Juniper Networks | Engineering Simplicity

PTX5000 Packet Transport Router

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RELEASE

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Quick Start Description

This Quick Start contains information you need to install and configure the PTX5000. For complete installation instructions, see the *PTX5000 Packet Transport Router Hardware Guide* at https://www.juniper.net/documentation/.

> **WARNING**: This Quick Start contains a summary of safety warnings in "Safety Warnings" on page 80. For a complete list of warnings for the PTX5000, including translations, see the *PTX5000 Packet Transport Router Hardware Guide* at https://www.juniper.net/documentation/.

The PTX5000 router is shipped in a wooden crate. A wooden pallet forms the base of the crate. The chassis is bolted to this pallet. The shipping crate also contains an accessory box and this Quick Start.

Step 1: Prepare the Site for the PTX5000

IN THIS SECTION

Before installing the PTX5000, make sure that the site meets all the power, environmental, and clearance requirements. See the site preparation guidelines in the *PTX5000 Packet Transport Router Hardware Guide*.

Rack-Mounting Requirements

You can install the PTX5000 in different types of racks, including a four-post rack or cabinet, or an open-frame rack.

- The rack rails must be spaced widely enough to accommodate the chassis's external dimensions: 62.5 in. (158.8 cm) high, 33.1 in. (84.1 cm) deep, and 17.5 in. (44.5 cm) wide. The outer edges of the

mounting brackets extend the width to 19 in. (48.3 cm). The front cable management system adds 3.8 in. (9.7 cm) to the depth. If the front door is used, this adds 5.5 in. (14 cm) to the depth of the chassis. The rear cable management system adds 5.5 in. (14 cm) to the depth of the chassis.

- The rack must be strong enough to support the weight of the fully configured PTX5000, up to about 1,200 lb (544.3 kg).

> **NOTE**: In an open-frame rack, center-mounting is required because the more even distribution of weight provides greater stability. For center-mounting, you use the mounting brackets attached to the center of the chassis for rack mounting.

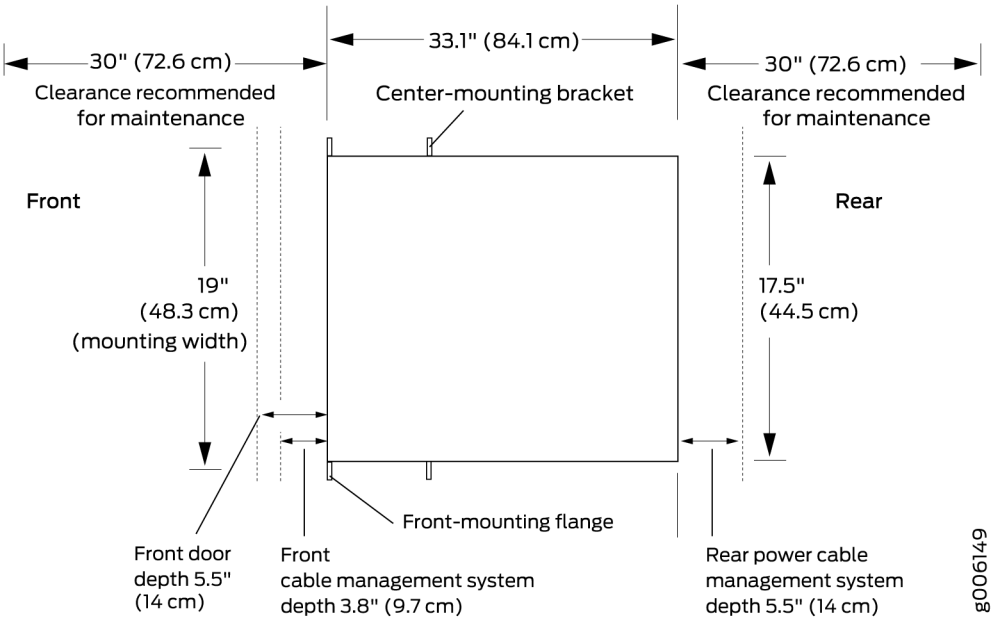
You must allow sufficient clearance around the rack (see Figure 1 on page 3):

- For the cooling system to function properly, the airflow around the chassis must be unrestricted.

> **NOTE**: If you mount the chassis in a cabinet, be sure that ventilation is sufficient to prevent overheating.

- For service personnel to remove and install hardware components, there must be adequate space at the front and back of the chassis. At least 24 in. (61.0 cm) are required both in front of and behind the PTX5000. NEBS GR-63 recommends that you allow at least 30 in. (72.6 cm) behind the rack.
- Additional clearance is required to accommodate the depth of the following components:
  - Front cable management system—3.8 in. (9.7 cm) additional depth in the front of the chassis.
  - Front door—5.5 in. (14 cm) additional depth in the front of the chassis.
  - Rear cable management system—5.5 in. (14 cm) additional depth in the rear of the chassis.

Figure 1: Chassis Dimensions and Clearance Requirements



Tools Required to Unpack and Install the PTX5000

Gather the tools required to unpack the PTX5000:

- Phillips (+) screwdriver, number 2
- 1/2-in. or 13-mm open-end or socket wrench to remove bracket bolts from the shipping pallet
- Blank panels to cover any slots not occupied by a component

Gather the tools required to install the PTX5000:

- Mechanical lift
- Phillips (+) screwdriver, number 2

Gather the tools required to ground the PTX5000:

- Grounding cable (which you must provide)
- Grounding lug (depending on your configuration, 0-AWG or 4-AWG (21.2 mm^2) cable lugs are supplied with DC PDUs, and can be used for grounding.)
- M6 screws or UNC 1/4-20 screws

- Electrostatic discharge (ESD) grounding wrist strap

If you have an AC-powered router, gather the tools required to connect the PTX5000 to AC power:

- AC power cords
- Phillips (+) screwdriver, number 2 to access the metal AC wiring compartment and remove or attach the AC power cord.
- 1/5-in. (5.5-mm) slotted screwdriver to attach the ground wire and input terminal wires of the AC power cord.

If you have a DC-powered router, gather the tools required to connect the PTX5000 to DC power:

- 7/16-in. (11-mm) nut driver, between 23 lb-in. to 25 lb-in. (2.6 Nm to 2.8 Nm) tightening torque, for tightening nuts to the terminal studs.

  CAUTION: You must use an appropriate torque-controlled tool to tighten the nuts. Applying excessive torque damages the terminal studs. The maximum torque that may be applied to this nut is 62 lb-in. (7 Nm).

- Phillips (+) screwdriver, number 2
- DC power cables, which you must provide
- DC power lugs

Step 2: Unpack the PTX5000

For detailed instructions on how to unpack the shipping crate and verifying the parts received, see the *PTX5000 Packet Transport Router Hardware Guide*.

Step 3: Install the PTX5000 Mounting Hardware

IN THIS SECTION

To install the mounting hardware, perform one of the following procedures:

Install the PTX5000 Mounting Hardware for a Four-Post Rack or Cabinet

IN THIS SECTION

Install Cage Nuts, If Needed

Insert cage nuts, if needed, into the holes listed in Table 1 on page 6 and Table 2 on page 6 (an X indicates a mounting hole location). The hole distances are relative to the standard U division on the rack that is aligned with the bottom of the mounting shelf and rear support bracket.

To install cage nuts in a four-post rack:

1. On the rear rack rails, insert cage nuts in the holes specified for the rear support bracket. Install the cage nuts in the rear of the rear rail (see Table 1 on page 6).
2. On the front rack rails, insert cage nuts in the holes specified for the four-post mounting shelf. Install the cage nuts in the front of the front rail (see Table 1 on page 6).
3. On the front rack rails, insert cage nuts in the holes specified for mounting the chassis. Install the cage nuts in the front of the front rail (see Table 2 on page 6).

Table 1: Mounting Hole Locations for Installing the Four-Post Mounting Shelf and Rear Support Bracket

Hole	Distance Above U Division		Four-Post Rack Mounting Shelf	Rear Support Bracket
6	3.25 in. (8.3 cm)	1.86 U	X	X
5	2.63 in. (6.7 cm)	1.5 U	X	X
4	2.00 in. (5.1 cm)	1.14 U	X	X
3	1.50 in. (3.8 cm)	0.86 U	X	X
2	0.88 in. (2.2 cm)	0.50 U	X	X
1	0.25 in. (0.6 cm)	0.14 U	X	X

Table 2: Mounting Hole Locations for Installing a PTX5000 in a Four-Post Rack

Hole	Distance Above U Division	
110	63.88 in. (162.2 cm)	36.50 U
101	58.63 in. (148.9 cm)	33.50 U
92	53.38 in. (135.6 cm)	30.50 U
83	48.13 in. (122.2 cm)	27.50 U
74	42.88 in. (108.9 cm)	24.50 U
65	37.63 in. (95.6 cm)	21.50 U
56	32.38 in. (82.2 cm)	18.50 U

Table 2: Mounting Hole Locations for Installing a PTX5000 in a Four-Post Rack *(Continued)*

Hole	Distance Above U Division	
47	27.13 in. (68.9 cm)	15.50 U
38	21.88 in. (55.6 cm)	12.50 U
29	16.63 in. (42.2 cm)	9.50 U
20	11.38 in. (28.9 cm)	6.50 U
11	6.13 in. (15.6 cm)	3.50 U

The holes in the front-mounting flanges are spaced at 3 U (5.25 in. or 13.3 cm).

Install the Four-Post Mounting Shelf and Rear Support Bracket

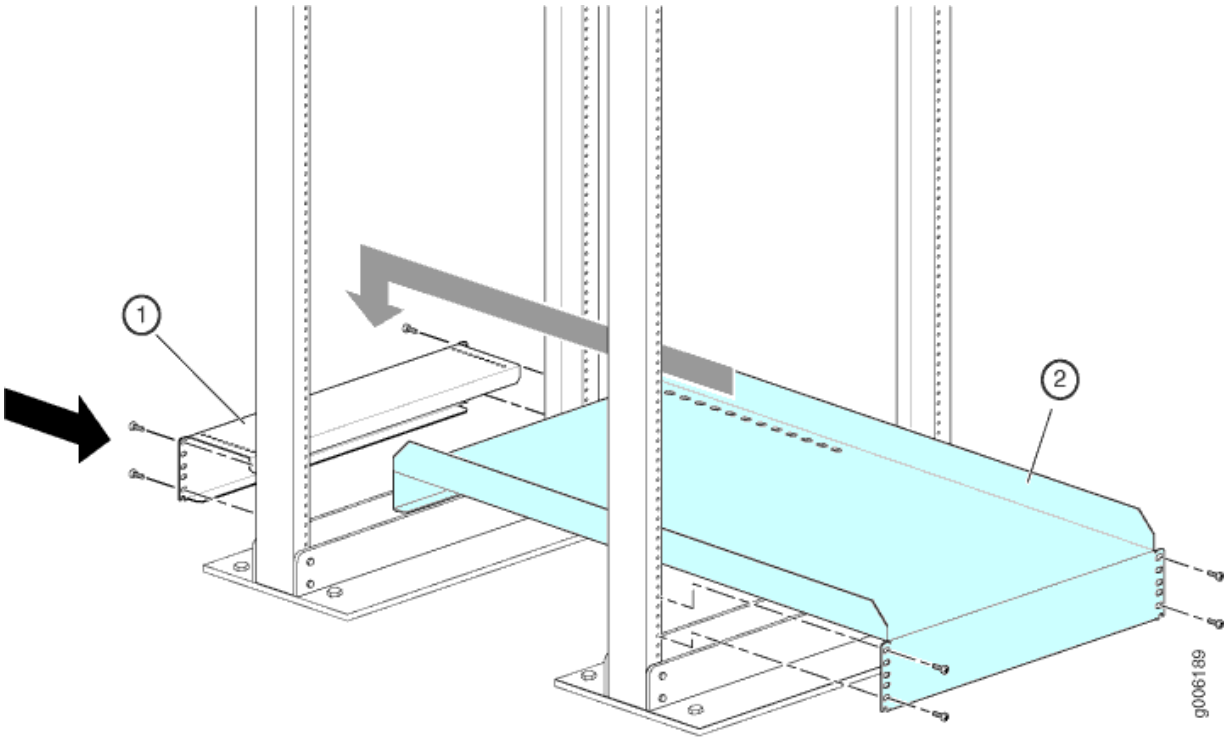
To install the four-post mounting shelf and rear support bracket (see Figure 2 on page 8):

1. On the rear of each rear rack rail, partially insert a mounting screw into the lowest hole specified in Table 1 on page 6.
2. Install the rear support bracket on the rear of the rear rack rails. Rest the bottom slot of the rear support bracket on a mounting screw. The rear support bracket extends toward the center of the rack.
3. Partially insert screws into the open holes in the rear support bracket.
4. Tighten all the screws completely.
5. On the front of each front rack rail, partially insert a mounting screw into the lowest hole specified in Table 1 on page 6.
6. Install the four-post rack mounting shelf on the front rack rails. Rest the bottom slot of the front flange on a mounting screw. Rest the back of the four-post rack mounting shelf on top of the rear support bracket.
7. Partially insert screws into the open holes in the mounting shelf.
8. Tighten all the screws completely.
9. Fasten the four-post mounting shelf to the rear support bracket by partially inserting the screws provided in the accessory kit into the open holes on top of the four-post mounting shelf.

NOTE: Several holes are provided on top of the shelf. Two holes on each side of the shelf will align with the holes in the rear support bracket.

10. Tighten all the screws completely.

Figure 2: Installing the Mounting Hardware for a Four-Post Rack



1– Rear support bracket	2– Four-post mounting shelf

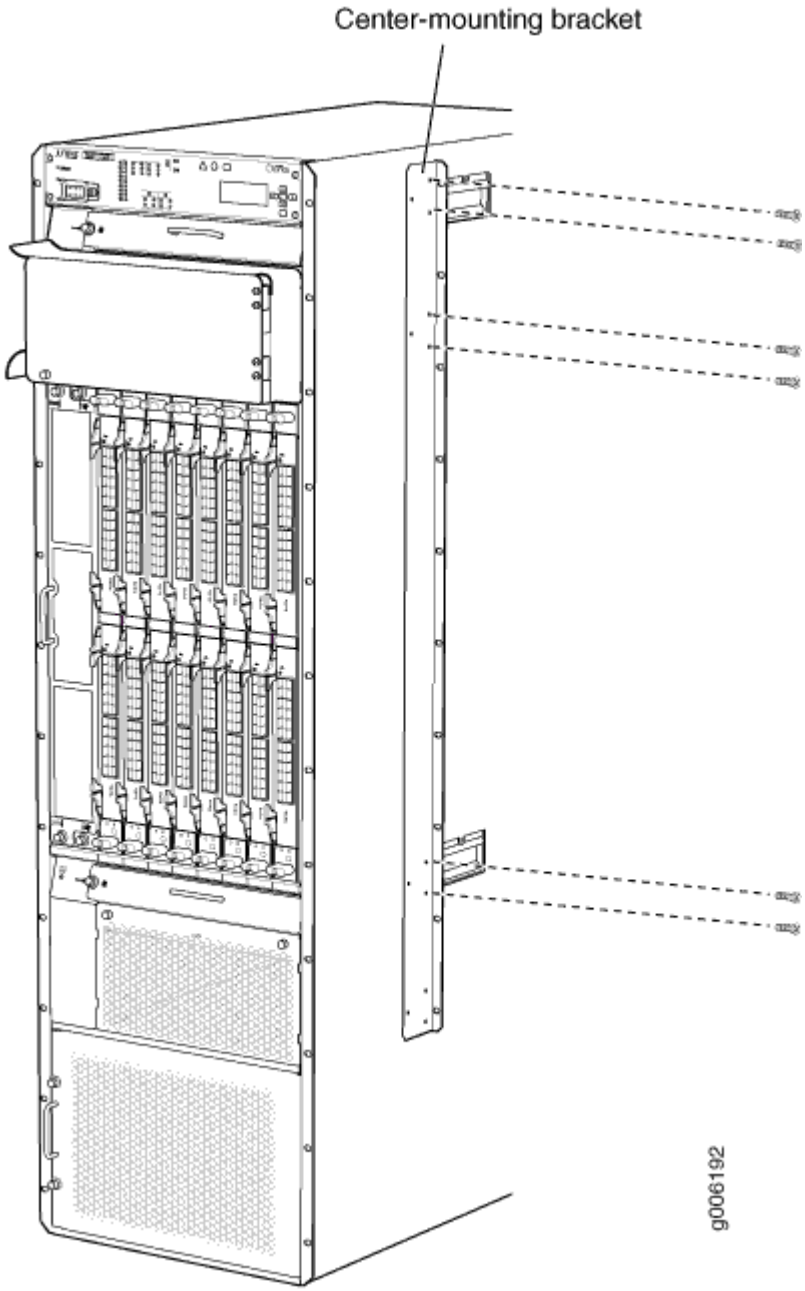
Remove the Center-Mounting Brackets

The center-mounting brackets are not used for a four-post rack, and must be removed from the chassis.

To remove the center-mounting brackets from the chassis:

1. Loosen the screws from each bracket (see Figure 3 on page 9).
2. Remove each bracket.

Figure 3: Removing the Center-Mounting Bracket



Install the PTX5000 Mounting Hardware for an Open-Frame Rack

IN THIS SECTION

Install Cage Nuts, If Needed

Insert cage nuts, if needed, into the holes listed in Table 3 on page 10 and Table 4 on page 11. The hole distances are relative to the standard U division on the rack that is aligned with the bottom of the mounting shelf and rear support bracket.

To install cage nuts in an open-frame rack:

1. On the rear side of both rack rails, insert cage nuts in the holes specified for the open-frame mounting shelf (see Table 3 on page 10).
2. On the front side of both rack rails, insert cage nuts in the holes specified for mounting the chassis (see Table 4 on page 11).

Table 3: Mounting Hole Locations for Installing a PTX5000 Open-Frame Rack Shelf

Hole	Distance Above U Division	
30	17.25 in. (43.8 cm)	9.86 U
27	15.5 in. (39.4 cm)	8.86 U
21	12.0 in. (30.5 cm)	6.86 U
15	8.5 in. (21.6 cm)	4.86 U
9	5.0 in. (12.7 cm)	2.86 U
3	1.5 in. (3.8 cm)	0.86 U

The holes in the center-mounting brackets are spaced at 3 U (5.25 in. or 13.3 cm).

Table 4: Mounting Hole Locations for Installing a Chassis in an Open-Frame Rack

Hole	Distance Above U Division	
104	60.38 in. (153.4 cm)	34.50 U
95	55.13 in. (140.0 cm)	31.50 U
86	49.88 in. (126.7 cm)	28.50 U
77	44.63 in. (113.3 cm)	25.50 U
68	39.38 in. (100.0 cm)	22.50 U
59	34.13 in. (86.7 cm)	19.50 U
50	28.88 in. (73.3 cm)	16.50 U
41	23.63 in. (60.0 cm)	13.50 U
32	18.38 in. (46.7 cm)	10.50 U
23	13.13 in. (33.3 cm)	7.50 U

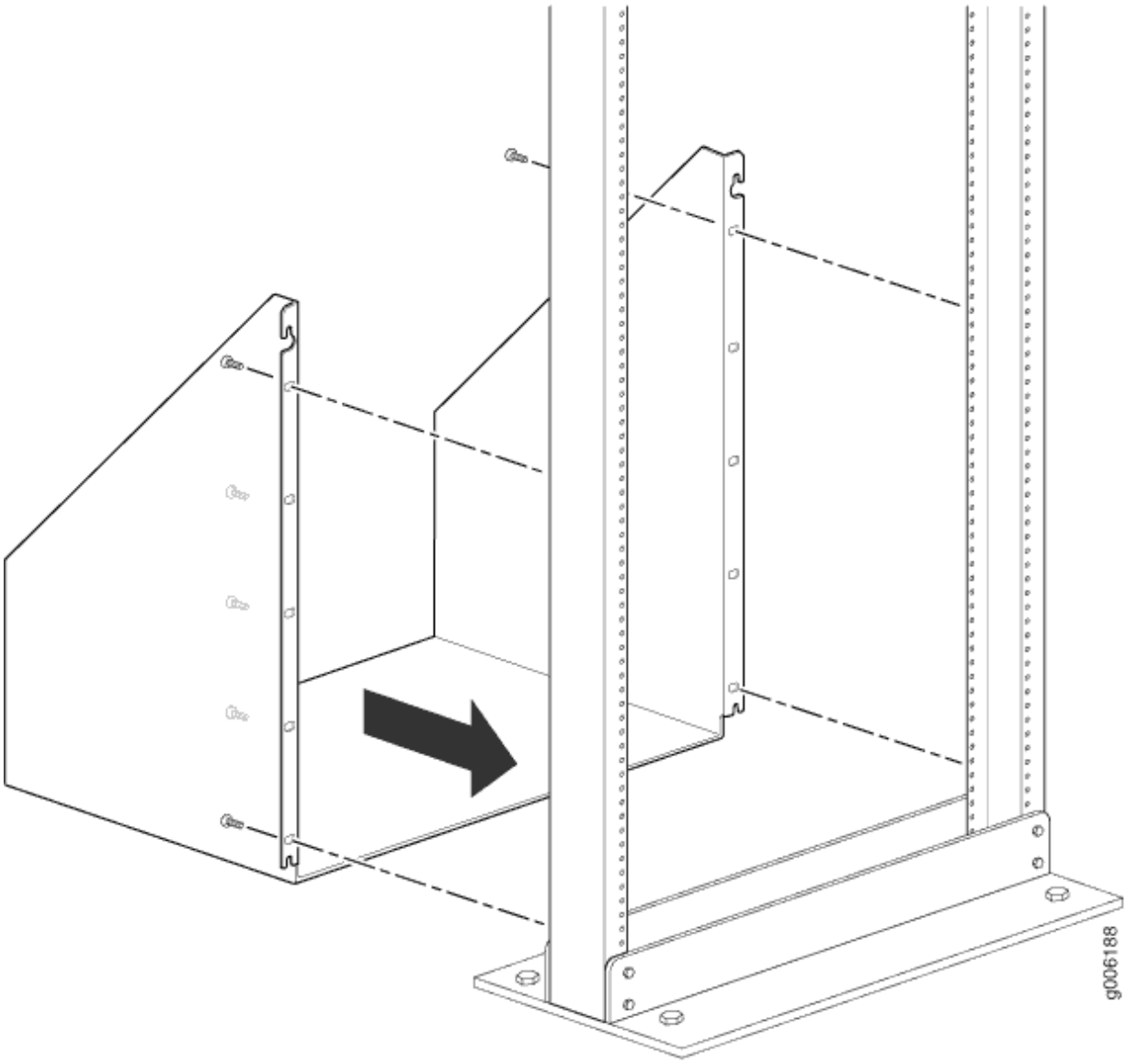
Install the Open-Frame Rack Mounting Shelf

Before mounting the chassis in an open-frame rack, you must first install the open-frame rack mounting shelf.

To install the open-frame rack mounting shelf (see Figure 4 on page 12):

1. On the rear of each rack rail, partially insert a mounting screw into the highest hole specified in Table 3 on page 10 for the open-frame rack mounting shelf.
2. Install the open-frame rack mounting shelf on the rack. Hang the shelf over the mounting screws by using the keyhole slots located near the top of the shelf flanges.
3. Partially insert screws into the open holes in the flanges of the open-frame rack mounting shelf.
4. Tighten all the screws completely.

Figure 4: Installing the Mounting Hardware for an Open-Frame Rack



Step 4: Install the PTX5000

CAUTION: Before installing the PTX5000:

- Ensure that a mechanical lift is available for the installation. Because of the PTX5000 router's size and weight—up to 1,200 lb (544.3 kg) depending on configuration—you must use a lift to install the chassis.
- Have a qualified technician verify that the rack is strong enough to support the chassis weight and is adequately supported at the installation site.
- Ensure that the rack is in its permanent location and is secured to the building.
- Ensure that the installation site allows adequate clearance for both airflow and maintenance.

