



# 2400W AC-Input Power Shelf for the Cisco uBR10012 Universal Broadband Router

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This document describes the Cisco 2400W AC-input power shelf and how to install it for use with the Cisco uBR10012 universal broadband router. This document provides the following information:

- [Feature Overview, page 1](#)
- [Safety Information and Warnings, page 4](#)
- [Installing the 2400W AC-Input Power Shelf, page 7](#)
- [Removing and Replacing an AC-Input Power Module, page 14](#)
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**Note**

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The 2400W AC-input power shelf can also be used with the Cisco AS5850 Universal Gateway. For information on using the shelf for this purpose, see the Cisco AS5850 Universal Gateway documentation, available on Cisco.com and the documentation CD-ROM.

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## Feature Overview

The 2400W AC-input power shelf converts AC-output power from an external AC power source into DC power that is suitable for powering the Cisco uBR10012 router. The power shelf supplies -54 VDC-output power to the two DC PEMs in the Cisco uBR10012 chassis.

The power shelf is two rack units high (3.5 inch [8.88 cm]) and can be mounted in a standard 19-inch 4-post equipment rack or telco-type rack. For convenience in cabling, the power shelf is designed to be rack-mounted immediately below the Cisco uBR10012 chassis.



**Note**

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The AC-input power shelf is designed to be installed underneath the Cisco uBR10012 router. To avoid the possibility of crushing the shelf during the router's installation, install the power shelf after you install the router in the rack.

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The power shelf includes three 1200-watt (W) AC-input power modules that plug into a common power backplane in the 2400W AC-input power shelf. Two 1200W AC-input power modules are capable of powering a fully configured Cisco uBR10012 router. The third power module provides full redundancy.

During normal operation, the three AC-input power modules provide automatic load-sharing with each power module supporting 33 percent of the power load. When you remove one of the AC-input power modules, the remaining power modules immediately ramp up to full power and maintain uninterrupted system power for a limited time. This allows you to replace the affected module without impacting system operations.

**Caution**

The AC-input power shelf is capable of powering the Cisco uBR10012 router with only two AC-input power modules, but this should not be the normal mode of operation. For uninterrupted service, replace the third power module immediately, if a spare module is on hand, or as soon as possible, if one must be ordered.

**Note**

The AC-input power modules in the 2400W AC-input power shelf are hot-swappable, allowing you to remove or replace a power module while the system is operating; system operation is not affected. For full redundancy, you must connect each AC-input power module to a separate AC power source.

Each AC-input power module is powered on automatically when it is plugged in and receiving power. Ejector levers secure the power module to the backplane connectors and allow you to remove and replace the power modules with ease, even when the unit is installed in an equipment rack.

Table 1 lists the product numbers for the AC-input power shelf and its components.

**Table 1** Product Numbers

Product Numbers	Description
UBR10-PWR-AC-EXT	Bundle with AC-input power shelf, DC PEM, and monitor cable.
UBR10-PWR-DC, UBR10-PWR-DC=	DC PEM without monitor cable connector
UBR10-PWR-DC-M, UBR10-PWR-DC-M=	DC PEM with monitor cable connector
UBR10-PWR-MON-CAB, UBR10-PWR-MON-CAB=	Power supply monitoring cable for connecting the DC PEM to the AC-input power shelf.

## Physical Description

Figure 1 shows a front view of a 2400W AC-input.

**Figure 1** Cisco uBR10012 Router AC-Input Power Shelf (Front View)

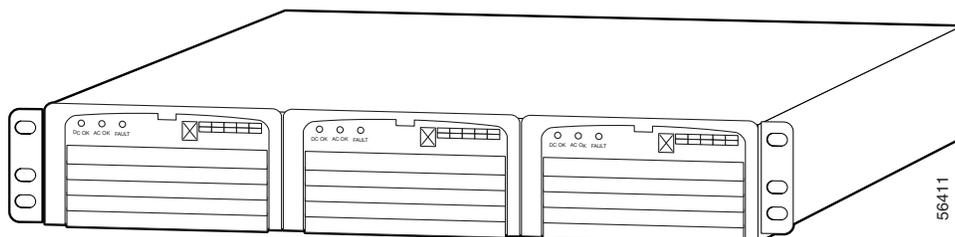
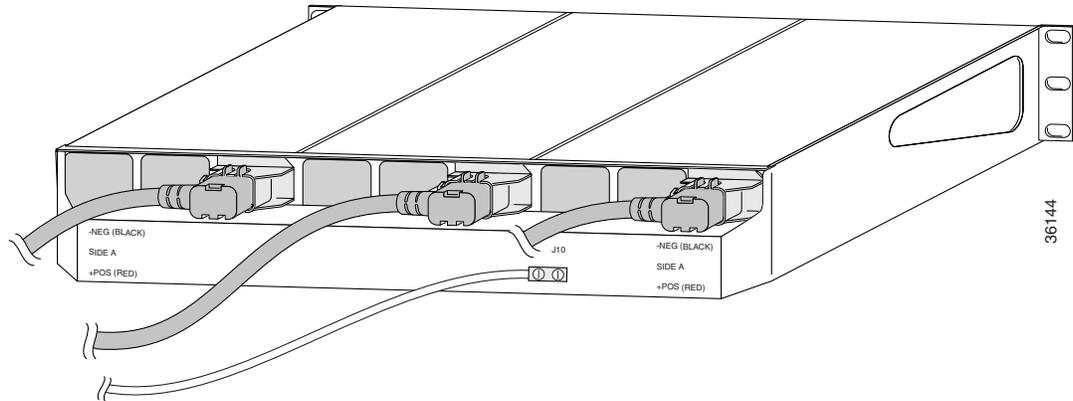


Figure 2 shows a rear view of a 2400W AC-input power shelf before installation.

**Figure 2** Cisco uBR10012 Router AC-Input Power Shelf (Rear View)



All cable connections for AC-input power, DC-output power, and status signals are made from the rear of the power shelf (see Figure 2). Three modular power cables connect each AC-input power module to the site AC-input power source. Two DC-interconnect cables provide DC-output power to the DC PEMs. A grounding cable provides a ground connection from the 2400W AC-input power shelf to the router.

