

1U Higher Voltage DC PDU (240V/380V)



Installation and Maintenance Guide

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Installation and Maintenance Guide

Note

Before using this information and the product it supports, read the general information in “Notices” on page 35 and the Appendix A, “Supplemental Safety Statement L015,” on page 29; and read the *Safety Information* and the *Environmental Notices and User Guide* on the *Documentation* CD that came with your product.

First Edition (February 2015)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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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.

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Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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Youq mwngz yungh canjbinj neix gaxgonq, itding aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Safety statements

These statements provide the caution and danger information that is used in this documentation.

Important:

Each caution and danger statement in this documentation 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* and the *Supplemental Safety Notice L015* documents.

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 documentation before you perform the procedures. Read any additional safety information that comes with your system or optional device before you install the device.

Important:

Each caution and danger statement in this documentation 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 documentation before you perform the procedures. Read any additional safety information that comes with your system 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 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.



L015



DANGER: Arc Flash/Arc Blast hazard when disconnected with power on. Turn off power before disconnecting. (L015)

Chapter 1. Introduction

The 1U Higher Voltage DC PDU (240V/380V) product enables you to connect up to six high-voltage dc devices to a single dedicated high-voltage dc power source. To prevent arcing, the PDU output connectors individually interrupt power when either end of the output power cable is disconnected. Power is only available at each output connector when it is connected to a compatible high-voltage dc device.

If documentation updates are available, you can download them from the Lenovo[®] web site. 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. To check for updates, go to <http://www.ibm.com/supportportal>.

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

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 *Lenovo 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 will need the following tools to install the PDU in a rack:

- 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 racks)

You can install a 1U PDU vertically in the side of a rack or horizontally within 1U¹ of EIA mounting space in a rack.

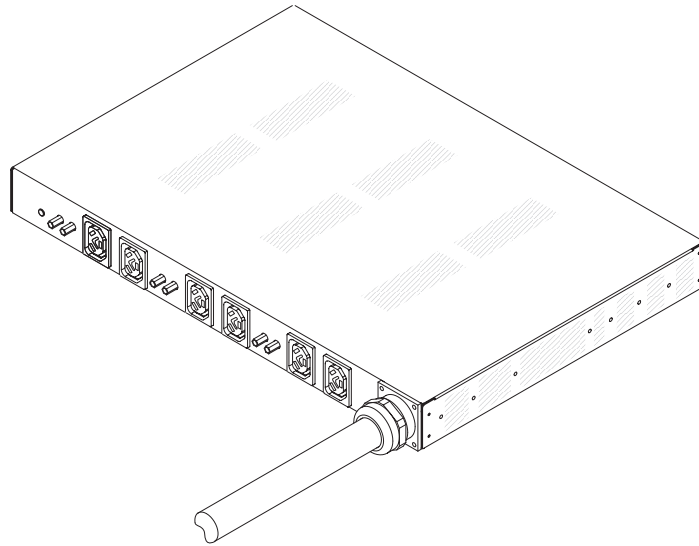
- For vertical mounting instructions of the 1U PDU, see Chapter 2, “Installing the 1U PDU vertically in a rack,” on page 7.
- For horizontal mounting instructions of the 1U PDU, see Chapter 3, “Installing the 1U PDU horizontally in a rack,” on page 17.

Inventory checklist

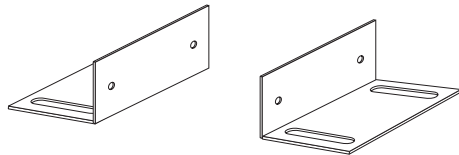
The following parts come with the PDU.

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

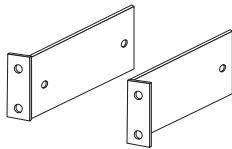
- The PDU (with an attached power cord)



- Two vertical-mounting brackets (for all racks)



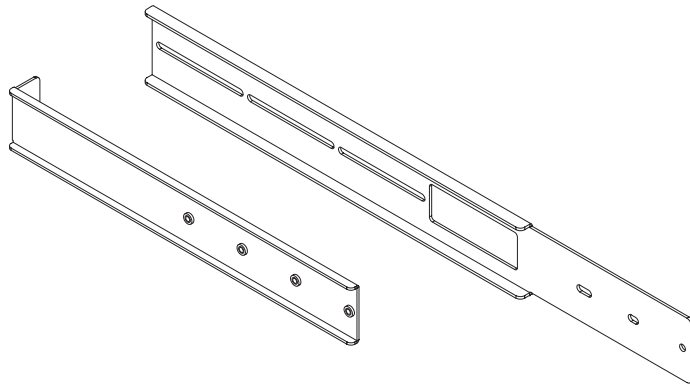
- Two short mounting brackets (for horizontal mounting in all racks; for vertical mounting only in Enterprise racks)



- Two adjustable mounting rails (for horizontal mounting in all racks)

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

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



- One 1U blank filler panel



- Cable straps
- Miscellaneous hardware kit (for attaching the mounting brackets to the PDU and installing the PDU in a rack)

Note:

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.

