



# Short User Guide for the Cisco cBR Series Converged Broadband Routers

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## Conventions

This document uses the following conventions:



### Note

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

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### Caution

Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

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### 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. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.**

## SAVE THESE INSTRUCTIONS

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# Product Description

The Cisco cBR Series Converged Broadband Router (Cisco cBR) is an Edge Services platform designed for cable MSOs. It supports the RF and Data-over-Cable Service Interface Specifications (DOCSIS) interfaces of a Cable Modem Termination System (CMTS) and digital optical interfaces such as Passive Optical Networks (PON) and point-to-point Ten Gigabit Ethernet.

## Product Characteristics

### Front Panel

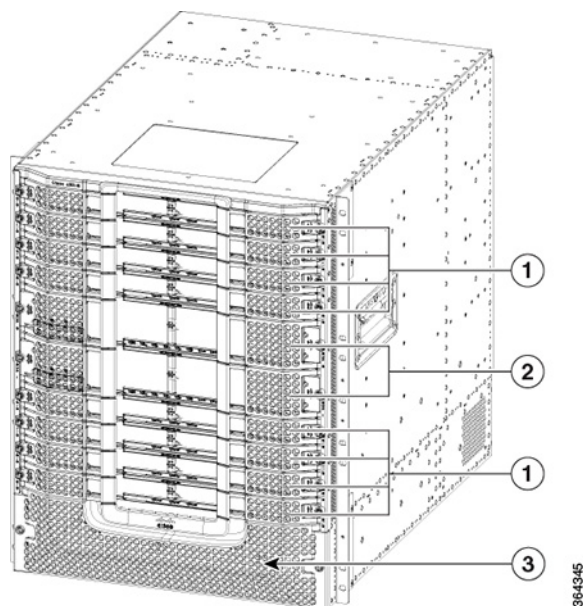
- Eight RF line cards
- Two Supervisor Cards
- One power entry bezel
- Two USB Type A connectors
- One USB mini-Type B (console) port
- LEDs

**Note**

For detailed information on these, see the installation guide at:

<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

**Figure 1** *Cisco cBR-8 Router Front Panel (Shown as an Example)*



<b>1</b>	RF Line Cards	<b>3</b>	Front Power Entry Bezel
<b>2</b>	Supervisor Cards		—

## Back Panel

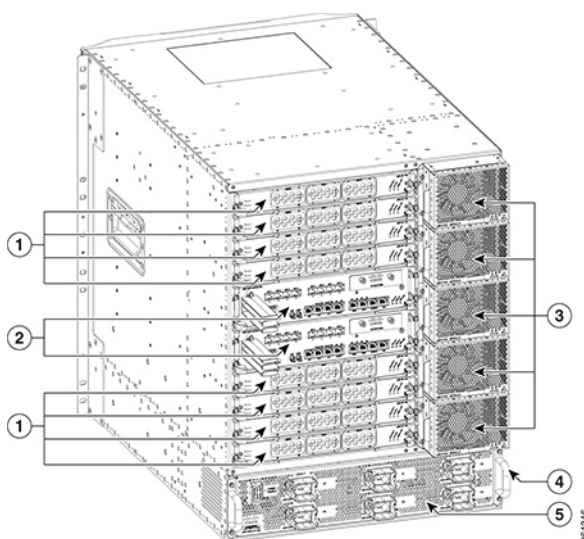
- Eight RF PICs
- Two Supervisor PICs
- Six DC Power Modules with redundant input feeds or six AC Power Modules
- Five Fan Modules
- LEDs
- Two Timing ports (one 1 PPS and one 10 MHz)
- One Console port
- One Auxiliary port
- One GPS port
- One CM/DTP port
- Two DTI ports
- Two NME ports
- Eight SFP+ ports