The AC-input power shelf also contains a power supply monitoring cable that is used with the newer models of the DC PEM power supply for the Cisco uBR10012 router. This monitoring cable provides information on whether a power module in the power shelf is missing, is reporting a fault, is experiencing an over-temperature condition, or is not receiving AC-input power.



**Note**

The power supply monitoring cable (product order number UBR10-PWR-MON-CAB) can be used only with a Cisco uBR10012 router that is running Cisco IOS Release 12.2(4)XF1 or later release. The router must also be using the newer model of DC PEMs.

## Power Module Safety Features

The power modules in the enhanced 2400W AC-input power shelf have the following safety features:

- AC power modules installed in the enhanced AC-input power shelf are protected against over current by circuit breakers and against over temperature by internal protection circuits.
- A spring-clip locking mechanism in the ejector levers holds individual AC power modules in place and prevents the power module from vibrating or sliding out of the power bay and dislodging from the power backplane. A small flat-blade screwdriver is needed to delatch the AC modules. Pulling on the levers without properly releasing the latches can damage the modules.
- Double grounding lugs (as per NEBS requirements) on both the enhanced AC-input power shelf and the server provide electrical grounding.
- The power modules are self-monitoring. Each power module monitors its own temperature and internal voltages. An internal fan in each power module draws cooling air from the front of the power shelf through the power module and out the rear of the power shelf.

# Safety Information and Warnings

Following are safety guidelines that you should follow when working with any equipment that connects to electrical power.

## Safety Warnings



### Warning

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix "Translated Safety Warnings" in the installation guide that accompanied this device.)

### Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. (Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het aanhangsel "Translated Safety Warnings" (Vertalingen van veiligheidsvoorschriften) in de installatiegids die bij dit toestel is ingesloten, raadplegen.

### Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. (Tässä julkaisussa esiintyvien varoitusten käännökset löydät tämän laitteen mukana olevan asennusoppaan liitteestä "Translated Safety Warnings" (käännetyt turvallisuutta koskevat varoitukset).)

### Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents. Pour obtenir les traductions des mises en garde figurant dans cette publication, veuillez consulter l'annexe intitulée « Translated Safety Warnings » (Traduction des avis de sécurité) dans le guide d'installation qui accompagne cet appareil.

### Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. (Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Anhang mit dem Titel "Translated Safety Warnings" (Übersetzung der Warnhinweise) in der diesem Gerät beiliegenden Installationsanleitung.)

- Avvertenza** Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nell'appendice, "Translated Safety Warnings" (Traduzione delle avvertenze di sicurezza), del manuale d'installazione che accompagna questo dispositivo.
- Advarsel** Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. (Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i vedlegget "Translated Safety Warnings" [Oversatte sikkerhetsadvarsler] i installasjonsveiledningen som ble levert med denne enheten.)
- Aviso** Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. (Para ver as traduções dos avisos que constam desta publicação, consulte o apêndice "Translated Safety Warnings" - "Traduções dos Avisos de Segurança", no guia de instalação que acompanha este dispositivo).
- ¡Advertencia!** Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. (Para ver traducciones de las advertencias que aparecen en esta publicación, consultar el apéndice titulado "Translated Safety Warnings," en la guía de instalación que se acompaña con este dispositivo.)
- Warning!** Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. (Se förklaringar av de varningar som förekommer i denna publikation i appendix "Translated Safety Warnings" [Översatta säkerhetsvarningar] i den installationshandbok som medföljer denna anordning.)

**Warning**


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Only trained and qualified personnel should be allowed to install or replace this equipment.

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**Warning**


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Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

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**Warning**


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This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

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**Warning**

**Do not work on the system or connect or disconnect cables during periods of lightning activity.**

**Warning**

**Before performing any of the following procedures, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position.**

**Warning**

**After wiring the DC power supply, remove the tape from the circuit breaker switch handle and reinstate power by moving the handle of the circuit breaker to the ON position.**

**Warning**

**When installing the unit, always make the ground connection first and disconnect it last.**

**Warning**

**Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.**

**Warning**

**This unit has more than one power supply connection; all connections must be removed completely to completely remove power from the unit.**

**Warning**

**Use copper conductors only.**

**Warning**

**This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.**

## Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

## Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which occurs when electronic cards or components are improperly handled, can result in complete or intermittent failures. The AC-input power shelf and its AC power modules contain a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the cards from ESD, use an antistatic strap each time you handle the modules.

Following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to a bare metal, unpainted surface on the chassis or rackmount.
- Handle components by the carrier edges only; avoid touching the card components or any connector pins.
- When removing a module, place it on an antistatic surface or in a static-shielding bag. If the module will be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.

**Caution**

For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms.

## Installing the 2400W AC-Input Power Shelf

This section explains how to attach the AC-input cables and ground cable and rack-mount the AC-input power shelf. For detailed cabling specification tables, see Appendix A, “*Technical Specifications*,” in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*.

**Note**

Do not install the AC-input power shelf until after you have installed the Cisco uBR10012 chassis, so as to avoid the possibility of crushing the shelf during the router’s installation.

## Parts Required

You need the following tools and parts to rack-mount the power shelf:

- 2400W AC-input power shelf with three AC power supplies
- Three AC power cables (already attached)
- Two pairs of DC interconnect cables (already attached)
- One power supply monitoring cable (part number 72-3505-01, optional, attached by installer)
- One 6-gauge ground cable (attached by installer)
- Two hex nuts and M4 screws
- Four 10-32 x 3/8-in. slotted screws
- One metal safety cover and screws

- 3/8-in. nut driver
- No. 2 Phillips screwdriver
- 1/4-in. flat-blade screwdriver
- Wire strippers, if needed, for your DC power cables
- Several cable ties to temporarily anchor the cables out of the way, if necessary

Proceed with the following sections to unpack, prepare, connect, and rack-mount the AC-input power shelf.

