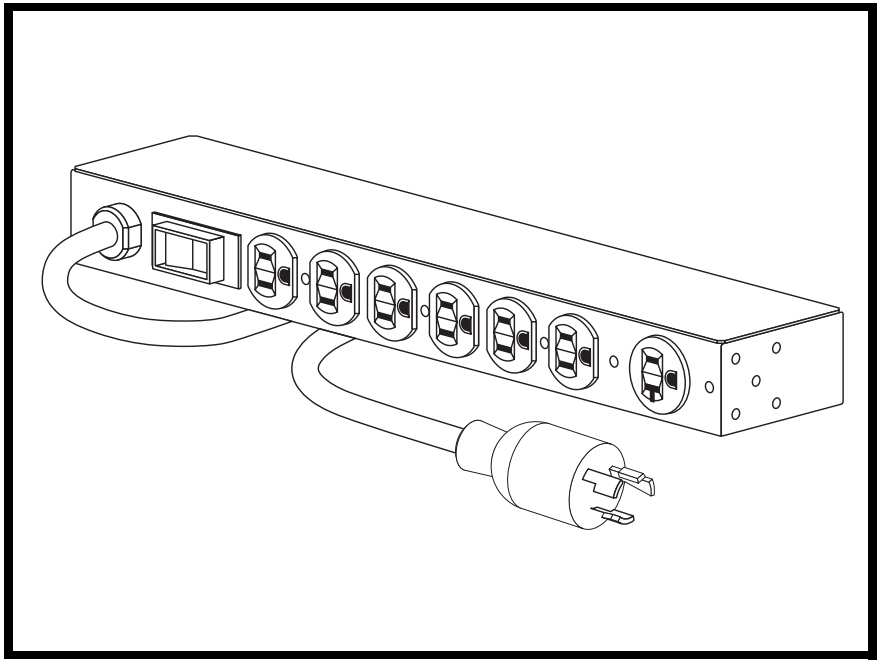
Power Distribution Unit Installation Instructions



www.dell.com

Warnings, Cautions, and Notes

Throughout this document, there may be blocks of text printed in bold type or in italic type. These blocks are warnings, cautions, and notes, and they are used as follows:

WARNING: A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

NOTE: A NOTE indicates important information that helps you make better use of your computer system.

Information in this document is subject to change without notice.
© 1999 Dell Computer Corporation. All rights reserved.

Reproduction in any manner whatsoever without the written permission of Dell Computer Corporation is strictly forbidden.

Trademarks used in this text: *Dell*, *PowerEdge*, and the *DELL* logo are trademarks of Dell Computer Corporation.

Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell Computer Corporation disclaims any proprietary interest in trademarks and trade names other than its own.

July 1999 P/N 990-0072A

Power Distribution Unit Installation Instructions

This document describes how to install a Power Distribution Unit (PDU) in a Dell™ PowerEdge™ rack.

Before You Begin

Before you install your PDU in the rack, read the safety and tool requirement information in the following subsections. You should also be familiar with the rack assembly before attempting to install a PDU. The *Dell PowerEdge Rackmountable Solutions Installation Guide* that came with your rack describes the rack assembly and provides safety and installation instructions necessary to install components in the rack.

Important Safety Information

This PDU is intended to be installed in a Dell rack by trained service technicians. If you install the kit in any other rack, be sure that the rack meets the specifications of the Dell rack.

CAUTION: Some Dell systems can be serviced only by trained service technicians because of high voltages and energy hazards. Do not attempt to open the PDU yourself, there are no user-serviceable parts inside. Always follow installation and service instructions closely.

CAUTION: Dell server systems are components for use in Dell racks with the PDU. The final installation of Dell servers and the PDU in any other brand of rack has not been approved by any safety agencies. It is the customer's responsibility to have the final combination of Dell servers and the PDU for use in other brands of racks evaluated for suitability by a certified safety agency.

CAUTION: All systems in the Dell PowerEdge rack system must connect to the AC power source through the PDU's NEMA L5-20P, NEMA L6-30P, or IEC309 locking plug. Bypassing the PDU by connecting server power cables directly to an AC power source could cause a high shock hazard resulting in personal injury.

Tool Requirement

To install the PDU, you need a #2 Phillips-head screwdriver.

Installation Preparation

Before you install the PDU in your rack, you must ensure that the total power requirements of all the systems you plan to connect to the PDU are within the PDU's amperage specification.

