Cisco N9396T12C-SE1 NX-OS Mode Switch Hardware Installation Guide

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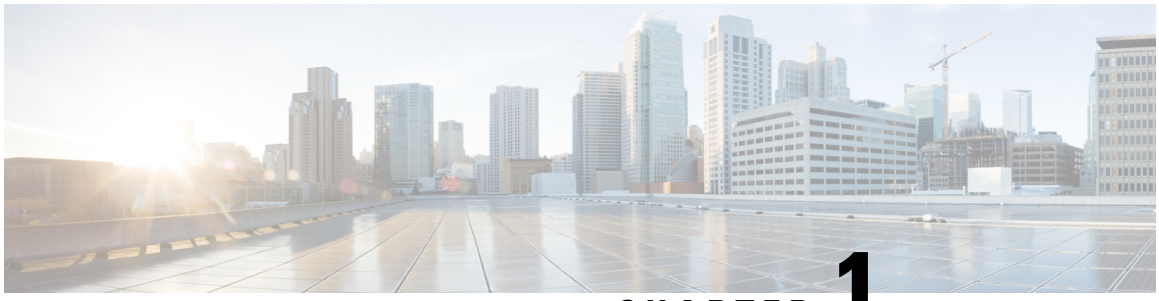


CHAPTER 1

Overview

Overview

The Cisco N9396T12C-SE1 switch is a fixed port switch that occupies two rack units (RU). It is designed for deployment in data centers.

Media Access Control Security (MACsec) is supported on all ports. The switch includes these ports:

- 96 10G RJ45 ports
- 12 40/100-Gigabit QSFP28 ports
- 2 management ports (one RJ45 port and one SFP port)
- 1 console port
- 1 USB port

This switch includes these user-replaceable components:

- Fan modules (three) with these airflow choices:
  - Port-side-exhaust fan module with blue coloring (NXA-SFAN-160CFM2PE)
  - Port-side-intake fan module with red coloring (NXA-SFAN-160CFM2PI)

Note

Table 1: Fan Speeds for this Switch

	Port-Side Intake Fan Speed %	Port-Side Exhaust Fan Speed %
Typical/Minimum	50%	60%
Maximum	95%	95%

Note

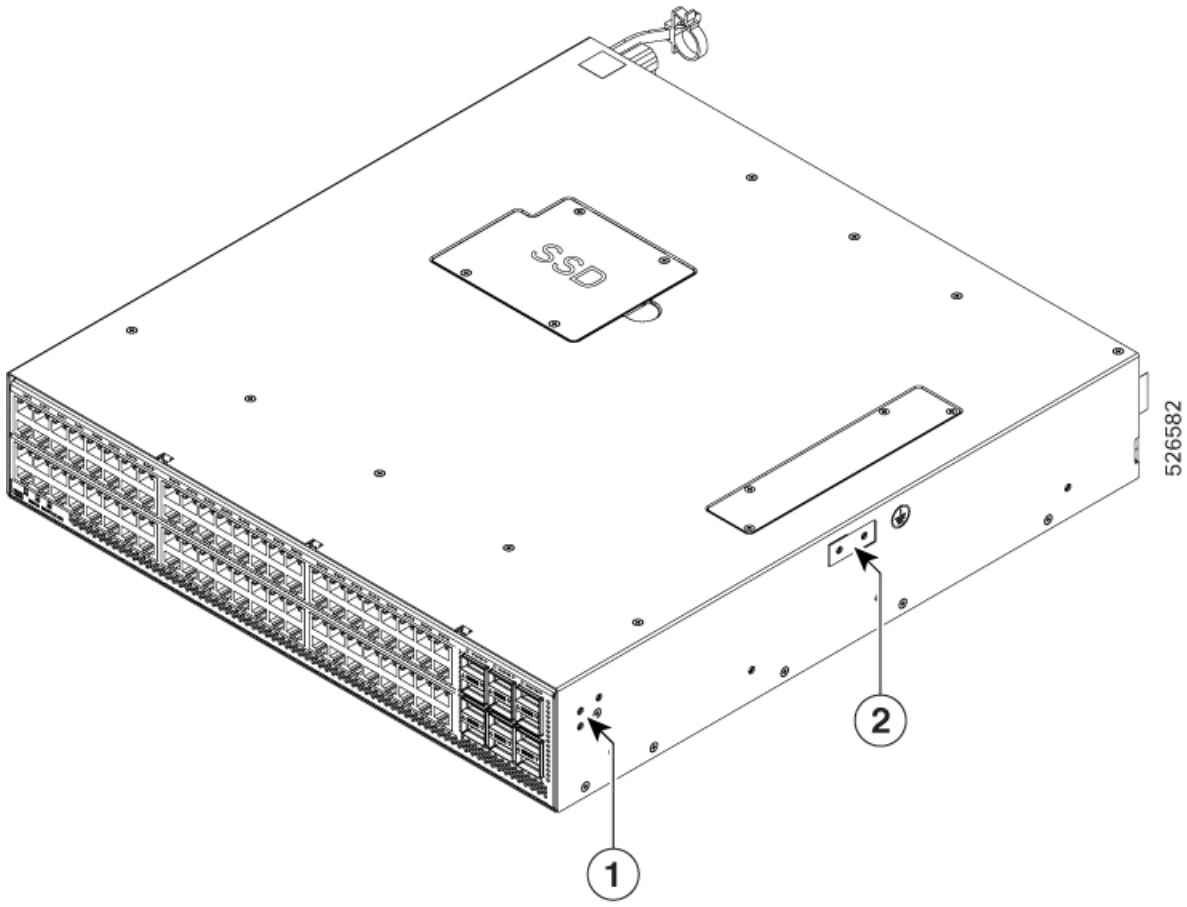
- The switch continues to function normally if only one fan tray fails. When more than one fan tray fails, the switch issues a warning and powers down within two minutes.