### Note

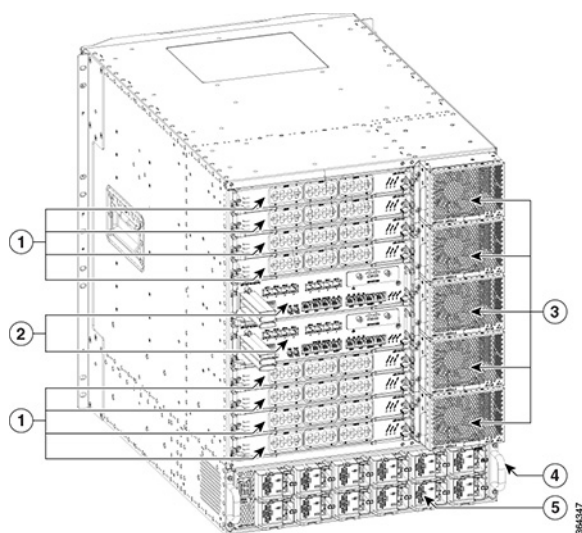
For detailed information on these, see the router installation guide at:  
<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

**Figure 2** Cisco cBR-8 Router Rear Panel with AC FPEM (Shown as an Example)



1	RF Line Card PIC	4	Lifting Handle
2	Supervisor PIC	5	AC FPEM
3	Fan Module		—

**Figure 3** Cisco cBR-8 Router Rear Panel with DC FPEM (Shown as an Example)



1	RF Line Card PIC	4	Lifting Handle
2	Supervisor PIC	5	DC FPEM
3	Fan Module		—

## Power System

The Cisco cBR chassis is powered using AC or DC power inputs. The power system consists of the following modules:

- Power Cassette Module
- AC or DC Facility Power Entry Modules (FPEM)
- AC or DC Power Modules

The Cisco cBR power system supports:

- Load sharing between the Power Modules
- N+1 redundancy for the DC power systems, and N+1 or 1+1 redundancy for the AC power systems
- Online Insertion and Removal (OIR)

The Cisco cBR-8 Converged Broadband Router (cBR-8) supports:

- One Power Cassette Module: Provides the physical support and keying for the Power Modules. It is keyed with a corresponding FPEM to determine AC or DC support.
- One FPEM: A field replaceable that allows the facility to change from AC to DC power, or vice versa, without replacing the chassis.
- Six Power Modules: Provides the power conversion, filtering, and conditioning from facility input power to the required -52 V midplane power that is used within the chassis. Both AC and DC Power Modules are available depending on the facility input voltage. These modules have internal fans for cooling.

For more information on the power supplies, see the router installation guide on Cisco.com at: <http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

## Specifications

**Table 1** *Cisco cBR Router Specifications*

Description	Specification
Physical Specifications	Height: 13RU (22.75 in./57.78 cm) Width: 17.45 in. (44.32 cm) (no rack mounts) 17.65 in. (44.83 cm) with rack mounts installed. Overall Depth: 28.075 in. (71.3 cm) Weight: 429 lb (195 kg) maximum fully loaded
Environmental Specifications	Operating temperature (nominal): 32 to 104°F (0 to 40°C) sea-level Operating humidity (nominal) (relative humidity): 5 to 85% Operating humidity (short-term): 5 to 90% Note: Not to exceed 0.024 kg water per 1 kg of dry air Storage temperature: -40 to 158°F (-40 to 70°C) Storage (relative humidity): 5 to 95% Note: Not to exceed 0.024 kg water per 1 kg of dry air. Operating altitude: -60 to 4000m

For more information on the router specifications, see the router data sheet on Cisco.com at: <http://www.cisco.com/c/en/us/products/collateral/video/cbr-8-converged-broadband-router/datasheet-c78-733099.html>.

## Installing the Router

The Cisco cBR-8 router can be either mounted on the rack at the front or in the middle. Also, the router can be either mounted on a standard 19-inch wide four-post equipment rack unit or a two-post rack unit.



### Note

The Cisco cBR-8 router usually ships fully loaded. Due to a fully configured system weighing approximately 430 lbs, components must be removed from the chassis to make the chassis lighter for rack installation. Remove all power supplies, supervisor cards, line cards, rear PIC cards and fan modules before rack-mounting to reduce the weight to approximately 117 lbs. For instructions on how to remove the components, see the monitoring sections in the router installation guide.

## Equipment That You Need

- Phillips screwdriver to rack-mount the router.

