CISCO SYSTEMS

Cisco AC/DC Power System, Release 1.0

This guide provides basic instructions for installing the Cisco AC/DC Power System. Use this guide as a general reference when performing a new installation. For more detailed installation instructions, see the *Cisco AC/DC Power System User Guide, Release 1.0*.

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

1 Installation Checklist

The following table is an installation checklist:

- Cisco AC/DC Power System Shelf secured in rack/cabinet.
- Cisco AC/DC Power System 1 RU Distribution Shelf mounted securely in rack/ cabinet directly above the system shelf (if applicable)

⚠ 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**

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

- Installation in ETSI cabinets allows for front-to-back ventilation and the use of a ventilated door and cabinet top.
- System alarm cabling is installed and secure.
- Rectifiers are installed and seated correctly in the system shelf.
- Alarm cabling is installed correctly.
- The controller and 1 RU faceplates are installed and secure.
- The system shelf rear cover is installed (if removed during the installation).
- The system powers up and all rectifier RED LEDs are extinguished after 5 minutes.

2 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 are materials supplied by Cisco with the system shelf:

- 6 pieces M6 0x20mm screw (thread forming)
- 6 pieces #12-24 x 1/2 screw (thread forming)

- 6 pieces M6 cage nut
- Mounting bracket 600mm ETSI rack
- Qty (2) 2A GMT fuses
- Qty (2) 5A GMT fuses
- Qty (2) 10A GMT fuses
- Qty (2) 15A GMT fuses
- Qty (4) Standard AC cable with local plugs
- Cable ties
- ESD wrist strap
- System documentation

The following materials are supplied with the optional 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 system shelf
- 6 AWG (16mm) ground cable for the 1 RU Distribution Shelf (if this option is ordered)
- Alarm cabling 26 to 22 AWG (0.14 to 0.34mm); size and length to be determined by installer
- DC distribution power cabling 10 to 8 AWG (6 to 10mm)
- GMT fuse cabling 16 to 14 AWG (1.5 to 2.5mm)
- Qty (2) UL-listed double-hole lug 1/4in and 5/8in. center-to-center (Panduit part # LCD6-14A- 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
- Insulated 8mm nut driver/wrench

3 Install the Cisco AC/DC Power System

Install Ear Mounts

Ear mounts come mounted on the shelf and support 19in. and 23in. IEC and ANSI standards. For 23in. 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   Ear Mounts*
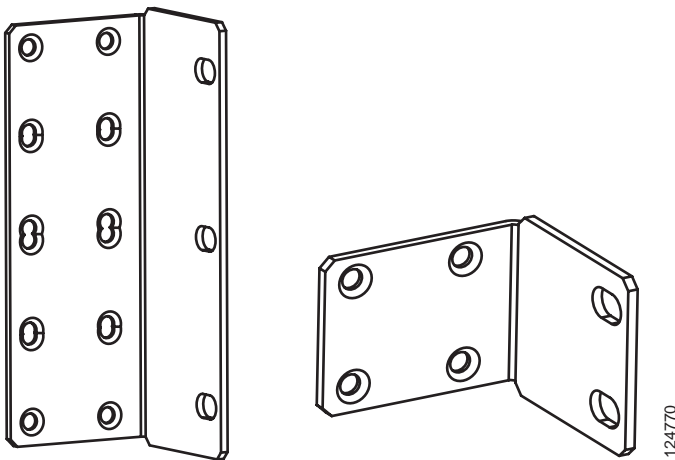
Install Shelves in a Rack/Cabinet

The system shelf should be installed first, followed by the 1 RU Distribution Shelf (if this option is included as part of the installation). If the install is going into a front access only environment, with no rear access after shelf installation, the AC cable installation and any rear wiring (communications cabling, ground cabling, alarm connections, and load connections) must be completed before the shelf is installed.

Install the System Shelf

Step 1 Determine if the correct ear mounts are installed on the system shelf. If ETSI ear mounts are required, see the "Install Ear Mounts" section on page 5.

Step 2 Move the system shelf to the desired rack/cabinet slot; allow 1 RU above the shelf if a 1 RU Distribution Shelf may be installed in the future (Figure 2).

Step 3 Secure the system shelf to the rack/cabinet using the six included mounting screws.

Step 4 Complete the "Install the 1 RU Distribution Shelf" procedure on page 7; if the system has no external distribution, complete the "Install Ground Cabling" procedure on page 10.

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Figure 2   Installing the Power System Shelf
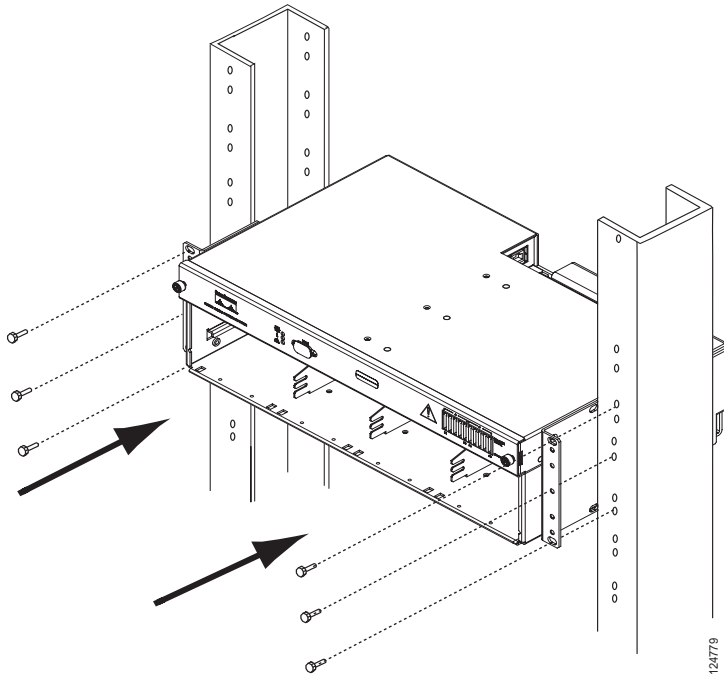
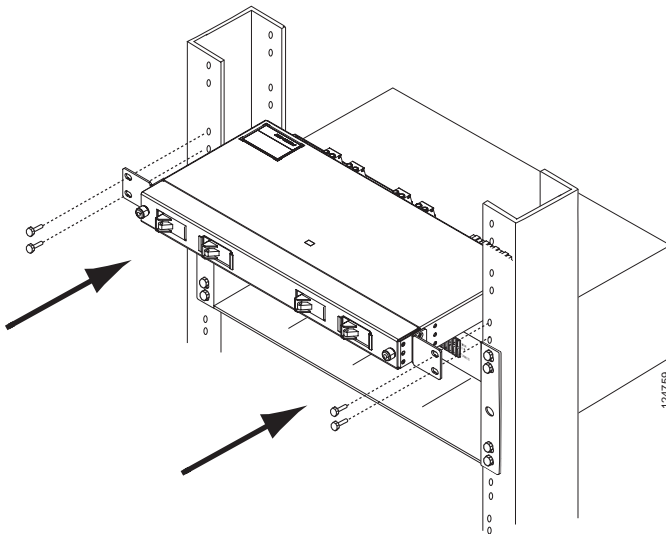## Install the 1 RU Distribution Shelf

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Note   The 1 RU Distribution Shelf is optional. If the system has no external distribution, skip this procedure and complete the "Install Ground Cabling" procedure on page 10.

