

0U 24 C13 and 0U 12 C19 / 12 C13 Switched and
Monitored PDUs
and 1U 9 C19 / 3 C13 Switched and Monitored PDU



Installation and Maintenance Guide

0U 24 C13 and 0U 12 C19 / 12 C13 Switched and
Monitored PDUs
and 1U 9 C19 / 3 C13 Switched and Monitored PDU



Installation and Maintenance Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 77, the *Safety Information* and *Environmental Notices and User Guide* documents on the IBM *Documentation* CD, and the *Warranty Information* document that comes with the product.

Second Edition (February 2011)

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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 ασφαλείας (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 *Safety Information* document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the *Safety Information* document under “Statement 1.”

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.

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **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 table when installing, moving, or opening covers on this product or attached devices.**

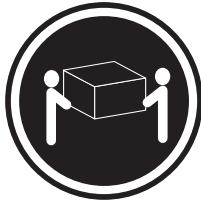
To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

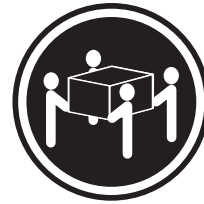
Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:

Use safe practices when lifting.

Statement 13:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 14:



CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the following label is attached.



Important:

- The PDU does not contain any serviceable parts.
- Make sure that the power receptacle is near the equipment and is easily accessible so that the PDU can be disconnected quickly.

To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection with an ampere rating in accordance with the National Electrical Code (NEC), ANSI/NFPA 70 or your local electrical code:

Model part number	i/p breaker	Note
46M4116, 46M4117, 46M4118	30 A/2 poles	UL489/CSA C22.2 No.5.1
46M4119, 46M4120, 46M4121	32 A/2 poles	IEC/EN 60934 contact air gap need 3 mm
46M4134, 46M4135, 46M4136	50 A/3 poles	UL489/CSA C22.2 No.5.1
46M4137, 46M4138, 46M4139	32 A/4 poles	IEC/EN 60934 contact air gap need 3 mm
46M4167, 46M4168, 46M4169	30 A/3 poles	UL489/CSA C22.2 No.5.1

Chapter 1. Introduction

The IBM® switched and monitored 1U and 0U PDU products enable you to connect up to 12 C19 devices or up to 24 C13 devices (depending on the PDU model) to a single dedicated power source. The PDUs have power monitoring capabilities.

The following PDU models are available.

Note: Each PDU model comes with an attached power cord.

- 46M4116 - IBM 0U 24 C13 Switched and Monitored 30 A PDU
- 46M4119 - IBM 0U 24 C13 Switched and Monitored 32 A PDU
- 46M4134 - IBM 0U 12 C19 / 12 C13 Switched and Monitored 50 A 3 Phase PDU
- 46M4137 - IBM 0U 12 C19 / 12 C13 Switched and Monitored 32 A 3 Phase PDU
- 46M4167 - IBM 1U 9 C19 / 3 C13 Switched and Monitored 30 A 3 Phase PDU

If firmware and documentation updates are available, you can download them from the IBM website. The PDU might have features that are not described in the documentation that comes with the PDU, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the PDU documentation.

Note: Changes are made periodically to the IBM website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

To check for updates, go to <http://www.ibm.com/systems/support/>. For firmware updates, click **Downloads**. For documentation updates, click **Documentation**.

The IBM Documentation CD

The IBM *Documentation* CD contains documentation for the PDU in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows XP, Windows 2000, or Red Hat Linux
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in your computer and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
 - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`

where *e* is the drive letter of the CD or DVD drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:
`sh runlinux.sh`

Select the PDU from the **Product** menu. The **Available Topics** list displays all the documents for the PDU. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Ctrl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the IBM *Documentation* CD. Each statement is numbered for reference to the corresponding statement in your language in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Installation requirements

You might need the following tools to install the PDU in a rack cabinet:

- One Phillips screwdriver
- One 10 mm (11/32 in.) wrench
- One cage-nut-insertion tool or flat-blade screwdriver (for installing cage nuts in some rack cabinets)

You can install a 1U PDU vertically in the side of a rack cabinet or horizontally within 1U¹ of EIA mounting space in a rack cabinet. The 0U (strip) PDU is installed vertically in the side of a rack cabinet.

- **1U PDU:**
 - For vertical mounting instructions, see Chapter 2, “Installing the 1U PDU vertically in a rack cabinet,” on page 15.
 - For horizontal mounting instructions, see Chapter 3, “Installing the 1U PDU horizontally in a rack cabinet,” on page 21.
- **0U PDU:** For vertical mounting instructions, see Chapter 4, “Installing the 0U PDU vertically in a rack cabinet,” on page 27.

1. One U is equal to 4.45 cm (1.75 in.)

Inventory checklist

Note: The illustrations in this document might differ slightly from your hardware.

Parts that come with all PDU models

The following parts come with all PDU models:

- One DB9-to-RJ-45 cable



- Hardware kit (for attaching the mounting brackets to the PDU and installing the PDU in a rack cabinet)

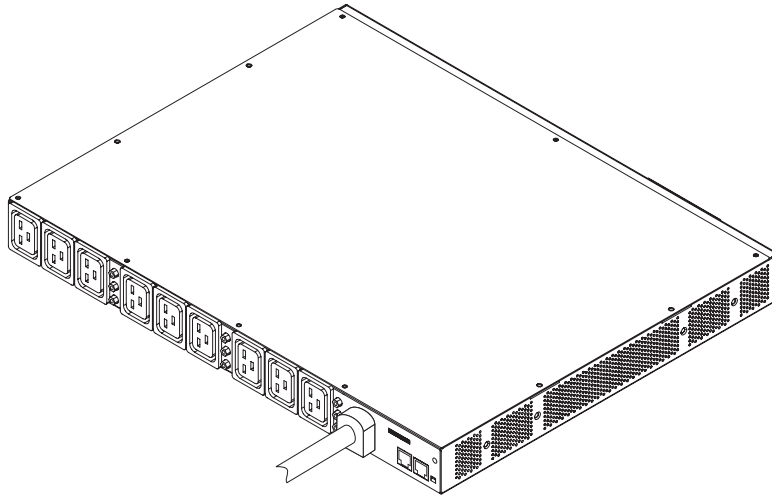
Notes:

1. Power cables for devices that you will connect to the PDU do not come with the PDU.
2. You will have some unused parts, depending on how you install the PDU.

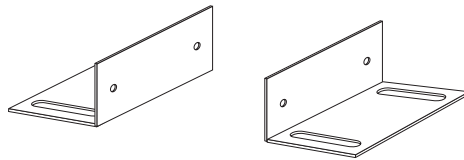
Parts that come with the 1U PDU models

The following parts come with the 1U PDU models:

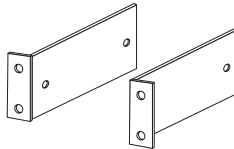
- 1U 9 C19 / 3 C13 Switched and Monitored PDU with an attached power cord



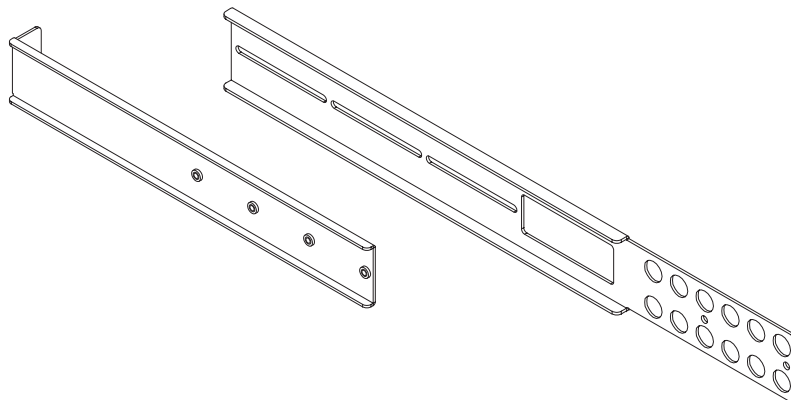
- Two vertical-mounting brackets (for all rack cabinets)



- Two short mounting brackets (for horizontal mounting in all rack cabinets; for vertical mounting only in IBM Enterprise rack cabinets)



- Two adjustable mounting rails and six screws (for horizontal mounting in all rack cabinets)



Note: The following illustration shows the two components of one adjustable mounting rail. The adjustable mounting rail might come pre-assembled.

- One 1U blank filler panel



Parts that come with the 0U PDU models

The following parts come with the 0U PDU models:

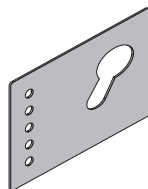
- One of the following PDU model types:
 - 0U 24 C13 PDU with an attached power cord



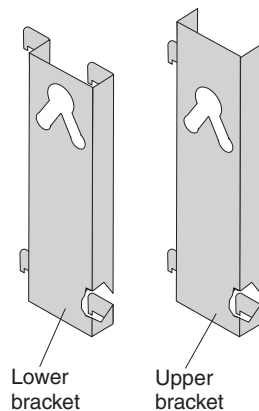
- 0U 12 C19 / 12 C13 PDU with an attached power cord



- The following 0U PDU mounting brackets. There are two of each bracket type.
 - For an IBM S2 42U Standard Rack cabinet (Types 9307, 9956)



- For an IBM Enterprise Rack cabinet (Types 1410, 9308)



Features of the PDU

The PDU models have the following features:

- Ability to access the versatile sensors in the environmental monitoring probe through the environmental monitoring probe inputs

Note: This feature requires an optional environmental monitoring probe, which must be purchased separately.

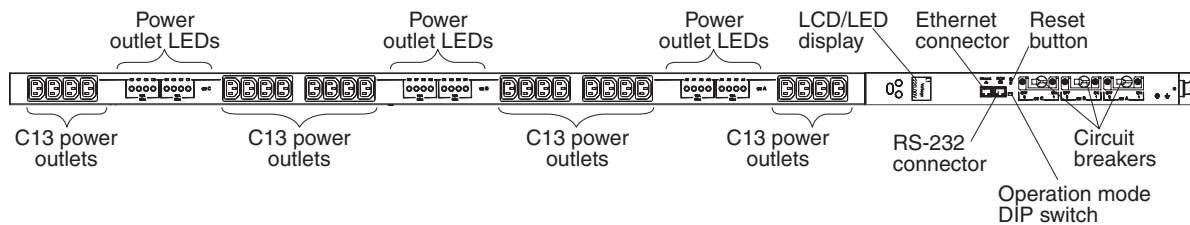
- Address-specific IP security masks to prevent unauthorized access
- Comprehensive power management and flexible configuration through a web browser, NMS, Telnet, SNMP, or HyperTerminal (console)
- Configurable user-security control
- Daily history report through email
- Detailed data-logging for statistical analysis and diagnostics
- Easy-to-use interface to display input and output status
- Event notification through SNMP trap or email alerts
- Monitoring of the PDU locally or remotely through a console or network
- Remote monitoring of connected devices and sensors
- Upgrade utility for easy firmware updates

Hardware components

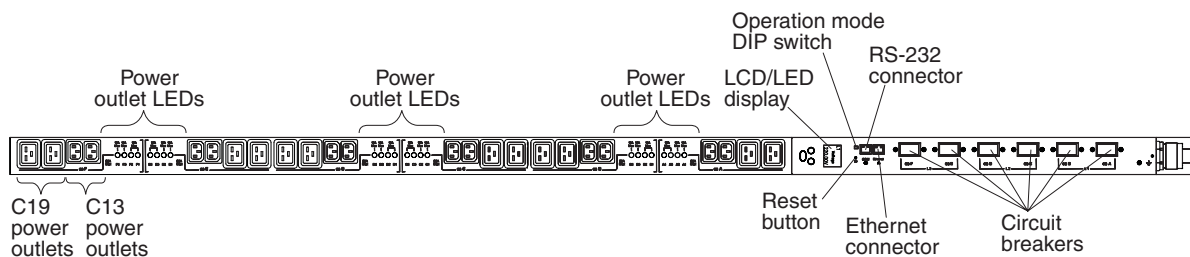
The following sections provide descriptions of the front and rear components on the PDU models.

Front view (0U PDU)

The following illustration shows the components and controls on the front of the 0U PDU with 24 C13 outlets on the front.



The following illustration shows the components and controls on the front of the 0U PDU with 12 C19 / 12 C13 outlets on the front.



Power outlet LEDs

The power outlet LEDs indicate the receptacle status. An LED is steady when the receptacle is supporting load, and the LED is off when the receptacle is not supporting load.

LCD/LED display

The PDU provides information about the load status, events, measurements, identification, and settings through the front panel display. For more information about the LCD, see Chapter 6, “Using the LCD (0U PDU models only),” on page 41.

RS-232 connector



Connect a DB9-to-RJ-45 cable to this connector and to the serial (COM) connector on a computer, and use the computer as a configuration console.

Green LED: This LED is lit when the power to the PDU is turned on.

Amber LED: This LED flashes while the PDU is communicating with a server or computer or when it is reading data from an environmental monitoring probe. When no device is connected to the PDU, the amber LED flashes because it is constantly polling for input or a new connection.



Ethernet connector

Use this connector to configure the PDU through a LAN. The Ethernet connector supports a 10/100 auto sensing network connection.

Green LED:

- This LED is lit when the PDU is connected to a 100 Mb network.
- This LED flashes while data is transmitted and received.

Amber LED:

- This LED is lit when the PDU is connected to a 10 Mb network.
- This LED flickers while data is transmitted and received.

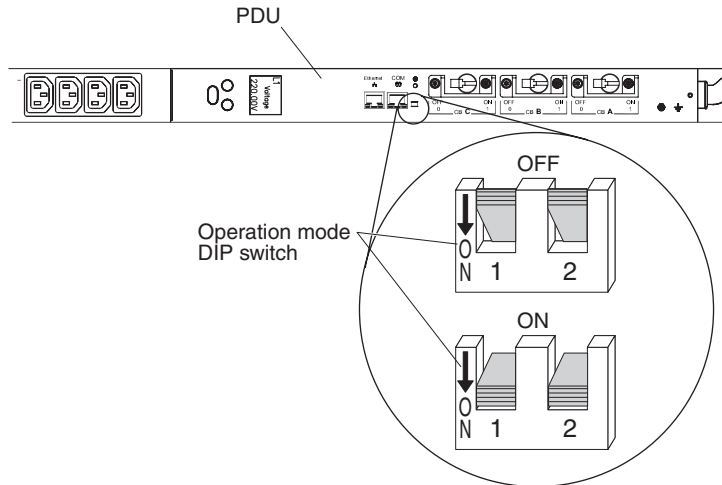
You can connect an environmental monitoring probe (purchased separately) to this connector. The environmental monitoring probe monitors humidity and temperature.

Reset button

Use this button to reset the PDU for communication purposes only. Resetting the PDU does not affect the loads.

Operation mode DIP switch

Use the DIP switch to set the mode of operation for the PDU. The default mode is switch 1 off, switch 2 off for normal operation. The following illustration shows the off and on positions.



The following table describes the available settings.

Table 1. Operation mode DIP switch available settings

Switch 1 (SW1)	Switch 2 (SW2)	Function mode	Description
On	On	Serial upgrade mode	Used only when upgrading the LCD control board firmware locally by using a DB9-to-RJ-45 cable.
On	Off	Serial upgrade of network management card firmware	Used only when upgrading the network management card firmware locally by using a DB9-to-RJ-45 cable.
Off	On	Read-only mode	The PDU runs normal operational firmware, but you cannot change any parameters of the PDU.
Off	Off	Operational mode	Default setting for normal operation.

Circuit breakers

If the load current rating of a power outlet exceeds 20 A, the associated circuit breaker is activated through a toggle handle or a toggle switch, depending on the PDU model. Power to the outlet is turned off automatically. To reset the circuit breaker, turn the breaker from Off to On.

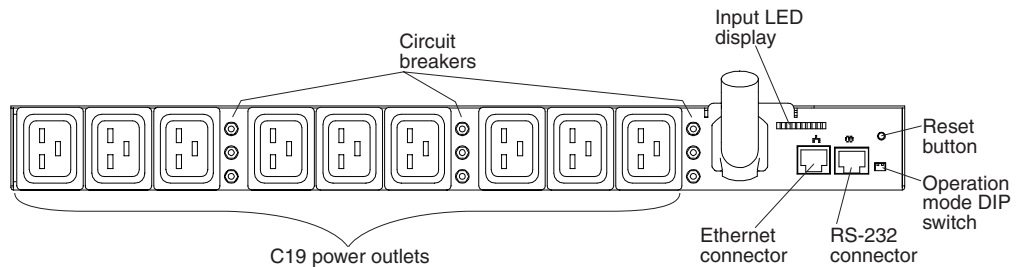
Note: To manually disconnect power to a device that is connected to the PDU, disconnect the device power cord from the PDU power outlet.

C19 and C13 power outlets

You can connect a device to each of the C19 and C13 power outlets.

Front view (1U PDU)

The following illustration shows the components and controls on the front of the 1U PDU with 9 C19 outlets on the front.



Circuit breakers

If the load current rating of a power outlet exceeds 20 A, the associated circuit breaker is activated (the breaker pole pops out), and power to the outlet is turned off automatically. To reset the circuit breaker, firmly press the breaker pole until it locks into place.

Note: To manually disconnect power to a device that is connected to the PDU, disconnect the device power cord from the PDU power outlet.

Input LED display

The input LEDs indicate the input power status. The following table shows the three conditions for an input LED.