## Unpacking and Preparing the AC Power Supply

To unpack the power shelf chassis and mount the AC-input and ground cables, complete the following steps:

- 
- Step 1** Open the shipping carton by cutting the packing tape along the flaps on the top of the crate.
- Step 2** Remove the AC-input power cables from the side compartment in the packaging.
- Step 3** Lift off the top layer of packaging to expose the power shelf chassis.
- Step 4** Remove the power shelf chassis from the carton.



**Note**

There is a metal spacer separating the power supply bays. Leave it in place until you mount the power shelf chassis in the rack.

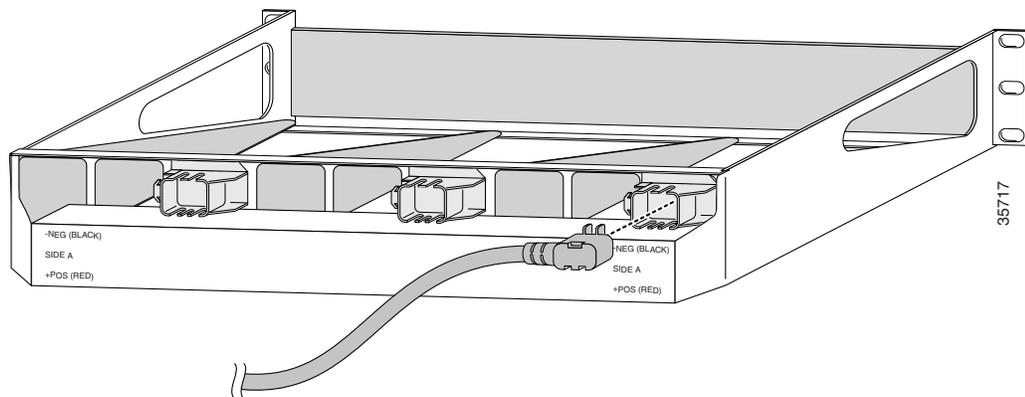
- 
- Step 5** Press the AC-input power cables into their slots on the back of the power shelf chassis, as shown in [Figure 3](#).



**Caution**

Do not connect the AC power cords to the AC power source until after the Cisco uBR10012 chassis is rack-mounted and installed. This will ensure that no harmful power is available during the installation process.

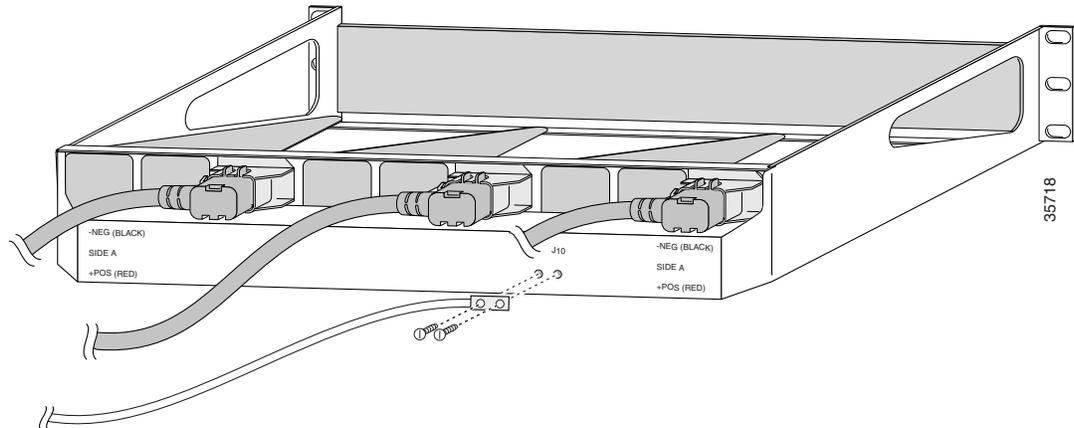
**Figure 3** Mounting AC-Input Cables on the Rear of the AC Power Shelf



The power shelf has three IEC 60320 Type C20 power inlets. If you are not using one of the standard Cisco power cords designated for your country, choose one that has an IEC 60320 Type C19 connector on one end and the appropriate country-specific plug on the other end. The power cord should be rated at least 15 A at low voltages (100 to 120 VAC) and at least 10 A at high voltages (200-240 VAC).

- Step 6** Remove the two screws on the rear of the 2400W AC-input power shelf (see [Figure 4](#)).

**Figure 4** Mounting the Ground Cable on the Rear of the AC Power Shelf



- Step 7** Attach the ground-cable double-ring lug to the power shelf chassis (see [Figure 4](#)).

Proceed to the next section to mount the AC-input power shelf in the equipment or telco rack.

## Mounting the AC-Input Power Shelf in the Rack

Install the power shelf in the rack by securing the permanent mounting flanges to two posts or mounting strips in the rack by using the slotted mounting screws provided. Because the mounting flanges support the weight of the entire power shelf, be sure to use at least two slotted screws per mounting flange.

The power shelf ships without power supplies mounted in their intended bays. There is a metal spacer installed in the power supply bays to maintain the chassis' proper shape until the chassis is installed in a rack. To install the power shelf in the rack, follow this procedure.



