Upgrading the Cisco AC/DC Power System 1 RU Distribution Shelf

This guide provides basic instructions for upgrading the Cisco AC/DC Power System. It contains the following sections:

For detailed installation instructions, see the *Cisco AC/DC Power System User Guide, Release 1.0*. Table 1 provides information on system configurations.

Table 1   Cisco AC/DC Power System Configurations

Configuration	Rectifiers	Distribution	Output at 220V AC	Output at 110V AC
Small Systems	2 CSCO-PWR-RECT Modules	10 position GMT Fuse Block	32A	13.4A

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Table 1   Cisco AC/DC Power System Configurations (Continued)

Configuration	Rectifiers	Distribution	Output at 220V AC	Output at 110V AC
Medium Systems	3 CSCO-PWR-RECT Modules	10 position GMT Fuse Block 4- position 1 RU Distribution Shelf	64A	26.8A
Large Systems	4 CSCO-PWR-RECT Modules	10 position GMT Fuse Block 4- position 1 RU Distribution Shelf	96A	40A

Safety Information

⚠
Warning   **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.** Statement 12

⚠
Warning   **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

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

⚠
Warning   **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.** Statement 43

Installation Checklist

•   Rectifiers are installed and seated correctly in the system shelf.

•   The controller and 1 RU faceplates are installed and secure.

⚠
Warning   **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

⚠ **Warning**   **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**
-This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
-When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
-If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

Installation Materials

Several items are needed to complete installation of the Cisco AC/DC Power System. Some items are supplied by Cisco and some are to be supplied by the user.

The following materials are supplied with the 1 RU Distribution Shelf:

- 4 pieces M6 0x20 (thread forming)
- 4 pieces #12-24 x 1/2" (thread forming)
- 4 pieces M6 cage nut
- Mounting bracket 600mm ETSI rack
- 2 or 4 quick disconnect circuit breakers (depending on system size)
- Cable ties
- ESD wrist strap

The following materials and tools are required but not supplied with the Cisco AC/DC Power System:

- 6 AWG (16mm) ground cable for the 1 RU Distribution Shelf (if this option is ordered)
- DC distribution power cabling 10 to 8 AWG (6 to 10mm)
- Qty (1) UL Listed double-hole lug 1/4in and 5/8in. center-to-center (lug part # Panduit LCD6-14A-L or equivalent)

Tools:

- Insulated Phillips and flathead screwdriver sets
- Insulated wire & cable strippers/crimpers (for ground lug, DC cable, alarm, and GMT cable installations)
- Digital multimeter

# Upgrade from a Small System to a Medium or Large System

The 1 RU Distribution Shelf requires installation of power, alarm, ground, and load connections during the system upgrade. Power connections are pre-wired to the system shelf and should be located at the top of the system shelf with a prewired 10 pin Molex™ alarm cable.

Upgrading to a large system also requires the installation of two additional circuit breakers. See the for instructions.

Install the IRU DC Distribution Shelf

Determine if the correct ear mounts are installed on the system shelf. Ear mounts come mounted on the shelf and support 19-inch (default) and 23-inch IEC and ANSI standards; for 23-inch shelves, ears should be removed, reversed and reinstalled. Two additional plates are also included to accommodate ETSI racks (Figure 1). To install ETSI mounting ears, remove existing ears and attach ETSI mounting ears using included hardware.

Figure 1   ETSI Ear Mounts
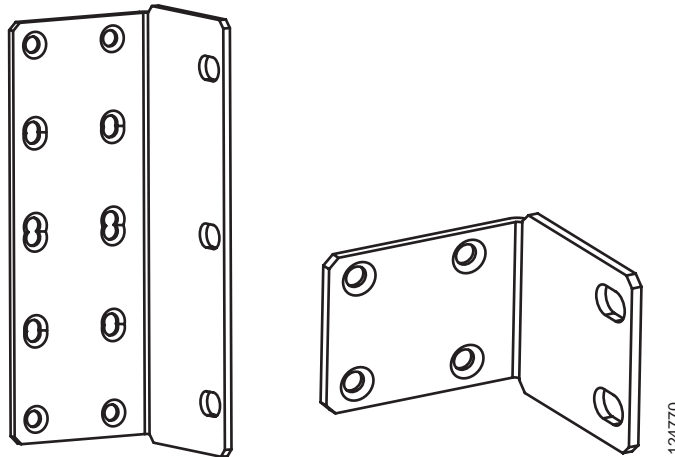

Step 1   Make sure that all circuit breakers are in the OFF position.

