



3300 W AC Power Entry Module for the Cisco uBR10012 Universal Broadband Router

Document Revision History

| Document Version | Date | Change Summary |
|------------------|----------------|---------------------------------|
| OL-24555-01 | February, 2011 | First version of this document. |

Contents

This document includes procedures for installing, replacing, and removing the 3300 W AC power entry module (AC PEM) in the Cisco uBR10012 universal broadband router.

This document provides the following information:

- [Objective, page 2](#)
- [Audience, page 2](#)
- [Overview, page 2](#)
- [Preparing to Unpack the AC PEM Module, page 9](#)
- [Installing the AC Power Entry Modules in the Chassis, page 16](#)
- [Removing and Replacing a 3300 W AC PEM, page 24](#)
- [Migrating from the 2400 W AC PEM to the 3300 W AC PEM, page 29](#)
- [Troubleshooting the 3300 W AC PEM, page 31](#)
- [Obtaining Documentation and Submitting a Service Request, page 33](#)



Objective

The purpose of this document is to provide installation, removal, and troubleshooting information for the 3300 W AC power entry module (AC PEM) installed in the Cisco uBR10012 universal broadband router.

Audience

This document is intended for field service engineers who are familiar with Cisco products and headend cable installation procedures.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030.

Overview

The Cisco uBR10012 router is shipped with two AC power entry modules (AC PEMs) that provide power supply to the system. One AC PEM module is sufficient to provide power for a fully configured chassis. However, if one AC PEM module fails, the other AC PEM module automatically begins providing power to the entire chassis, without impacting the system operation.

The AC PEM modules use a standard 200–240 VAC (50 or 60 Hz) input power obtained through power receptacles on the front panel of each PEM. The two AC PEMs convert the AC power to provide filtered, redundant, and load shared DC power to the Cisco uBR10012 chassis. The AC PEM modules can be identified by their product part numbers.

The AC PEM modules supported on the Cisco uBR10012 chassis are:

- AC PEM Module (UBR10-PWR-AC=)
- AC PEM Module (UBR10-PWR-AC-PLUS=)

[Table 1](#) summarizes the specifications of the AC PEM modules:

Table 1 **Specifications of the AC PEM Modules**

| Component | UBR10-PWR-AC-PLUS= | UBR10-PWR-AC= |
|---|---------------------------|---------------------------|
| Cisco AC PEM (Part Number) ¹ | 341-0387-01 | 34-1966-02 |
| Power Output | 3300 W | 2400 W |
| DC-output Voltage | 57.5 VDC | 54 VDC |
| AC-input Power Connections | 13 A + 13 A | 13 A |
| AC-input Voltage | 200-240 VAC (50 or 60 Hz) | 200-240 VAC (50 or 60 Hz) |
| Physical Differences | | |
| Weight | 19 lbs (8.64 kg) | 14.7 lbs (6.65 kg) |
| LEDs | 4 | 2 |
| PRODUCT ID LED/switch | Yes | No |

1. The 34- part number is listed on compliance label of the AC PEM.

This document includes procedures for installing, replacing, and removing the 3300 W AC power entry module (UBR10-PWR-AC-PLUS=). For information on migrating from the 2400 W AC PEM to the 3300 W AC PEM, see [“Migrating from the 2400 W AC PEM to the 3300 W AC PEM” section on page 29](#).

For information on installing, replacing, and removing the 2400 W AC PEM, see [AC Power Entry Module for the Cisco uBR10012 Universal Broadband Router](#).

**Caution**

The Cisco uBR10012 router supports using either the AC PEM modules or the DC PEM modules, but it does not support mixing AC and DC PEMs. Both PEMs must be either AC PEMs or DC PEMs.

**Caution**

The 3300 W AC PEMs cannot be used with a 100–120 VAC input power source.

**Tip**

For fully redundant power protection, use either an uninterruptible power supply (UPS) or a separate AC-input power source for each 3300 W AC PEM.

**Note**

The output of the **show inventory** command does not display the serial numbers for the AC PEMs (UBR10-PWR-AC and UBR10-PWR-AC-PLUS). Visually inspect the serial number labels printed on the AC PEMs to locate the serial number.

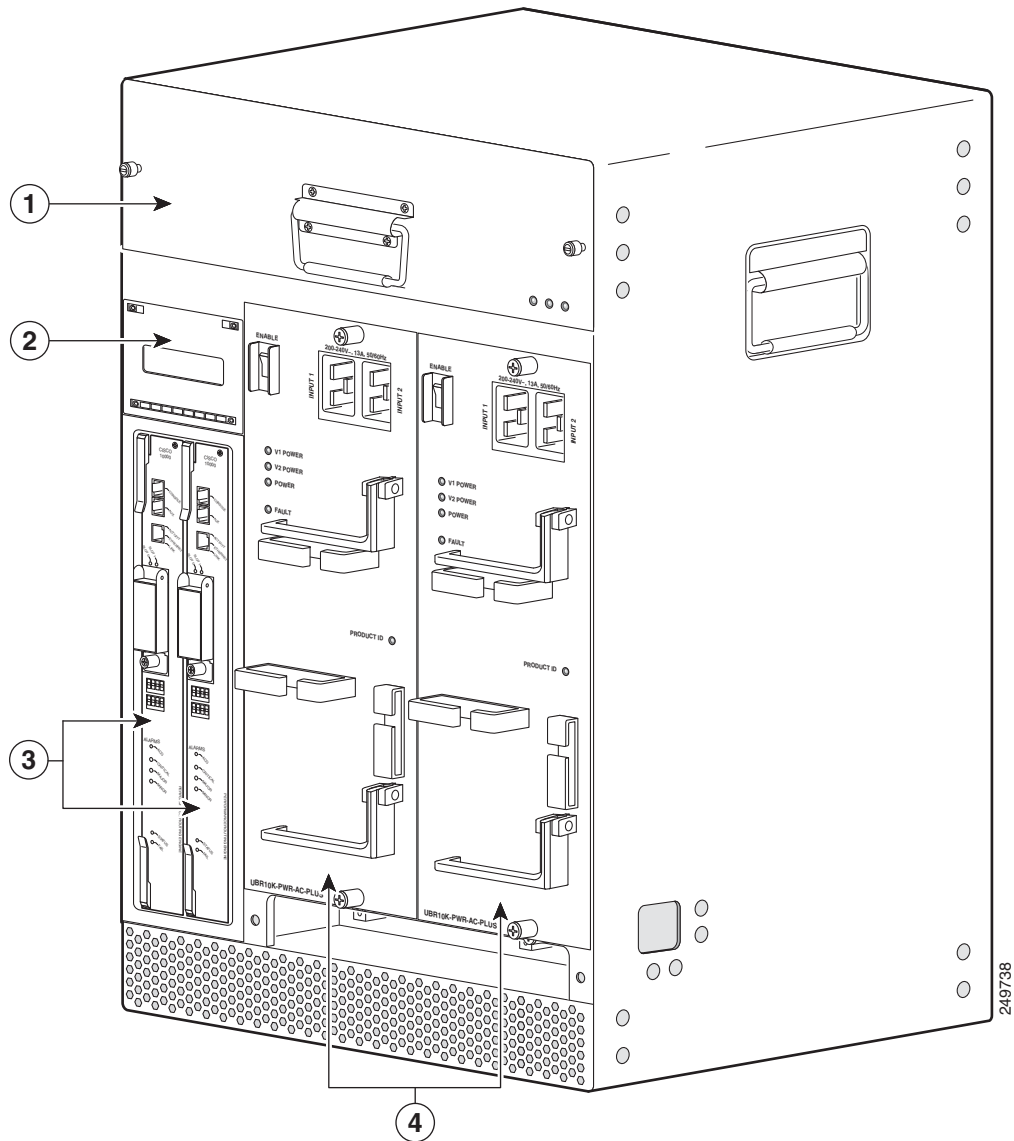
Physical Description

The 3300 W AC PEM module provides a power output of 3300 W with dual AC-input power connections. This AC PEM module provides:

- Increased power to the chassis
- Load shared power to the chassis (under normal conditions)

[Figure 1](#) shows a Cisco uBR10012 router with dual 3300 W AC PEMs installed.

