



Cisco Nexus 9396PX Switch Site Preparation and Hardware Installation Guide

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Preface

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- [Related Documentation for Cisco Nexus 9000 Series NX-OS Software, page ix](#)
- [Obtaining Documentation and Submitting a Service Request, page x](#)

Audience

This publication is for hardware installers and network administrators who install, configure, and maintain Cisco Nexus devices.

Document Conventions

Command descriptions use the following conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
<i>Italic</i>	Italic text indicates arguments for which the user supplies the values.
[x]	Square brackets enclose an optional element (keyword or argument).
[x y]	Square brackets enclosing keywords or arguments separated by a vertical bar indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical bar indicate a required choice.

Convention	Description
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
<i>variable</i>	Indicates a variable for which you supply values, in context where italics cannot be used.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Examples use the following conventions:

Convention	Description
<code>screen font</code>	Terminal sessions and information the switch displays are in screen font.
<code>boldface screen font</code>	Information you must enter is in boldface screen font.
<i><code>italic screen font</code></i>	Arguments for which you supply values are in italic screen font.
<>	Nonprinting characters, such as passwords, are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:



Note

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



Caution

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

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Related Documentation for Cisco Nexus 9000 Series NX-OS Software

The entire Cisco NX-OS 9000 Series documentation set is available at the following URL:

http://www.cisco.com/en/US/products/ps13386/tsd_products_support_series_home.html

Release Notes

The release notes are available at the following URL:

http://www.cisco.com/en/US/products/ps13386/prod_release_notes_list.html

Configuration Guides

These guides are available at the following URL:

http://www.cisco.com/en/US/products/ps13386/products_installation_and_configuration_guides_list.html

The documents in this category include:

- *Cisco Nexus 9000 Series NX-OS Fundamentals Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS High Availability and Redundancy Guide*
- *Cisco Nexus 9000 Series NX-OS Interfaces Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Layer 2 Switching Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Multicast Routing Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Quality of Service Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Security Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS System Management Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Unicast Routing Configuration Guide*
- *Cisco Nexus 9000 Series NX-OS Verified Scalability Guide*
- *Cisco Nexus 9000 Series NX-OS VXLAN Configuration Guide*

Other Software Documents

- *Cisco Nexus 7000 Series and 9000 Series NX-OS MIB Quick Reference*

- *Cisco Nexus 9000 Series NX-OS Programmability Guide*
- *Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide*
- *Cisco Nexus 9000 Series NX-OS System Messages Reference*
- *Cisco Nexus 9000 Series NX-OS Troubleshooting Guide*
- *Cisco NX-OS Licensing Guide*
- *Cisco NX-OS XML Interface User Guide*

Obtaining Documentation and Submitting a Service Request

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

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



Overview

This chapter includes the following sections:

- [Overview of the Cisco Nexus 9396PX Switch Chassis Hardware, page 1](#)

Overview of the Cisco Nexus 9396PX Switch Chassis Hardware

The Cisco Nexus 9396PX switch (N9K-C9396PX) is a 2-RU, fixed-port switch designed for Top-of-Rack (ToR), Middle-of-Rack (MoR), and End-of-Rack (EoR), and spine-leaf deployment in data centers. This switch has 48 fixed 1- and 10-Gigabit Ethernet downlink ports and 12 fixed 40-Gbps QSFP+ uplink ports provided through an uplink module. The chassis for this switch includes the following user-replaceable components:

- M12PQ uplink module
- Fan trays (three—two for operations and one for redundancy [2+1]) with the following airflow choices:
 - Cold-Air-In version with blue stripe at top (N9K-C9300-FAN2-B)
 - Hot-Air-Out version with red stripe at top (N9K-C9300-FAN2)

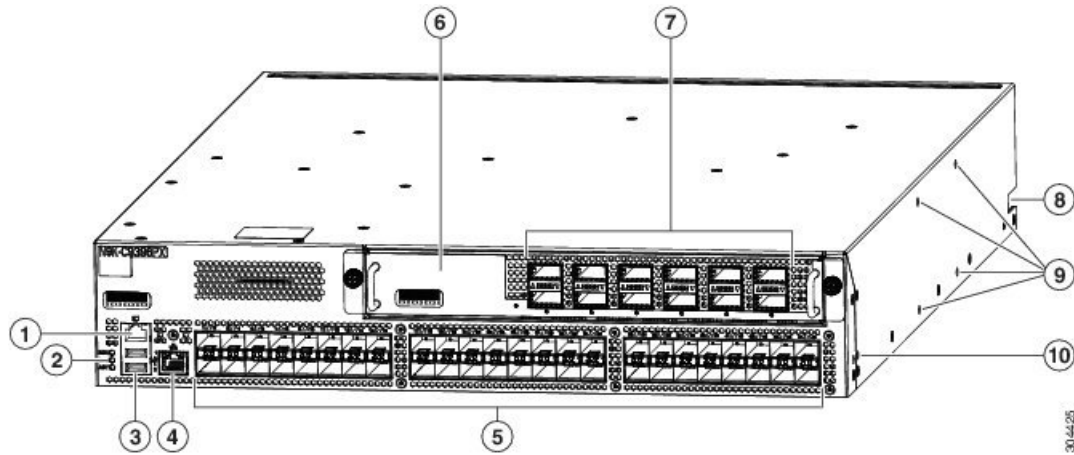


Note Previously, the Cisco Nexus 9396PX shipped with the N9k-C9300-FAN1-B or N9K-C9300-FAN1 fans. Currently, the N9K-C9300-FAN2-B and N9K-C9300-FAN2 are shipped with the switch.

- 650-W AC Power supplies (two—one for operations and one for redundancy [1+1]) with the following airflow choices:
 - Cold-Air-In version with blue stripe on latch handle (N9K-PAC-650W-B)
 - Hot-Air-Out version with red stripe on latch handle (N9K-PAC-650W)

The following figure shows the hardware features seen from the port side of the chassis.

Figure 1: Hardware Features on the Port Side of the Chassis



1	Console port (RS232 port)	6	M12PQ uplink module.
2	Chassis LEDs <ul style="list-style-type: none"> • Beacon (BCN) • Status (STS) • Environment (ENV) 	7	12 40-Gigabit Ethernet Quad Small Form-Factor Pluggable (QSFP+) optical ports for uplink connections to aggregation or spine switches
3	Two USB ports used for saving or copying functions Note USB support is limited to USB 2.0 devices that use less than 2.5 W (less than 0.5 A inclusive of surge current). Devices, such as external hard drives, that instantaneously draw more than 0.5 A are not supported.	8	Notch in both sides of the chassis for locking the power supply and fan tray end of the chassis to the bottom-support rails
4	Out-of-band management port (RJ-45 port)	9	Screw holes (4) for attaching a center-mount rack bracket for two-post racks (one bracket for each of two sides)
5	48 1- and 10-Gigabit Ethernet Small Form-Factor Pluggable (SFP+) optical downlink ports to servers or Fabric Extenders (FEXs) connected to additional servers	10	Screw holes (2) for attaching a front-mount bracket for four-post racks (one bracket on each of two sides)

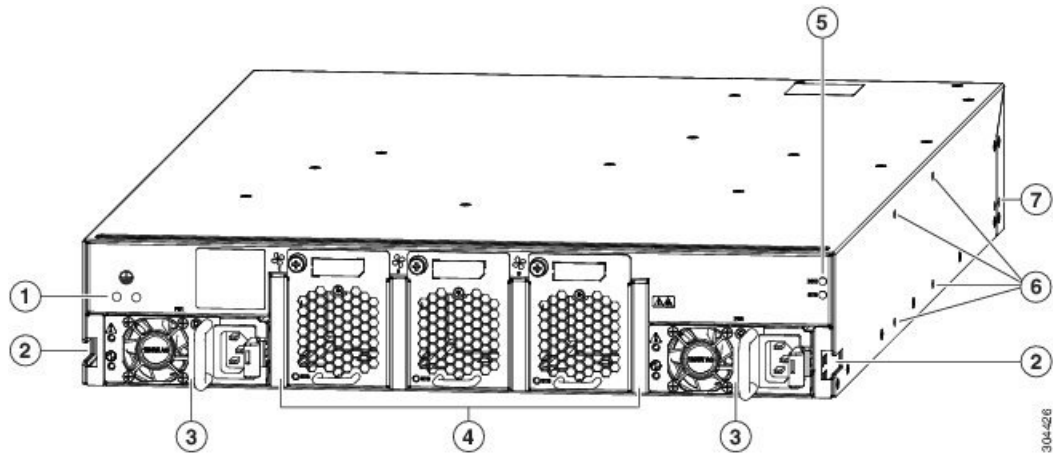
You can use the downlink ports to connect this switch to up to 48 servers or to up to six FEXs, which can be connected to additional servers. You can connect any of the following FEXs to the downlink ports:

- Cisco Nexus 2248TP FEX
- Cisco Nexus 2248TP-E FEX
- Cisco Nexus 2232PP FEX
- Cisco Nexus 2232TM FEX
- Cisco Nexus 2224TP FEX
- B22-HP FEX

For installation information on the Cisco Nexus 2000 Series FEXs, see the *Cisco Nexus 2000 Series Hardware Installation Guide*. For information on the Cisco Nexus B22-HP FEX, see the *Cisco Nexus B22 Fabric Extender for HP Getting Started Guide*.

The following figure shows the hardware features seen from the fan tray and power supply side of the chassis.

Figure 2: Hardware Features on the Fan Tray and Power Supply Side of the Chassis



1	Screw holes (2) for attaching the grounding lug.	5	Chassis LEDs are as follows: <ul style="list-style-type: none"> • Beacon (BCN) • Status (STS)
2	Notch in both sides of the chassis for locking the power supply and fan tray end of the chassis to the bottom-support rails.	6	Screw holes (4) for attaching a center-mount rack bracket for two-post racks (one bracket for each of two sides).