NOTICE: The maximum AC current load that a single PDU can support is specified on its label. Any load greater than specified can cause the circuit breaker in the PDU to trip and disconnect the power. Multiple PDUs may be installed to distribute the electrical load from accessories that plug into the PDU. The optional power strip can also be used to provide additional plug receptacles if the PDU does not provide enough receptacles for all rack accessories. However, you must ensure that the load on any PDU (including devices plugged into the power strip) does not exceed the PDU's specified maximum amperage. In addition, it is necessary to make sure that the total AC current load of the rack equipment does not exceed the safe current handling capacity of the circuit to which the equipment is connected.

The circuit breaker regulates power to the PDU outlets and also serves as a master system switch. If the circuit breaker trips, you may need to redistribute the power among the rack systems or perhaps service one of the systems. The circuit breaker trip rating is specified on the PDU label.

PDU Location and Orientation

The recommended position for the PDU is at the rear of the rack as close to the bottom as possible. You can install the PDU in either a horizontal or vertical orientation in the Dell PowerEdge rack system. The installation brackets attached to the sides of the PDU can be removed and repositioned for either orientation. Whichever orientation you use, be sure the PDU placement allows enough cable maneuverability so that each connected system can slide freely for servicing.

In addition to the rear of the rack mounting location, 1U PDUs can be mounted in the side of the rack, and 2U PDUs can be mounted in the base of the rack. Mounting hardware is included (See Figure 1) which will enable you to install your PDU in any of these locations.

NOTICE: When installing the PDU in the rack, be careful not to block power supply vents or otherwise restrict airflow to other equipment in the rack.

Before you install the PDU, remove one or more cable access plates, side panels, and back filler panels, if necessary. Refer to the *Installation Guide* that came with your rack for information about removing cable access plates, side panels, and filler panels. You may need to move or remove the lowest-mounted component so that the locking plugs have room to pass through the open cable access plates.

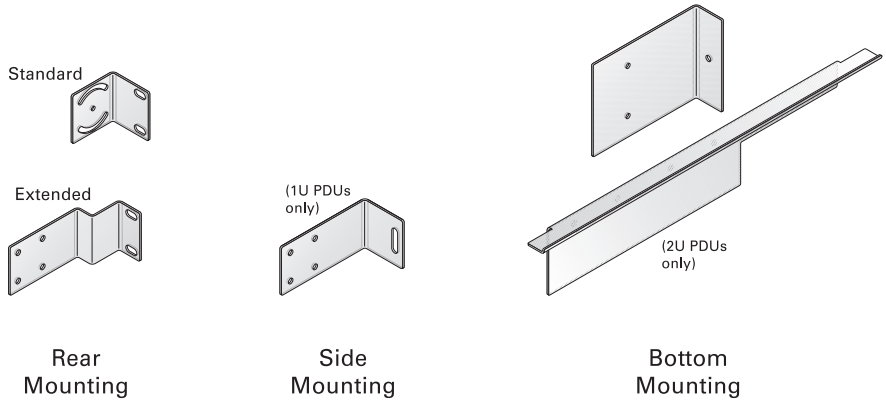


Figure 1. PDU Mounting Brackets

Installing the PDU

Rear of Rack Installation

To install the PDU in the rear of your Dell rack, perform the following steps:

1. Locate and identify the correct brackets for your particular installation. There are two different sets of brackets (See Figure 1) that can be used to install a PDU in the rear of the rack:

   - *Standard Brackets* can be used for mounting both 1U and 2U PDUs in either a horizontal or vertical orientation. In addition, PDUs installed with the standard brackets can be mounted either within the rack's vertical mounting supports or outside of the vertical mounting supports. See Figure 3, Figure 4, Figure 5, or Figure 6 for installation options using the standard brackets.
   - *Extended Brackets* can be used for mounting 1U PDUs only. When the extended brackets are used, the PDU is mounted in a vertical orientation outside of the rack's vertical mounting supports. See Figure 7 for installation options using the extended brackets.

2. Identify and mark the location of the PDU in the lowest unit (U) location in which it can be installed. Figure 2 shows a rack U.

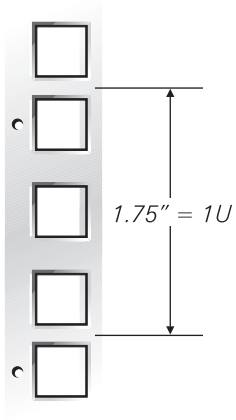


Figure 2. Rack U

3. Install cage nuts in the first and third holes of the U location.

4. Position the PDU as shown in Figure 3, Figure 4, Figure 5, Figure 6, or Figure 7, depending on your PDU and preferred orientation, and secure the unit with screws and washers.