- Power supply modules (two—one for operations and one for redundancy [1+1]) with these choices:
  - 1400-W port-side exhaust AC power supply with blue coloring (NXA-PAC-1400W-PE)
  - 1400-W port-side intake AC power supply with red coloring (NXA-PAC-1400W-PI)
  - 2000-W port-side intake DC power supply with red coloring (NXA-PDC-2KW-PI)

Note

- A mix of AC and DC power supplies in the same switch are supported for hot swapping purposes within a time limit of 15 minutes.
- All the fan modules and power supplies must use the same airflow direction.

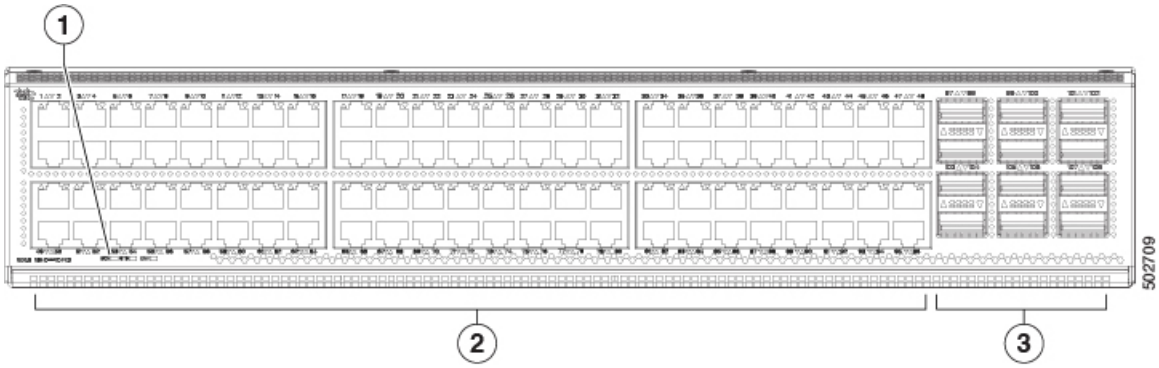
The figure shows the switch features on the port side of the chassis.



The table presents the switch features on the port side of the chassis.

1	Screw holes for front mounting brackets (left and right sides)	2	Grounding pad

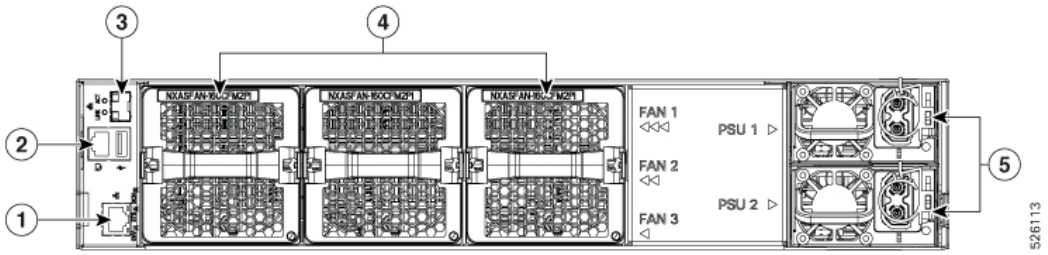
The figure illustrates the switch features on the port side of the chassis.



1	Beacon (BCN), Status (STS), and Environment (ENV) LEDs	3	12 40/100-Gigabit QSFP28 ports
2	96 10G RJ45 ports		

To determine which transceivers, adapters, and cables are supported by this switch, see the Cisco Transceiver Modules Compatibility Information document.

The figure illustrates the switch features on the power supply side of the chassis.