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

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

Figure 3   Installing the 1 RU Distribution Shelf


Install Communications Cabling

Intra-system shelf communications cabling is installed at the factory and requires no installation; however, the cabling must be installed in systems with the optional 1 RU Distribution Shelf.

Step 1   Locate the distribution alarm connection at the rear 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 4).

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

Figure 4   *Installing Communications Cables*
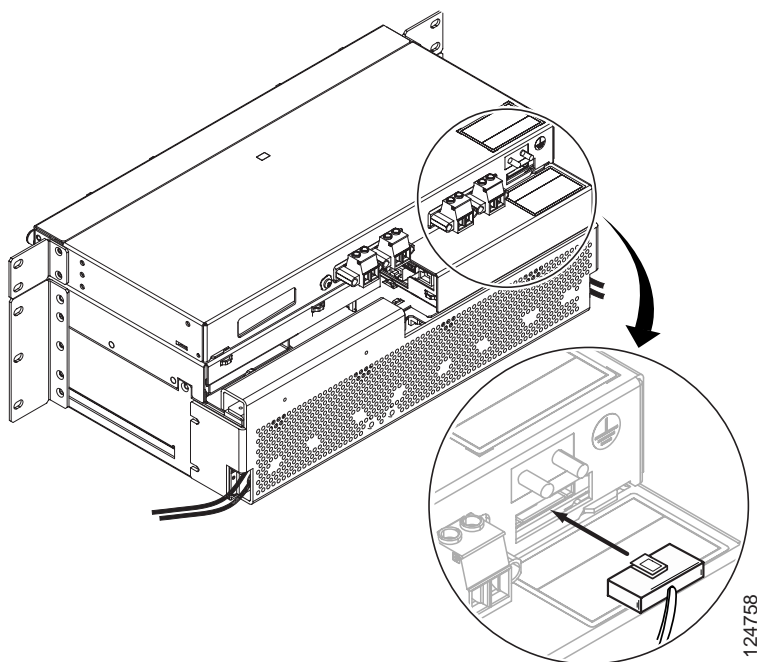
Install DC Power Cabling

In systems equipped with the 1 RU Distribution Shelf, follow the instructions below. For systems without the 1 RU Distribution Shelf, skip this procedure and go to the "Install Ground Cabling" procedure on page 10.


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

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> **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.

Step 2 Connect the power cables to the appropriate connection points on the 1 RU Distribution Shelf labeled load (-48V) and return (Return) (Figure 5).

Figure 5   Installing the DC Power Cable
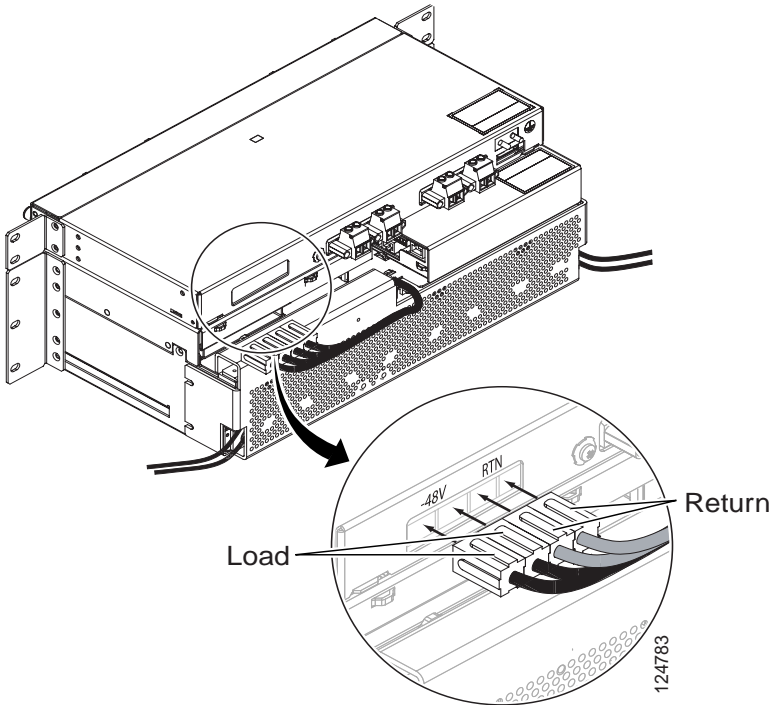
Return

Load

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Install Ground Cabling

The Equipment Rack/Cabinet, system shelf, and optional 1 RU Distribution Shelf need to be properly grounded to ensure the safe and efficient operation of the DC Power System.