## Before You Begin

To avoid injuring yourself or damaging the equipment, review the Safety Guidelines in Preparing for Installation section in the router installation guide on Cisco.com at:

<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

- Clearance is maintained so that the LEDs on the front panel can be read.
- AC power cord reaches from the AC power outlet to the front-panel connector.
- The router rear panel has a clearance of 11.1 cm.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting. Make sure the cabling is safely away from other devices that might damage the cables. If needed, allow one RU space between devices to provide room for cabling.
- Airflow around the router and through the vents is unrestricted.
- The temperature around the unit does not exceed the specified operating temperature. If the router is in a closed or multitrack assembly, the temperature might be higher than normal room temperature.
- Humidity around the router does not exceed 93 percent.
- Altitude at the installation site is below 4,000 meters.
- For 10/100/1000 fixed ports, cables from the router to connected devices are not longer than 100 meters.
- Cooling mechanisms, such as fans and blowers in the router, can draw dust and other particles causing contaminant buildup inside the chassis, which can result in system malfunction. Install the router in an environment as free as possible from dust and foreign conductive material (such as metal flakes from construction activities).

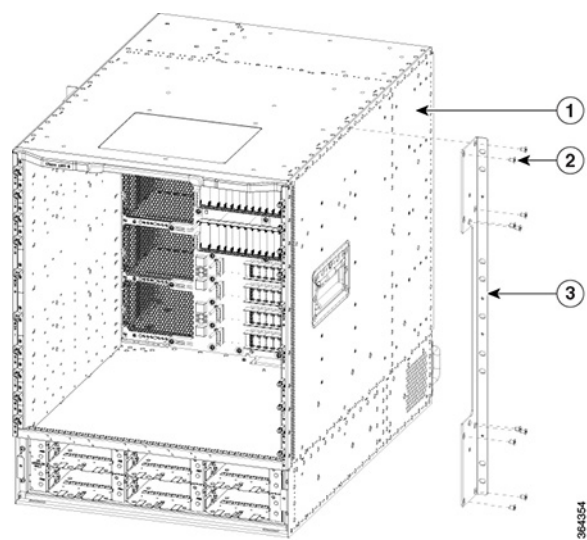
## Installation Warning Statements

Translations of these warning statements appear in the *Regulatory Compliance and Safety Information for the Cisco cBR Series Converged Broadband Router* at

[http://www.cisco.com/c/en/us/td/docs/cable/cbr/regulatory/compliance/cbr\\_rcsi.html](http://www.cisco.com/c/en/us/td/docs/cable/cbr/regulatory/compliance/cbr_rcsi.html).

# Attaching the Brackets

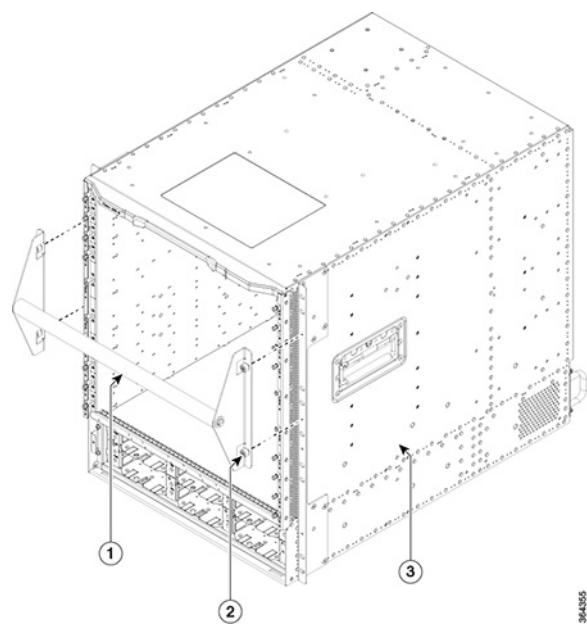
Figure 4      Installing Rack-Mount Bracket