3	<p>Two 650-W AC power supplies (one used for operations and one used for redundancy) of the following types:</p> <ul style="list-style-type: none"> • Cold-Air-In version with blue stripe on latch handle (N9K-PAC-650W-B) • Hot-Air-Out version with red stripe on latch handle (N9K-PAC-650W) <p>Power supply slots are numbered 1 on the left and 2 on the right (as seen when looking at the power supplies).</p>	7	<p>Screw holes (2) for attaching a front-mount bracket for four-post racks (one bracket on each of two sides).</p>
4	<p>Three fan trays (two used for operations and one used for redundancy) of the following types:</p> <ul style="list-style-type: none"> • Cold-Air-In version with blue stripe at top (N9K-C9300-FAN2-B) • Hot-Air-Out version with red stripe at top (N9K-C9300-FAN2) <p>Note Earlier shipments of the switch were made with the N9K-C9300-FAN1-B or N9K-C9300-FAN1 fans. Fan tray slots are numbered 1 (leftmost slot) to 3 (rightmost slot).</p>		



Preparing the Site

- [Temperature Requirements, page 5](#)
- [Humidity Requirements, page 5](#)
- [Altitude Requirements, page 6](#)
- [Dust and Particulate Requirements, page 6](#)
- [Minimizing Electromagnetic and Radio Frequency Interference, page 6](#)
- [Grounding Requirements, page 7](#)
- [Planning for Power Requirements, page 7](#)
- [Airflow Requirements, page 8](#)
- [Rack and Cabinet Requirements, page 8](#)
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Temperature Requirements

The switch requires a operating temperature of 32 to 104° F (1 to 40° C). If the switch is not operating, the temperature must be between –40 to 158° F (–40 to 70° C).

Humidity Requirements

High humidity can cause moisture to enter the switch. Moisture can cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and size. The switch is rated to operate at 8 to 80 percent relative humidity, with a humidity gradation of 10 percent per hour. For nonoperating conditions, the switch can withstand from 5 to 95 percent relative humidity. Buildings in which the climate is controlled by air-conditioning in the warmer months and by heat during the colder months usually maintain an acceptable level of humidity for the switch equipment. However, if the switch is located in an unusually humid location, you should use a dehumidifier to maintain the humidity within an acceptable range.

Altitude Requirements

If you operate a switch at a high altitude (low pressure), the efficiency of forced and convection cooling is reduced and can result in electrical problems that are related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or to perform at a reduced efficiency. This switch is rated to operate at altitudes from –500 to 13,123 feet (–152 to 4,000 meters). You can store the switch at altitudes of –1,000 to 30,000 feet (–305 to 9,144 meters).

Dust and Particulate Requirements

Exhaust fans cool power supplies and system fan trays cool switches by drawing in air and exhausting air out through various openings in the chassis. However, fans also ingest dust and other particles, causing contaminant buildup in the switch and increased internal chassis temperature. A clean operating environment can greatly reduce the negative effects of dust and other particles, which act as insulators and interfere with the mechanical components in the switch.

In addition to regular cleaning, follow these precautions to avoid contamination of your switch:

- Do not permit smoking near the switch.
- Do not permit food or drink near the switch.

Minimizing Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from the switch can adversely affect other devices such as radio and television (TV) receivers operating near the switch. Radio frequencies that emanate from the switch can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the switch monitor.

RFI is defined as any EMI with a frequency above 10 kHz. This type of interference can travel from the switch to other devices through the power cable and power source or through the air like transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI that can be emitted by computing equipment. Each switch meets these FCC regulations.

To reduce the possibility of EMI and RFI, follow these guidelines:

- Cover all open expansion slots with a blank filler plate.
- Always use shielded cables with metal connector shells for attaching peripherals to the switch.

When wires are run for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires with the following implications:

- Bad wiring can result in radio interference emanating from the plant wiring.
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in the chassis and even create an electrical hazard by conducting power surges through lines into equipment.

**Note**

To predict and prevent strong EMI, you might need to consult experts in radio frequency interference (RFI).

The wiring is unlikely to emit radio interference if you use twisted-pair cable with a good distribution of grounding conductors. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable.

**Caution**

If the wires exceed the recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic switches. You might want to consult experts in electrical surge suppression and shielding if you had similar problems in the past.

Grounding Requirements

The switch is sensitive to variations in voltage supplied by the power sources. Overvoltage, undervoltage, and transients (or spikes) can erase data from the memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the switch. You can connect the grounding pad on the switch either directly to the earth-ground connection or to a fully bonded and grounded rack.

You must provide the grounding cable to make this connection, but you can connect the grounding wire to the switch using a grounding lug that ships with the switch. Size the grounding wire to meet local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations (for those installations, we recommend that you use commercially available 6 AWG wire). The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.

**Note**

You automatically ground the AC power supplies when you connect them to a power source. You must also connect the chassis to the facility earth ground.

Planning for Power Requirements

You can install one or two 650-W AC power supplies in the switch. One power supply is required for operations and a second power supply is required if you need power redundancy. For power supply ($n+1$) redundancy, you need only one AC power source and you can connect both power supplies to the same power source. For input-source ($n+n$) redundancy, you need two AC power sources and you connect each power supply to a different power source.

You must ensure that the circuit used for the switch is dedicated to the switch to minimize the possibility of circuit failure.

Airflow Requirements

The switch is designed to be positioned with its ports in either the front or the rear of the rack depending on your cabling and maintenance requirements. To allow for either hot or cold aisles in front of the chassis, you can order fan tray and power supply modules that have either of the following airflow directions:

- Hot-air-out airflow—Cool air enters the chassis through the port end and exhausts through the fan tray and power supply modules.
- Cold-air-in airflow—Cool air enters the chassis through the fan tray and power supply modules and exhausts through the port side of the chassis.

You can identify the airflow direction by looking at the colored stripe on the front of each fan tray and power supply module. A red stripe indicates hot-air-out airflow and a blue stripe indicates the cold-air-in airflow.

**Note**

All of the fan tray and power supply modules in a switch must have the same direction of airflow.

Rack and Cabinet Requirements

You can install the following types of racks or cabinets for your switch:

- Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom to top cooling)
- Standard open four-post Telco racks
- Standard open two-post Telco racks

To correctly install the switch in a cabinet that is located in a hot-aisle/cold-aisle environment, you should fit the cabinet with baffles to prevent exhaust air from recirculating into the chassis air intake.

Work with your cabinet vendors to determine which of their cabinets meet the following requirements or see the Cisco Technical Assistance Center (TAC) for recommendations:

- Use a standard 19-inch (48.3 cm), four-post Electronic Industries Alliance (EIA) cabinet or rack with mounting rails that conform to English universal hole spacing per section 1 of the ANSI/EIA-310-D-1992 standard.
- The depth of a four-post rack must be 24 to 32 inches (61.0 to 81.3 cm) between the front and rear mounting brackets.
- Required clearances between the chassis and the edges of its rack or the interior of its cabinet are as follows:
 - 4.5 inches (11.4 cm) between the front of the chassis and the interior of the cabinet (required for cabling).
 - 3.0 inches (7.6 cm) between the rear of the chassis and the interior of the cabinet (required for airflow in the cabinet).
 - No clearance is required between the chassis and the sides of the rack or cabinet (no side airflow).

Additionally, you must have power receptacles located within reach of the power cords used with the switch. For the power cord specifications, see [AC Power Cord Specifications](#), on page 39

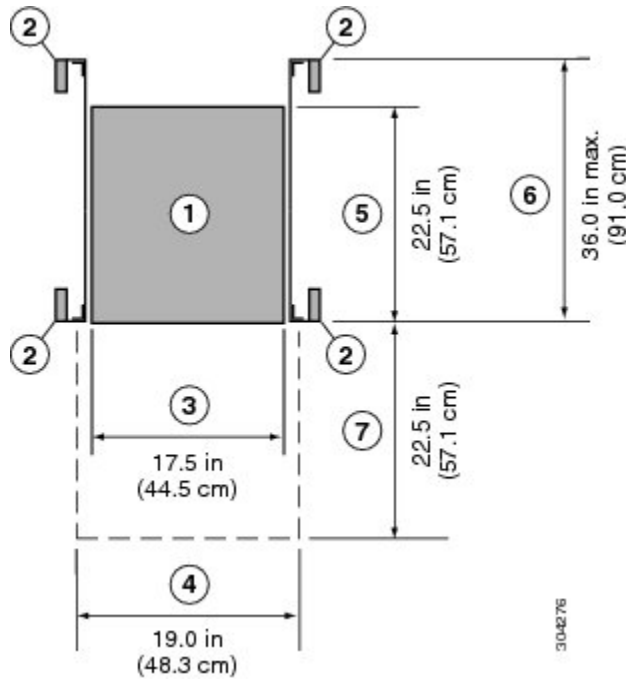


Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

Clearance Requirements

You must provide the chassis with adequate clearance between the chassis and any other rack, device, or structure so that you can properly install the chassis, route cables, provide airflow, and maintain the switch. For the clearances required for an installation of this chassis in a four-post rack, see the following figure.

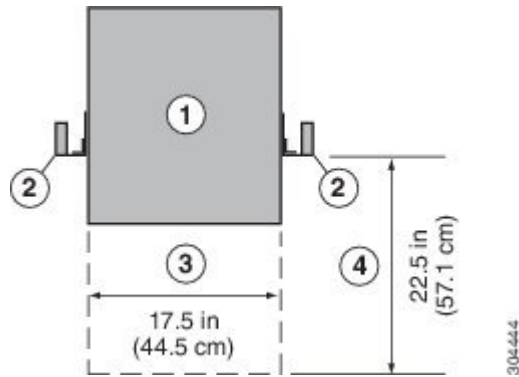
Figure 3: Clearances Required for a Four-Post Rack Installation



1	Chassis	5	Depth of the chassis
2	Vertical rack-mount posts and rails	6	Maximum extension of the bottom-support rails
3	Chassis width	7	Depth of the front clearance area (this equals the depth of the chassis)
4	Width of the front clearance area (this equals the width of the chassis with two rack-mount brackets attached to it)		

For the clearances required for a two-post rack installation, see the following figure.