To ground the equipment rack/cabinet, it should be bonded to the building principal ground busbar. Refer to the NEC, CEC, ANSI T1-333, ETSI 300-386-TC, and local codes for guidelines on bonding telecom DC power equipment to the building ground.
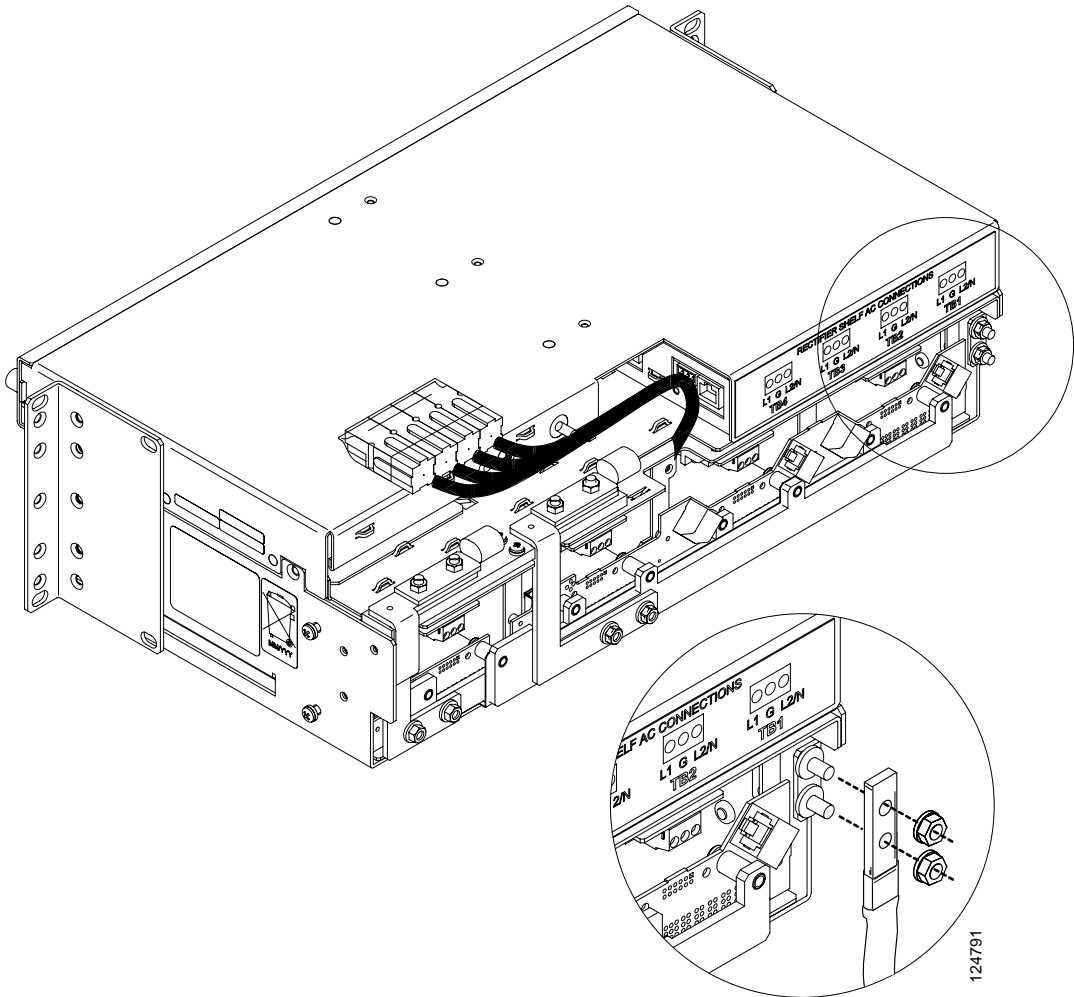
Ground the System Shelf

Step 1 Loosen the cover from the rear of the system shelf by loosening the four screws (Figure 6).

Step 2 Pull out from the bottom and lift up to remove.

Figure 6   Removing the System Shelf Rear Cover
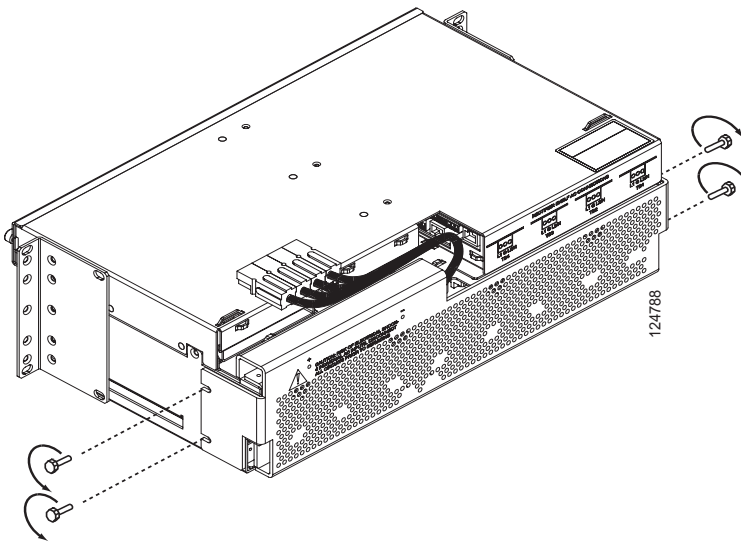
Step 3 Locate the #10 studs at the rear of the system shelf.

Step 4 Using a UL-listed 6 AWG (16mm)wire with an insulation rated to at least 75˚C, connect the shelf to the appropriate cabinet connection point (Figure 7). The connection at the shelf end is made using a UL-listed double-hole lug 1/4in and 5/8in. center-to-center (Panduit part # LCD6-14A or equivalent).

Figure 7   Grounding the System Shelf

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Step 5   Determine if the system is equipped with the optional 1 RU Distribution Shelf, If so, continue with the "Ground the 1 RU Distribution Shelf" procedure on page 13; if not, continue with the "Install AC Power Cabling" procedure on page 14.

Ground the 1 RU Distribution Shelf

If a 1 RU Distribution Shelf is not installed, skip this procedure and continue with the "Install AC Power Cabling" procedure on page 14.

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 DC Distribution shelf to the appropriate rack/cabinet connection point (Figure 8).

Step 3 The connection at the shelf end is made using a UL-listed double-hole lug 1/4in and 5/8in. 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 8   *Grounding the 1 RU Distribution Shelf*
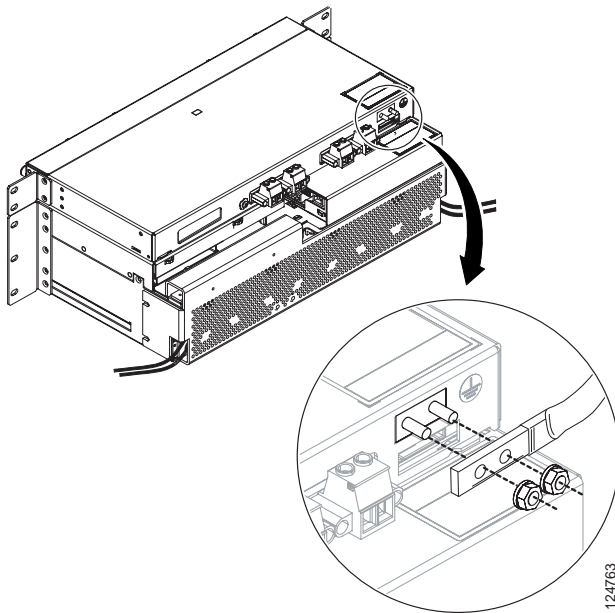
Install AC Power Cabling

Step 1   Ensure that input circuit breakers or fuses are OFF or removed and the cable is not connected to the outlet.

Step 2   To aid in future expansion, all AC cable positions should be connected to the rear of the shelf during installation.

Step 3   The system shelf is supplied with four AC cables. Each AC cable provides power to individual rectifier positions. The cable is terminated for local plug requirements.

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> **Note**   A 15A circuit (for both 110/208VAC) should be used based on maximum AC input per rectifier of 9.1A

Step 4   The rear cover of the system shelf should already be removed; if it is not, remove it using the first two steps of the "Ground the System Shelf" procedure on page 11.

Step 5   Locate the cables at the rear of the system shelf.