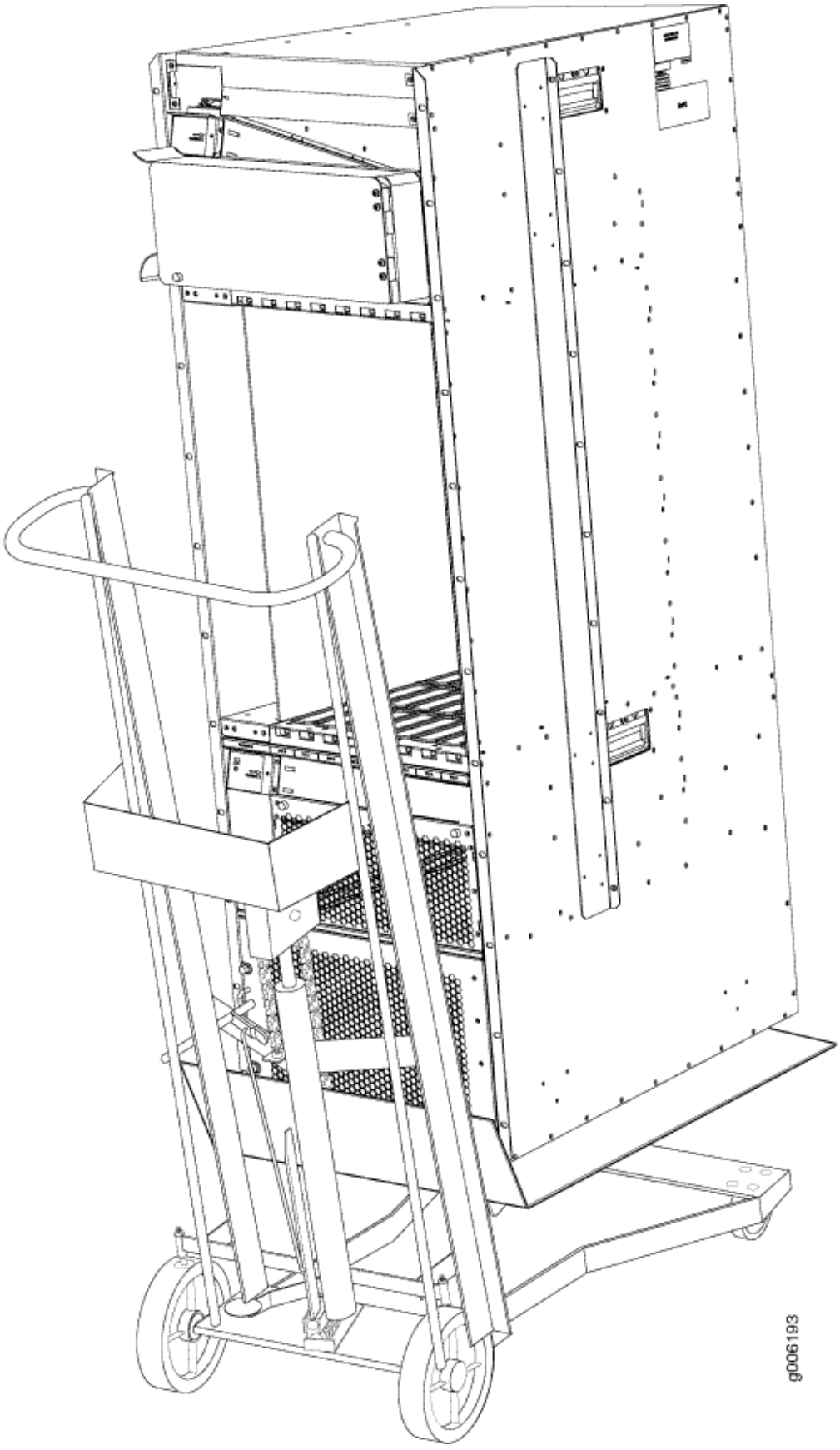
To install the PTX5000 by using a lift (see Figure 5 on page 14, Figure 6 on page 15, and Figure 7 on page 16):

1. Load the PTX5000 onto the lift, making sure that the chassis rests securely on the mechanical lift.

   ⚠ **CAUTION**: Do not lift the PTX5000 by using the handles on the sides of the chassis. Use these handles only to help position the PTX5000.

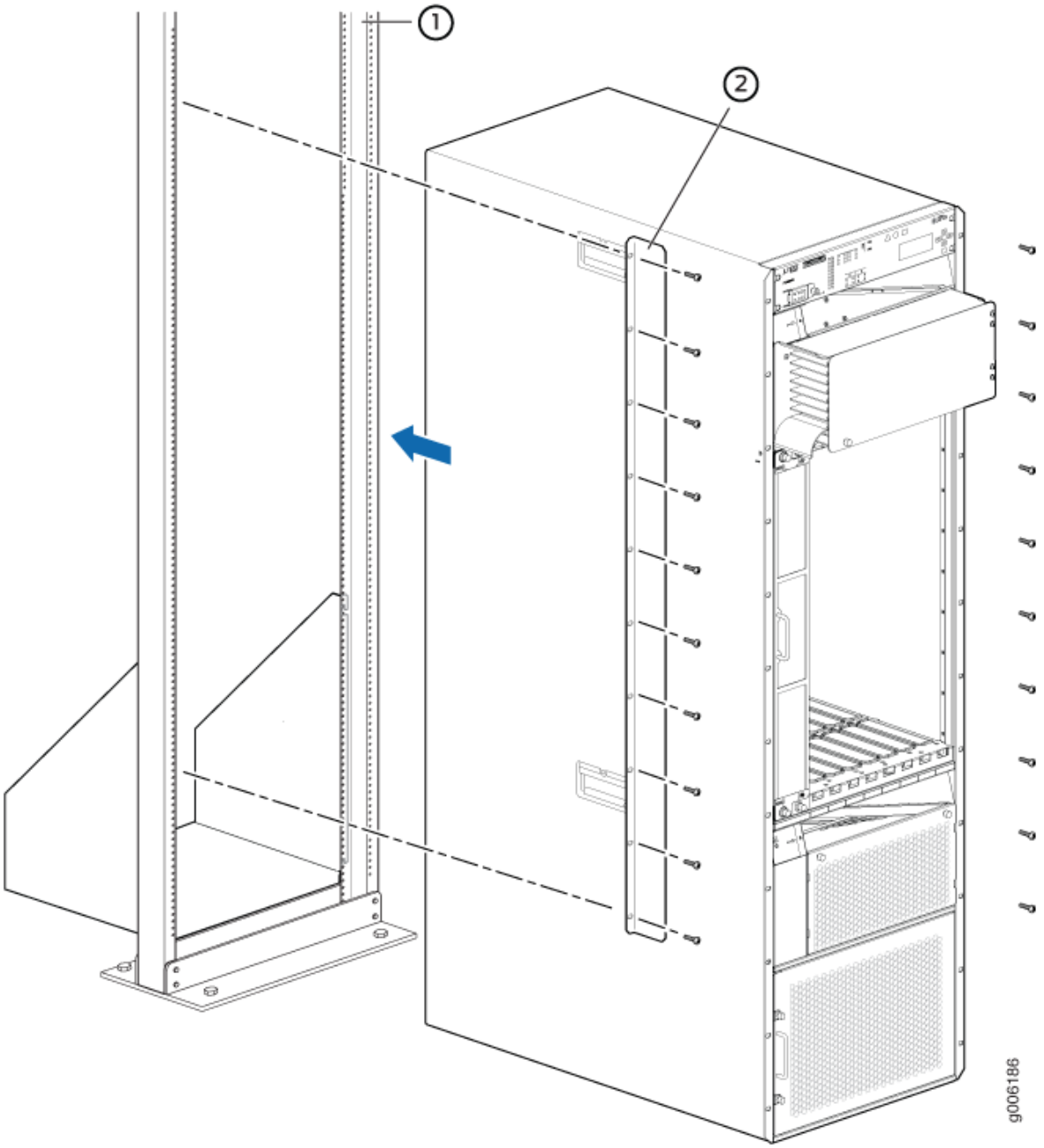
2. Using the lift, position the PTX5000 in front of the rack, centering it in front of the mounting shelf.
3. Lift the chassis slightly above the surface of the mounting shelf, and position it as close as possible to the shelf.
4. Carefully slide the PTX5000 onto the mounting shelf, so that the bottom of the chassis and the mounting shelf overlap by approximately 2 inches.
5. With four people pushing on the front-mounting flanges, slide the PTX5000 onto the mounting shelf until the center-mounting brackets (open-frame racks) or front-mounting flanges (four-post racks) contact the rack rails. The shelves ensure that the holes in the center-mounting brackets and the front-mounting flanges of the chassis align with the holes in the rack rails.
6. Visually inspect the alignment of the PTX5000. If the chassis is installed properly in the rack, all the mounting screws on one side of the rack should be aligned with the mounting screws on the opposite side, and the chassis should be level.
7. Install a mounting screw into each of the mounting holes aligned with the rack, starting from the bottom.
8. Move the lift away from the rack.

Figure 5: Loading the PTX5000 onto the Lift



The holes in the center-mounting brackets are spaced at 3 U (5.25 in. or 13.3 cm).

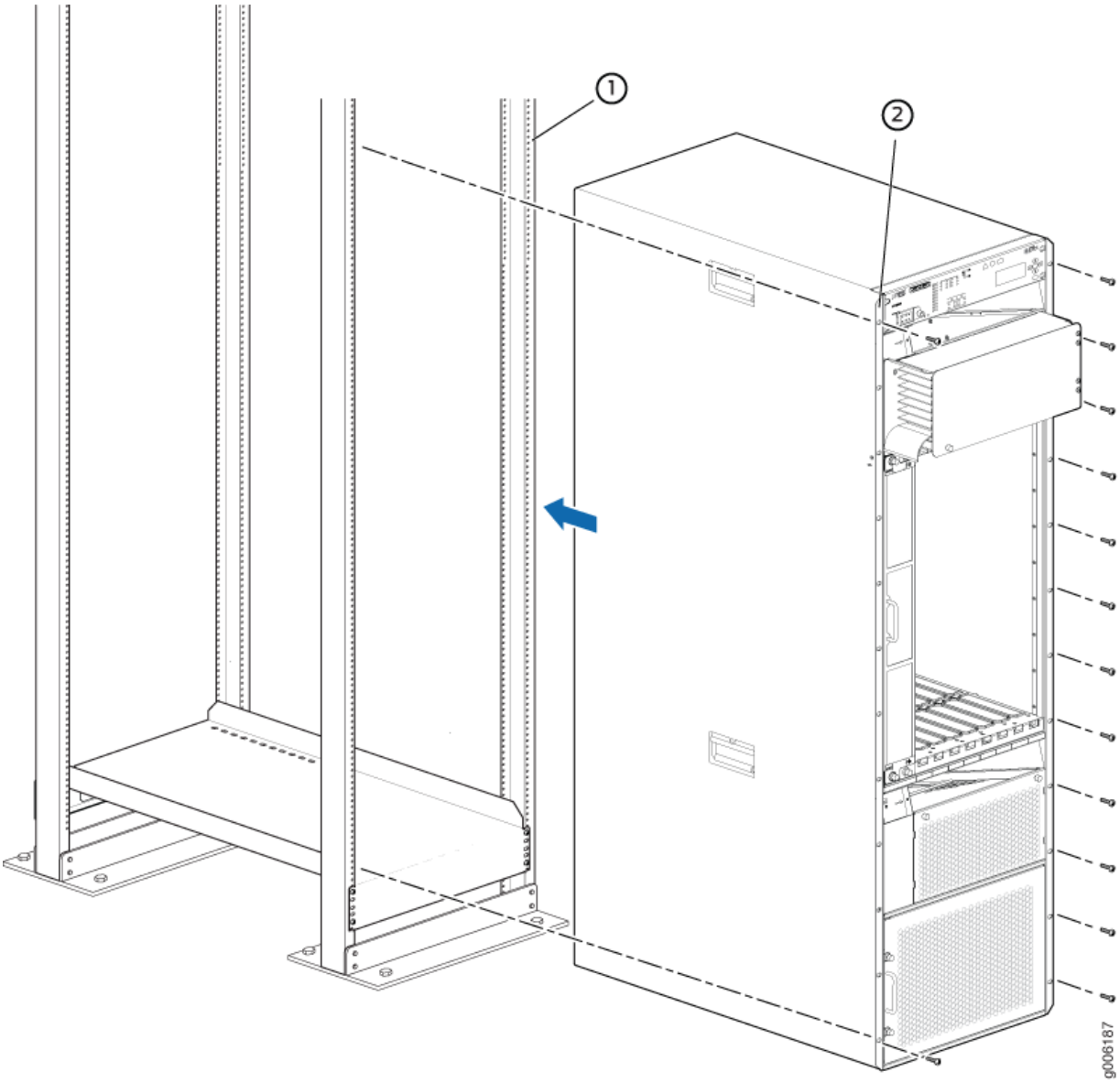
Figure 6: Installing the PTX5000 in an Open-Frame Rack



1– Open-frame rack	2– Center-mounting bracket

The holes in the front-mounting flanges are spaced at 3 U (5.25 in. or 13.3 cm).

Figure 7: Installing the PTX5000 in a Four-Post Rack



1– Four-post rack	2– Front-mounting flange

Step 5: Connect the PTX5000 Grounding Cable

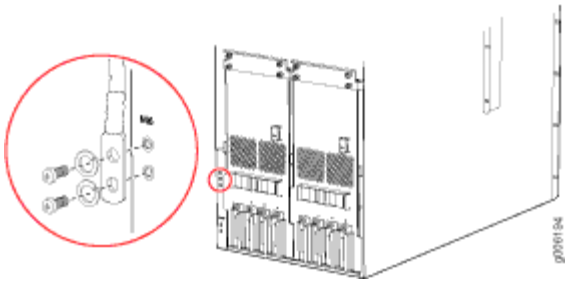
You ground the PTX5000 by attaching a grounding cable to the chassis. You must provide the grounding cable. Depending on your configuration, 0-AWG or 4-AWG (21.2 mm^2) cable lugs are supplied with DC

PDUs, and can be used for grounding. See *PTX5000 Chassis Grounding Cable and Lug Specifications* for more information.

To ground the PTX5000 (see Figure 8 on page 17):

1. Connect the grounding cable to a proper earth ground.
2. Verify that a licensed electrician has attached the cable lug provided with the PTX5000 to the grounding cable.
3. Make sure that grounding surfaces are clean and brought to a bright finish before grounding connections are made.
4. Place the grounding cable lug over the grounding points on the bottom rear of the chassis. The top pair is sized for M6 screws, and the bottom pair is sized for UNC 1/4-20 screws. You can use either pair of grounding points. UNC 1/4-20 screws are provided in the accessory kit.
5. Secure the grounding cable lug to the grounding points, first with the washers, then with the screws.
6. Verify that the grounding cabling is correct, that the grounding cable does not touch or block access to the PTX5000 components, and that it does not drape where people could trip on it.

Figure 8: Connecting the Grounding Cable



Step 6: Install the Front Door on a PTX5000

Optionally, you can install a door over the front card cage of the PTX5000. For more information, see the following documentation:

- *Installing the Front Door on a PTX5000 in a Four-Post Rack*
- *Installing the Front Door on a PTX5000 in an Open-Frame Rack*

Step 7: Connect External Devices and PIC Cables to the PTX5000

IN THIS SECTION

To connect external devices and PIC cables, perform the following procedures:

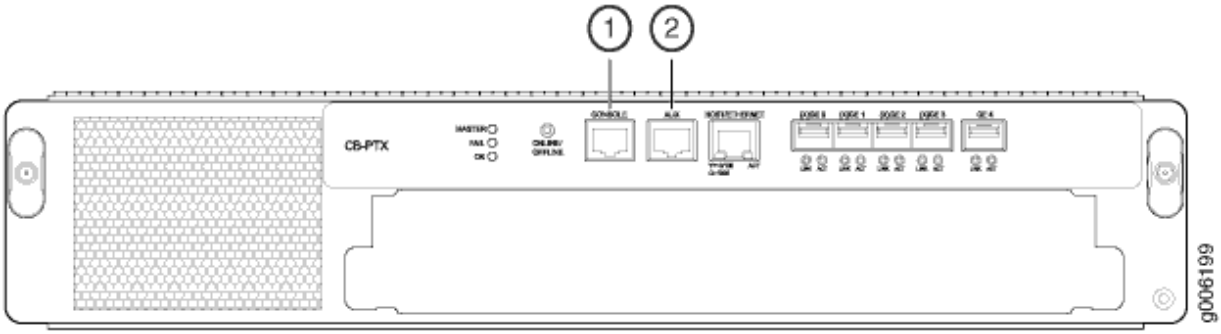
Connect to a Console or Auxiliary Device

Attach one or more management console or auxiliary devices to the Routing Engine ports on each Control Board for management and service operations (see Figure 9 on page 19).

To connect the cables to a management console or auxiliary device:

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
2. If necessary, turn off the power to the console or auxiliary device.
3. Plug one end of a copper cable with RJ45 connectors into the **CONSOLE** or **AUXILIARY** port on the Control Board in slot **CB0**. This port connects to the Routing Engine installed into the Control Board in slot **CB0**.
4. Attach the other end of the cable to the console or auxiliary device.
5. Plug one end of another copper cable with RJ45 connectors into the **CONSOLE** or **AUXILIARY** port on **CB1**. This port connects to the Routing Engine installed into the control in slot **CB1**.
6. Attach the other end of the cable to the console or auxiliary device.

Figure 9: Connecting to the Console or Auxiliary Port on the Control Board



1– Console port	2– Auxiliary port

Connect to a Network for Out-of-Band Management

To connect the Routing Engines in a PTX5000 to a network for management of the PTX5000, connect a UTP Category 5 Ethernet cable with an RJ45 connector to the **HOST/ETHERNET** port on a Control Board.

NOTE: For PTX5000 routers with two host subsystems, we recommend that you connect both Control Boards to a network. To connect another cable to the **HOST/ETHERNET** port on the other Control Board, you need an additional cable.

To connect a cable to a network device:

1. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.

   ⚠ **CAUTION**: During the initial installation before the chassis is grounded, you must connect to an approved site ESD point. See the instructions for your site.

2. Plug one end of a UTP Category 5 Ethernet cable (Figure 10 on page 20 shows the connector) into the **HOST/ETHERNET** port on the Control Board in slot **CB0** (see Figure 11 on page 20). This port connects to the Routing Engine installed into the Control Board in slot **CB0**.
3. Plug the other end of the cable into the network device.
4. Plug one end of another UTP Category 5 Ethernet cable into the **HOST/ETHERNET** port on the Control Board in slot **CB1**. This port connects to the Routing Engine installed into the Control Board in slot **CB1**.

5. Plug the other end of the cable into the network device.

Figure 10: Routing Engine Ethernet Cable Connector

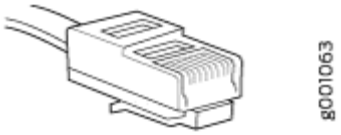
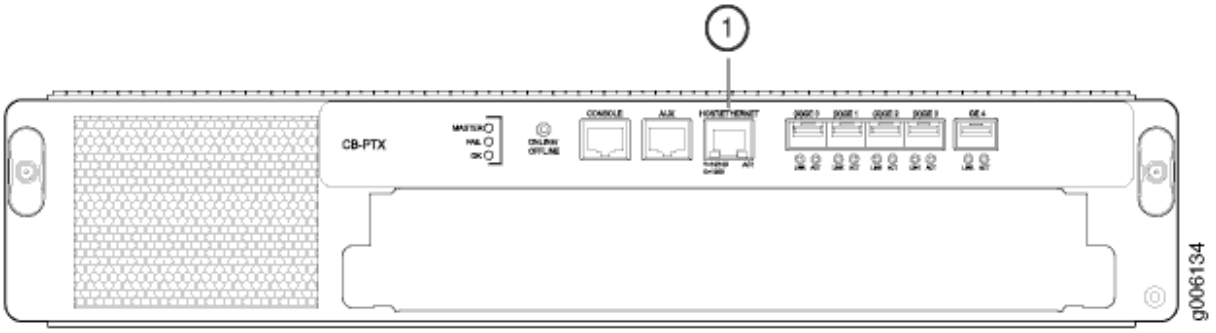


Figure 11: Connecting to the HOST/ETHERNET Port on the Control Board



1– HOST/ETHERNET port

Connect the PIC Cables

The PTX5000 supports PICs that use various kinds of network cable, including multimode and single-mode fiber-optic cable. For information about the type of cable used by each PIC, see the PTX Series Interface Module Reference.

You connect PICs to the network by plugging in network cable. To connect cable to the PICs (see Figure 12 on page 22):

1. Have ready a length of the type of cable used by the PIC. See the PTX Series Interface Module Reference.
2. If the PIC cable connector port is covered by a rubber safety plug, remove the plug.

LASER WARNING: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

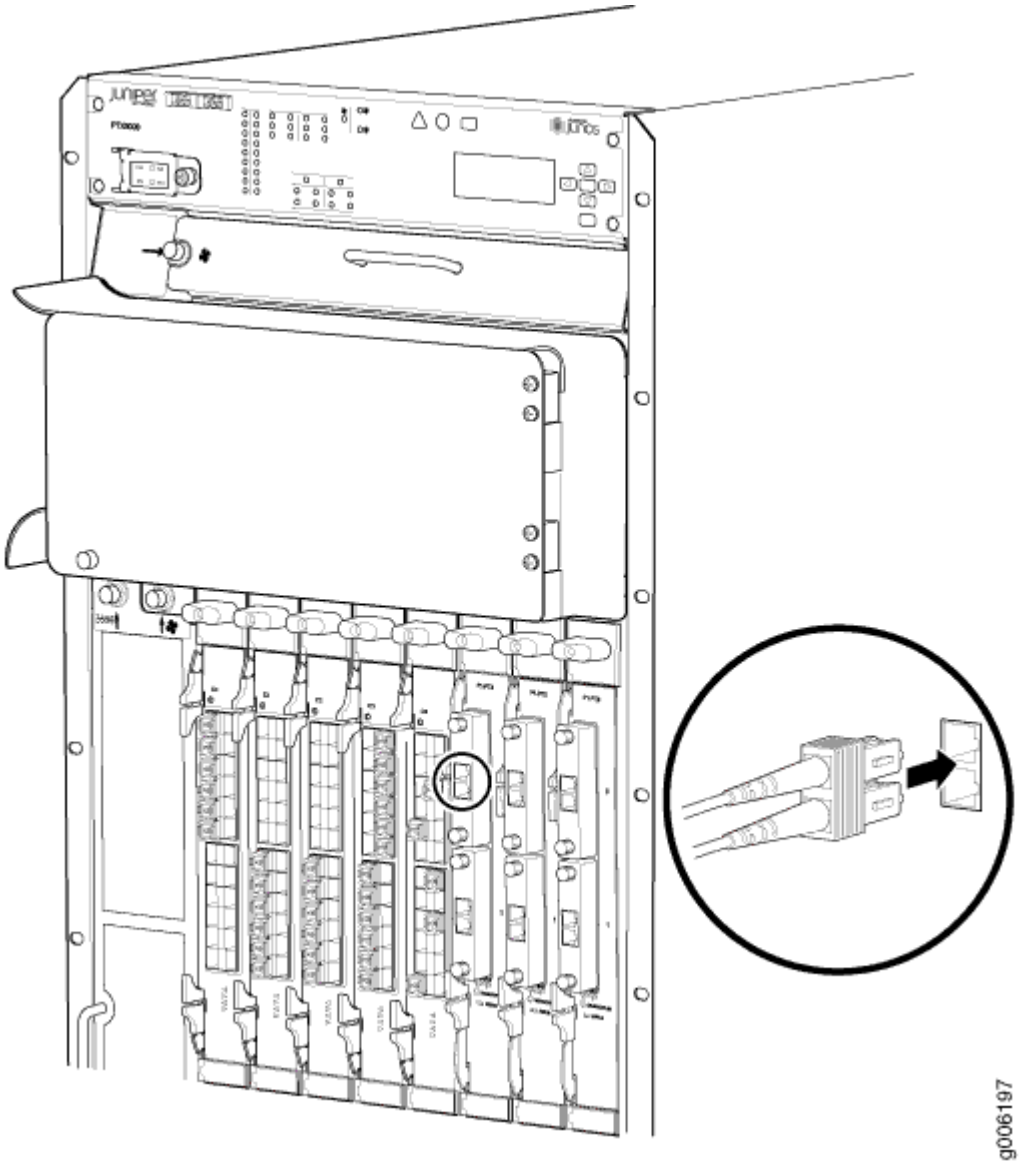
CAUTION: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and prevents accidental exposure to laser light.