Figure 4: Clearances Required for a Two-Post Rack Installation



1	Chassis	3	Chassis width
2	Vertical rack-mount posts and rails	4	Service clearance required for replacing the chassis (equals the length of the chassis)



Note Both the front and rear of the chassis must be open to both aisles for airflow.



Installing the Chassis

- [Install a Rack, page 11](#)
- [Unpacking and Inspecting a New Switch, page 12](#)
- [Installing the Chassis in a Two-Post Rack, page 13](#)
- [Installing the Chassis in a Four-Post Rack, page 16](#)
- [Grounding the Chassis, page 21](#)
- [Powering Up the Switch, page 23](#)

Install a Rack

Before you install the switch, you must install a standard four-post, 19-inch EIA data center rack (or a cabinet that contains such a rack) that meets the requirements listed in .

-
- Step 1** Bolt the rack to the concrete subfloor before moving the chassis onto it.
- Warning** Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.
- Step 2** If the rack has bonded construction, connect it to the earth ground. This action enables you to easily ground the switch and its components and to ground your electrostatic discharge (ESD) wrist strap to prevent damaging discharges when you handle ungrounded components before installing them.
- Step 3** If you need access to the source power at the rack, include AC power receptacle with the amperage required by the switch that you are installing.
- Warning** Take care when connecting units to the supply circuit so that wiring is not overloaded.
- Note** If you are using the combined power mode or power-supply redundancy, you need only one power source. If you are using input-source redundancy or full redundancy, you need two power sources.
-

Unpacking and Inspecting a New Switch

Before you install a new chassis, you need to unpack and inspect it to be sure that you have all the items that you ordered and verify that the switch was not damaged during shipment. If anything is damaged or missing, contact your customer representative immediately.



Caution

When you handle the chassis or its components, you must follow ESD protocol at all times to prevent ESD damage. This protocol includes but is not limited to wearing an ESD wrist strap that you connect to the earth ground.



Tip

Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them. If you need to move or ship the system in the future, you will need this container.

Step 1

Compare the shipment to the equipment list that is provided by your customer service representative and verify that you have received all of the ordered items.

The shipment should include the following:

- Switch chassis, which includes the following installed components:
 - Two 650-W AC power supplies
 - Hot-air-out airflow (N9K-PAC-650W)
 - Cold-air-in airflow (N9K-PAC-650W-B)
 - Three fan trays
 - Hot-air-out airflow (N9K-C9300-FAN2) (currently shipped with the switch)
 - Cold-air-in airflow (N9K-C9300-FAN2-B) (currently shipped with the switch)
 - Hot-air-out airflow (N9K-C9300-FAN1) (previously shipped with the switch)
 - Cold-air-in airflow (N9K-C9300-FAN1-B) (previously shipped with the switch)
- Switch accessory kit

Step 2

Check the contents of the box for damage.

Step 3

If you notice any discrepancies or damage, send the following information to your customer service representative by email:

- Invoice number of the shipper (see the packing slip)
- Model and serial number of the missing or damaged unit
- Description of the problem and how it affects the installation

Installing the Chassis in a Two-Post Rack

Attaching Center-Mount Brackets to the Chassis

You need to attach a right-angled bracket to each side of the chassis. This bracket centers the chassis and secures it in place on a two-post rack.

**Note**

If you are installing the chassis in a two-post rack, see [Attaching Front-Mount Brackets to the Chassis, on page 17](#)

**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.

Before You Begin

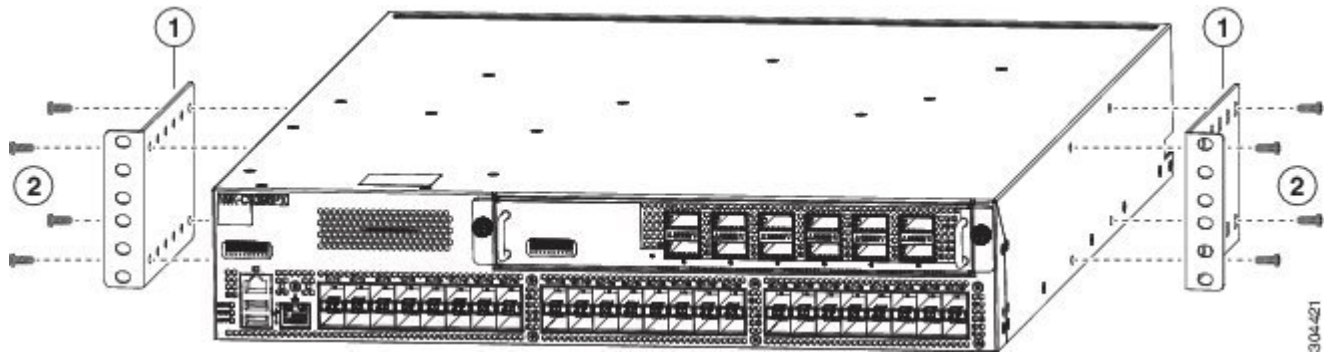
- You must separately order the center-mount brackets if you are installing the chassis in a two-post rack. These brackets do not ship with the chassis unless you specifically order them.
- You must have the following tools and equipment:
 - Manual Phillips-head torque screwdriver
 - Center-mount bracket kit

Step 1

Align one of the two center-mount brackets on the left or right side of the chassis and be sure that the angled portion is facing the front of the chassis (see the following figure).

Be sure to align four of the screw holes on the larger side of the bracket with the four screw holes near the center of the left or right side of the chassis.

Figure 5: Aligning and Attaching Center-Mount Brackets to the Sides of the Chassis



1	Center-mount bracket with its larger side facing the chassis and the longer side facing the front (port side) of the chassis. Align four screw holes in the bracket to four screw holes in the side of the chassis.	2	Four M4 x 8 mm screws used to fasten the bracket to the chassis.
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- Step 2** Use four M4 x 8 mm screws to attach the bracket to the chassis. Tighten each screw to 11 to 15 in-lb (1.2 to 1.7 N·m).
- Step 3** Repeat Steps 1 and 2 to attach the second center-mount bracket to the other side of the chassis.

What to Do Next

You are ready to mount the chassis to the two-post rack.

Installing the Chassis in a Two-Post Rack

You need to position the chassis near the top of the rack with the fan trays and power supplies in the appropriate aisle for their required airflow. If these modules have a blue stripe for cold-air-in airflow, then you must position the modules by the cold aisle. If the modules have a burgundy stripe for hot-air-out airflow, you must position the modules by the hot aisle.


Warning

Installation of the equipment must comply with local and national electrical codes.


Warning

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.

Before You Begin

- Make sure that the two-post rack is properly installed and secured to the concrete subfloor.
- Make sure that two center-mount brackets are securely fastened to the middle of each side of the chassis.
- Make sure that you have six customer-supplied rack-mount screws (typically M6 x 10 mm or the appropriate screw for the vertical mounting rails on the rack).
- You have at least two people to install the chassis.



Warning

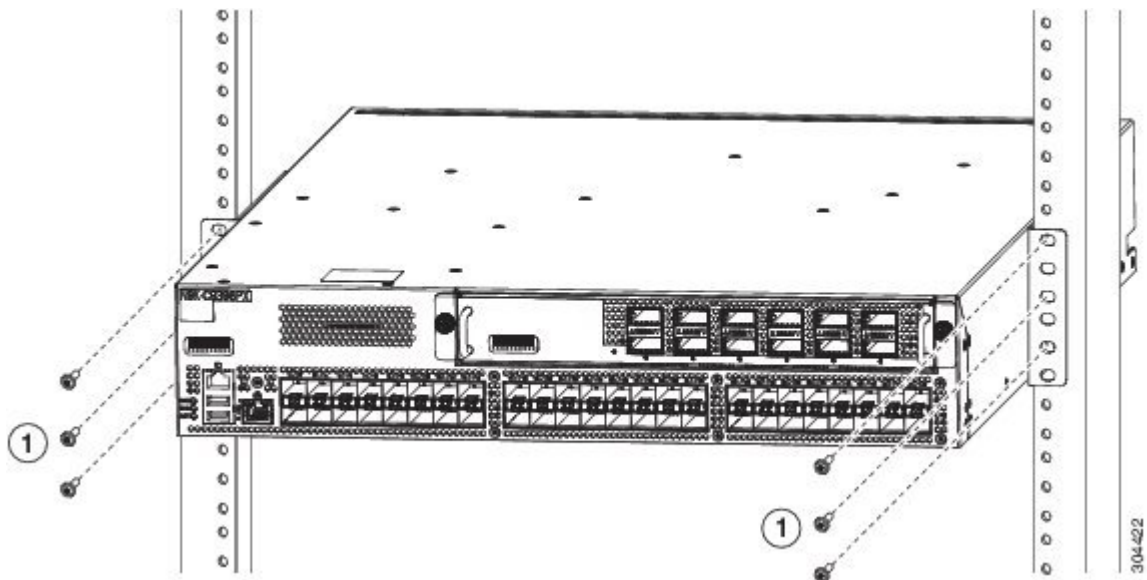
To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- 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.

Step 1

Use one person to position the chassis so that it is near the top of the rack with the fan trays and power supplies in the appropriate aisle and the center-mount bracket has its screw holes aligned to screw holes on the two-post rack. If these modules have a blue stripe for cold-air-in airflow, then you must position the modules by the cold aisle. If the modules have a burgundy stripe for hot-air-out airflow, you must position the modules by the hot aisle.

Figure 6: Attaching the Chassis to a Two-Post Rack



304422

1	Three customer-supplied screws (typically M6 x 10 mm screws or the appropriate screws for the rack) to hold each side of the chassis to the two-post rack.		
---	--	--	--

Step 2 Use the second person to secure the three customer-supplied rack-mount screws (typically M6 x 10 mm or other appropriate screws for the rack) on each center-mount bracket to attach the chassis to the rack. Tighten each screw to the appropriate torque setting for the screws (for M6 x 10 mm screws, use 40 in-lbs [4.5 N·m] of torque).