1	Chassis	3	Rack-Mount Bracket
2	M5 undercut flat-head screws		—

# Attaching the Installation Handle (optional)

Figure 5      Attaching the Chassis Installation Handles





<b>1</b>	Chassis Installation Handle	<b>3</b>	Chassis
<b>2</b>	Captive Screw		—

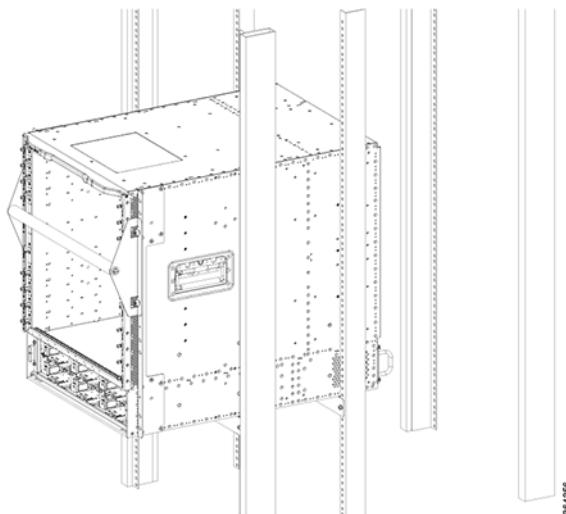
## Rack-Mounting the Router

Rack mount the chassis by securing the rack-mount brackets to two posts or mounting strips in the rack. Use at least four rack-mount screws on each side to fasten the two rack-mount brackets to the rack posts because the rack-mount brackets support the weight of the entire chassis.

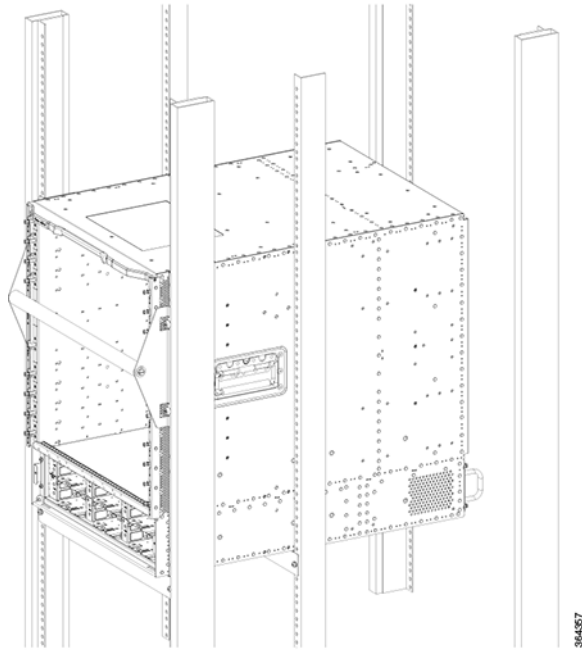
You can install the chassis in either a four-post rack unit or a two-post rack unit.