Figure 1 Cisco uBR10012 Router with Dual 3300 W AC PEM Modules



| | | | |
|---|--------------|---|-----------------------|
| 1 | Fan assembly | 3 | PRE modules |
| 2 | LCD module | 4 | 3300 W AC PEM modules |



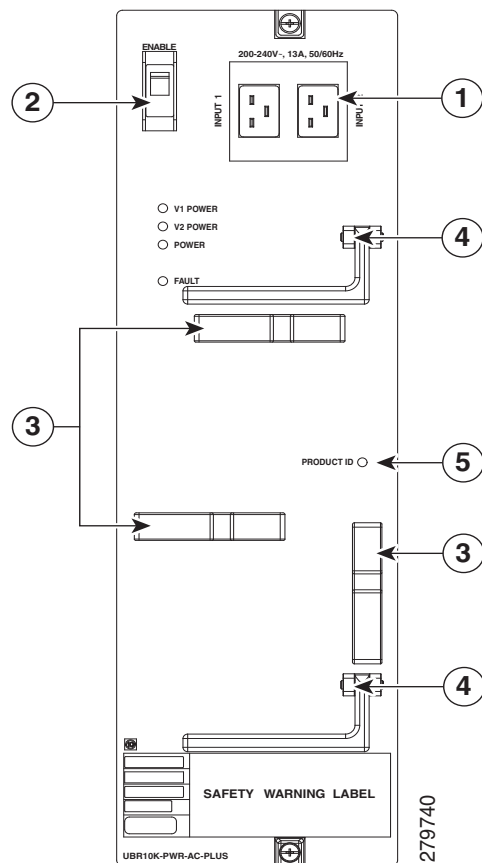
Caution

Do not attempt to lift the Cisco uBR10012 chassis by using the two handles on the front of the 3300 W AC PEM. The handles on the 3300 W AC PEM are for removing and inserting the PEM into the Cisco uBR10012 chassis.

Figure 2 shows the faceplate of the AC PEM module, which has:

- Two AC power receptacles—These connect to the facility power source.
- AC PEM enable power switch—This powers on the AC PEM module.
- AC power cord clips—These help to secure the AC power cables.
- Two handles—These help during the removal and installation of the AC PEM module in the Cisco uBR10012 chassis.

Figure 2 3300 W AC PEM Front Panel



| | | | |
|----------|------------------------|----------|-----------------------|
| 1 | AC power receptacles | 4 | Handles on the AC PEM |
| 2 | AC power enable switch | 5 | PRODUCT ID LED/switch |
| 3 | AC power cord clips | | — |

LEDs

Four LEDs (V1 POWER, V2 POWER, POWER, and FAULT) indicate the status of the AC PEM module. In addition, there is a PRODUCT ID LED/switch on the front panel of the AC PEM module.


Tip

Use a small object, such as a paper clip, to press the PRODUCT ID LED/switch inside the cavity on the front panel of the AC PEM module.

Table 2 describes the LEDs on the 3300 W AC PEM.

Table 2 AC PEM LEDs and Their Functions

| LED | Color | Description |
|-----------------------|--------|--|
| VI POWER | Green | Indicates that the PEM is receiving power from the AC power source. These LEDs only indicate that an input voltage is present on the PEMs and not that the PEM is powered on. Note This LED may illuminate even if the voltage applied is not in the proper range to power on the PEM. |
| V2 POWER | Green | Indicates that the PEM is receiving power from the AC power source. These LEDs only indicate that an input voltage is present on the PEMs and not that the PEM is powered on. Note This LED may illuminate even if the voltage applied is not in the proper range to power on the PEM. |
| POWER | Green | Indicates that the power at the output is within the required voltage, and the PEM is providing power to the Cisco uBR10012 chassis. |
| FAULT | Yellow | Indicates that the AC-input power is being received by the PEM, but that the PEM is not supplying power to the chassis, typically because the power enable switch of the AC PEM is set to the Standby (0) position. If the power switch is in the ENABLE (I) position, and the FAULT LED is illuminated, the PEM is not operating correctly. |
| PRODUCT ID LED/switch | Green | When you press the PRODUCT ID LED/switch it illuminates (green) and the Cisco IOS software identifies the PEM module as UBR10-PWR-AC-PLUS only if you are running a supported Cisco IOS Release on the chassis. Otherwise, the software reports the default UBR10-PWR-AC product part number and the show environment command randomly displays the PEM type as DC instead of AC. |

Table 3 lists the default activation status of the PRODUCT ID LED/switch when it is shipped.

Table 3 *PRODUCT ID LED/Switch Default Activation Status*

| Ordered Equipment | PRODUCT ID LED/Switch Status |
|---|------------------------------|
| AC PEM module (spare) | Activated |
| AC PEM module and Cisco uBR10012 chassis running unsupported Cisco IOS Release | Not activated |
| AC PEM module and Cisco uBR10012 chassis running supported Cisco IOS Release ¹ | Activated |

1. For information on Cisco IOS Releases that support the PRODUCT ID LED/switch feature, see the [Cisco uBR10012 Router Release Notes for Cisco IOS Release 12.2\(33\)SCE](#).



Note

If you are installing the AC PEM module (spare) in an existing Cisco uBR10012 router chassis, ensure that the Cisco IOS Release running on the chassis supports the PRODUCT ID LED/switch feature before installing the module.



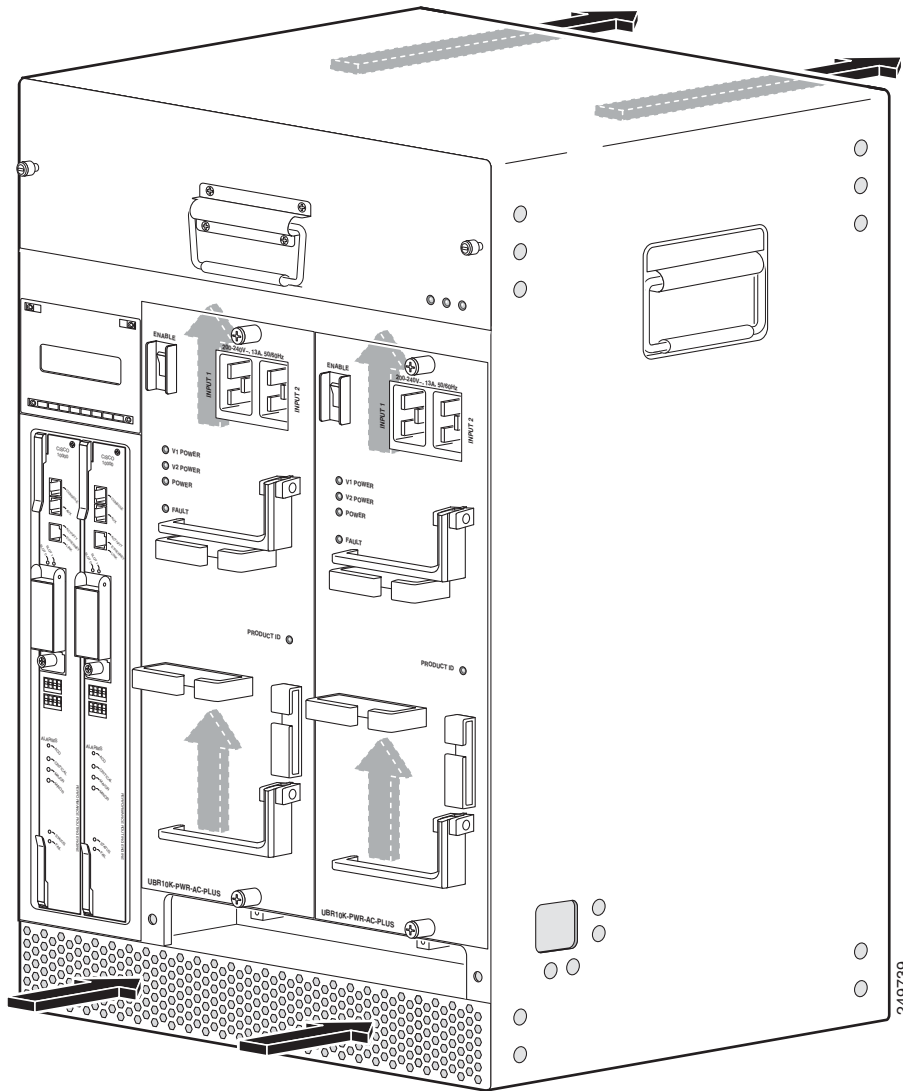
Note

Even if you are using a supported Cisco IOS Release, the software may not identify the PEM module as UBR10-PWR-AC-PLUS. If this occurs, ensure that the PRODUCT ID LED/switch is illuminated and then either reload the software, or physically remove the AC PEM module for at least 1 minute and then reinsert it.