Installing the Chassis in a Four-Post Rack

Attaching the Bottom-Support Rails to the Rack

The switch chassis that you are installing ships with two adjustable bottom-support rails that you can attach to a four-post rack to hold the chassis. Each of these bottom-support rails has two pieces—one that slides into the other so that you can adjust them to fit racks with front and rear mounting posts that are spaced less than 36 inches (91 cm). On each bottom-support rail, the rail half that slides into the other rail includes a chassis stop that fits into the module end of the chassis. Depending on whether the power supplies and fan trays are designed to exhaust hot air (hot-air-out airflow with burgundy color markings) or take in cold air (cold-air-in airflow with blue color markings), you need to position the rail half with the chassis stop so that the fan trays and power supplies end up in the appropriate aisle as follows:

- Hot-air-out (burgundy color markings) airflow requires that the bottom-support rail with the chassis stop be located on the hot aisle side of the rack.
- Cold-air-in (blue color markings) airflow requires that the bottom-support rail with the chassis stop be located on the cold aisle side of the rack.



Warning

Installation of the equipment must comply with local and national electrical codes.

Before You Begin

Before you can install the bottom support rails for the chassis, you must do the following:

- Verify that a four-post rack or cabinet is installed.
- If any other devices are stored in the rack or cabinet, verify that the heavier switches are installed below lighter switches and that there is at least 2 rack units open to install the switch.
- Verify that the bottom-support rails kit is included in the switch accessory kit.
- Verify that you have 8 screws for attaching the bottom support brackets to the racks (typically M6 x 10 mm screws or the screw appropriate for the vertical mounting rails on the rack).

**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.

-
- Step 1** Look at the fan trays and power supplies installed in the chassis to determine how you must position the bottom-support rails on the rack.
- If the modules have blue stripes (cold-air-in modules), you must position the bottom support rails so that the chassis stop is positioned by the cold aisle.
 - If the modules have burgundy stripes (hot-air-out modules), you must position the bottom support rails so that the chassis stop is positioned by the hot aisle.
- Step 2** Separate the two sliders that make up one bottom-support rail and position the half with the chassis stop by the appropriate aisle for the fan trays and power supplies. Also make sure that there is at least 2 rack units open above the bottom-support rails so that you can easily install the chassis.
- Step 3** Use two customer-supplied screws (typically M6 x 10 mm screws) to attach the bottom-support rail half to the vertical mounting rails on the rack post. Tighten each screw to the appropriate torque setting for the screws (for M6 x 10 mm screws, use 40 in. lbs [4.5 N·m] of torque).
- Step 4** Slide the other half of the bottom-support rail onto the attached half of the rail set and use two customer supplied screws (typically M6 x 10 mm screws) to secure that portion to the vertical mounting rails on the rack. Tighten each screw to the appropriate torque setting for the screws (for M6 x 10 mm screws, use 40 in. lbs [4.5 N·m] of torque).
- Step 5** Repeat Steps 2 and 3 to attach the other expanding bottom-support rails to the other side of the rack.
- Note** Check the two installed bottom support rails to be sure that both have their chassis stops by the same aisle (either both by the hot aisle or both by the cold aisle) and that both rails are level and level with each other. If they are not level, adjust the higher rail down to the level of the lower rail.
-

What to Do Next

You are ready to install two front-mount brackets on the chassis.

Attaching Front-Mount Brackets to the Chassis

You need to attach a right-angled bracket to each side of the chassis. This bracket holds the chassis in place on a four-post rack.

**Note**

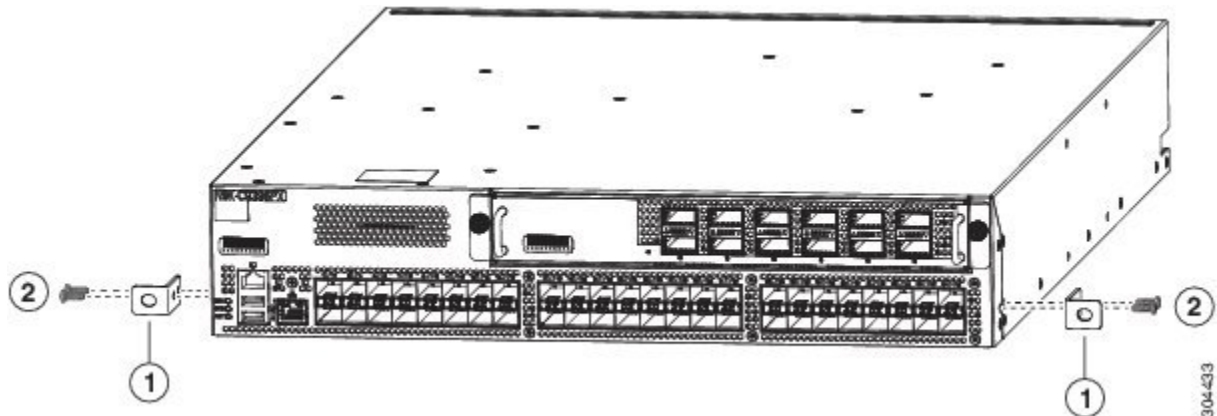
If you are installing the chassis in a two-post rack, see [Attaching Center-Mount Brackets to the Chassis](#), on page 13

Before You Begin

- You must have the following tools and equipment:
 - Manual Phillips-head torque screwdriver
 - Front-mount brackets (2) and screws (4) (found inside the switch accessory kit)

- Step 1** Align the two holes in one side of one of two front-mount brackets to two holes on the left or right side of the chassis (see the following figure).
Be sure that the other side of the bracket is facing toward the front (port end) of the chassis.

Figure 7: Aligning and Attaching Front-Mount Brackets to the Sides of the Chassis



1	Front-mount bracket with two screw holes aligned to two screw holes in the chassis and one screw hole facing the front (port side) of the chassis.	2	Two M4 x 6 mm screws used to fasten the bracket to the chassis.
---	--	---	---

- Step 2** Use two M4 x 6 mm screws to attach the bracket to the chassis. Tighten each screw to 11 to 15 in-lb (1.2 to 1.7 N·m).
Step 3 Repeat Steps 1 and 2 to attach the second center-mount bracket to the other side of the chassis.

What to Do Next

You are ready to mount the chassis to the four-post rack.

Installing the Chassis in a Four-Post Rack

You need to slide the chassis onto the bottom-support rails so that the end with the fan trays and power supplies locks onto the chassis stops at the end of the rails and so that the front-mount brackets on the chassis come into contact with the front-mount rails on the rack.

**Warning**

Installation of the equipment must comply with local and national electrical codes.

**Warning**

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.

Before You Begin

- Make sure that the four-post rack is properly installed and secured to the concrete subfloor.
- Make sure that the bottom support rails are installed so that the power supplies and fan trays will be in the appropriate aisle as follows:
 - Burgundy striped (hot-air-out) modules are positioned in a hot aisle (the chassis stop on the bottom-support rails is positioned by the hot aisle).
 - Blue striped (cold-air-in) modules are positioned in a cold aisle (the chassis stop on the bottom-support rails is positioned by the cold aisle).
- Make sure that two front-mount brackets are securely fastened to the sides of the chassis at the port end.
- Make sure that you have two customer-supplied rack-mount screws (M6 x 10 mm or appropriate screw for the vertical mounting rails on the rack).

**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:

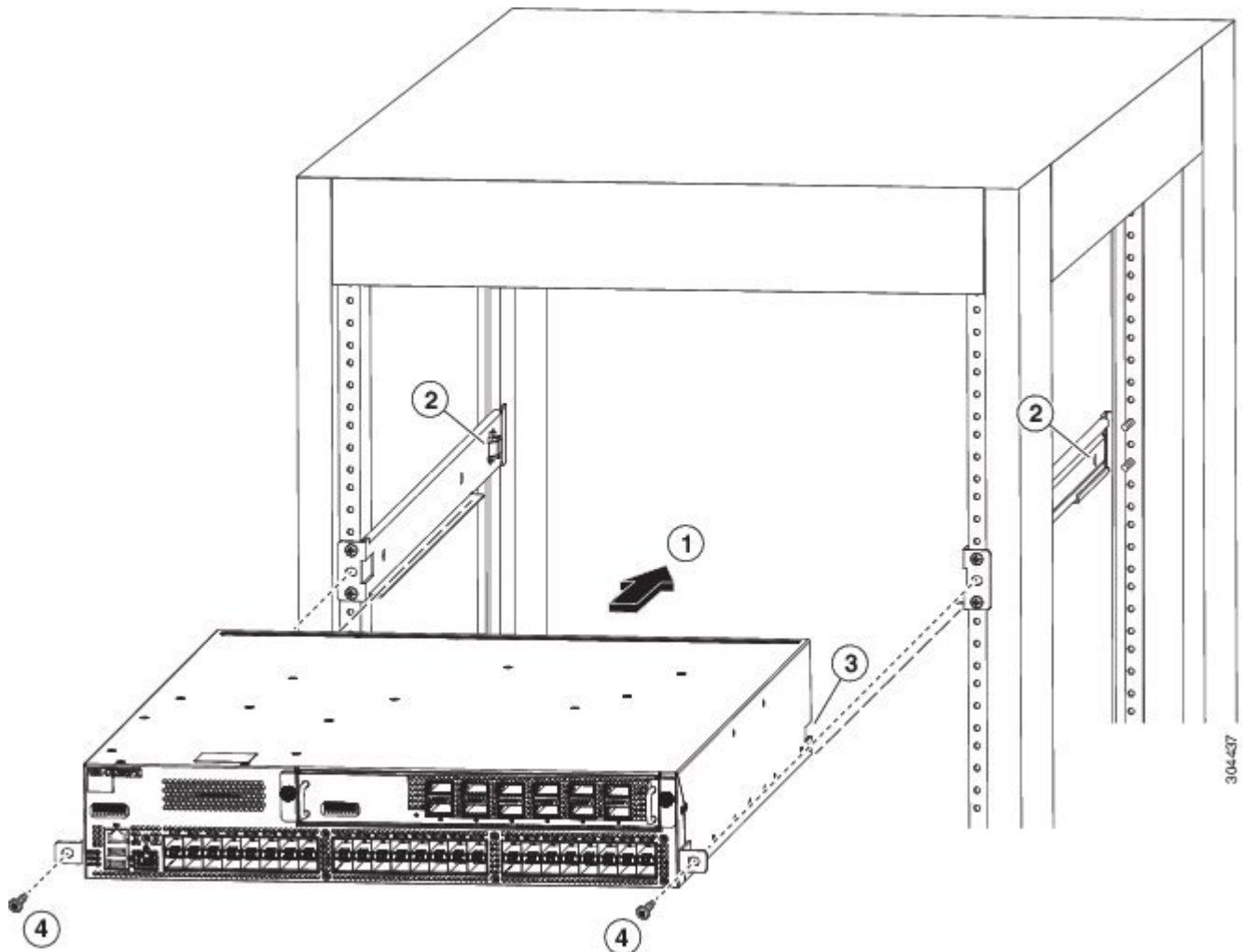
- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Step 1

Slide the power supply and fan tray end of the chassis onto the bottom support rails that are installed on the rack. Be sure that the sides of the chassis by the fan trays and power supplies clips into the chassis stops on the bottom support rails and the front mounting brackets come in contact with the rack (see the following figure).