### Four-Post Rack

**Figure 6** Lifting the Chassis into Position

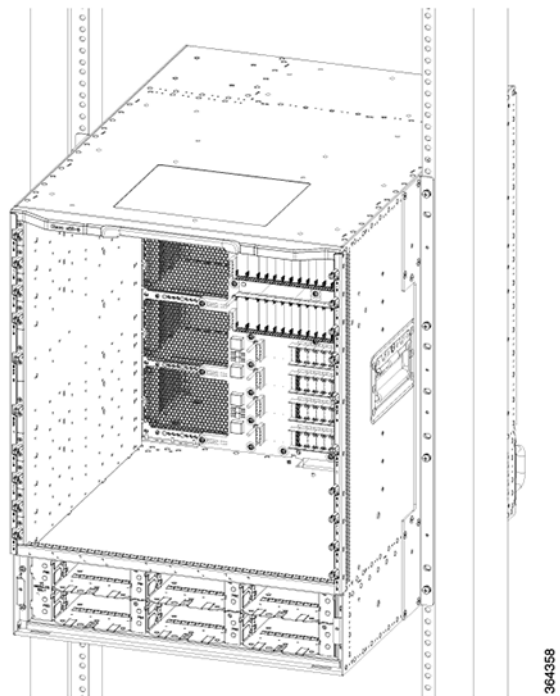


**Figure 7** *Flushing Against Mounting Rails*



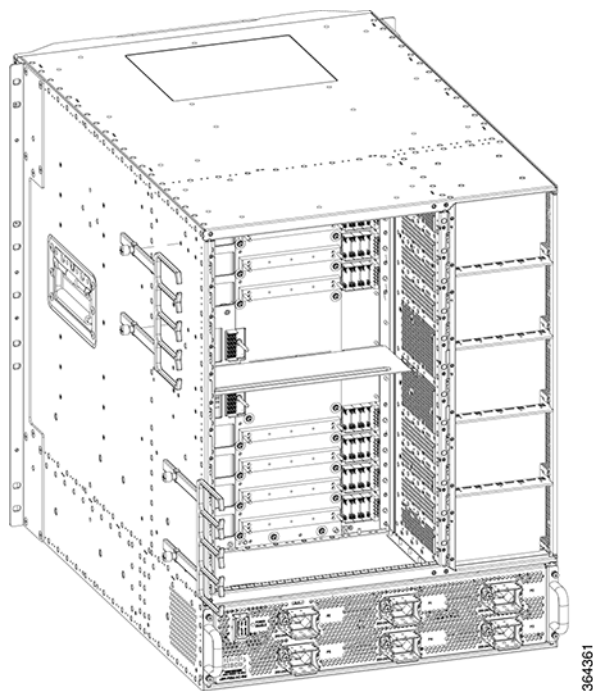
## Two-Post Rack

**Figure 8** *Two-Post Rack Mountings*



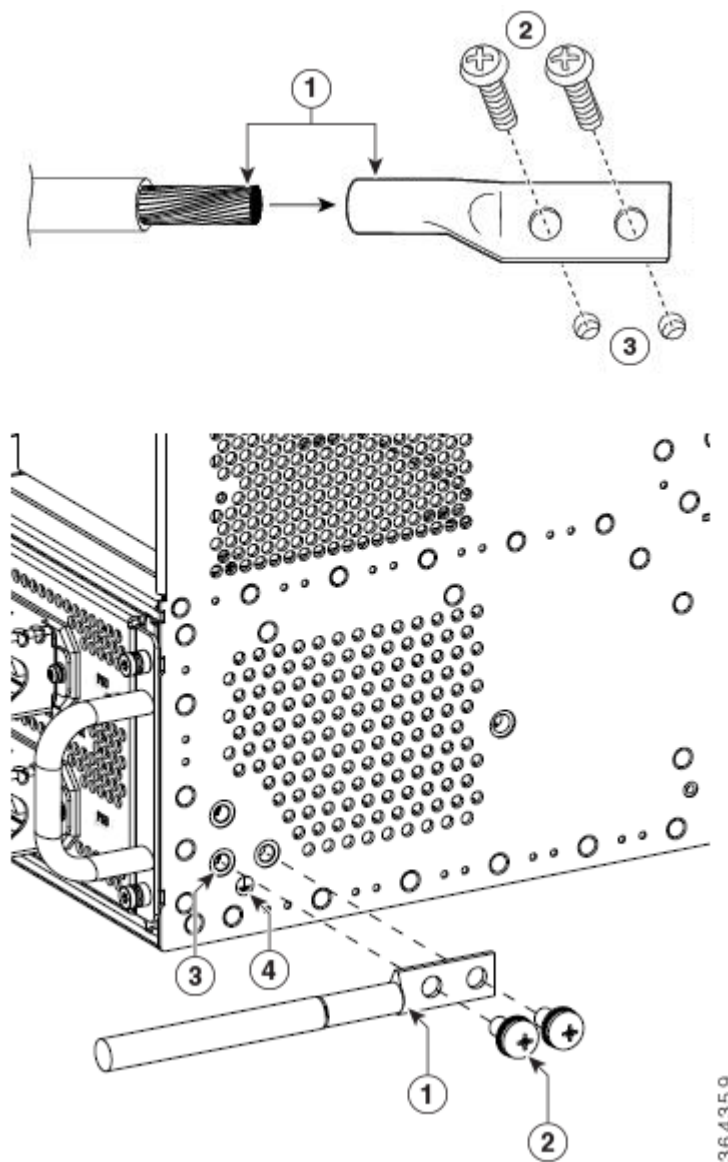
## Installing the Cable-Management Brackets

**Figure 9** *Installing the Cable-Management Brackets*



## Attaching a Chassis Ground Connection

**Figure 10** Chassis Ground Connection



<b>1</b>	Chassis earth ground lug and lead wire	<b>3</b>	Earth ground lug holes on the chassis
<b>2</b>	¼-20 Grounding screws	<b>4</b>	Earth ground symbol

Install the power supplies modules if needed.