1	Management port (1—RJ-45 copper port).	4	Fan modules (3) with slots numbered from 1 (left) to 3 (right).
2	Console management (1 —RJ-45 copper port) and USB port (1).	5	AC power supply modules (2) with slots numbered 1 (top) and 2 (bottom).
3	1—SFP optical port		

You can order fan and power supply modules with port-side intake or port-side exhaust airflow, based on your port positioning. Fan and AC power supply modules have red coloring for port-side intake airflow. For port-side exhaust airflow, fan and AC power supply modules have blue coloring.

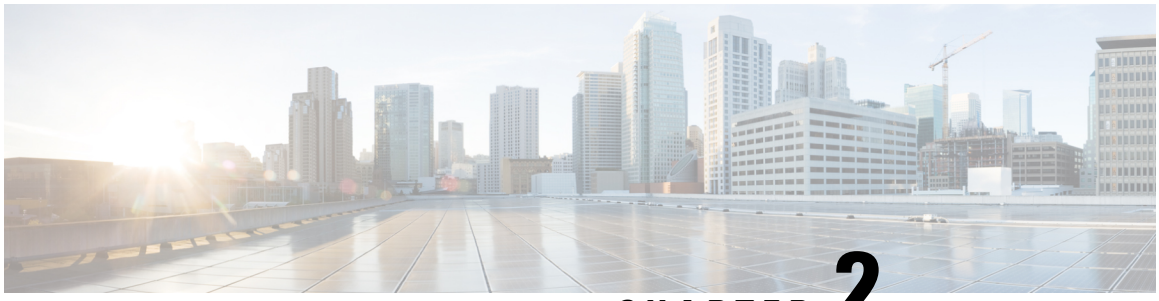
The fan and power supply modules are field-replaceable.

You can replace one fan module or one power supply module during operation if all other modules are installed and functioning.

If only one power supply is installed, insert the replacement into the open slot before you remove the original unit.

Note All fan and power supply modules must be installed with the same airflow direction. If they differ, the switch can overheat and shut down.

Caution If the switch has port-side intake airflow (red coloring for fan modules), you must locate the ports in the cold aisle. If the switch has port-side exhaust airflow (blue coloring for fan modules), you must locate the ports in the hot aisle. If you locate the air intake in a hot aisle, the switch can overheat and shut down.



CHAPTER 2

Preparing the Site

Operating temperatures

The operating temperature of the switch is 32 to 104 degrees Fahrenheit (0 to 40 degrees Celsius) at sea level. For every 1,000 feet (300 meters) above sea level, the maximum operating temperature is reduced by one degree Celsius. The non-operating temperature of the switch is –40 to 158 degrees Fahrenheit (–40 to 70 degrees Celsius).

Module Temperatures

Built-in automatic sensors continuously monitor all Cisco Nexus 9000 Series switches. Each module (supervisor, I/O, and fabric) includes temperature sensors with two thresholds:

Note For any major temperature alarms from the sensors, the switch powers down in 2 minutes. After you resolve the temperature issue, power on the switch.

- If the minor temperature threshold is exceeded, a minor alarm occurs. All four sensors perform these actions:
  - The system displays messages.

- The system sends Call Home alerts if configured.
- The system sends Simple Network Management Protocol (SNMP) notifications if configured.
- The system increases the fan speed.

- If the major temperature threshold is exceeded, a major alarm occurs, and these actions happen:

  If the threshold is exceeded in a switching module, only that module is shut down.

  For all sensors:

  - The system displays messages.
  - The system sends Call Home alerts if configured.
  - The system sends SNMP notifications if configured.
  - The system increases the fan speed.
  - If the major threshold is exceeded in a switching module, only that module is shut down.
  - If the major threshold is exceeded in an active supervisor module with HA-standby or standby present, the switch shuts down only that supervisor module. The standby supervisor module takes over.
  - If you do not have a standby supervisor module in your switch, you have 2 minutes to decrease the temperature. During this time, the software checks the temperature every 5 seconds and sends system messages every 10 seconds.

Humidity Requirements

High humidity can cause moisture to enter the switch. Moisture can cause corrosion of internal components. It can also degrade properties such as electrical resistance, thermal conductivity, physical strength, and size. The switch withstands relative humidity levels of 5 to 95 percent when off and 5 to 90 percent when operating.

A climate-controlled building keeps humidity within an acceptable level for your switch. If the switch is located in an unusually humid location, use a dehumidifier to maintain the humidity within an acceptable range.

Altitude Requirements

The altitude rating is 10,000 feet (3,048 meters) worldwide except in China, where the rating is 6,562 feet (2,000 meters).

For every 1,000 feet (300 meters) of elevation, the maximum ambient temperature decreases by one degree Celsius (1°C).

Dust and Particulate Requirements

Exhaust fans cool power supplies. System fans cool switches by drawing in air and exhausting air out through various openings in the chassis.