3. Insert the cable connector into the cable connector port on the PIC faceplate.
4. Arrange the cable in the cable management system to prevent it from dislodging or developing stress points. Secure the cable so that it is not supporting its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

CAUTION: Avoid bending fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

CAUTION: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

Figure 12: Connecting PIC Cables



Step 8: Connect Power to the PTX5000 Router

IN THIS SECTION

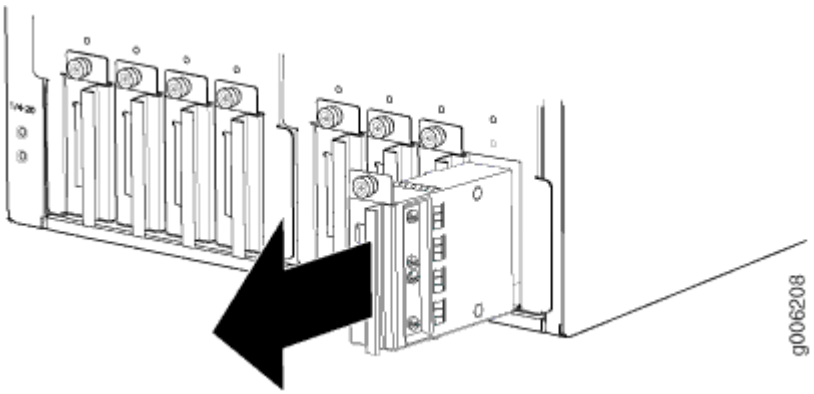
Depending on the type of power distribution units (PDUs) you have installed, perform the appropriate procedure:

Connect Power to the PTX5000 60-A DC Input Power Trays

To connect the DC source power cables to the 60-A DC inputs:

1. Verify that a properly rated customer-site circuit breaker for each DC power cable has been installed. See *PTX5000 DC Power Electrical Safety Guidelines* in the *PTX5000 Packet Transport Router Hardware Guide* for more information.
2. Switch off the customer-site circuit breakers. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.
3. Verify that a licensed electrician has attached appropriate cable lugs to the DC power cables. See *PTX5000 DC Power Cable and Lugs Specifications* in the *PTX5000 Packet Transport Router Hardware Guide* for more information.
4. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
5. Switch the input power switches on the PDU faceplate to the off (**O**) position.
6. Loosen the captive screw that fastens the input power tray to the PDU .
7. Grasp the metal handle of the input power tray, and pull it out to remove the input power tray from the PDU (see Figure 13 on page 24. The 60-A DC input power tray weighs 1.6 lb (0.7 kg).

Figure 13: Removing the 60-A DC Input Power Tray



8. Use a Phillips (+) screwdriver to loosen the screw on the metal input power tray cover.
9. Open the metal input power tray cover.
10. Loosen the cable restraints.
11. Remove the nuts from the DC power terminal studs.
12. Route the positive (+) DC source power cable through the cable restraint, and connect it to the **RTN –1** input terminal (see Figure 14 on page 25). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal (see Figure 15 on page 26).

> **CAUTION**: You must use an appropriate torque-controlled tool to tighten the nuts. Applying excessive torque damages the terminal studs and power supply. The maximum torque that may be applied to this nut is 99 lb-in. (11 Nm).

Figure 14: 60-A DC Input Terminals

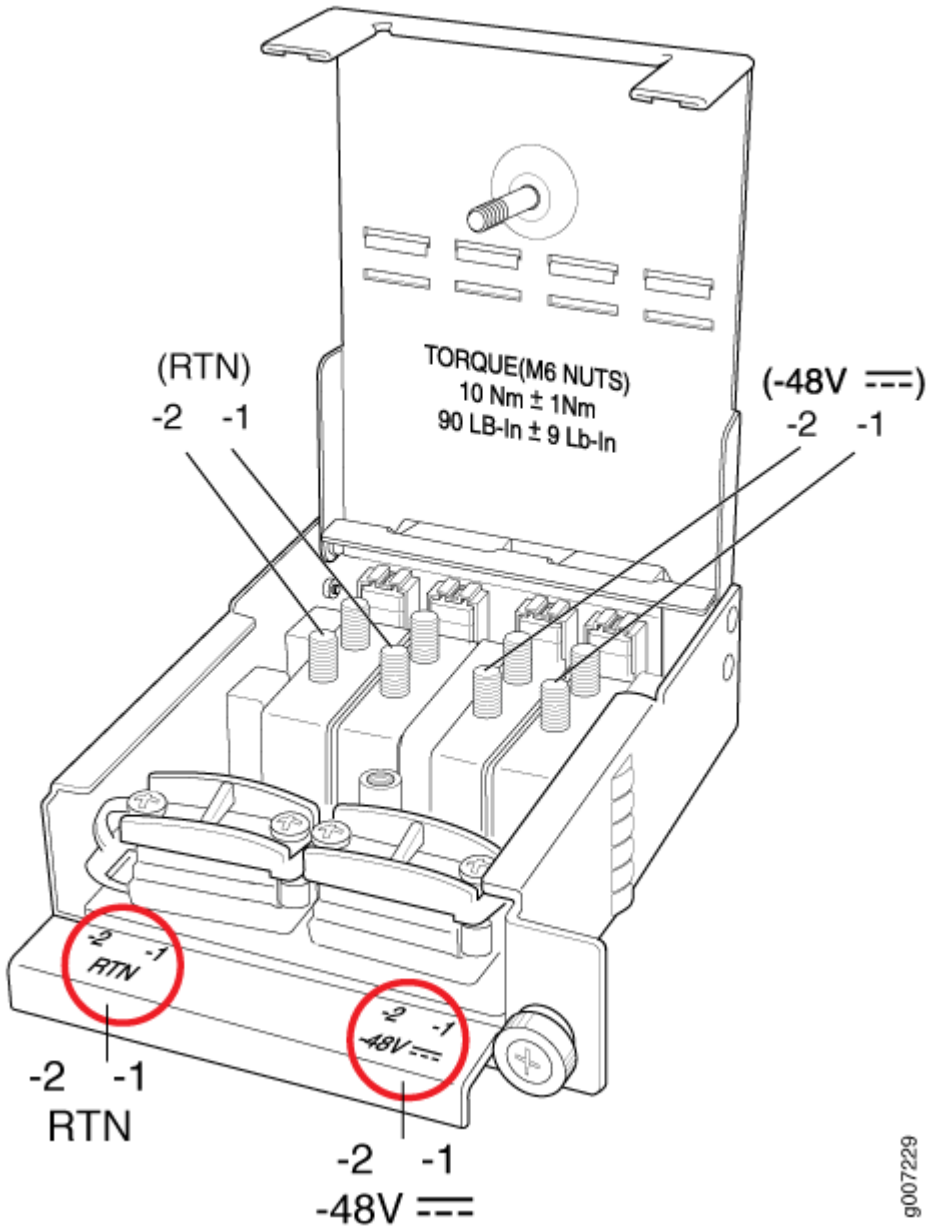
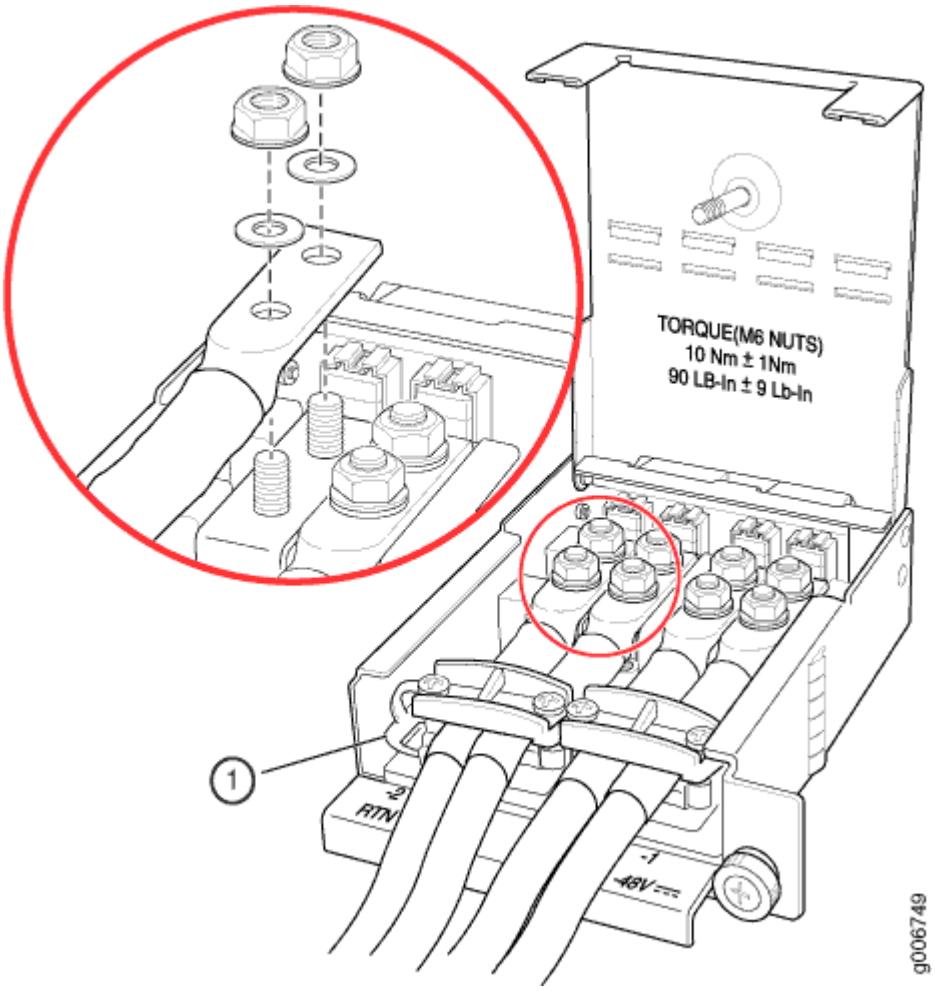


Figure 15: Connecting the DC Source Power Cable Lugs to an Input Power Tray

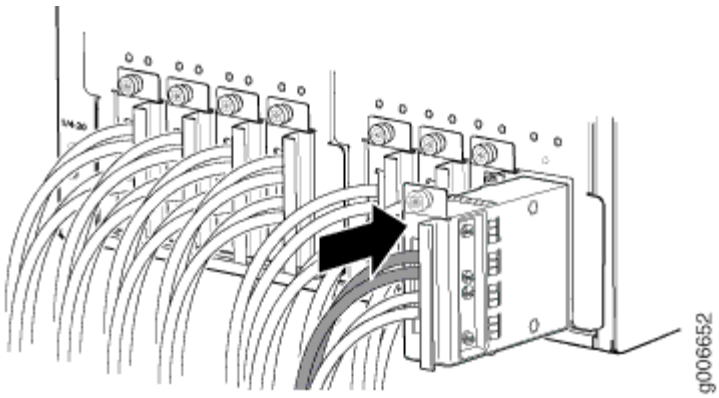


CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled **(+)** and **(–)** to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

CAUTION: All inputs on the DC PDU in slot **PDU0** must be powered by dedicated power feeds derived from feed A, and all inputs on the DC PDU in slot **PDU1** must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

13. Route the positive (+) DC source power cable through the cable restraint, and connect it to the **RTN –2** input terminal (see Figure 14 on page 25). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal.
14. Route the negative (–) DC source power cable through the cable restraint, and connect it to the **-48 V –1** input terminal (see Figure 14 on page 25). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal.
15. Route the negative (–) DC source power cable through the cable restraint, and connect it to the **-48 V –2** input terminal (see Figure 14 on page 25). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal (see Figure 15 on page 26).
16. Tighten the cable restraints over the DC power cables.
17. Verify that the source power cables are connected to the appropriate terminal: the positive (+) source cable to the return terminals (labeled **RTN**) and the negative (–) source cable to the input terminals (labeled **–48V**).
18. Close the input power tray cover, and secure it with the screw.
19. Insert the input power tray into the PDU (see Figure 16 on page 27).
20. Repeat the procedure for all input power trays in the PDU.
21. Repeat the procedure for the other PDU.
22. Verify that the DC power cables do not touch or block access to the components, and that they do not drape where people could trip on them.

Figure 16: Installing a 60-A DC Input Power Tray

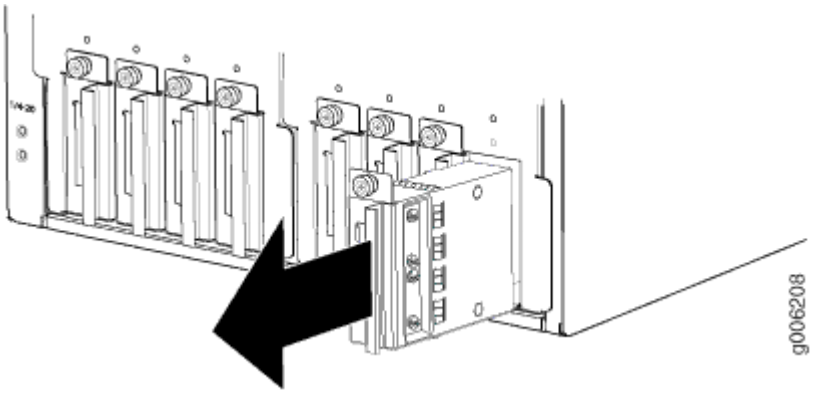


Connect Power to the PTX5000 120-A DC Input Power Trays

To connect the DC source power cables to the 120-A DC inputs:

1. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.
2. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
3. Switch the circuit breakers on the power distribution unit (PDU) faceplate to the off (**O**) position.
4. Loosen the captive screw that fastens the input power tray to the PDU .
5. Grasp the metal handle of the input power tray, and pull it out to remove the input power tray from the PDU (see Figure 17 on page 28). The 120-A DC input power tray weighs 1.6 lb (0.7 kg).

Figure 17: Removing the 120-A DC Input Power Tray



6. Use a Phillips (+) screwdriver to loosen the screw on the metal input power tray cover.
7. Open the metal input power tray cover.
8. Loosen the cable restraints.
9. Remove the nuts from the DC power terminal studs.
10. Route the positive (+) DC source power cable lug through the left cable restraint.
11. Secure the positive (+) DC source power cable lug to the **RTN** (return) terminal, located on the left, with a nut.

    Use a 10-mm nut driver to tighten the nut.
12. Route the negative (–) DC source power cable lug through the right cable restraint.
13. Attach the negative (–) DC source power cable lug to the **–48V** (input) terminal, located on the right (see Figure 18 on page 30).

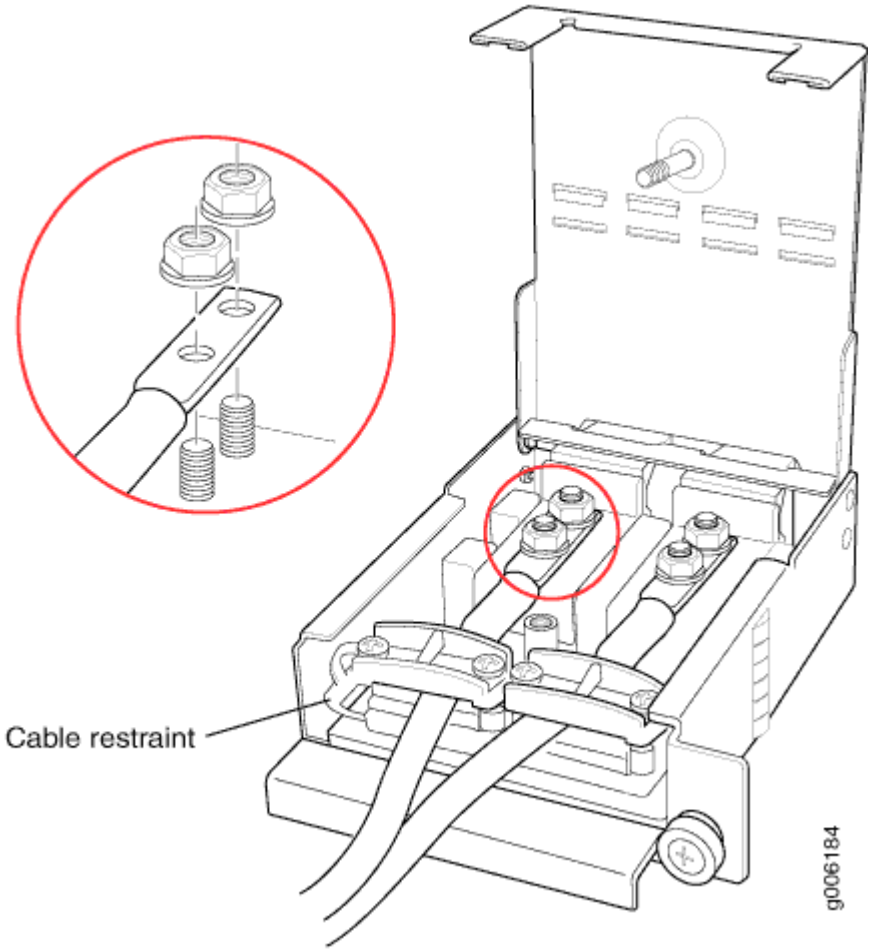
    Use a 10-mm nut driver to tighten the nut.

CAUTION: You must use an appropriate torque-controlled tool to tighten the nuts. Applying excessive torque damages the terminal studs and power supply. The maximum torque that may be applied to this nut is 99 lb-in. (11 Nm).

CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled **(+)** and **(–)** to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

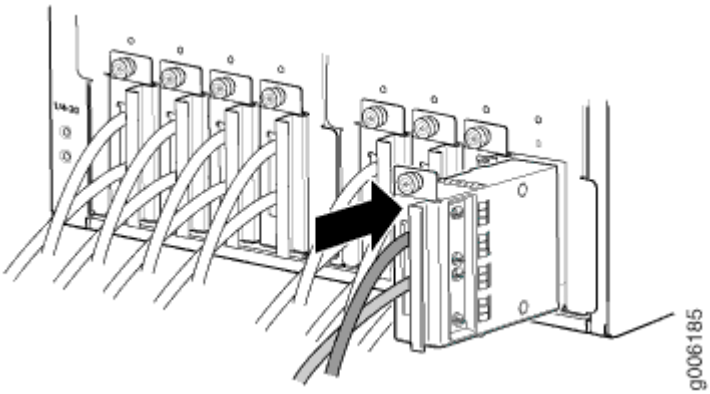
CAUTION: All inputs on the DC PDU in slot **PDU0** must be powered by dedicated power feeds derived from feed A, and all inputs on the DC PDU in slot **PDU1** must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

Figure 18: Connecting the DC Source Power Cable Lugs to an Input Power Tray



14. Tighten the cable restraint over the DC power cables.
15. Verify that the source power cables are connected to the appropriate terminal: the positive (+) source cable to the return terminal (labeled **RTN**) and the negative (–) source cable to the input terminal (labeled **–48V**).
16. Close the input power tray cover, and secure it with the screw.
17. Insert the input power tray into the PDU (see Figure 19 on page 31).
18. Repeat the procedure for all input power trays in the PDU.
19. Repeat the procedure for the other PDU.
20. Verify that the DC power cables do not touch or block access to the components, and that they do not drape where people could trip on them.

Figure 19: Installing a 120-A DC Input Power Tray

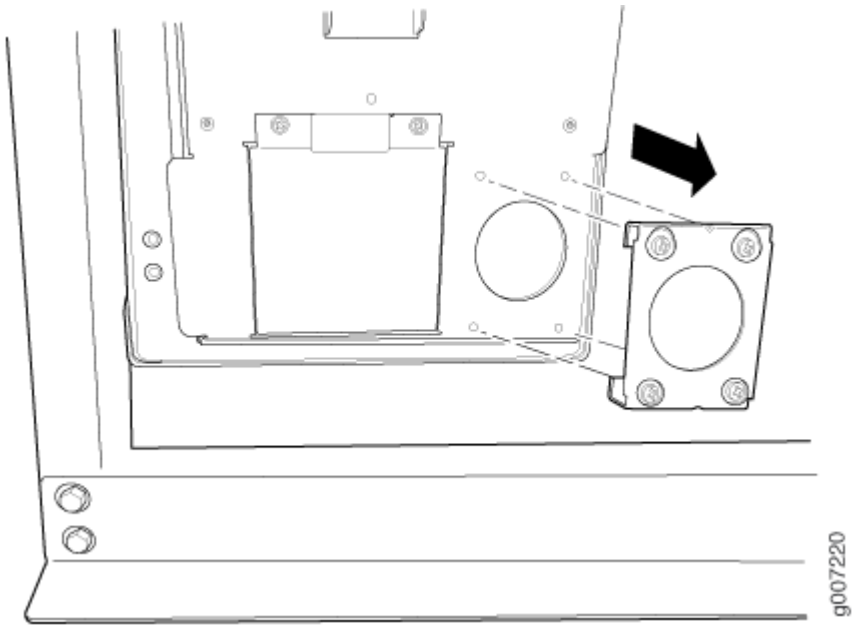


Connect Power to the PTX5000 Three-Phase Delta AC PDUs

To connect the delta AC power cords to the three-phase delta AC PDUs (see Figure 26 on page 37):

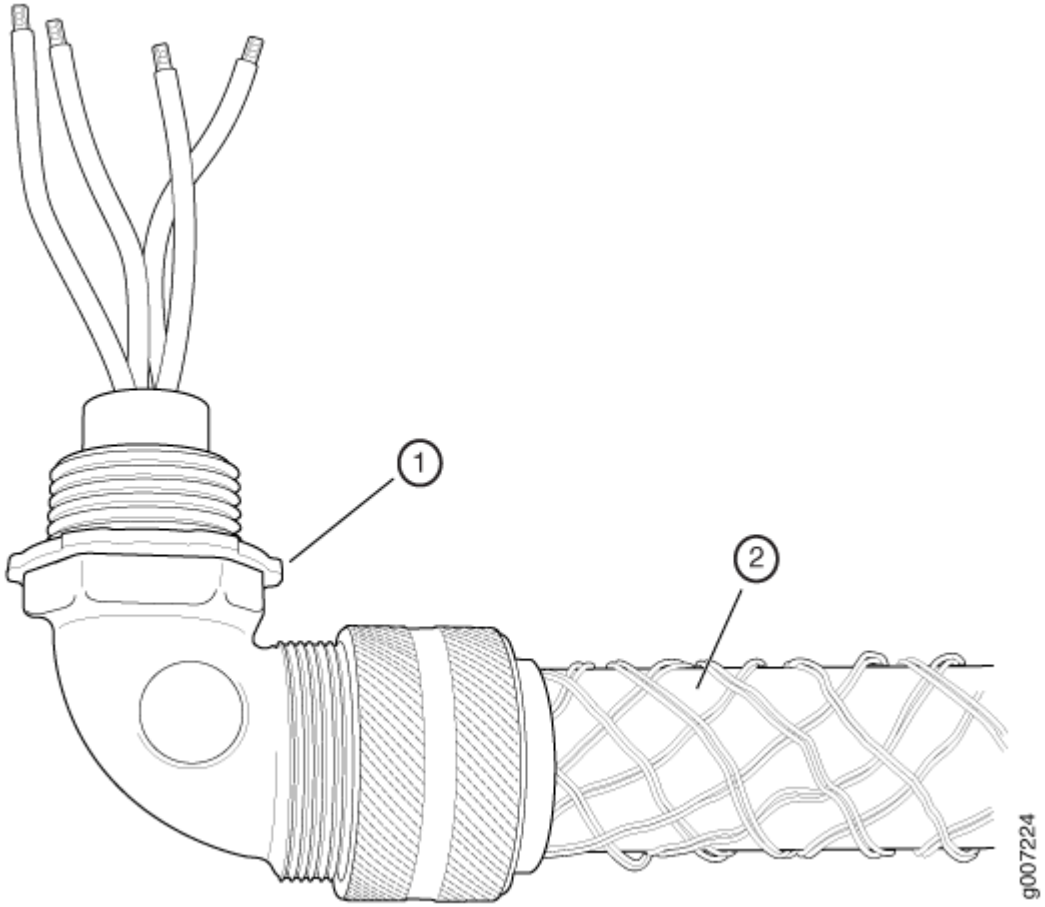
1. Switch off the customer-site circuit breakers. Ensure that the voltage across the AC power source is 0 V and that there is no chance that the voltage might become active during installation.
2. Switch the circuit breaker and power **OUTPUT** switch on the PDU faceplate to the off (**O**) position.
3. Using a number 2 Phillips (+) screwdriver, remove the four screws from the metal retaining bracket located on the lower right of the PDU. Remove the metal retaining bracket from the PDU (see Figure 20 on page 32).