Air Flow

The 3300 W AC PEM works together with the fan assembly module to ensure that the Cisco uBR10012 chassis is properly cooled during normal operation. [Figure 3](#) shows the airflow through the Cisco uBR10012 chassis when dual AC PEMs are installed.

Figure 3 Airflow Through the Cisco uBR10012 Chassis with Dual 3300 W AC PEMs



Note

Figure 3 shows the Cisco uBR10012 chassis without the front cover (U-CHAS-COVER-PLUS=) installed. The front cover should be installed during normal operation so that the air filter in the cover can filter the incoming air before it enters the chassis.

Power Supply Cables

The 3300 W AC PEM requires different power supply cables, depending on the country of operation.


Note

The two AC power cables must be connected and powered on for each AC PEM to function properly. Ensure that you exercise caution when the AC power cables are attached to the facility power source, and the facility power is turned on. The AC PEM internal fans start working and are audible as soon as the AC power cables are installed and AC power is supplied to the AC PEMs, although the AC power enable switch is in the Standby (0) position.


Note

The U-CHAS-COVER-PLUS= front cover must be used with the Cisco uBR10012 chassis for proper routing of the AC cables from the 3300 W AC PEMs through the chassis to the facility power source.

[Table 4](#) lists the product order numbers for the power supply cables that are available for the 3300 W AC PEM for the Cisco uBR10012 universal broadband router.

Table 4 Power Cables for the 3300 W AC Power Entry Module for the Cisco uBR10012 Router

| Product Order Number | Description |
|----------------------|---|
| CAB-UBR10-AC-US | North America—Uses a locking NEMA L6-20 connector at the end that plugs into the AC power source. |
| CAB-UBR10-AC-AR | Argentina |
| CAB-UBR10-AC-AU | Australia/New Zealand |
| CAB-UBR10-AC-CH | China |
| CAB-UBR10-AC-EU | Europe |
| CAB-UBR10-AC-IT | Italy |
| CAB-UBR10-AC-JP | Japan |
| CAB-UBR10-AC-UK | United Kingdom |

Preparing to Unpack the AC PEM Module

This section presents the following topics:

- [Safety Guidelines](#), page 10
- [Electrical Equipment Guidelines](#), page 14
- [Preventing Electrostatic Discharge Damage](#), page 14
- [Technical Specifications](#), page 15
- [Unpacking and Preparing the 3300 W AC PEM](#), page 15

Safety Guidelines

Follow the safety guidelines provided here, when working with any equipment that connects to electrical power.



Note

For Class B emission compliance requirements, one ferrite bead must be installed on the alarm port wire exiting the chassis. Two ferrite beads (part number 36-0219-01) are included in the Cisco uBR10012 router accessory kit, and one ferrite bead is shipped with the spare AC power entry modules. For information on attaching the ferrite beads, see [Cisco uBR10012 Broadband Router - Quick Start Guide](#).



Warning

IMPORTANT SAFETY INSTRUCTIONS

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 translated safety warnings that accompanied this device.

Note: SAVE THESE INSTRUCTIONS

Note: This documentation is to be used in conjunction with the specific product installation guide that shipped with the product. Please refer to the Installation Guide, Configuration Guide, or other enclosed additional documentation for further details.

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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 de standaard praktijken om ongelukken te voorkomen. Voor een vertaling van de waarschuwingen die in deze publicatie verschijnen, dient u de vertaalde veiligheidswaarschuwingen te raadplegen die bij dit apparaat worden geleverd.

Opmerking BEWAAR DEZE INSTRUCTIES.

Opmerking Deze documentatie dient gebruikt te worden in combinatie met de installatiehandleiding voor het specifieke product die bij het product wordt geleverd. Raadpleeg de installatiehandleiding, configuratiehandleiding of andere verdere ingesloten documentatie voor meer informatie.

Varoitus

TÄRKEITÄ TURVALLISUUTEEN LIITTYVIÄ OHJEITA

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 asiakirjassa esitettyjen varoitusten käännökset löydät laitteen mukana toimitetuista ohjeista.

Huomautus SÄILYTÄ NÄMÄ OHJEET

Huomautus Tämä asiakirja on tarkoitettu käytettäväksi yhdessä tuotteen mukana tulleen asennusoppaan kanssa. Katso lisätietoja asennusoppaasta, kokoonpano-oppaasta ja muista mukana toimitetuista asiakirjoista.

Attention IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez les consignes de sécurité traduites qui accompagnent cet appareil.

Remarque CONSERVEZ CES INFORMATIONS

Remarque Cette documentation doit être utilisée avec le guide spécifique d'installation du produit qui accompagne ce dernier. Veuillez vous reporter au Guide d'installation, au Guide de configuration, ou à toute autre documentation jointe pour de plus amples renseignements.

Warnung WICHTIGE SICHERHEITSANWEISUNGEN

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 sind im Lieferumfang des Geräts enthalten.

Hinweis BEWAHREN SIE DIESE SICHERHEITSANWEISUNGEN AUF

Hinweis Dieses Handbuch ist zum Gebrauch in Verbindung mit dem Installationshandbuch für Ihr Gerät bestimmt, das dem Gerät beiliegt. Entnehmen Sie bitte alle weiteren Informationen dem Handbuch (Installations- oder Konfigurationshandbuch o. Ä.) für Ihr spezifisches Gerät.

Figyelem! FONTOS BIZTONSÁGI ELŐÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található.

Megjegyzés ŐRIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Megjegyzés Ezt a dokumentációt a készülékhez mellékelt üzembe helyezési útmutatóval együtt kell használni. További tudnivalók a mellékelt Üzembe helyezési útmutatóban (Installation Guide), Konfigurációs útmutatóban (Configuration Guide) vagy más dokumentumban találhatók.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Per le traduzioni delle avvertenze riportate in questo documento, vedere le avvertenze di sicurezza che accompagnano questo dispositivo.

Nota CONSERVARE QUESTE ISTRUZIONI

Nota La presente documentazione va usata congiuntamente alla guida di installazione specifica spedita con il prodotto. Per maggiori informazioni, consultare la Guida all'installazione, la Guida alla configurazione o altra documentazione acclusa.

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette varselssymbolet betyr fare. Du befinner deg i en situasjon som kan forårsake personskade. Før du utfører arbeid med utstyret, bør du være oppmerksom på farene som er forbundet med elektriske kretssystemer, og du bør være kjent med vanlig praksis for å unngå ulykker. For å se oversettelser av advarslene i denne publikasjonen, se de oversatte sikkerhetsvarslene som følger med denne enheten.

Merk TA VARE PÅ DISSE INSTRUKSJONENE

Merk Denne dokumentasjonen skal brukes i forbindelse med den spesifikke installasjonsveiledningen som fulgte med produktet. Vennligst se installasjonsveiledningen, konfigureringsveiledningen eller annen vedlagt tilleggsdokumentasjon for detaljer.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. O utilizador encontra-se numa situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha em atenção os perigos envolvidos no manuseamento de circuitos eléctricos e familiarize-se com as práticas habituais de prevenção de acidentes. Para ver traduções dos avisos incluídos nesta publicação, consulte os avisos de segurança traduzidos que acompanham este dispositivo.

Nota GUARDE ESTAS INSTRUÇÕES

Nota Esta documentação destina-se a ser utilizada em conjunto com o manual de instalação incluído com o produto específico. Consulte o manual de instalação, o manual de configuração ou outra documentação adicional inclusa, para obter mais informações.

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Vea las traducciones de las advertencias que acompañan a este dispositivo.

Nota GUARDE ESTAS INSTRUCCIONES

Nota Esta documentación está pensada para ser utilizada con la guía de instalación del producto que lo acompaña. Si necesita más detalles, consulte la Guía de instalación, la Guía de configuración o cualquier documentación adicional adjunta.

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal 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 vanliga förfaranden för att förebygga olyckor. Se översättningarna av de varningsmeddelanden som finns i denna publikation, och se de översatta säkerhetsvarningarna som medföljer denna anordning.

OBS! SPARA DESSA ANVISNINGAR

OBS! Denna dokumentation ska användas i samband med den specifika produktinstallationshandbok som medföljde produkten. Se installationshandboken, konfigurationshandboken eller annan bifogad ytterligare dokumentation för närmare detaljer.