Features of the PDU

The PDU has the following features:

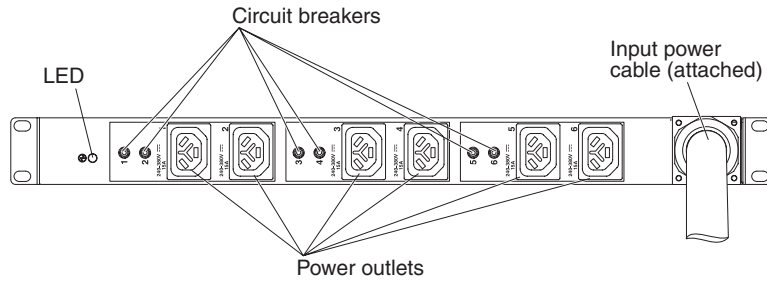
- Wide input voltage range (192 - 400 V dc)
- High-current capability (90 A)
- Six 15 A high-voltage dc output connectors with individual circuit-breaker protection.
- Automatic power interruption on output connectors to prevent arcing during cable disconnection.

Hardware components

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

Front view

The following illustration shows the components and controls on the front of the PDU.



LED The green LED shows the PDU input voltage status. When this LED is lit, the PDU is receiving a sufficient level of dc input voltage. If the input voltage is too low, this LED is off.

Circuit breakers

If the load current rating for a power outlet exceeds 15 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 power cable

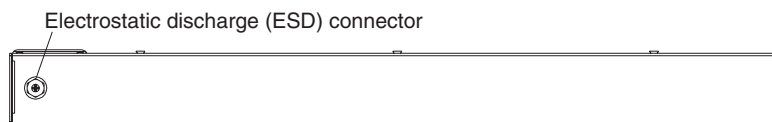
You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.

Power outlets

You can connect a device to each power outlet. There are six Rong Feng RF-203P power outlets, with smart-sensing power interruption capability, on the PDU.

Rear view

The following illustration shows the electrostatic discharge (ESD) connector on the rear of the PDU.



PDU load groups

The PDU dc input power is distributed as a single load group, as described in the following illustration and table.

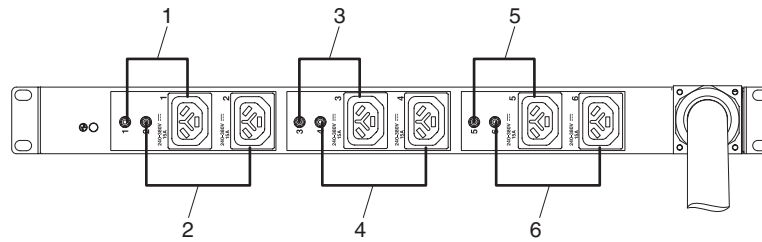


Table 1. PDU load group

Circuit breaker number	Associated front outlet
1	1
2	2
3	3
4	4
5	5
6	6

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

This chapter describes how to install the PDU vertically in a rack. To install the PDU in the side of an Enterprise rack, see “Installing the PDU in the side of an Enterprise rack only” on page 12. The PDU is a high-voltage dc device that must be connected to its input power source by a Licensed Electrician.

Attention: You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.

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:

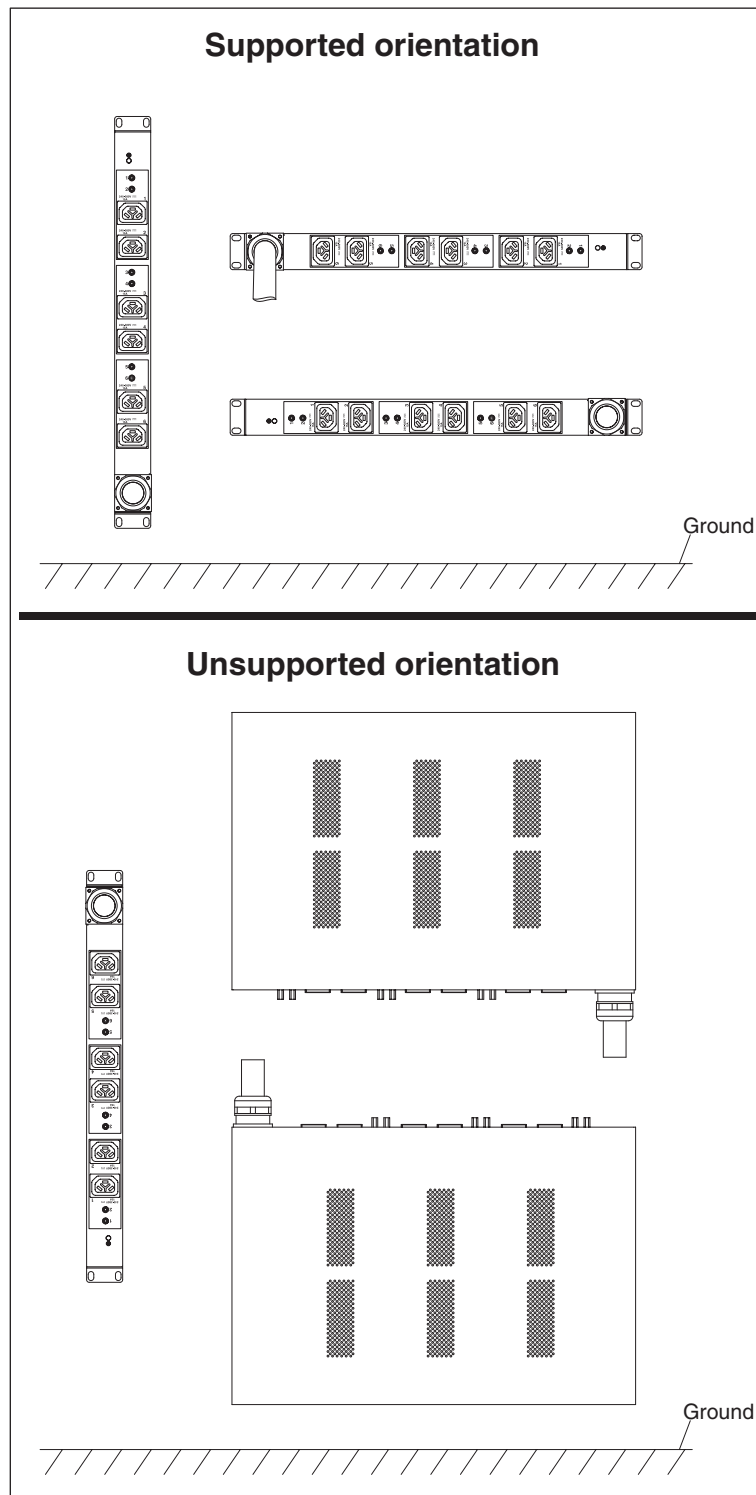
1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Installing the PDU in the side of a rack