Figure 20: Removing the Metal Retaining Bracket from a Three-Phase Delta AC PDU



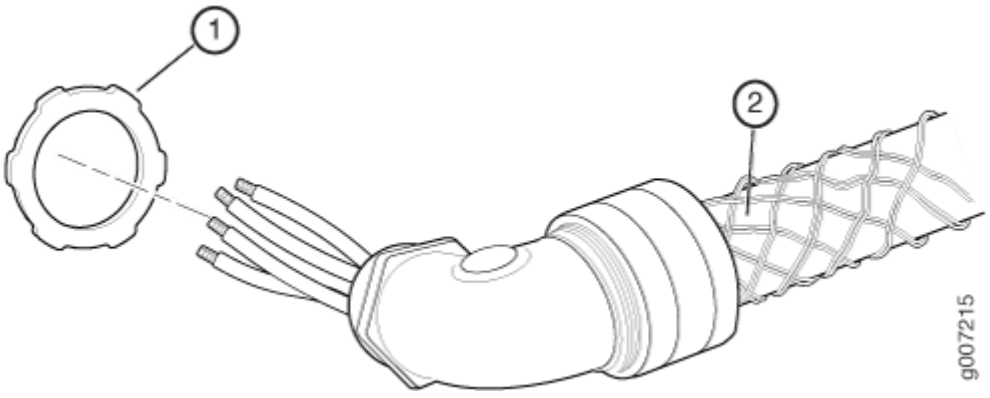
4. Unscrew the retaining nut from the AC power cord (see Figure 21 on page 33 and Figure 22 on page 33).

Figure 21: Retaining Nut on a Three-Phase Delta AC Power Cord



1– Retaining nut	2– Three-phase delta AC power cord

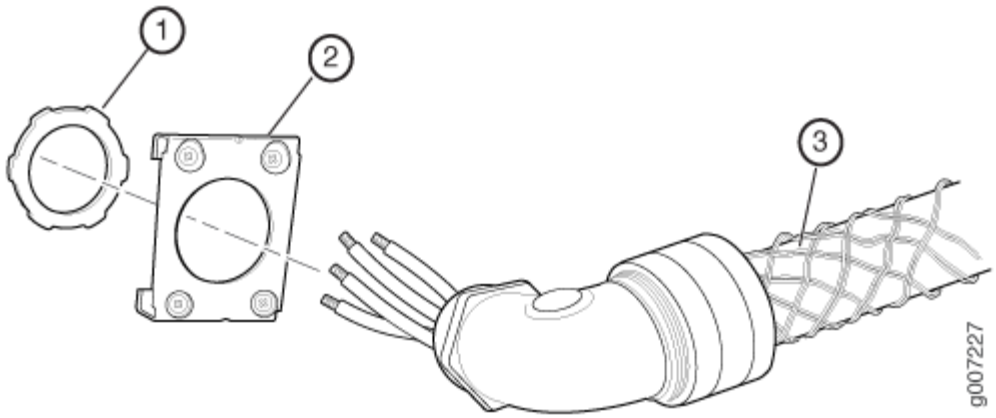
Figure 22: Removing the Retaining Nut from a Three-Phase Delta AC Power Cord



1– Retaining nut	2– Three-phase delta AC power cord

5. Put the wires of the AC power cord through the hole of the metal retaining bracket, and screw the retaining nut onto the AC power cord to secure it to the metal retaining bracket (see Figure 23 on page 34).

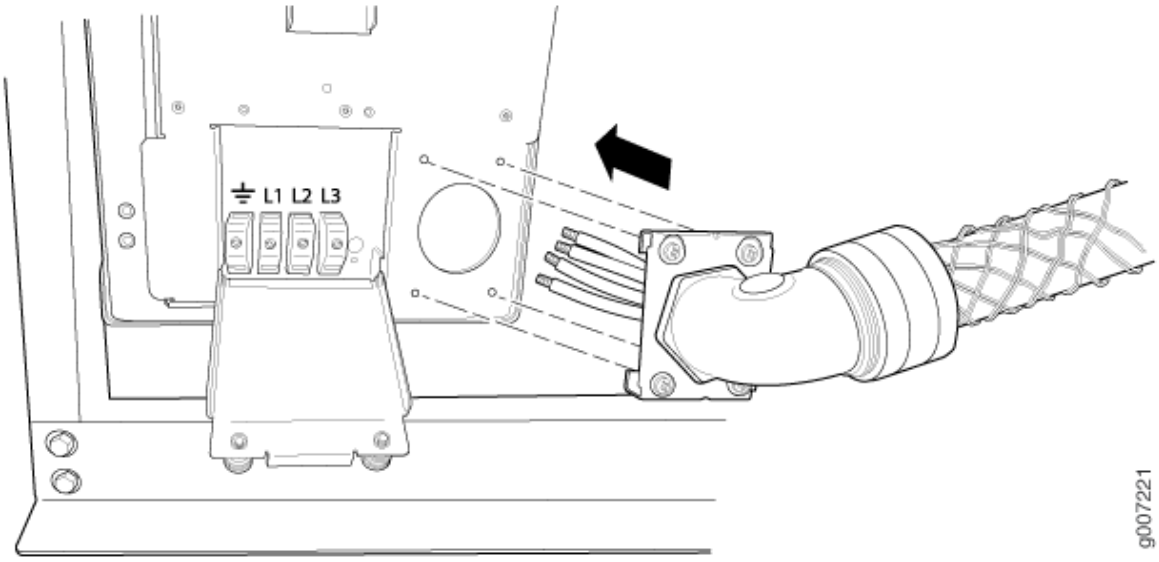
Figure 23: Connecting the Metal Retaining Bracket to Three-Phase Delta AC Power Cord



1– Retaining nut	3– Three-phase delta AC power cord
2– Metal retaining bracket	

6. Using a number 2 Phillips (+) screwdriver, loosen the two captive screws on the metal AC wiring compartment. Open the metal door of the metal AC wiring compartment. Push the wires of the AC power cord into the area for the metal retaining bracket, and pull the wires to the left toward the metal AC wiring compartment. Using a number 2 Phillips (+) screwdriver, use the four screws on the metal retaining bracket to secure the AC power cord to the PDU (see Figure 24 on page 35).

Figure 24: Connecting Power to a Three-Phase Delta AC PDU



7. Connect the wires to the AC terminal block on the three-phase delta AC PDU (Figure 25 on page 36). Using a 1/5-in. (5.5-mm) slotted screwdriver, loosen each of the input terminals or grounding point screws, insert each wire into the grounding point or input terminal, and tighten the screw.

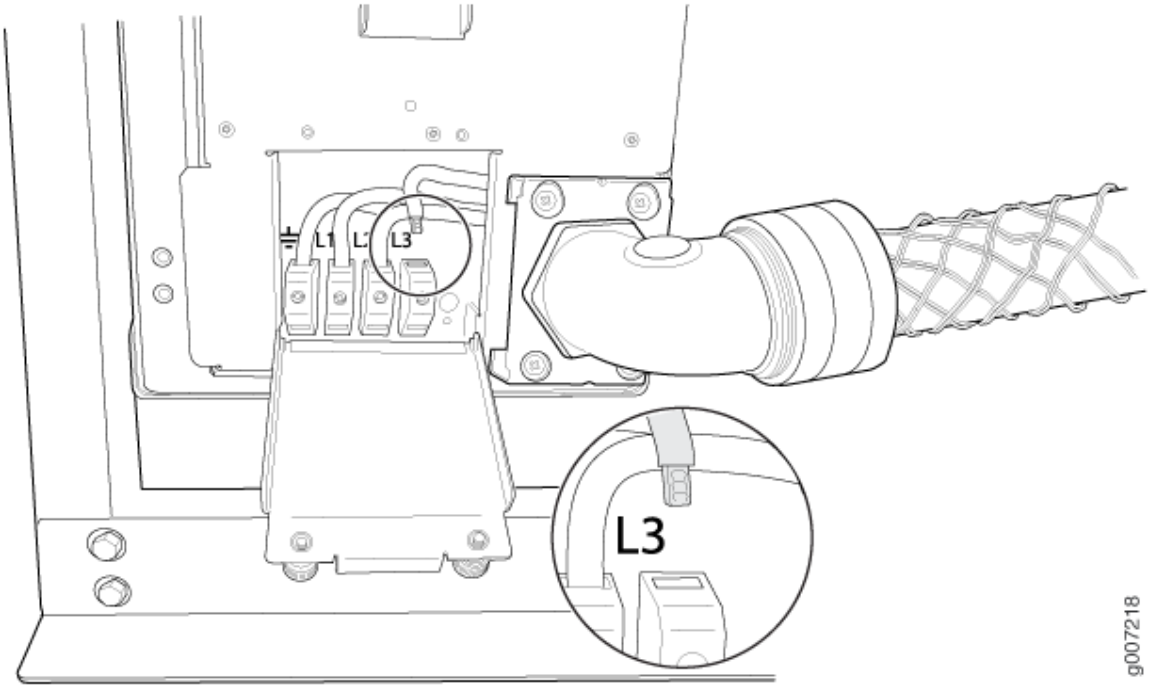
   a. Insert the wire labeled **GND** into the grounding point.

   b. Insert the wire labeled **L1** into the **L1** input terminal.

   c. Insert the wire labeled **L2** into the **L2** input terminal.

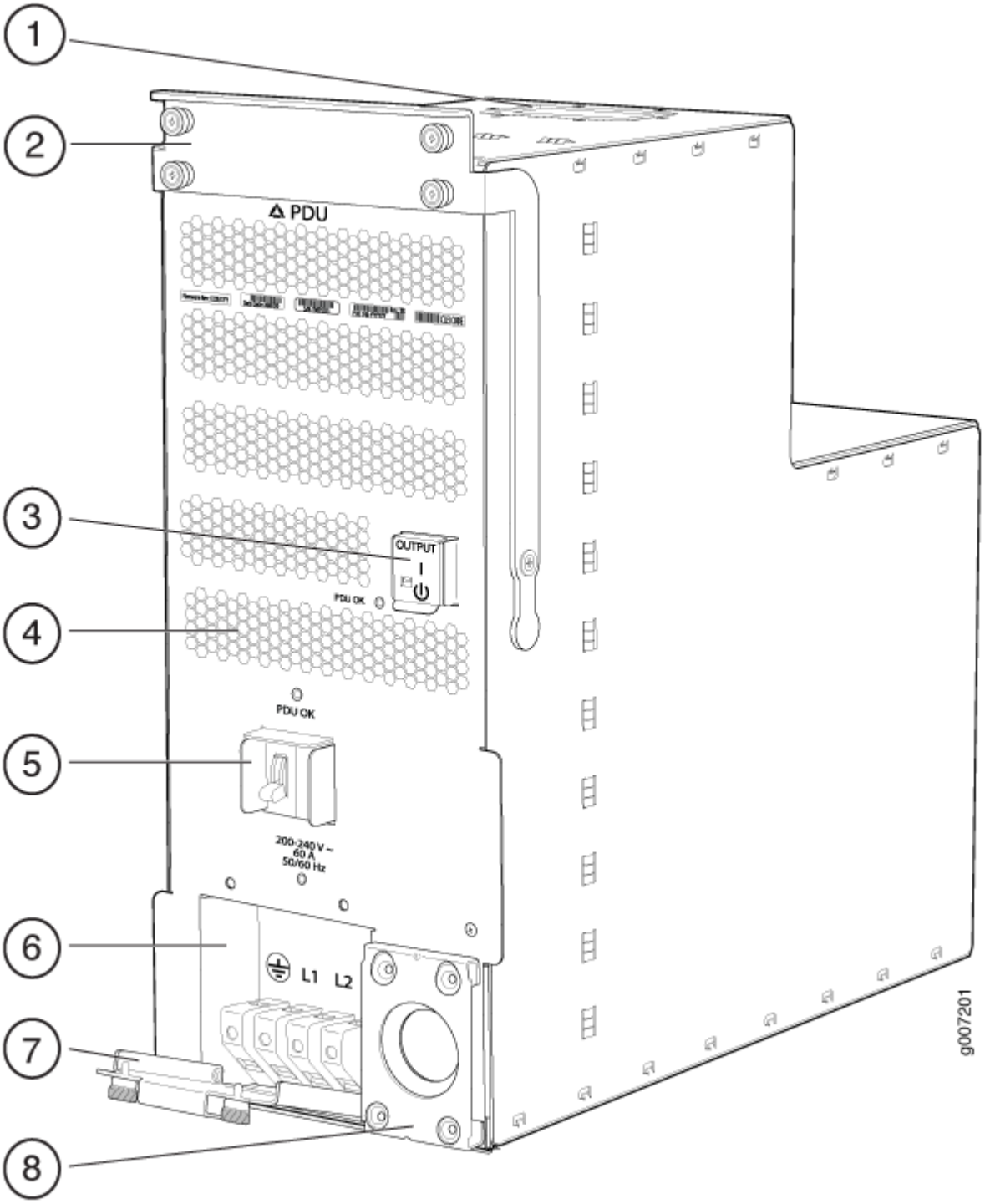
   d. Insert the wire labeled **L3** into the **L3** input terminal.

Figure 25: Connecting Ground and Power to a Three-Phase Delta AC PDU



8. Verify that the AC power wiring connections are correct.
9. Close the door to the metal AC wiring compartment, and use a number 2 Phillips (+) screwdriver to tighten the two captive screws to secure the door to the metal AC wiring compartment.
10. Verify that the AC power cord does not touch or block access to PTX5000 components, and that it does not drape where people could trip on it.
11. Repeat the procedure for the other three-phase delta AC PDU.

Figure 26: Three-Phase Delta AC PDU



1– Top installation handle	5– Circuit breaker
2– Front installation handle	6– Wiring compartment
3– Power **OUTPUT** switch	7– Wiring compartment door

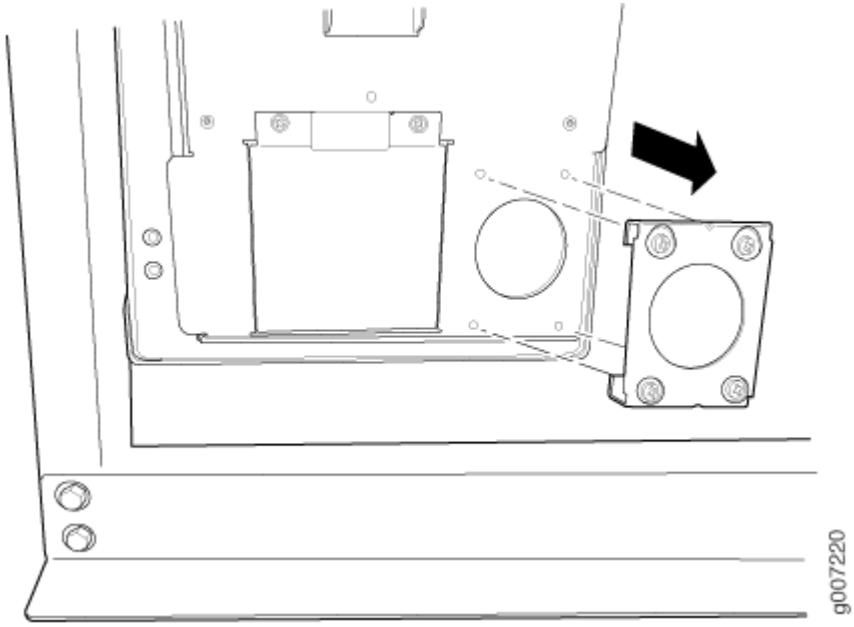
4– Air exhaust ventilation	8– Metal retaining bracket

Connect Power to the PTX5000 Three-Phase Wye AC PDUs

To connect an AC power cord to a three-phase wye AC PDU (see Figure 33 on page 43):

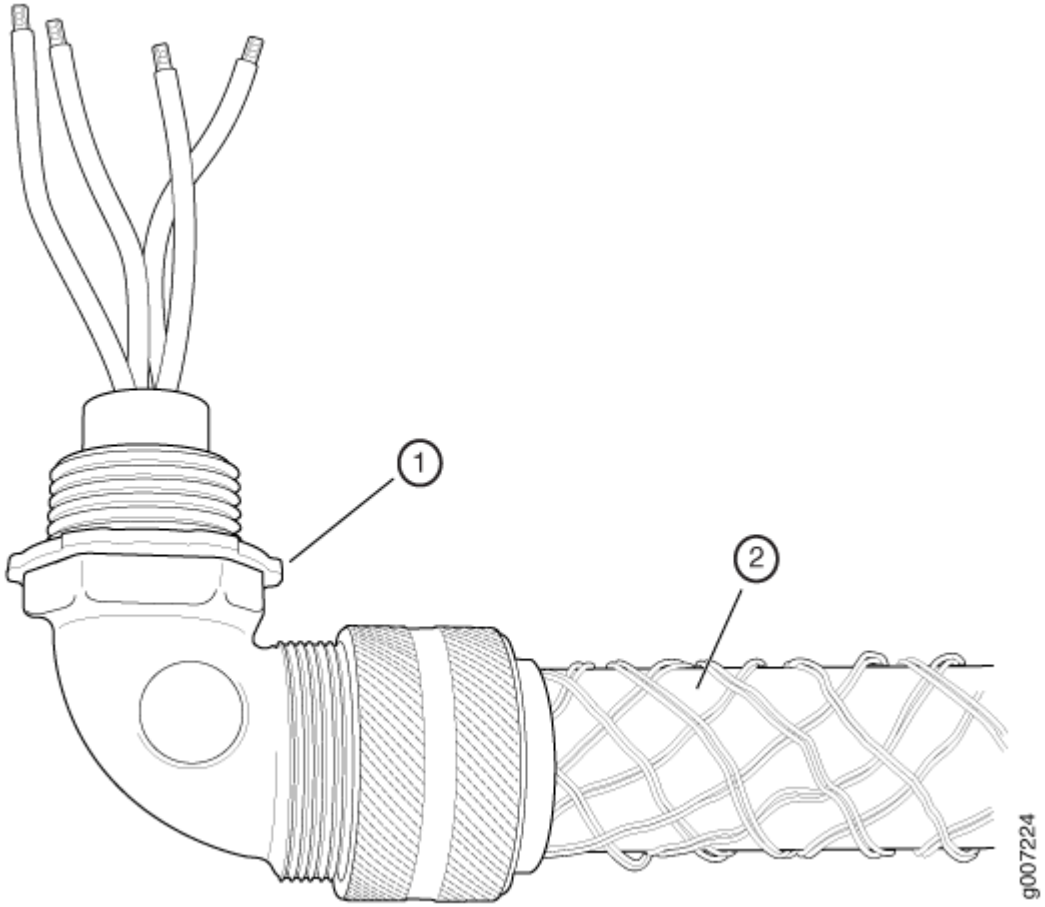
1. Switch off the customer-site circuit breakers. Ensure that the voltage across the AC power source is 0 V and that there is no chance that the voltage might become active during installation.
2. Switch the circuit breaker and power **OUTPUT** switch on the PDU faceplate to the off (**O**) position.
3. Using a number 2 Phillips (+) screwdriver, loosen the four captive screws that fasten the metal retaining bracket to the PDU, and remove the metal retaining bracket from the PDU (see Figure 27 on page 38).

Figure 27: Removing the Metal Retaining Bracket from a Three-Phase Wye AC PDU



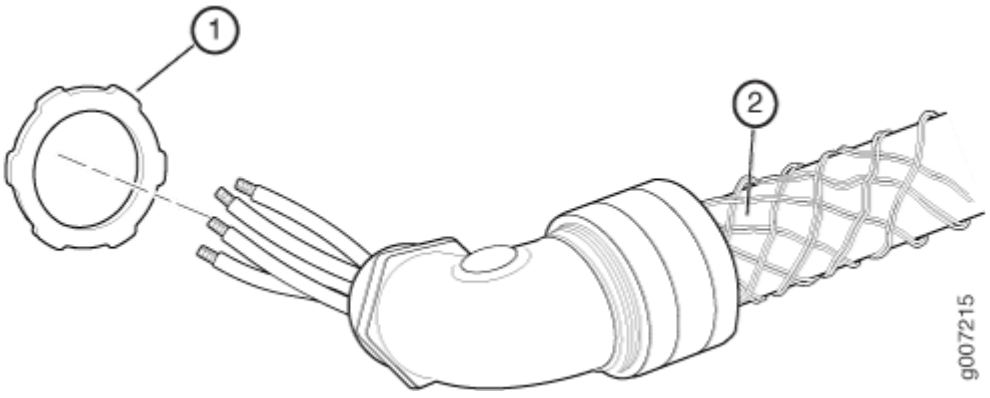
4. Unscrew the retaining nut from the AC power cord (see Figure 28 on page 39 and Figure 29 on page 39).

Figure 28: Retaining Nut on a Three-Phase Wye AC Power Cord



1– Retaining nut	2– Three-phase wye AC power cord

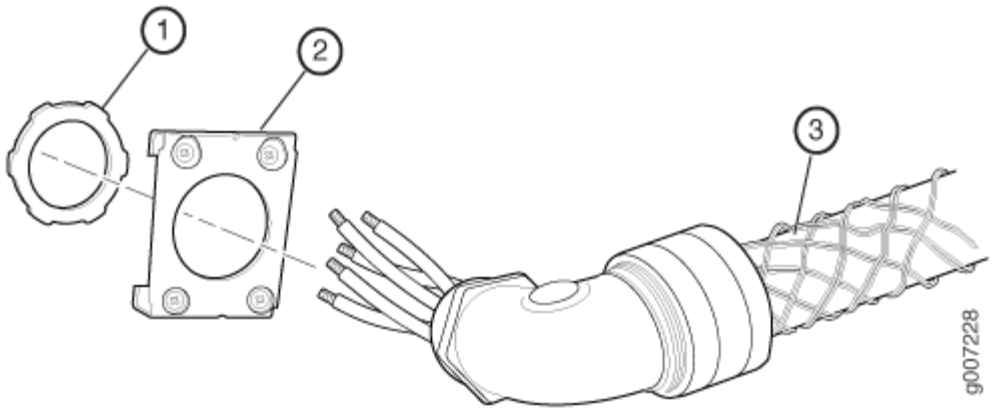
Figure 29: Removing the Retaining Nut from a Three-Phase Wye AC Power Cord



1– Retaining nut	2– Three-phase wye AC power cord

5. Put the wires of the AC power cord through the hole of the metal retaining bracket, and screw the retaining nut onto the AC power cord to secure it to the metal retaining bracket (see Figure 30 on page 40).