Предупреждение ВАЖНЫЕ СВЕДЕНИЯ ПО БЕЗОПАСНОСТИ

Этот символ предупреждает о наличии опасности. При неправильных действиях возможно получение травм. Перед началом работы с любым оборудованием необходимо ознакомиться с ситуациями, в которых возможно поражение электротоком, и со стандартными действиями для предотвращения несчастных случаев. Переведенный текст предупреждений содержится в соответствующем документе, поставляемом вместе с устройством.

Примечание **СОХРАНЯЙТЕ ЭТУ ИНСТРУКЦИЮ**

Примечание Эта инструкция должна использоваться вместе с руководством по установке конкретного изделия, входящим в комплект поставки. Дополнительные сведения см. в руководстве по установке, руководстве по настройке и другой документации, поставляемой с изделием.

警告 有关安全的重要说明

这个警告符号指有危险。您所处的环境可能使身体受伤。操作设备前必须意识到电流的危险性，务必熟悉操作标准，以防发生事故。如果需要了解本说明中出现的警告符号的译文，请参阅本装置所附之安全警告译文。

注意 保存这些说明

注意 本文件应与本产品附带的具体安装说明一并阅读。如欲了解详情，请参阅《安装说明》、《配置说明》或所附的其他文件。

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止対策に留意してください。このマニュアルに記載されている警告の各国語版は、装置に付属の「Translated Safety Warnings」を参照してください。

注 これらの注意事項を保管しておいてください。

注 この資料は、製品に付属のインストレーション ガイドと併用してください。詳細は、インストレーション ガイド、コンフィギュレーション ガイド、または添付されているその他のマニュアルを参照してください。

**Warning**

This equipment must be grounded. 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.

(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.)

**Warning**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2)

while the housing is open.

(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.)



Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded.

(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.)

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 where 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 3300 W AC PEMs 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.

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 rack-mount.
- 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 is to 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 (Mohm).

Technical Specifications

Table 5 lists the specifications for the 3300 W AC PEM.

Table 5 Cisco uBR10012 3300 W AC PEM Specifications

| Description | Specifications |
|-----------------------------|--|
| Product order number | <ul style="list-style-type: none"> UBR10-PWR-AC-PLUS (Primary) UBR10-PWR-AC-PLUS= (Spare) |
| Dimensions | <ul style="list-style-type: none"> Height: 19.4 in. (49.3 cm) Width: 6 in. (15.2 cm) Depth: 5 in. (12.7 cm) |
| Weight | 19 lbs (8.64 kg) |
| AC-input Voltage Rating | 200–240 VAC (50 or 60 Hz) Note 100–120 VAC operation is not supported. |
| AC operating Voltage Rating | 180–255 VAC (50 or 60 Hz) Note 100–120 VAC operation is not supported. |
| AC-input Current Rating | 16 Amps |
| DC-output Voltage | 57.5 VDC nominal 59.0 VDC maximum |
| DC-output Current | 58 A nominal 59 A maximum |
| Power Output | 3300 W maximum |
| Temperature Range | <ul style="list-style-type: none"> Operating: 41° to 104° F (5° to 40° C) Storage: –40° to 158° F (–40° to 70° C) |
| Relative Humidity | <ul style="list-style-type: none"> Operating: 5% to 85%, non-condensing Storage: 5% to 95%, non-condensing |
| Operating Altitude | –197 to 13,693 feet (–60 to 4000 m) |

Unpacking and Preparing the 3300 W AC PEM

Prerequisites

No prerequisites exist for this task.

Required Tools and Equipment

- 3300 W AC PEM module (UBR10-PWR-AC-PLUS=)
- ESD-preventive wrist strap

Steps

To unpack the 3300 W AC PEMs:

-
- | | |
|---------------|--|
| Step 1 | Open the shipping carton by cutting the packing tape along the flaps on the top of the box. |
| Step 2 | Remove the PEM from the packaging and place it on an antistatic surface. |
| Step 3 | Retain the packaging and the carton to return the module to the factory if it is found defective. For more information, see the “Obtaining Documentation and Submitting a Service Request” section on page 33. |
-

What to do next

After performing this step, install the AC PEM modules, see [“Installing the AC Power Entry Modules in the Chassis”](#) section on page 16.

Installing the AC Power Entry Modules in the Chassis

This section presents the following topics:

- [Installing the AC Power Entry Modules, page 16](#)
- [Connecting the AC Power Cables on the AC Power Entry Modules, page 19](#)
- [Powering On the AC Power Entry Module, page 22](#)

Installing the AC Power Entry Modules

Prerequisites

- Do not use the DC terminal blocks when you are using the AC PEMs. Verify that the DC terminal blocks are not connected to any wires before proceeding with the installation.
- Ensure that you attach ferrite beads on the alarm cables or the grounding cables before you proceed to install the AC PEM modules in the chassis. You cannot access the alarm cables or grounding cables after the PEMs are installed in the chassis. For information about attaching the ferrite beads, see [Cisco uBR10012 Broadband Router - Quick Start Guide](#).
- If you are installing the AC PEM module (spare) in an existing Cisco uBR10012 router chassis, ensure that the PRODUCT ID LED/switch activation status is in accordance with the Cisco IOS Release running on the chassis (see [Table 3](#)).

Required Tools and Equipment

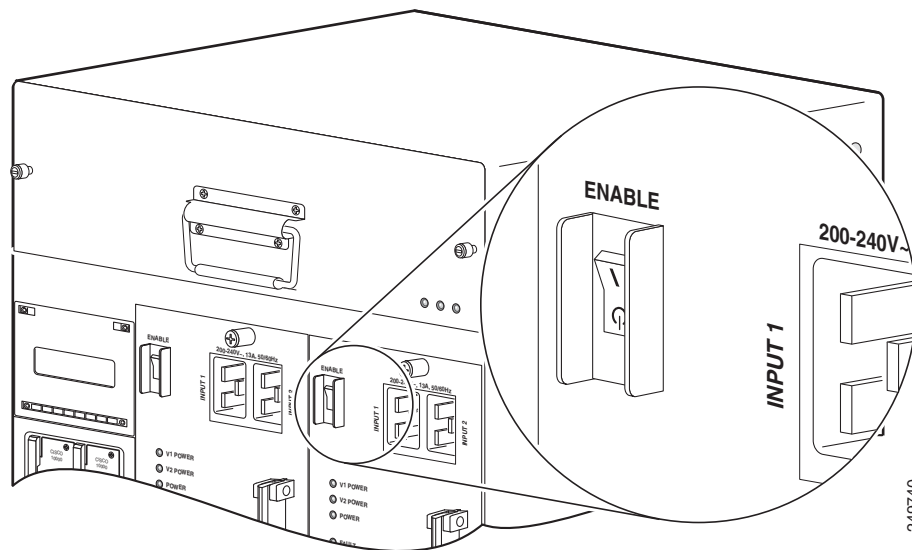
- 3300 W AC PEM module (UBR10-PWR-AC-PLUS=)
- Flat-head screwdriver

Steps

To install the AC PEM module on the Cisco uBR10012 router:

-
- Step 1** Ensure that the Cisco IOS Release running on the Cisco uBR10012 router supports the PRODUCT ID LED/switch feature.
- Step 2** Verify that the power switch on the AC PEM is set to the Standby (0) position (see [Figure 4](#)).