Step 2   Move the 1 RU Distribution Shelf to the desired rack slot (directly above the system shelf)

> **Note**   If no rear access is available, complete the "Install Communications Cabling" procedure on page 5, the "Install DC Power Cabling" procedure on page 6, and the Install 1 RU Distribution Shelf Ground Cabling, page 7 before securing the shelf to the rack/cabinet.

Step 3   Secure the 1 RU Distribution Shelf to the rack using the four included mounting screws (Figure 2).

Figure 2   Installing the 1 RU Distribution Shelf
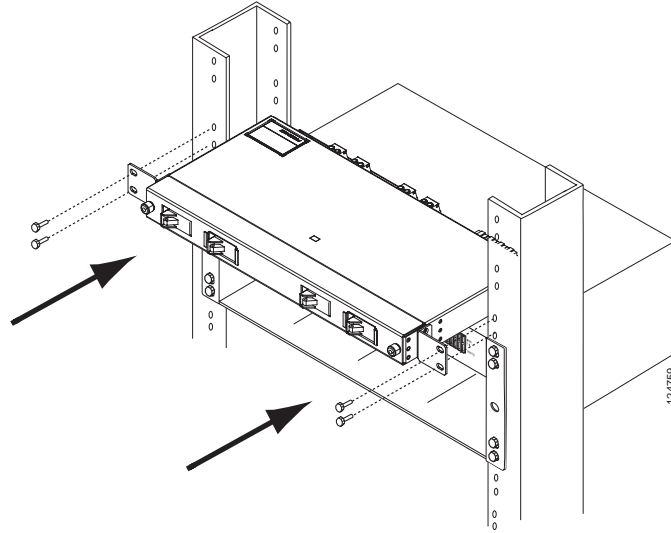

Install Communications Cabling

Step 1   Locate the distribution alarm connection at the top of the system shelf.

Step 2   This connection is a prewired 10 pin Molex connector and is connected to the 1 RU at the indicated connection point (Figure 3).

> ✎
>
> **Note**   The Molex™ alarm connector is keyed and can only be inserted one way. If the connector does not insert easily into the mount, ensure that the connector is being inserted with the key side up.

Figure 3   Installing Communications Cables
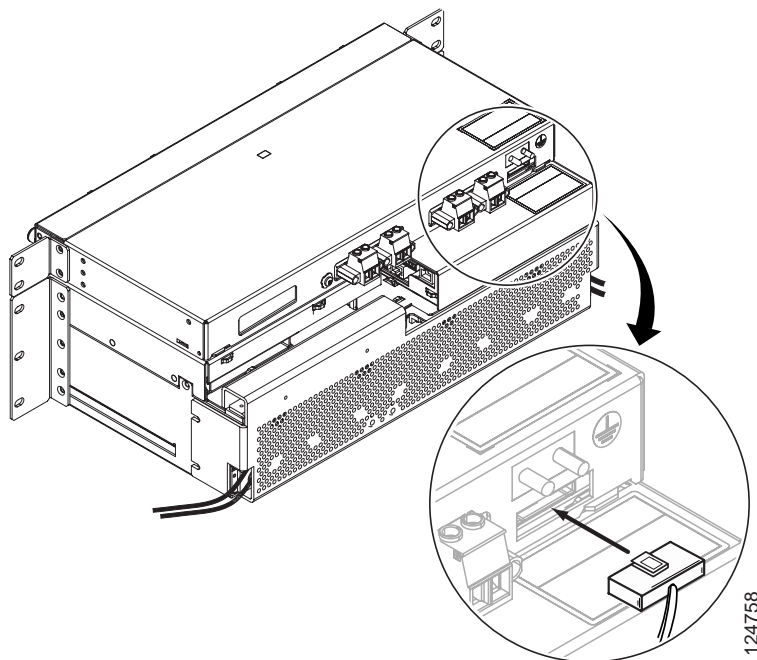
Install DC Power Cabling

Step 1   Locate the four 6 AWG (16mm) power cables provided at the top of the system shelf.   These are terminated with Anderson Powerpole™ Connectors. To install the power cables, remove the heat shrink from the ends of the connector.

Step 2   Connect the power cables to the appropriate connection points on the 1 RU Distribution Shelf labeled load (-48V) and return (Return) (Figure 4).

Note   Anderson Powerpole™ Connectors are keyed and can only be inserted one way. If the connector does not insert easily into the mount, make sure that the connector is being inserted with the key side up.