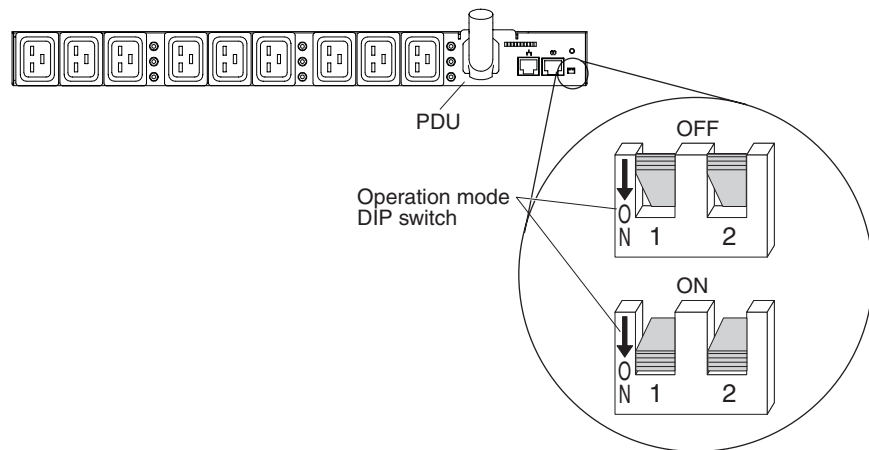
LED status	Description
LED is off	No input power
LED is on (steady)	Input power is normal
LED is flashing (0.5 seconds on, 0.5 seconds off)	Input power is not normal

Reset button

Use this button to reset the PDU for communication purposes only. Resetting the PDU does not affect the loads.

Operation mode DIP switch

Use the DIP switch to set the mode of operation for the PDU. The default mode is switch 1 off, switch 2 off for normal operation. The following illustration shows the on and off positions.



The following table describes the available settings.

Table 2. Operation mode DIP switch available settings

Switch 1 (SW1)	Switch 2 (SW2)	Function mode	Description
On	On	Serial upgrade mode	Used only when upgrading the LCD control board firmware locally by using a DB9-to-RJ-45 cable.
On	Off	Serial upgrade of network management card firmware	Used only when upgrading the network management card firmware locally by using a DB9-to-RJ-45 cable.
Off	On	Read-only mode	The PDU runs normal operational firmware, but you cannot change any parameters of the PDU.
Off	Off	Operational mode	Default setting for normal operation.

RS-232 connector

Connect a DB9-to-RJ-45 cable to this connector and to the serial (COM) connector on a computer, and use the computer as a configuration console.

Green LED: This LED is lit when the power to the PDU is turned on.

Amber LED: This LED flashes while the PDU is communicating with a server or computer or when it is reading data from an environmental monitoring probe. When no device is connected to the PDU, the amber LED flashes because it is constantly polling for input or a new connection.



Ethernet connector

Use this connector to configure the PDU through a LAN. The Ethernet connector supports 10/100 auto sense network connection.

Green LED:

- This LED is lit when the PDU is connected to a 100 Mb network.
- This LED flashes while data is transmitted and received.

Amber LED:

- This LED is lit when the PDU is connected to a 10 Mb network.
- This LED flickers while data is transmitted and received.

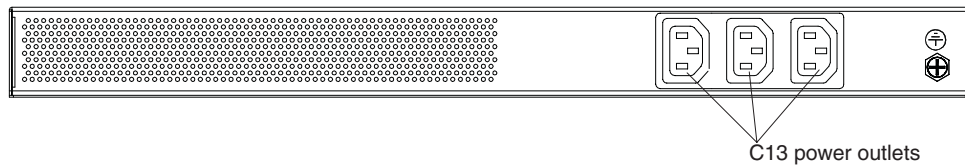
You can connect an optional environmental monitoring probe to this connector. The environmental monitoring probe monitors humidity and temperature.

Power outlets

You can connect a device to each of the nine C19 power outlets on the front of the 1U PDU.

Rear view (1U models)

The following illustration shows the power outlets on the rear of the 1U PDU.



PDU load groups

The PDU load groups are described in the following tables.

Table 3. 1U C19 switched and monitored PDU load groups

Circuit breaker number	Associated front outlet	Associated rear outlet
1	1	10
2	2	
3	3	
4	4	11
5	5	
6	6	
7	7	12
8	8	
9	9	

Table 4. 0U 12 C19 / 12 C13 switched and monitored PDU load groups

Load segment	Circuit breaker number	Associated outlets
L1	A	A1, A2, A3, and A4
	B	B1, B2, B3, and B4
L2	C	C1, C2, C3, and C4
	D	D1, D2, D3, and D4
L3	E	E1, E2, E3, and E4
	F	F1, F2, F3, and F4

Table 5. 0U 24 C13 switched and monitored PDU load groups

Load Segment	Circuit breaker number	Associated outlets
L1	A	A1, A2, A3, A4, A5, A6, A7, and A8
	B	B1, B2, B3, B4, B5, B6, B7, and B8
	C	C1, C2, C3, C4, C5, C6, C7, and C8

Chapter 2. Installing the 1U PDU vertically in a rack cabinet

This chapter describes how to install the PDU vertically in a rack cabinet. To install the PDU in the side of an IBM Enterprise rack cabinet, see “Installing the 1U PDU in the side of an IBM Enterprise rack cabinet only” on page 18.

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- 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 table when installing, moving, or opening covers on this product or attached devices.

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Installing the 1U PDU in the side of a rack cabinet

The mounting holes on the upper and lower side braces in a rack side compartment must be between 48.6 cm (19.1 in.) and 56.9 cm (22.4 in.) apart. If your rack cabinet has movable side braces and they are not already spaced for this installation, see the rack cabinet documentation for information about relocating the side braces.

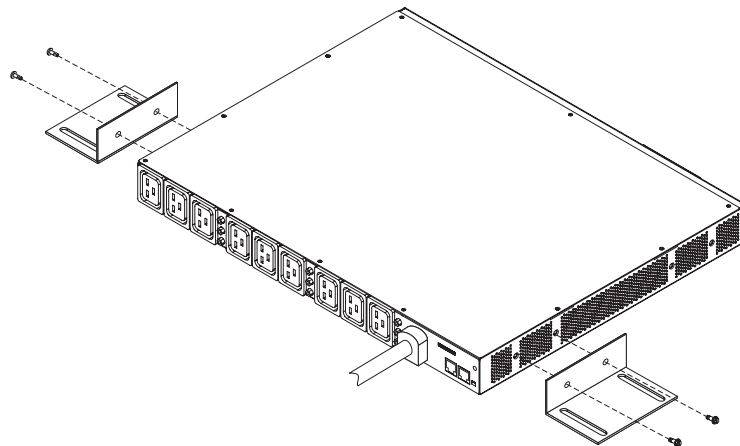
Note: Removing the rack doors and side panels might make installation easier. See the rack cabinet documentation for more information.

Review the documentation that comes with your rack cabinet for safety and cabling information. When you install the PDU in a rack cabinet, observe the following precautions:

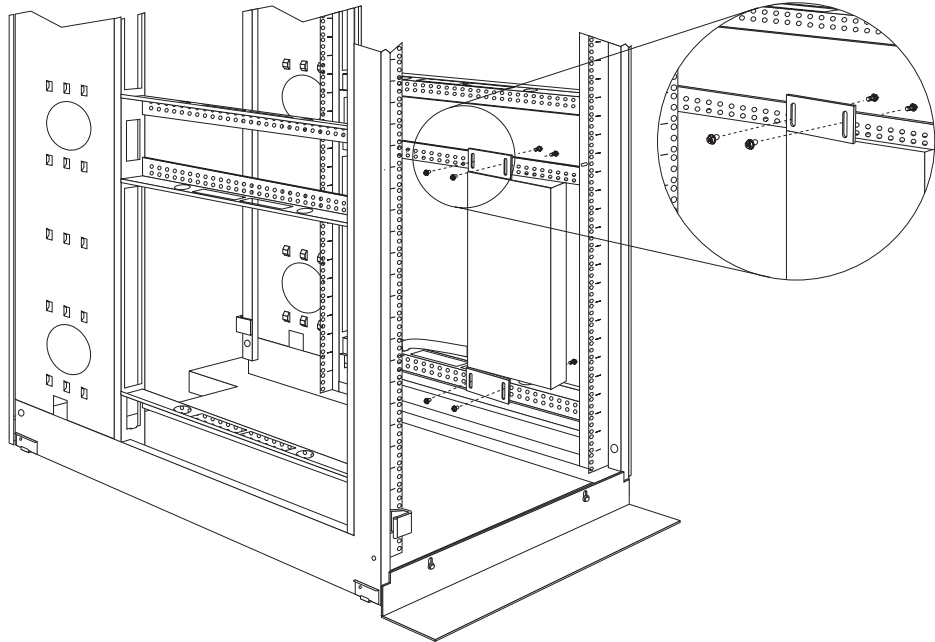
- Make sure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; usually 15 cm (6 in.) of air space provides proper airflow.
- Connect all power cords to properly wired and grounded electrical outlets.
- Do not overload the power outlet when you install multiple devices in the rack cabinet.

To install a PDU in the side of a rack cabinet by using the vertical mounting brackets, complete the following steps:

1. Align the holes in the vertical mounting brackets with the threaded holes in the sides of the PDU and attach the brackets to the PDU with two M3 x 5 screws per bracket. Use the screws that come in the hardware kit. You can install the PDU in a rack cabinet with the power outlets facing the rear or the front of the rack cabinet.



2. Hold the PDU in the side of the rack cabinet, and attach the vertical mounting brackets to the side braces with four M6 screws and nuts that come in the hardware kit.



Note: Leave enough space to connect, route, and disconnect power cords.

3. Route the power cord from the PDU toward the rack cabinet side braces; then, route the power cord along a side brace toward the back of the rack cabinet, and secure the power cord with the cable straps that come with the PDU.
4. Route the power cord toward a dedicated power source. Use the provided cable straps to secure the power cord along the way. If the power cord must exit the rack cabinet to connect to a power source, use the openings in the rack cabinet.
5. Connect the power cord to a properly wired and grounded dedicated power source. Then, you can connect servers or rack PDUs in the rack cabinet to the power outlets on the PDU.

Note: After the power cord is connected, the output receptacles turn on sequentially to avoid large surge currents.

6. Route all the other power cords neatly and secure the power cords with cable straps.

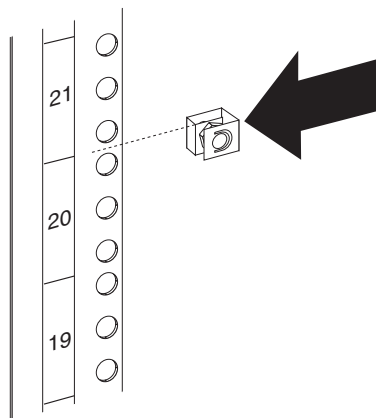
Installing the 1U PDU in the side of an IBM Enterprise rack cabinet only

Note: Removing the rack doors and side panels might make installation easier. See the rack cabinet documentation for more information.

Review the documentation that comes with your rack cabinet for safety and cabling information. When you install the PDU in a rack cabinet, observe the following precautions:

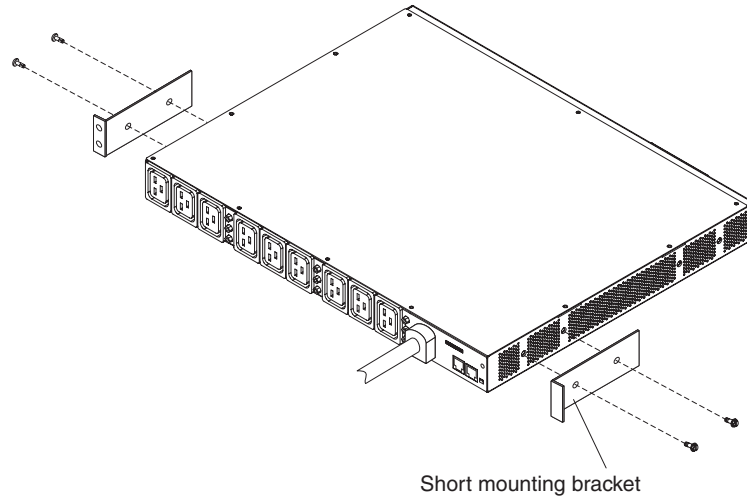
- Make sure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; usually 15 cm (6 in.) of air space provides proper airflow.
- Connect all power cords to properly wired and grounded electrical outlets.
- Do not overload the power outlet when you install multiple devices in the rack.

You must use clip nuts to install the mounting brackets. Clip nuts come with the PDU and are installed on the rack mounting flanges, as shown in the following illustration.

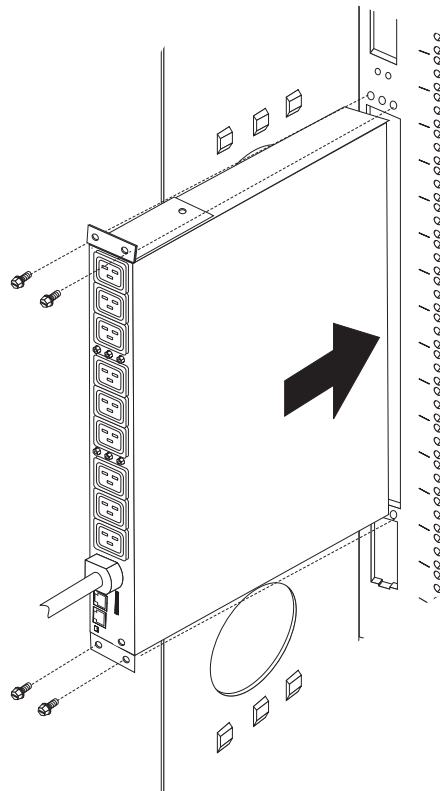


To install the PDU in the 1U mounting space in the side of an IBM Enterprise rack cabinet, complete the following steps:

1. Align the holes in the short mounting brackets with the threaded holes in the sides of the PDU and attach the brackets to the PDU with two M3 x 5 screws in each bracket. Use the screws that come in the hardware kit. Be sure to attach the brackets so that the power outlets face the rear of the rack cabinet.



2. Align the PDU with the opening in the side of the rack cabinet; then, while you hold the PDU in place, attach the brackets to the rack-mounting flanges with four clip nuts and four M6 screws that come with the PDU.



3. Route the power cord from the PDU toward the rack cabinet side braces; then, route the power cord along a side brace toward the rear of the rack cabinet, and secure the power cord with cable straps.
4. Route the power cord toward a dedicated power source. Use cable straps to secure the power cord along the way. If the power cord must exit the rack cabinet to connect to a power source, use the openings in the rack cabinet.
5. Connect the power cord to a properly wired and grounded dedicated power source. Then, you can connect servers or rack PDUs in the rack cabinet to the power outlets on the PDU.

Note: After the power cord is connected, the output receptacles turn on sequentially to avoid large surge currents.

6. Route all the other power cords neatly and secure the power cords with cable straps.

Chapter 3. Installing the 1U PDU horizontally in a rack cabinet

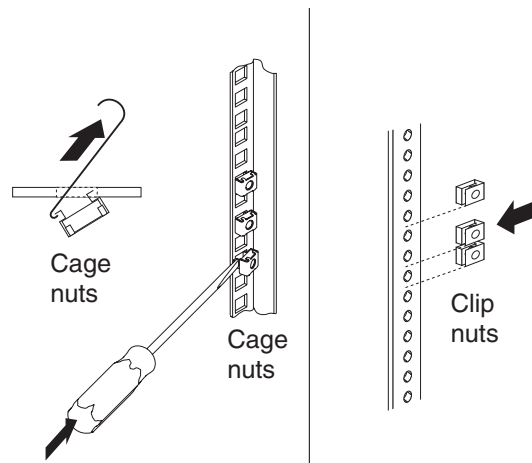
Attention: Horizontal installation of a PDU is not supported during relocation or shipping of a rack cabinet. You must remove any horizontally mounted PDUs from the EIA mounting space before you relocate the rack cabinet.

Note: Removing the rack doors and side panels might make installation easier. See the rack cabinet documentation for more information.

Review the documentation that comes with your rack cabinet for safety and cabling information. When you install the PDU in a rack cabinet, observe the following precautions:

- Make sure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; usually 15 cm (6 in.) of air space provides proper airflow.
- Plan the device installation starting from the bottom of the rack cabinet.
- Install the heaviest device in the bottom of the rack cabinet.
- Do not extend more than one device out of the rack cabinet at the same time.
- Connect all power cords to properly wired and grounded electrical outlets.
- Do not overload the power outlet when you install multiple devices in the rack cabinet.

Use cage nuts for rack cabinets with square holes, and use clip nuts for rack cabinets with round holes. If your rack cabinet requires cage nuts, use a cage-nut-insertion tool or a flat-blade screwdriver to install them.



Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **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 table when installing, moving, or opening covers on this product or attached devices.**

To Connect:

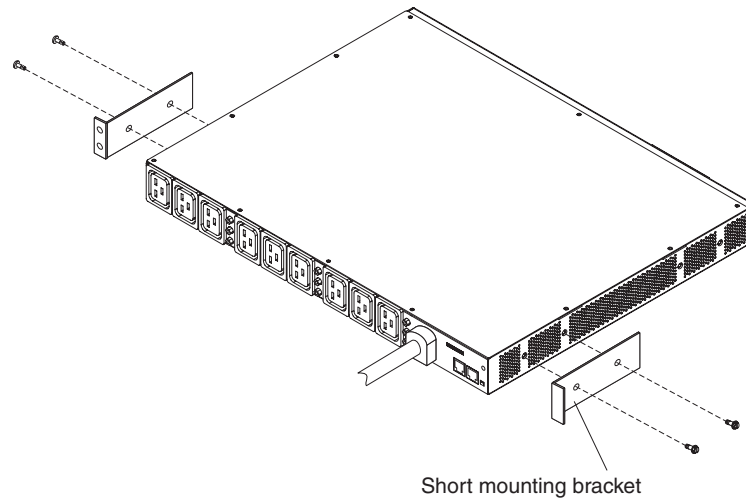
1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

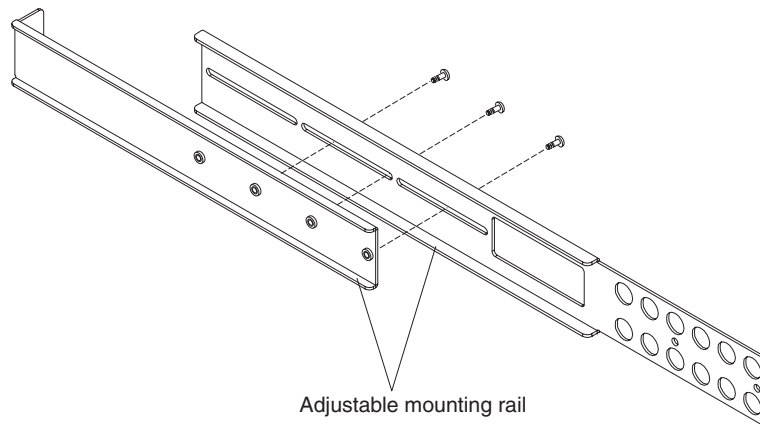
1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

To install the PDU horizontally in a rack cabinet, complete the following steps:

1. Align the holes in the short mounting brackets with the threaded holes in the front of the PDU and attach the brackets to the PDU with two M3 flat-head screws per bracket. Use the screws that come in the hardware kit.

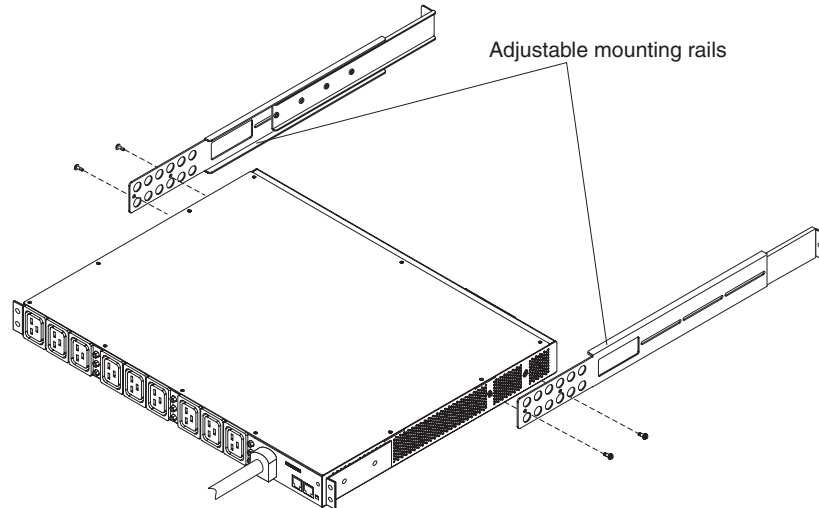


2. If the adjustable mounting rail is not assembled, complete the following steps to assemble it:
 - a. Align the two parts of the adjustable mounting rail as shown in the following illustration.

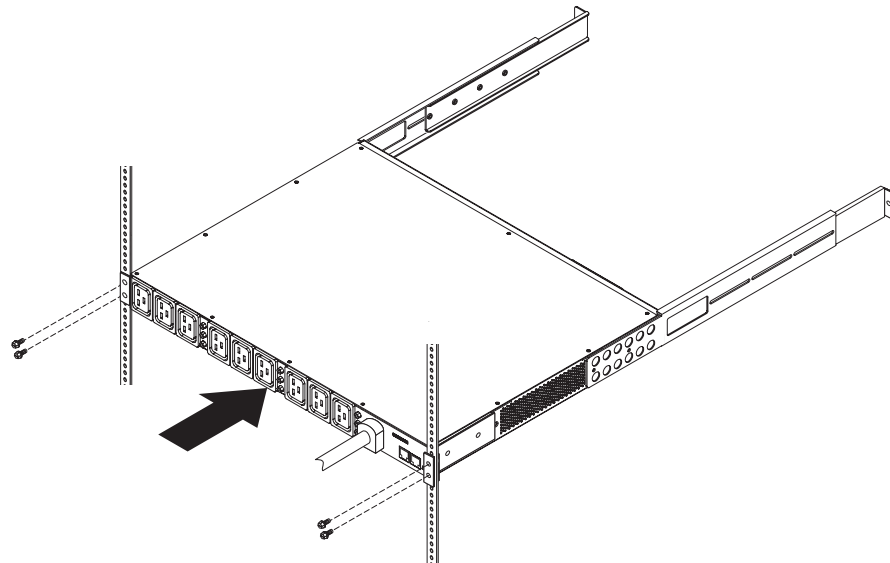


- b. Secure the two adjustable mounting rail parts with three screws that come in the hardware kit.

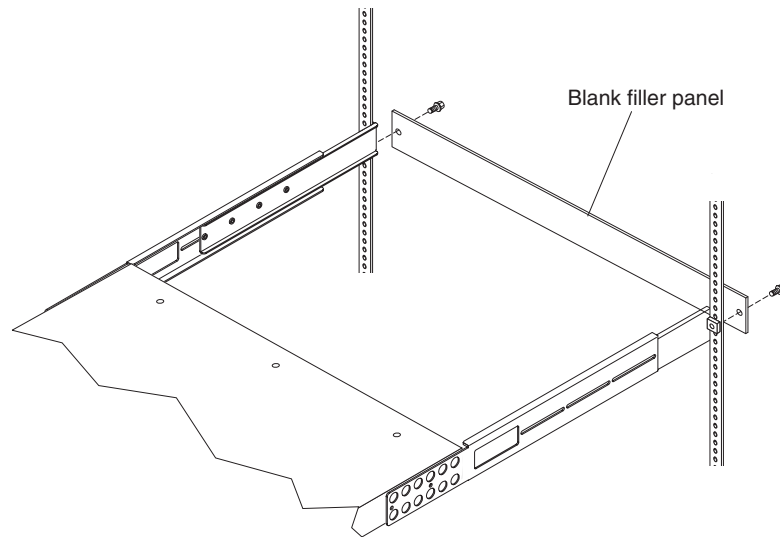
3. Align the adjustable mounting rails with the holes in the side rear of the PDU and attach the mounting rails to the PDU with two M3 pan-head screws with captive lock washers per rail. Use the screws that come in the hardware kit.



4. Hold the PDU at a slight angle and carefully insert it into the 1U mounting space in the rack cabinet. Pushing in slightly on both of the adjustable mounting rails helps clear the rails from the rack flanges.
5. Secure the end of the PDU that has the short mounting brackets to the rack cabinet first. Make sure that the short mounting brackets are aligned with the outside of the rack flanges. Attach the brackets to the rack flanges with two M6 screws and two cage nuts or clip nuts per bracket. Use the cage nuts or clip nuts and the screws that come in the hardware kit.



6. Secure the adjustable mounting rails and the 1U blank filler panel to the rack cabinet.



- a. Install a cage nut or clip nut in the applicable hole in the rack flange on each side of the rack cabinet.
 - b. Adjust the adjustable mounting rails to fit the depth of the rack cabinet.
 - c. Make sure that the adjustable mounting rail is aligned with the outside of the rack flanges.
 - d. Align the blank filler panel on the outside of the rack flanges.
 - e. Attach the filler panel to the adjustable mounting rail and then to the rack flanges and then to the rack cabinet. Use one M6 screw per mounting rail.
 - f. Tighten the M3 pan-head screws that secure the adjustable mounting rails to the PDU.
7. Route the power cord from the PDU toward the rack cabinet side braces; then, route the power cord along a side brace toward the rear of the rack cabinet, and secure the power cord with cable straps.
 8. Route the power cord toward a dedicated power source. Use cable straps to secure the power cord along the way. If the power cord must exit the rack cabinet to connect to a power source, use the openings in the rack cabinet.
 9. Connect the power cord to a properly wired and grounded dedicated power source. Then, you can connect servers or rack PDUs in the rack cabinet to the power outlets on the PDU.

Note: After the power cord is connected, the output receptacles turn on sequentially to avoid large surge currents.

10. Route all the other power cords neatly and secure the power cords with cable straps.

Chapter 4. Installing the 0U PDU vertically in a rack cabinet

This chapter describes how to install the PDU vertically in one of the following rack cabinets:

- IBM S2 42U Standard Rack Cabinet (Types 9307 and 9956)
- IBM Enterprise Rack Cabinet (Types 1410 and 9308)
- IBM 42U 1200 mm Deep Dynamic Rack Cabinet (Type 9360)
- IBM 42U and 47U 1200 mm Deep Static Rack Cabinet (Types 9361 and 9362)

Statement 1:



DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- 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 table when installing, moving, or opening covers on this product or attached devices.

To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Note: Removing the rack doors and side panels might make installation easier. See the rack cabinet documentation for more information.

Review the documentation that comes with your rack cabinet for safety and cabling information. When you install the PDU in a rack cabinet, observe the following precautions:

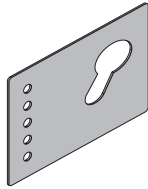
- Make sure that the room air temperature is below 35°C (95°F).
- Do not block any air vents; usually 15 cm (6 in.) of air space provides proper airflow.
- Connect all power cords to properly wired and grounded electrical outlets.
- Do not overload the power outlet when you install multiple devices in the rack cabinet.

Installing the 0U PDU in an IBM S2 42U Standard Rack cabinet (Types 9307 and 9956)

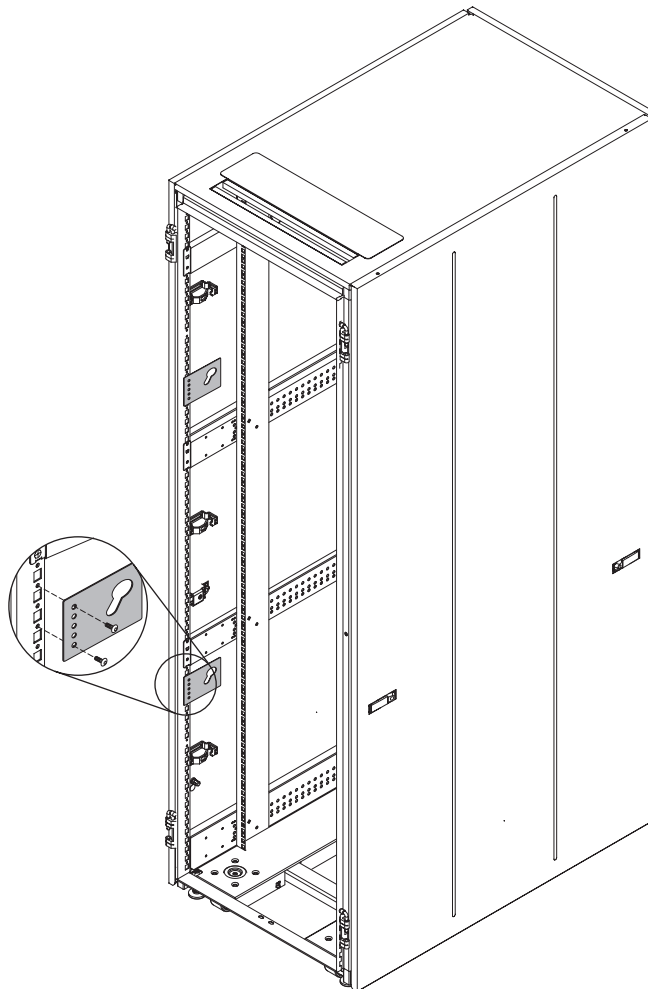
Note: Depending on the requirements for your rack cabinet configuration, you might want to mount the PDU in a location other than what is described in the following procedure.

To install the PDU in the 1U mounting space in the side of an IBM S2 42U Standard Rack cabinet, complete the following steps:

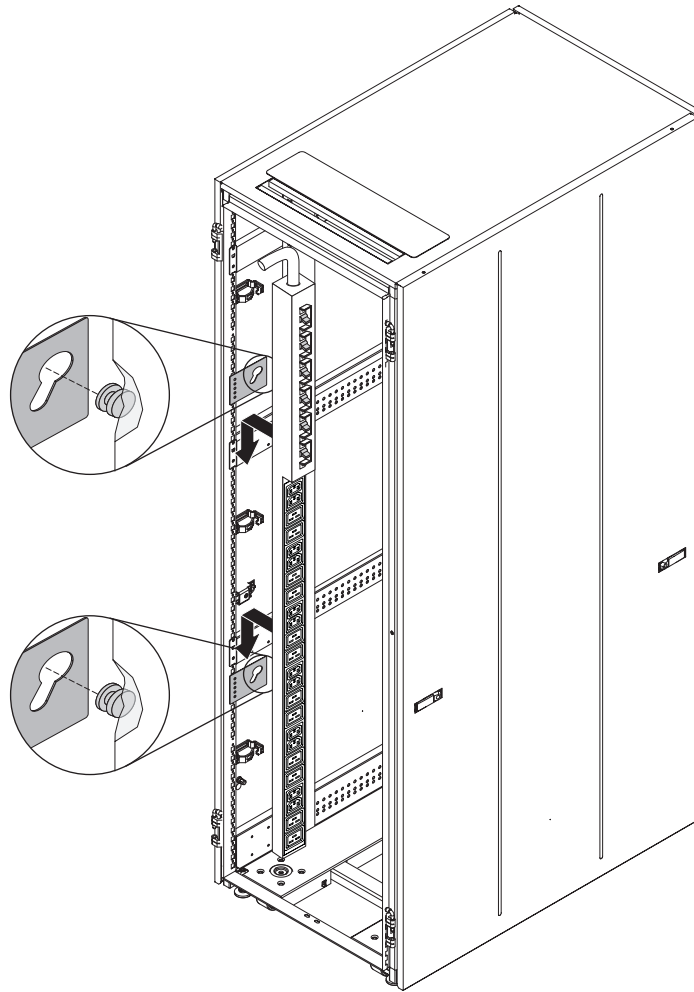
1. Select the correct rack-mounting brackets for the S2 42U rack cabinet in the hardware kit that comes with the PDU. You need two rack-mounting brackets. The correct bracket is shown in the following illustration.



2. Align the holes in the top rack-mounting bracket with the holes in the rack frame. Secure the bracket to the rack frame with two M6 screws that come in the hardware kit. Repeat this step for the bottom rack-mounting bracket.



3. Orient the PDU vertically and insert the two pegs on the PDU into the keyhole slots in the rack-mounting brackets. Push down to secure the PDU in position.



4. Route the power cord toward a dedicated power source. Use cable straps to secure the power cord along the way. If the power cord must exit the rack cabinet to connect to a power source, use the openings in the rack cabinet.
5. Connect the power cord to a properly wired and grounded dedicated power source. Then, you can connect servers or rack PDUs in the rack cabinet to the power outlets on the PDU.

Note: After the power cord is connected, the output receptacles turn on sequentially to avoid large surge currents.

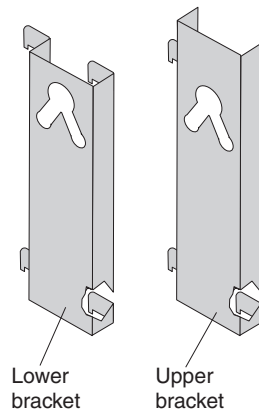
6. Route all the other power cords neatly and secure the power cords with cable straps.

Installing the 0U PDU in an IBM Enterprise Rack cabinet (Types 1410 and 9308)

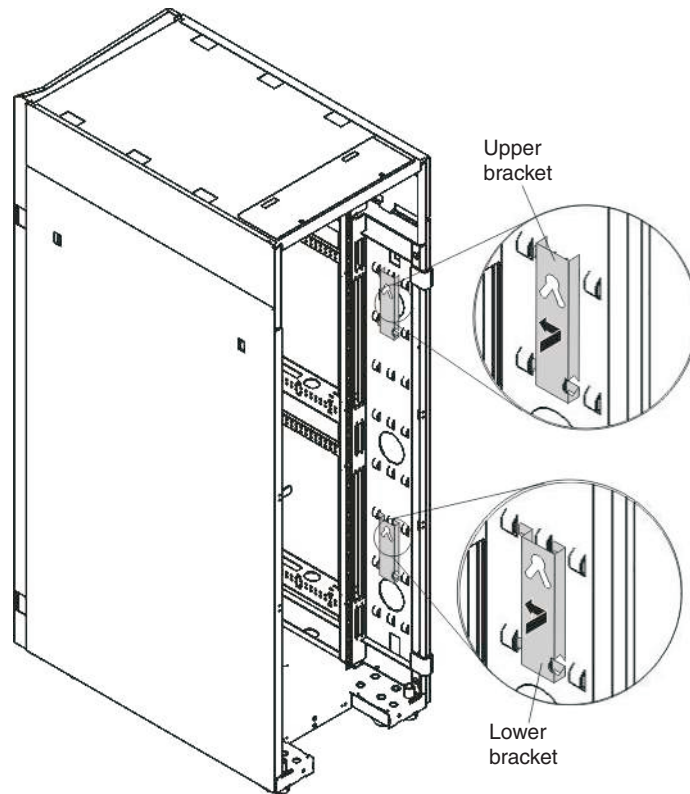
Note: Depending on the requirements for your rack cabinet configuration, you might want to mount the PDU in a location other than what is described in the following procedure.

