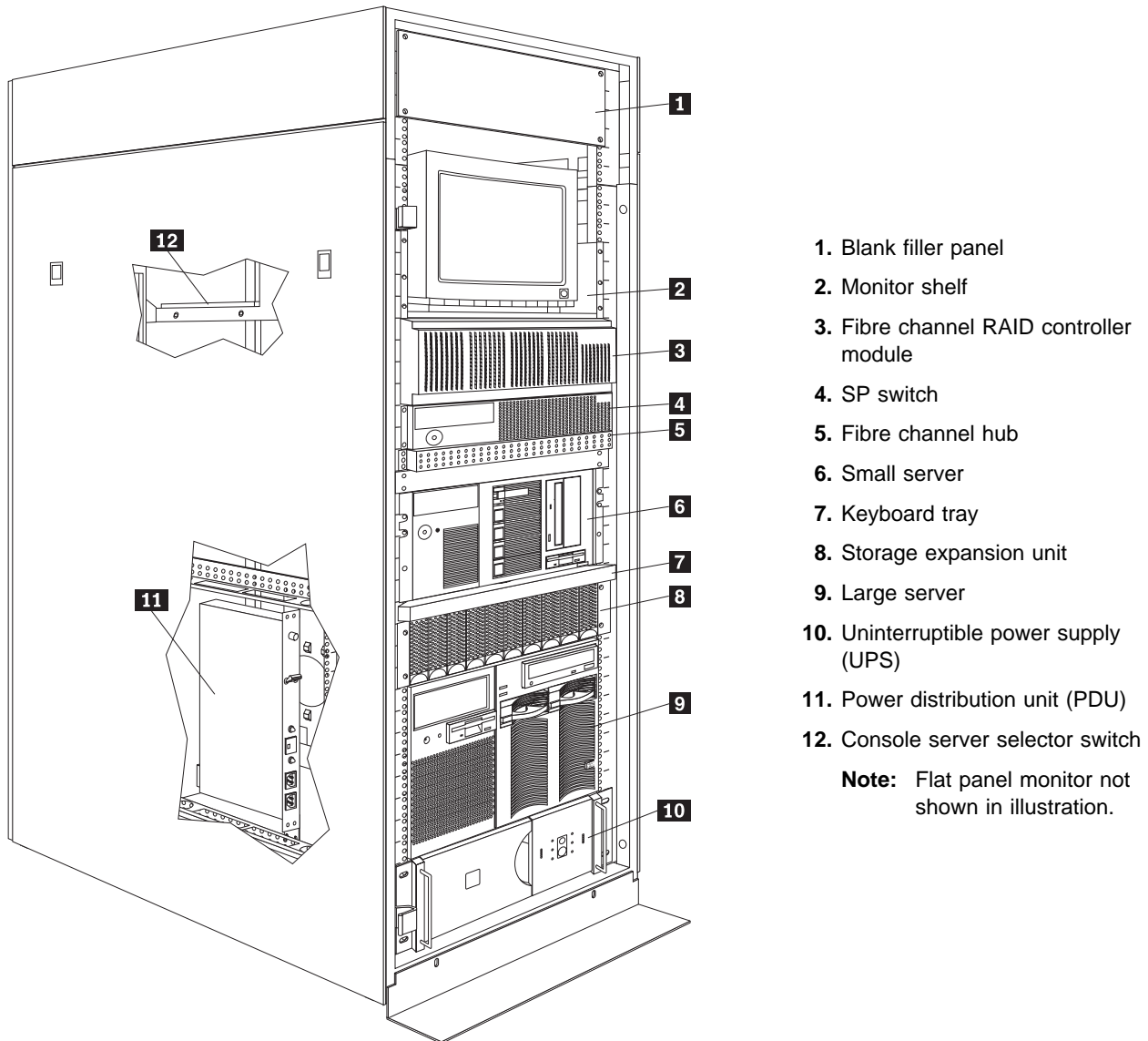   **Note:** Flat panel monitor not shown in illustration.