# Installing the Power System in the Cisco cBR Chassis

## Installing the Power Cassette Module in the Cisco cBR Chassis

The chassis ships with the Power Cassette Module installed. You may need to install the Power Cassette Module to swap the power system of the chassis.

### Before You Begin



**Warning**

**When you install the module, the chassis ground connection must always be made first and disconnected last. Statement 1046**

Be aware of the weight and size of the equipment. Handle it with care.

### Required Tools and Equipment

- 3/16" flat-blade torque screwdriver
- AC or DC Power Cassette Module
- T10 Torx torque screwdriver

### Procedure

- Step 1** Loosen the two screws on the front power entry bezel using a 3/16" flat-blade torque screwdriver. Remove the front power entry bezel from the chassis.
- Step 2** Remove the four #6-32 Torx-head screws located on the chassis mounting flanges using a T10 Torx torque screwdriver.
- Step 3** Slide the Power Cassette Module into the slot in the chassis until the mounting flanges are fully seated.
- Step 4** Insert the four #6-32 Torx-head screws into the mounting flanges. Tighten the screws using a T10 Torx torque screwdriver with a torque of 8-10 in-lb (0.90-1.13Nm) to secure the module.
- Step 5** Position the front power entry bezel on the chassis. Insert and tighten the two screws using a 3/16" flat-blade torque screwdriver with a torque of 5-7 in-lb (0.56-0.79 Nm) to secure the bezel.

### What to Do Next

- Install the FPIM.
- Install the Power Modules.

## Installing the FPEM in the Cisco cBR Chassis

The chassis ships with the FPEM installed. You may need to install the FPEM to swap the power system of the chassis. Use this procedure to install the following modules in the chassis:

- AC FPEM
- DC FPEM

### Before You Begin

Install the Power Cassette Module.

**Note**

Attach an ESD-preventive wrist strap to your wrist and connect the other end to the grounding lug connected to the chassis.

Be aware of the weight and size of the equipment. Handle it with care.

**Required Tools and Equipment**

- ESD-preventive wrist strap
- AC or DC FPEM
- T10 Torx torque screwdriver

**Procedure**

- Step 1** Remove the four #6-32 Torx-head screws located on the chassis mounting flanges using a T10 Torx torque screwdriver.
- Step 2** Carefully slide the FPEM into the slot using the two handles applying even pressure to both the handles until the FPEM is fully seated in the chassis.

**Caution**

To prevent damage to the midplane connectors, do not use excessive force when inserting the FPEM into the slot.

- Step 3** Insert the four #6-32 Torx-head screws into the mounting flanges. Tighten the screws using a T10 Torx torque screwdriver with a torque of 8-10 in-lb (0.90-1.13Nm) to secure the module.

**What to Do Next**

- For an AC-powered Cisco cBR chassis, connect the AC power.
- For a DC-powered Cisco cBR chassis, connect the DC power.
- Install the Power Modules.

## Installing the Power Module in the Cisco cBR Chassis

The chassis ships with the Power Module already installed. Use this procedure to install the following modules in the chassis:

- AC Power Module
- DC Power Module

**Before You Begin****Note**

We recommend that you wire the chassis for 9 KW of power. If you wire it for less than 9 KW power, you may need to add more power modules while adding new hardware or upgrading the existing hardware.

**Warning**

**If you are adding new hardware or upgrading the existing hardware, ensure that the power modules installed in the chassis are adequate to support the hardware.**

- Install the Power Cassette Module.

**Note**

Attach an ESD-preventive wrist strap to your wrist and connect the other end to the grounding lug connected to the chassis.

- Install the FPIM.

Be aware of the weight and size of the equipment. Handle it with care.

**Required Tools and Equipment**

- ESD-preventive wrist strap
- 3/16" flat-blade torque screwdriver
- AC or DC Power Module

**Procedure**

**Step 1** Loosen the two screws on the front power entry bezel using a 3/16" flat-blade torque screwdriver. Remove the front power entry bezel from the chassis.