To install the PDU in the 1U mounting space in the side of an IBM Enterprise Rack cabinet, complete the following steps:

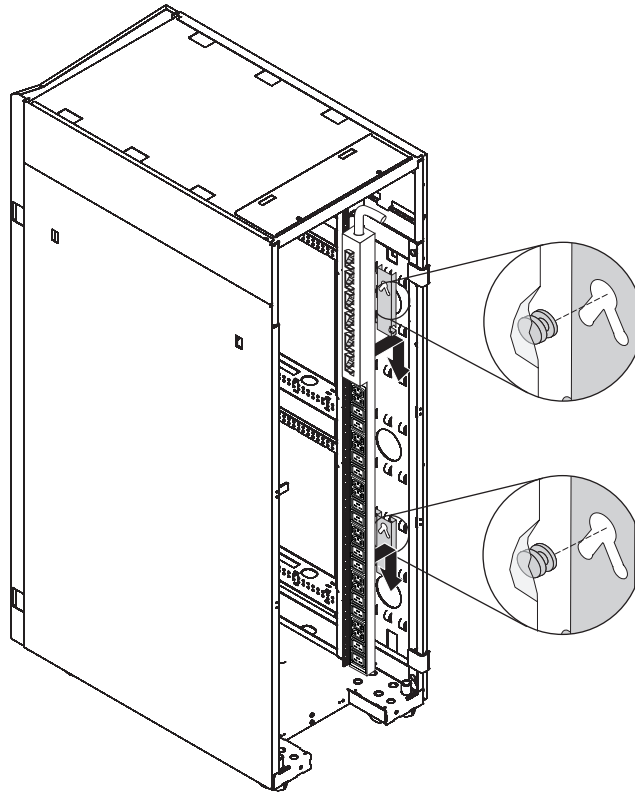
1. Select the correct rack-mounting brackets for the Enterprise rack cabinet in the hardware kit that comes with the PDU. You need two rack-mounting brackets. The correct bracket is shown in the following illustration.



2. Align one rack-mounting bracket with the holes in the rack frame as shown in the following illustration. Insert the bracket mounting tabs into the holes in the frame and then push the bracket to the right to secure it. Repeat this step for the other rack-mounting bracket.



3. Orient the PDU vertically and insert the two pegs on the PDU into the keyhole slots in the rack-mounting brackets. Push down to secure the PDU in position.



4. Route the power cord toward a dedicated power source. Use cable straps to secure the power cord along the way. If the power cord must exit the rack cabinet to connect to a power source, use the openings in the rack cabinet.
5. Connect the power cord to a properly wired and grounded dedicated power source. Then, you can connect servers or rack PDUs in the rack cabinet to the power outlets on the PDU.

Note: After the power cord is connected, the output receptacles turn on sequentially to avoid large surge currents.

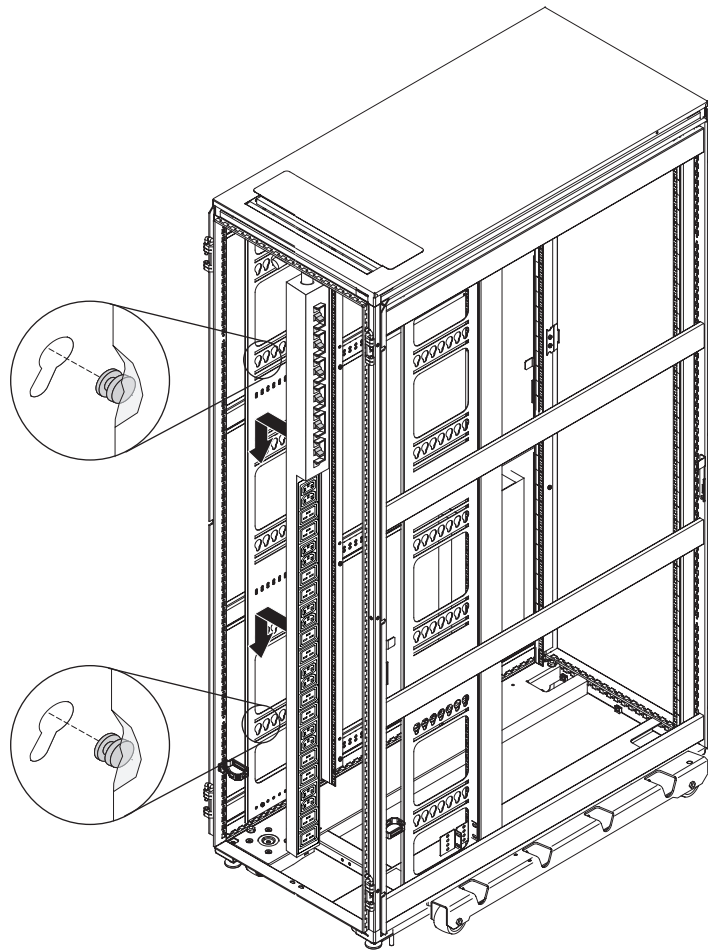
6. Route all the other power cords neatly and secure the power cords with cable straps.

Installing the PDU in an IBM 1200 mm Deep Static or Deep Dynamic Rack cabinet (Types 9360, 9361, and 9362)

Note: Depending on the requirements for your rack cabinet configuration, you might want to mount the PDU in a location other than what is described in the following procedure.

To install the PDU in the side of an IBM 1200 mm Deep Static or Deep Dynamic Rack cabinet, complete the following steps:

1. Select the location for the PDU in the rear of the rack cabinet.
2. Orient the PDU vertically and insert the two pegs on the PDU into the keyhole slots in the side of the rack cabinet (see the following illustration). Push down to secure the PDU in position.



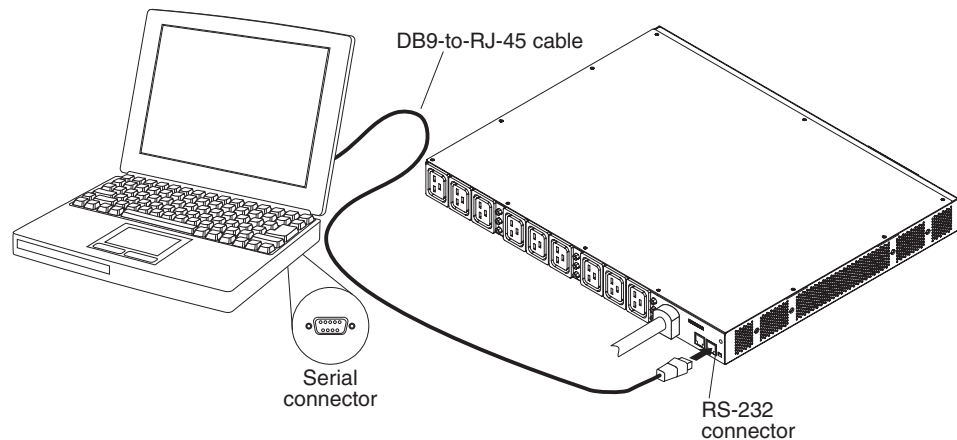
Chapter 5. Connecting devices to the PDU

This chapter provides information about connecting a PDU to a console, LAN, or environmental monitoring probe.

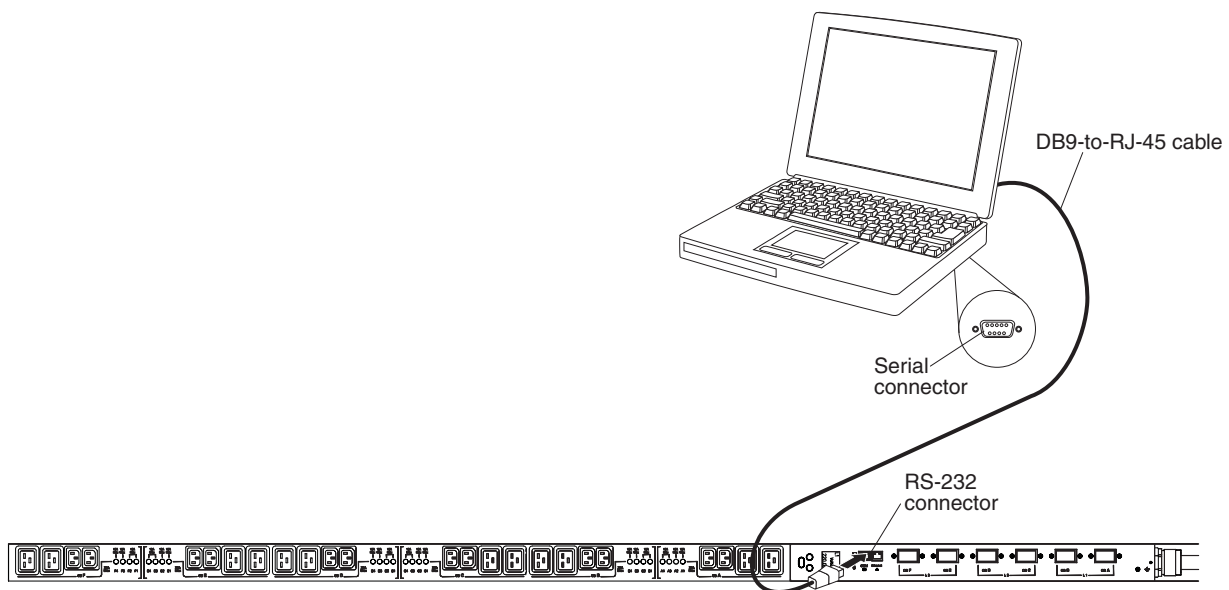
Connecting to a computer

Use a DB9-to-RJ-45 cable to connect the serial (COM) connector on a computer to the RS-232 connector on the PDU.

The following illustration shows how to connect a notebook computer to a 1U PDU.



The following illustration shows how to connect a notebook computer to a 0U PDU.



If your computer does not have a DB9 serial connector, you can use a DB9-to-USB converter cable to connect the PDU to a computer.

To connect the PDU to a computer by using a DB9-to-USB converter cable, complete the following steps:

1. Obtain a DB-9-to-USB converter cable (purchased separately).
 2. On the computer that you are connecting to the PDU, install the device drivers for the DB-9-to-USB converter cable, by using the instructions that come with the converter cable.
 3. Connect a DB9-to-RJ-45 cable to the RS-232 connector on the PDU, as shown in the previous illustration.
 4. Connect the DB9 connector end of the converter cable to the cable that you connected to the PDU in step 3.
 5. Connect the USB connector end of the converter cable to the computer.
- Communication is now established with the PDU through the COM port that is created by the converter cable.

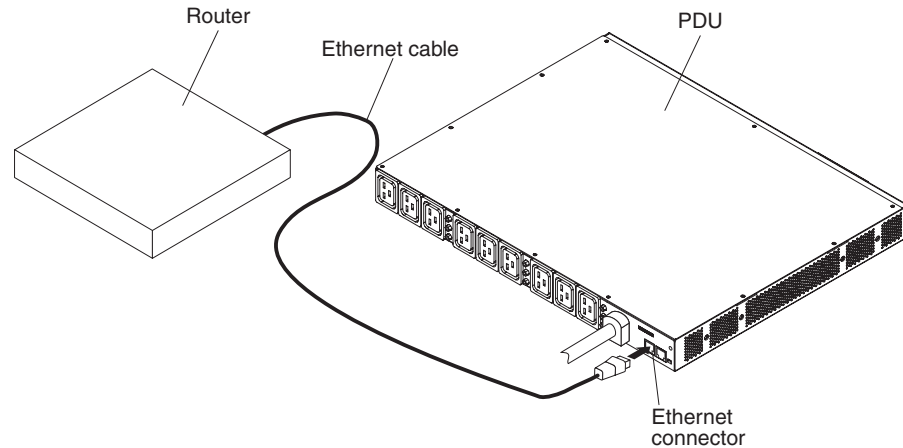
For information about initially setting up the PDU and to configure PDU settings, see “Using the IBM DPI Configuration Utility to set up the PDU” on page 43.

Connecting to a LAN

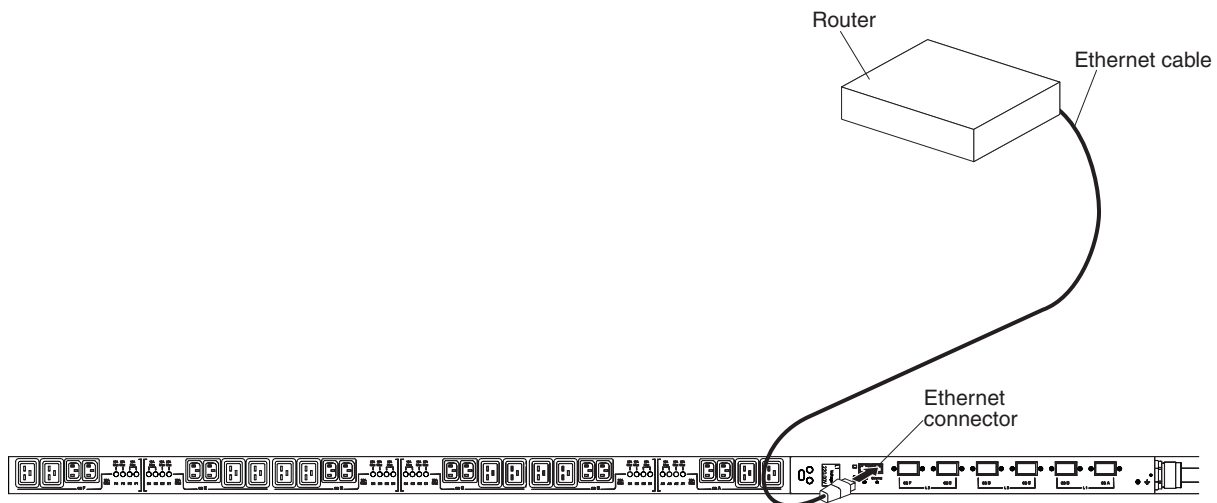
You can monitor the PDU power outlets and digital outputs over a network through the web interface, using a LAN connection.

Connect a router or switch to the Ethernet connector on the PDU, using an Ethernet cable. You can then monitor the PDU from a computer that is connected to the same network. For more information about how to monitor the PDU and its output devices through the web, see “Using the web interface” on page 50.

The following illustration shows how to connect a router or switch to a 1U PDU.



The following illustration shows how to connect a router or switch to a 0U PDU.

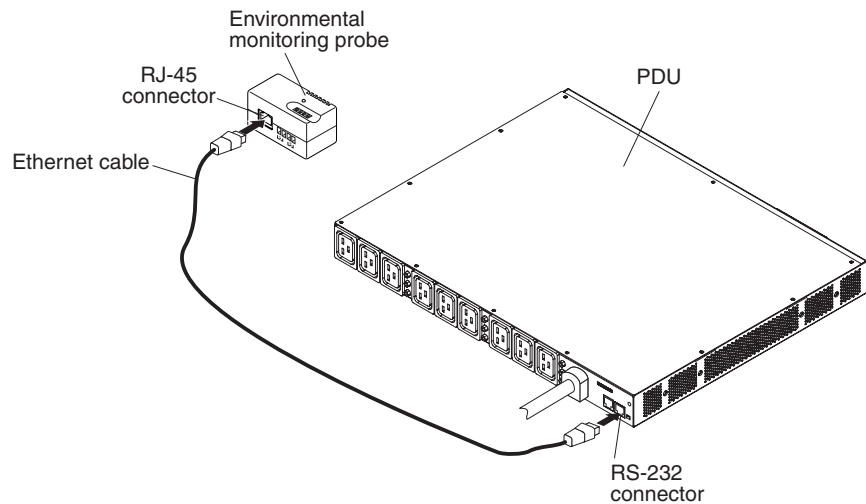


Connecting to an environmental monitoring probe

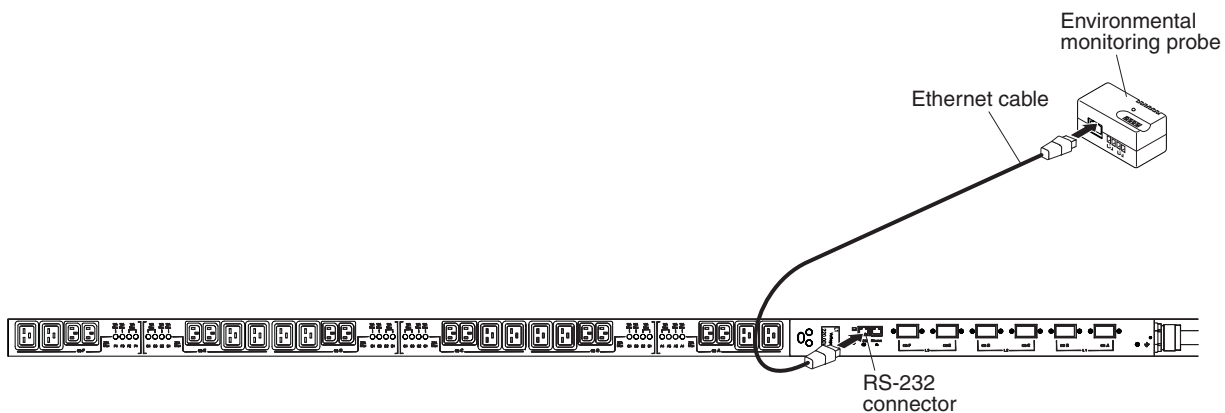
Note: The environmental monitoring probe does not come with the PDU and must be purchased separately.