About this task

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 has movable side braces, see the rack documentation for information about relocating the side braces if they are not already spaced for this installation.

Attention: You must install the PDU with the front panel facing either the front or rear of the rack, either horizontally or vertically with the cable end at the bottom; do *not* install the PDU with the front panel facing up or down, or vertically with the cable end at the top.



Note:

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

- The PDU must be installed with the input power cord toward the bottom end of the PDU.

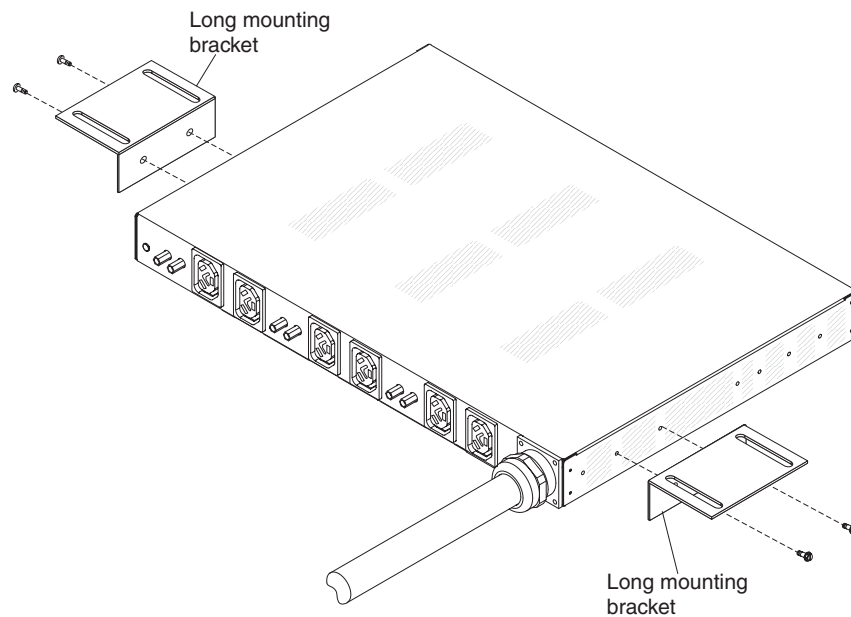
Review the documentation that comes with your rack for safety and cabling information. When you install the PDU in a rack, observe the following precautions:

- Make sure that the room air temperature is below 40°C (104°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.

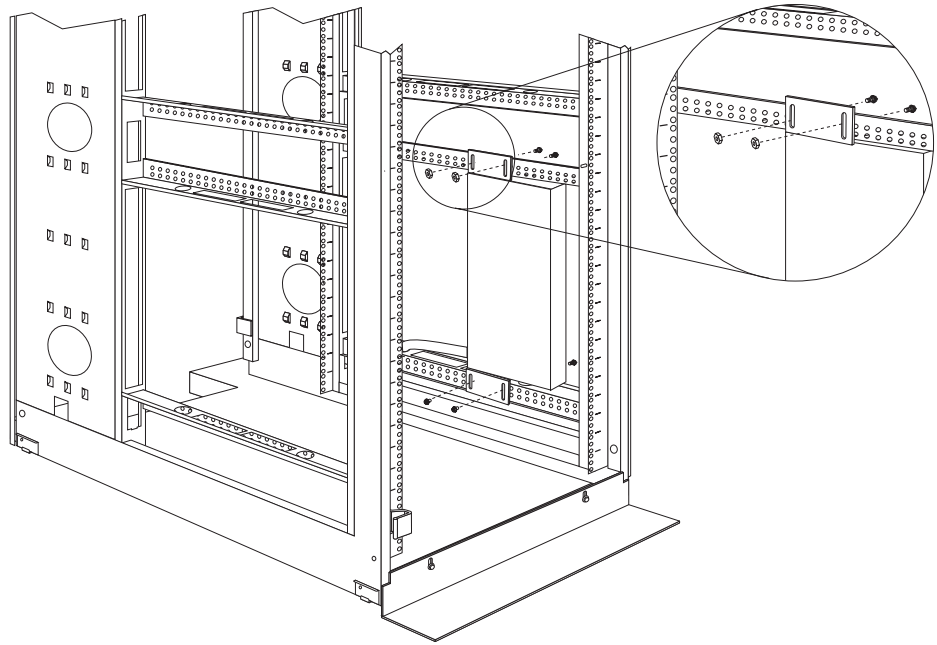
To install a PDU in the side of a rack by using the vertical mounting brackets, complete the following steps:

Procedure

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



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



Note:

- a. Leave enough space to connect, route, and disconnect power cords.
- b. If you are installing a cable-management bracket in the same side of the rack, leave enough space between the outlet side of the PDU and the EIA mounting flanges for the cable-management bracket installation.
3. Route the power cord from the PDU toward the rack side braces; then, route the power cord along a side brace toward the back of the rack, 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 to connect to a power source, use the openings in the rack.