Figure 7. Rack with commonly installed options

⚠

3 **DANGER**

> – **Always install servers and power devices in the rack from the bottom to the top.**
>
> – **Always install the heaviest equipment in the bottom of the rack.**
>
> – **Always install the UPS (uninterruptible power supply) in the bottom of the rack.**
>
> – **Always install the stabilizer bracket.**
>
> – **Do not extend more than one sliding device at a time.**

Notes:

1. If installation instructions for the device you are installing are not provided in the *IBM Netfinity 9308 Enterprise Rack Installation Guide* booklet, use the instructions provided with the device.

2. IBM periodically makes updated instructions available on the web at the following URL:

   `http://www.ibm.com/pc/support`

Using threaded rails or bars to mount optional devices

You must install rails that have threaded holes on the inside of the rack mounting flanges. However, you can install rails that come with threaded bars on either the inside or the outside of the rack mounting flanges. Refer to the optional device documentation for detailed installation information.

Using clip nuts to mount optional devices

You must use clip nuts for all optional devices that do not have threaded holes. Clip nuts install on the rack mounting flanges as shown in Figure 8. A few devices, such as the UPS, require that you install the clip nuts on the rail instead of the rack. Refer to the optional device documentation for detailed installation information.
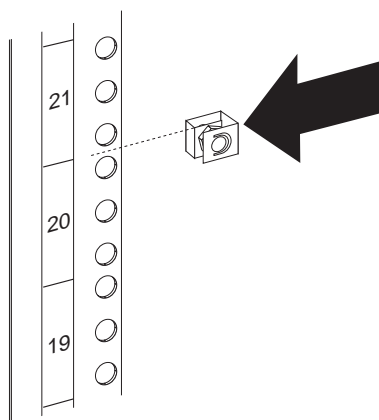

Figure 8. Installing clip nuts on the rack mounting flanges

Note: The 9308 Enterprise Rack comes with clip nuts that you can use to install optional devices.

Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM Personal Computer HelpCenter (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM Statement of Limited Warranty.

The following services are available during the warranty period:

- Problem Determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- IBM Hardware Repair - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.

- Engineering Change Management - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make Engineering Changes (ECs) available that apply to your hardware.

Be sure to retain your proof of purchase to obtain warranty service. Refer to the IBM hardware warranty for a full explanation of IBM's warranty terms.

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

On the World Wide Web, the IBM Personal Computing Web site has up-to-date information about IBM Personal Computer products and support.

Some helpful addresses are:

`http://www.ibm.com`	Main IBM home page
`http://www.ibm.com/pc`	IBM Personal Computing
`http://www.ibm.com/pc/support`	IBM Personal Computing Support
`http://www.ibm.com/pc/us/accessories`	Options by IBM (U.S.)
`http://www.ibm.com/pc/us/netfinity`	IBM Netfinity Servers (U.S.)
`http://www.ibm.com/pc/techconnect`	IBM TechConnect

You can select a country-specific Web site from these pages.

If you select Profile from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. You will have the information you need, all in one place. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products. You also can access online support forums, which are community sites monitored by IBM support staff.

Appendix A. APC Smart-UPS specifications

The APC Smart-UPS power supplies are high-performance, line-interactive, uninterruptible power supplies (UPS) designed to provide reliable ac power to server systems. Standard features include:

- Sine wave output for compatibility with all loads

- EMI/RFI filtering to eliminate line noise

- SmartBoost to automatically correct brownouts

- SmartTrim to automatically correct overvoltages

- UL 1449 rated for maximum surge suppression

- UL listed, CSA certified, VDE certified, FCC Class B compliant

- SmartSlot for customization of UPS (contact APC)

- Automatic self-testing of battery failure with notification of failure

- Site wiring fault indicator

- Resettable input circuit breaker for equipment protection

- Emergency power-off cable for user-provided emergency power-off switch

- Easy battery replacement (kits available from APC)

- Power-management software (APC PowerChute Plus)

Smart-UPS 1400

The UPS is 48cm (19in.) wide by 13.2cm (5.2in.) high by 38cm (15in.) deep and weighs 25kg (55lbs). It provides 1400 volt-amperes (950 watts) and contains four 12V, 7 ampere-hour batteries. The Smart-UPS 1400 communicates with a single server.