Step 6   Attach the ferrule end of the cables (Ground (G), L1, and L2 (neutral)) to the system shelf AC receptacle by inserting the ferrule (it will only fit in one direction) and tightening it with a flat screwdriver (Figure 9).

Figure 9   Installing AC Cabling

Rectifier Module AC
Install Locations

L1 G L2/N

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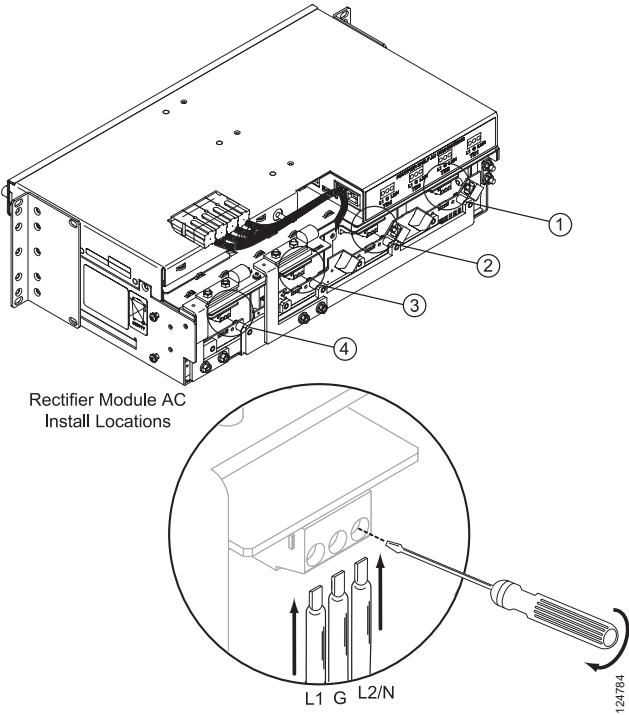
Step 7   After attaching the AC cables, route the cables to the rear of the shelf using the supplied
tie-offs to secure the cables and exit the cables at the sides of the shelf (Figure 10).

Figure 10   AC Cable Routing

Tie-Off Points

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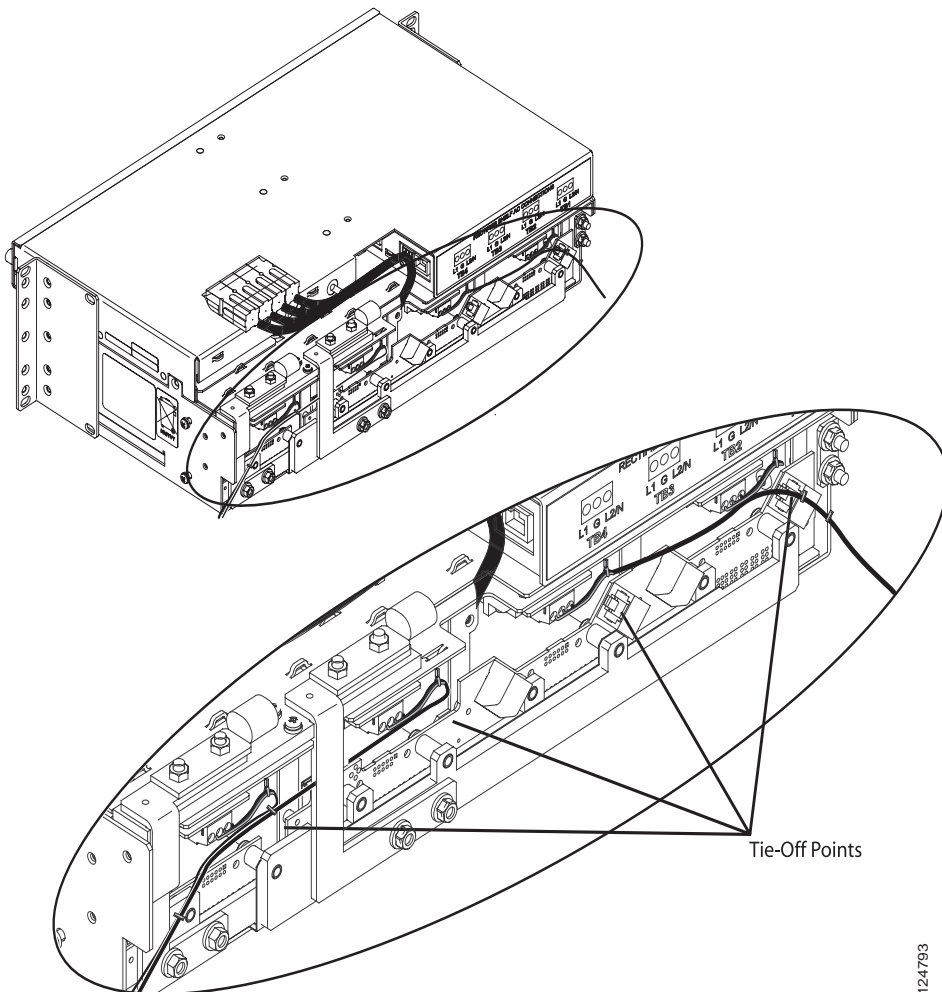
Step 8   AC cabling is routed through either side of the system shelf and secured using tie off points.

Step 9   AC cabling should be tied off inside the cabinet/rack.

Step 10   Repeat for all AC cables.

Step 11 If AC power is switched off at the AC feed location, connect the terminated AC plugs to the AC feed location. If not, do not connect the AC cables to the feed location until you perform the "Commission the System" procedure on page 32.

Install Rectifiers

To install rectifiers in the DC Power System:

Step 1 Locate the first rectifier installation location. This is the left-most rectifier when viewed from the front of the system.

Step 2 Make sure that the rectifier handle is in the OPEN position, that is, the handle is pulled away from the rectifier body.

Step 3 Place the module in front of the correct mounting slot on the shelf with the handle facing out (Figure 11 #1).

Step 4 Slide the module in until it contacts the interface connection at the rear of the shelf.

Step 5 Fully insert the rectifier by pushing the module handle towards the shelf; the handle will rise up and lock the module into place (Figure 11 #2).

Figure 11   Installing a Rectifier
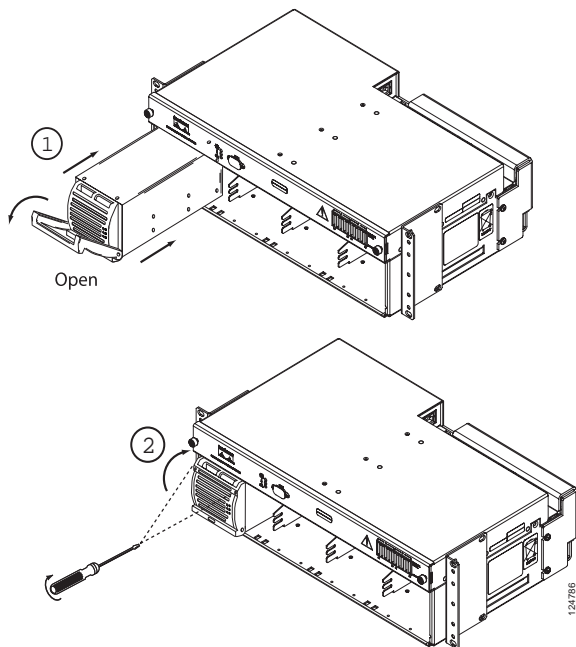
Step 6   Repeat this procedure for any additional rectifiers (two total for small systems, three for medium systems, and four for large systems).