Figure 4 AC Power Switch in Standby Position

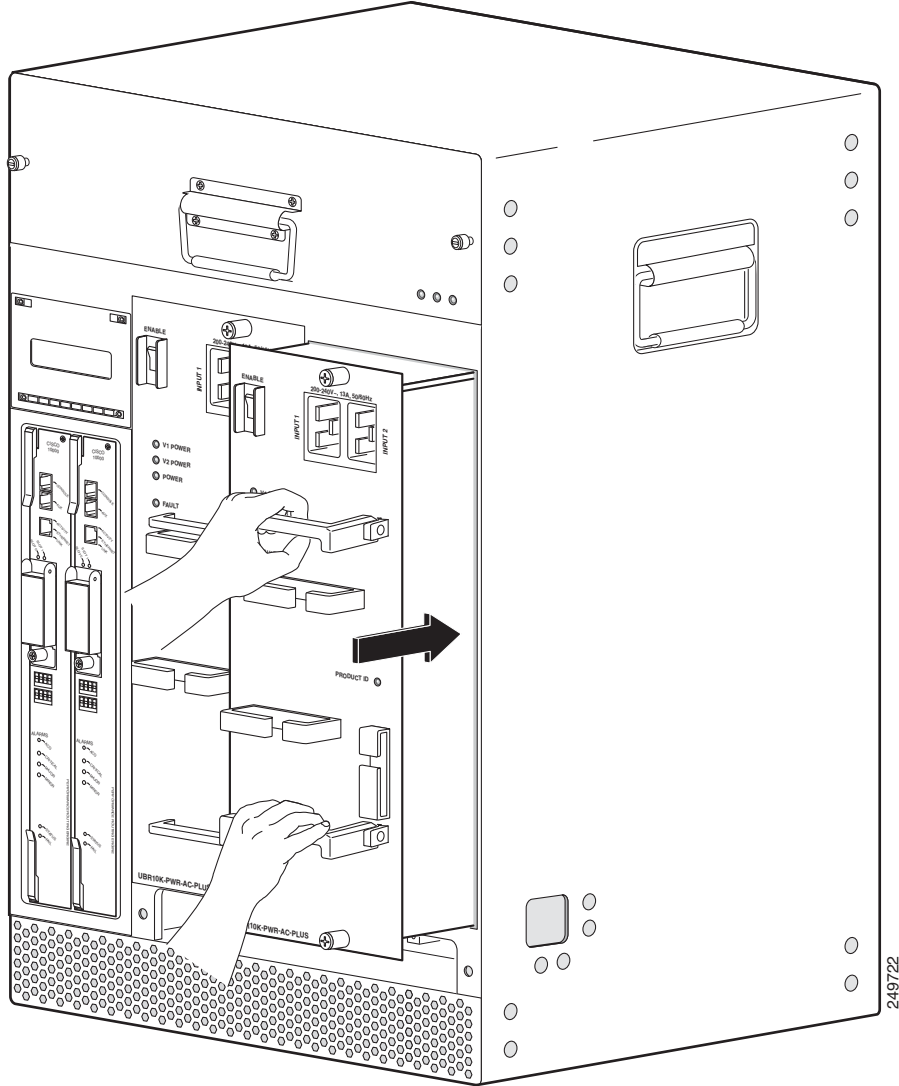


Caution

Do not connect power to the AC power sources or apply power to the chassis. This is done as part of the system startup after all connections are made.

- Step 3** Position the AC PEM in the power bay and slide it all the way in, and ensure that it makes a secure connection with the chassis backplane (see [Figure 5](#)).

Figure 5 Installing the 3300 W AC PEM



Step 4 Tighten the captive screws to secure the AC PEM using a screwdriver.



Note To tighten the captive screws on the AC PEM modules, the installation torque used should be 8 in-lbs.

Step 5 Repeat [Step 1](#) to [Step 4](#) to install the second AC PEM module.

What to do next

After performing this task, connect the AC power cables, see [“Connecting the AC Power Cables on the AC Power Entry Modules”](#) section on page 19.

Connecting the AC Power Cables on the AC Power Entry Modules

Prerequisites

No prerequisites exist for this task.

Required Tools and Equipment

- AC power cables
- Front cover (U-CHAS-COVER-PLUS=)

Steps

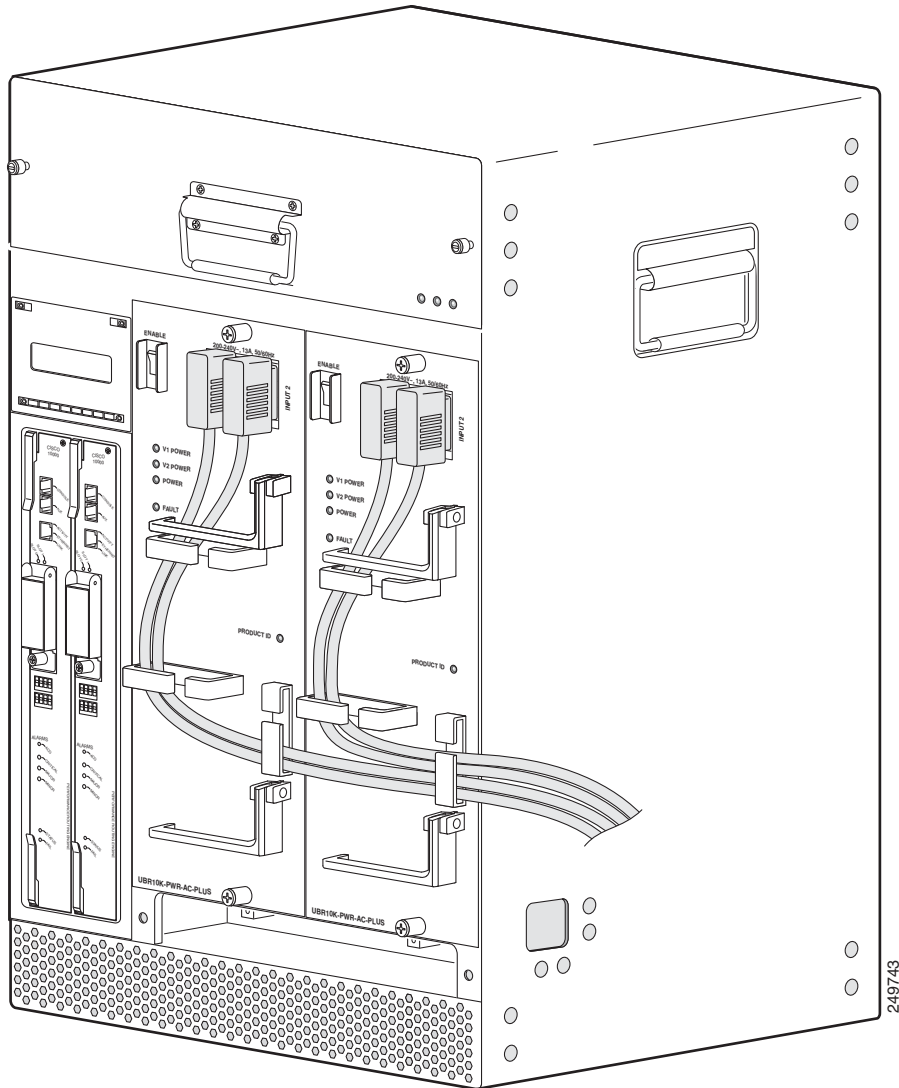
To connect the AC power cables on the 3300 W AC PEM modules:

-
- Step 1** Plug the AC-input power cables into the power receptacles on the front of each AC PEM module.
- Step 2** Route the power cables down to the front of the AC PEM modules and clip it down into the three retaining clips. (See [Figure 6](#).)



Note Ensure that you lift the handles and route the cables underneath the handles and through the power cord clips of the AC PEM modules as shown in [Figure 6](#) so that the front cover fits on the Cisco uBR10012 chassis.

Figure 6 Routing the AC Cables on the UBR10-PWR-AC-PLUS= Module



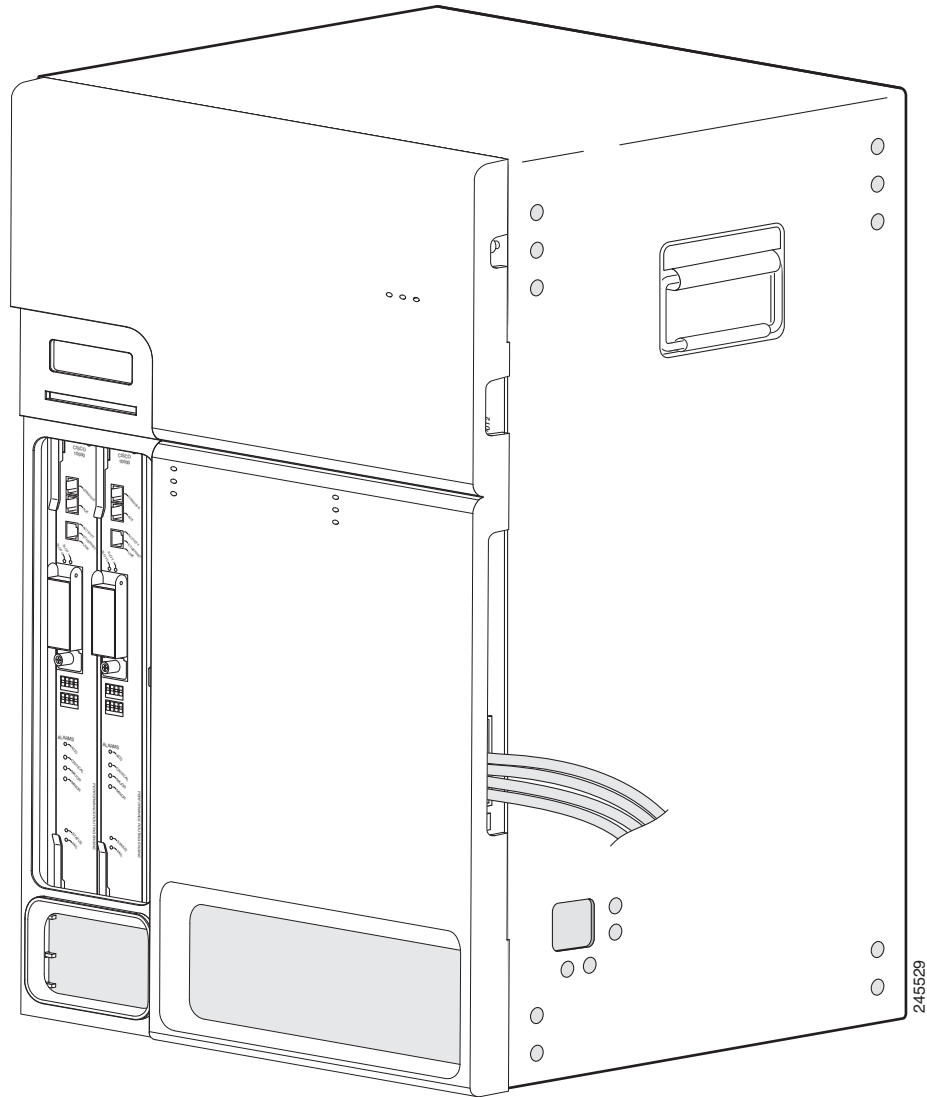
- Step 3** Install the front cover (U-CHAS-COVER-PLUS=) on the 3300 W AC PEM modules for proper routing of the AC cables. If you are using the front cover (UBR10-CHAS-COVER=) that is used with the 2400 W PEM modules, note that this front cover will not fit the chassis with the 3300 W PEMs installed, due to the routing of the AC power cables.