5. Complete the installation by grounding the PDU as described in "Connecting the Ground Wire" on page 10.

NOTE: With the exception of the 1U PDU mounted with extended brackets, PDUs may be installed in either of two directions; toward the inside of the rack (PDU is contained within the vertical mounting supports of the rack), or toward the outside of the rack (PDU mounted outside of the vertical mounting supports, between the supports and the rear door of the rack). Figure 3, Figure 4, Figure 5, and Figure 6 illustrate both of these mounting options. The 1U PDUs mounted with extended brackets must be installed toward the outside of the rack. See Figure 7 for details.

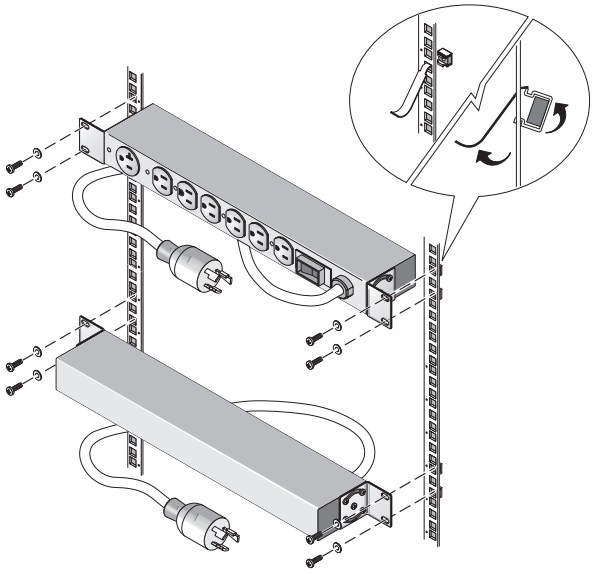


Figure 3. 1U PDU Installation (Horizontal Position)

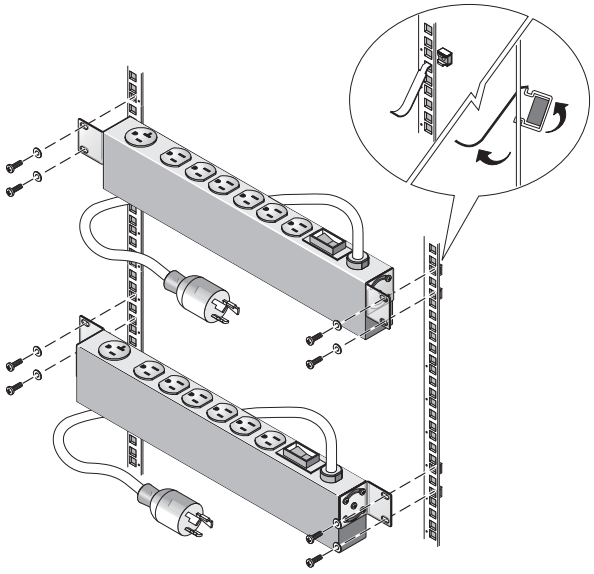


Figure 4. 1U PDU Installation (Vertical Position)

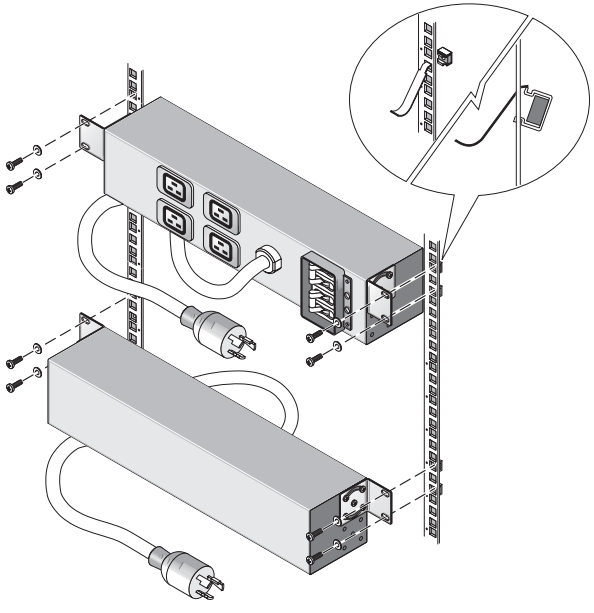


Figure 5. 2U PDU Installation (Horizontal Position)