Fans also introduce dust and other particles, causing contaminant buildup in the switch and increased internal chassis temperature. Dust and particles can act as insulators and interfere with the mechanical components in the switch. Keep a clean operating environment to reduce the negative effects of dust and other particles.

In addition to keeping your environment free of dust and particles, use these precautions to avoid contamination of your switch:

- Keep the switch area smoke-free.
- Keep food and drinks away from the switch.

Minimizing electromagnetic and radio frequency interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from your switch can affect other devices, such as radio and television receivers. Additionally, radio frequencies from the switch can interfere with cordless and low-power telephones. RFI from high-power telephones can cause spurious characters to appear on your switch monitor.

RFI is any EMI with a frequency above 10 kHz. This type of interference can travel from the switch to other devices either through the power cable and source or through the air as transmitted radio waves.

The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI that are emitted by computing equipment. Each switch meets these FCC regulations.

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

- Install blank filler plates to cover any open expansion slots on your switch.
- Attach peripherals using shielded cables with metal connector shells to your switch.

When wires are run for any significant distance in an electromagnetic field, interference can occur to the signals on the wires. Consider these implications:

- Improper wiring can result in radio interference from the plant wiring.
- Strong EMI, especially from lightning or radio transmitters, can destroy the signal drivers and receivers in your chassis. It can also create an electrical hazard by conducting power surges through lines into equipment.

Note Consult RFI expert for help with predicting and preventing strong EMI.

To reduce radio interference risk, use twisted-pair cables with well-distributed grounding conductors. Keep copper cable lengths within the maximum distance specified for the cable type.

Caution If cables exceed the recommended distance or run between buildings, be aware of possible lightning strikes nearby. Electromagnetic pulses from lightning or other high-energy events can create enough energy into unshielded cables and destroy electronic switches. Consult experts in electrical surge suppression and shielding if you have had similar problems in the past.

Shock and vibration requirements

The switch has been shock- and vibration-tested for operating ranges, handling, and earthquake standards.

Preventing Electrostatic Discharge Damage

Many switch components can be damaged by static electricity. Failing to take proper electrostatic discharge (ESD) precautions can result in intermittent or complete component failures. To minimize the potential for ESD damage, always use an ESD-preventive, anti-static wrist strap (or ankle strap). Ensure that the strap makes adequate skin contact.

Note Check the resistance value of the ESD-preventive strap periodically. The measurement should be between 1 to 10 megohms. Before you perform any of the procedures in this guide, attach an ESD-preventive strap to your wrist and connect the leash to the chassis.

Grounding Requirements

The switch is sensitive to changes in its power supply voltage that is supplied by the power sources.

To prevent data loss or hardware failure caused by overvoltage, undervoltage, or transients (spikes), make sure your switch has an earth-ground connection.

Connect the grounding pad on your switch directly to the earth-ground connection or to a fully bonded and grounded rack.

Install the chassis in a grounded rack to ensure metal-to-metal contact grounds the switch. Remove any paint, stain, dirt, or other material. Maintain proper conductivity between the rack and switch as described in the Note.

Alternatively, ground your chassis with a customer-supplied grounding cable that meets your local and national installation requirements. For installations in the United States, use 6 AWG wire (13.3 mm^2). Attach the grounding cable to the chassis using the grounding lug from the accessory kit. Connect the cable to the facility ground.

Note Create an electrical conducting path between the chassis and the metal surface of the enclosure or rack. You can also connect it to a grounding conductor. Provide electrical continuity by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Remove any paint or other non-conductive coatings on the surfaces between the mounting hardware and the enclosure or rack. Clean the surfaces and apply an antioxidant before installation.

Planning for Power Requirements

The switch includes two power supplies (one-to-one redundancy with current sharing) in one of these combinations:

- two 1400-watt AC power supplies or
- two 2000-watt DC power supplies.

Note For one-plus-one redundancy, you must use two power sources and connect each power supply to a separate power source.

The power supplies are rated to output up to 1400 watts for AC power supplies and up to 2000 watts for DC power supplies. The switch typically requires less power than the supply ratings.

To operate the switch, provision enough power from the source to meet the requirements of both the switch and one power supply.

Typically, this switch and a power supply require 605 watts of power input from the power source, but you must provision as much as 1100 watts power input from the power source to cover peak demand.

Note Some of the power supply modules have rating capabilities that exceed the switch requirements. When calculating your power requirements, use the switch requirements to determine the amount of power that is required for the power supplies.

To minimize the possibility of circuit failure, verify that each power source circuit that is used by the switch is dedicated to the switch.

Airflow Requirements

The switch is positioned with its ports in either the front or the rear of the rack, depending on your cabling and maintenance requirements. To identify the airflow options for your switch, review the user-replaceable components in the *Overview* section of this document.