Step 7   Some systems may require the removal of installed blank rectifier faceplates. To do this, remove the two Phillips screws from the blank rectifier faceplate and remove the faceplate (Figure 12 #1). Remove the blank rectifier faceplate mounting bracket by removing the two Phillips screws (Figure 12#2).

Figure 12   *Removing a Blank Rectifier Faceplate*
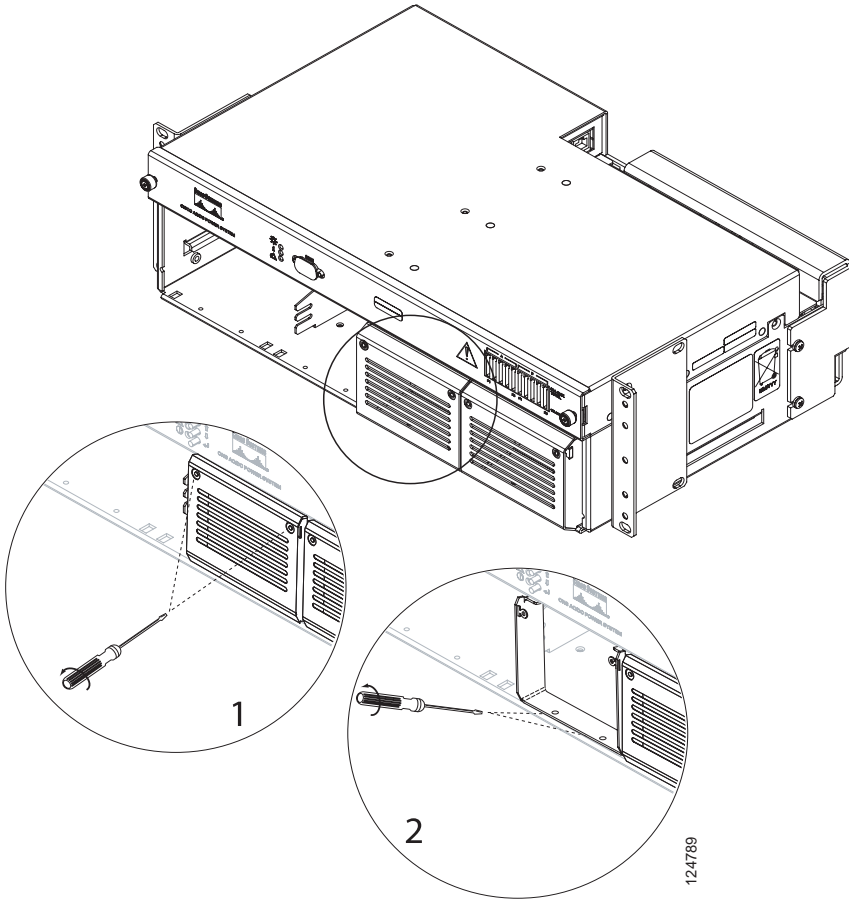
Step 8   Tighten the handle-mounted common screws into the rectifier to ensure a firm connection (Figure 11 #2).

Install Circuit Breakers on Large Systems

Large systems equipped with the 1 RU DC 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.
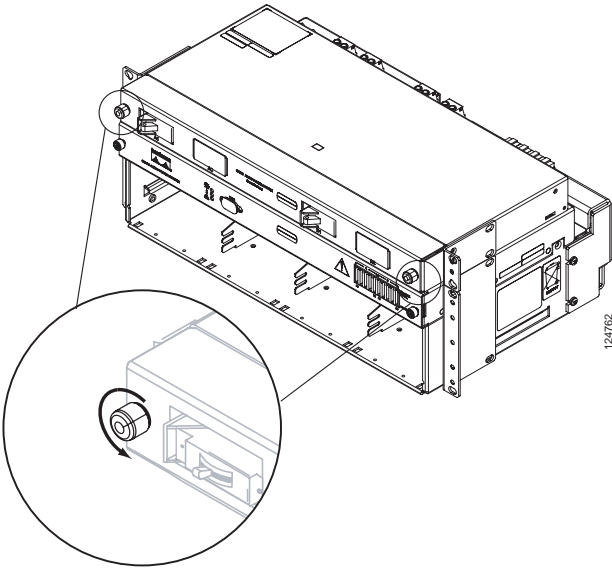
To install circuit breakers in a large system:

Step 1   Ensure that all breakers are in the OFF position.

Figure 13   Breaker On/Off Positions
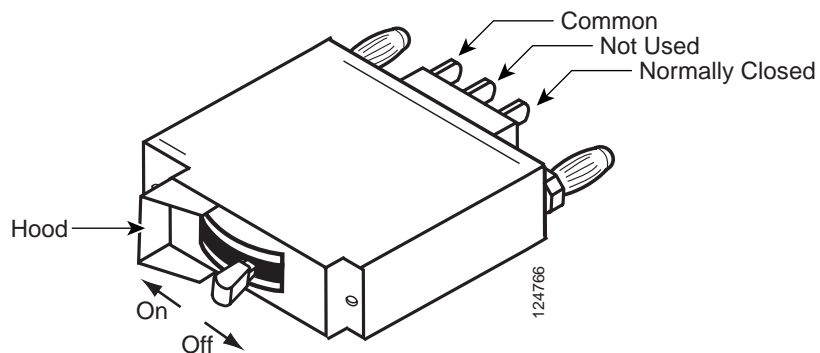
Step 2   Remove the 1 RU Distribution faceplate by loosening the two thumbscrews on the shelf faceplate (Figure 14).

Figure 14   Removing the 1 RU Distribution Faceplate

Step 3   Locate the circuit breaker installation locations inside the 1 RU Distribution Shelf (see Table 1). Circuit breakers should be installed with the protective hood (covering the "ON" position) on the left side of the shelf (Figure 13 on page 20) 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 common (C) and NC (Normally Closed) and are attached to the positions shown in Figure 13 on page 20.

Step 5   Gently glide the breaker in so that the quick-disconnect plugs are aligned with the mounting holes (refer to Figure 15 on page 22 for proper orientation).