Note The front cover (U-CHAS-COVER-PLUS=) is designed for the 3300 W AC PEM modules with notches on the sides such that the AC power cables route through it, and the front cover fits the Cisco uBR10012 router.

- Step 4** Route the cables through the notch provided on the right side of the front cover. [Figure 7](#) shows the AC power cables routed from the modules going out through the notch on the right side of the front cover when it is installed.

Figure 7 Routing of the AC Cables Through the Front Cover



What to do next

After performing this task, power on the AC PEM module, see [“Powering On the AC Power Entry Module”](#) section on page 22.

Powering On the AC Power Entry Module

Prerequisites

Ensure that the AC power cables are plugged into the power receptacles, see [“Connecting the AC Power Cables on the AC Power Entry Modules”](#) section on page 19.

Required Tools and Equipment

No tools or equipment is needed.

Steps

To power-on the 3300 W AC PEM module:

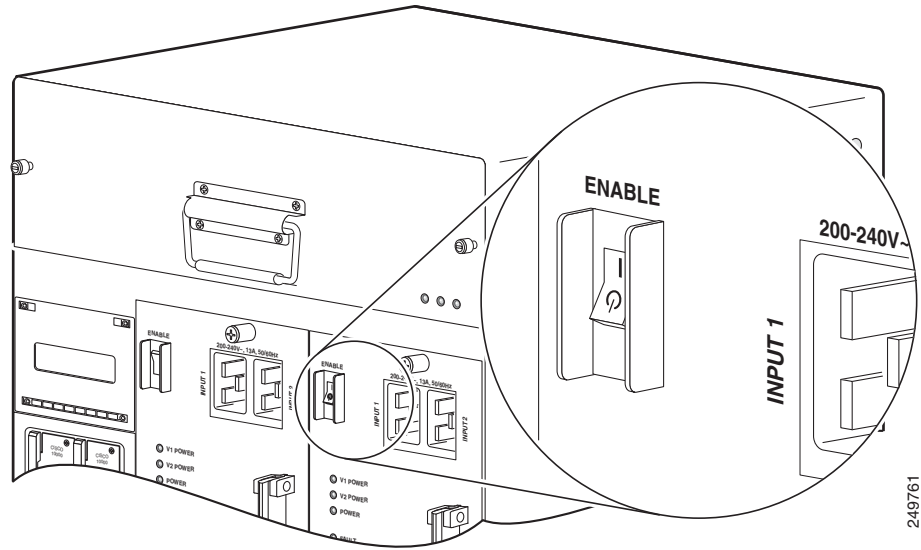
-
- Step 1** Connect the AC power cables to the facility power sources.
 - Step 2** Remove any tape from the circuit breaker switch handle.
 - Step 3** Power on the power source that is supplying the AC power for the chassis.

**Note**

The internal fans of the AC PEM module start working and are audible as soon as the AC-input power cables are connected to the facility power source and the facility power is turned on, although the AC power enable switch is in Standby (0) position.

- Step 4** After powering on the AC power source, verify the LEDs on the AC PEMs.
The V1 POWER and V2 POWER LEDs on each PEM should illuminate (green). These LEDs only indicate that an input voltage is present on the PEMs and not that the PEM is powered on. In addition, the FAULT LED on each PEM illuminates (yellow). If the FAULT LED on the PEMs do not illuminate (yellow), see the [“Troubleshooting the 3300 W AC PEM”](#) section on page 31.
- Step 5** Set the power enable switch on the AC PEMs to the ENABLE (I) position (see [Figure 8](#)).

Figure 8 AC Power Switch in ENABLE Position



249761

- Step 6** Verify that the following LEDs are illuminated properly.
- The V1 POWER and V2 POWER LEDs on each PEM are illuminated (green). In addition, the POWER LED on each PEM is illuminated (green) indicating that power is being received and is being delivered to the chassis.
 - If the FAULT LED illuminates (yellow), see the [“Troubleshooting the 3300 W AC PEM” section on page 31](#).
 - If you are running a Cisco IOS Release that supports the PRODCUT ID LED/switch feature, verify that the PRODUCT ID LED/switch illuminates (green).



Note If you are running a Cisco IOS Release that does not support the PRODUCT ID LED feature, ensure that the PRODUCT ID LED/switch is not illuminated. For information on Cisco IOS Releases that support the PRODUCT ID LED/switch feature, see [Cisco uBR10012 Router Release Notes for Cisco IOS Release 12.2\(33\)SCE](#).

Removing and Replacing a 3300 W AC PEM



Note If a 3300 W AC PEM fails, order and install a replacement 3300 W AC PEM as soon as possible. The product order number for a replacement 3300 W AC PEM is UBR10-PWR-AC-PLUS=. For proper airflow, cooling, and safety, do not remove the failed unit until the replacement unit is available for installation.

This section contains information on removing and replacing 3300 W AC PEM modules in the Cisco uBR10012 router chassis.



Tip The 3300 W AC PEM is operating correctly when its POWER LED is illuminated (green). When the FAULT LED is illuminated (yellow), the AC PEM is receiving AC-input power but is not providing power to the system. Verify that the AC PEM is fully inserted into the power bay and that its captive screws have been tightened. Then, set the AC power enable switch on the 3300 W AC PEM to the Standby (0) position, wait several seconds, and then switch it to the ENABLE position. If the FAULT LED does not go off and the POWER LED does not illuminate (green), replace the 3300 W AC PEM.

This section represents the following topics:

- [Replacing a Redundant 3300 W AC PEM, page 25](#)
- [Replacing Both 3300 W AC PEMs, page 27](#)

Replacing a Redundant 3300 W AC PEM

This procedure is needed when the FAULT LED is illuminated (yellow) and the troubleshooting steps in the [“Troubleshooting the 3300 W AC PEM”](#) section on page 31 do not correct the problem.

Prerequisites

No prerequisites exist for this task.