Figure 4   Installing DC Power Cable
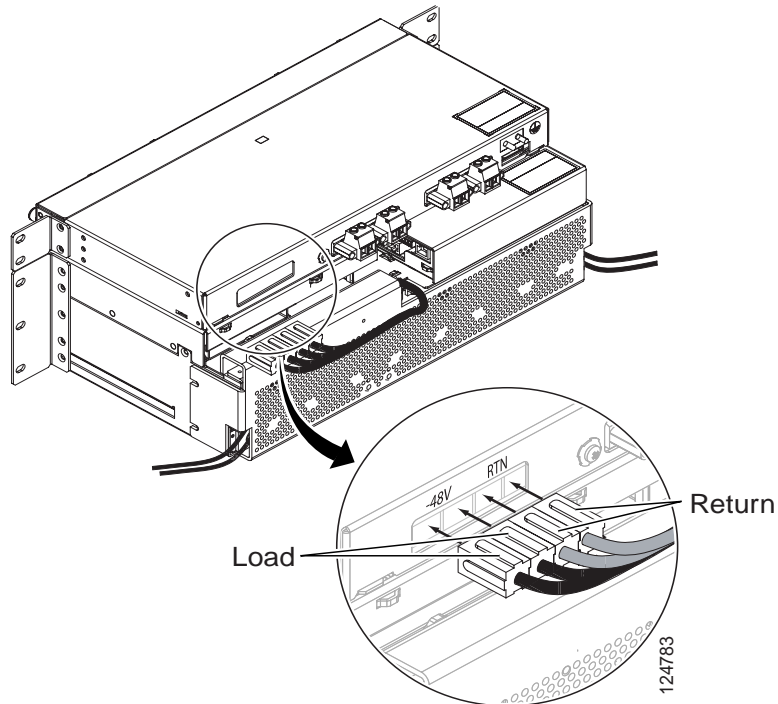
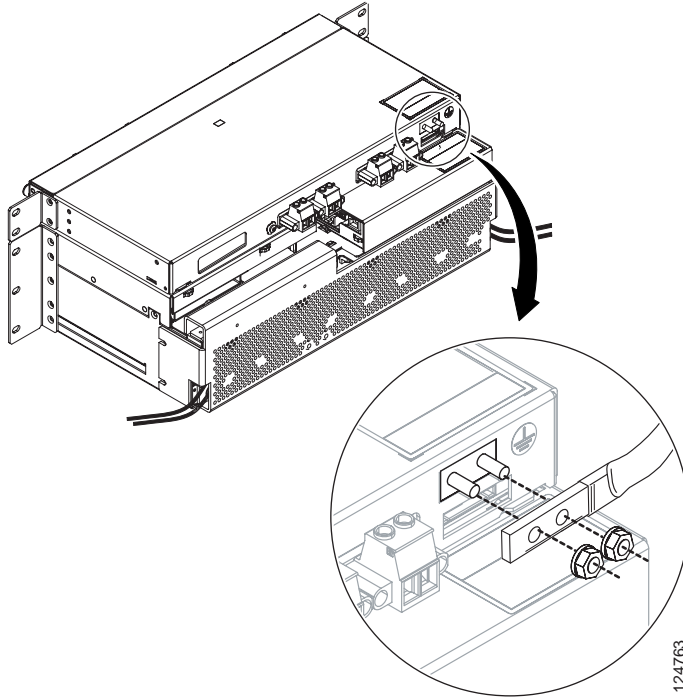## Install 1 RU Distribution Shelf Ground Cabling

⚠

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.** Statement 1024

The 1 RU Distribution Shelf needs to be properly grounded to ensure the safe and efficient operation of the DC Power System.

Step 1   Locate the #10 studs at the rear of the 1 RU Distribution Shelf.

Step 2   Using a UL-listed 6 AWG (16mm) wire with an insulation rated to at least 75˚C, connect the 1 RU Distribution shelf to the appropriate rack/cabinet connection point (Figure 5 on page 8).

Step 3   The connection at the shelf end is made using a UL-listed double-hole lug 1/4 inch and 5/8 inch center-to-center (lug part # Panduit LCD6-14A-L or equivalent).

Step 4   To accommodate future upgrades, leave a service loop (1.5ft [60cm]) at the side of the shelf.

Figure 5   Installing the 1 RU Distribution Shelf Ground

Install 1 RU Distribution Load-and-Return Connections in a Medium or Large System

This section explains how to install the DC load-and-return connections to the rear of the 1 RU Distribution Shelf.

Step 1 Select the correct wire gauge for the application (Table 1).

Table 2   Load Connection Wire Gauge

Wire Gauge (Stranded)	Application
10 to 8 AWG (6 - 10mm)	Breaker Load (up to 30A)

Step 2 Locate the load-and-return connections at the rear of the 1 RU Distribution Shelf for medium systems; positions A1 and B1 correspond to the A1 and B1 circuit breakers.