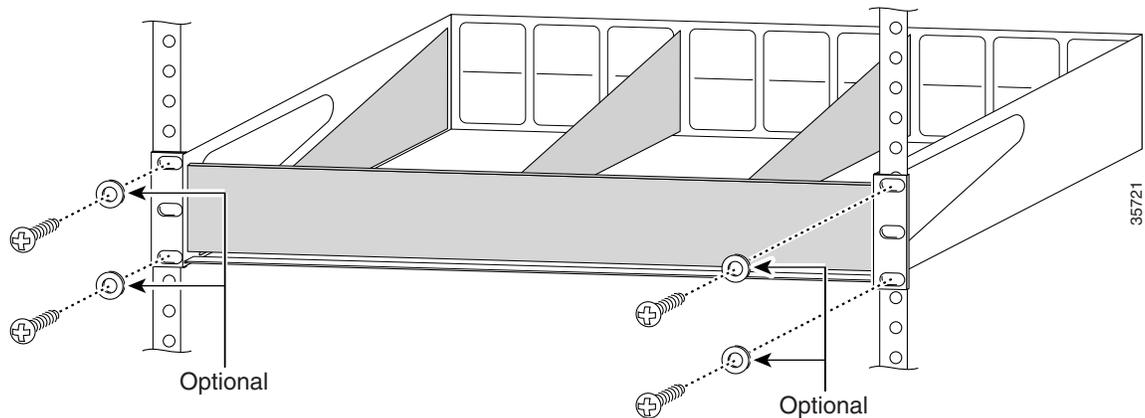
### Caution

The AC-input power shelf with three power supplies installed weighs approximately 28 lb. (12.7 kg). Use caution when lifting the power shelf. Bend your knees and lift by using your legs. Do not strain your back. If the power supplies have already been installed in the power shelf, Cisco recommends that you remove the power supplies from the shelf before you mount it in a rack.

- Step 1** Verify that your path to the rack is unobstructed, and ensure that the rack is stabilized.
- Step 2** Determine the proper position in the rack for the power shelf. For convenience in cabling, install the power shelf immediately below the Cisco uBR10012 chassis. (To avoid the danger of crushing the shelf, install the shelf after installing the Cisco uBR10012 chassis.)
- Step 3** Position the power shelf in front of the rack. To prevent injury, avoid sudden twists or moves.

- Step 4** Lift and slide the power shelf into the rack. Push it back until the front mounting flanges meet the mounting strips or posts on both sides of the equipment rack.
- Step 5** Position the power shelf, so that the holes in the mounting flanges are aligned to those in the mounting strips while keeping the mounting flanges flush against the posts or mounting strips.
- Step 6** Insert the 10-32 x 3/8-inch slotted screws (two screws per side at a minimum) through the power shelf mounting flange and into the mounting strip. Use a 1/4-inch flat-blade screwdriver to tighten the screws (see [Figure 5](#)).

**Figure 5** Mounting the 2400W Power Shelf



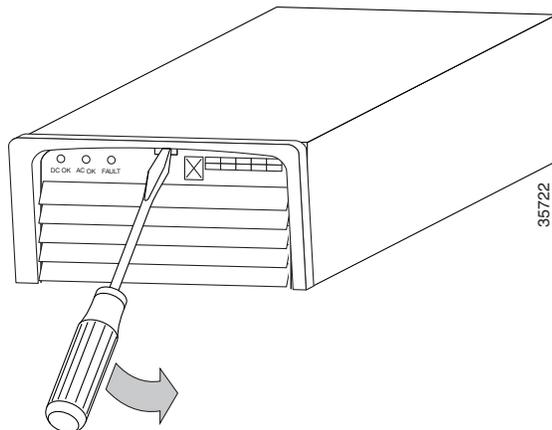
**Note** Using washers as shown in [Figure 5](#) is optional but recommended.

- Step 7** Remove the metal spacer to allow installing the power supplies.
- Step 8** Attach an ESD-preventive wrist strap between you and an unpainted chassis surface.
- Step 9** Remove the second level of packing from the power shelf shipping box.
- Step 10** Remove the first power module from the shipping crate.

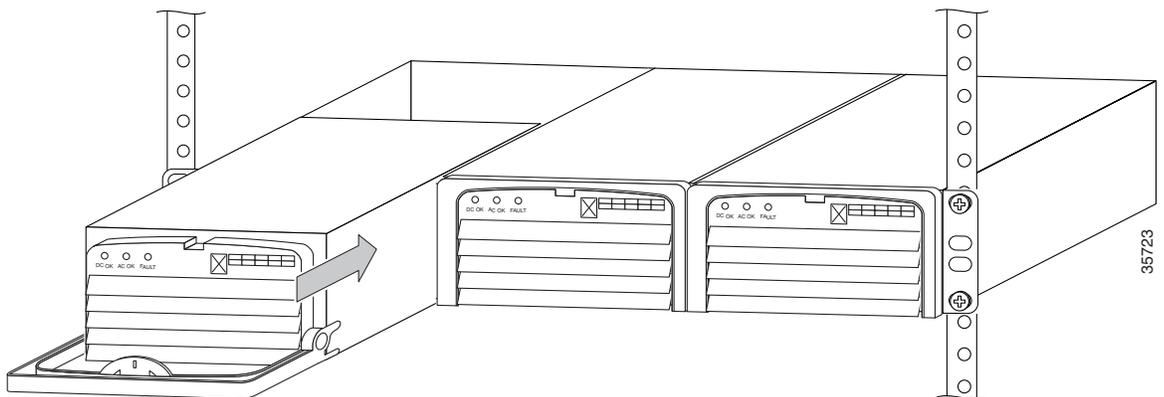


**Caution** A single power module weighs 7 lb. (3.2 kg). Use both hands when removing or replacing a power module.

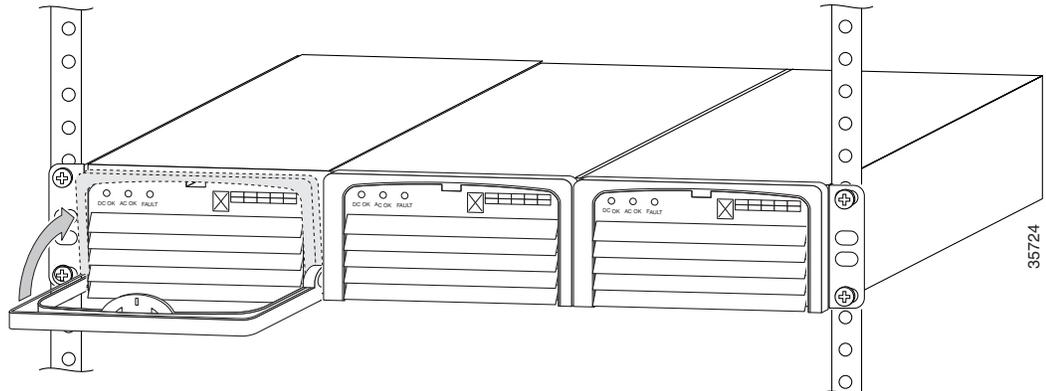
- Step 11** The power supplies are secured by self-locking ejector levers. Use a flathead screwdriver to release the locking ejector lever on the power module (see [Figure 6](#)):

**Figure 6** Releasing the Ejector Lever

- Step 12** With the ejector lever in its fully-down position, slide the power module into the power module bay (see [Figure 7](#)). Push the power module fully into the power shelf until the front is flush against the power shelf frame. To prevent damage to the backplane connector, do not jam the power module into the bay.