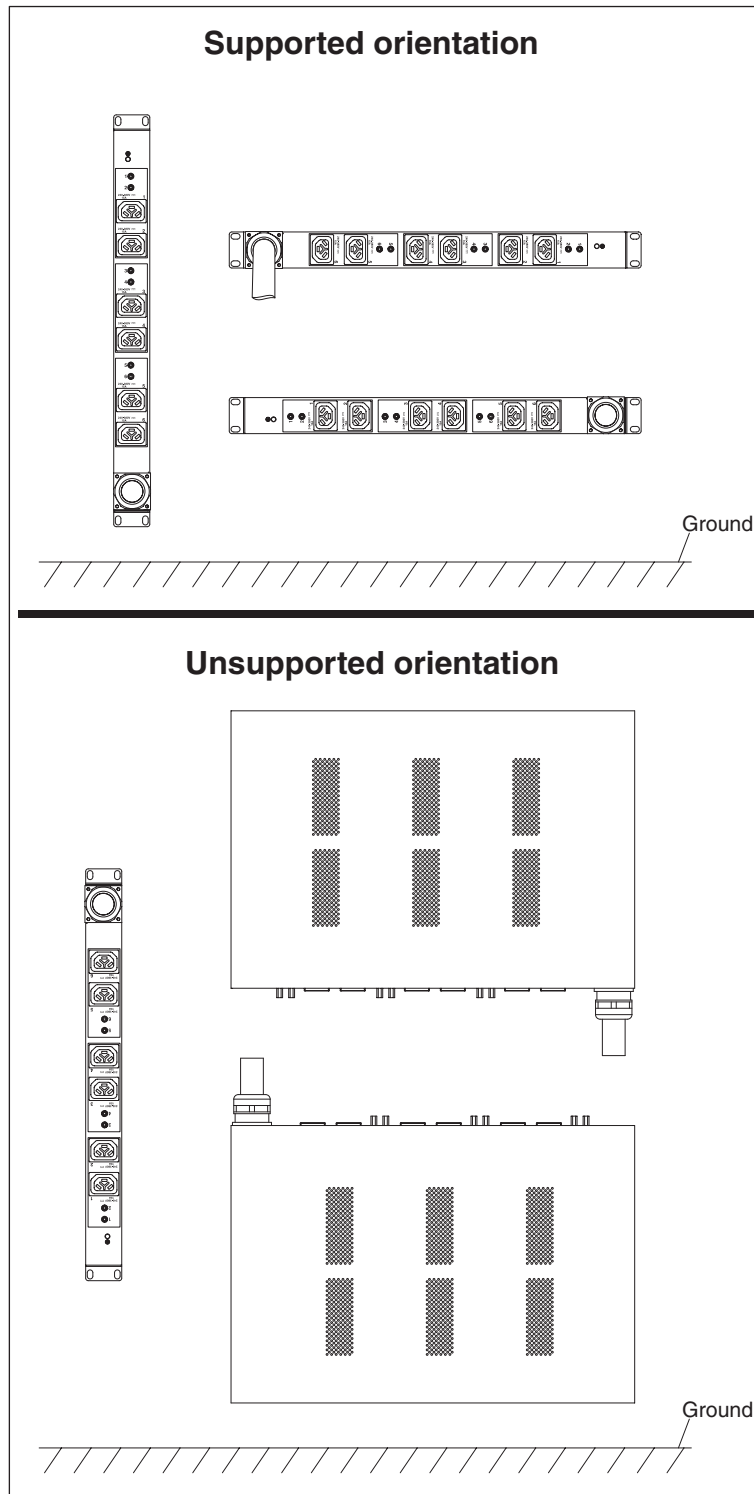
Attention:

- You must disconnect the main input power before you connect or disconnect the input power cord of the PDU.
 - You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.
5. Connect the power cord to a properly wired and grounded dedicated power source (see “Connecting input power” on page 23 for information); then, you can connect servers or rack PDUs in the rack to the power outlets on the PDU.

Installing the PDU in the side of an Enterprise rack only

About this task

Attention: You must install the PDU with the front panel facing either the front or rear of the rack, either horizontally or vertically with the cable end at the bottom; do *not* install the PDU with the front panel facing up or down, or vertically with the cable end at the top.



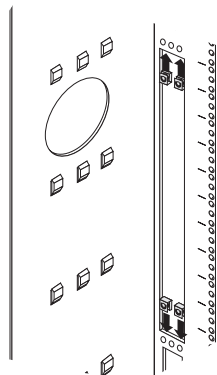
Note:

- Removing the rack doors and side panels might make installation easier. See the rack documentation for more information.
- The PDU must be installed with the input power cord toward the bottom end of the PDU.

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

- Make sure that the room air temperature is below 40°C (104°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.