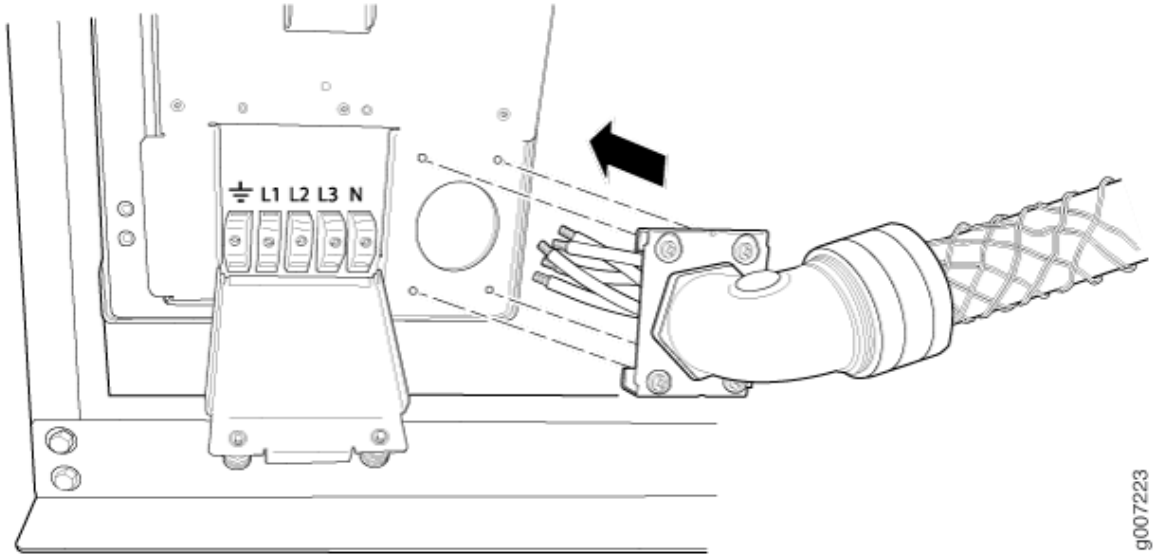
Figure 30: Connecting the Metal Retaining Bracket to the Three-Phase Wye AC Power Cord



1– Retaining nut	3– Three-phase wye AC power cord
2– Metal retaining bracket	

6. Using a number 2 Phillips (+) screwdriver, loosen the two captive screws on the metal AC wiring compartment. Open the metal door of the metal AC wiring compartment. Push the wires of the AC power cord into the area for the metal retaining bracket, and pull the wires to the left toward the metal AC wiring compartment. Using a number 2 Phillips (+) screwdriver, use the four captive screws on the metal retaining bracket to secure the AC power cord to the PDU (see Figure 31 on page 41).

Figure 31: Connecting Power to a Three-Phase Wye AC PDU



7. Connect the wires to the AC terminal block on the three-phase wye AC power supply (Figure 32 on page 42). Using a 1/5-in. (5.5-mm) slotted screwdriver, loosen each of the input terminals or grounding point screws, insert each wire into the grounding point or input terminal, and tighten the screw.

   a. Insert the wire labeled **GND** into the grounding point.

   b. Insert the wire labeled **L1** into the **L1** input terminal.

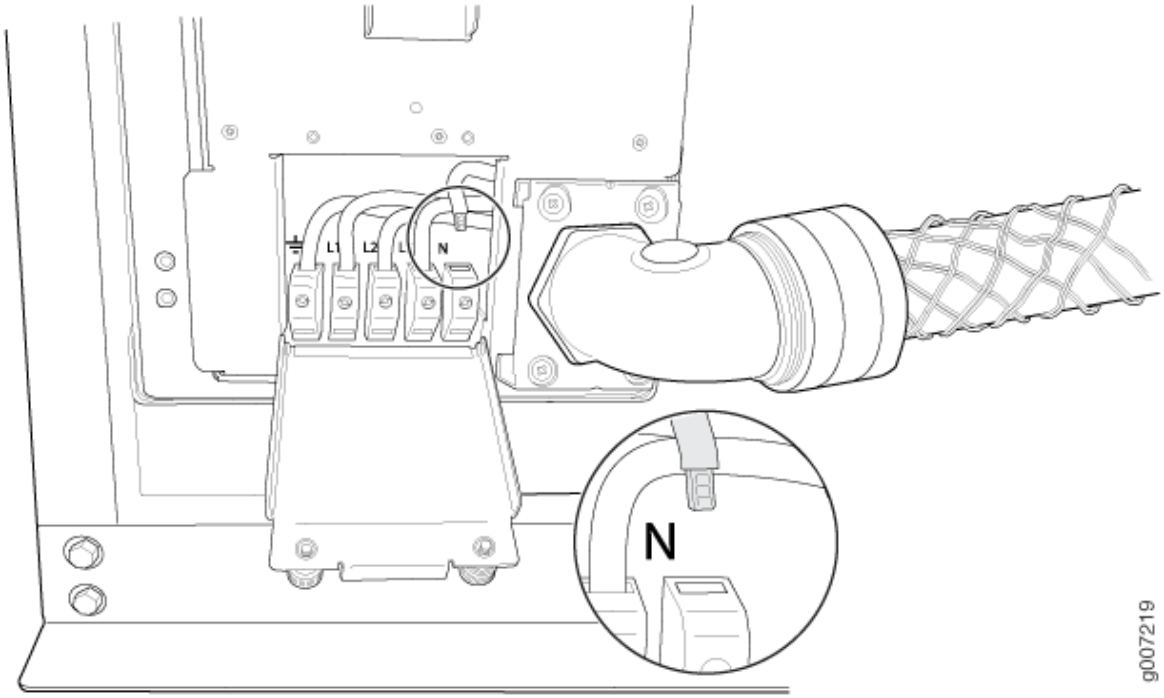
   c. Insert the wire labeled **L2** into the **L2** input terminal.

   d. Insert the wire labeled **L3** into the **L3** input terminal.

   e. Insert the wire labeled **N** into the **N** input terminal

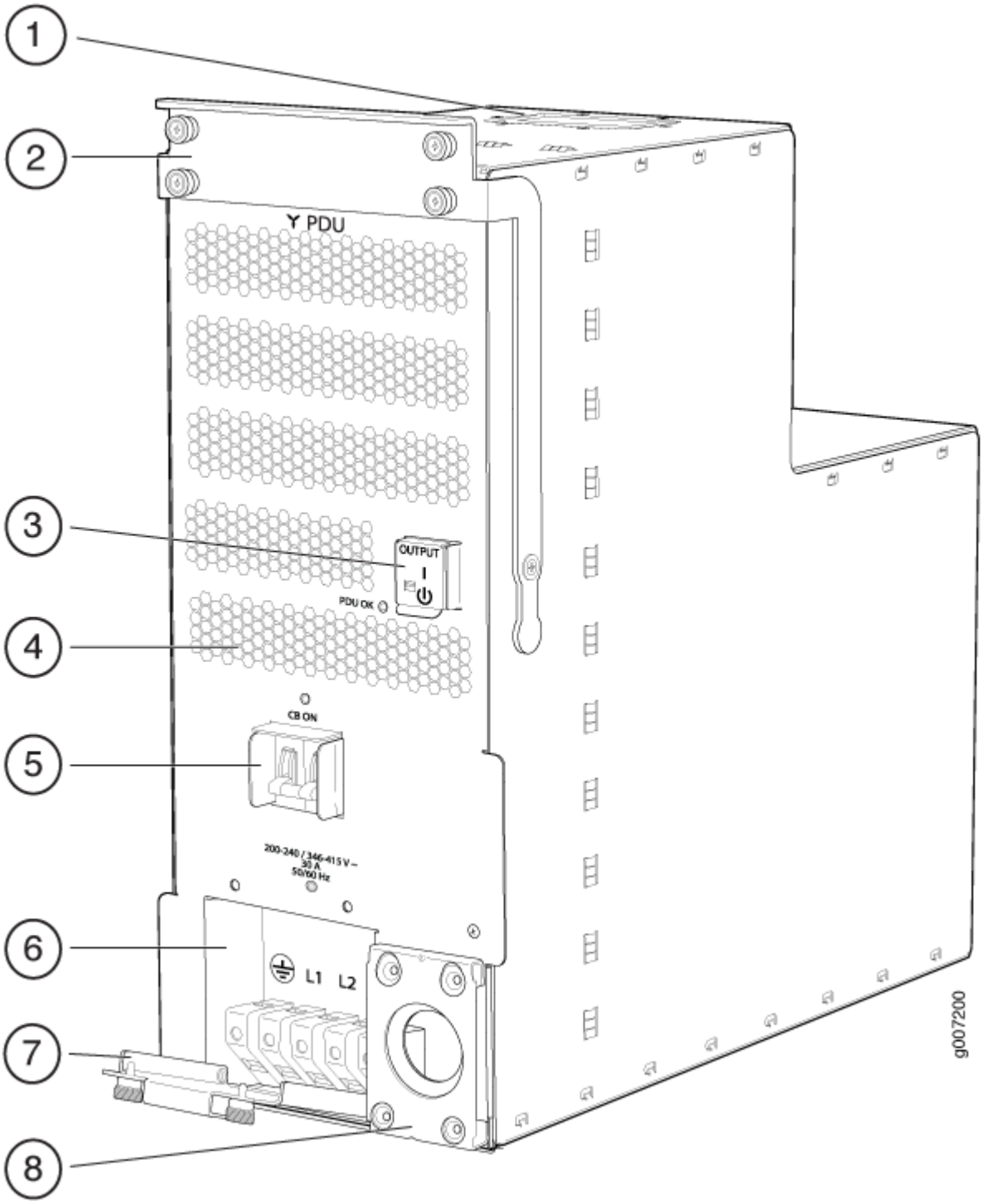
> ⚠ **CAUTION**: To avoid damage to the PDU, do not connect the neutral wire to the **L1**, **L2**, or **L3** input terminals.

Figure 32: Connecting Power to the Three-Phase Wye AC Power Supply



8. Verify that the AC power wiring connections are correct.
9. Close the door to the metal AC wiring compartment, and use a number 2 Phillips (+) screwdriver to tighten the two captive screws to secure the door to the metal AC wiring compartment.
10. Verify that the AC power cord does not touch or block access to router components, and that it does not drape where people could trip on it.
11. Repeat the procedure for the other three-phase wye AC PDU.

Figure 33: Three-Phase Wye AC PDU



1– Top installation handle	5– Circuit breaker
2– Front installation handle	6– Wiring compartment
3– Power **OUTPUT** switch	7– Wiring compartment door

4– Air exhaust ventilation	8– Metal retaining bracket

Connect Power to the PTX5000 High Capacity DC PDUs

To connect the DC source power cables to the High Capacity DC inputs:

1. Verify that a properly rated customer-site circuit breaker for each DC power cable has been installed. See *PTX5000 DC Power Electrical Safety Guidelines* in the *PTX5000 Packet Transport Router Hardware Guide* for more information.
2. Switch off the customer-site circuit breakers. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.
3. Verify that a licensed electrician has attached appropriate cable lugs to the DC power cables. See *PTX5000 DC Power Cable and Lugs Specifications* in the *PTX5000 Packet Transport Router Hardware Guide* for more information.
4. Attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
5. Move the power switch to the standby
   (
   ⏻
) position.
6. Unfasten the screw using a number 2 Phillips (+) screwdriver and remove the terminal block safety cover.
7. Remove the nuts from the DC power terminal studs.
8. Connect the positive (+) DC source power cable to the **RTN** input terminal (see Figure 34 on page 45). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal (see Figure 35 on page 46).

   The terminal studs for each PSM are numbered on the faceplate. For example, the DC input terminals for PSM0 are **PSM0_1** and **PSM0_2**, in the first and second rows of the terminal blocks. There are sixteen 60-A input terminals for the eight PSMs supported for each PDU.

   ⚠ **CAUTION**: You must use an appropriate torque-controlled tool to tighten the nuts. Applying excessive torque damages the terminal studs and power supply. The maximum torque that may be applied to this nut is 65 lb-in. (7.3 Nm).

Figure 34: High Capacity DC Input Terminals

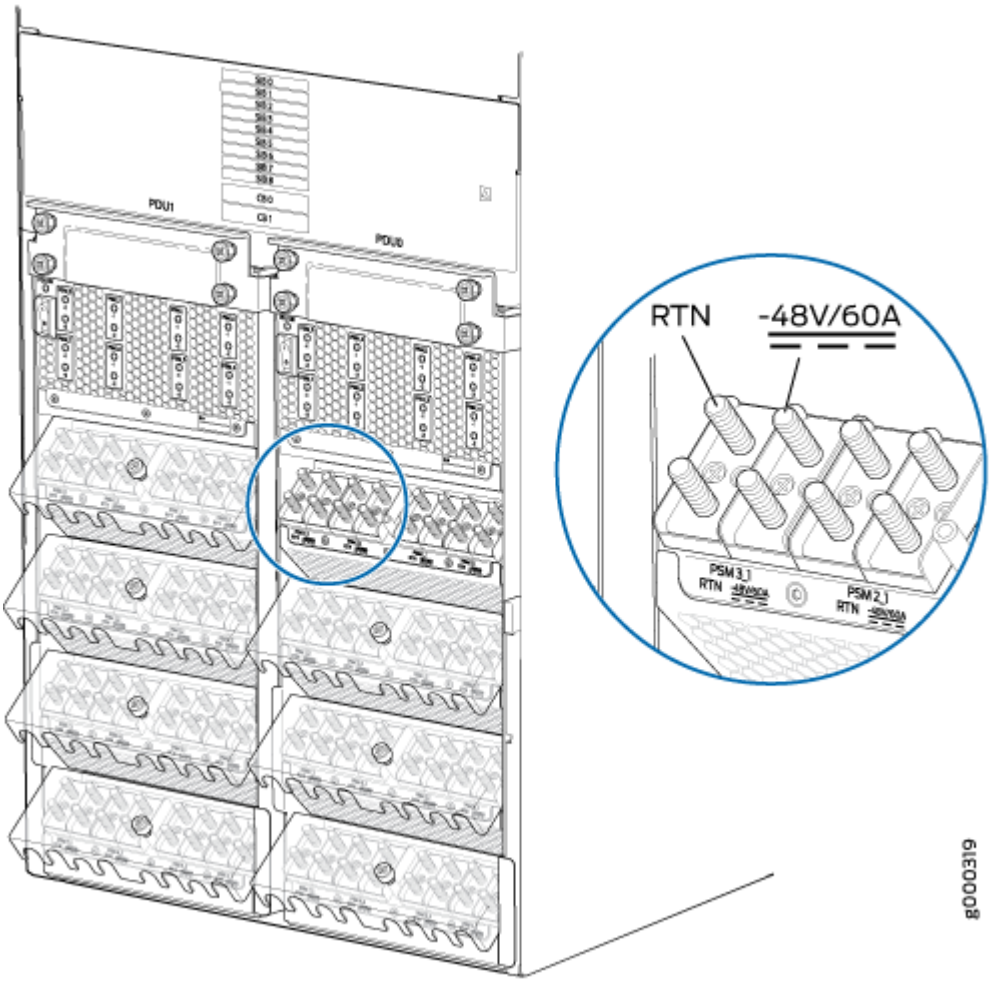
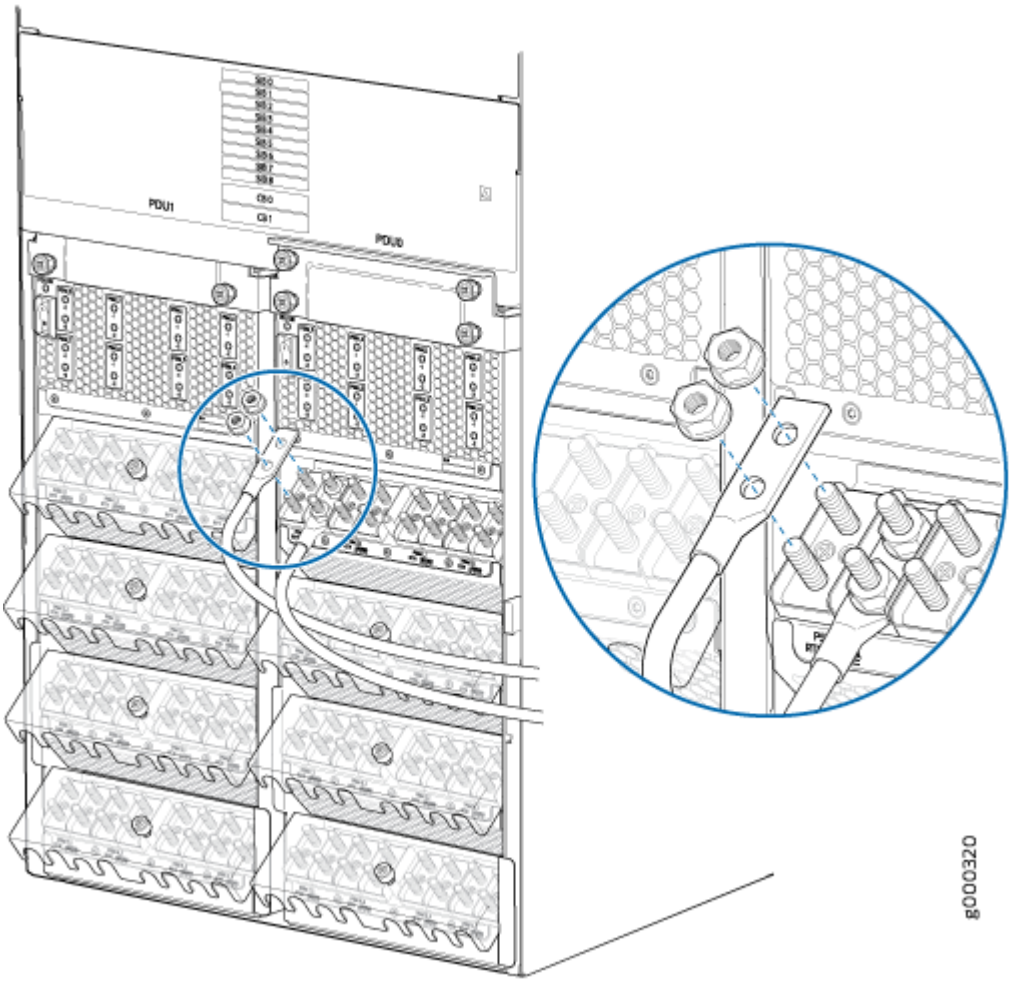


Figure 35: Connecting the DC Source Power Cable Lugs to an Input Power Terminal



CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled **(+)** and **(–)** to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

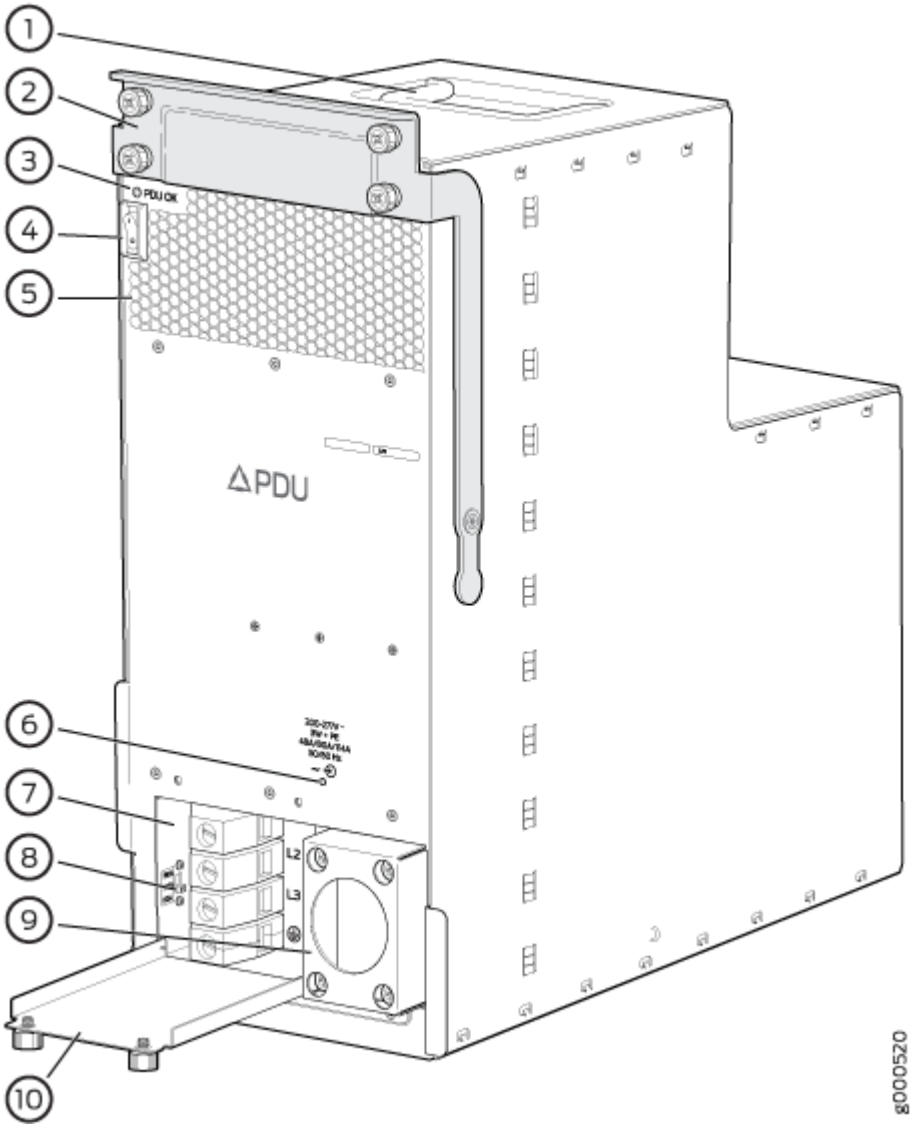
CAUTION: All inputs on the DC PDU in slot **PDU0** must be powered by dedicated power feeds derived from feed A, and all inputs on the DC PDU in slot **PDU1** must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

9. Connect the negative (–) DC source power cable to the **-48 V/60A** input terminal (see Figure 35 on page 46). Using a 7/16-in. (11-mm) nut driver, tighten the nut to secure the cable lug to the input terminal.
10. Verify that the source power cables are connected to the appropriate terminal: the positive (+) source cable to the return terminals (labeled **RTN**) and the negative (–) source cable to the input terminals (labeled **–48V/60A**).
11. Replace the terminal block safety cover and ensure that the cables fit into the slots of the safety cover.
12. Repeat the procedure for the input power terminals for all the PSMs in the PDU.
13. Repeat the procedure for the other PDU.
14. Verify that the DC power cables do not touch or block access to the components, and that they do not drape where people could trip on them.