✎

Note For upgrades to large systems, it is necessary to populate the A2 and B2 circuit breaker and load positions. For information on installing these additional breakers see the "Install Circuit Breakers in a Large System" procedure on page 11.

Step 3   Remove the (A1 and B1) Phoenix Contact PC6™ connectors from the 1 RU Distribution Shelf by loosening the flat screws and pulling the connectors away from the 1 RU Distribution Shelf (Figure 6 #1).

Step 4   Connect the wires to the appropriate terminal for the load-and- return connections by inserting and then tightening the connector (Phoenix Contact PC6™ connectors) (Figure 6 #2, #3). Leave enough of a service loop to allow for the removal of the 1 RU Distribution Shelf.

Step 5   Reconnect to the 1 RU Distribution Shelf (Figure 6 #4).

Step 6   Connect the load-and-return cables to the equipment that requires the supplied DC Power.

Step 7   If the upgrade is to a large system, also connect A2 and B2 load cables.

*Figure 6   Installing the 1 RU Load Connections*
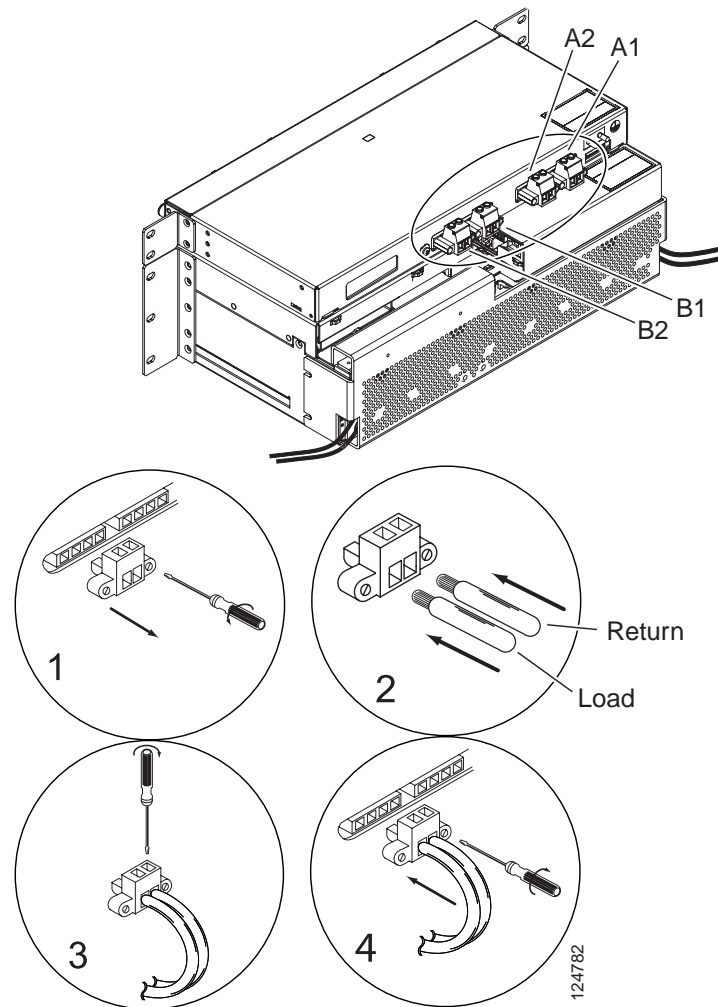
Install Rectifiers in a Medium or Large System

Complete this procedure to install rectifiers in the DC Power System.

Step 1 From the left side, locate the third rectifier installation location.

Step 2 System upgrades require the removal of installed blank rectifier faceplates:

    a. Remove the two Phillips screws from the blank rectifier faceplate and remove the faceplate (Figure 7 #1).

    b. Remove the mounting bracket on the blank rectifier faceplate by removing the two Phillips screws (Figure 7#2).

    c. If the upgrade is to a large system, remove the remaining blank rectifier faceplate also.