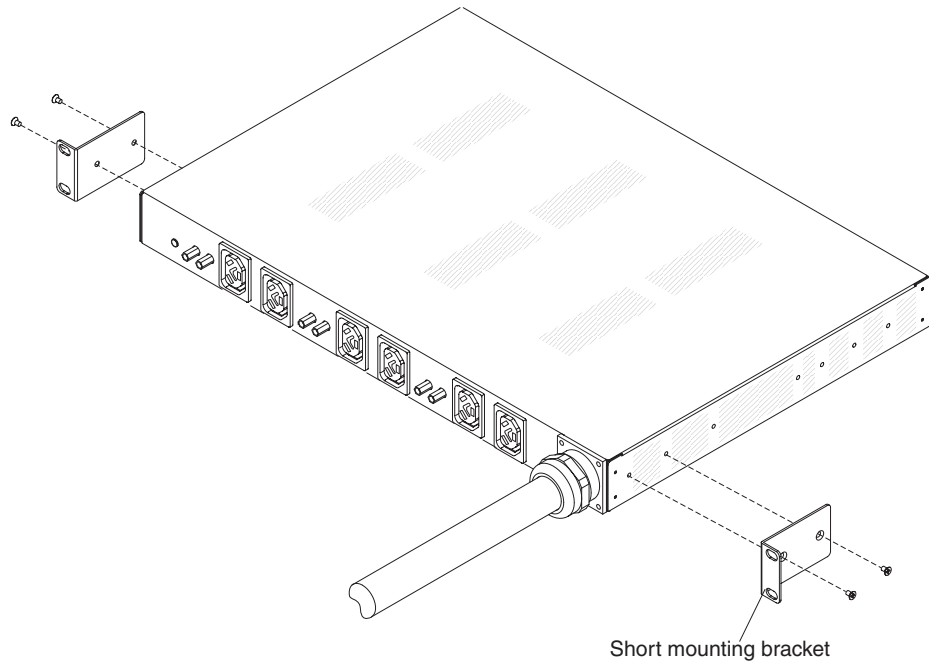
You must use clip nuts to install the mounting brackets. Clip nuts come with the PDU and are installed on the rack mounting flanges, as shown in the following illustration.



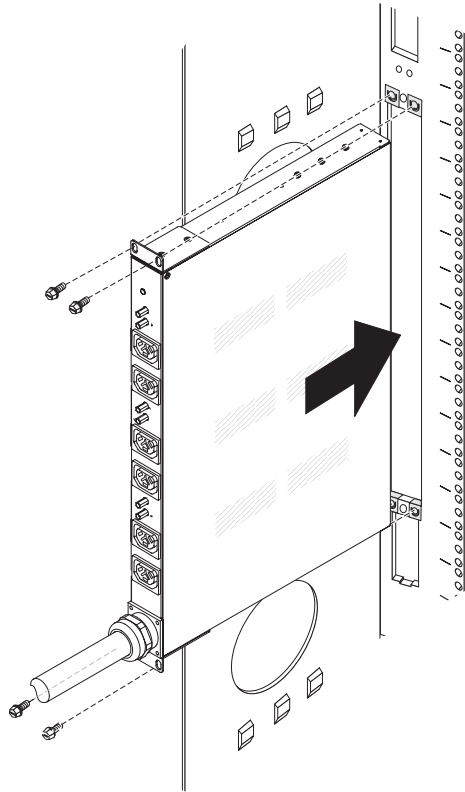
To install the PDU in the 1U mounting space in the side of an Enterprise rack, complete the following steps:

Procedure

1. Align the vertical-mounting brackets to the front of the PDU. Be sure to attach the brackets so that the power outlets face the rear of the rack.



2. Attach the brackets to the PDU with two M3 x 5 screws per bracket. Use the screws that come with the PDU.
3. Align the PDU with the opening in the side of the rack; 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.



4. Route the power cord from the PDU along the side of the rack and secure the power cord with the cable straps that come with the PDU.

5. 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 to connect to a power source, use the openings in the rack.

Attention:

- You must disconnect the main input power before you connect or disconnect the input power cord of the PDU.
 - You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.
6. Connect the power cord to a properly wired and grounded dedicated power source (see “Connecting input power” on page 23 for information); then, you can connect servers or rack PDUs in the rack to the power outlets on the PDU.
 7. 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

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

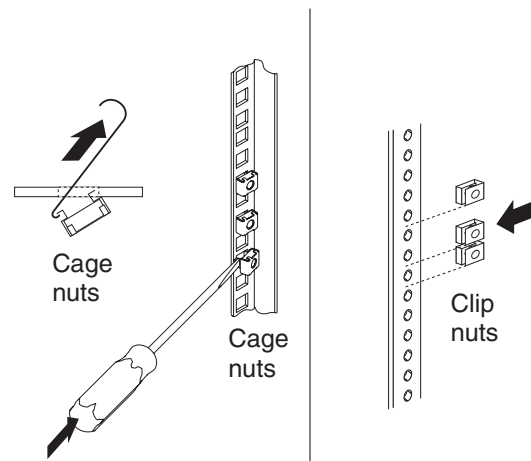
Note:

- Removing the rack doors and side panels might make installation easier. See the rack documentation for more information.
- The PDU can be installed horizontally with the input power cord toward the right or left side of the PDU.

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

- Make sure that the room air temperature is below 40°C (104°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.
- Install the heaviest device in the bottom of the rack.
- Do not extend more than one device out of the rack 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.