Position the air intake for the switch in a cold aisle to prevent overheating and shutdown.

- port-side exhaust airflow: Cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle.

- port-side intake airflow: Cool air enters the chassis through the port end in the cold aisle and exhausts through the fan and power supply modules in the hot aisle.
- single-direction airflow: The airflow direction depends on how the fan modules are installed.

Identify the airflow direction of each fan and power supply module by its coloring.

- Blue coloring indicates port-side exhaust airflow.
- Red coloring indicates port-side intake airflow.

Note Position the air intake for the switch in a cold aisle to prevent overheating and shutdown. Install the fan and power supply modules so that their airflow directions match. To change the airflow direction for the switch, shut down the switch before changing the modules.

Rack and Cabinet Requirements

Install these types of racks or cabinets for your switch:

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

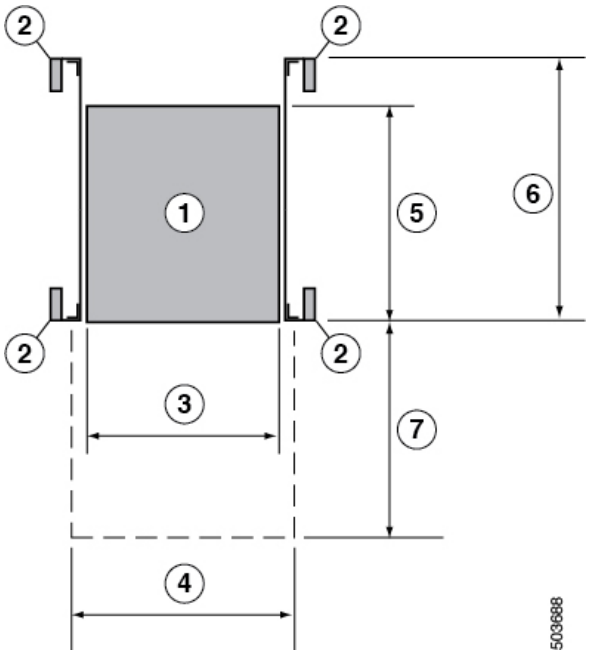
Consult your cabinet vendors to determine which of their cabinets meet these requirements. You can also contact the Technical Assistance Center (TAC) for recommendations.

- Use a standard 19-inch (48.3-centimeter), 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 rails (for proper mounting of the bottom-support brackets or other mounting hardware).

Also, you must have power receptacles that are located within reach of the power cords that are used with the switch.

Clearance Requirements

Ensure the chassis has enough clearance from other racks, devices, or structures to allow proper installation. Allow sufficient space around the chassis for cable routing, airflow, and maintenance. Refer to the figure for clearance requirements for installing the chassis in a four-post rack.



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

1	Chassis	5	Depth of the chassis with PSU 18.74 in (47.6 cm)
2	Vertical rack-mount posts and rails	6	Maximum extension of the bottom-support rails 36.0 in (91.0 cm)
3	Chassis width 17.4 in (44.2 cm)	7	Depth of the front clearance area (equal to the depth of the chassis) 22.27 in (56.68 cm)
4	Width of the front clearance area (equal to the width of the chassis with two rack-mount brackets that are attached to it) 19.0 in (48.26 cm)		Chassis height 3.4 in (8.63 cm)

Network Equipment-Building System (NEBS) Statements

NEBS describes the environment of a typical United States Regional Bell Operating Company (RBOC) central office. NEBS is the most common set of safety, spatial, and environmental design standards applied to telecommunications equipment in the United States. It is not a legal or regulatory requirement, but rather an industry requirement.

Note **Statement 7001—**ESD Mitigation

This equipment may be ESD sensitive. Always use an ESD ankle or wrist strap before handling equipment. Connect the equipment end of the ESD strap to an unfinished surface of the equipment chassis or to the ESD jack on the equipment if provided.

Warning **Statement 7003** —Shielded Cable Shielded Cable Requirements for Intrabuilding Lightning Surge

The intrabuilding port(s) of the equipment or subassembly must use shielded intrabuilding cabling/wiring that is grounded at both ends.

The following port(s) are considered intrabuilding ports on this equipment:

RJ-45 Ethernet Port

Note **Statement 7004—** Special Accessories Required to Comply with GR-1089 Emission and Immunity Requirements

To comply with the emission and immunity requirements of GR-1089, shielded cables are required for the following ports:

Copper RJ-45 Ethernet port

Warning **Statement 7005**—Intrabuilding Lightning Surge and AC Power Fault

The intrabuilding port(s) 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-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

This statement applies to the intrabuilding ports listed below:

RJ-45 Ethernet port

Warning **Statement 7012—**Equipment Interfacing with AC Power Ports

Connect this equipment to AC mains that are provided with a surge protective device (SPD) at the service equipment that complies with NFPA 70, the National Electrical Code (NEC).