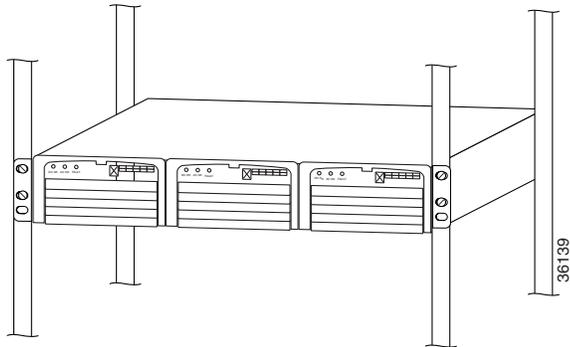
**Figure 7** Installing a Power Supply

- Step 13** Push the self-locking ejector lever upward until the plastic handle/spring-clip locks into place (listen for the click). The ejector lever will slide the power supply into its connection to the power supply backplane. See [Figure 8](#).

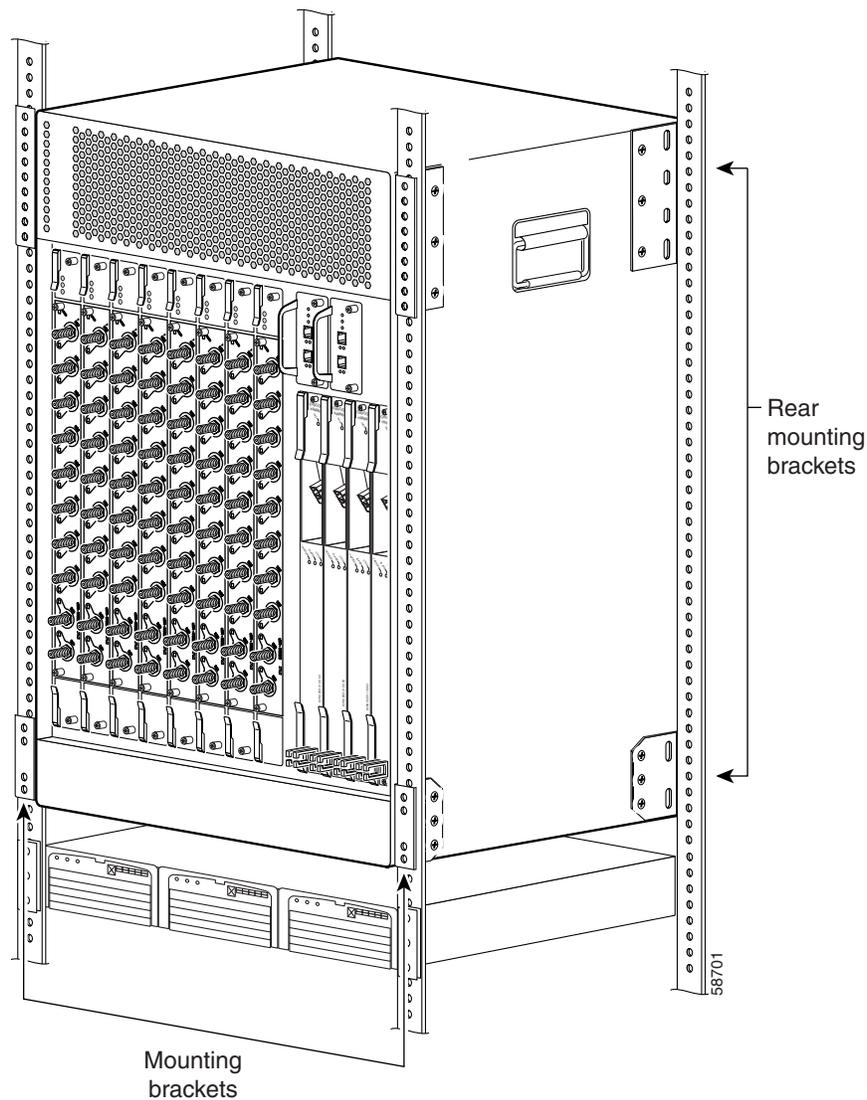
**Figure 8** Securing the Ejector Lever

**Step 14** Repeat steps 10 through 13 to install the other two power supplies.

Figure 9 illustrates the AC-input power shelf after you have mounted it in a 4-post rack and installed all three power supplies. Figure 10 shows the same shelf installed underneath the Cisco uBR10012 chassis (the recommended configuration).

**Figure 9** AC-Input Power Shelf Installed in a Four-Post Rack

**Figure 10** AC-Input Power Shelf Installed Underneath the Cisco uBR10012 Router



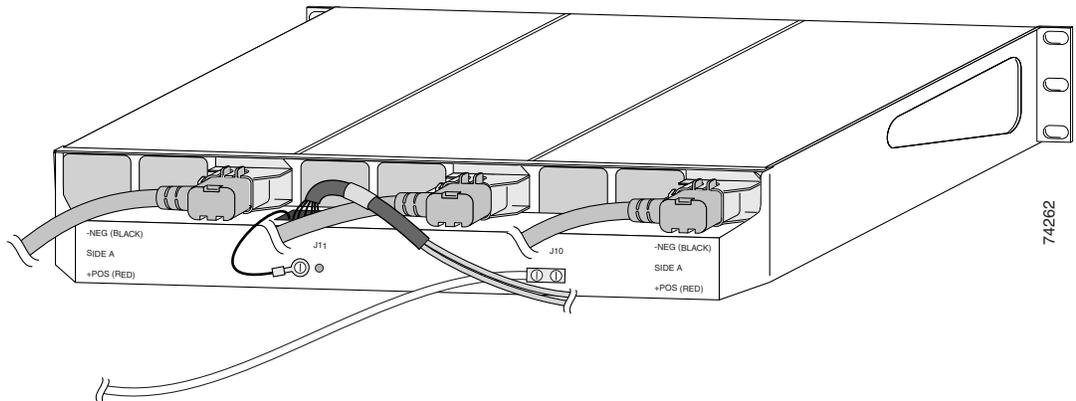
## Connecting the Cables to the Cisco uBR10012 Router