Table 1   Circuit Breaker Positions

System Size	A1	A2	B1	B2
Small	n/a	n/a	n/a	n/a
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 15).

Step 7 Repeat for additional breaker.

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

*Figure 15   Installing a Circuit Breaker*
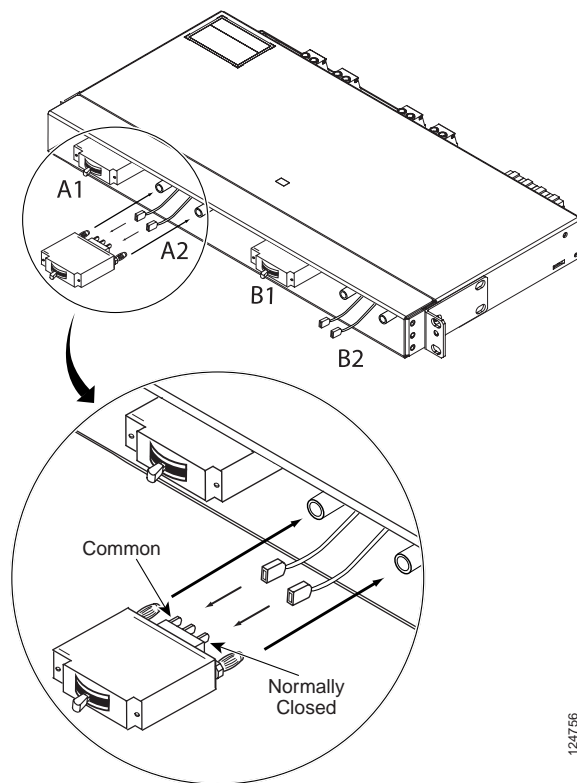
Install Alarm Cables

To install alarm cabling in the DC Power System:

Step 1   Remove the system shelf faceplate by loosening the two thumbscrews on the shelf faceplate in order to access the sliding controller drawer (Figure 16).

Figure 16   Removing the Controller Faceplate

Controller Sliding
Drawer

Alarm Interface
Board

2

1

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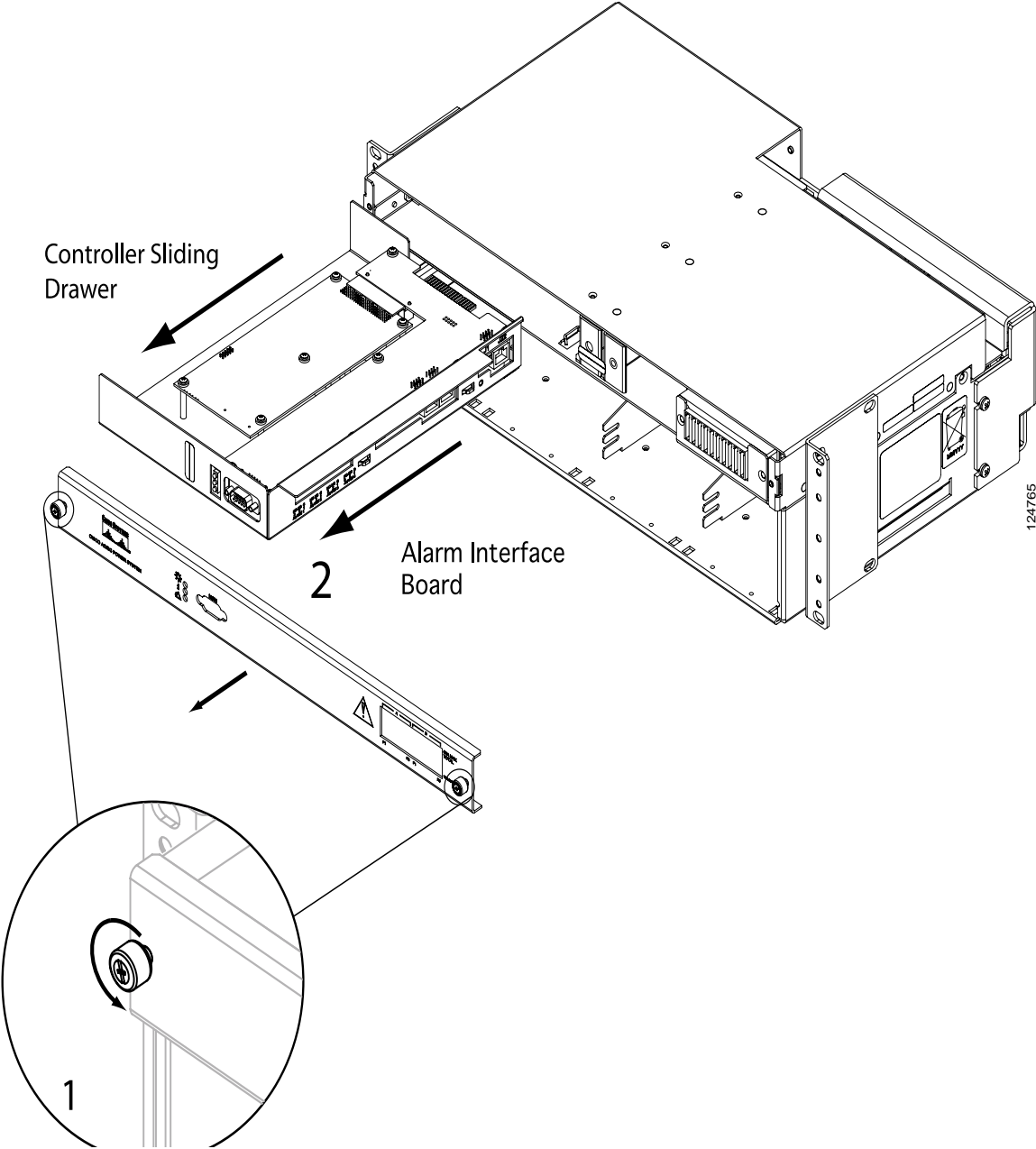
Step 2   Slide the drawer out and away from the system shelf to access the alarm interface board.