Note If the bottom support rails are extended a long distance, they can bend outwards slightly when you install the chassis and the chassis stops at the far end of the rails might not fit into the end of the chassis. If this happens, press the side rails toward the sides of the chassis so that the chassis stops can go inside the chassis and hold it in place on the rack.

Figure 8: Sliding the Chassis onto the Bottom-Support Rails



nxos-93128-hardware-only

1	Slide the fan-tray and power-supply end of the chassis onto the bottom-support rails so that the chassis locks onto the chassis stops at the end of the rails.	3	Receiving hole on each side of the chassis for the chassis stops on the bottom-support rails.
2	Chassis stops for holding the chassis (positioned by the aisle required for the fan trays and power supplies).	4	Customer-supplied rack-mount screw (M6 x 10 mm screw or other screw appropriate for the rack) used to secure each side of the chassis to the rack.

- Step 2** Use a customer-supplied rack-mount screw (an M6 x 10 mm screw or other appropriate screw for the rack) to attach each of the two mounting brackets on the chassis to the rack and tighten each screw to the appropriate torque setting for the screw (for M6 x 10 mm screws, use 40 in-lbs [4.5 N·m] of torque).
-

Grounding the Chassis

The switch is grounded when you connect the chassis and the power supplies to the earth ground in the following ways:

- You connect the chassis (at its grounding pad) to either the data center ground or to a fully-bonded and grounded rack.



Note The chassis ground connection is active even when the AC power cables are not connected to the system.

- You connect the AC power supplies to the earth ground automatically when you connect an AC power supply to an AC power source.



Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last.

Before You Begin

Before you can ground the chassis, you must have a connection to the earth ground for the data center building. If you installed the switch chassis into a bonded rack (see the rack manufacturer's instructions for more information) that now has a connection to the data center earth ground, you can ground the chassis by connecting its grounding pad to the rack. Otherwise, you must connect the chassis grounding pad directly to the data center ground.

To connect the switch chassis to the data center ground, you need the following tools and materials:

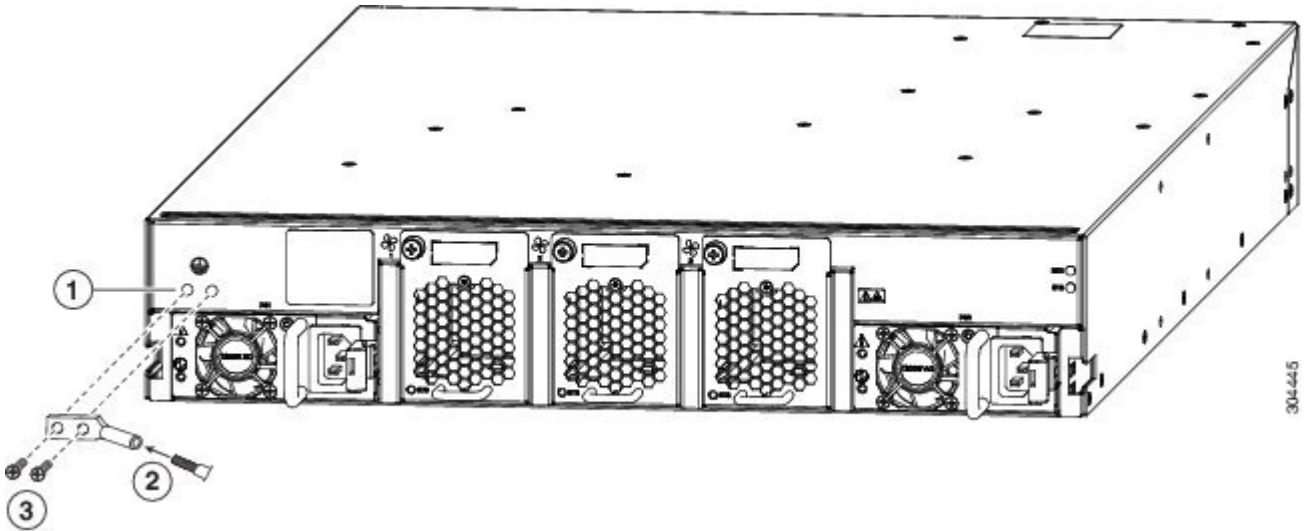
- Grounding lug—A two-holed standard barrel lug that supports up to 6 AWG wire. This lug is supplied with the accessory kit.
- Grounding screws—Two M4 x 8 mm (metric) pan-head screws. These screws are shipped with the accessory kit.
- Grounding wire—Not supplied with the accessory kit. This wire should be sized to meet local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations. We recommend that you use commercially available 6 AWG wire. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- Number 1 Phillips-head torque screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.

- Wire-stripping tool to remove the insulation from the grounding wire.

Step 1 Use a wire-stripping tool to remove approximately 0.75 inch (19 mm) of the covering from the end of the grounding wire.

Step 2 Insert the stripped end of the grounding wire into the open end of the grounding lug, and use a crimping tool to crimp the lug to the wire (see Callout 2 in the following figure). Verify that the ground wire is securely attached to the grounding lug by attempting to pull the wire out of the crimped lug.

Figure 9: Grounding a Cisco Nexus 9396 Chassis



1	Chassis grounding pad	3	Two M4 screws used to secure the grounding lug to the chassis
2	Grounding cable, with 0.75 in. (19 mm) of insulation stripped from one end, inserted into the grounding lug and crimped in place		

Step 3 Secure the grounding lug to the chassis grounding pad with two M4 screws (see Callouts 1 and 3 in the previous figure), and tighten the screws to 11.5 to 15 in-lb (1.3 to 1.7 N·m) of torque.

Step 4 Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure an adequate earth ground for the switch. If the rack is fully bonded and grounded, connect the grounding wire as explained in the documentation provided by the vendor for the rack.

Powering Up the Switch

To power up the switch, you must connect one or two power supplies to AC power sources. The number of power supplies and power sources used depends on the following conditions:

- If you are using combined power (not using power redundancy), you must connect one power supply to one AC power source.
- If you are using power-supply ($n+1$) redundancy, you must connect two power supplies to one AC power source.
- If you are using input-source ($n+n$) redundancy, you must use two power supplies and two AC power sources—you must connect each power supply to a different power source.

**Warning**

Read the installation instructions before connecting the system to the power source.

**Warning**


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

Before You Begin

- Switch installed in a rack and connected to an Earth ground
- Recommended power cable for your nation or region
- AC power source with the required amperage located within reach of the power cable being used


Step 1

Connect a power supply to an AC power source as follows:

- Using the recommended power cable for your country or region (see [AC Power Cord Specifications, on page 39](#)), connect the C19 plug on the power cable to the power receptacle on the power supply.
- Rotate the cable retention clip on the power supply over the C19 plug to prevent accidental unplugging of the cable.
- Connect the other end of the power cable to the AC power source.
- Verify that the  LED is on and green.
If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.


Step 2

If you are using the power-supply ($n+1$) redundancy mode, you must connect the second power supply as follows:

- Using the recommended power cable for your country or region (see [AC Power Cord Specifications, on page 39](#)), connect the C19 plug on the power cable to the power receptacle on the second power supply.
- Rotate the cable retention clip on the power supply over the C19 plug to prevent accidental unplugging of the cable.
- Connect the other end of the power cable to the AC power source used by the first power supply.
- Verify that the  LED is on and green.

If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.

Step 3 If you are using the input-source ($n+n$) redundancy mode, you must connect the second power supply as follows:

- Using the recommended power cable for your country or region (see [AC Power Cord Specifications](#), on page 39), connect the C19 plug on the power cable to the power receptacle on the second power supply.
- Rotate the cable retention clip on the power supply over the C19 plug to prevent accidental unplugging of the cable.
- Connect the other end of the power cable to the second AC power source (this is a different power source than the one used for the first power supply).
- Verify that the  LED is on and green.

If the LED is off, check the AC power source circuit breaker to be sure that it is turned on.



Connecting the Switch to the Network

- [Setting Up the Management Interface, page 25](#)
- [Uplink Connections, page 25](#)
- [Downlink Connections, page 26](#)
- [Guidelines for Connecting Ports, page 27](#)
- [Maintaining Transceivers and Optical Cables, page 28](#)

Setting Up the Management Interface

The management port (MGMT ETH) provides out-of-band management, which enables you to use the command-line interface (CLI) to manage the switch by its IP address. This port uses a 10/100/1000 Ethernet connection with an RJ-45 interface.

Before You Begin

The switch must be powered on.

-
- Step 1** Connect a modular, RJ-45, UTP cable to the MGMT ETH port on the switch.
- Step 2** Connect the other end of the cable to a 10/100/1000 Ethernet port on a network device.
-

What to Do Next

You are ready to connect the interface ports on each of the I/O modules to the network.