**Step 2** Carefully slide Power Module into the bay until it mates with the FPIM connectors.

**Note**

To prevent damage to the FPIM connectors, do not use excessive force when inserting the Power Module into the bay.

**Step 3** Move the handle up to lock the Power Module in the chassis.

**Step 4** Tighten the screw using a 3/16" flat-blade screwdriver with a torque of 5-7 in-lb (0.56-0.79 Nm) to secure the Power Module.

**Step 5** Repeat Step 2 to Step 4 for each Power Module.

**Step 6** Position the front power entry bezel on the chassis. Insert and tighten the two screws using a 3/16" flat-blade torque screwdriver with a torque of 5-7 in-lb (0.56-0.79 Nm) to secure the bezel.

**What to Do Next**

- For an AC-powered Cisco cBR chassis, connect the AC power.
- For an DC-powered Cisco cBR chassis, connect the DC power.
- If all the interfaces and other cables are connected, power up the Cisco cBR chassis.
- Verify that the input power LED on the Power Module illuminates green.

## Connecting Power to the AC-Powered Cisco cBR Chassis


**Note**

Before connecting AC Power to the AC FPEM, the chassis ground connection must always be made first and disconnected last.


**Note**

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

The AC FPEM has six input connectors. Each input connector corresponds to the AC Power Module installed in the front of the chassis. They are IEC60320, C22 inlet connectors, which require facility power cords with a C21 style connector. These are similar to a standard C19/C20 combination, but they have chamfers in the upper corners, which are used to distinguish them as rated for 155C instead of the typical 70C used on the C19/C20.

**Before You Begin**

- Attach the Chassis Ground Connection.
- Install the AC Power Cassette Module.
- Install the AC FPIM.
- Install the AC Power Modules.

**Required Tools and Equipment**

- AC power cord
- #2 Phillips torque screwdriver

**Procedure**

- Step 1** Ensure that the power switch on the AC FPEM is in off (down) position.
- Step 2** Connect the AC power cord to the receptacle on the AC FPEM.
- Step 3** Tighten the Phillips-head screw on the cable retaining bracket using a #2 Phillips torque screwdriver with a torque of 8-10 in-lb (0.90-1.13Nm).
- Step 4** Connect the other end of the AC power cord to the AC source receptacle.
- Step 5** Repeat Step 2 to Step 4 for all power connections.

**What to Do Next**

- If all the interfaces and other cables are connected, power up the Cisco cBR chassis.

## Connecting Power to the DC-Powered Cisco cBR Chassis


**Warning**

The terminal block covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed. Statement 1077



**Warning**

**Before connecting DC Power to the DC FPEM, the ground connection must always be made first and disconnected last.**

**Warning**

**Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003**

**Warning**

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

The DC FPEM provides terminal blocks for facility input connectivity. It has 12 sets of input terminal blocks to provide each power module with the option of both A and B facility connections.

#### **Before You Begin**

- Attach the Chassis Ground Connection.
- Install the DC Power Cassette Module.
- Install the DC FPIM.
- Install the DC Power Modules.

The color coding of the DC-input power supply leads depends on the color coding of the DC power source at your site. Typically, green or green/yellow is used for ground (GND), black is used for -48V on negative (-) terminal and red is used for RTN on the positive (+) terminal. Ensure that the lead color coding you choose for the DC-input power supply matches lead color coding used at the DC power source.

For DC input power cables, select the appropriate wire gauge based on the National Electrical Code (NEC) and local codes for 60-amp service at nominal DC input voltage (-48 VDC). Two pairs of cable leads, source DC (-) and source DC return (+) on P-A and P-B, can be used for each DC Power Module. These cables are available from any commercial cable vendor. All input power cables for the chassis must have the same wire gauge.

**Note**

You do not need to connect power to both P-A and P-B feeds for each DC Power Module. The DC Power Modules can operate even with one power input connected.

Each DC input power cable is terminated at the FPEM by a cable lug (included in the accessory kit). The cable lugs must be dual-hole, and have a 90 degree tongue (reference Panduit LCD4-14AF-L). They must be able to fit over 1/4-20 terminal studs on 0.625 in (15.88 mm) centers and have a maximum tongue width of 0.6 inches.