Connect Power to the PTX5000 High Capacity Delta AC PDUs

To connect an AC power cord to a High Capacity Delta AC PDU (see Figure 36 on page 48):

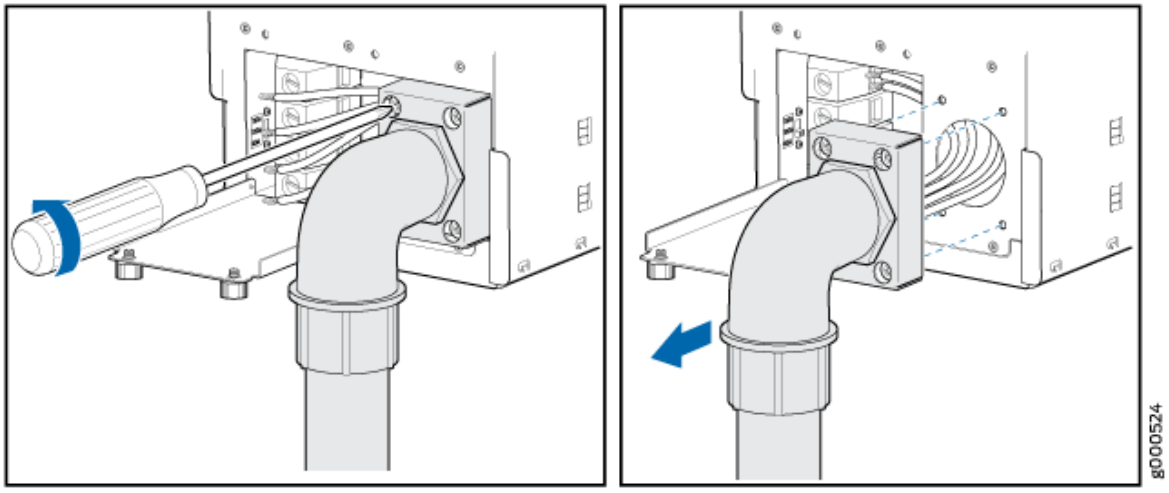
Figure 36: High Capacity Delta AC PDU



1– Top installation handle	6– Input voltage LED
2– Front installation handle	7– Wiring compartment
3– **PDU OK** LED	8– Power input cord selection switch
4– Power switch labeled (|) for the on position and (⏻) for the standby position.	9– Metal retaining bracket
5– Air exhaust ventilation	10– Wiring compartment door

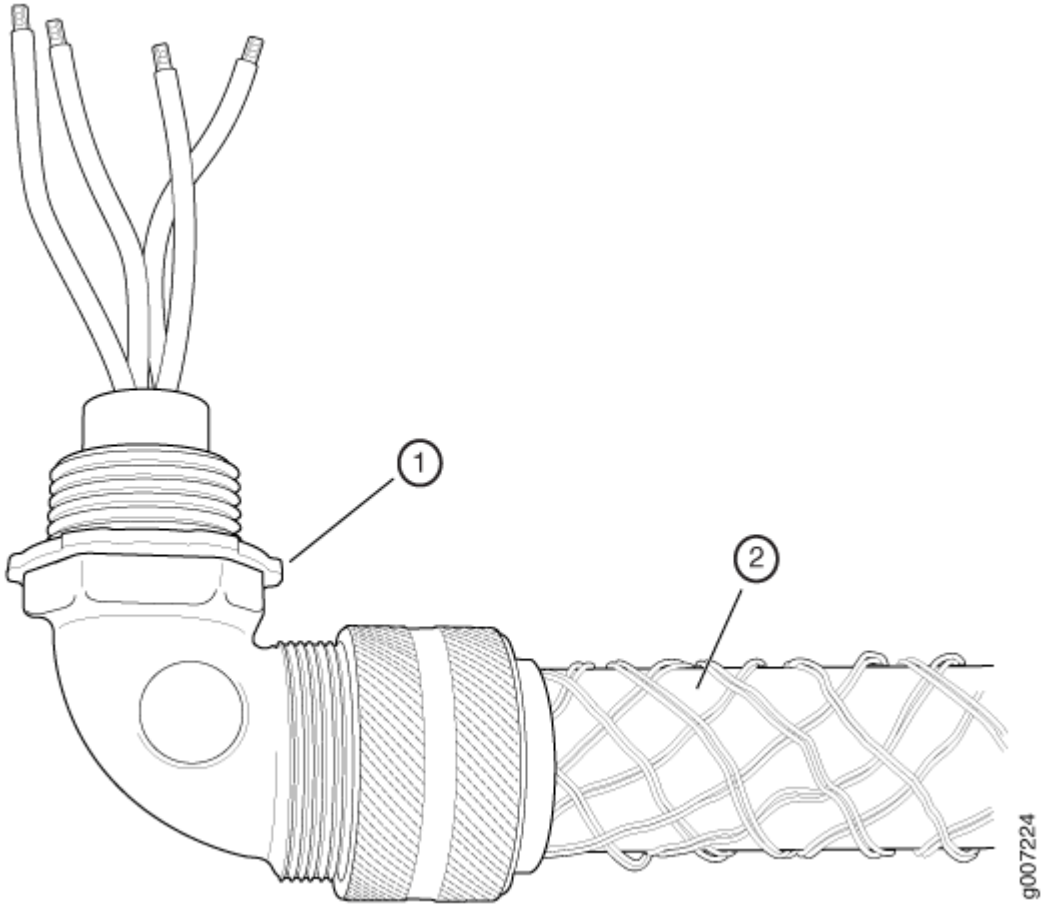
1. Switch off the customer-site circuit breakers. Ensure that the voltage across the AC power source is 0 V and that there is no chance that the voltage might become active during installation.
2. Switch the power switch on the PDU faceplate to the standby
   (
   ⏻
) position.
3. Using a number 2 Phillips (+) screwdriver, remove the four screws from the metal retaining bracket located on the lower right of the PDU. Remove the metal retaining bracket from the PDU (see Figure 37 on page 49).

Figure 37: Removing the Metal Retaining Bracket from a High Capacity Delta AC PDU



4. Unscrew the retaining nut from the AC power cord (see Figure 38 on page 50 and Figure 39 on page 51).

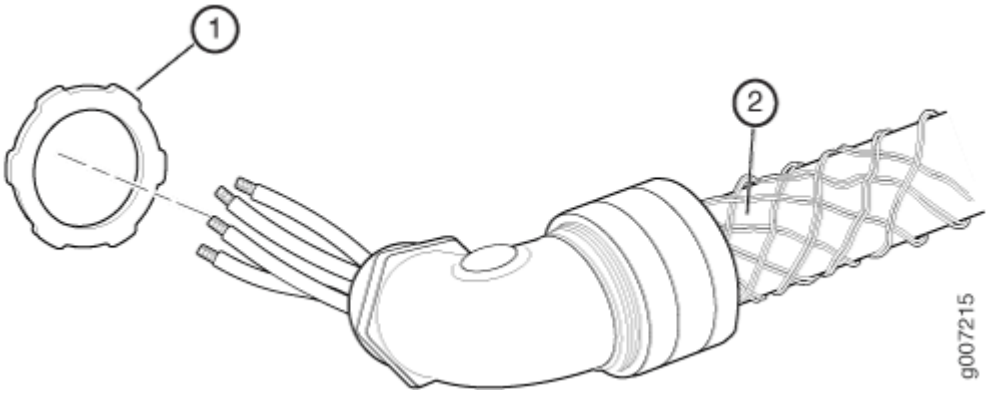
Figure 38: Retaining Nut on an AC Power Cord



1– Retaining nut	2– AC power cord

NOTE: This is a representational image. The High Capacity Delta AC PDU supports three power cords for 60 A, 100 A, and 150 A, respectively.

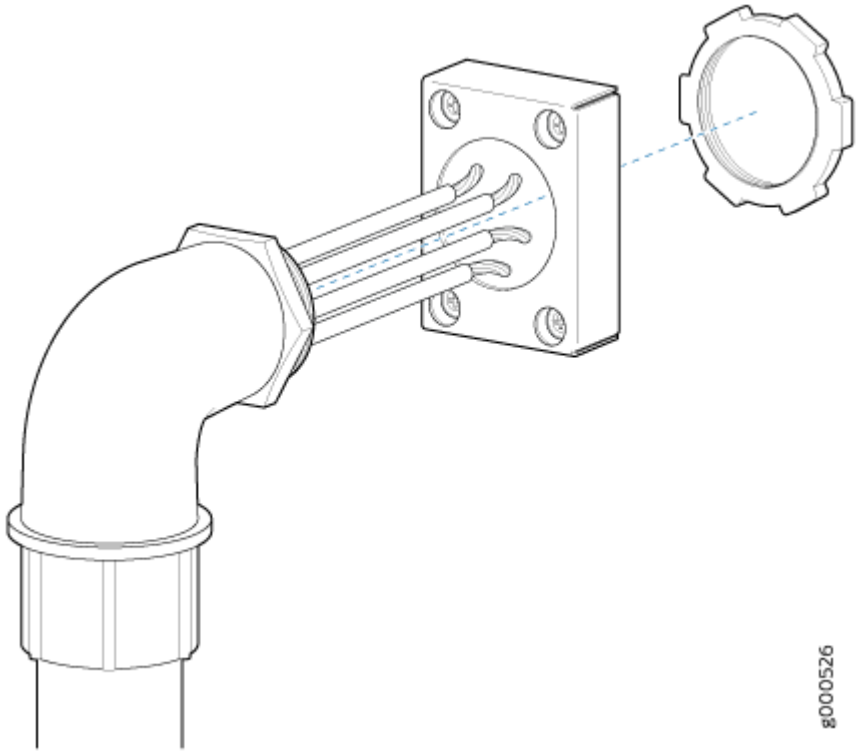
Figure 39: Removing the Retaining Nut from an AC Power Cord



1– Retaining nut	2– AC power cord

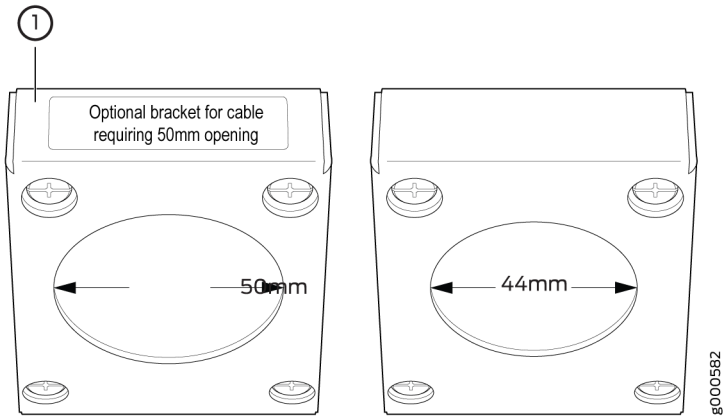
5. Put the wires of the AC power cord through the hole of the metal retaining bracket, and screw the retaining nut onto the AC power cord to secure it to the metal retaining bracket (see Figure 40 on page 51).

Figure 40: Connecting the Metal Retaining Bracket to an AC Power Cord



NOTE: If you are using 150 A power, you must use a metal bracket that is larger than the default metal bracket. This bracket is shipped along with the High Capacity Delta AC PDUs. Labels on top of the metal brackets specify the power cords that can be used for each bracket (see Figure 41 on page 52). The installation procedure to connect the metal bracket to the PDU is the same for both metal brackets.

Figure 41: Metal Brackets for Power Cords



1– Metal Bracket with label **Use for 740-053918, 740-059634 Power Cords**—740-053918 indicates the 100-A power cord and 740-059634 the 150-A power cord for the High Capacity Delta AC PDU.

2– Metal Bracket with label **Use for 740-053919, 740-059635, 740-035459 Power Cords**—740-053919 indicates the power cord for the High Capacity Delta AC PDU. 740-059635 indicates the 100-A power cord and 740-035459 the 60-A power cord.

6. Attach the power cord to the PDU:

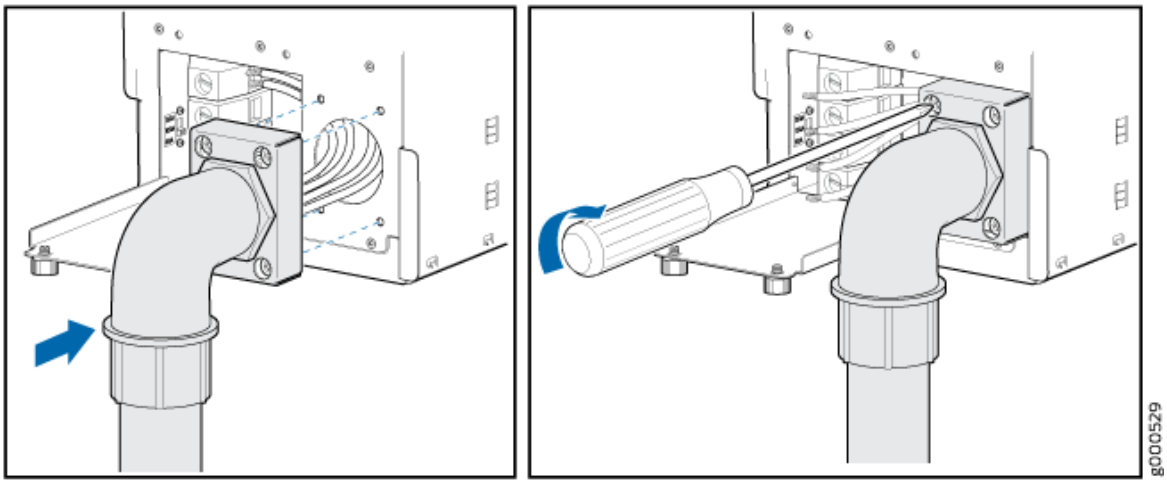
   a. Using a number 2 Phillips (+) screwdriver, loosen the two captive screws on the metal AC wiring compartment.

   b. Open the metal door of the metal AC wiring compartment.

   c. Push the wires of the AC power cord into the area for the metal retaining bracket, and pull the wires to the left toward the metal AC wiring compartment.

   d. Using a number 2 Phillips (+) screwdriver, use the four screws on the metal retaining bracket to secure the AC power cord to the PDU (see Figure 42 on page 53).

Figure 42: Attaching the Power Cord to the High Capacity Delta AC PDU



7. Connect the wires to the AC terminal block on the High Capacity Delta AC PDU (Figure 43 on page 54). Using a 1/5-in. (5.5-mm) slotted screwdriver, loosen each of the input terminal screws and the grounding point screw, insert each wire into the grounding point or input terminal, and tighten the screw.

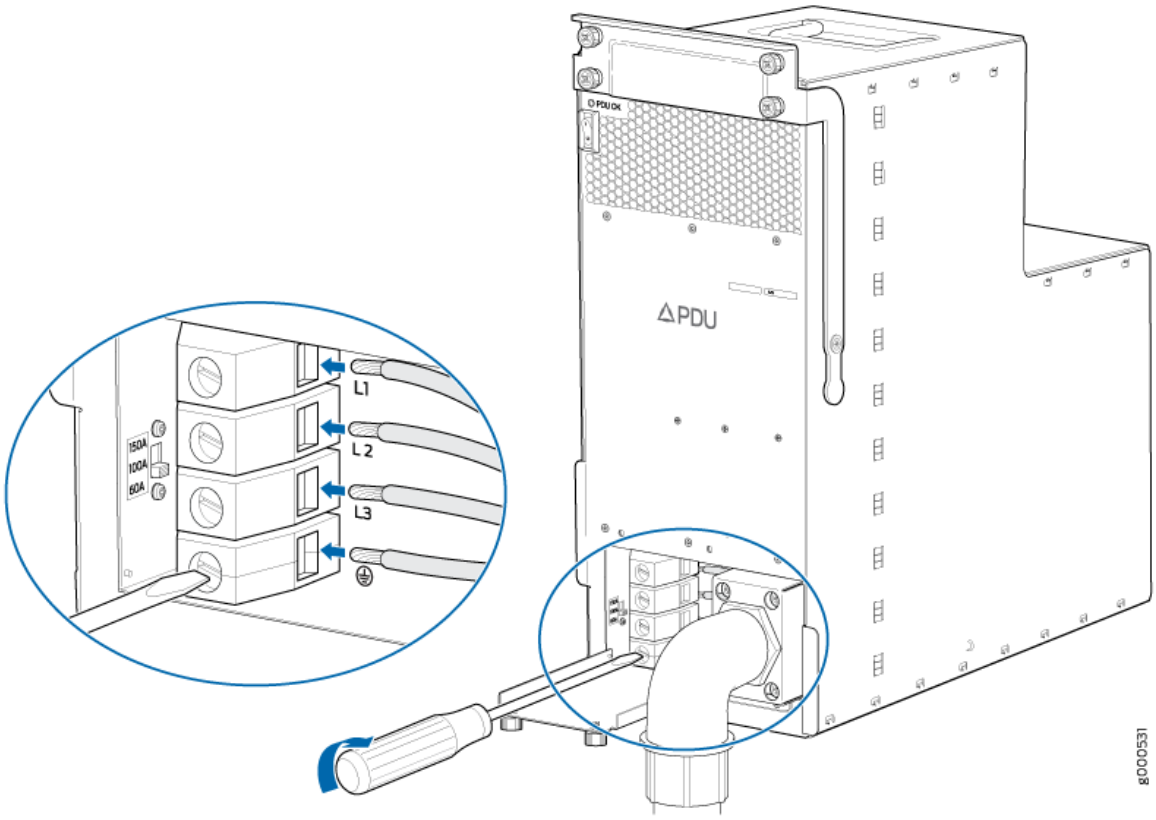
   a. Insert the wire labeled **GND** into the grounding point.

   b. Insert the wire labeled **L1** into the **L1** input terminal.

   c. Insert the wire labeled **L2** into the **L2** input terminal.

   d. Insert the wire labeled **L3** into the **L3** input terminal.

Figure 43: Connecting Ground and Power to a High Capacity Delta AC PDU



8. Verify that the AC power wiring connections are correct.
9. Close the door to the metal AC wiring compartment, and use a number 2 Phillips (+) screwdriver to tighten the two captive screws to secure the door to the metal AC wiring compartment.
10. Verify that the AC power cord does not touch or block access to PTX5000 components, and that it does not drape where people could trip on it.
11. Before you power on the PDU, select the switch setting corresponding to the AC input power cord that is connected to the PDU. Figure 44 on page 55 shows an ampere switch, located inside the wiring compartment.

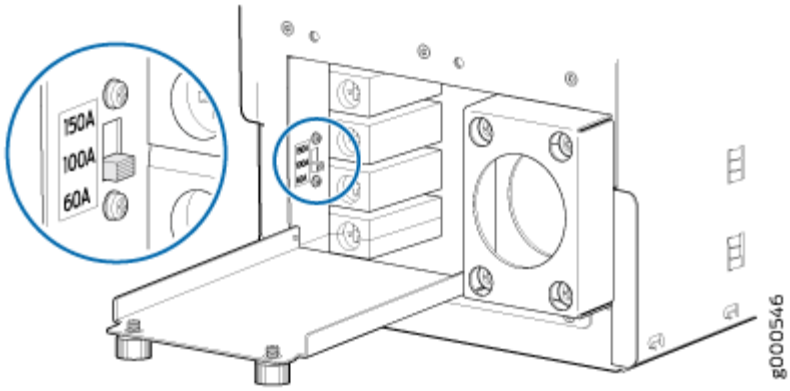
    - If CBL-PTX-AC-D cable is used, set the switch to 60A.
    - If CBL2-PTX-100AC-D cable is used, set the switch to 100A.
    - If CBL2-PTX-150AC-D cable is used, set the switch to 150A.

    You can verify the switch setting by using the `show chassis environment pdu` command. The command displays the input power rating as shown in the following example:

    show chassis environment pdu 0

```
PDU 0 status: State Online BoostConv OK Feed Switch 150Amps <<<=== Hours Used 142 Firmware Version (MCU1)
03.04
```

Figure 44: Ampere Switch



WARNING: If you set the ampere switch in the wiring compartment incorrectly, the AC power cord might overheat. Setting the ampere switch incorrectly might also cause the site circuit breaker to trip.

NOTE: The system software gets the system power configuration from the PDU and displays it in the output of the `show chassis environment pdu` command. Depending on the setting, the system software limits the system configuration (FPCs and PICs) to keep the power demand within the maximum output power available from the PDU.

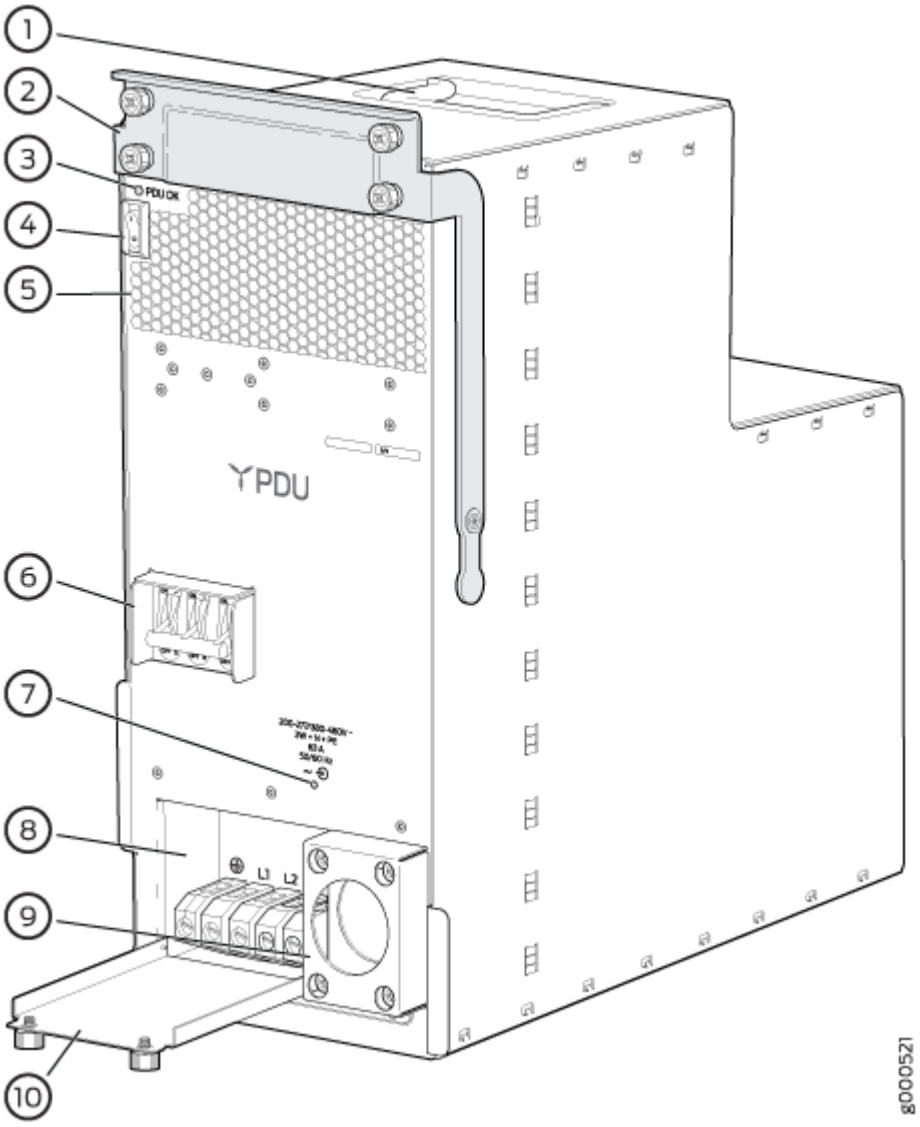
NOTE: In a redundant system with two PDUs, the PDUs share the load. If the ampere switch setting of one PDU is lower than the other, Junos OS reduces the rating of the other PDU to the lower value.