Proceed with the installation of the Cisco uBR10012 chassis. Follow the instructions given in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*. This includes connecting the DC power cables from the AC-input power shelf to the DC terminal blocks on the Cisco uBR10012 chassis and connecting the alarm monitor cable (if using the newer model of DC PEM):

- The two sets of DC power cables are connected to each side of the shelf at the factory. Connect the other ends of these cables to the DC power terminal blocks on the Cisco uBR10012 chassis, as described in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*.

- If you are using the newer model of DC PEM that supports the power supply monitoring cable, connect the two RJ-45 connectors to the connectors on the front panels of each DC PEM. Then connect the 12-pin plug connector end of the cable to connector block J11 on the back panel of the power shelf. Attach the ground lug to one of the grounding screws immediately under connector J11. See [Figure 11](#):

**Figure 11** Connecting the Power Supply Monitoring Cable



**Note**

The power supply monitoring cable (product number UBR10-PWR-MON-CAB, part number 72-3505-01) for the Cisco uBR10012 router DC PEMs is not the same cable that is used for the similar connection on the Cisco AS5850 Universal Gateway (part number 72-2673-01).



**Caution**

Do not connect the three AC power cords to a power source until you have connected the shelf to the DC-input terminal blocks on the Cisco uBR10012 chassis.



**Note**

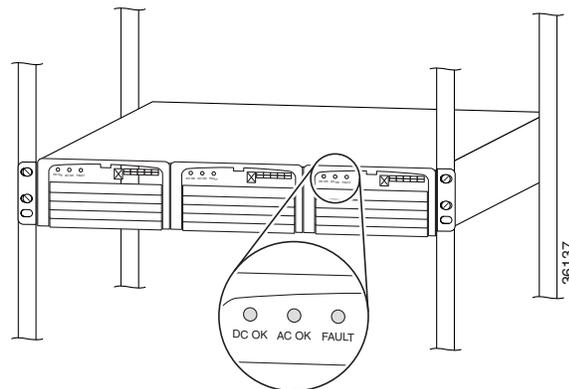
When you connect the AC-input power shelf to power, do not attempt to plug all three AC power cords into a single power strip. A single power strip cannot support the requirements for the AC shelf. Each AC input should be on a separate fuse or breaker circuit, both for safety reasons as well as to ensure full redundancy of the AC-input power source.

## Removing and Replacing an AC-Input Power Module

The AC-input power shelf requires two AC-input power modules for normal operations. The third AC-input power module is a redundant power module. If one power module fails or if power is removed from a module, the redundant power feature causes the other two power supplies to ramp up to full power and maintain uninterrupted system operation.

This section describes how to remove and replace an individual power module in the power shelf. You can replace an individual module without interrupting system operations as long as the other two modules are operating correctly and providing proper power.

A module is operating correctly when its AC OK and DC OK LEDs are both on (green). You must replace a module when its FAULT LED is red. See [Figure 12](#):

**Figure 12** 2400W AC-Input Power Module LEDs

## Tools and Parts Required

To remove and replace an individual power module you need the following tools and parts:

- Replacement AC power module (the product order number is AS58-PWR-3AC/MOD=).
- ESD-preventive wrist strap.
- If access to the power module bays is partially blocked by a power strip or other permanent rack fixture, you will need a 1/4-in., flat-blade screwdriver to temporarily detach the fixture from the equipment rack-mounting strips.

## Removing a Power Module

Use the following procedure to remove and replace a faulty AC-input power module. The AC-input power shelf is configured with three 110 VAC power supplies. You can remove or replace one of the power supplies without affecting system operation.



### Tip

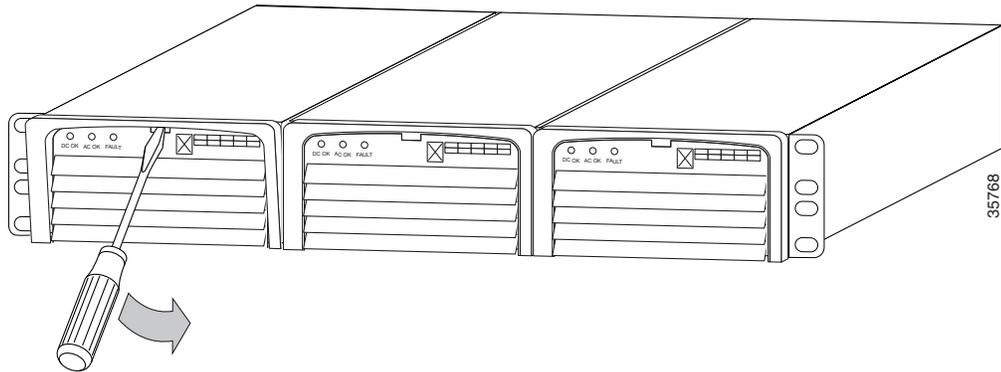
You can remove and replace the power modules without removing the AC-input power shelf from its mounting rack.