The optional environmental monitoring probe has a built-in temperature and humidity sensor and enables you to remotely monitor the temperature and humidity of the environment in which the PDU is operating. Connect the environmental monitoring probe to the environmental monitoring probe connector on the PDU.

The following illustration shows how to connect an environmental monitoring probe to a 1U PDU.



The following illustration shows how to connect an environmental monitoring probe to a 0U PDU.



For more information about the environmental monitoring probe, see Chapter 8, “Using the environmental monitoring probe,” on page 65.

Connecting output devices

The PDU power outlets are for connecting devices such as workstations, servers, and printers. You can monitor the power status of a connected device either manually or remotely through the RS-232 and Ethernet connectors. Connect a device that you want to monitor to a power outlet on the PDU with the power cord that comes with the device.

Chapter 6. Using the LCD (OU PDU models only)

The OU PDU models have a graphical liquid crystal display (LCD) with one color backlight. Standard backlight is used to light the display with white text and a blue background. The display flashes if any alarms are active.

Control buttons

There are three control buttons on the front panel of the PDU:

Down (▼): Press this button to scroll down to the next menu option.

Up (▲): Press this button to scroll up to the previous menu option. Press and hold this button for more than 1 second to return to the previous menu without running a command or saving any changes.

OK: Press this button to select the current menu or option. Press and hold this button for more than 1 second to save the present setting that you are editing. On the Meters and Notice/Alarm screens, press and hold the Select button for 1 second to lock the screen.

LCD menus

The System Status screen is displayed automatically when no button is pushed for 15 minutes and you have not locked any screen. If the System Status screen is active due to a timeout, press any button to return to the main menu.

The following choices are on the main menu. Depending on the PDU model, some menu choices might differ slightly from these descriptions.

- **System status**

The system status screens are displayed only when notices or alarms are active. There is a separate screen for each active alarm and notice. If no alarms or notices are active, the message No active alarms is displayed on the first screen.

- **Meters**

The meters screens display the load segment voltage, current, and frequency. The meters menu has the following choices:

- Input meters
- Power meters
- Outlet meters
- Environment meters

Note: The Environment meters function is available only if an optional environmental monitoring probe is connected to the PDU.

- **Alarm History**

The alarm history log holds the last 50 events and starts from the latest event. The first row contains the date and time (hh:mm:ss) at which the event occurred. The second and third rows are the type of event and event description.

In the right bottom corner on the last row there are two numbers. The first number is the ordering number of the event in the log and the second number is the total number of the events in the log.

Note: When an alarm is active, the LCD active alarm screen flashes. After you press any button, the flashing stops and the display returns to normal.

- **Control**

You can turn the power outlets on and off from the control screens.

- **Information**

The information screens display the following PDU information:

- Type/model
- Part number
- Serial number
- Network management card firmware
- PDU firmware
- Network management card IP address (IPv4 and IPv6)

Note: If the network management card is not installed, the network management card IP address is displayed as Unknown.

- **Configuration**

All user configurable features and functions are defined under the password protected Configuration menu.

You can configure the following configuration settings:

- Cumulative setting
- Input setting
- Outlet setting
- Environment setting
- Dry contact setting
- LCD setting

Chapter 7. Monitoring the power status

You can monitor the power status of any device that is connected to the PDU, either locally or remotely, by using the PDU web interface or the IBM DPI Configuration Utility.

Notes:

1. All of the DPI Configuration Utility configuration menu choices are available through the web interface after the PDU is set up on the local network.
2. You can use Telnet or any other terminal program to configure the PDU after the IP address is set.

Using the IBM DPI Configuration Utility to set up the PDU

The IBM DPI Configuration Utility is integrated in the PDU and is used to configure the PDU settings, such as the IP address, network parameters, and trap receivers table. Before you can use the web interface to monitor the PDU power status, you must use the DPI Configuration Utility to set up the PDU.

To configure the PDU by using the IBM DPI Configuration Utility, complete the following steps:

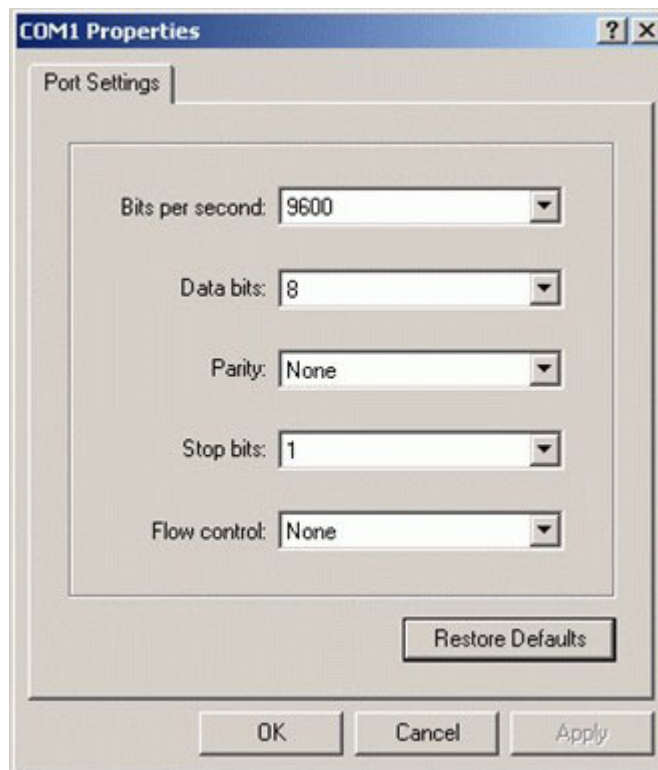
1. Connect a computer to the PDU. Connect one end of a DB9-to-RJ-45 cable to the RS-232 connector on the PDU and the other end to an RS-232 serial (COM) connector on a computer. For more information, see “Connecting to a computer” on page 35.
2. To start HyperTerminal and set up a connection between the computer and the IBM DPI Configuration Utility on the PDU, click **Start → Programs → Accessories → Communications → HyperTerminal**. The Connection Description window opens. In the **Name** field, type a name for the connection and select an icon for the connection. Click **OK**. The Connect To window opens.



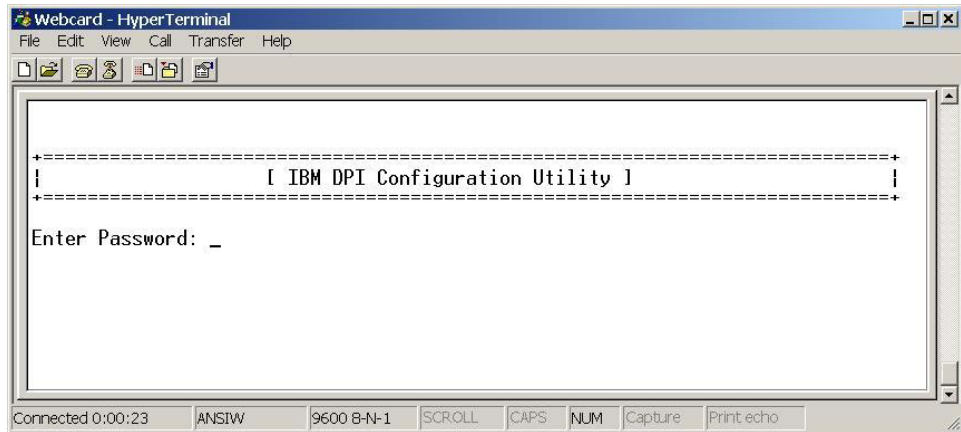
3. From the **Connect using** list, select the COM port that is connected to the PDU. Click **OK**. The Properties window opens.



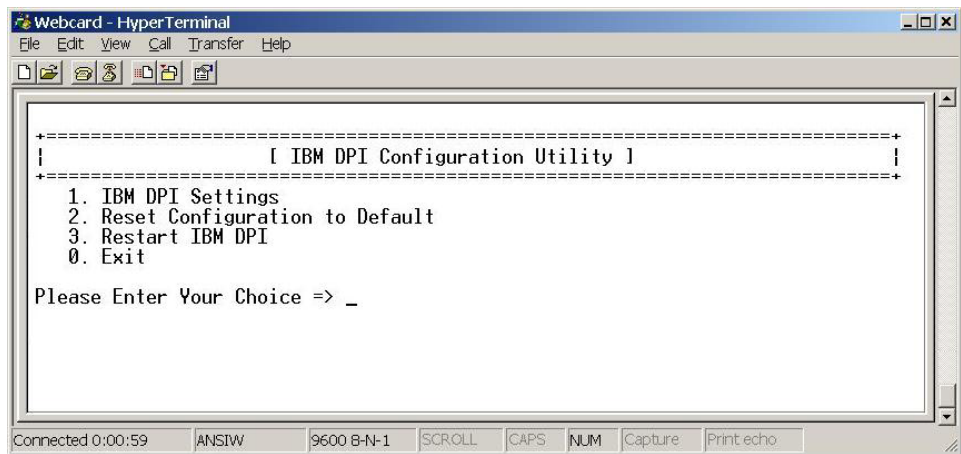
4. Select **9600** from the **Bits per second** list and select **None** from the **Flow control** list. Click **OK**.



5. Press any key. The IBM DPI Configuration Utility main menu opens, and you are prompted for a password. Type `passw0rd` (all lowercase letters with a zero, not O) and press Enter.



The IBM DPI Configuration Utility main window opens.



See "Configuration Utility menu choices" on page 46 for descriptions of the choices in this window.

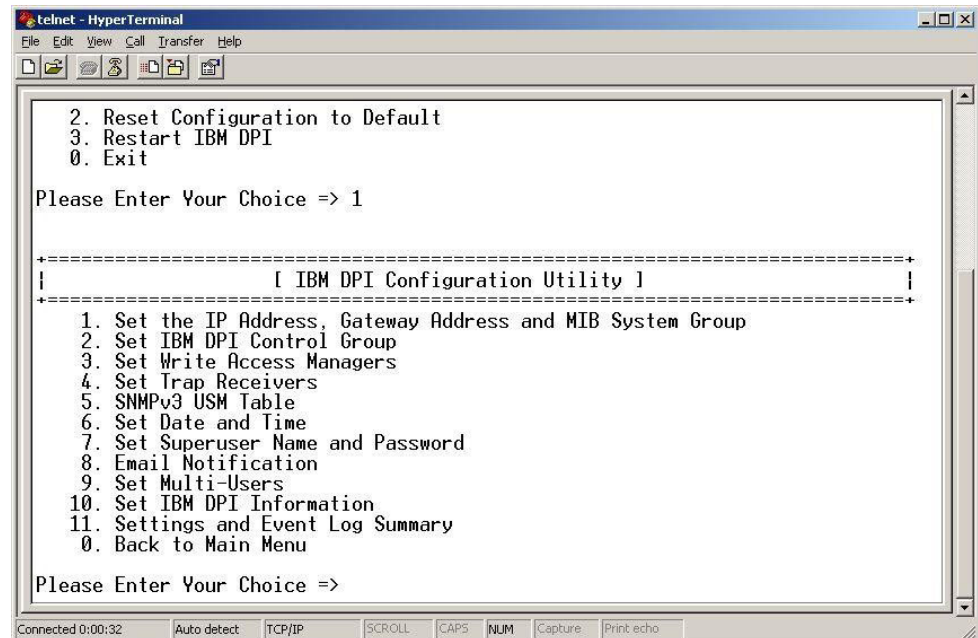
Configuration Utility menu choices

The following choices are on the Configuration Utility main menu.

Note: The Configuration Utility menu choices and commands might be different, depending on the PDU model.

- **IBM DPI Settings**

When you select **IBM DPI Settings**, the following window opens.



The following choices are available:

- **Set the IP Address, Gateway Address and MIB System Group**
Select this choice to view and change the IP address, date, time, and system information.
- **Set IBM DPI Control Group**
Select this choice to set the administrator user name, password, and access protocols.
- **Set Write Access Managers**
Select this choice to set up a list of users who can access and control the PDU.
- **Set Trap Receivers**
Select this choice to configure remote network management system (NMS) servers to receive traps.
- **SNMPv3 USM Table**
Select this choice to set the SNMPv3 USM Table to configure the PDU using SNMPv3 tools.
- **Set Date and Time**
Select this choice to adjust the date and time information for the PDU.
- **Set Superuser Name and Password**
Select this choice to set the user name and password of the administrator who will use a web browser to configure the PDU.

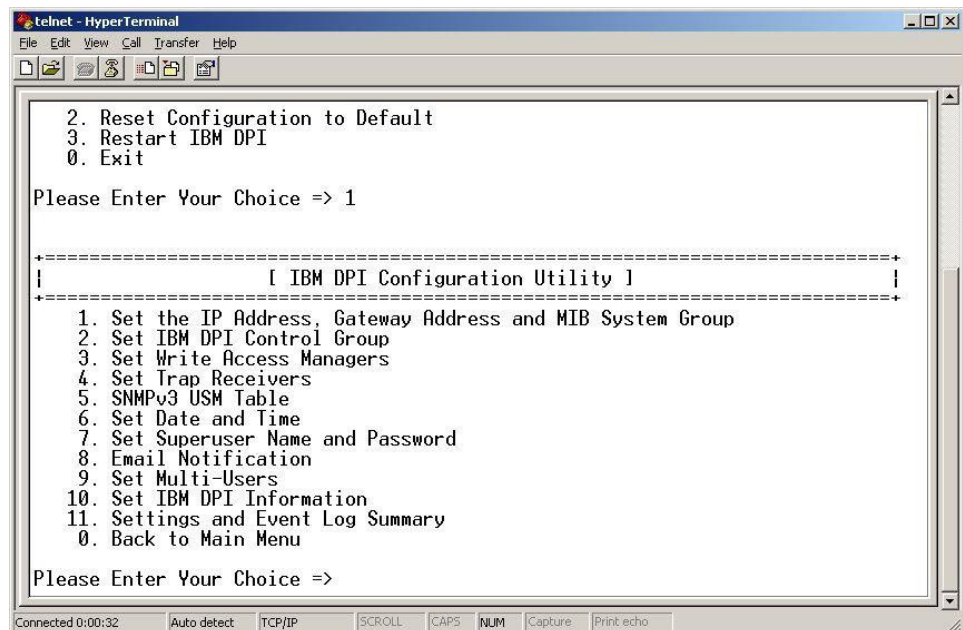
- **E-mail Notification**
Select this choice to set up a list of users who will be alerted with event messages if an unusual event is triggered on the PDU.
- **Set Multi-Users**
Select this choice to configure other user and password logins and the read and write access levels.
- **Set IBM DPI Information**
Select this choice to configure the PDU logging interval, refresh rate, and custom name fields for the load groups.
- **Settings and Event Log Summary**
Select this choice to view all PDU configuration settings.
- **Reset Configuration to Default**
Select this choice to reset all PDU settings to their factory default values.
- **Restart HD-PDU**
Select this choice to restart the PDU.

Setting the IP address

Note: You must set the IP address before you can use the web interface. If you do not know the IP address, contact your network administrator.

To set the IP address of the PDU, complete the following steps:

1. In the Configuration Utility main menu, select **IBM DPI Settings**. The following window opens.



2. Select **Set the IP Address, Gateway Address and MIB System Group**. You must set the IP address before you can access the PDU in an IP network (LAN/WAN).

Note: The MIB system group contains the system name, system contact, and system location information. This information is returned through the system group in SNMP and is also displayed through the web interface.