12. Repeat the procedure for the other High Capacity Delta AC PDU.

Connect Power to the PTX5000 High Capacity Wye AC PDUs

To connect an AC power cord to a High Capacity Wye AC PDU (see Figure 45 on page 56):

Figure 45: High Capacity Wye AC PDU

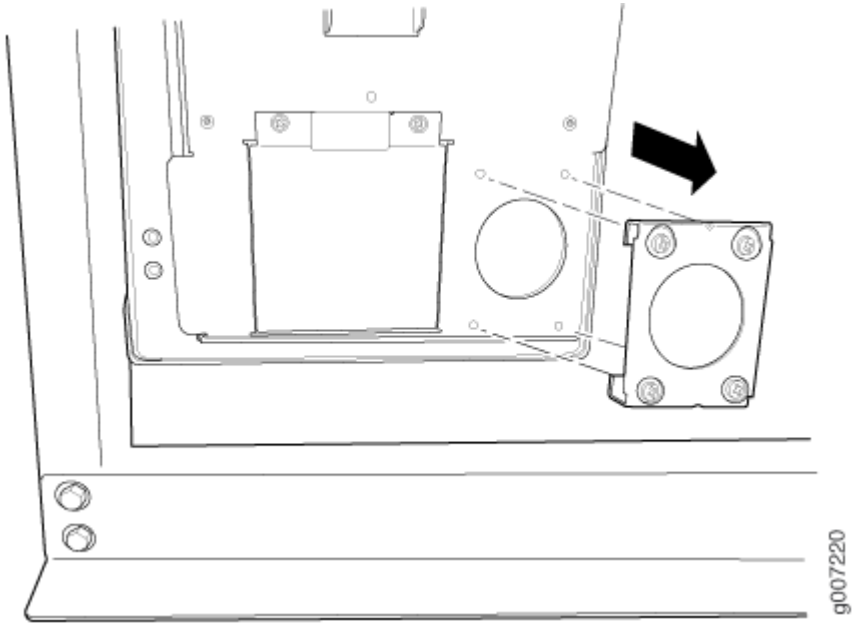


1– Top Installation handle	6– Circuit breaker
2– Front installation handle	7– Input voltage LED
3– **PDU OK** LED	8– Wiring compartment
4– Power switch labeled (**|**) for the on position and (⏻) for the standby position.	9– Metal retaining bracket
5– Air exhaust ventilation	10– Wiring compartment door

To connect an AC power cord to a High Capacity Wye AC PDU (see Figure 45 on page 56):

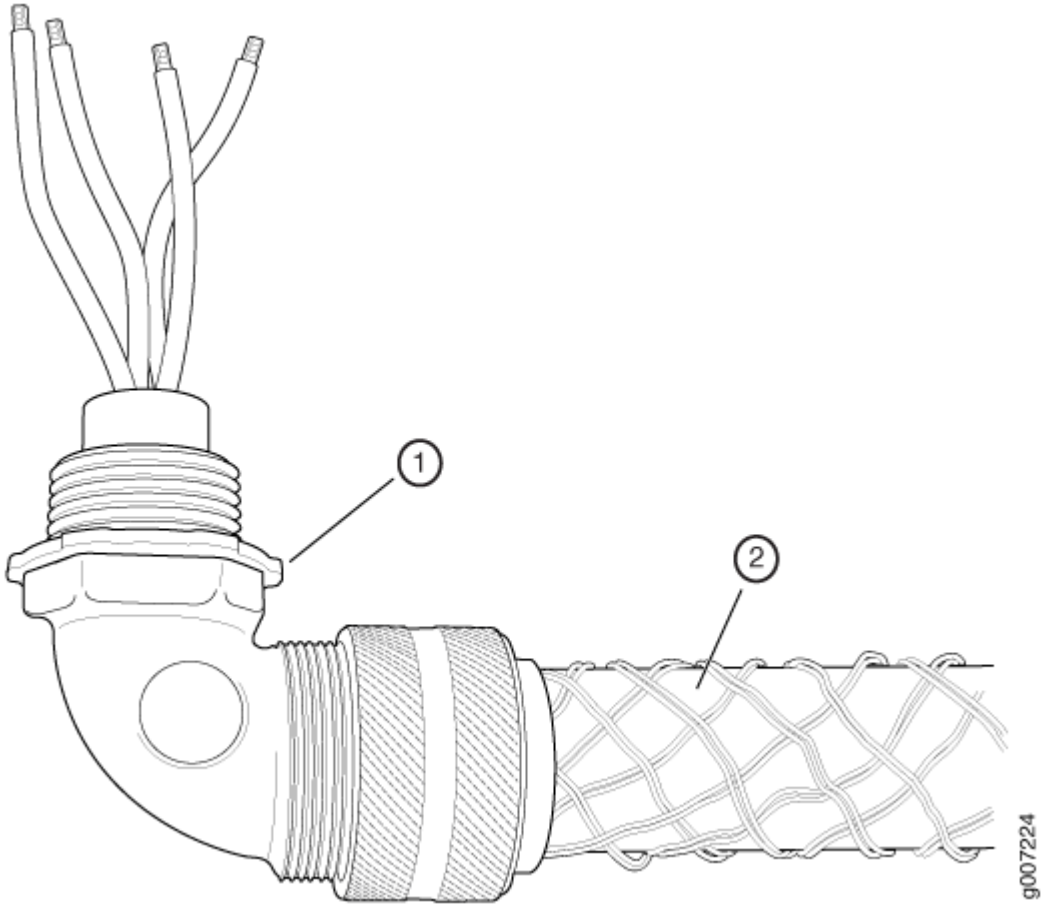
1. Switch off the customer-site circuit breakers. Ensure that the voltage across the AC power source is 0 V and that there is no chance that the voltage might become active during installation.
2. Move the circuit breaker on the faceplate of the PDU to the off position.
3. Move the power switch located on the faceplate of the PDU to the standby
   (
   ⏻
) position.
4. Using a number 2 Phillips (+) screwdriver, loosen the four captive screws that fasten the metal retaining bracket to the PDU, and remove the metal retaining bracket from the PDU (see Figure 46 on page 57).

Figure 46: Removing the Metal Retaining Bracket from a High Capacity Wye AC PDU



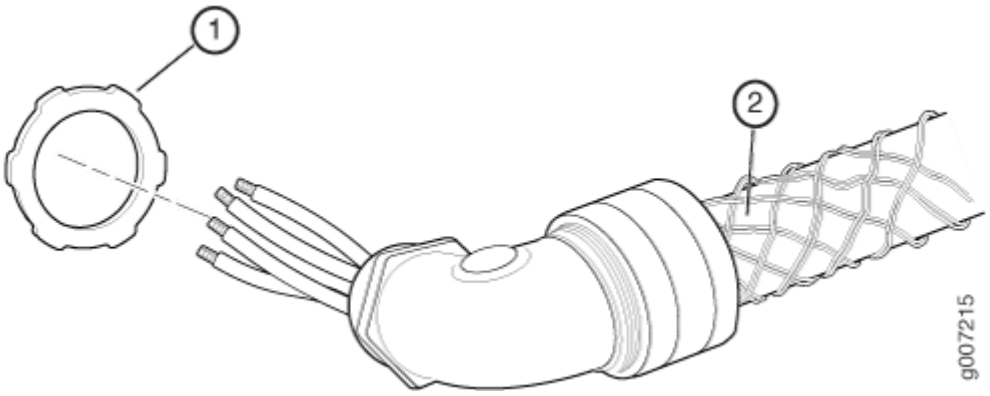
5. Unscrew the retaining nut from the AC power cord (see Figure 47 on page 58 and Figure 48 on page 58).

Figure 47: Retaining Nut on an AC Power Cord



1– Retaining nut	2– AC power cord

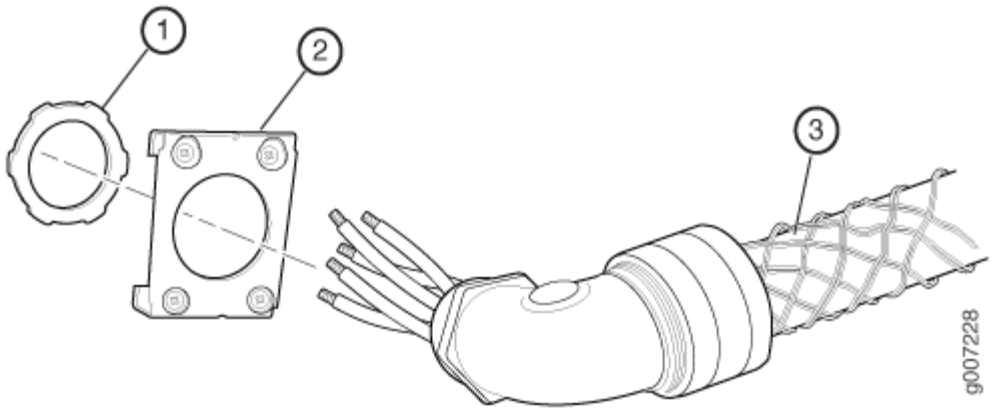
Figure 48: Removing the Retaining Nut from an AC Power Cord



1– Retaining nut	2– AC power cord

6. Put the wires of the AC power cord through the hole of the metal retaining bracket, and screw the retaining nut onto the AC power cord to secure it to the metal retaining bracket (see Figure 49 on page 59).

Figure 49: Connecting the Metal Retaining Bracket to the AC Power Cord



1– Retaining nut	3– AC power cord
2– Metal retaining bracket	

7. Attach the power cord to the PDU:

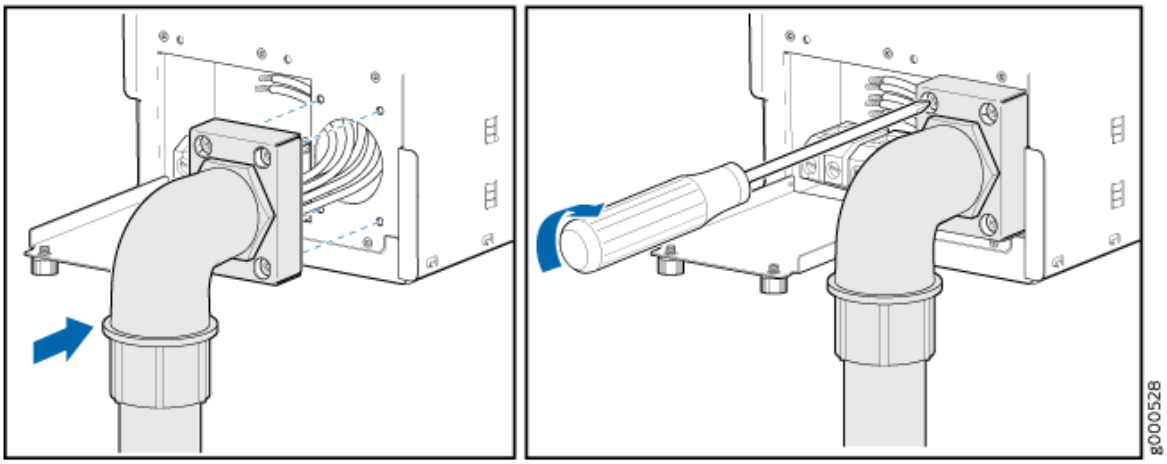
   a. Using a number 2 Phillips (+) screwdriver, loosen the two captive screws on the metal AC wiring compartment.

   b. Open the metal door of the metal AC wiring compartment.

   c. Push the wires of the AC power cord into the area for the metal retaining bracket, and pull the wires to the left toward the metal AC wiring compartment.

   d. Using a number 2 Phillips (+) screwdriver, use the four captive screws on the metal retaining bracket to secure the AC power cord to the PDU (see Figure 50 on page 60).

Figure 50: Connecting Power to a High Capacity Wye AC PDU



8. Connect the wires to the AC terminal block on the High Capacity Wye AC PDU (see Figure 51 on page 61). Using a 1/5-in. (5.5-mm) slotted screwdriver, loosen each of the input terminal screws and the grounding point screw, insert each wire into the grounding point or input terminal, and tighten the screw.

   a. Insert the neutral wire labeled **GND** into the grounding point.

   b. Insert the wire labeled **L1** into the **L1** input terminal.

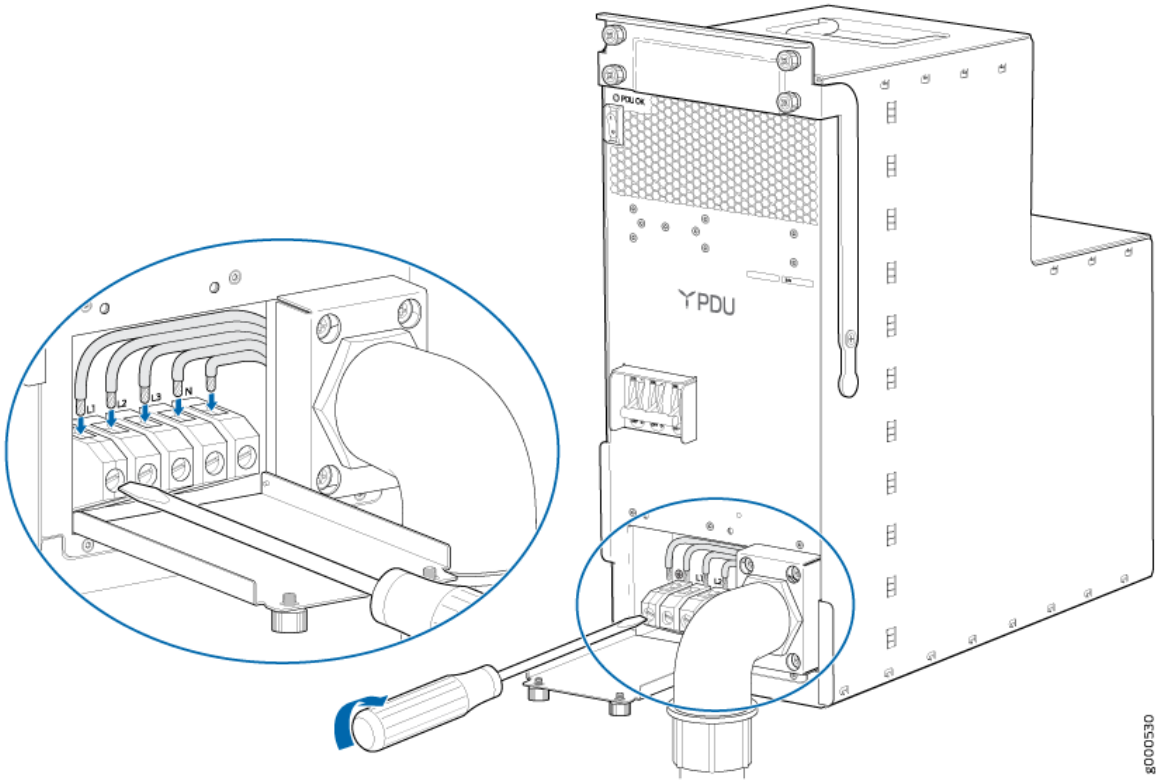
   c. Insert the wire labeled **L2** into the **L2** input terminal.

   d. Insert the wire labeled **L3** into the **L3** input terminal.

   e. Insert the wire labeled **N** into the **N** input terminal.

> ⚠ **CAUTION**: To avoid damage to the PDU, do not connect the neutral wire to the **L1**, **L2**, or **L3** input terminal.

Figure 51: Connecting Power to the High Capacity Wye AC PDU



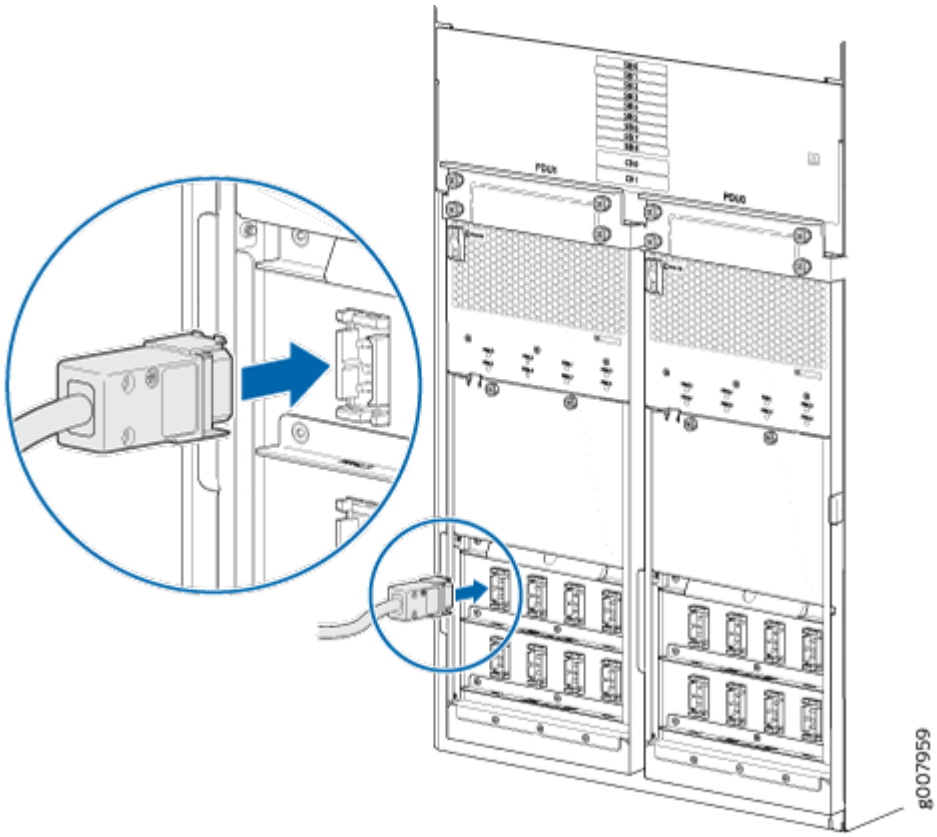
9. Verify that the AC power wiring connections are correct.
10. Close the door to the metal AC wiring compartment, and use a number 2 Phillips (+) screwdriver to tighten the two captive screws to secure the door to the metal AC wiring compartment.
11. Verify that the AC power cord does not touch or block access to PTX5000 components, and that it does not drape where people could trip on it.
12. Repeat the procedure for the other High Capacity Wye AC PDU.

Connect Power to the PTX5000 High Capacity Single-Phase AC PDUs

The high-capacity single-phase AC PDU accepts eight single-phase 30-A or eight single-phase 20-A, 200–250 VAC L-L input power. One 30-A or 20-A input power provides dedicated input power to each PSM.

To connect the AC power cords to the single-phase AC PDUs (see Figure 52 on page 62):

Figure 52: Connecting the Source Power to a High Capacity Single-Phase AC PDU



1. Switch off the customer-site circuit breakers. Ensure that the voltage across the AC power source is 0 V and that there is no chance that the voltage might become active during installation.
2. Move the power output switch on the PDU faceplate to the standby
   (
   ⏻
) position.
3. Using a number 2 Phillips (+) screwdriver, loosen the two screws from the metal door of the metal AC wiring compartment—located in the middle of the PDU faceplate for 20-A inputs and lower part of the PDU for the 30-A inputs.
4. Using a number 2 Phillips (+) screwdriver, loosen the screw on the 20-A input terminal and plug in the connector (see Figure 53 on page 63 and Figure 54 on page 64). Tighten the screw after plugging in the connector.

> **NOTE**: The 30-A connector does not have a clamp, but it has its own integral clip for locking the connector.

Figure 53: Plug Type for the 20-A Connector

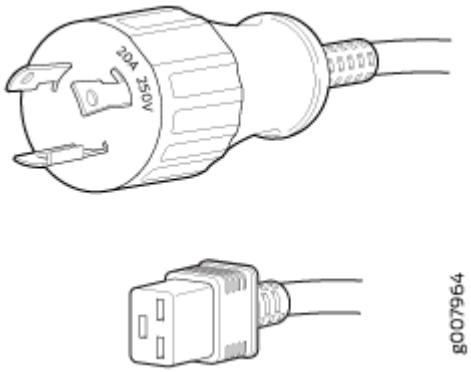
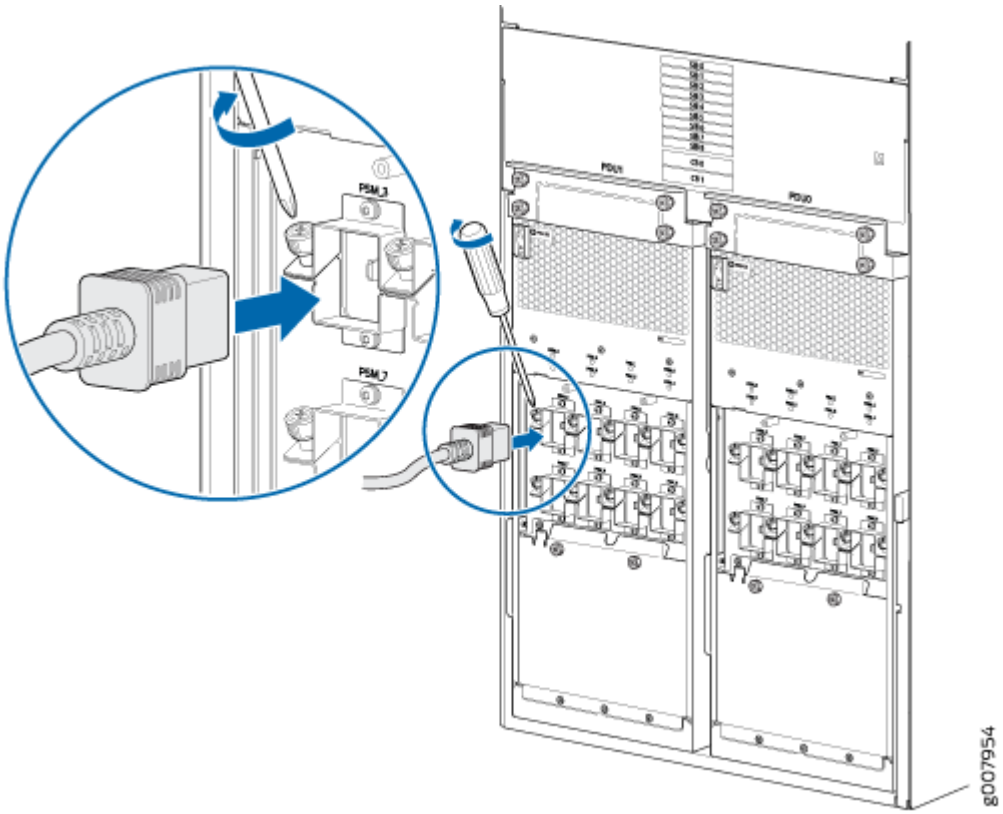
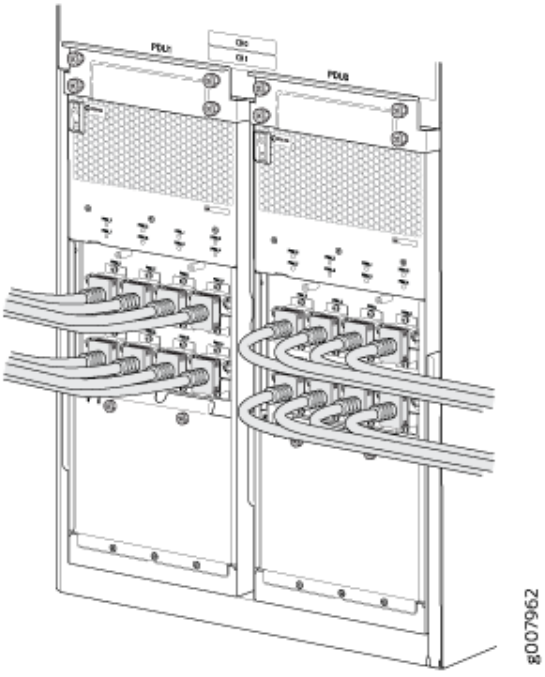