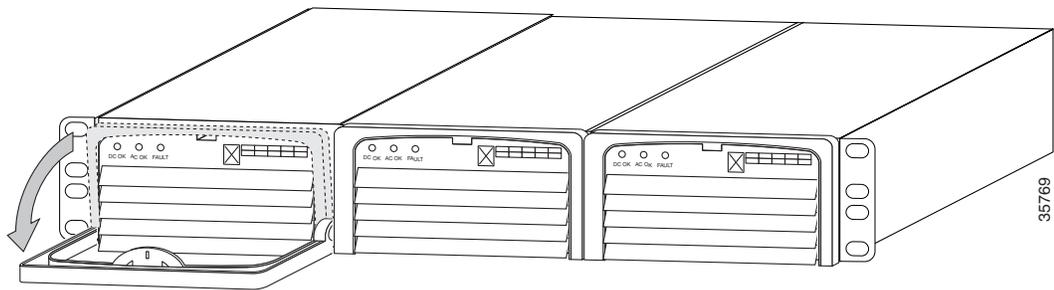
### Caution

A single power module weighs 7 lb. (3.2 kg). Use both hands when removing or replacing a power module.

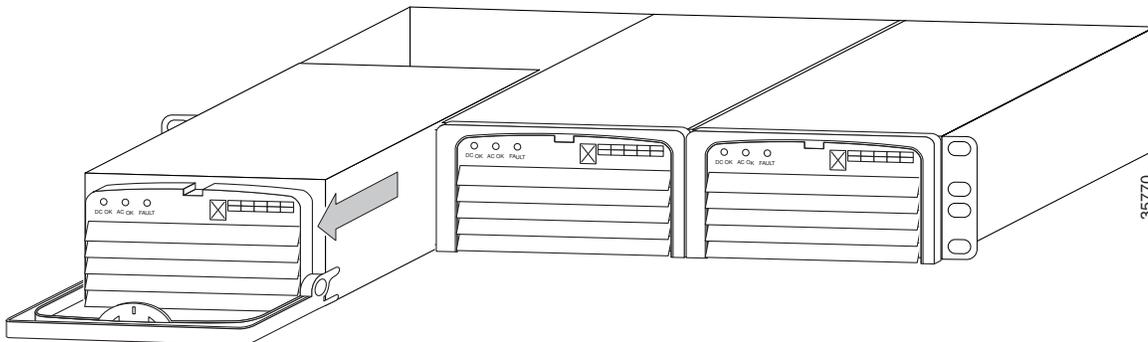
- Step 1** Attach an ESD-preventive wrist strap between you and an unpainted chassis surface.
- Step 2** Use a flathead screwdriver to pry the ejector lever up to release the lock. The power supplies are secured by self-locking ejector levers.

**Figure 13** Releasing the Lock on a Power Module

- Step 3** Apply downward pressure to the ejector lever to disconnect the power module from the power backplane. See [Figure 14](#).

**Figure 14** Unlocking a Power Module

- Step 4** Grasp the power module handle and pull the power module halfway out of the bay. Then with your other hand under the power module to support it, pull the power module completely out of the bay. See [Figure 15 on page 16](#).

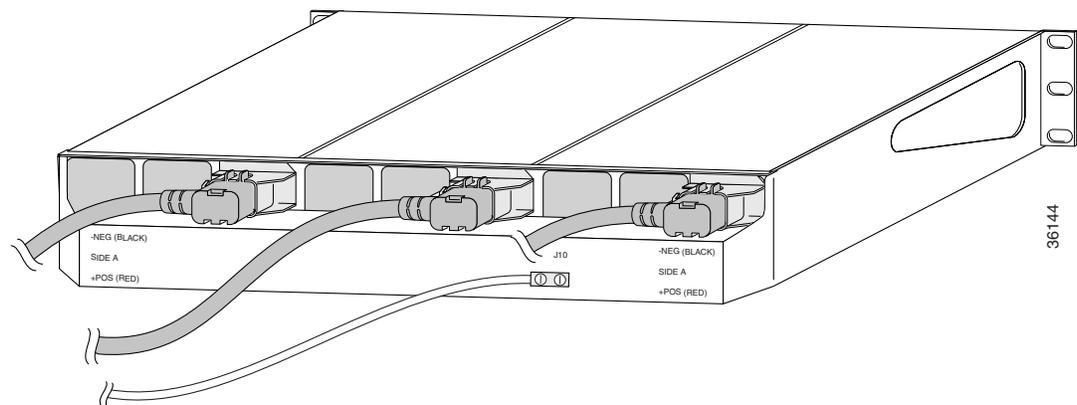
**Figure 15** Removing a Power Module

- Step 5** Discard the faulty power module according to all applicable laws and regulations.

## Replacing a Power Module

- Step 1** Remove the replacement power module from its packaging material.
- Step 2** Position the power module in the vacant power module bay. Push the power module fully into the power shelf until the front is flush against the power shelf frame. To prevent damage to the backplane connector, push the module slowly but firmly; do not jam the power module into the bay.
- Step 3** Push the self-locking ejector lever upward until the spring-clip locks into place (listen for the click).
- Step 4** Verify that the AC OK and DC OK LEDs are on. If they are not lit, verify that the AC-input power cord is plugged into the module's power plug on the back of the shelf. See [Figure 16](#).

**Figure 16** 2400W AC-Input Power Shelf—Rear View



## Troubleshooting the AC-Input Power Shelf

The optional AC-input power shelf accepts AC-input power from a standard wall outlet and provides the DC-output power suitable for the Cisco uBR10012 router. The AC-input power shelf contains three separate power supplies—during normal use, all three supplies perform load sharing and provide the power that is required by the Cisco uBR10012 router. However, if one power supply should fail, the other two immediately ramp up to provide the full power needed.

Each power module in the AC-input power shelf contains three LEDs that provide the current status of the supply. [Figure 17](#) shows the location of the LEDs on each power module.