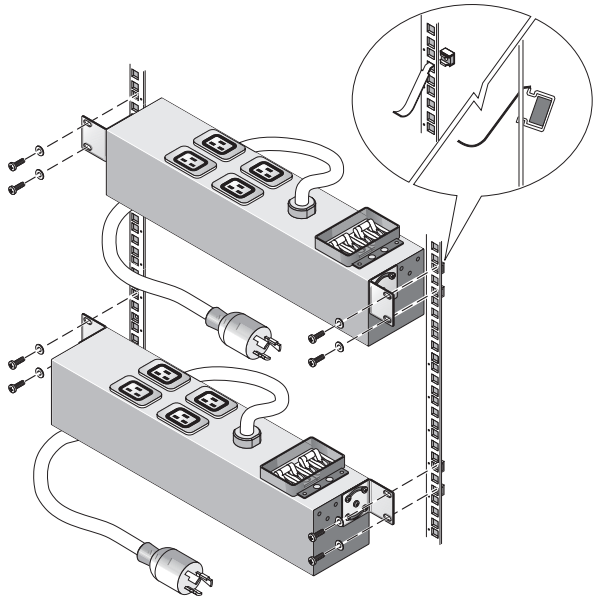


Figure 6. 2U PDU Installation (Vertical Position)

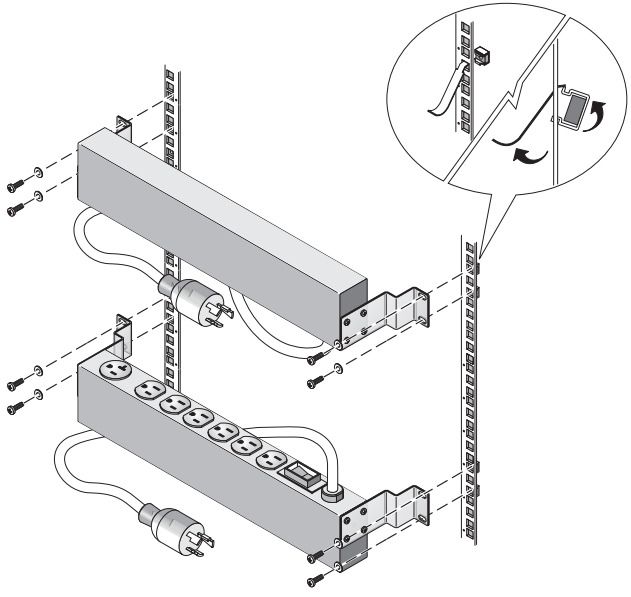


Figure 7. 1U PDU Installation with Extended Brackets

Side of Rack Installation

NOTE: Only 1U PDUs can be mounted in the side of the rack. There is insufficient room to mount a 2U PDU in this space.

To install the PDU in the side of your Dell rack, perform the following steps:

1. Locate and identify the correct brackets for mounting a 1U PDU in the side of the rack. See Figure 1 for help in identifying the proper brackets.

2. Identify and mark the location of the PDU on the side of one of the rear vertical support members (See Figure 8). When the mounting brackets are in place on the PDU, there is approximately 17.7 inches (450 mm) between the bracket's mounting holes. Make sure that the PDU will not interfere with other equipment or cables in the rack when it is installed in the desired location.

3. Position the PDU as shown in Figure 8 and secure the unit with screws and washers. Cage nuts are not required when mounting the PDU in the side of the rack; the PDU's mounting brackets are screwed directly to the vertical mounting supports using the screws provided.

4. Complete the installation by grounding the PDU as described in "Connecting the Ground Wire" on page 10.

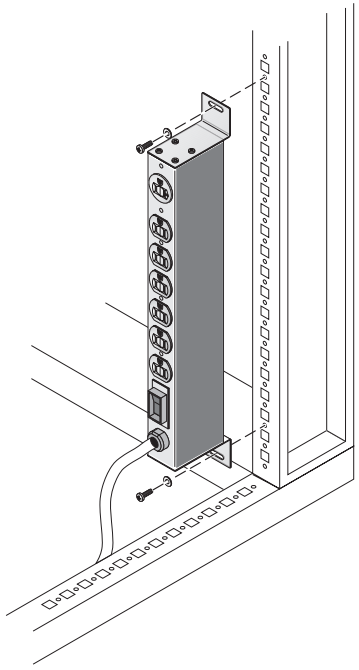


Figure 8. 1U PDU Installation in Side of Rack

Bottom of Rack Installation

NOTE: Only 2U PDUs can be mounted in the bottom of the rack. The mounting brackets will not accommodate a 1U PDU.