A window similar to the one in the following illustration is displayed.

```
8. Email Notification
9. Set Multi-Users
10. Set IBM DPI Information
11. Settings and Event Log Summary
0. Back to Main Menu

Please Enter Your Choice => 1

+-----+
| [ IBM DPI Configuration Utility ] |
+-----+

IBM DPI Version : IBM DPI V0302.0010
Ethernet Address : 00-E0-D8-FF-A5-A0
1. IPv4 Configuration
2. IPv6 Configuration
3. DNS IP Address : 10.222.1.75
4. Mail Server : 10.222.1.16
5. System Contact : Barrman / Gavin x6458
6. System Name : IBM DPI
7. System Location : Tower Of Power - Left Rack
0. Return to previous menu

Please Enter Your Choice =>
```

3. To configure the Internet Protocol, choose one of the following:
 - To configure Internet Protocol version 4, select **IPv4 Configuration**. A window similar to the one in the following illustration is displayed.

```
+-----+
| IBM DPI Version : IBM DPI V0302.0010 |
| Ethernet Address : 00-E0-D8-FF-A5-A0 |
| 1. IPv4 Configuration |
| 2. IPv6 Configuration |
| 3. DNS IP Address : 10.222.1.75 |
| 4. Mail Server : 10.222.1.16 |
| 5. System Contact : Barrman / Gavin x6458 |
| 6. System Name : IBM DPI |
| 7. System Location : Tower Of Power - Left Rack |
| 0. Return to previous menu |
+-----+

Please Enter Your Choice => 1

+-----+
| [ IPv4 Configuration Menu ] |
+-----+

1. IPv4 Address : 10.222.45.193
2. Gateway Address : 10.222.45.254
3. Network Mask : 255.255.255.0
0. Return to previous menu

Please Enter Your Choice => _
```

- To configure Internet Protocol version 6, select **IPv6 Configuration**. A window similar to the one in the following illustration is displayed.

```

2. IPv6 Configuration
3. DNS IP Address   : 10.222.1.75
4. Mail Server     : 10.222.1.16
5. System Contact  : Barrman / Gavin x6458
6. System Name     : IBM DPI
7. System Location : Tower Of Power - Left Rack
0. Return to previous menu

Please Enter Your Choice => 2

+-----+
|               [ IPv6 Configuration Menu ]               |
+-----+
IPv6 Link-local Address      : FE80::2E0:D8FF:FEFF:A5A0
Address Status              : Manual Configuration
1. Address Autoconfiguration Status : Disable
2. IPv6 Global Address       : FD00::192.168.7.18
3. IPv6 Global Prefix Length : 64
4. IPv6 Default Router      : FD00::192.168.1.254
0. Return to previous menu

Please Enter Your Choice => _

```

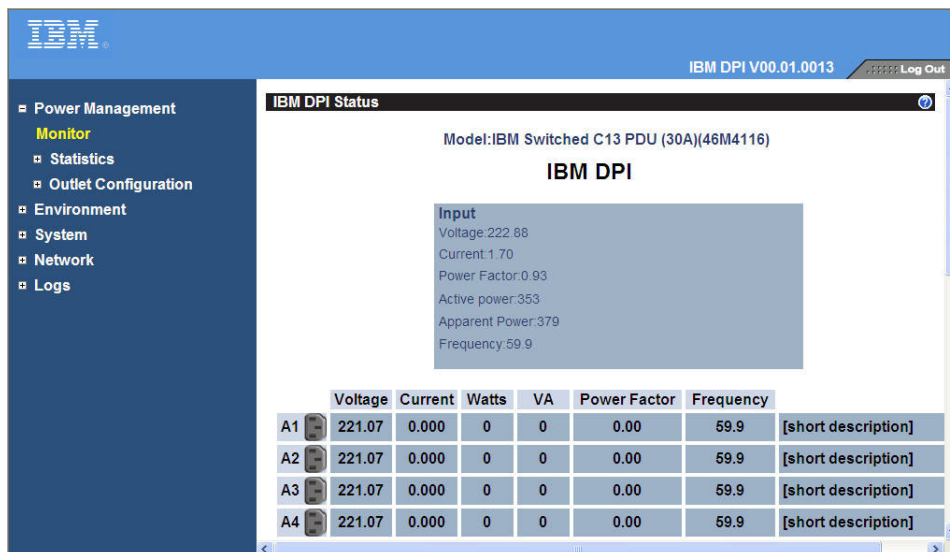
Using the web interface

This section provides information about using the web interface to configure and monitor the PDU remotely. The PDU provides a graphical user interface that you can view from a web browser. Using a web browser, you can access and monitor the PDU power outlets and output devices remotely from a computer.

Starting the web interface

To start the web interface, complete the following steps:

1. Start a web browser from a computer and enter the IP address of the PDU in the address field. For more information about setting the IP address of the system, see “Setting the IP address” on page 47.
2. The “Connect to” window opens. In the **User name** field, type USERID (all uppercase letters). In the **Password** field, type passw0rd (all lowercase letters with a zero, not O).
3. Click **OK**. The main status page opens.



The main page shows a graphical representation of the PDU power outlets and input status:

- The left pane shows the menus and submenus for the PDU. Click a menu to display the menu choices, expand the menu items, and modify the menu choices as required.
- The graphic in the right pane shows the status of the PDU, including the current, watts, output power in VA, power factor, and frequency.

Each menu page provides online help to assist you with configuring the PDU. Click the help icon at the top of each page to view the help.

Statistics of the PDU and outlets

You can view the statistics of the overall PDU and of each outlet.

On the Statistics of Overall PDU page, you can view the present, minimum, and maximum values for the overall PDU.

To view the statistics of the PDU, click **Overall PDU** under **Statistics**. The Statistics of Overall PDU page is displayed.

IBM DPI V00.01.0013 Log Out

Statistics of Overall PDU

IBM DPI	Present Value	MIN	MAX
Input Voltage (V)	222.56	222.63	
Input Current (A)	1.71	1.70	
Power Factor Phase	0.93	0.93	
Input Frequency (Hz)	59.9	59.9	
Input Active Power (W)	353	354	392
PDU Ambient Temperature (°C)	40.4	40.4	
EMP Ambient Temperature (°C)	25	25	28
EMP Humidity (%)	43	42	43

Reset MIN/MAX Statistics Reset MIN Reset MAX

Cumulative Kilowatt Hours 8
Since: 01/01/1970 00:00:11 Reset

Last Updated: Thu Sep 16 09:28:24 EDT 2010

On the Statistics of Outlet page, you can view the present, minimum, and maximum values for a specific outlet.

To view the statistics for a specific outlet, click the outlet under **Statistics**. The Statistics of Outlet page is displayed.

IBM DPI V00.01.0013 Log Out

Statistics of Outlet A1

A1:[short description]
[description]

	Present Value	MIN	MAX
Output Voltage (V)	219.84	219.90	225.02
Output Current (A)	0.000	0.000	0.000
Output Power Factor	0.00	0.00	0.00
Load Group Watts (W)	0	0	0

Reset MIN/MAX Statistics Reset MIN Reset MAX

Cumulative Kilowatt Hours 0
Since: 01/01/1970 00:00:11 Reset

Outlet is ON
Control Outlet

Last Updated: Wed Sep 15 10:11:20 EDT 2010

Outlet configuration

On the Configuration of Power Management page, you can view the configuration of each outlet, change the outlet name and its description, and change the outlet alert thresholds.

To view or change the outlet description, click **Name Configuration** under **Outlet Configuration**.

The screenshot shows the IBM DPI V01.02.0021 Configuration of Power Management page. The left sidebar contains a navigation menu with the following items: Power Management, Monitor, Statistics, Outlet Configuration (highlighted), Name Configuration (highlighted), Outlet Alert Thresholds, System, Network, and Logs. The main content area is titled "Configuration of Power Management" and contains a "Configuration" section. This section displays the configuration for Outlet 1, including the System Name (IBM DPI), Outlet 1 Short Description (Outlet 1), and Additional Details (IBM 3690 Rack 3). Below this, there are sections for Outlet A2, Outlet A3, and Outlet A4, each with a Short Description and Additional Details field.

System Name	IBM DPI
Outlet 1	Outlet 1
Short Description	Outlet 1
Additional Details	IBM 3690 Rack 3
Outlet A2	Outlet 2
Short Description	[description]
Additional Details	[description]
Outlet A3	Outlet 3
Short Description	[description]
Additional Details	[description]
Outlet A4	

Outlet alert threshold

On the Configuration of IBM DPI page (Outlet alert threshold), you can change the outlet alert thresholds of the PDU.

To view or change the outlet alert thresholds, click **Outlet Alert Thresholds** under **Outlet Configuration**.

The screenshot shows the IBM DPI V01.02.0021 Configuration of IBM DPI page. The left sidebar contains a navigation menu with the following items: Power Management, Monitor, Statistics, Outlet Configuration (highlighted), Name Configuration, Outlet Alert Thresholds (highlighted), System, Network, and Logs. The main content area is titled "Configuration of IBM DPI" and contains two sections: "Input Threshold Configuration of IBM DPI" and "Outlet Threshold Configuration of IBM DPI".

Input Threshold Configuration of IBM DPI

	Warning	Critical
Input L1 Over Current(A)	19.20	24.00
Internal Over Temperature(C)	50.0	80.0

Outlet Threshold Configuration of IBM DPI

	High warning	Low warning
Input L1 Voltage Limits(V)	239.20	176.80

Outlet Threshold Configuration of IBM DPI

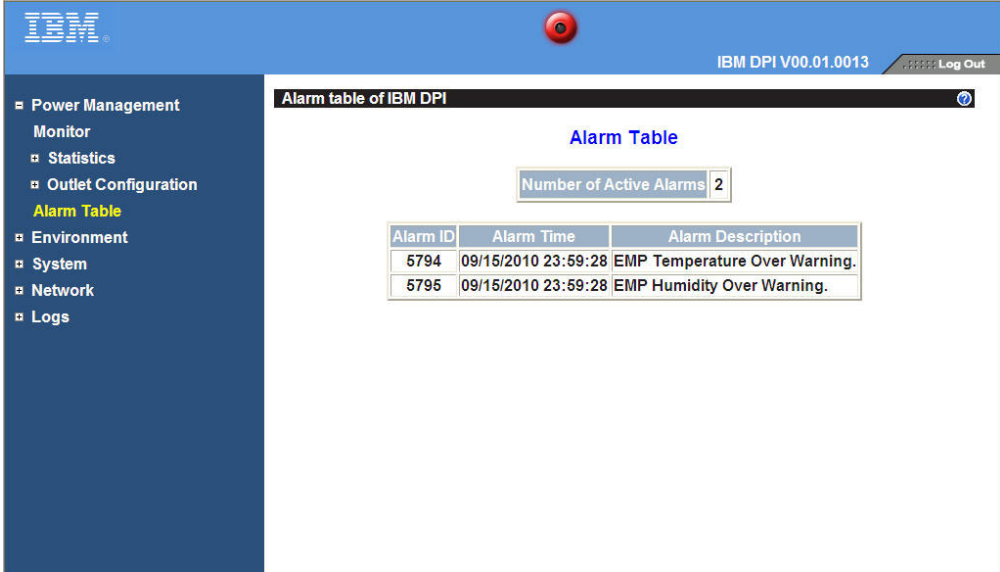
	Warning	Critical
Outlet A1 Over Current(A)	9.000	10.000
Outlet A2 Over Current(A)	9.000	10.000
Outlet A3 Over Current(A)	9.000	10.000
Outlet A4 Over Current(A)	9.000	10.000
Outlet A5 Over Current(A)	9.000	10.000
Outlet A6 Over Current(A)	9.000	10.000
Outlet A7 Over Current(A)	9.000	10.000
Outlet A8 Over Current(A)	9.000	10.000
Outlet B1 Over Current(A)	9.000	10.000
Outlet B2 Over Current(A)	9.000	10.000

Alarm table

On the Alarm table page, you can view the details of the PDU active alarms. A red alert button flashes at the top of the web interface window to indicate a PDU active alarm. The alarm table refreshes automatically.

Note: The Alarm table page is available only if there is a PDU active alarm.

To view the alarm table, click **Alarm Table** under **Power Management**. The Alarm table page is displayed.



The screenshot shows the IBM DPI web interface. The top header bar is blue with the IBM logo on the left, a red alert button in the center, and the text "IBM DPI V00.01.0013" and "Log Out" on the right. A left sidebar contains a menu with the following items: Power Management, Monitor, Statistics, Outlet Configuration, Alarm Table (highlighted in yellow), Environment, System, Network, and Logs. The main content area is titled "Alarm table of IBM DPI" and "Alarm Table". Below the title, there is a box labeled "Number of Active Alarms" with the value "2". A table displays the active alarms:

Alarm ID	Alarm Time	Alarm Description
5794	09/15/2010 23:59:28	EMP Temperature Over Warning.
5795	09/15/2010 23:59:28	EMP Humidity Over Warning.

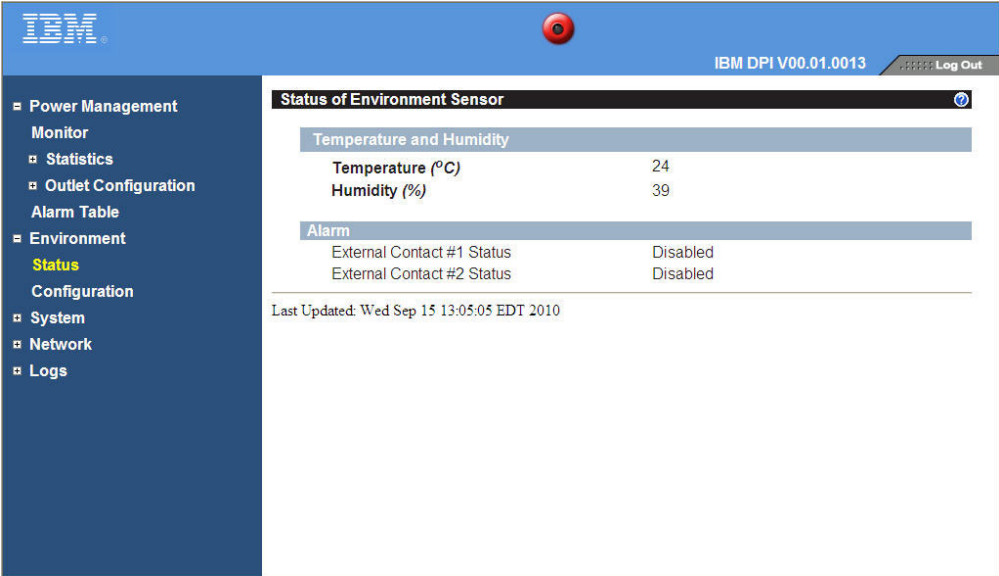
Environment status and configuration

If an environmental monitoring probe is connected to the PDU, you can view the temperature and humidity information. For more information about installing and using the environmental monitoring probe, see Chapter 8, “Using the environmental monitoring probe,” on page 65.

Viewing the environment status

On the Status of Environment Sensor page, you can view the environment status (temperature and humidity).

To view the status of an environmental monitoring probe that is connected to the PDU, click **Status** under **Environment**. The Status of Environment Sensor page is displayed, and the temperature and humidity of the environmental monitoring probe are displayed.



The screenshot displays the IBM DPI V00.01.0013 web interface. The left sidebar contains a navigation menu with the following items: Power Management, Monitor, Statistics, Outlet Configuration, Alarm Table, Environment (highlighted), Status (highlighted in yellow), Configuration, System, Network, and Logs. The main content area is titled "Status of Environment Sensor" and includes a "Log Out" button. It displays the following data:

Temperature and Humidity	
Temperature (°C)	24
Humidity (%)	39

Alarm	
External Contact #1 Status	Disabled
External Contact #2 Status	Disabled

Last Updated: Wed Sep 15 13:05:05 EDT 2010

Changing the environment configuration settings

On the Configuration of Environment Sensor page, you can change the parameters of the environmental monitoring probe and change parameters associated with the environment events.

To configure the environmental monitoring probe that is connected to the PDU, click **Configuration** under **Environment**.

The screenshot displays the 'Configuration of Environment Sensor' page in the IBM DPI V00.01.0013 interface. The left sidebar contains a navigation menu with the following items: Power Management, Monitor, Statistics, Outlet Configuration, Alarm Table, Environment, Status, Configuration (highlighted in yellow), System, Network, and Logs. The main content area is titled 'Configuration of Environment Sensor' and is divided into three sections: 'Configure Temperature', 'Configure Humidity', and 'Configure Alarm'. The 'Configure Temperature' section includes 'Display Degrees' (set to Celsius), 'Temperature Critical Threshold (0 - 70°C)' (70), 'Temperature Warning Threshold (0 - 70°C)' (0), and 'Temperature Hysteresis (0 - 10°C)' (2). The 'Configure Humidity' section includes 'Humidity Critical Threshold (0 - 90%)' (90), 'Humidity Warning Threshold (0 - 90%)' (0), and 'Humidity Hysteresis (0 - 20%)' (2). The 'Configure Alarm' section includes 'Alarm-1 Summary Display Name' (External Contact #1 Status), 'Alarm-1 Contact Type' (Disabled), 'Alarm-2 Summary Display Name' (External Contact #2 Status), and 'Alarm-2 Contact Type' (Disabled). A 'Save' button is located at the bottom right of the configuration area.

Configure Temperature	
Display Degrees	Celsius
Temperature Critical Threshold (0 - 70°C)	70
Temperature Warning Threshold (0 - 70°C)	0
Temperature Hysteresis (0 - 10°C)	2

Configure Humidity	
Humidity Critical Threshold (0 - 90%)	90
Humidity Warning Threshold (0 - 90%)	0
Humidity Hysteresis (0 - 20%)	2

Configure Alarm	
Alarm-1 Summary Display Name	External Contact #1 Status
Alarm-1 Contact Type	Disabled
Alarm-2 Summary Display Name	External Contact #2 Status
Alarm-2 Contact Type	Disabled

Save

Modifying the basic settings

Use the **System** menu to configure the PDU system parameters such as the superuser name and password. Some of these settings are described in the following sections.

Changing the superuser name and password

On the Configuration page, you can set the user name and password of the administrator who will use a web browser to configure the PDU.

Note: To change the superuser name and password, you must have read/write access to the PDU.

To view and change the system superuser user name and password, click **Configuration** under **System**.

IBM DPI V01.02.0021 Log Out

Configuration of IBM DPI

Configure System

System Name	IBM DPI
System Contact	Technical Support Team
System Location	
SNMP Read Community	*****
SNMP Write Community	*****
History Log Interval (Sec)	60
Web Refresh Rate (Sec)	10

Save

Superuser User Name and Password

Superuser User Name	USERID
Superuser Password	*****
Confirm Superuser Password	*****

Save

Control

Reset to Default Restart System

Identifying the PDU and IBM Network Management Card

On the Identification of Power Management page, you can view the PDU and the IBM Network Management Card information.

To view the identification information of the PDU and network management card, click **Identification** under **System**.