Note **Statement 7013—**Equipment Grounding Systems—Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

Note **Statement 7016** —Battery Return Conductor

Treat the battery return conductor of this equipment as DC-I.

Note **Statement 7018—**System Recover Time

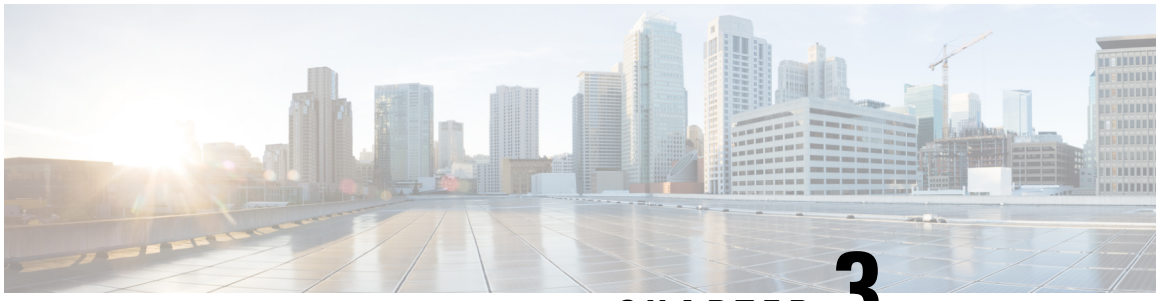
The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

Note **Statement 8015—**Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Note **Statement 8016—**Installation Location Where the National Electric Code (NEC) Applies

This equipment is suitable for installation in locations where the NEC applies.



CHAPTER 3

Installing the Chassis

Safety

Before you install, operate, or service the switch, refer to the *Regulatory, Compliance, and Safety Information for the Cisco Nexus 9000 Series* content for important Safety Information.

Warning

Statement 1071— Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number provided at the end of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS

Warning

Statement 1089—Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 1074**—Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Note **Statement 407**—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品使用 における 安全上 の 注意〉

www.cisco.com/web/JP/techdoc/index.html

接 続ケーブル 、電源 コードセット 、 **AC** アダプタ 、 バッテリなどの 部品 は 、必 ず 添付品 または

指定品 をご 使用 ください 。添付品 ・ 指定品以外 をご 使用 になると 故障 や 動作不良、火災 の

原因 となります 。 また 、電源 コードセットは 弊社 が 指定 する 製品以外 の 電 気 機器 には 使用

できないためご注意ください。

Warning **Statement 1017**—Restricted Area

This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area.

Warning **Statement 1091**—Installation by an Instructed Person

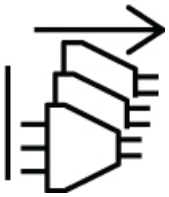
Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed or skilled person.

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning

Statement 1028—More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning

Statement 1003— Power Disconnection

To reduce risk of electric shock or personal injury, disconnect power before removing or replacing components or performing upgrades.

Warning

Statement 1046—Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning

Statement 1022—Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning

Statement 1033—Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

Warning

Statement 1024—Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning **Statement 1032—**Lifting the Chassis

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.

Warning **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

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.

Caution To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the switch are within the current ratings for the wiring and breakers.

Note For AC and HVAC/HVDC input application, please refer to the statement below:

Warning **Statement 1005—** Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective devices is rated not greater than 20A (North America), 16A (Europe), and 13A (UK).

Note For LVDC input application, please refer to the statement below:

Warning **Statement 1005—** Circuit Breaker

This product relies on the building installation for short-circuit (overcurrent) protection. Ensure that the protective devices are rated not greater than 70A (North America), 63A (Rest of World).

Warning **Statement 1056—**Unterminated Fiber Cable

Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments, for example, eye loupes, magnifiers, and microscopes, within a distance of 100 mm, may pose an eye hazard.

Warning **Statement 1255—**Laser Compliance Statement

Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019.

Installation Options with Rack-Mount Kits

The rack-mount kit enables you to install the switch into racks of varying depths. Position the switch with easy access to either the port connections or the fan and power supply modules.

Install the switch using the N9K-C9300-RMK rack mount kit for four post racks that you can order from Cisco.

The rack or cabinet that you use must meet the requirements listed the in General requirements for cabinets and racks, on page 47 section.

Note You are responsible for verifying that your rack and rack-mount hardware comply with the guidelines that are described in this document.

Install a rack

Before you begin

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 Overview of racks, on page 47 .

Follow these steps to install a rack.

Procedure

Step 1 Bolt the rack to the concrete subfloor before moving the chassis onto it.

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 Include one or two power sources at the rack. For AC power, provide a power receptacle.

Step 4 Include one or two power sources at the rack. For DC power, provide a circuit breaker with terminals for connecting power cables.