Use cage nuts for racks with square holes, and use clip nuts for racks with round holes. If your rack 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:

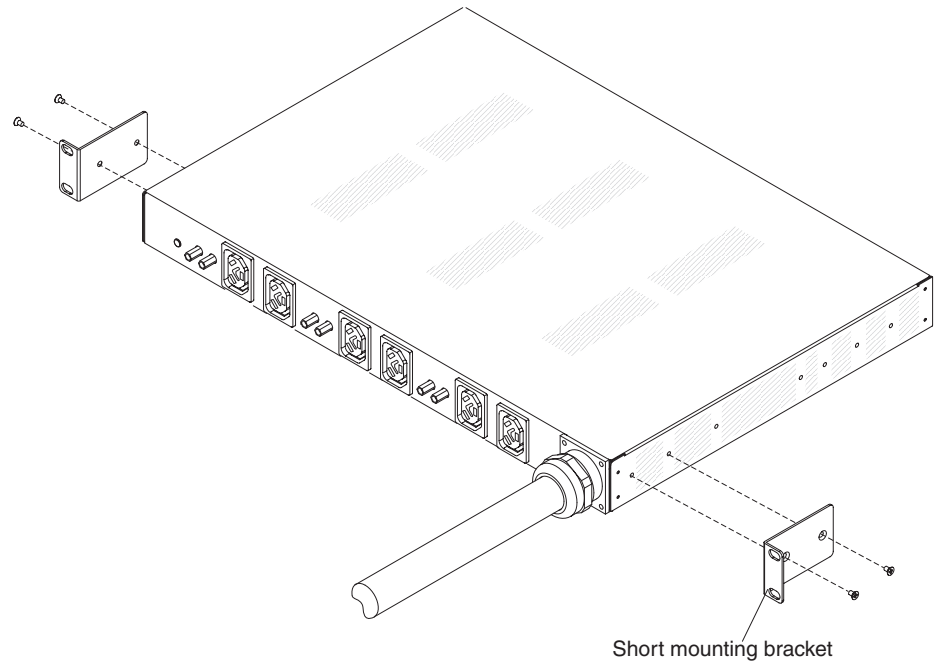
1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To Disconnect:

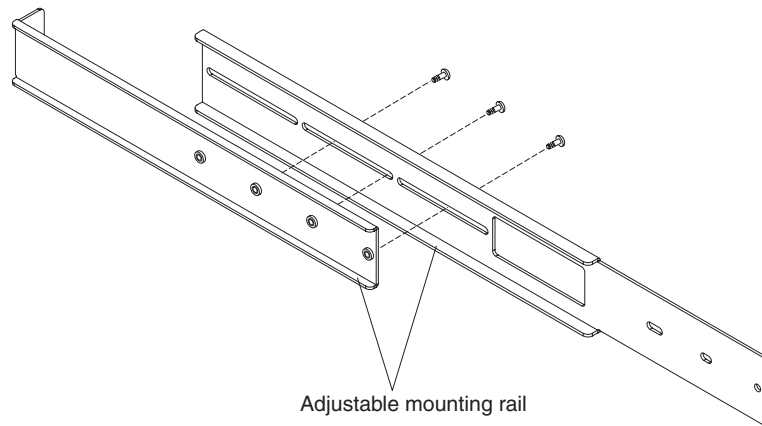
1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

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

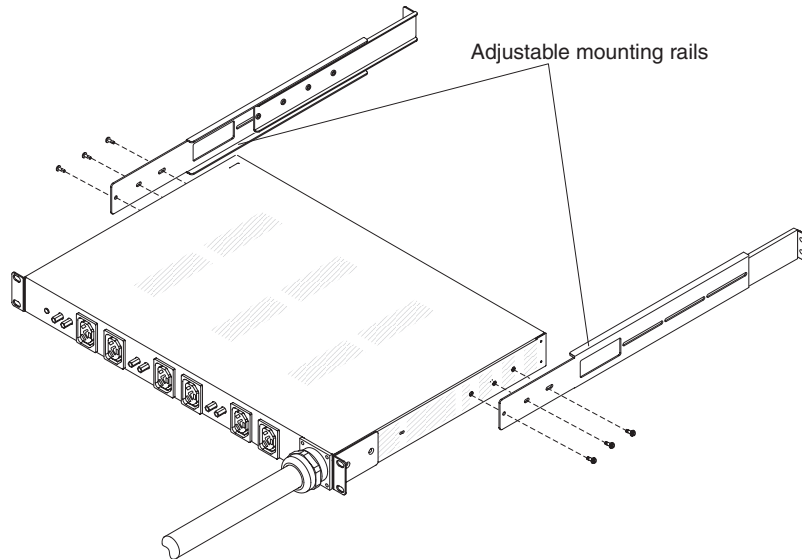
1. Align the short mounting brackets with the holes in the front of the PDU and attach the brackets to the PDU with two M3 flat-head screws per bracket. Use the screws that come with the rack-mounting kit.



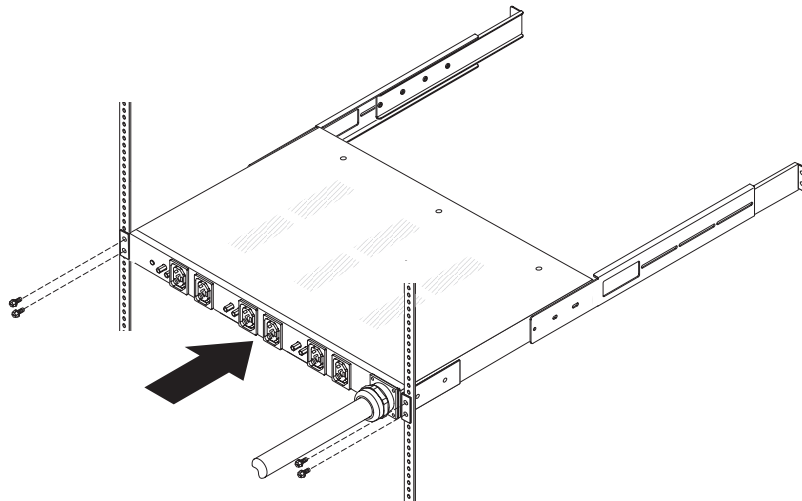
2. If the adjustable mounting rail is not assembled, complete the following steps to assemble it:
 - a. Align the two parts of the adjustable mounting rail as shown in the following illustration.