The screenshot shows the 'Identification of Power Management' page. The left sidebar has a menu with 'System' expanded and 'Identification' selected. The main content area is divided into two sections:

- PDU Identification**

Model	IBM Switched C13 PDU (32A)
Part Number	46M4119
Serial Number	46M4116YK10C1011001
Software Version	00.01.0007
- IBM Network Management Card Identification**

Software Version	IBM DPI V00.01.0015(alpha4)
Serial Number	
MAC Address	00-E0-D8-FF-A7-E9
System Up-Time	0 days 0 hours 0 mins 38.95 secs.

Adding users

On the Multi-User Configuration page, you can add or remove users who can access and control the PDU. The maximum number of users is eight.

To create a list of users who can access and control the PDU, click **Multi-User** under **System**. You can add users who can only view the PDU status or users who can change the PDU settings.

The screenshot shows the 'Multi-User Configuration of IBM DPI' page. The left sidebar has a menu with 'System' expanded and 'Multi-User' selected. The main content area shows a 'Multi-User List' table:

Index	User Name	Password	Access Type
1	bmoran	*****	Read/Write
2			No Access
3			No Access
4			No Access
5			No Access
6			No Access
7			No Access
8			No Access

Below the table is a 'Save' button.

Changing the date and time

On the Date and Time page, you can change the date and time of the PDU.

Note: Changing the PDU date and time affects other PDU settings such as email, traps, and logs.

To view and change the date and time, click **Date and Time** under **System**. You can set the date and time manually, synchronize it with the computer time, or synchronize it with an NTP server.

The screenshot displays the IBM DPI V00.01.0013 web interface. On the left is a navigation menu with categories: Power Management, Monitor, Statistics, Outlet Configuration, System, Configuration, Identification, Multi-User, Date & Time (highlighted), Trap Receivers, Email Notification, External Links, Network, and Logs. The main content area is titled 'Date and Time of IBM DPI'. It contains two sections: 'Current Date and Time' and 'Configure Date and Time'. The 'Current Date and Time' section shows 'IBM DPI System Date (mm/dd/yyyy)' as 09/15/2010 and 'IBM DPI System Time (hh:mm:ss)' as 23:05:09. The 'Configure Date and Time' section has three radio button options: 'Synchronize with computer time' (selected), 'Synchronize with NTP server', and 'Set manually'. Under 'Synchronize with computer time', there are fields for 'Computer Date (mm/dd/yyyy)' (09/15/2010) and 'Computer Time(hh:mm:ss)' (11:06:47). Under 'Synchronize with NTP server', there are fields for 'NTP server address', 'DNS Address' (9.0.6.1), and a 'Time Zone' dropdown menu set to '[GMT 00:00] Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London'. There is also an unchecked checkbox for 'Enable Daylight Saving Time'. Under 'Set manually', there are fields for 'Date (mm/dd/yyyy)' (09/15/2010) and 'Time (hh:mm:ss)' (23:04:59).

Changing event alerts

On the SNMP Trap Receivers page, you can change event alerts.

To create a list of users (or computers) who will be alerted with an SNMP trap message, click **Trap Receivers** under **System**. You can specify the IP addresses of up to eight trap receivers, the community information, type of trap, severity of trap, and description of the events that cause the traps.

Index	NMS IP Address	Community	Trap Type	Severity	Description
1		public	Disabled	All Traps	
2		public	Disabled	All Traps	
3		public	Disabled	All Traps	
4		public	Disabled	All Traps	
5		public	Disabled	All Traps	
6		public	Disabled	All Traps	
7		public	Disabled	All Traps	
8		public	Disabled	All Traps	

Save

To create a list of up to four users who will be alerted with an email, click **Email Notification** under **System**. On this page you can specify the mail server, DNS address, and other information that is necessary to set up a mail server for sending mail alerts. Use the Email Receivers Table to add the email addresses.

Index	Mail Account	Description	Mail Type	Event Level	Mail Daily Report Hour
1			None	All	00:00
2			None	All	00:00
3			None	All	00:00

Changing the network configuration

Use the **Network** menu to change the network information for the PDU, for example, the IP address.

To view or change the network configuration of the PDU, click **Configuration** under **Network**. You can set the PDU IP address, gateway address, subnet mask, and Domain Name System (DNS) address.

General TCP/IPv4 Configuration	
IP Address	9.42.236.151
Gateway Address	9.42.236.1
Subnet Mask	255.255.254.0
DNS Address	9.0.6.1

General TCP/IPv6 Configuration	
Address AutoConfiguration Status	Disabled
Address Status	Manual Configuration
Link-Local Address	FE80::E61F:13FF:FE8C:32
Global Address	FD00::192.168.7.18
Global Prefix Length	64
Default Router Address	FD00::192.168.1.254

Save

Click **Control** under **Network** to configure TCP/IP settings.

Click **Access Control** under **Network** to set access control to prevent unauthorized users from accessing the PDU.

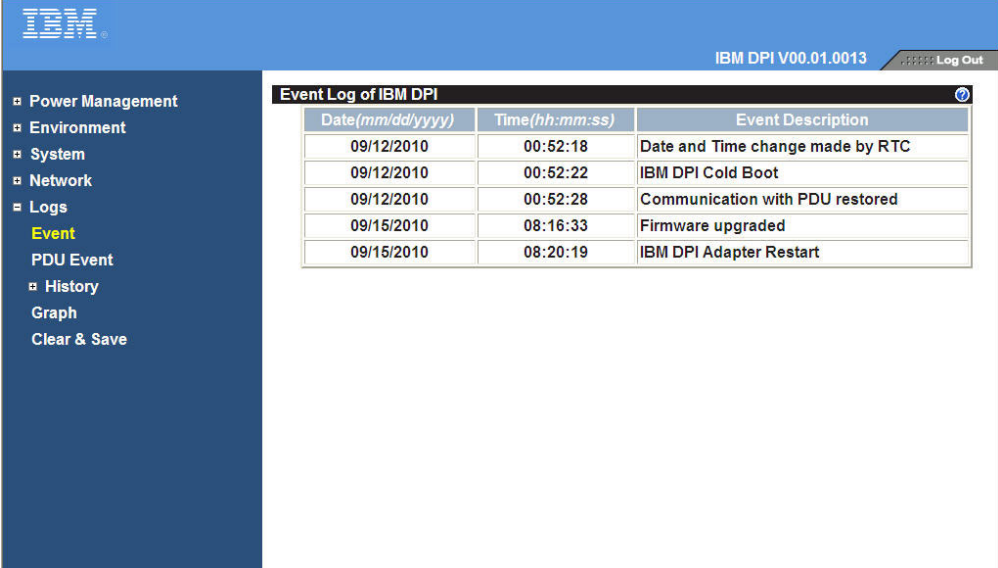
History and event log summaries

The **Logs** menu provides a detailed description of all events and a record of the PDU status. You can use this page to analyze problems with network equipment.

Viewing the event log

On the Event Log page, you can view the complete record of the PDU events.

To view the complete record of the PDU events, under **Logs**, click **Event**. Each event log file shows the time, date, and description of all the events that have occurred on the PDU.



IBM DPI V00.01.0013 Log Out

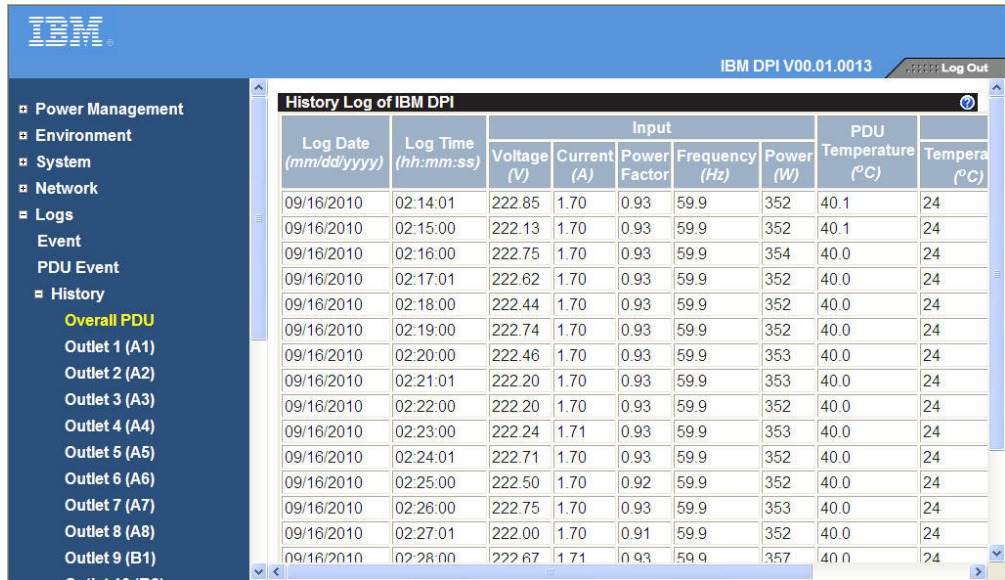
Event Log of IBM DPI

Date(mm/dd/yyyy)	Time(hh:mm:ss)	Event Description
09/12/2010	00:52:18	Date and Time change made by RTC
09/12/2010	00:52:22	IBM DPI Cold Boot
09/12/2010	00:52:28	Communication with PDU restored
09/15/2010	08:16:33	Firmware upgraded
09/15/2010	08:20:19	IBM DPI Adapter Restart

Viewing the history log

On the History Log page, you can view the complete history of the PDU inputs, outputs, and environmental monitoring probe.

To view the history of the PDU, under **Logs**, click **History**. Each log file shows a record of the input power, output power of each outlet, and environmental monitoring probe temperature and humidity.

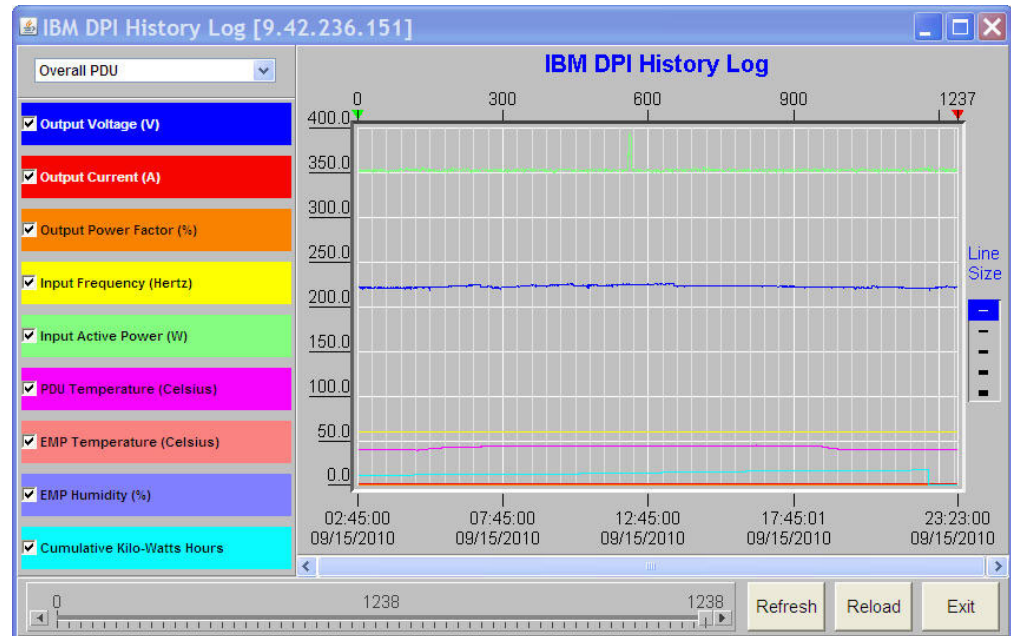


Log Date (mm/dd/yyyy)	Log Time (hh:mm:ss)	Input					PDU Temperature (°C)	Tempera (°C)
		Voltage (V)	Current (A)	Power Factor	Frequency (Hz)	Power (W)		
09/16/2010	02:14:01	222.85	1.70	0.93	59.9	352	40.1	24
09/16/2010	02:15:00	222.13	1.70	0.93	59.9	352	40.1	24
09/16/2010	02:16:00	222.75	1.70	0.93	59.9	354	40.0	24
09/16/2010	02:17:01	222.62	1.70	0.93	59.9	352	40.0	24
09/16/2010	02:18:00	222.44	1.70	0.93	59.9	352	40.0	24
09/16/2010	02:19:00	222.74	1.70	0.93	59.9	352	40.0	24
09/16/2010	02:20:00	222.46	1.70	0.93	59.9	353	40.0	24
09/16/2010	02:21:01	222.20	1.70	0.93	59.9	353	40.0	24
09/16/2010	02:22:00	222.20	1.70	0.93	59.9	352	40.0	24
09/16/2010	02:23:00	222.24	1.71	0.93	59.9	353	40.0	24
09/16/2010	02:24:01	222.71	1.70	0.93	59.9	352	40.0	24
09/16/2010	02:25:00	222.50	1.70	0.92	59.9	352	40.0	24
09/16/2010	02:26:00	222.75	1.70	0.93	59.9	353	40.0	24
09/16/2010	02:27:01	222.00	1.70	0.91	59.9	352	40.0	24
09/16/2010	02:28:00	222.67	1.71	0.93	59.9	357	40.0	24

Viewing the history graph

On the History Graph page, you can view a graphical view of the data logged by the PDU over time.

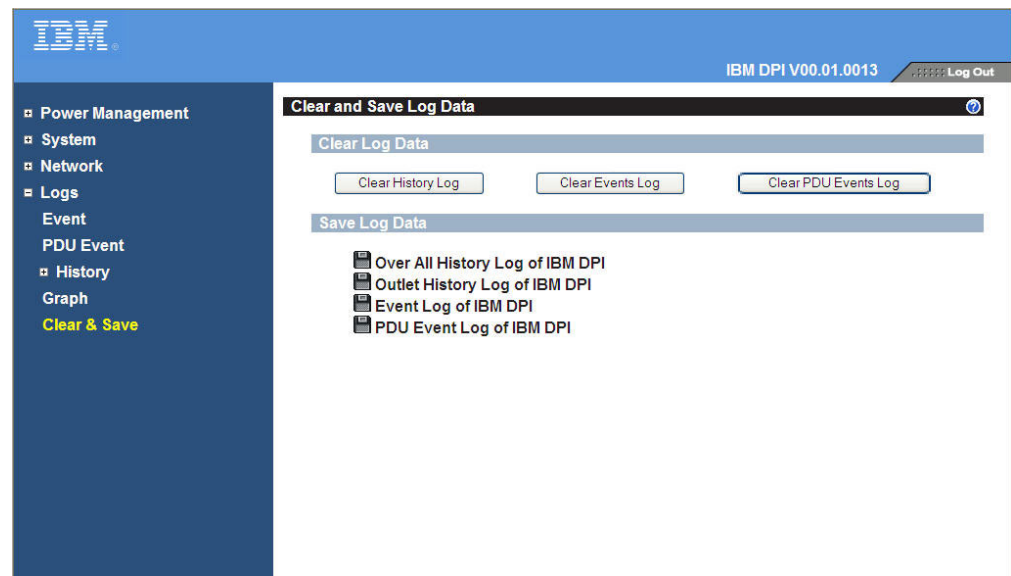
To view the history graph of the PDU, under **Logs**, click **Graph**.



Clearing and saving log data

On the Clear and Save Log Data page, you can clear or save specific log data.

To clear or save specific log data, under **Logs**, click **Clear & Save**.

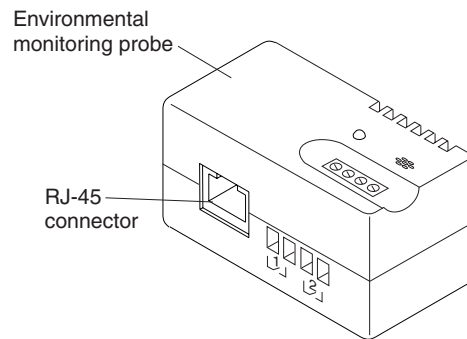


Chapter 8. Using the environmental monitoring probe

The optional environmental monitoring probe is a connectivity device that enables you to remotely monitor the temperature, humidity, and status of two contact devices through a standard web browser, providing greater power management control and flexible monitoring.

Overview

When the environmental monitoring probe is connected to the environmental monitoring probe connector on the PDU, temperature and humidity readings are automatically displayed in the web interface. To access the readings, you must run the web browser and connect to the PDU IP address.



The environmental monitoring probe option comes with one environmental monitoring probe, screws, hook-and-loop fasteners, tie wrap, and Ethernet cable. You can install the device anywhere you want on the rack. To attach the environmental monitoring probe, use the hook-and-loop fasteners or mount the probe on the screw. The environmental monitoring probe has a universal slot on the back that makes it easy to mount on the screw in any direction.