Required Tools and Equipment

- Replacement AC PEM module (UBR10-PWR-AC-PLUS=)
- Flat-head screwdriver

Steps



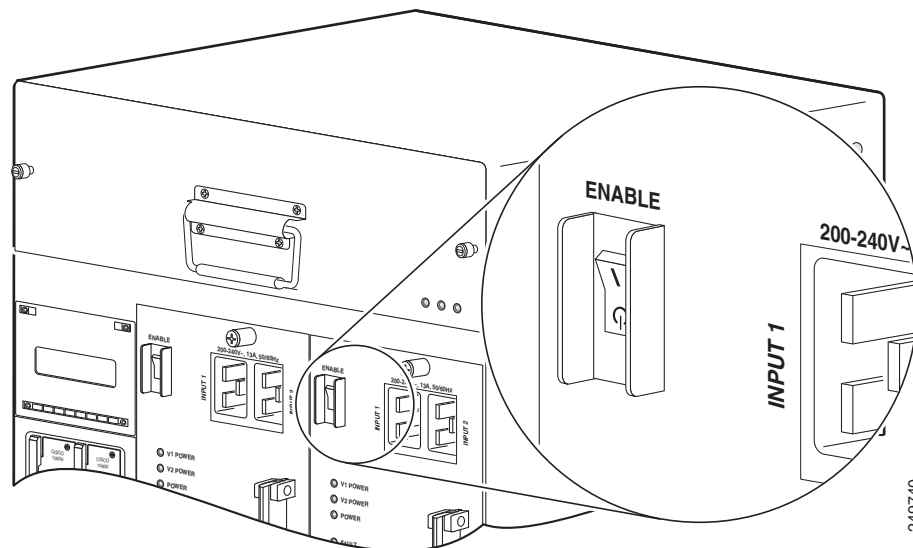
Tip

If you want to replace both 3300 W AC PEMs without shutting down the router, repeat this procedure for each AC PEM, one at a time. Do not use this procedure if both 3300 W AC PEMs have failed; instead, use the procedure in the [“Replacing Both 3300 W AC PEMs”](#) section on page 27.

To replace and install a redundant 3300 W AC PEM module:

- Step 1** Remove the front cover by lifting it up slightly and then pulling it towards you.
- Step 2** Turn off the 3300 W AC PEM you are replacing by positioning the AC power enable switch to the Standby (0) position (see [Figure 9](#)).

Figure 9 AC Power Switch in Standby Position




Caution

Do not power off both 3300 W AC PEMs because it will cause the system to shut down and all data traffic to stop. Power off only the 3300 W module you are replacing.

Step 3

Unplug the AC-input power cables from the AC power receptacles on the front panel of the AC PEM. For safety, also unplug the other end of the power cables from the AC-input power source.

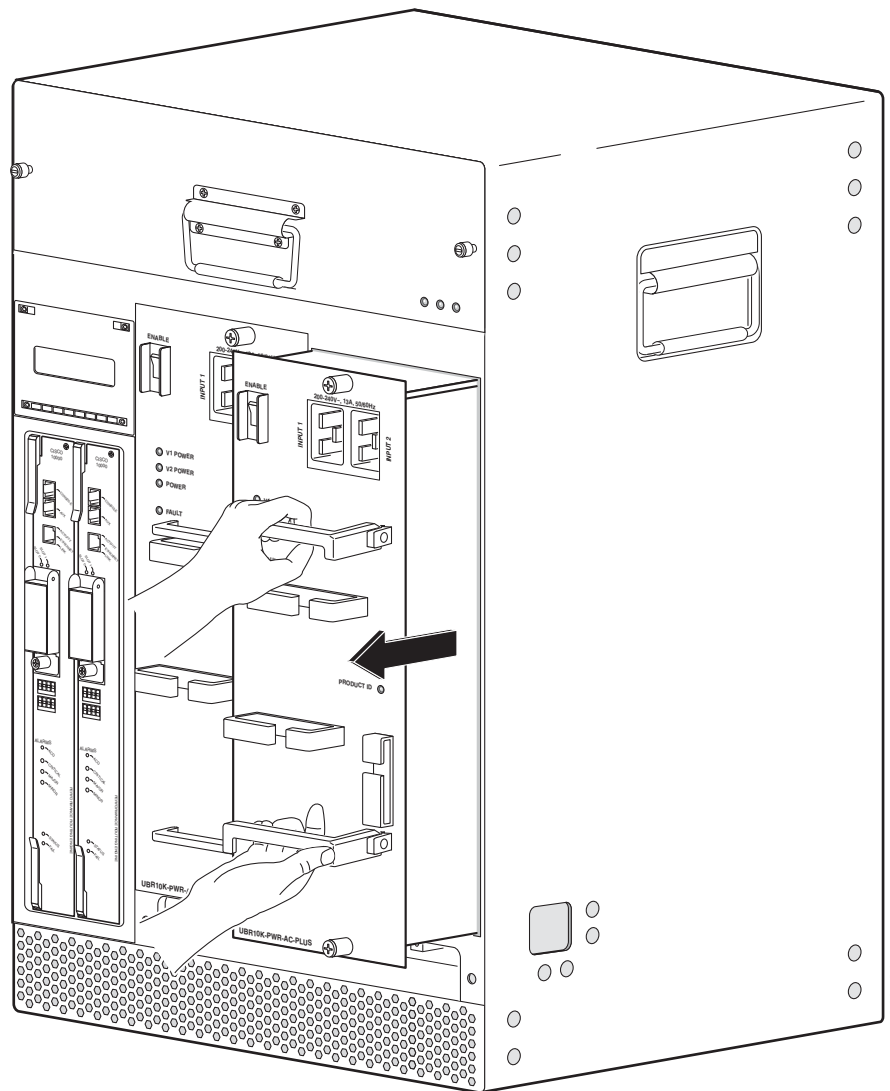

Tip

For true redundant power protection, ensure that you are using separate AC-input power sources for each 3300 W AC PEM.

Step 4

Use a screwdriver to loosen the captive screws on the 3300 W AC PEM you are removing. Then pull the PEM from the chassis by using the handles on the faceplate (see [Figure 10](#)). Set the removed 3300 W AC PEM aside on an antistatic mat.

Figure 10 Removing the AC PEM



249721

- Step 5** Verify that the AC power enable switch on the replacement 3300 W AC PEM is in the Standby (0) position.
- Step 6** Install the replacement 3300 W AC PEM in the power bay, see [“Installing the AC Power Entry Modules” section on page 16](#).
- Step 7** Plug the AC-input power cables into the AC power receptacles on the front panel of each AC PEM, see [“Connecting the AC Power Cables on the AC Power Entry Modules” section on page 19](#).



Note The two AC power cables must be connected and powered on for the AC PEM to function.

- Step 8** Plug the other end of the AC-input power cables into a 200–240 VAC power outlet, see [“Powering On the AC Power Entry Module” section on page 22](#).
-

Replacing Both 3300 W AC PEMs



Note The illustrations for this procedure are identical to the illustrations in the [“Replacing a Redundant 3300 W AC PEM” section on page 25](#) and therefore not repeated.

Prerequisites

This procedure is needed only when you need to move the chassis or reinstall it in another location.

Required Tools and Equipment

- AC PEM modules (UBR10-PWR-AC-PLUS=)
- Flat-head screwdriver

Steps

To replace both the 3300 W AC PEM modules:

- Step 1** Remove the front cover.
- Step 2** Shut down the system using the following procedure:
- Notify appropriate personnel that you plan to shut down the system and that the shutdown will result in total loss of service. Appropriate personnel includes the regional alarm or network monitoring center, central office personnel, and key customers.
 - Before you shut down the router, use the **copy** command to save any configuration changes to the NVRAM and, if you want, to a PCMCIA Flash memory card. For instructions about using the **copy** command, see the [Cisco uBR10012 Universal Broadband Router Software Configuration Guide](#).
 - Set the AC power enable switch on each AC PEM to the Standby (0) position.
- Step 3** Unplug the AC-input power cables from the power receptacles on the front panel of each 3300 W AC PEM. For safety, also unplug the other end of the power cables from each AC-input power source.

- Step 4** Use the screwdriver to loosen the captive screws on each 3300 W AC PEM. Then pull each AC PEM from the chassis by using the handles on the faceplate. Set the two AC PEMs aside on an antistatic mat.
- Step 5** Verify that the AC power enable switch on each replacement 3300 W AC PEM is in the Standby (0) position.
- Step 6** Install the first replacement 3300 W AC PEM in the power bay, see [“Installing the AC Power Entry Modules” section on page 16](#).
- Step 7** Install the second replacement 3300 W AC PEM in the power bay, see [“Installing the AC Power Entry Modules” section on page 16](#).



Caution

Although one 3330 W AC PEM can supply sufficient power for a fully configured chassis, we recommend that you run the Cisco uBR10012 router with two 3300 W AC PEMs installed, because this provides redundant power support.

- Step 8** Plug the AC-input power cables into the AC power receptacles on the front panel of each AC PEM, see [“Connecting the AC Power Cables on the AC Power Entry Modules” section on page 19](#).



Note

The two AC power cables must be connected and powered on for the AC PEM to function.