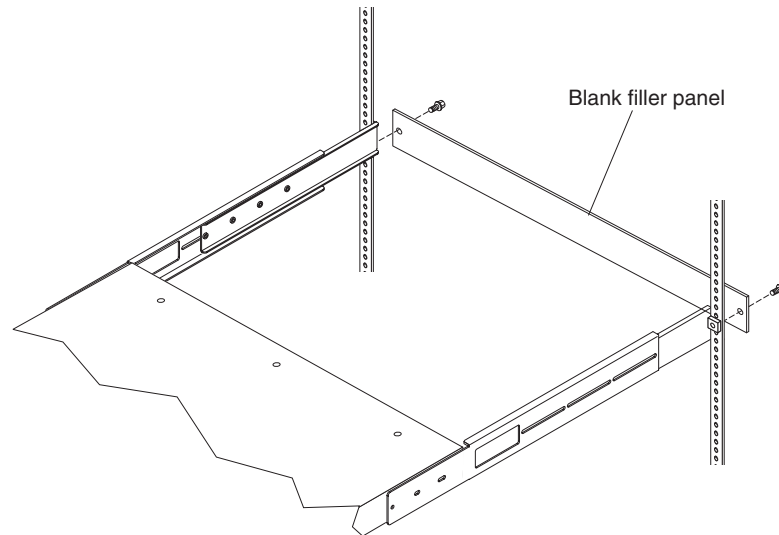
- b. Secure the two adjustable mounting rail parts with three screws that come with the rack-mounting kit.
3. Align the adjustable mounting rails with the holes in the side rear of the PDU and attach the mounting rails to the PDU with three M3 pan-head screws with captive lock washers per rail. Use the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



4. Orient the PDU so that the vent holes are facing up. Hold the PDU at a slight angle and carefully insert it into the 1U mounting space in the rack. 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 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 with the rack-mounting kit.



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



- a. Install a cage nut or clip nut in the applicable hole in the rack flange on each side of the rack.
 - b. Adjust the adjustable mounting rails to fit the depth of the rack.
 - 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. 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 side braces; then, route the power cord along a side brace toward the back of the rack, and secure the power cord with the cable straps that come with the PDU.
 8. 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 to connect to a power source, use the openings in the rack.
- Attention:**
- You must disconnect the main input power before you connect or disconnect the input power cord of the PDU.
 - You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.
9. Connect the power cord to a properly wired and grounded dedicated power source (see “Connecting input power” on page 23 for information); then, you can connect servers or rack PDUs in the rack to the power outlets on the PDU.
 10. Route all the other power cords neatly and secure the power cords with cable straps.

Chapter 4. Cabling the PDU

This chapter provides information about connecting the PDU to a power source and about connecting devices.

Connecting input power

The PDU is a high-voltage dc device that must be connected to its input power source by a Licensed Electrician.

L015



DANGER: Arc Flash/Arc Blast hazard when disconnected with power on. Turn off power before disconnecting. (L015)

Attention: You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.

The PDU input power cable is 4.3 m (14.1 ft.) in length, with a pig-tail termination. It has three stranded copper conductors, each with a cross section of 25 sq. mm (approximately 2 AWG).

The PDU requires a high-voltage dc power source between 240 V dc and 380 V dc with 90 A capacity that is protected by a 100 A circuit breaker.

The PDU conductors are connected to a high-voltage dc power source of as described in the table. All connections must be performed by a licensed electrician, following local electrical codes or requirements.

Table 2. PDU input cable connection

Wire color	Function
Green-yellow	Earth ground
Blue	Negative dc voltage
Brown	Positive dc voltage

Connecting output devices

The PDU power outlets are for connecting high-voltage dc devices. Connect a device to a power outlet on the PDU with the power cord that comes with the device. See the documentation that comes with your high-voltage dc device for information and instructions.

Chapter 5. Customer replaceable unit parts

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document.

Attention: You are responsible for making sure that only a Licensed Electrician installs or removes the PDU power cable from the DC Power source. All National and Local building code requirements must be met. Lenovo and IBM service technicians are not Licensed Electricians.

Important: The PDU does not contain any serviceable parts.

PDU description	Option part number	Tier 1 CRU part number	FRU part number
1U Higher Voltage DC PDU (240V/380V) (with power cord)	44T0966		44T0969
Mounting hardware kit		46M5293	

Chapter 6. PDU specifications

This chapter contains the product specifications of the PDU.

Height	42 mm (1.65 in.)
Width	444 mm (17.5 in.)
Depth	305 mm (12 in.)
Additional clearance	25 mm (0.98 in.) for circuit breakers 3 mm (0.12 in.) for outlets
Length of power cord	4.3 m (14.1 ft.)
Weight (including power cord)	10 kg (22 lb)
Operating temperature at 0 - 1524 m (0 - 5000 ft) (room ambient)	5°C - 57°C (41°F - 134.6°F)
Operating humidity	8% - 85% (noncondensing)
Shipping and storage temperature at 0 - 1524 m (0 - 5000 ft) (room ambient)	-40°C - 60°C (-40°F - 140°F)
Shipping and storage humidity	5% - 100% (includes condensing)
Localized air temperature in PDU	40.6°C (105°F) maximum

Rated voltage, rated current 192 - 400 V dc, 90 amps Important: The PDU input power connection must be protected by a 100 A circuit breaker.	Maximum power rating 36 000 VA
Rated frequency Direct current (dc) 0 Hz	
Circuit breakers Six double-pole branch rated circuit breakers rated at 15 amps.	
Power outlets Six Rong Feng RF-203P outlets rated at 15 amps (TUV/CSA)	

The high-voltage dc power cord that comes with the PDU must be connected to a properly wired and grounded high-voltage dc power source by a licensed electrician. See “Connecting input power” on page 23 for additional information.