Uplink Connections

The switch has an uplink module with 12 40-Gb optical ports that you can connect with up to 12 aggregation or spine switches. You can use the following transceivers and cable types with these ports:

- 40GBASE transceivers

- QSFP-40G-CSR4 transceivers with MMF cables for distances up to 1312 feet (400 m) (maximum distances vary by modal bandwidth)
- QSFP-40G-SR4 transceivers with MMF cables for distances up to 492 feet (150 m) (maximum distances vary by modal bandwidth)
- QSFP-40G-SR-BD bidirectional transceivers with multi-mode fiber (MMF) optical cable for distances up to 492 feet (150 m)
- QSFP-H40G-CUxM direct-attach copper cables (passive) and transceivers
 - QSFP-H40G-CU1M transceivers with direct-attach copper cables (passive) for distances up to 3.3 feet (1 m)
 - QSFP-H40G-CU3M transceivers with direct-attach copper cables (passive) for distances up to 9.8 feet (3 m)
 - QSFP-H40G-CU5M transceivers with direct-attach copper cables (passive) for distances up to 16.4 feet (5 m)
- QSFP-H40G-ACUxM direct-attach copper cables (active) and transceivers
 - SFP-H40G-ACU7M transceivers with direct-attach copper cables (active) for distances up to 22.8 feet (7 m)
 - SFP-H40G-ACU10M transceivers with direct-attach copper cables (active) for distances up to 32.5 feet (10 m)
- CVR-QSFP-SFP10G adapter for QSFP+ to SFP+ transceivers

By default, the uplink ports operate at 40 Gbps, but you can use the **speed-group 10000** command to change the administrative speed to 10 Gbps. If you change the speed, you must also use a QSFP+-to-SFP+ adapter and a supported SFP+ transceiver in each of the converted SFP+ ports. All of the ports in a group of ports must operate at the same speed or you will see an error with a "check speed-group config" message. The Cisco Nexus 9396PX switch has two port groups: ports 1 through 6 (2/1-6), and ports 7 through 12 (2/7-12). To return the administrative speed to 40 Gbps, use the **no speed-group 10000**.

**Note**

The M12PQ uplink module ports connected with copper cables do not autonegotiate their speeds so you must set the speed for each port at the connected device by using the **speed 40000** command.

**Warning**

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

Downlink Connections

The switch has 48 downlink ports that connect to servers or Fabric Extenders (FEXs). Each of these ports supports 10-Gb and 1-Gb Ethernet speeds over optical cables. You can use the following transceivers and cables for these ports:

- 10GBASE SFP+ transceiver type
 - SFP-10G-LR transceivers with single-mode fiber (SMF) cables for distances up to 6.1 miles (10 km)
 - SFP-10G-SR transceivers with multi-mode fiber (MMF) cables for distances up to 1312 feet (400 m) (maximum distances vary depending on modal bandwidth)
- 1000BASE-SX transceiver type
 - GLC-SX-MM transceivers with MMF cables for distances up to 1804 feet (550 m) (maximum distances vary depending on modal bandwidth)
- 1000BASE-LH transceiver type
 - GLC-LH-SM transceivers with MMF cables for distances up to 1804 feet (550 m)

Guidelines for Connecting Ports

You can use Quad Small Form-Factor Pluggable Plus (QSFP+), Small Form-Factor Pluggable Plus (SFP+), or SFP transceivers connectors to connect the ports on the I/O modules to other network devices, which can include other switches or Fabric Extenders (FEXs).

The transceivers used with fiber-optic cables come separated from their cables. To prevent damage to the fiber-optic cables and their transceivers, we recommend that you keep the transceivers disconnected from their fiber-optic cables when installing the transceiver in the I/O module. Before removing a transceiver for a fiber-optic cable, remove the cable from the transceiver.

To maximize the effectiveness and life of your transceivers and optical cables, do the following:

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever handling transceivers. The switch is typically grounded during installation and provides an ESD port to which you can connect your wrist strap.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep the transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and to prevent damage to the connectors. Attenuation (loss of light) is increased by contamination and should be kept below 0.35 dB.
 - Clean these parts before installation to prevent dust from scratching the fiber-optic cable ends.
 - Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors if they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedures.
 - Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.
- Inspect routinely for dust and damage. If you suspect damage, clean and then inspect fiber ends under a microscope to determine if damage has occurred.

**Warning**

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

Maintaining Transceivers and Optical Cables

Transceivers and fiber-optic cables must be kept clean and dust free to maintain high signal accuracy and prevent damage to the connectors. Attenuation (loss of light) is increased by contamination and should be below 0.35 dB.

Consider the following maintenance guidelines:

- Transceivers are static sensitive. To prevent ESD damage, wear an ESD-preventative wrist strap that is connected to the grounded chassis.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its useful life.
- Keep all optical connections covered when not in use. Clean them before using to prevent dust from scratching the fiber-optic cable ends.
- Do not touch the ends of connectors. Touching the ends can leave fingerprints and cause other contamination.
- Clean the connectors regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors if they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedures.
- Inspect routinely for dust and damage. If you suspect damage, clean and then inspect fiber ends under a microscope to determine if damage has occurred.



Replacing Modules

- [Replacing the Uplink Module, page 29](#)
- [Replacing a Fan Tray, page 30](#)
- [Replacing a Power Supply, page 32](#)

Replacing the Uplink Module

You must shut down the switch before replacing the uplink module.



Note The M12PQ uplink module ports connected with copper cables do not autonegotiate their speeds so you must set the speed for each port at the connected device by using the **speed 40000** command.

-
- Step 1** Power off the switch by removing the power cables from both of the power supplies installed in the switch.
- Step 2** Verify that both LEDs on each power supply are off and that all of the other switch LEDs are off. If any LEDs are on, look for a power supply that is still powered on and remove its power cable.
- Step 3** Remove the cables from each of the ports on the uplink module. Be sure to label each cable for future reference.
- Step 4** Unscrew both captive screws on the front of the module.
- Step 5** Holding both handles on the front of the module, slide the module out of the slot.
- Caution** To prevent electrostatic discharge (ESD) damage to the module electronics, do not touch the electrical connectors on the back side of the module. Also, to prevent any damage to the electrical connectors, prevent them touching anything that can bend or break them.
- Step 6** Place the module on an antistatic surface or inside an antistatic bag. If possible, repack the module in its shipping materials for safe shipping or storage.
- Step 7** Remove the replacement module from its packing materials and place it on an antistatic surface. Hold the module by its two handles and do not touch the electrical connectors on its backside. Also, to protect the electrical connectors, avoid letting them come in contact with anything other than the electrical connectors inside the chassis.

- Step 8** Holding the replacement module by its two handles, position the module with the electrical components on its backside facing the open uplink-module slot.
- Step 9** Slide the module all the way into the chassis until its front side comes in contact with the chassis. For the last 0.2 inches (0.5 cm), carefully mount the module onto the chassis connectors by pushing more firmly, but do not force the module if it does not move further (excessive force can damage the connectors).
- Note** If you are not able to push the module all the way into the slot, carefully slide the module out of the slot and check its electrical connectors for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat Step 6 to reinstall the module.
- Step 10** Screw in both captive screws on the front of the module to secure the module to the chassis. Tighten each screw to 8 in-lb (0.9 N·m).
- Step 11** Verify that the Status (STS) LED turns on and becomes amber.
- Step 12** Reconnect each of the uplink cables and verify that the LED for each port becomes green. Under each set of two uplink ports, there is an Active (ACT) LED that indicates whether the ports are active for this switch. Connect cables to only the active ports.
-

Replacing a Fan Tray

The switch requires three fan trays: two of which are required for operations and one is used for redundancy. All fan trays and power supplies must have the same airflow direction or else an error can occur and the chassis can have an overtemperature condition. You can determine the airflow direction of a fan tray by the color of the stripe on the front of the module. A blue stripe indicates a cold-air-in airflow direction and a burgundy stripe indicates a hot-air-out airflow direction. Cold-air-in modules must face the cold aisle and hot-air-out modules must face the hot aisle to avoid overtemperature conditions.

Before You Begin

Before you can replace a fan tray, ensure both of the following conditions exist:

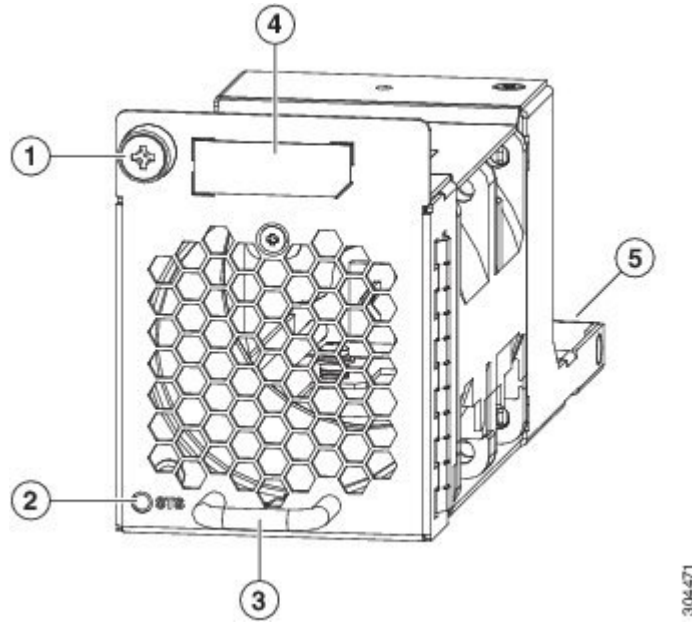
- There are two functioning fan trays in the other fan tray slots. In order to replace a fan tray during operations, there must be two fan trays circulating air in the chassis at all times. The other fan tray is redundant and can be replaced.
- The replacement fan tray must have the same airflow direction as the other modules in the chassis. If the other modules have a blue stripe or blue lever, the replacement fan tray module must have a blue stripe. If the other modules have a burgundy stripe or burgundy lever, the replacement fan tray module must have a burgundy stripe.

If you must replace the fan tray during operations and both of the above conditions are not met, leave the fan tray that you need to replace in the chassis to preserve the designed airflow until you have the required fan tray.