- Step 9** Plug the other end of the AC-input power cables into a 200–240 VAC power outlet, see [“Powering On the AC Power Entry Module” section on page 22](#). For a fully redundant operation, each 3300 W AC PEM should use separate power sources, or you should be using an uninterruptible power supply (UPS).
-

Migrating from the 2400 W AC PEM to the 3300 W AC PEM

This section describes the steps for a seamless migration from the 2400 W AC PEM modules to the 3300 W AC PEM modules.

Prerequisites

- The 3300 W AC PEM module requires two AC power cables to be installed on each PEM module as against the single AC power cable for the 2400 W AC PEM module.
- The routing of the AC power cables for the 3300 W AC PEM is different from the routing of the AC power cable for the 2400 W AC PEM. If you are using an existing AC power cable, the installation should be examined prior to migration for proper cable routing.
- The U-CHAS-COVER-PLUS= front cover must be used with the Cisco uBR10012 chassis with the 3300 W AC PEMs.

**Note**

You do not need to shut down the Cisco uBR10012 router to replace a 2400 W AC PEM module with a 3300 W AC PEM module. To avoid shutting down the Cisco uBR10012 router, you must replace one 2400 W AC PEM at a time; bring the 3300 W AC PEM module online, and then replace the other 2400 W AC PEM module.

Required Tools and Equipment

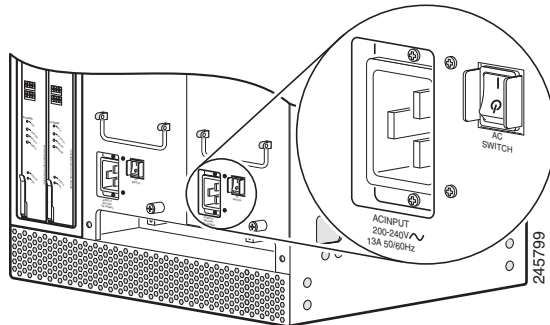
- 3300 W AC PEM module (UBR10-PWR-AC-PLUS=)
- 2400 W AC PEM module (UBR10-PWR-AC=)
- Two AC power cables
- Front cover (U-CHAS-COVER-PLUS=)
- Flat-head screwdriver

Steps

To replace the 2400 W AC PEM with the 3300 W AC PEM module:

- Step 1** Remove the front cover on the 2400 W AC PEM modules.
- Step 2** Set the AC power switch to Standby (0) position on one of the 2400 W AC PEM (that is to be removed) modules (see [Figure 11](#)).

Figure 11 AC Power Switch UBR-10-PWR-AC=



- Step 3** Unplug the AC-input power cable from the power plug on the front panel of 2400 W AC PEM module. For safety, also unplug the other end of the power cable from each AC-input power source.
- Step 4** Use a screwdriver to loosen the captive screws on the 2400 W AC PEM that you are removing. Then pull the 2400 W AC PEM from the chassis by using the handles on the faceplate and set the 2400 W AC PEM aside on an antistatic mat.
- Step 5** Verify that the POWER LED on the other 2400 W AC PEM module is illuminated (green) and does not blink.
- Step 6** Position the 3300 W AC PEM in the power bay and slide it all the way in and ensure it makes a secure connection with the chassis backplane, see [“Installing the AC Power Entry Modules” section on page 16](#).
- Step 7** Plug the two AC-input power cables into the power receptacles on the front panel of the 3300 W AC PEM, see [“Connecting the AC Power Cables on the AC Power Entry Modules” section on page 19](#).



Note The two AC power cables must be connected on the 3300 W AC PEM modules for proper functioning of the PEM module.

- Step 8** Plug the other end of the AC-input power cables into a 200-240 VAC power outlet, see [“Powering On the AC Power Entry Module” section on page 22](#).



Note Verify that the V1 POWER and V2 POWER LEDs illuminate (green) on the 3300 W AC PEM module.

- Step 9** Turn the AC power enable switch on the 3300 W AC PEM module to the ENABLE (I) position. The FAULT LED should go off and the POWER LED should illuminate (green).
- Step 10** Verify if the POWER LED illuminates (green) within three seconds on the 3300 W AC PEM module. If the POWER LED on the 3300 W AC PEM remains green and does not blink, it indicates that the migration is successful and the 3300 W AC PEM is now enabled and is supplying power to the chassis.

- Step 11** Repeat [Step 1](#) to [Step 10](#) to replace the second 2400 W AC PEM module with the 3300 W AC PEM module.
- Step 12** Install the U-CHAS-COVER-PLUS= front cover on the 3300 W AC PEM modules.
- Step 13** Route the power cable out through the right side, so that it fits through the notch on the right side of the front cover.
-

Troubleshooting the 3300 W AC PEM

Check the following to help isolate a problem with the 3300 W AC PEM:

- The AC power cables are installed into the AC PEM receptacles and the facility power source is turned on. The AC power enable switch is set to the Standby (0) position.

Check if the AC PEM is receiving power.

- The V1 POWER and V2 POWER LEDs should illuminate (green).

If these LEDs are not illuminated, check the external wiring and facility power source. If the fans are working and are audible, it indicates that the AC PEM is receiving power, so there could be a possibility that the LEDs are not working.

- The FAULT LED should illuminate (yellow).

If this LED is not illuminated, there could be a possibility that the LED is not working, therefore the LED cannot indicate a valid fault on the PEM.

If the above LEDs do not illuminate but you are confident that PEM is receiving power, you can proceed to power on the PEM, see [“Powering On the AC Power Entry Module”](#) section on page 22. Ensure that the POWER LED is not illuminated (green). If this LED is illuminated, the AC PEM should be replaced. See the [“Obtaining Documentation and Submitting a Service Request”](#) section on page 33.

- The AC PEM is powered on, and the V1 POWER and V2 POWER LEDs are illuminated (unless they may not be working, as above). The AC power enable switch on the AC PEM is set to the ENABLE (I) position.
 - The FAULT LED should stop illuminating. If it remains illuminated, the AC PEM should be replaced because this is a valid fault. See the [“Obtaining Documentation and Submitting a Service Request”](#) section on page 33.
 - The POWER LED should illuminate (green). If this LED does not illuminate, and the FAULT LED is not illuminated, there might be a possibility that the POWER LED is not working. You may need to verify if the PEM is providing valid power to the system by checking the AC PEM voltage and current using the Cisco IOS Release running on the router. Contact technical support for assistance, see the [“Obtaining Documentation and Submitting a Service Request”](#) section on page 33.

- The FAULT LED is illuminated (yellow).
 - The FAULT LED illuminates when the PEM module detects an over-voltage or over-current condition, or when the PRE issues the command to shut down the PEM module (this could occur due to overheating). Ensure that none of these conditions exist in the system, and then try to switch the PEM module off and switch it on again.
 - If another PEM module exists in the system that powers up the chassis, and the FAULT LED is not illuminated on that module, then ensure that the PRE does not issue the command to shut down the PEM module.
 - If the problem persists, try another working unit. Else, see the [“Obtaining Documentation and Submitting a Service Request”](#) section on page 33.
- The **show environment** command output displays a DC PEM module instead of AC PEM.

```
Router# show environment

Temperature information:
  Temperature normal: Inlet sensor      measured at 31C/87F
  Temperature normal: Outlet sensor     measured at 35C/95F

Voltage information:
  RP Voltage readings:
  Channel      Margin      ADC Value
  =====
  2.5v         Normal     2.49v
  1.8v         N/A        1.81v
  1.5v         Normal     1.49v
  1.8vFPGA     Normal     1.79v
  1.2v         Normal     1.20v
  3.3v         Normal     3.29v

Fan:                                OK
Power Entry Module 0 type DC status:  OK // DC PEM is displayed //
Power Entry Module 1 type AC status:  OK
```

- Upgrade to a supported Cisco IOS Release and then press the PRODUCT ID LED/switch.
- Reload the software or physically remove the AC PEM module for at least 1 minute and then reinsert it.



Note The **show environment** command provides accurate information on the 3300 W AC PEM if the Cisco uBR10012 router is running a supported Cisco IOS Release. If using an earlier Cisco IOS release, the **show environment** command will not correctly identify the error messages of the 3300 W AC PEM.

- If none of the above suggestions correct the problem, the 3300 W AC PEM could be faulty. Contact technical support for assistance, see [“Obtaining Documentation and Submitting a Service Request”](#) section on page 33.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: <http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

This document is to be used in conjunction with the Cisco uBR10000 Series Universal Broadband Router Hardware Installation Guide.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

Copyright ©2011, Cisco Systems, Inc.

All Rights Reserved.