There are two versions of this UPS which are country specific:

- Model 1400RMB

    - 120V ac
    - Six NEMA 5-15R receptacles
    - Fixed 1.8m (6ft) power cable with a NEMA L5-15P plug
    - Resettable 15 amp circuit breaker

- Model 1400RMiB

    - 220–240V ac
    - Four IEC 320-C13 receptacles
    - IEC 320-C14 connector for a detachable power cable (country specific)
    - Resettable 12 amp circuit breaker

Smart-UPS 3000

The UPS is 48cm (19in.) wide by 13.2cm (5.2in.) high by 61cm (24in.) deep and weighs 51kg (112lbs). It provides 3000 volt-amperes (2250 watts) and contains eight 12V, 7 ampere-hour batteries. The Smart-UPS 3000 communicates with up to three servers.

There are two versions of this UPS which are country specific:

- Model 3000RMB

    - 120V ac
    - Eight NEMA 5-15R receptacles
    - Fixed 1.8m (6ft) power cable with a NEMA L5-30P plug
    - Resettable 40 amp circuit breaker

- Model 3000RMiB

    - 220–240V ac
    - Eight IEC 320-C14 and one IEC 320-C19 receptacle
    - IEC 320-C20 connector for a detachable power cable (country specific)
    - Resettable 20 amp circuit breaker

APC PowerChute Plus power-management software

The APC PowerChute Plus software comes with IBM Netfinity and PC Servers on IBM ServerGuide. It monitors voltages, loads, and runtime while managing automatic software alerts and orderly server shutdowns. The software is compatible with many available operating systems.

Appendix B. PDU specifications

You can install a power distribution unit (PDU) horizontally in one EIA U of space, or vertically in the rack side wall. Choose a PDU model based upon your power requirements.

100-120V Power Distribution Unit

The 100–120V ac PDU is 48cm (19in.) wide by 4.5cm (1.75in.) high by 11.5cm (4.5in.) deep and weighs 2.27kg (5lbs). This PDU has the following features:

- Eight National Electrical Manufacturers Association (NEMA)-15R power outlets

- A fixed 2.7m (9ft) power cable with a NEMA L5-15P locking plug

- A 15 amp circuit breaker

- A maximum current rating of 12 amps by Underwriters Laboratory (UL) standards

- A maximum power rating of 1440 volt-amperes (VA)

- Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) filtering for common mode noise (line to ground) and differential mode noise (line to line)

- A spike and surge suppression circuit to protect the line

200-240V Power Distribution Unit

The 200–240V ac PDU is 48cm (19in.) wide by 4.5cm (1.75in.) high by 17.8cm (7in.) deep and weighs 3.63kg (8lbs). This PDU has the following features:

- Ten International Electrotechnical Commission (IEC) 320-C13 outlets

- A maximum current rating of 16 amps by Verband Deutscher Elektrotechniker (VDE) standards

- A maximum power rating of 3200 VA

- A panel mount IEC 320-C20 inlet (16 amps/230V ac) standard connector

- A detachable power cable with a NEMA L6-20P plug (country specific)

- Ten IEC outlets rated at 10 amps (VDE) or 15 amps (UL/CSA)

    – Eight outlets on the rear panel
    – Two outlets on the front panel

- Conforms to UL1950, Canadian Standards Association (CSA) 22.0-950, and IEC 950

- A 2-pole, 20 amp circuit breaker with time-delay protection; that supports input currents of up to 600 amps without nuisance tripping

- EMI/RFI filtering for common noise (line to ground) and differential mode noise (line to line)

- A spike and surge suppression circuit to protect the line

Appendix C. Optional power cables

The following optional power cables are available to connect IBM Netfinity, PC Servers, and other devices to a PDU or UPS in the 9308 Enterprise Rack when longer power cables are required:

- Power Cable Type A14

    - Connectors: IEC 320 C13-NEMA 5-15P
    - Length: 4.3m (14ft)
    - Used with: 100–120V ac PDU or 120V ac UPS

- Power Cable Type B14

    - Connectors: IEC 320 C19-NEMA 5-15P
    - Length: 4.3m (14ft)
    - Used with: 100–120V ac PDU or 120V ac UPS

- Power Cable Type C12

    - Connectors: IEC 320 C13-C14
    - Length: 3.7m (12ft)
    - Used with: 200–240V ac PDU or 220–240V ac UPS

- Power Cable Type D12

    - Connectors: IEC 320 C19-C14
    - Length: 3.7m (12ft)
    - Used with: 200–240V ac PDU or 220–240V ac UPS

Appendix D. Product notices

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