Figure 7   *Removing a Blank Rectifier Faceplate*
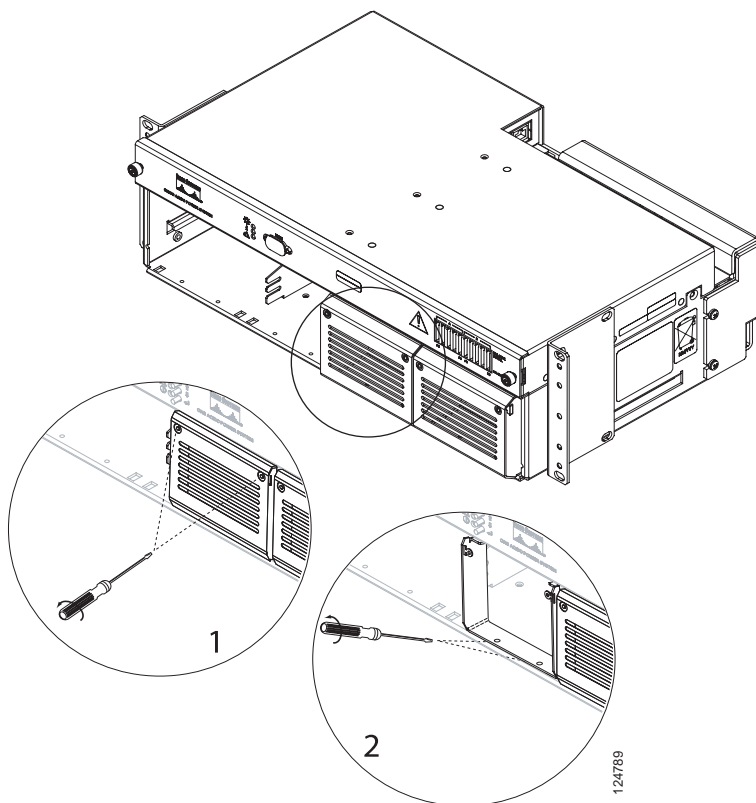
Step 3 Make sure that the rectifier handle is in the OPEN position, that is, the handle is pulled away from the rectifier body.

Step 4 Place the module in front of the correct mounting slot on the shelf with the handle facing out (Figure 8 #1).

Step 5 Slide the module in until it contacts the interface connection at the rear of the shelf.

Step 6 Fully insert the rectifier by pushing the module handle towards the shelf; the handle will rise up and lock the module into place (Figure 8 #2).

Figure 8   *Installing Rectifiers*
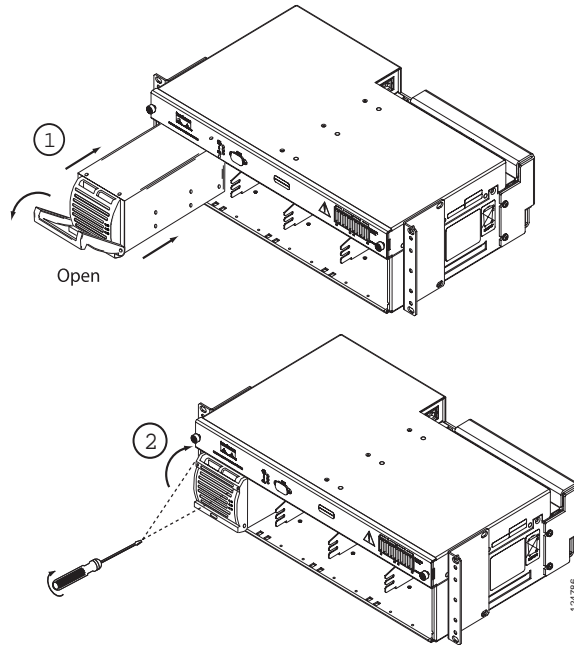
Step 7   Repeat this procedure for any additional modules (two total for Small Systems, three for Medium Systems, and four for Large Systems).

Step 8   Tighten the handle-mounted common screws into the rectifier to ensure a firm connection (Figure 8 #2).

When the rectifiers have been installed, the system controller will attempt to communicate with the new rectifiers. See the "Commission the System" section on page 17.

# Upgrade from a Medium System to a Large System

To upgrade from a medium system to a large system, two circuit breakers, two load connections, and a rectifier must be installed. The following section contains information on upgrading the 1 RU Distribution Shelf to four circuit breakers.