To install the PDU in the bottom of your Dell rack, perform the following steps:

1. Locate and identify the correct brackets for mounting a 2U PDU in the bottom of the rack. See Figure 1 for help in identifying the proper brackets.
2. Attach the mounting brackets to both ends of the PDU as illustrated in Figure 9.
3. Position the PDU as shown in Figure 9 and secure the unit with screws and washers. Cage nuts are not required when mounting the PDU in the bottom of the rack; the PDU's mounting brackets are screwed directly to the bottom mounting supports using the screws provided.
4. Complete the installation by grounding the PDU as described in "Connecting the Ground Wire" on page 10.

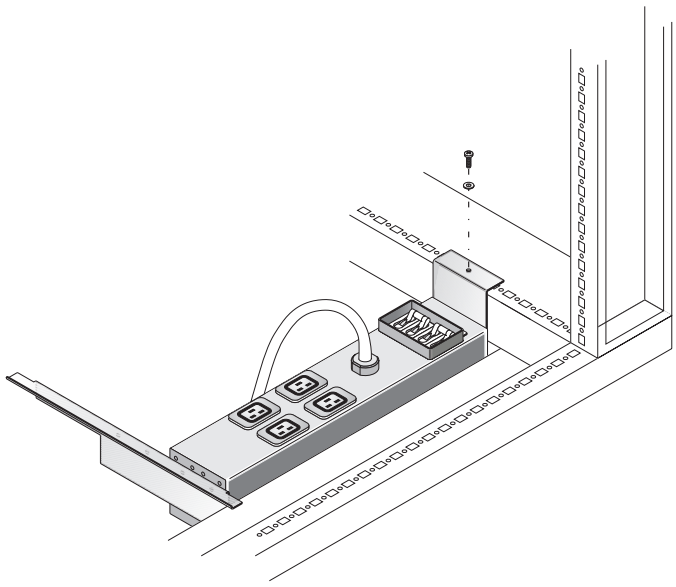


Figure 9. 2U PDU Installation in Bottom of Rack

Connecting the Ground Wire

To ensure proper grounding, a ground wire must be connected between the PDU and the rack.

1. Connect the PDU ground wire to the rack by inserting the self-tapping screw through the ring terminal on the ground wire, and then through the star washer. Install the screw on the rack through one of the round rack holes behind the cage nuts and tighten so that the star washer makes tight contact with the rack.

NOTE: A tight connection is required to ensure that the star washer contacts bare metal through the paint on the rack.

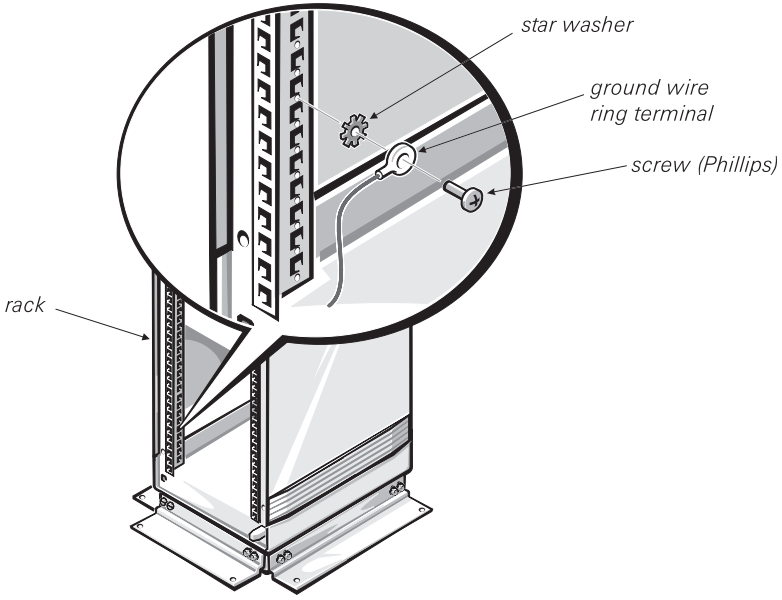


Figure 10. PDU Ground Wire Connection

Cabling the Rack Systems to the PDU

The method you use to cable your systems to the PDU depends on whether you are using an uninterruptible power supply (UPS) and/or optional power strip with your rack system and whether the UPS has a locking power plug. Locking plugs must only be inserted into locking receptacles and nonlocking plugs must only be inserted into nonlocking receptacles.