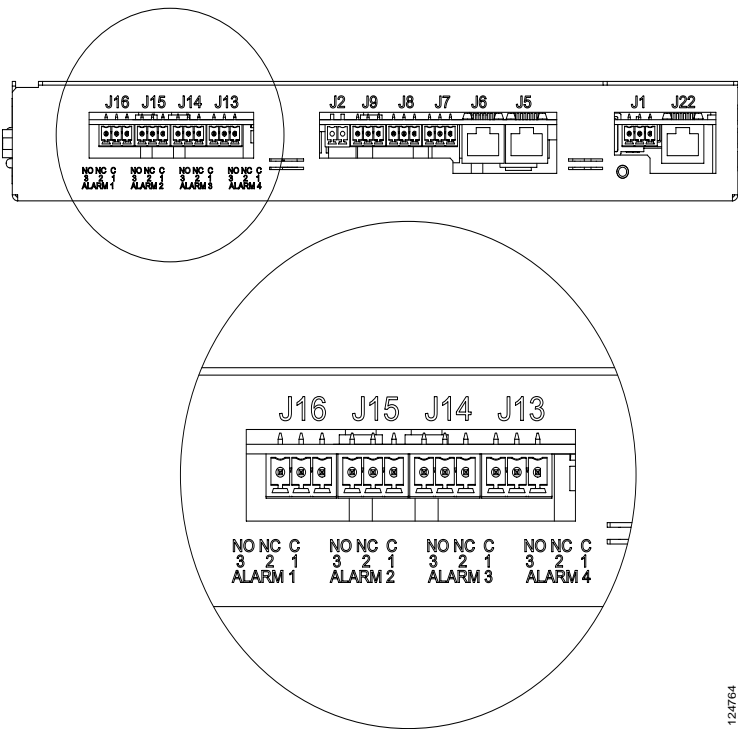**Step 3**   Terminal blocks can be removed to make alarm cable connections (Figure 17 #1).

Figure 17   Installing Alarm Cable

Service Loop

Tie-off Points

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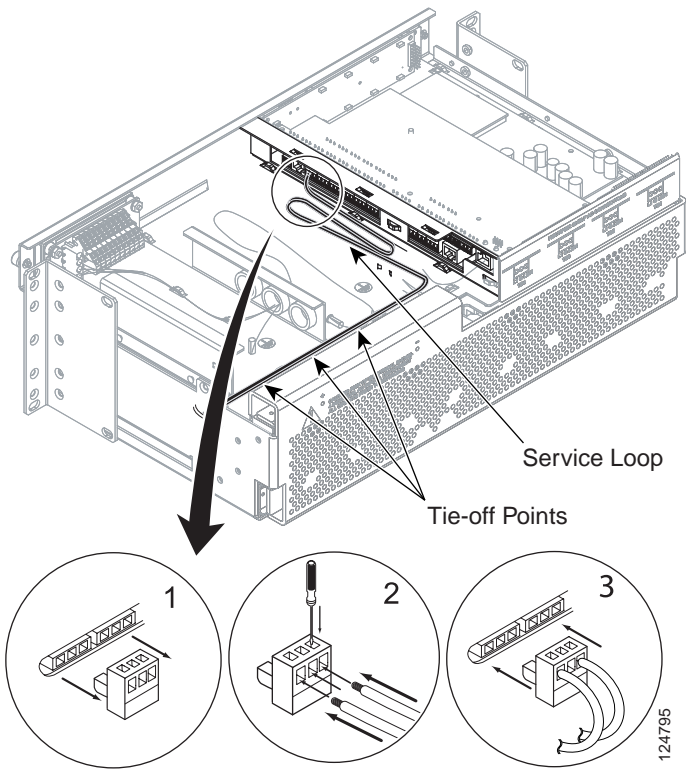
Note   Alarm contacts labeled 1 through 4, NO, C, and NC refer to the off state of the power system and alarmed condition (Figure 18).

Figure 18   Alarm Board Connections

Note   All alarm connections are for the unpowered state. When the power is off the NC is normally closed and when the power is on, the NC is open.

Step 4   The terminal blocks (green) will accept 26 to 22AWG (0.14 to 0.34mm) cables. Remove the terminal block (Figure 17 #1). Refer to Table 1 for information on alarms.

Table 2   Alarm Designations

Jumper	Alarm Designation	1	2	3	4
J16 (1-3)	Low Voltage	X			
J15 (1-3)	Mains Error		X		

Table 2   Alarm Designations

Jumper	Alarm Designation	1	2	3	4
J14 (1-3)	Module Failure			X	
J13 (1-3)	Fuse/Circuit Breaker Fail				X

Step 5   Insert the cable into the green connector and tighten the screw using a flat screwdriver (Figure 17 #2).

Step 6   Reinsert the terminal block (Figure 17 #3).

Step 7   Alarm cables are run from the rear of the system shelf (leaving enough of a service loop to allow the drawer to slide out) through the access window between the controller drawer and the GMT drawer area (Figure 17).

Step 8   Secure the alarm cables using the provided strain relief tie-offs to aid in cable management.

Install Load-and-Return Connections

This section explains how to install 1 RU Distribution Shelf and GMT load-and-return connections.

Install the 1 RU Distribution Shelf Load-and-Return Connections

The following section is for systems that use the 1 RU Distribution Shelf. For systems without the distribution shelf, skip this procedure and go to the "Install GMT Load-and-Return Connections" procedure on page 30.

**Step 1**   Select the correct wire gauge for the application (Table 2).

Table 3   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.

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 19 #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 19 #2, #3). Leave enough of a service loop to allow for the removal of the 1 RU Distribution Shelf.