Install Circuit Breakers in a Large System

Large systems equipped with the 1 RU Distribution Shelf require the installation of circuit breakers to ensure proper system protection (the 1 RU Distribution Shelf is shipped with two circuit breakers installed for use in medium systems). To install circuit breakers in a large system:
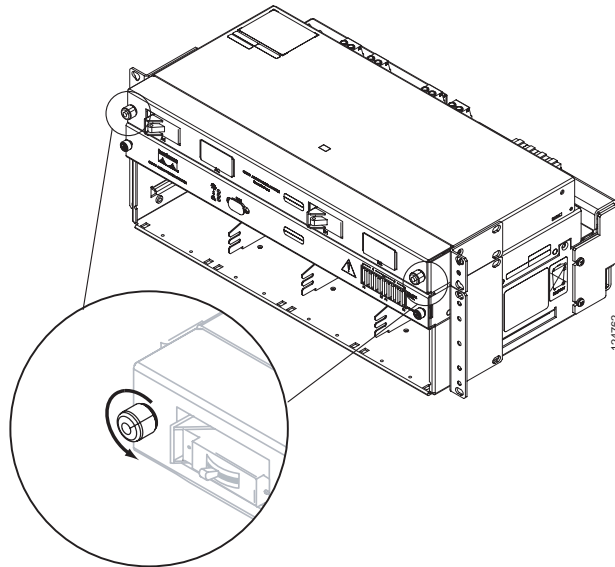
Step 1   Make certain all breakers are in the OFF position.

Upgrading the Cisco AC/DC Power System 1 RU Distribution Shelf

Figure 9   Breaker On/Off Positions
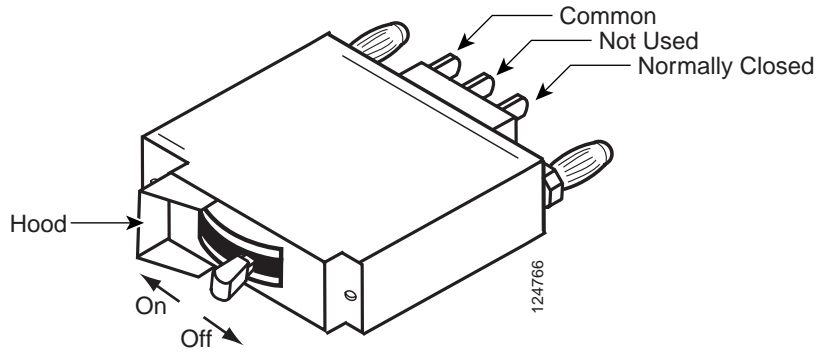
Step 2   Remove the 1 RU Distribution faceplate by loosening the two thumbscrews on the shelf faceplate (Figure 10).

Figure 10   Removing the 1 RU Distribution Shelf Faceplate

Step 3   Locate the circuit breaker installation locations inside the 1 RU Distribution Shelf (positions A2 and B2). Circuit breakers should be installed with the protective hood (covering the "ON" position) on the left side of the shelf (Figure 9 on page 12) to allow the 1 RU Distribution faceplate to be correctly installed.

Step 4   Attach the circuit breaker alarm cables to the rear of the circuit breaker; the alarm cables are labeled C (Common) and NC (Normally Closed) and are attached to the positions shown in Figure 9 on page 12.

Step 5   Gently glide the breaker in so that the quick-disconnect plugs are aligned with the mounting hole. Refer to Figure 11 for proper orientation.

*Table 3   Circuit Breaker Positions*

System Size	A1	A2	B1	B2
Small	n/a	n/a	n/a	n/a

Table 3   *Circuit Breaker Positions (Continued)*

System Size	A1	A2	B1	B2
Medium	X	[1]	X	[2]
Large	X	X	X	X

1. Future Upgrade
2. Future Upgrade

Step 6   Push the breaker in until the quick-disconnect plugs are firmly seated in the mounting holes (Figure 11).

Step 7   Repeat for the additional breaker.

Step 8   Replace the 1 RU Distribution Shelf faceplate and tighten the thumbscrews.

Figure 11   *Installing Circuit Breakers*
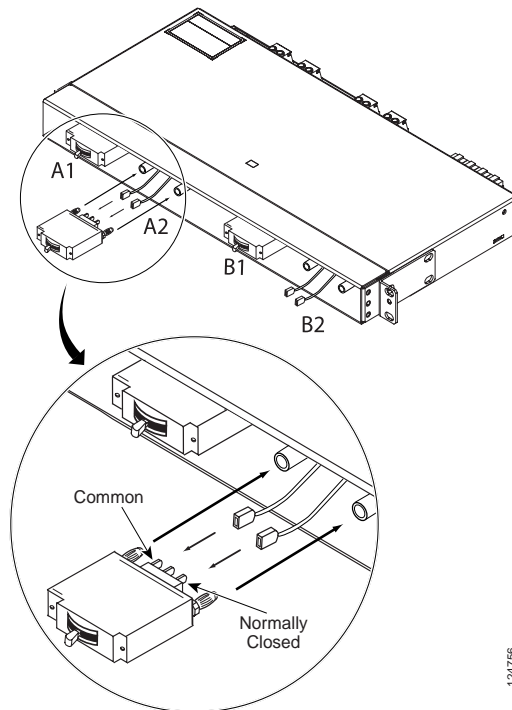
Install 1 RU Distribution Load-and-Return Connections in a Large System

Complete this procedure to install the DC load and return connections to the rear of the 1 RU Distribution Shelf.