Appendix A. Supplemental Safety Statement L015

These topic provides translations for Safety Statement L015.

L015



خطر: قد يتم التعرض لمخاطر الشرر والفرقة (القوس الكهربائي) عند قطع الاتصال أثناء تشغيل الطاقة. يجب إيقاف تشغيل الطاقة قبل قطع الاتصال. (L015)

AVISO: Risco de arco elétrico ao desconectar com a energia ligada. Desligue a energia antes da desconexão. (L015)

ОПАСНО: Опасност от искра от волтова дъга/заряд от волтова дъга, когато се прекъсва свързането при включено захранване. Изключете захранването, преди да прекъснете свързането. (L015)

DANGER: Risque d'explosion ou d'arc électrique en cas de déconnexion lorsque l'unité est sous tension. Mettez l'unité hors tension avant de la déconnecter. (L015)

危險: 开机情况下断开连接可能导致电弧危險。断开连接前请先关闭电源。(L015)

危險: 在電源開啟時中斷連接, 有電弧閃光/電弧爆炸的危險。斷線之前, 請先關閉電源。(L015)

OPASNOST: Rizik od lučnog iskrenja kod odspajanja s uključenim napajanjem. Isključite napajanje prije odspajanja. (L015)

NEBEZPEČÍ: Riziko záblesku/výbuchu při odpojení přístroje se zapnutým napájením. Před odpojením přístroje musíte vypnout napájení. (L015)

Fare! Risiko for gnistspring eller eksplosion ved afmontering, mens strømmen er tilsluttet. Sluk for strømmen inden afmontering. (L015)

GEVAAR: Gevaar van boogflits/boogontploffing indien verbinding verbroken met stroom aan. Zet de stroom uit voordat u de verbinding verbreekt.(L015)

DANGER: Arc Flash/Arc Blast hazard when disconnected with power on. Turn off power before disconnecting. (L015)

VAARA: Irrotus voi aiheuttaa valokaaren leimahduksen tai syttymisen, kun virta on kytkettynä. Katkaise virta ennen irrotusta. (L015)

Gefahr: Beim Trennen der Verbindung im eingeschalteten Zustand kann ein Bogenblitz oder ein Kurzschlussbogen entstehen. Daher vor dem Trennen der Verbindung den Strom ausschalten. (L015)

ΚΙΝΔΥΝΟΣ: Κίνδυνος τόξου εκκένωσης κατά την αποσύνδεση σε κατάσταση λειτουργίας. Απενεργοποιήστε τη συσκευή πριν την αποσυνδέσετε. (L015)

Appendix B. Getting help and technical assistance

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

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

Before you call

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

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

- 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.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check <http://www.ibm.com/systems/info/x86servers/serverproven/compat/us> to make sure that the hardware and software is supported by your product.
- Go to <http://www.ibm.com/supportportal> to check for information to help you solve the problem.
- Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
 - Hardware and Software Maintenance agreement contract numbers, if applicable
 - Machine type number (Lenovo 4-digit machine identifier)
 - Model number
 - Serial number
 - Current system UEFI and firmware levels
 - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request to submit an Electronic Service Request. Submitting an Electronic Service Request

will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs 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 Lenovo system and preinstalled software, if any, or optional device is available in the product documentation. 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. Lenovo 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>.

Getting help and information from the World Wide Web

Up-to-date information about Lenovo products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support is available at <http://www.ibm.com/supportportal>. The most current version of the product documentation is available in the following product-specific Information Centers:

Flex System products:

<http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp>

System x products:

<http://www.ibm.com/systems/x>

NeXtScale System products:

<http://pic.dhe.ibm.com/infocenter/nxtscale/documentation/index.jsp>

How to send DSA data

You can use the Enhanced Customer Data Repository to send diagnostic data to IBM.

Before you send diagnostic data to IBM, read the terms of use at <http://www.ibm.com/de/support/ecurep/terms.html>.

You can use any of the following methods to send diagnostic data:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw

- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Creating a personalized support web page

You can create a personalized support web page by identifying Lenovo products that are of interest to you.

To create a personalized support web page, go to <http://www.ibm.com/support/mynotifications>. From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your Lenovo products.

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

Hardware service and support

IBM is Lenovo's preferred service provider for the System x, Flex System and NeXtScale System products.

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

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

Taiwan product service

Use this information to contact IBM Taiwan product service.

台灣 IBM 產品服務聯絡方式：
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 1 024 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 Lenovo.

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

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

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

Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:
<http://www.lenovo.com/recycling>.

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 Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo 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 3. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Copper: Class G1 as per ANSI/ISA 71.04-1985³• Silver: Corrosion rate of less than 300 Å in 30 days

Table 3. Limits for particulates and gases (continued)

Contaminant	Limits
	<p>¹ ASHRAE 52.2-2008 - <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i>. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</p> <p>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.</p> <p>³ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p>

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo 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 might 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. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

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

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

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 (früher 89/336/EWG) 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 Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007

(früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4: **Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

Nach der EN 55022: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

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.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guidelines with Modifications (products greater than 20 A
per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
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，可能需要用户对其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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