Note
If you are not using power redundancy or are using *n*+1 redundancy, you need only one power source. If you are using *n* + *n* redundancy, you need two power sources.

Unpack and inspect a new switch

Before you install a new chassis, unpack and inspect it to be sure that you have all the items that you ordered. 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, 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.

Before you begin

Follow these steps to unpack and inspect a new switch.

Procedure

Step 1 Compare the shipment to the equipment list that is provided by your customer service representative. Verify that you have received all of the ordered items.

The shipment should include:

- Switch chassis, which includes these installed components:
  - Two power supplies (any combination of these, with the airflow direction being the same as for the fan modules):
    - 1400-W AC power supply
      - Port-side exhaust AC power supply with blue coloring (NXA-PAC-1400W-PE)
      - Port-side intake AC power supply with burgundy coloring (NXA-PAC-1400W-PI)
    - 2000-W DC power supply
      - Port-side intake DC power supply with burgundy coloring (NXA-PDC-2KW-PI)
  - Three fan modules (all fan and power supply modules must have the same airflow direction)

- Port-side exhaust airflow with blue coloring (NXASFAN-160CFM2PE)
- Port-side intake airflow with burgundy coloring (NXASFAN-160CFM2PI)

- Switch accessory kit

Step 2 Check the contents of the box for damage.

Step 3 If you notice any discrepancies or damage, send this 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

Planning How to Position the Chassis in the Rack

The switch is designed so that you can have coolant air flow through the switch in one of two directions:

- Enter the port side and exhaust out the power supply side (port-side intake airflow)
- Enter the power supply side and exhaust out the port side (port-side exhaust airflow)

For port-side intake airflow, the switch must have port-side intake fan modules and AC or DC power supply modules. Both the fan modules and the power supplies have red coloring.

For port-side exhaust airflow, the switch must have port-side exhaust fan and AC or DC power supply modules. Both the fan modules and the power supplies have blue coloring.

Plan the positioning of the switch so that its ports are located close to ports on connected devices or so that the fan and power supply modules are conveniently located in a maintenance aisle. Order the modules that move coolant air in the appropriate direction from the cold aisle to the hot aisle.

Note All fan and power supply modules in the same switch must operate with the same direction of airflow. The air intake portion of the switch must be located in a cold aisle.

Install the switch using the NXK-ACC-RMK2-2RU rack-mount kit

To install the switch, attach mounting brackets to the rack, install slider rails on the rear of the rack, slide the switch onto the slider rails, install the retainer brackets, and secure the switch to the rack with the retainer clips. Typically, the front of the rack is the side easiest to access for maintenance.

Note You supply the eight 10-32 or 12-24 screws required to mount the slider rails and switch to the rack.

Before you begin

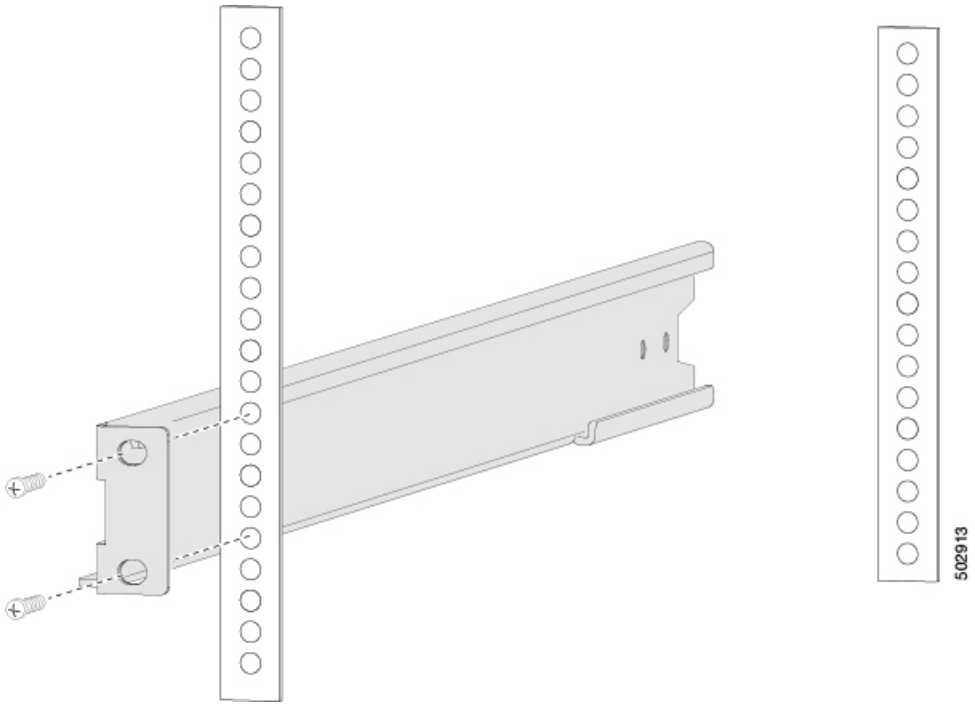
- Inspect the switch shipment to ensure that you have everything ordered.
- Verify that the switch rack-mount kit includes these parts:
  - Rack-mount brackets (2)
  - Rack-mount front-mount brackets (2)
  - Rack-mount slider rails (2)
  - Rack-mount retainer clips (2)
  - Phillips countersink screws (12)
  - Flat head screws M4 (6)
  - Flat head screws M3 (4)
- The rack is installed and secured to its location.