-
- Step 1** Verify that the two fan trays that you are not replacing each have a lit Status (STS) LED (see the following figure for the location of the LED). If you are replacing a fan tray during operations, the other two fan trays must be operating.

Note If you are replacing the fan tray while the chassis is down, you can skip this step.

Figure 10: Installation Features on the Fan Tray



1	Captive screw	4	Colored stripe specifying the airflow direction (burgundy for the hot-air-out direction or blue for the cold-air-in direction)
2	Status (STS) LED	5	Electrical connectors on the backside.
3	Handle		

Note Early shipments of the switch included the FAN1 or FAN1-B fan trays, which have a slightly different appearance when removed from the chassis.

Step 2 Unscrew the captive screw that secures the fan tray to the chassis.

Step 3 Pull the fan tray handle to slide the fan tray out of the chassis.

Caution To prevent electrostatic discharge (ESD) damage to the module electronics, do not touch the electrical connectors on the back side of the module. Also, to prevent any damage to the electrical connectors, prevent them touching anything that can bend or break them.

Step 4 Place the removed module on an antistatic surface or in an antistatic bag. If possible, repack the module in its packing materials for safe shipping or storage.

Step 5 Remove the replacement fan tray from its packing materials and place it on an antistatic surface. Hold the module by its handle and do not touch the electrical connectors on its backside. Also, to protect the electrical connectors, avoid letting them come in contact with anything other than the electrical connectors inside the chassis.

- Step 6** Verify that you have the right fan tray for the Cisco Nexus 9396PX chassis. The correct fan tray has one of the following part numbers:
- N9K-C9300-FAN2-B (cold-air-in airflow direction and a blue stripe)
 - N9K-C9300-FAN2 (hot-air-out airflow direction and a burgundy stripe)
- Note** Previously, the Cisco Nexus 9396PX shipped with the N9k-C9300-FAN1-B or N9K-C9300-FAN1 fans. Currently, the N9K-C9300-FAN2-B and N9K-C9300-FAN2 are shipped with the switch by default.
- Note** Be sure that the color of the stripe on the front of the module matches the color of the stripe on the other fan trays already installed in the chassis.
- Step 7** Position the fan tray in front of the open fan tray slot (be sure that the backside of the module with the electrical connectors is positioned to enter the slot first) and slide the module all the way into the chassis until its front side comes in contact with the chassis. For the last 0.2 inches (0.5 cm), carefully mount the module onto the chassis connectors by pushing more firmly, but do not force the module if it does not move further (excessive force can damage the connectors).
- Note** If you are not able to push the module all the way into the slot, carefully slide the module out of the slot and check its electrical connectors for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat Step 6 to reinstall the module.
- Step 8** Verify that the STS LED turns on and becomes green.
If the STS LED does not turn on, slide the module out of the chassis, and visually check the electrical connectors on the back side of the chassis for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat Step 6 to reinstall the module.
- Step 9** Secure the fan tray to the chassis by screwing in the captive screw to the chassis. Tighten the screw to 8 in-lb (0.9 N·m).

Replacing a Power Supply

The switch requires two power supplies: one power supply outputs power for operations and the other power supply provides redundant power in case the other power supply or the grid for the other power supply fails.

All power supply and fan tray modules must have the same airflow direction or else an overtemperature condition will occur. Each module is color coded to indicate its airflow direction. Modules with a burgundy stripe or latch handle have hot-air-out airflow and must face the hot aisle. Modules with a blue stripe or latch handle have a cold-air-in airflow and must face the cold aisle.



Warning

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.



Warning

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing

Before You Begin

Before you can replace a power supply, ensure both of the following conditions exist:

- There is a functioning power supply in the other power supply slot. In order to replace a power supply during operations, there must be one power supply outputting power to the chassis at all times. The other power supply can be replaced.
- The replacement power supply must have the same airflow direction as the other modules in the chassis. If the other modules have a blue stripe or blue lever, the replacement power supply module must have a blue lever. If the other modules have a burgundy stripe or burgundy lever, the replacement power supply module must have a burgundy lever.

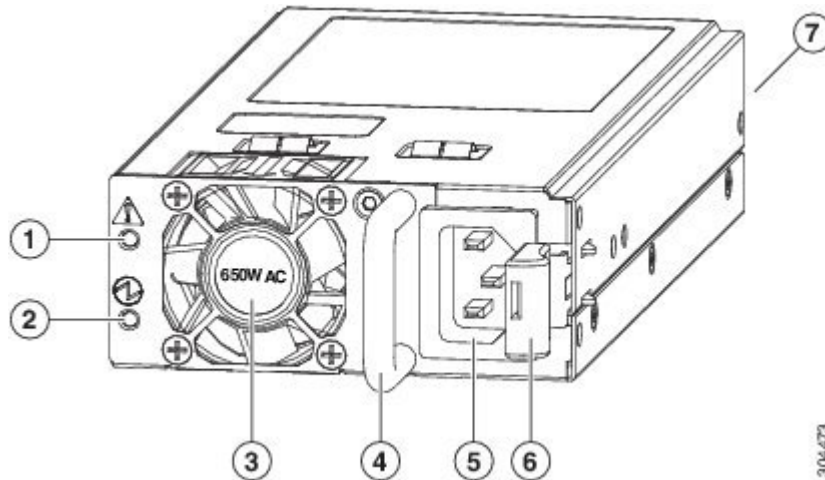
If you must replace the power supply during operations and both of the above conditions are not met, leave the power supply that you need to replace in the chassis to preserve the designed airflow until you have the required power supply.

Step 1

Verify that the power supply that you are not replacing has a lit, green Okay (🟢) LED and an unlit Fault (⚠️) LED (see the following figure for the location of the two LEDs). If you are replacing a power supply during operations, the other power supply must be providing power without a fault condition or else the chassis might power down when you remove the other power supply.


Note If you are replacing the power supply while the chassis is down, you can skip this step.


Figure 11: Installation Features of the 650-W Power Supply



1	Fault (⚠️) LED	4	Handle
2	Okay (🟢) LED	5	Power receptacle
3	Power designation for the power supply (650 W is required for Cisco Nexus 9396PX chassis)	6	Ejector latch (colored burgundy for hot-air-out airflow or blue for cold-air-in airflow)

Step 2

Remove the AC power plug from the power supply that you are replacing and verify that its  LED is off.

Note The  LED will probably be lit with an amber color to indicate that the power source is not connected to the power supply.

Step 3

Press the ejector latch to the left, pull on the handle, and slide the power supply out of the chassis slot.

Caution To prevent electrostatic discharge (ESD) damage to the module electronics, do not touch the electrical connectors on the back side of the power supply. Also, to prevent any damage to the electrical connectors, prevent them touching anything that can bend or break them.

Step 4

Place the removed module on an antistatic surface or in an antistatic bag. If possible, pack the module in its shipping materials for safe shipping or storage.

Step 5

Remove the replacement power supply from its packing materials and place it on an antistatic surface.

Hold the fan tray by its handle and do not touch the electrical connectors on its backside. Also, to protect the electrical connectors, avoid letting them come in contact with anything other than the electrical connectors inside the chassis.

Step 6

Verify that you have the right power supply for the Cisco Nexus 9396PX chassis. The correct power supply is labeled for 650 W and has one of the following part numbers:


- N9K-PAC-650W (hot-air-out airflow direction and a burgundy ejector latch)
- N9K-PAC-650W-B (cold-air-in airflow direction and a blue ejector latch)


Note Be sure that the color of the ejector latch on the replacement power supply matches the color of the ejector latch on the other power supply already installed in the chassis.

Step 7

Hold the replacement power supply by its handle, position the side with the electrical connectors in front of the open power supply slot in the chassis, and slide the module all the way into the chassis until its latch clicks and the module is locked in place.

Step 8


Verify that the  LED turns on and becomes amber.

If the  LED does not turn on, press the ejector latch to the left, pull the module by its handle until it is outside the chassis, and visually check the electrical connectors on the back side of the chassis for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat Step 8 to reinstall the module.

Step 9

Plug the AC cable into the power receptacle on the power supply. Be sure that the other end of the power cable is connected to an AC power source.

Step 10

Verify that the  LED turns on and becomes green.

If the LED is not on, make sure that the power cable is securely plugged into the power receptacle and that the circuit breaker for the power source is on. If the LED is still not on and there is no fault with the power source, contact Cisco Technical Assistance for instructions.



Rack Specifications

This appendix includes the following topics:

- [Rack Specifications, page 35](#)

Rack Specifications

This section provides the requirements for the following types of cabinets and racks, assuming an external ambient air temperature range of 0 to 104°F (0 to 40°C):

- Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom to top cooling)
- Standard open racks



Note

If you are selecting an enclosed cabinet, we recommend one of the thermally validated types, either standard perforated or solid-walled with a fan tray.



Note

Do not use racks that have obstructions (such as power strips), because the obstructions could impair access to field-replaceable units (FRUs).

General Requirements for Cabinets and Racks

The cabinet or rack must also meet the following requirements:

- Standard 19-inch (48.3 cm) (two- or four-post EIA cabinet or rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992). See the "Requirements Specific to Perforated Cabinets" section.
- The minimum vertical rack space requirement per chassis is two RUs (rack units), equal to 3.5 inches (8.8 cm).

- The width between the rack-mounting rails must be at least 17.75 inches (45.0 cm) if the rear of the device is not attached to the rack. For four-post EIA racks, this measurement is the distance between the two front rails.

Four-post EIA cabinets (perforated or solid-walled) must meet the following requirements:

- The minimum spacing for the bend radius for fiber-optic cables should have the front-mounting rails of the cabinet offset from the front door by a minimum of 3 inches (7.6 cm).
- The distance between the outside face of the front mounting rail and the outside face of the back mounting rail should be 23.0 to 30.0 inches (58.4 to 76.2 cm) to allow for rear-bracket installation.

Requirements Specific to Standard Open Racks

In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, if you are mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets the following requirements:

- The minimum vertical rack space per chassis must be two rack units (RU), equal to 3.47 inches (8.8 cm).
- The distance between the chassis air vents and any walls should be 2.5 inches (6.4 cm).