Figure 19   Installing the 1 RU Load

A2 A1

B1
B2

Return

Load

1

2

3

4

124782
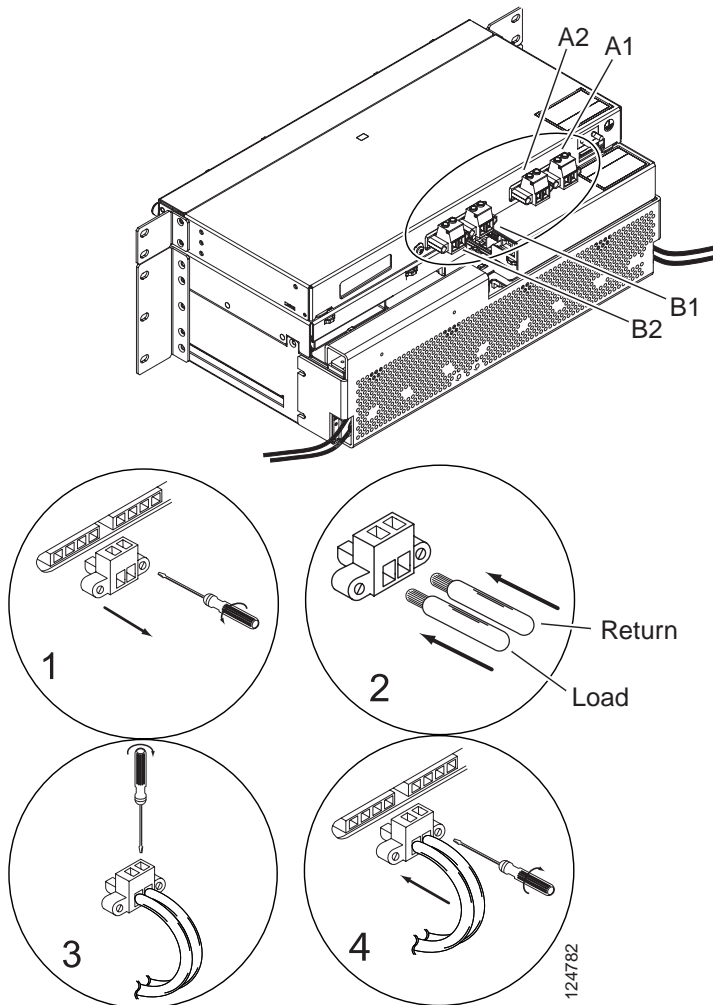
Step 5   Reconnect to the 1 RU Distribution Shelf (Figure 19 #4).
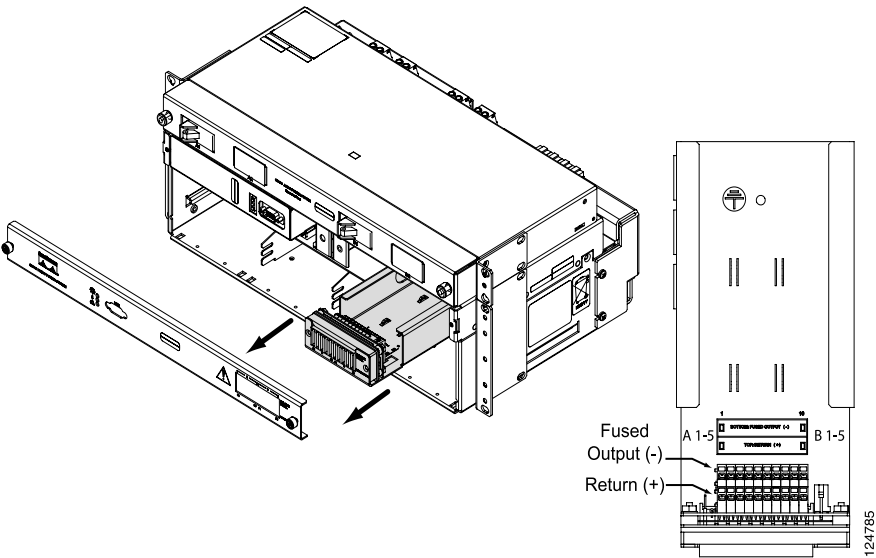
Step 6   Connect the load-and-return cables to the equipment that requires the supplied DC Power.

Step 7   Repeat for additional DC cabling.

Install GMT Load-and-Return Connections

Step 1 Locate the GMT fuse connections by removing the controller faceplate and sliding the GMT drawer out (Figure 20).

Figure 20   GMT Fuse Block Location

Step 2 Route the GMT load-and-return cabling from the rear of the system shelf (Table 4). Leave enough of a service loop to allow the drawer to slide out through the fuse panel channel, and secure the cabling using the supplied tie-downs (Figure 21).

Table 4   GMT Load Connection Wire Gauge

Fuse Size	Wire Gauge
2A GMT Fuse	22 AWG (0.34mm)
5A GMT Fuse	18 AWG (0.75mm)
10A GMT Fuse	14 AWG (2.5mm)
15A GMT Fuse	14 AWG (2.5mm)

Figure 21   Routing GMT Fuse Load Cables

Service Loop

Tie-off Points
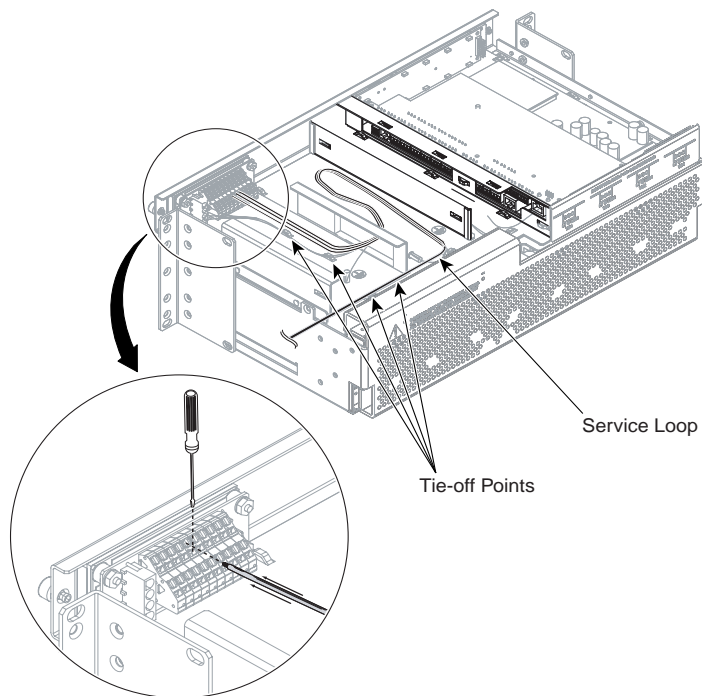
Step 3   Connect the wires to the appropriate terminal by using a flat screwdriver to open the terminal (Figure 21) and inserting the appropriate cable into the spring loaded terminals. Terminals correspond to fuses (side A (1-5) and side B (1-5) from left to right [as viewed from the front of the system]).
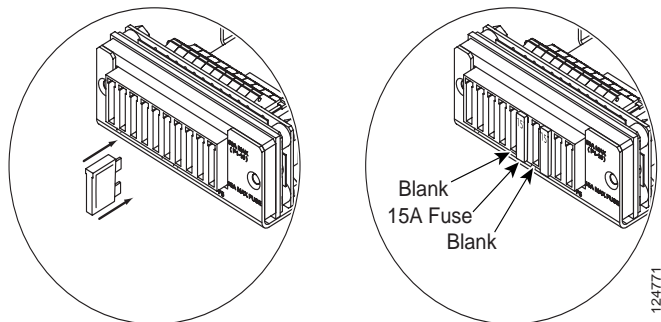
Step 4   Connect the cables to the equipment that requires the supplied DC power.

> **Note**   An empty space should be left on each side of any 15A GMT fuse used for thermal considerations (Figure 22).

Figure 22   Installing GMT Fuses

Blank
15A Fuse
Blank

124771

4 Commission the System

The following section should be used to power-up the system for the first time.

Step 1   Turn on AC breakers at the AC distribution panel to power up the shelf through the rectifiers.

Step 2   The controller and rectifier LEDs will start to blink. It may take a few minutes for the controller to communicate with all rectifiers.

Step 3   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*.

5 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

Ordering Documentation

You can find instructions for ordering documentation at this URL:

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

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  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).

6 Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

7 Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

http://www.cisco.com/techsupport

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

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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.

8 Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

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

- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

  http://cisco.com/univercd/cc/td/doc/pcat/

- *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:

http://www.cisco.com/packet

- *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:

http://www.cisco.com/ipj

- 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

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78-16642-02
DOC-7816642=