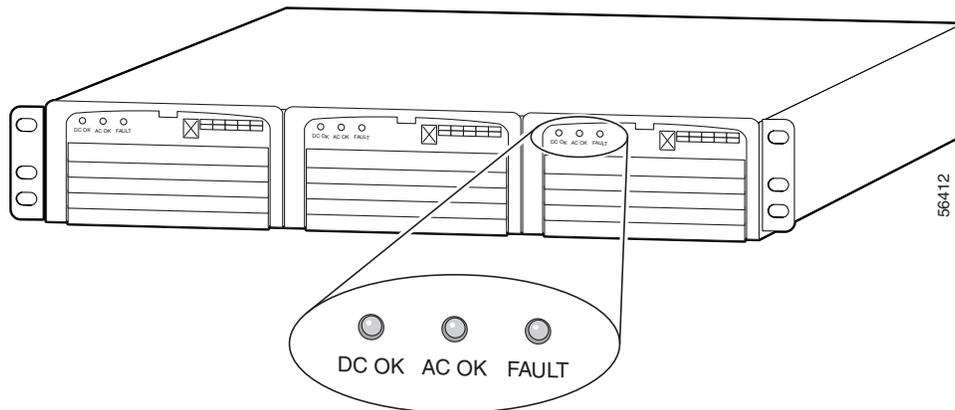
**Figure 17 AC-Input Power Shelf LEDs**

Table 2 describes the functions of each LED.

**Table 2 2400W AC-Input Power Module LEDs**

LED	Status	Description
DC OK	Green	On indicates DC-output power is present and within the specified voltage and frequency levels.
AC OK	Green	On indicates AC-input power is present and within the specified voltage and frequency levels.
Fault	Red	On indicates a power fault condition such as over voltage, under voltage, over temperature, or HV bus low.

Table 3 lists the AC-input power shelf fault symptoms and corrective actions.

**Table 3 AC-Input Power Shelf Fault Symptoms and Corrective Action**

Fault Symptom	Corrective Action
DC and AC OK LEDs are not on.	<ol style="list-style-type: none"> <li>1. Make sure that the AC power cord is correctly plugged in to both the AC-output wall outlet and in to the back of the AC-input power shelf. (A separate power cord is used for each power supply.)</li> <li>2. Make sure the AC power supply is properly inserted, seated, and locked. If necessary, remove the AC power supply and reinsert it.</li> <li>3. Check the external AC power source.</li> <li>4. Swap the AC power supply with one of the others. If the failure follows the power supply, replace the power supply. If the failure remains in that particular power bay, double-check the external AC power source and the power cord connections; if they are correct, contact the Cisco TAC for additional troubleshooting.</li> </ol>

**Table 3 AC-Input Power Shelf Fault Symptoms and Corrective Action (continued)**

DC OK LED is not on.	<ol style="list-style-type: none"> <li>1. Double-check the wiring to the Cisco uBR10012 router DC-input terminal blocks.</li> <li>2. If the problem persists, contact the Cisco TAC.</li> </ol>
Fault LED is yellow	<ol style="list-style-type: none"> <li>1. Check that the external AC power source is supplying consistent AC voltage at the proper levels, without spikes or brownouts.</li> <li>2. Flip the circuit-breaker for the external AC power source.</li> <li>3. Replace the power supply with a known good replacement.</li> <li>4. Contact the Cisco TAC.</li> </ol>

If you are using the newer model of DC PEM that has the power supply monitoring connector on the front panel, you can use the **show environment** command to monitor the AC-input power shelf:

```
Router# show environment
Temperature normal: chassis inlet measured at 29C/84F
Temperature normal: chassis core measured at 42C/107F
Fan: OK
Power Entry Module 0 type DC status: OK
Power Entry Module 1 type DC status: OK
Router#
```

If the DC PEM status is either “External AC Supply Fault” or “Input/Output Voltage Fault,” a problem exists with the AC-input power shelf:

- The “External AC Supply Fault” message indicates that one of the power modules is reporting either a fault, an over-temperature condition, or is missing. Check the LEDs on the front panels of the power modules on the external power supply to discover which module has the fault.
- The “Input/Output Voltage Fault” message indicates that one of the power modules is not receiving AC-input power. Check the LEDs on each power module, that each power module is plugged into an AC-input power outlet, and that those outlets are providing power.

# Technical Specifications

Table 4 lists the specifications for the 2400W AC-Input Power Shelf:

**Table 4 2400W AC-Input Power Shelf System Specifications**

Description	Specifications
Product order numbers	<ul style="list-style-type: none"> <li>• UBR10-PWR-AC-EXT (2400W AC-input power shelf and DC PEM bundle)</li> <li>• UBR10-PWR-DC, UBR10-PWR-DC= (DC PEM without monitor cable connector)</li> <li>• UBR10-PWR-DC-M, UBR10-PWR-DC-M= (DC PEM with monitor cable connector)</li> <li>• UBR10-PWR-MON-CAB, UBR10-PWR-MON-CAB= (monitor cable)</li> </ul>
Chassis dimensions	<ul style="list-style-type: none"> <li>• Height: 3.46 in. (87.9 cm)</li> <li>• Width: 19 in. (482.26 cm)</li> <li>• Depth: 12.00 in. (304.2 cm)</li> <li>• Mounting: 19-inch rack mountable (2 rack units)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Shelf only: 7 lb. (3.2 kg)</li> <li>• Each power module only: 7 lb. (3.2 kg)</li> <li>• Fully configured shelf: 28 lb. (12.8 kg)</li> </ul>
AC-input voltage and frequency	<ul style="list-style-type: none"> <li>• 100,120 to 200,240 VAC, 50/60 Hz</li> </ul>
AC voltage and current	<ul style="list-style-type: none"> <li>• 110 VAC at 15A maximum with power factor correction (PFC)</li> <li>• 240 VAC at 7.4 A maximum with power factor correction (PFC)</li> </ul>
AC power cable receptacle	<ul style="list-style-type: none"> <li>• IEC-320 15A receptacle that accepts right-angle cords</li> </ul>
Temperature range	<ul style="list-style-type: none"> <li>• Operating: 41° F to 104° F (5° C to 40° C)</li> <li>• Storage: -40° F to 158° F (-40° C to 70° C)</li> </ul>
Relative humidity	<ul style="list-style-type: none"> <li>• Operating: 5% to 85%</li> <li>• Storage: 5% to 95%</li> </ul>
Operating altitude	-197 ft. to 13,123 ft. (-60 m to 4000 m)

# Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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