The environmental monitoring probe has the following features:

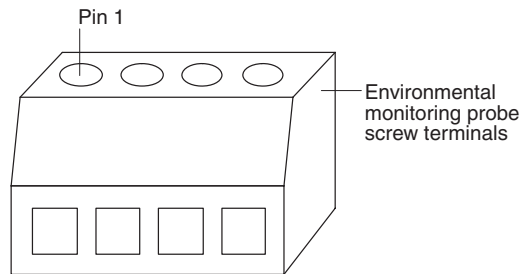
- The hot-swap feature simplifies installation by enabling you to install the probe safely without turning off power to the PDU or to the loads that are connected to it.
- It monitors temperature and humidity information of any environment that you want, to protect your critical equipment.
- It measures temperatures between 0°C and 80°C (32°F and 176°F) with an accuracy of $\pm 1^\circ\text{C}$.
- It measures relative humidity between 10% and 90% with an accuracy of $\pm 5\%$.
- It can be located away from the PDU with a Category 5 network cable up to 20 m (65.6 ft) long.
- It monitors the status of the two user-provided contact devices.
- Temperature, humidity, and contact closure status can be displayed through a web browser.
- User-selectable alarm thresholds enable you to define acceptable temperature or humidity limits
- You can use email client software to set up email notification through Simple Mail Transfer Protocol (SMTP) when acceptable alarm limits are exceeded or contact status changes.
- Changes in external contact status are logged in the PDU event history log.

- When temperature and humidity values exceed user-selectable limits, the event is logged in the PDU event history log.

Installing the environmental monitoring probe

To install the environmental monitoring probe, complete the following steps:

1. If applicable, connect external contact inputs to the screw terminals on the environmental monitoring probe.



Note: External contact device 1 is connected between pins 1 and 2. Device 2 is connected between pins 3 and 4 (as labeled to show device 1 and 2). External contact devices can be normally open or normally closed.

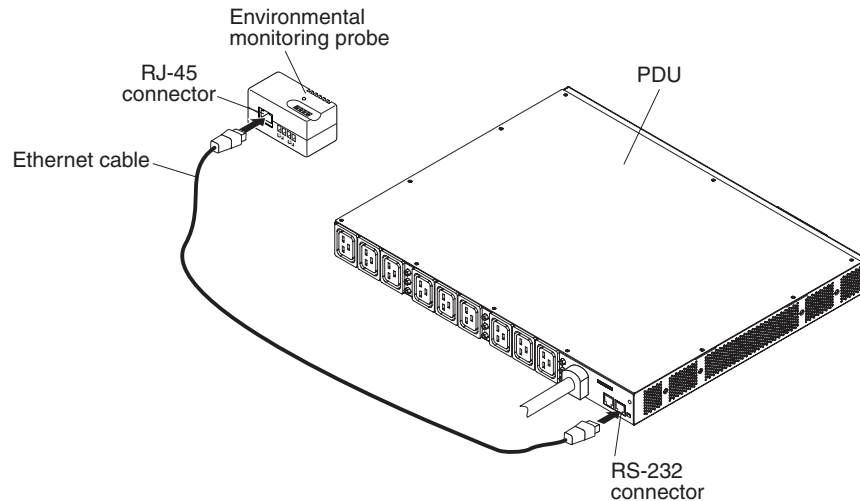
Table 6. Environmental monitoring probe screw terminal pin assignment

Pin number	Description	Normally open/ normally closed
1	Contact 1 return	Normally closed
2	Contact 1 signal input	Normally open
3	Contact 2 return	Normally closed
4	Contact 2 signal input	Normally open

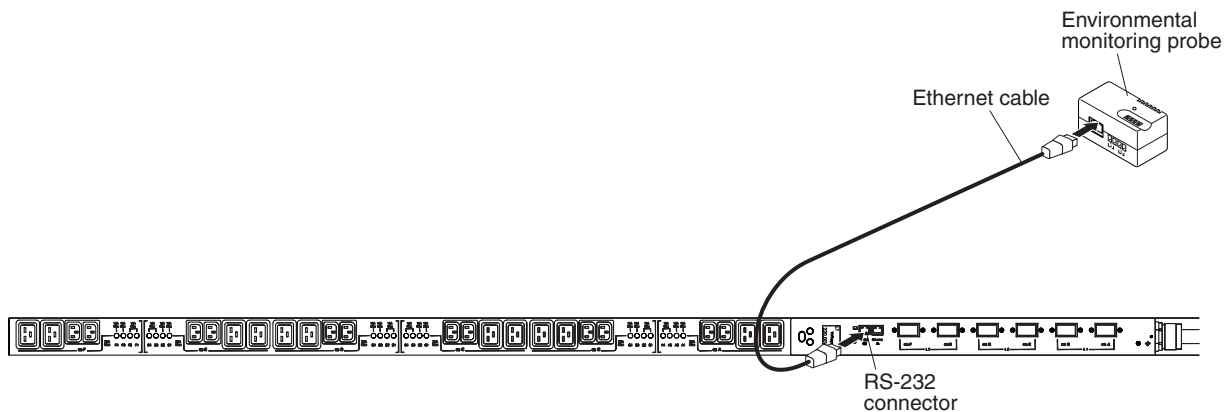
2. Connect the Category 5 Ethernet cable that comes with the environmental monitoring probe to the RJ-45 connector on the environmental monitoring probe and to the RS-232 connector on the PDU.

Note: If the cable is not long enough for your configuration, you can use a cable that is 20 m (65.6 ft) or less.

The following illustration shows how to connect an Ethernet cable to a 1U PDU and to the environmental monitoring probe.



The following illustration shows how to connect an Ethernet cable to a 0U PDU and to the environmental monitoring probe.



3. Make sure that the PDU has a network connection, the power cord is connected, and the power to the PDU is turned on. The environmental monitoring probe is automatically recognized by the PDU.

4. Start a web browser and connect to the PDU IP address (for more information, see “Using the web interface” on page 50). The web interface main status page opens. Click **Environment**, and then click **Status**. The Status of Environment Sensor page opens. The temperature and humidity status is automatically displayed.

IBM DPI V00.01.0013 Log Out

Power Management
Monitor
Statistics
Outlet Configuration
Environment
Status
Configuration
System
Network
Logs

Status of Environment Sensor

Temperature and Humidity

Temperature (°C)	25
Humidity (%)	42

Alarm

External Contact #1 Status	Disabled
External Contact #2 Status	Disabled

Last Updated: Fri Sep 17 11:39:29 EDT 2010

5. Before the status of the contact closures is displayed, you must configure and enable this feature on the PDU web interface. Click **Environment**, and then click **Configuration**. The Configuration of Environment Sensor page opens.

IBM DPI V00.01.0013 Log Out

Power Management
Monitor
Statistics
Outlet Configuration
Environment
Status
Configuration
System
Network
Logs

Configuration of Environment Sensor

Configure Temperature

Display Degrees: Celsius

Temperature Critical Threshold (0 - 70°C): 70

Temperature Warning Threshold (0 - 70°C): 70

Temperature Hysteresis (0 - 10°C): 2

Configure Humidity

Humidity Critical Threshold (0 - 90%): 90

Humidity Warning Threshold (0 - 90%): 90

Humidity Hysteresis (0 - 20%): 2

Configure Alarm

Alarm-1 Summary Display Name: External Contact #1 Status

Alarm-1 Contact Type: Disabled

Alarm-2 Summary Display Name: External Contact #2 Status

Alarm-2 Contact Type: Disabled

Save

You can configure and enable both contacts and set upper and lower ranges of temperature and humidity that will generate SNMP traps and email notification if the PDU is configured to do so.

Chapter 9. Replaceable PDU parts

The replaceable PDU parts are Tier 1 customer replaceable units (CRUs). Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For information about the terms of the warranty, see the *Warranty Information* document that comes with the PDU. For more information about getting service and assistance, see Appendix A, “Getting help and technical assistance,” on page 75.

Important: The PDU does not contain any serviceable parts.

PDU description	Option part number	Tier 1 CRU part number
IBM 0U 24 C13 30 A Switched and Monitored PDU (with attached power cord)	46M4116	46M4118
IBM 0U 24 C13 32 A Switched and Monitored PDU (with attached power cord)	46M4119	46M4121
IBM 0U 12 C19 & 12 C13 50 A Switched and Monitored PDU (with attached power cord)	46M4134	46M4136
IBM 0U 12 C19 & 12 C13 32 A Switched and Monitored PDU (with attached power cord)	46M4137	46M4139
IBM 1U 9 C19 & 3 C13 30 A Switched and Monitored PDU (with attached power cord)	46M4167	46M4169
DB9-to-RJ-45 cable	40K9636	40K9640
Environmental monitoring probe kit	46M4113	41Y9210
Hardware kit (0U PDU)	Not applicable	81Y2345
Hardwares kit (1U PDU)	Not applicable	81Y2346

Chapter 10. PDU specifications

The tables in this chapter contain the product specifications of the PDUs.

Table 7 contains the PDU part numbers and descriptions.

Table 7. PDU descriptions

PDU part number	PDU description
46M4116	30 amp / 208 V single-phase 0U 24 C13 switched and monitored PDU with NEMA fixed L6-30P connector
46M4119	32 amp / 240 V single-phase 0U 24 C13 switched and monitored PDU with IEC 309 P+N+Gnd connector
46M4134	50 amp / 208 V three-phase 0U 12 C19 12 C13 switched and monitored PDU with 50A connector
46M4137	32 amp / 240 V three-phase 0U 12 C19 12 C13 switched and monitored PDU with IEC 309 3P+N+Gnd connector
46M4167	30 amp / 208 V three-phase 1U 9 C13\3 C13 switched and monitored PDU with NEMA fixed 3M L21-30P connector

Table 8. PDU operating specifications

Height	1800 mm (71 in.) (PDU part numbers 46M4116 and 46M4119) 1840 mm (72.4 in.) (PDU part numbers 46M4134 and 46M4137) 43.4 mm (1.73 in.) (PDU part number 46M4167)
Width	44 mm (1.73 in.) (PDU part numbers 46M4116 and 46M4119) 55 mm (2.16 in.) (PDU part numbers 46M4134 and 46M4137) 447 mm (17.6 in.) (PDU part number 46M4167)
Depth	85 mm (3.35 in.) (PDU part numbers 46M4116 and 46M4119) 108 mm (4.25 in.) (PDU part numbers 46M4134 and 46M4137) 350 mm (13.78 in.) (PDU part number 46M4167)
Additional clearance	25 mm (0.98 in.) for circuit breakers
Operating temperature at 0 - 914 m (0 - 3000 ft) (room ambient)	10°C - 55°C (50°F - 122°F)
Operating temperature at 914 - 2133 m (3000 - 7000 ft) (room ambient)	10°C - 55°C (50°F - 122°F)
Operating humidity	5% - 90% (noncondensing)
Localized air temperature in PDU	55°C (122°F) maximum
Maximum operating altitude	3048 m (10,000 ft)

Table 9. PDU weight (includes attached power cord)

PDU part number	Weight
46M4116	6 kg (13 lb)
46M4119	6 kg (13 lb)
46M4134	11 kg (24 lb)
46M4137	9 kg (20 lb)
46M4167	9 kg (20 lb)

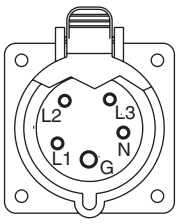
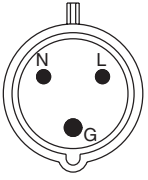
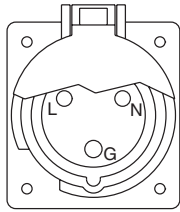
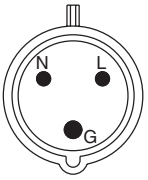
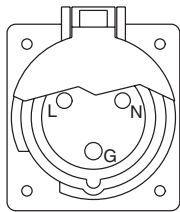
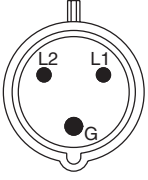
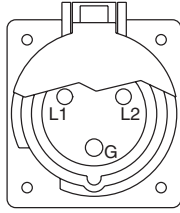
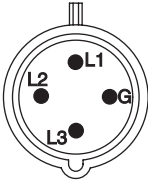
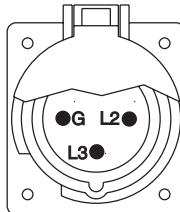
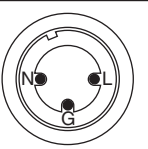
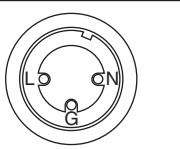
Table 10. PDU electrical specifications

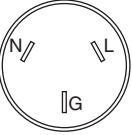
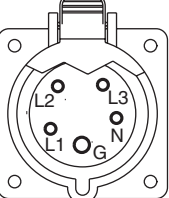
PDU part number	Rated voltage, rated current	Maximum power rating
46M4116	200 - 208 V ac, 30 amps, single-phase (North America Regulatory Derated Current 24 A)	6240 VA
46M4119	220 - 240 V ac, 32 amps, single-phase	7680 VA
46M4134	200 - 208 V ac, 50 amps, three-phase (North America Regulatory Derated Current 40 A)	31200 VA
46M4137	220 - 240 V ac, 32 amps, three-phase wye	22920 VA
46M4167	200 - 208 V ac, 30 amps, three-phase (North America Regulatory Derated Current 24 A)	18720 VA
Rated frequency 50 - 60 Hz		

Table 11. PDU circuit breaker, power outlets, and power cord specifications

PDU part number	Circuit breaker	Power outlets	Power cord
46M4116	Three double-pole branch rated circuit breakers rated at 20 amps	24 IEC 320 - C13 outlets rated at 10 amps (VDE) / 15 amps (UL/CSA)	L6-30P
46M4119			IEC 309
46M4134	Six double-pole branch rated circuit breakers rated at 20 amps	12 IEC 320 - C13 outlets rated at 10 amps (VDE) / 15 amps (UL/CSA), 12 IEC 320 - C19 outlets rated at 16 amps (VDE) / 20 amps (UL/CSA)	CS8365L
46M4137			IEC 309
46M4167	Nine double-pole branch rated circuit breakers rated at 20 amps	Three IEC 320 -C13 outlets rated at 10 amps (VDE) / 15 amps (UL/CSA), Nine IEC 320 -C19 outlets rated at 16 amps (VDE) / 20 amps (UL/CSA)	L21-30P

You must connect the connector on the power cord that comes with the PDU to a properly wired and grounded outlet. The following table shows illustrations of the power cord connector (plug) and the correct outlet for each of the PDUs.

PDU description	Plug	Outlet	Rating
DPI 32 amp / 250 V three-phase Enterprise C19 / C13 PDU+ (or PDU) with IEC 309 3P+N+Gnd connector			32 amps, 250 V ac IEC 309 3P+N+Gnd
DPI 32 amp / 250 V single-phase Enterprise C19 / C13 PDU+ (or PDU) with IEC 309 P+N+Gnd connector			32 amps, 250 V ac IEC 309 P+N+Gnd
DPI 63 amp / 250 V single-phase Enterprise C19 / C13 PDU+ (or PDU) with IEC 309 P+N+Gnd connector			63 amps, 250 V ac IEC 309 P+N+Gnd
DPI 30 amp / 208 V single-phase Enterprise C19 / C13 PDU+ (or PDU) with NEMA L6-30P (2P+Gnd) connector			30 amps, 250 V ac NEMA L6-30P (2P+Gnd)
DPI 60 amp / 208 V single-phase Enterprise C19 / C13 PDU+ (or PDU) with IEC 309 2P+Gnd connector			48 amps, 250 V ac IEC 309 2P+Gnd
DPI 60 amp / 208 V three-phase Enterprise C19 / C13 PDU+ (or PDU) with IEC 309 3P+Gnd connector			48 amps, 250 V ac IEC 309 3P+Gnd
DPI 32 amp / 250 V single-phase Enterprise C19 / C13 PDU+ (or PDU) P+N+Gnd (PDL P/N 56P332) Australia/New Zealand connector			32 amps, 250 V ac P/N 56S0332 P+N+Gnd

PDU description	Plug	Outlet	Rating
DPI 30 amp / 250 V single-phase Enterprise C19 / C13 PDU+ (or PDU) P+N+Gnd (Shin Ju P/N SJ-P3302) Korea connector			30 amps, 250 V ac P+N+Gnd
0U strip switched and monitored PDU 24 C13 3ø NA 30A fixed 4.3M L21-30P 43V6109 with fixed power cord			24 amps, 250 V ac NEMA L21-30P (3P+G)
0U strip switched and monitored PDU 24 C13 3ø INTL 16A fixed 4.3M IEC309 3P+N+G 43V6108 with fixed power cord			16 amps, 250 V ac IEC 309 3P+N+Gnd

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM 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 website at <http://www.ibm.com/supportportal/> 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/supportportal/> 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 website has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x® and xSeries® information is <http://www.ibm.com/systems/x/>. The address for IBM BladeCenter® information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation® information is <http://www.ibm.com/systems/intellistation/>.

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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.

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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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Important notes

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

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 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 can 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 that are available from IBM.

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

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Some software might differ from its retail version (if available) and might 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 12. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹. • 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. • The deliquescent relative humidity of the particulate contamination must be more than 60%². • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985³ • Silver: Corrosion rate of less than 300 Å in 30 days

¹ 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.

² 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.

³ 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.

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

Information Development
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205/A015

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P.O. Box 12195
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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.

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.

Attention: This is an EN 55022 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.

Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
E-mail: tjahn@de.ibm.com

Germany Class A statement

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 Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
E-mail: tjahn@de.ibm.com

Generelle Informationen:

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

Japan VCCI Class A statement

この装置は、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。 VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for
Interference (VCCI). If this equipment is used in a domestic environment, radio
interference may occur, in which case the user may be required to take corrective
actions.

Korea Communications Commission (KCC) statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

Please note that this equipment has obtained EMC registration for commercial use.
In the event that it has been mistakenly sold or purchased, please exchange it for
equipment certified for home use.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу A.
В жилых помещениях оно может создавать радиопомехи, для
снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

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，
可能需要用户对干扰采取切实可行的措施。

Taiwan Class A compliance 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。

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