Figure 54: Connecting 20-A Inputs to a High Capacity Single-Phase AC PDU





5. Connect up to eight inputs (20-A or 30-A) to the PDU. See Figure 55 on page 65 and Figure 56 on page 66.

Figure 55: Plug Types for the 30-A Connector

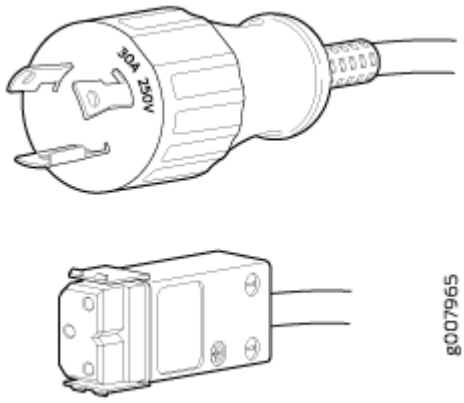
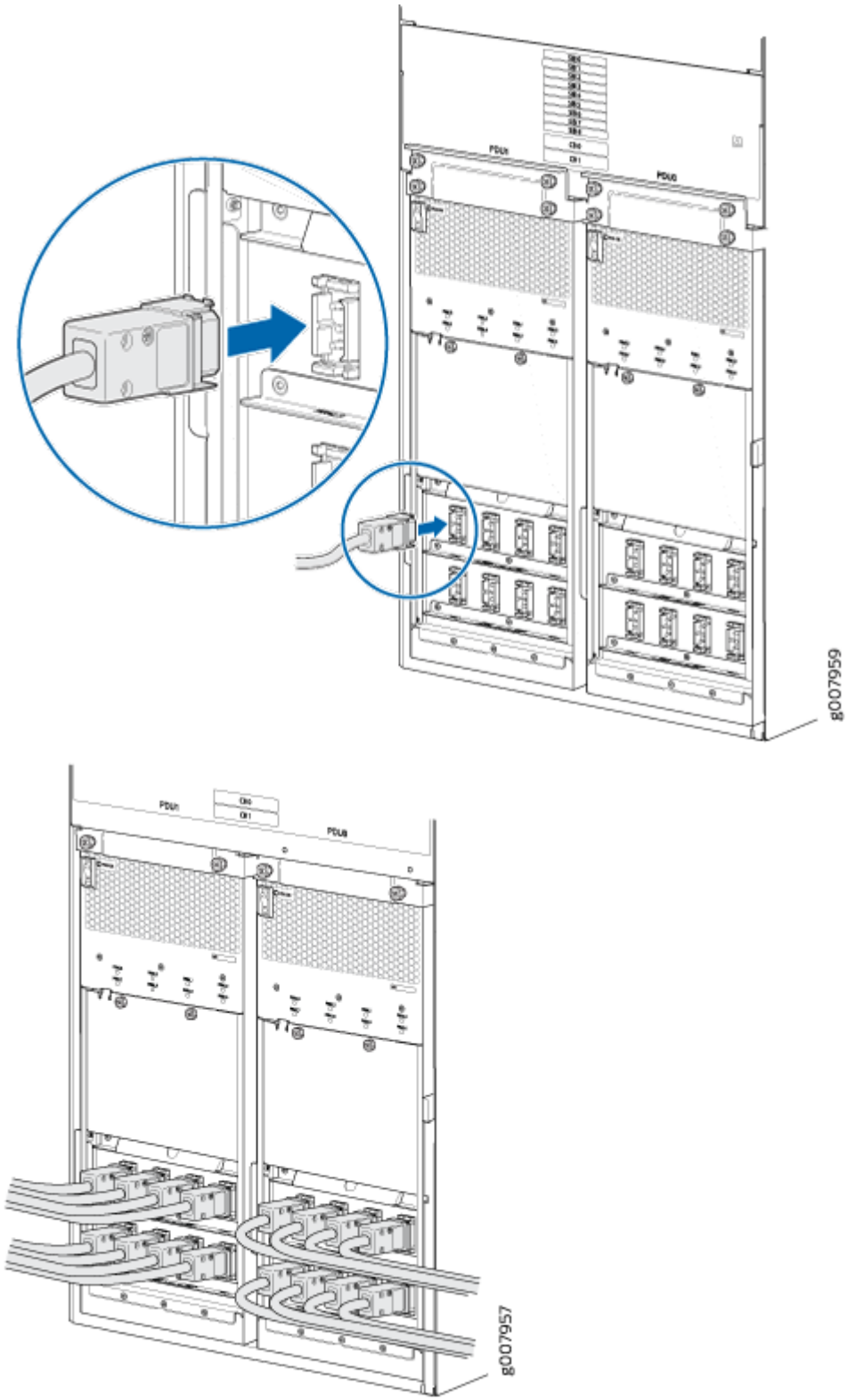


Figure 56: Connecting 30-A Inputs to a High Capacity Single-Phase AC PDU



6. Verify that the AC power wiring connections are correct.

7. Verify that the AC power cord does not touch or block access to PTX5000 components, and that it does not drape where people could trip on it.
8. Repeat the procedure for the other single-phase AC PDU.

Step 9: Power On the PTX5000

IN THIS SECTION

Depending on the type of PDUs you have installed, perform the appropriate procedure:

Power On a PTX5000 with 60-A DC PDUs

To power on the DC-powered PTX5000 with 60-A DC PDUs and 60-A DC PSMs:

NOTE: After powering off a power supply, you must wait at least 60 seconds before powering it on again.

1. Verify that the power distribution units (PDUs) and power supply modules (PSMs) are fully inserted in the chassis and that the captive screws on the faceplates are tightened.
2. Verify that an external management device is connected to one of the Routing Engine ports on the Control Board (**AUXILIARY** or **CONSOLE**).

> **NOTE**: The management Ethernet port labeled **HOST/ETHERNET** on the Control Board is not available until after the initial software configuration. You can monitor the startup process during the initial installation using devices connected to the **AUXILIARY** or **CONSOLE** ports.

3. Turn on power to the external management device.
4. Switch on the customer-site circuit breakers to provide voltage to the DC power source cables.
5. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
6. Verify that the green **DC IN** LEDs for both inputs on the PDU faceplate are lit steadily green, indicating that the inputs are receiving power.
7. Switch all the input power switches on one of the PDUs to the on (|) position.
8. Verify that the green **SW ON** LEDs on the PDU faceplate are lit steadily. The **SW ON** LEDs blink momentarily, then light steadily to indicate that the input power switches are on.

> **NOTE**: After a PDU is powered on, it can take up to 60 seconds for status indicators—such as the LEDs on the PDU and PSMs, the command output displays, and messages on the LCD display on the craft interface—to indicate that the PDU and PSMs are functioning normally. Ignore error indicators that appear during the first 60 seconds.

9. Move the **OUTPUT** power switch on the PDU to the on (|) position.
10. Verify that the **PDU OK** LED on the PDU faceplate is lit steadily and that the **FAULT** LED is off, indicating that the PDU is correctly installed and is functioning properly.

> **NOTE**: If the **PDU OK** LED does not light steadily, repeat the installation and cabling procedures.

11. Check the LEDs on the PSMs. For each PSM, verify that the **Input OK** and **Output OK** LEDs are lit steadily green, and that the **Fault** LED is off.

> **NOTE**: If the **Input OK** and **Output OK** LEDs do not light steadily or if the **FAULT** LED is lit, see *Troubleshooting the PTX5000 Power System* in the *PTX5000 Packet Transport Router Hardware Guide*.

12. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.
13. Repeat steps 7 through 12 for the other PDU.

NOTE: The Routing Engine boots as the PDU completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system, see *Powering Off the PTX5000* in the *PTX5000 Packet Transport Router Hardware Guide*.

After powering on a power supply, you must wait at least 60 seconds before powering it off.

Power On a PTX5000 with 120-A DC PDUs

To power on the DC-powered PTX5000 with 120-A DC PDUs and 120-A DC PSMs:

NOTE: After powering off a power supply, you must wait at least 60 seconds before powering it on again.

1. Verify that the power distribution units (PDUs) and power supply modules (PSMs) are fully inserted in the chassis and that the captive screws on the faceplates are tightened.
2. Verify that an external management device is connected to one of the Routing Engine ports on the Control Board (**AUXILIARY** or **CONSOLE**).

   NOTE: The management Ethernet port labeled **HOST/ETHERNET** on the Control Board is not available until after the initial software configuration. You can monitor the startup process during the initial installation using devices connected to the **AUXILIARY** or **CONSOLE** ports.
3. Turn on power to the external management device.
4. Switch on the customer-site circuit breakers to provide voltage to the DC power source cables.
5. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
6. Verify that the green **–48 V 120 A** LEDs on the PDU faceplate are lit steadily green, indicating that the inputs are receiving power.
7. Switch all the circuit breakers on one of the PDUs to the on (**|**) position.
8. Verify that the green **CB ON** LEDs on the PDU faceplate are lit steadily. The **CB ON** LEDs blink momentarily, then light steadily to indicate that the circuit breakers are on.

NOTE: After a PDU is powered on, it can take up to 60 seconds for status indicators—such as the LEDs on the PDU and PSMs, the command output displays, and messages on the LCD display on the craft interface—to indicate that the PDU and PSMs are functioning normally. Ignore error indicators that appear during the first 60 seconds.

9. Move the **OUTPUT** power switch on the PDU to the on (|) position.
10. Verify that the **PDU OK** LED on the PDU faceplate is lit steadily and that the **FAULT** LED is off, indicating that the PDU is correctly installed and is functioning properly.

NOTE: If the **PDU OK** LED does not light steadily, repeat the installation and cabling procedures.

11. Check the LEDs on the PSMs. For each PSM, verify that the **Input OK** and **Output OK** LEDs are lit steadily green, and that the **Fault** LED is off.

NOTE: If the **Input OK** and **Output OK** LEDs do not light steadily or if the **FAULT** LED is lit, see *Troubleshooting the PTX5000 Power System* in the *PTX5000 Packet Transport Router Hardware Guide*.

12. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.
13. Repeat steps 7 through 12 for the other PDU.

NOTE: The Routing Engine boots as the PDU completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system, see the *Powering Off the PTX5000* in the *PTX5000 Packet Transport Router Hardware Guide*.

After powering on a power supply, you must wait at least 60 seconds before powering it off.

Power On a PTX5000 with High Capacity DC PDUs

To power on the DC-powered PTX5000 with High Capacity DC PDUs and High Capacity DC PSMs:

NOTE: After powering off a power supply, you must wait at least 60 seconds before powering it on again.

1. Verify that the power distribution units (PDUs) and power supply modules (PSMs) are fully inserted in the chassis and that the captive screws on the faceplates are tightened.
2. Verify that an external management device is connected to one of the Routing Engine ports on the Control Board (**AUXILIARY** or **CONSOLE**).

   NOTE: The management Ethernet port labeled **HOST/ETHERNET** on the Control Board is not available until after the initial software configuration. You can monitor the startup process during the initial installation using devices connected to the **AUXILIARY** or **CONSOLE** ports.
3. Turn on power to the external management device.
4. Switch on the customer-site circuit breakers to provide voltage to the DC power source cables.
5. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
6. Switch the power switch on one of the PDUs to the on (|) position.
7. Verify that the green **PDU OK** LED is lit steadily green, indicating that the inputs are receiving power.
8. Verify that the **-1** and **-2** LEDs for each installed PSM are lit green. Also check the input **1 OK**, input **2 OK**, output **OK**, and fault
   (
   ⚠
) LEDs on each PSM.

   NOTE: The **-1** and **-2** LEDs are lit depending on the number of PSMs connected to each PDU. A minimum of three PSMs are required out of a maximum of eight per PDU. Also, each PSM has LEDs indicating input and output status.

   NOTE: After a PDU is powered on, it can take up to 60 seconds for status indicators—such as the LEDs on the PDU and PSMs, the command output displays, and messages on the LCD display on the craft interface—to indicate that the PDU and PSMs are functioning normally. Ignore error indicators that appear during the first 60 seconds.

NOTE: If the **PDU OK** and PSM LEDs do not light steadily or if the fault
(
⚠
) LED on the PSM is lit, see *Troubleshooting the PTX5000 Power System* in the *PTX5000 Packet Transport Router Hardware Guide*.

9. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.
10. Repeat Step 6 through Step 8 for the other PDU.

NOTE: The Routing Engine boots as the PDU completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system, see the *Powering Off the PTX5000* in the *PTX5000 Packet Transport Router Hardware Guide*.

After powering on a power supply, you must wait at least 60 seconds before powering it off.

Power On a PTX5000 with Three-Phase AC PDUs

To power on the AC-powered PTX5000 with three-phase delta AC PDUs or three-phase wye AC PDUs, and with AC PSMs:

NOTE: After powering off a PDU, you must wait at least 60 seconds before powering it on again.

1. Verify that the power distribution units (PDUs) and power supply modules (PSMs) are fully inserted in the chassis and that the captive screws on the faceplates are tightened.
2. Verify that an external management device is connected to one of the Routing Engine ports on the Control Board (**AUXILIARY** or **CONSOLE**).

NOTE: The management Ethernet port labeled **HOST/ETHERNET** on the Control Board is not available until after the initial software configuration. You can monitor the startup process during the initial installation using devices connected to the **AUXILIARY** or **CONSOLE** ports.

3. Turn on power to the external management device.
4. Switch on the customer-site circuit breakers to provide voltage to the AC power cords.

5. Verify that the PDUs are receiving power.
   - On the three-phase wye AC PDUs, verify that the green **220-240 V/346-415 V 30 A 50-60 Hz** LED is lit steadily green.
   - On the three-phase delta AC PDUs, verify that the green **200-240 V~ 60 A 50-60 Hz** LED is lit steadily green.
6. Switch the circuit breaker on one of the PDUs to the on (|) position.
7. Verify that the green **CB ON** LEDs on the PDU faceplate are lit steadily. The **CB ON** LEDs blink momentarily, then light steadily to indicate that the circuit breaker is on.

   NOTE: After a PDU is powered on, it can take up to 60 seconds for status indicators—such as the LEDs on the PDU and PSMs, the command output displays, and messages on the LCD display on the craft interface—to indicate that the PDU and PSMs are functioning normally. Ignore error indicators that appear during the first 60 seconds.

8. Move the **OUTPUT** power switch on the PDU to the on (|) position.
9. Verify that the **PDU OK** LED on the PDU faceplate is lit steadily, indicating that the PDU is correctly installed and is functioning properly.

   NOTE: If the **PDU OK** LED does not light steadily, repeat the installation and cabling procedures.

10. Repeat steps 6 through 9 for the other PDU.
11. Check the LEDs on the PSMs. For each PSM, verify that the **AC IN OK** and **DC IN OK** LEDs are lit steadily green, and that the **Fault** LED is off.

    NOTE: If the **Input OK** and **Output OK** LEDs do not light steadily or if the **FAULT** LED is lit, see *Troubleshooting the PTX5000 Power System* in the *PTX5000 Packet Transport Router Hardware Guide*.

12. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.

Power On a PTX5000 with High Capacity Single-Phase AC PDUs

To power on the AC-powered PTX5000 with high-capacity single-phase AC PDUs, and with AC PSMs:

NOTE: After powering off a PDU, you must wait at least 60 seconds before powering it on again.

1. Verify that the PDUs and PSMs are fully inserted in the chassis and that the captive screws on the faceplates are tightened.
2. Verify that an external management device is connected to one of the Routing Engine ports on the Control Board (**AUXILIARY** or **CONSOLE**).

   NOTE: The management Ethernet port labeled **HOST/ETHERNET** on the Control Board is not available until after the initial software configuration. You can monitor the startup process during the initial installation using devices connected to the **AUXILIARY** or **CONSOLE** ports.

3. Turn on power to the external management device.
4. Switch on the customer-site circuit breakers to provide voltage to the AC power cords.
5. Verify that the PDUs are receiving power. Verify that the green **PDU OK** LED is lit steadily green.
6. Switch on one of the PDUs to by turning its power switch to the on (|) position.

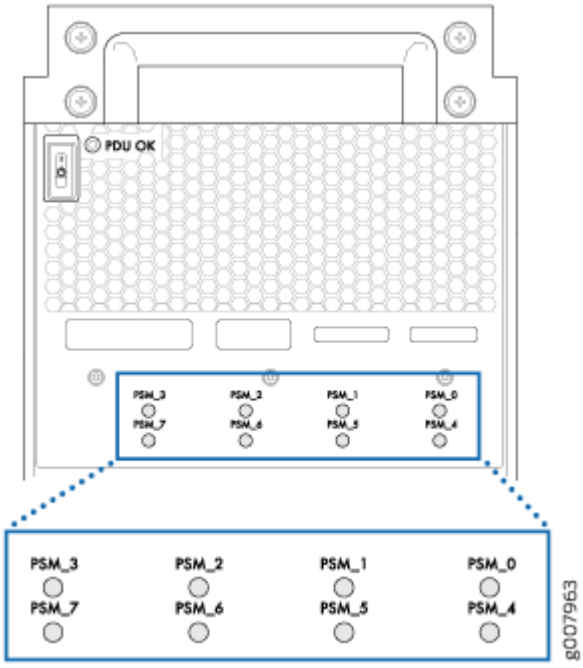
   NOTE: After a PDU is powered on, it can take up to 60 seconds for status indicators—such as the LEDs on the PDU and PSMs, the command output displays, and messages on the LCD display on the craft interface—to indicate that the PDU and PSMs are functioning normally. Ignore error indicators that appear during the first 60 seconds.

7. Verify that the **PDU OK** LED on the PDU faceplate is lit steadily, which indicates that the PDU is correctly installed and is functioning properly.

   NOTE: If the **PDU OK** LED does not light steadily, repeat the installation and cabling procedures.

8. Check the LEDs on the PSMs. For each PSM, verify that the **PSM** LEDs are lit steadily green.

Figure 57: PSM LEDs on the Single-Phase AC PDU



NOTE: If the **PSM** LED does not light steadily, see *Troubleshooting the PTX5000 Power System* in the *PTX5000 Packet Transport Router Hardware Guide*.

9. Repeat steps 6 through 8 for the other PDU.
10. On the external management device connected to the Routing Engine, monitor the startup process to verify that the system has booted properly.

Step 10: Perform the PTX5000 Initial Software Configuration

IN THIS SECTION

These procedures connect a PTX5000 to the network but do not enable it to forward traffic. For complete information about enabling the PTX5000 to forward traffic, including examples, see the Junos OS configuration guides.

You configure the PTX5000 by issuing Junos OS CLI commands, either on a console device attached to the **CONSOLE** port, or over a Telnet connection to a network connected to the **HOST/ETHERNET** port.

NOTE: These procedures enable you to use the **HOST/ETHERNET** management port. For the initial configuration, use a device attached to the **CONSOLE** port.

Enter Configuration Mode

1. Verify that the network device is powered on.
2. Log in as the root user. There is no password.

```
Amnesiac <ttyd0>
login: root
```

3. Start the CLI.

```
root@% cli
root>
```

4. Enter configuration mode.

```
root> configure
Entering configuration mode.
[edit]
root#
```

Configure User Accounts and Passwords

For information about using an encrypted password or an SSH public key string (DSA or RSA), see *Configuring the Root Password* and *user*.

1. Add a password to the root administration user account. Enter a cleartext password.

```
[edit]
root@host# set system root-authentication plain-text-password
New password: password
Retype new password: password
```

2. Create a management console user account.

```
[edit]
root@host# set system login user user-name authentication plain-text-password
New Password: password
Retype new password: password
```

3. Set the user account class to `super-user`.

```
[edit]
root@host# set system login user user-name class super-user
```

Configure System Attributes

1. Configure the name of the PTX5000. If the name includes spaces, enclose the name in quotation marks (“ ”).

```
[edit]
root@# set system host-name host-name
```

NOTE: The DNS server does not use the hostname to resolve to the correct IP address. This hostname is used to display the name of the device in the CLI. For example, this hostname is displayed on the command-line prompt when the user is logged in to the CLI:

user-name@host-name>

2. Configure the IP address of the DNS server.

```
[edit]
root# set system name-server address
```

3. Configure the domain name of the PTX5000.

```
[edit]
root@# set system domain-name domain-name
```

4. Configure the IP address and prefix length for the PTX5000 router's management Ethernet interface.

```
[edit]
root@# set interfaces em0 unit 0 family inet address address/prefix-length
```

5. Configure the IP address of a backup router. The backup router allows the PTX5000 to install a route to the management network while the Routing Engine is booting and before the routing protocol process (rpd) is up and running. The backup router must be directly connected—that is, on the same subnet—through the management Ethernet interface.

```
[edit]
root@# set system backup-router address
```

6. (Optional) Configure the static routes to remote subnets with access to the management port. Access to the management port is limited to the local subnet. To access the management port from a remote subnet, you must add a static route to that subnet within the routing table.

```
[edit]
root@# set routing-options static route remote-subnet next-hop destination-IP retain no-
readvertise
```

7. Configure the Telnet service at the `[edit system services]` hierarchy level.

```
[edit]
root@# set system services telnet
```

Commit the Configuration

1. Display the configuration to verify that it is correct.

```
[edit]
root@# show
system {
    host-name host-name;
    domain-name domain-name;
    backup-router address;
    root-authentication {
        authentication-method (password | public-key);
    }
    name-server {
        address;
    }
}
interfaces {
    em0 {
        unit 0 {
            family inet {
                address address/prefix-length;
            }
        }
    }
}
```

2. Commit the configuration to activate it.

```
[edit]
root@# commit
```

3. Optionally, configure additional properties by adding the necessary configuration statements. Then commit the changes to activate them.

```
[edit]
root@host# commit
```

4. When you have finished the configuration, exit configuration mode.

```
[edit]
root@host# exit
root@host>
```

Safety Warnings

WARNING: See installation instructions before connecting the PTX5000. This is a summary of safety warnings. For a complete list of warnings for the PTX5000, including translations, see the *PTX5000 Packet Transport Router Hardware Guide* at https://www.juniper.net/documentation/hardware/.

WARNING: The intrabuilding ports of the equipment or subassembly are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the Outside Plant (OSP) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

WARNING: The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

Attention Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

CAUTION: Before removing or installing components of a PTX5000, attach an ESD strap to an ESD point, and place the other end of the strap around your bare wrist. Failure to use an ESD strap could result in damage to the router.

CAUTION: Use an external surge protective device (SPD) at the AC input of the router.

- Only trained and qualified personnel must install or replace the PTX5000.
- Perform only the procedures described in this Quick Start or in the *PTX5000 Packet Transport Router Hardware Guide*. Other services must be performed by authorized service personnel only.
- Read the installation instructions before you connect the PTX5000 to a power source.
- Before installing the PTX5000, read the guidelines for site preparation in the *PTX5000 Packet Transport Router Hardware Guide* to make sure that the site meets power, environmental, and clearance requirements for the router.
- For the cooling system to function properly, the airflow around the chassis must be unrestricted.
- When installing the PTX5000, do not use a ramp inclined more than 10 degrees.
- Manually installing the PTX5000 without a mechanical lift is not supported.
- The PTX5000 must be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the PTX5000 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 PTX5000 in the rack.
- When removing or installing an electrical component, always place it component-side up on a flat antistatic surface or in an electrostatic bag.
- When you install the PTX5000, always make the ground connection first and disconnect it last.
- Wire the DC power distribution unit using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then –48 V to –48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, then ground to ground. Always connect the ground wire first and disconnect it last.
- Do not work on the system or connect or disconnect cables during electrical storms.

- Before working on equipment that is connected to power lines, remove jewelry, including rings, necklaces, and watches. Metal objects heat up when connected to power and ground and can cause serious burns or become welded to the terminals.
- Failure to observe these safety warnings can result in serious physical injury.
- AC power cable warning (Japan):

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。