120 volt (V) PDUs have several NEMA 5-15 nonlocking receptacles and a single NEMA 5-20 nonlocking receptacle. 120 V PDUs also have a NEMA L5-20 locking plug for AC-input power. 120 V PDUs can be used in conjunction with an optional power strip to provide additional receptacles for rack-mounted accessories.

208 V PDUs have four IEC320-C19 nonlocking receptacles for output, and a single NEMA L6-30P locking plug for AC-input power.

230 V, 13A PDUs (1 U in height) have several IEC-C13 nonlocking receptacles and a single CEE 7/7 nonlocking receptacle. 230 V PDUs also have an IEC309 locking plug for AC-input power.

230 V, 24A PDUs (2 U in height) have four IEC-C19 nonlocking receptacles and a single CEE 7/7 nonlocking receptacle. 230 V, 24A PDUs have an IEC309 locking plug for AC-input power.

If your rack system does not have a UPS, connect the PDU to the AC power source and connect all power cables from rack-mounted devices to the PDU (see Figure 11). If the optional power strip is used, plug the power strip into an available receptacle on the PDU and connect the rack-mounted devices to the power strip's receptacles.

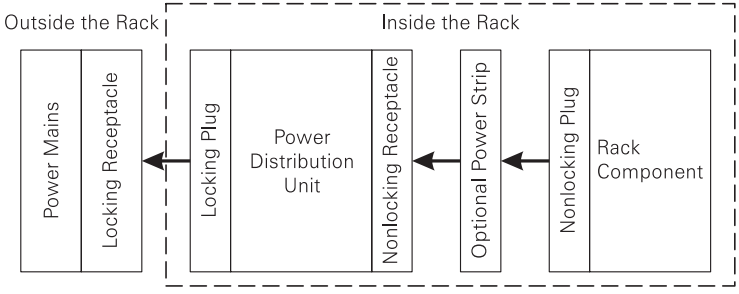


Figure 11. Power Distribution (Without UPS)

If you are using a UPS that does not have a locking plug, connect the PDU to the AC power source, connect the UPS power cable to the PDU, and then connect all the power cables for rack-mounted devices to the UPS (see Figure 12). If the optional power strip is used, plug the power strip into an available receptacle on the UPS and connect the rack-mounted devices to the power strip's receptacles.

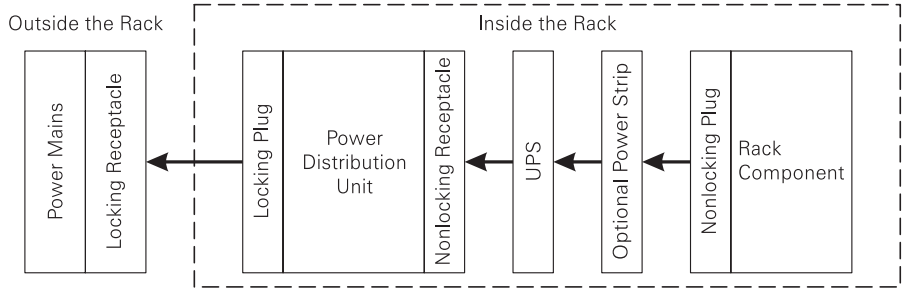


Figure 12. Power Distribution (UPS without Locking Plug)

If you are using a UPS that has a locking plug, a power strip must be used in place of the PDU if additional receptacles are needed for rack-mounted accessories. Connect the UPS locking plug to the AC power source and connect the rack-mounted devices to the UPS receptacles. If an optional power strip is used, plug the power strip into a UPS receptacle and connect the rack-mounted devices to the receptacles on the power strip (see Figure 13).

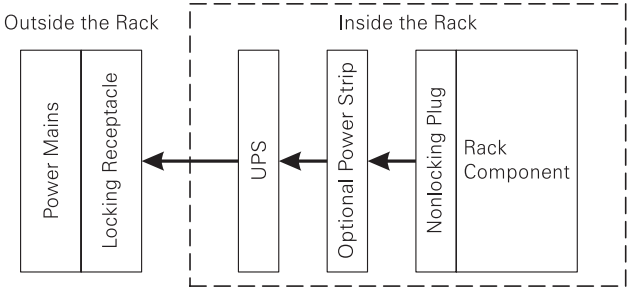


Figure 13. Power Distribution (UPS with Locking Plug)

Printed in the U.S.A.
Imprimé aux U.S.A.
Gedruckt in den U.S.A.
Impreso en los EE.UU.

DELL™

P/N 990-0072A