Requirements Specific to Perforated Cabinets

A perforated cabinet has perforations in its front and rear doors and side walls. In addition to the requirements listed in the "General Requirements for Cabinets and Racks" section, perforated cabinets must meet the following requirements:

- The front and rear doors must have at least a 60 percent open area perforation pattern, with at least 15 square inches (96.8 square cm) of open area per rack unit of door height.
- The roof should be perforated with at least a 20 percent open area.
- The cabinet floor should be open or perforated to enhance cooling.

The Cisco R Series rack conforms to these requirements.

Cable Management Guidelines

To help with cable management, you might want to allow additional space in the rack above and below the chassis to make it easier to route all of the fiber optic or copper cables through the rack.



APPENDIX **B**

System Specifications

This appendix includes the following topics:

- [Environmental Specifications, page 37](#)
- [Switch Dimensions, page 38](#)
- [Switch and Module Weights and Quantities, page 38](#)
- [Power Requirements, page 38](#)
- [AC Power Cord Specifications, page 39](#)

Environmental Specifications

Environment		Specification
Temperature	Ambient operating	32 to 104°F (0 to 40°C)
	Ambient nonoperating	−40 to 158°F (−40 to 70°C)
Relative humidity	Ambient (noncondensing) operating	5 to 90% (45 to 50% recommended)
	Ambient (noncondensing) nonoperating	5 to 95%
Altitude	Operating	−500 to 13,000 feet (−152 to 4,000 meters)
	Storage	−1,000 to 30,000 feet (−305 to 9,144 meters)

Switch Dimensions

Switch Component	Width	Depth	Height
Cisco Nexus 9396 chassis	17.5 inches (44.5 cm)	22.5 inches (57.1 cm)	5.3 inches (13.3 cm) (3 RU)

Switch and Module Weights and Quantities

Component	Weight per Unit	Quantity
Cisco Nexus 9396 Chassis (N9K-C9396)	22.45 lb (10.2 kg)	1
M12PQ Uplink Module	3.12 lb (1.4 kg)	1
Fan Trays (fan trays currently shipped with the switch)	—	3 (2 for operations and 1 for redundancy [2+1])
– Hot-air-out (burgundy stripe) fan tray (N9K-C9300-FAN2)	1.14 lb (0.5 kg)	
– Cold-air-in (blue stripe) fan tray (N9K-C9300-FAN2-B)		
Fan Trays (fan trays previously shipped with the switch)	—	3 (2 for operations and 1 for redundancy [2+1])
– Hot-air-out (burgundy stripe) fan tray (N9K-C9300-FAN1)	0.92 lb (0.4 kg)	
– Cold-air-in (blue stripe) fan tray (N9K-C9300-FAN1-B)		
Power Supplies	—	2 (1 for operations and one for redundancy [1+1])
– 650-W AC hot-air-out (burgundy latch) power supply (N9K-PAC-650W)	2.42 lb (1.1 kg)	
– 650-W AC cold-air-in (blue latch) power supply (N9K-PAC-650W-B)		

Power Requirements

	Typical	Maximum
Cisco Nexus 9396PX	204 W	455 W

AC Power Cord Specifications

Locale	Power Cord Part Number	Cord Set Description
Argentina	CAB-250V-10A-AR	250 V, 10 A, 8.2 feet (2.5 m)
Brazil	CAB-250V-10A-BR	250 V, 10 A, 6.9 feet (2.1 m)
Peoples Republic of China	CAB-250V-10A-CN	250 V, 10 A, 8.2 feet (2.5 m)
South Africa	CAB-250V-10A-ID	250 V, 10 A, 8.2 feet (2.5 m)
Israel	CAB-250V-10A-IS	250 V, 10 A, 8.2 feet (2.5 m)
Australia	CAB-9K10A-AU	250 VAC, 10 A, 3112 plug, 8.2 feet (2.5 m)
European Union	CAB-9K10A-EU	250 VAC, 10 A, CEE 7/7 plug, 8.2 feet (2.5 m)
India	CAB-IND-10A	10 A, 8.2 feet (2.5 m)
Italy	CAB-9K10A-IT	250 VAC, 10 A, CEI 23-16/VII plug, 8.2 feet (2.5 m)
Switzerland	CAB-9K10A-SW	250 VAC, 10 A, MP232 plug, 8.2 feet (2.5 m)
United Kingdom	CAB-9K10A-UK	250 VAC, 10 A, BS1363 plug (13 A fuse), 8.2 (2.5 m)
North America	CAB-9K12A-NA	125 VAC, 13 A, NEMA 5-15 plug, 8.2 feet (2.5 m)
North America	CAB-AC-L620-C13	NEMA L6-20-C13, 6.6 feet (2.0 m)
North America	CAB-N5K6A-NA	200/240V, 6A, 8.2 feet (2.5 m)
	CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 6.6 feet (2.0 m)
	CAB-C13-C14-AC	Power cord, C13 to C14 (recessed receptacle), 10 A, 9.8 feet (3 m)
	CAB-C13-CBN	Cabinet jumper power cord, 250 VAC, 10 A, C14-C13 connectors, 2.3 feet (0.7 m)



APPENDIX

C

LEDs

This appendix includes the following topics:

- [Switch Chassis LEDs, page 41](#)
- [Uplink Module LEDs, page 42](#)
- [Fan Tray LEDs, page 42](#)
- [Power Supply LEDs, page 43](#)

Switch Chassis LEDs

The BCN, STS, and ENV LEDs are located on the left side of the front of the switch. The port LEDs are appear as triangles pointing up or down to the nearest port.

LED	Color	Status
BCN	Flashing blue	The operator has activated this LED to identify this module in the chassis.
	Off	This module is not being identified.
STS	Green	The switch is operational.
	Flashing amber	The switch is booting up.
	Flashing red	Temperature exceeds major alarm threshold.
	Off	The switch is not receiving power.
ENV	Green	Power supplies and fan trays are operational.
	Amber	At least one power supply or fan tray module is not operating.

LED	Color	Status
(port)	Green	Port is connected with a transceiver or other connector.
	Amber	Port is not connected.

Uplink Module LEDs

The Status (STS) LED is located on the left side of the uplink module. There is an ACT LED located below each two uplink ports. Next to each ACT LED are two triangular port LEDs that point to the top or bottom to identify their port as being the top or bottom port.

Table 1: Uplink Module LED Descriptions

LED	Color	Status
STS	Green	This module is operational.
	Red	Temperature is not operational.
	Off	The module is not receiving power.
ACT	On (white)	The two ports above this LED are enabled.
	Off	The two ports above this LED are not enabled.
(port)	Green	The port is connected with a transceiver or other connector.
	Off	The port is not connected.

Fan Tray LEDs

The fan tray LED is located below the air holes on the front of the module.

LED	Color	Status
STS	Green	The fan tray is operational.
	Red	The fan tray is not operational (fan is probably not functional).
	Off	Fan tray is not receiving power.

Power Supply LEDs





The power supply LEDs are located on the left front portion of the power supply. Combinations of states indicated by the Okay () and Fault () LEDs indicate the status for the module as shown in the following table.

Table 2: Power Supply LED Descriptions

 LED	 LED	Status
Green	Off	Power supply is on and outputting power to the switch.
Flashing green	Off	Power supply is connected to AC power source but not outputting power to the switch—power supply might not be installed in the chassis.
Off	Off	Power supply is not receiving power.
Off	Flashing amber	Power supply warning—possibly one of the following conditions: <ul style="list-style-type: none"> • High voltage • High power • Low voltage • Power supply installed in chassis but not connected to AC power source • Slow power supply fan
Off	Amber	Power supply failure—possibly one of the following conditions: <ul style="list-style-type: none"> • Over voltage • Over current • Over temperature • Power supply fan failure



Site Preparation and Maintenance Records

- [Site Preparation Checklist, page 45](#)
- [Contact and Site Information, page 47](#)
- [Chassis and Module Information, page 47](#)

Site Preparation Checklist

Planning the location and layout of your equipment rack or cabinet is essential for successful switch operation, ventilation, and accessibility.

The following table lists the site planning tasks that we recommend that you complete before you install the switch. Your completion of each task ensures a successful switch installation.

Planning Activity	Verification Time and Date
Space evaluation:	
Space and layout	
Floor covering	
Impact and vibration	
Lighting	
Physical access	
Maintenance access	
Environmental evaluation:	

Planning Activity	Verification Time and Date
Ambient temperature	
Humidity	
Altitude	
Atmospheric contamination	
Airflow	
Power evaluation:	
Input power type	
Power receptacles	
Receptacle proximity to the equipment	
Dedicated (separate) circuits for power redundancy	
UPS for power failures	
Grounding: proper wire gauge and lugs	
Circuit breaker size	
Grounding evaluation:	
Data center ground	
Cable and interface equipment evaluation:	
Cable type	
Connector type	
Cable distance limitations	
Interface equipment (transceivers)	
EMI evaluation:	

Planning Activity	Verification Time and Date
Distance limitations for signaling	
Site wiring	
RFI levels	

Contact and Site Information

Use the following worksheet to record contact and site information for the installation.

Contact person	
Contact phone	
Contact e-mail	
Building/site name	
Data center location	
Floor location	
Address (line 1)	
Address (line 2)	
City	
State/Provence	
Contact person	
ZIP/postal code	
Country	

Chassis and Module Information

Use the following three worksheets to record information about the chassis and modules.

Table 3: Switch Information

Contract number	
Chassis serial number	
Product number	

Table 4: Network-Related Information

Switch IP address	
Switch IP netmask	
Hostname	
Domain name	
IP broadcast address	
Gateway/router address	
DNS address	

Table 5: Module Information for the Cisco Nexus 9396 Chassis

Slot	Module Type	Module Serial Number	Notes
Uplink module			
Power supply 1 (left)			
Power supply 2 (right)			
Fan tray 1 (left)			
Fan tray 2 (center)			
Fan tray 3 (right)			



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