Step 1   Select the correct wire gauge for the application (Table 4).

Table 4   Load Connection Wire Gauge

| Wire Gauge (Stranded)	Application
10 to 8 AWG (6 - 10mm)	Breaker Load (up to 30A)

Step 2   Locate the load-and-return connections at the rear of the 1 RU Distribution Shelf; positions A2 and B2 correspond to the A2 and B2 circuit breakers.

> **Note**   For upgrades to large systems, it is necessary to populate the A2 and B2 breaker positions. For information on installing these additional breakers see the "Install Circuit Breakers in a Large System" procedure on page 11.

Step 3   Remove the Phoenix Contact PC6™ connectors from 1 RU Distribution Shelf by loosening the flat screws and pulling the connectors away from the 1 RU Distribution Shelf (Figure 12 #1).

Step 4   Connect the wires to the appropriate terminal for the load-and- return connections by inserting and then tightening the connector (Phoenix Contact PC6™ connectors) (Figure 12 #2, #3). Allow enough of a service loop to allow for the removal of the 1 RU Distribution Shelf.

Step 5   Reconnect to the 1 RU Distribution Shelf (Figure 12 #4).

Step 6   Connect the load-and-return cables to the equipment that requires the supplied DC Power.

Figure 12   Installing 1 RU Load Connections
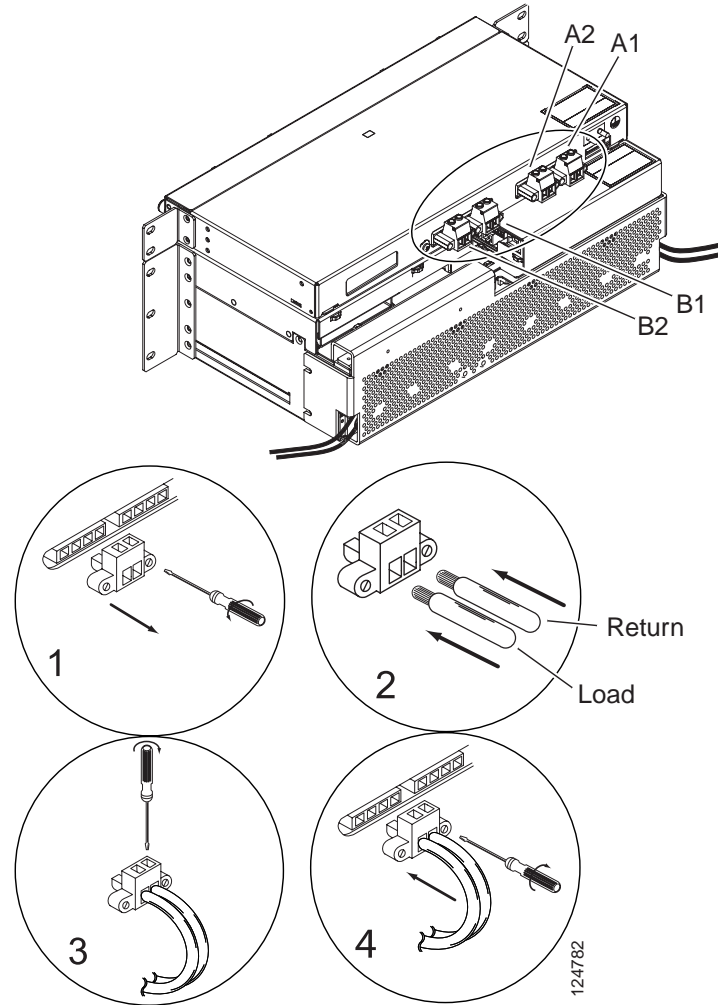
Install Rectifiers in a Large System

Complete this procedure to install rectifiers in the DC Power System.

Step 1 From the left side, locate the fourth rectifier install location.

Step 2 System upgrades require the removal of installed blank rectifier faceplates.

  a. Remove the two Phillips screws from the blank rectifier faceplate and remove (Figure 13 #1).

  b. Remove the blank rectifier faceplate mounting bracket by removing the two Phillips screws (Figure 13 #2).