**Note**

DC input power cables must be connected to the FPEM terminal studs in the proper positive (+) and negative (-) polarity. Some DC cable leads are labeled, which is a relatively safe indication of the polarity. However, you must verify the polarity by measuring the voltage between the DC cable leads. When measuring the voltage, the positive (+) lead and the negative (-) lead must always match the (+) and (-) labels on the power distribution unit.

To avoid hazardous conditions, all components in the area where DC input power is accessible must be properly insulated. Therefore, before installing the DC cable lugs, ensure to insulate the lugs according to the manufacturer's instructions.

**Caution**

Before installing the DC cable lugs, insulate the entire 90 degree portion of the lugs where the wire is crimped to avoid hazardous conditions where DC input power is accessible through the terminal block cover of the DC FPEM.

**Required Tools and Equipment**

- Insulating sleeving
- Torque wrench
- 7/16" hex socket
- Lugs for the cables
- Cables for positive and negative leads
- Crimping tool

**Procedure**

- 
- Step 1** Ensure that the power switch on the DC FPEM is in off (down) position.
- Step 2** Attach the lug to the lead cable. Carefully crimp the receptacle around the cable using the crimping tool. Insulate the entire 90 degree portion of the lug with shrink sleeving for each lead wire.
- Step 3** Remove the terminal block cover on each terminal block by pushing down on the bottom tab then pivoting the bottom out.
- Step 4** Loosen the 1/4-20 terminal bolts using a torque wrench and 7/16" hex socket and remove them.
- Step 5** Connect the negative lead cable and secure it in place with the 1/4-20 terminal bolts using a torque wrench and 7/16" hex socket with a torque of 45-50 in-lb (5.08-5.65 Nm).
- Step 6** Connect the positive lead cable and secure it in place with the 1/4-20 terminal bolts using a torque wrench and 7/16" hex socket with a torque of 45-50 in-lb (5.08-5.65 Nm).
- Step 7** Repeat Step 5 and Step 6 for each terminal block connection.
- Step 8** Reinstall the terminal block covers by clipping them on the top edge of the terminal block housing and then rotating them down until they snap into place.
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**What to Do Next**

- If all the interfaces and other cables are connected, power up the Cisco cBR chassis.

## Other FRU Modules

For more information on other FRUs, see the router installation guide on Cisco.com at:

<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

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Общий многоканальный телефон:

+7 495 961 13 82 (Москва), (8 800) 700 05 22 (Россия)

Беларусь: 800 721 7549;

Казахстан: 8 800 121 4321 (наберите 8, подождите до 2-го сигнала, затем наберите остальные цифры; наберите PIN 800 721 7549).

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+7 495 961 13 82 (Москва), (8 800) 700 05 22 (Россия) - меню Технические услуги.

Подробная информация об услугах технической поддержки доступна на сайте: <http://www.cisco.com/cisco/web/RU/support/index.html>

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#### **Месяц и год изготовления технического средства.**

Год изготовления зашифрован в серийном номере устройства в десятичной системе исчисления в первых двух цифрах после трехзначного буквенного кода и рассчитывается следующим образом: 2012 году изготовления соответствует цифра 16, 2013 – 17, 2014 – 18, 2015 – 19 и так далее. Неделя изготовления указана в виде двух цифр десятичной системы следующих после кода года. Первой неделей января соответствует код 01, последней неделей декабря 52 или 53. Информация о дате изготовления наносится на месте производства на само оборудование и/или упаковку.

#### **Дополнительная информация:**

Ознакомиться более подробно с инструкциями по монтажу на английском языке возможно на официальном web-сайте Cisco:

<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>.

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<http://www.cisco.com/c/dam/en/us/td/docs/cable/cbr/Cisco-cBR/IOS-XE-16-5-1/index.html>

Дополнительная информация, руководства и правила обращения с продуктом, а также возможность загрузки ПО доступны в разделе Product/Technology Support на официальном web-сайте Cisco: <http://www.cisco.com/cisco/web/psa/default.html>

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<http://tools.cisco.com/FinAdm/GCTA/servlet/ControllerServlet?action=QueryForm>

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