Figure 13   *Removing the Blank Rectifier Faceplate*
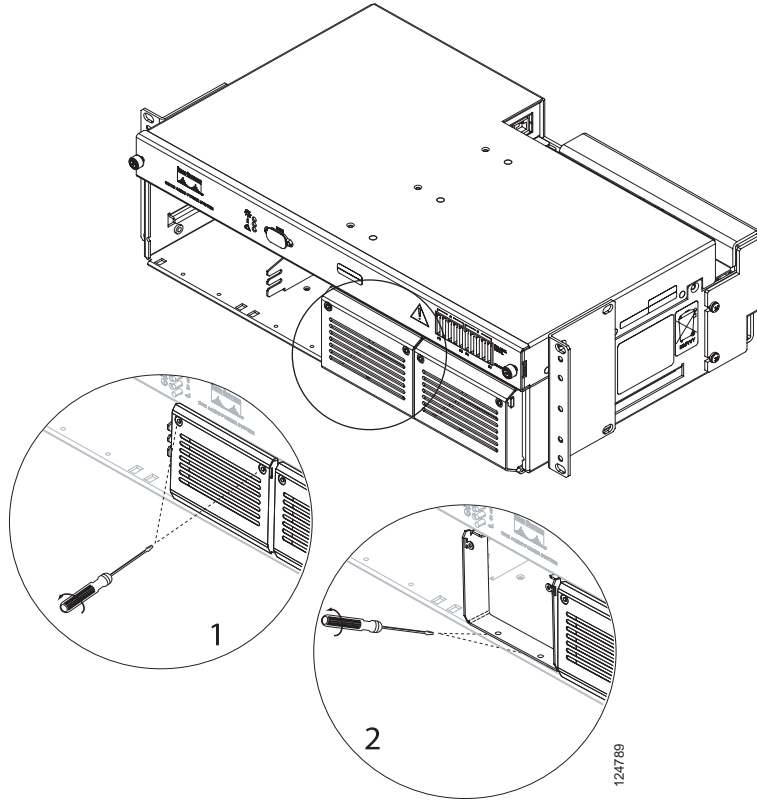
Step 3   Ensure that the rectifier handle is in the OPEN position, that is, the handle is pulled away from the rectifier body.

Step 4   Place the module in front of the correct mounting slot on the shelf with the handle facing out (Figure 14 #1).

Step 5   Slide the module in until it contacts the interface connection at the rear of the shelf.

Step 6   Fully insert the rectifier by pushing the module handle towards the shelf; the handle will rise up and lock the module into place (Figure 14 #2).

Figure 14   Installing Rectifiers
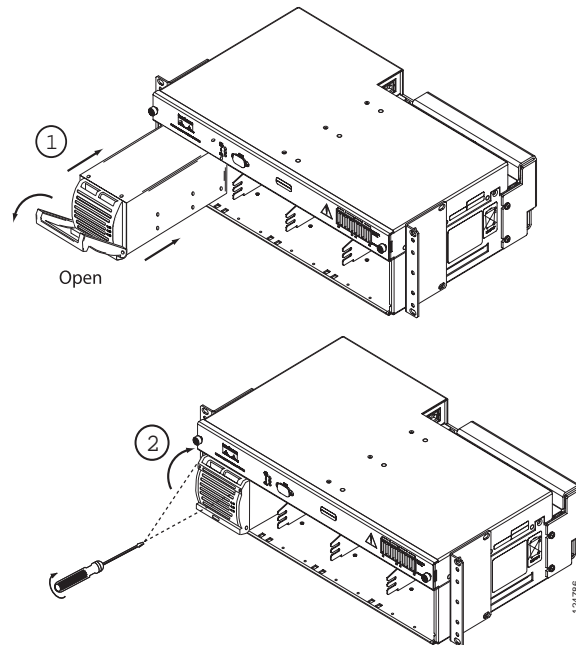
Step 7   Repeat this procedure for any additional modules (four modules are required for large systems).

Step 8   Tighten the handle-mounted common screws into the rectifier to ensure a firm connection (Figure 8 #2).

When the rectifiers have been installed, the system controller will attempt to communicate with the new rectifiers.

Commission the System

Use this procedure to power-up the system for the first time.

Step 1   After installing the rectifiers, the controller and rectifier LEDs will start to blink. It may take a few minutes for the controller to communicate with all rectifiers.

Step 2   The system is now commissioned. If the RED LED on the controller is on, refer to the "Alarm Warnings" chapter in the *Cisco AC/DC Power System User Guide, Release 1.0*.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

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http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

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  http://www.cisco.com/en/US/partner/ordering/index.shtml

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

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We appreciate your comments.

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Cisco Technical Support Website

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Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

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- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

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- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

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- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html