Procedure

Step 1 Install two rack-mount brackets to the rack.

a) Determine which end of the chassis goes in the cold aisle:
   - If the switch has port-side intake modules (fan modules with burgundy coloring), position the front-mount brackets so that the switch ports will be in the cold aisle.
   - If the switch has port-side exhaust modules (fan modules with blue coloring), position the front-mount brackets so that the switch fan and power supply modules will be in the cold aisle.

b) Position a front-mount bracket so that it aligns to the desired position in the rack and secure the bracket with 12-24 screws or 10-32 screws, depending on the rack thread type (see the figure). Tighten 12-24 screws to 30 in-lb (3.39 N·m) of torque. Tighten 10-32 screws to 20 in-lb (2.26 N·m) of torque.



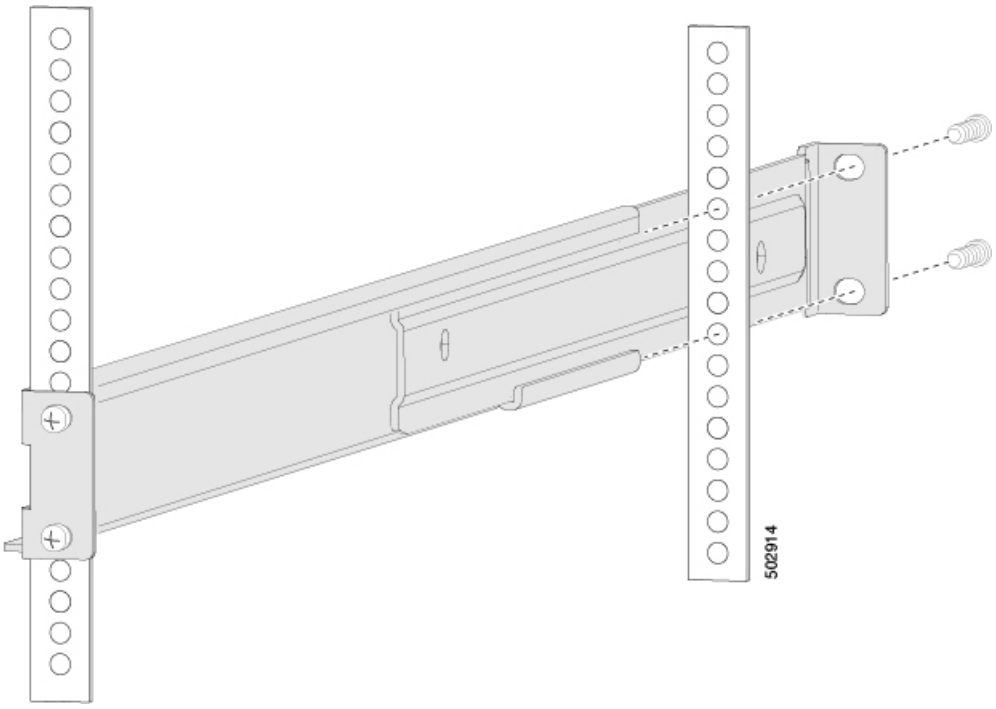
c) Repeat Step 1 for the other front rack-mount bracket on the other side of the rack and be sure to position that bracket horizontally to the same level as the first bracket.

Step 2 If you are not installing the chassis into a grounded rack, attach a customer-supplied grounding wire to the chassis as explained in Ground the chassis, on page 28 . If you are installing the chassis into a grounded rack, skip this step.

Step 3 Install the slider rails on the rack or cabinet.

a) Determine which two posts of the rack or cabinet you should use for the slider rails. Of the four vertical posts in the rack or cabinet, two will be used for the front mount brackets attached to the easiest accessed end of the chassis. The other two posts will have the slider rails.

b) Position a slider rail at the desired level on the back side of the rack and slide it into the front-mount bracket already installed. Secure with 12-24 screws or 10-32 screws, depending on the rack thread type (see the figure). Tighten 12-24 screws to 30 in-lb (3.39 N·m) of torque. Tighten 10-32 screws to 20 in-lb (2.26 N·m) of torque.

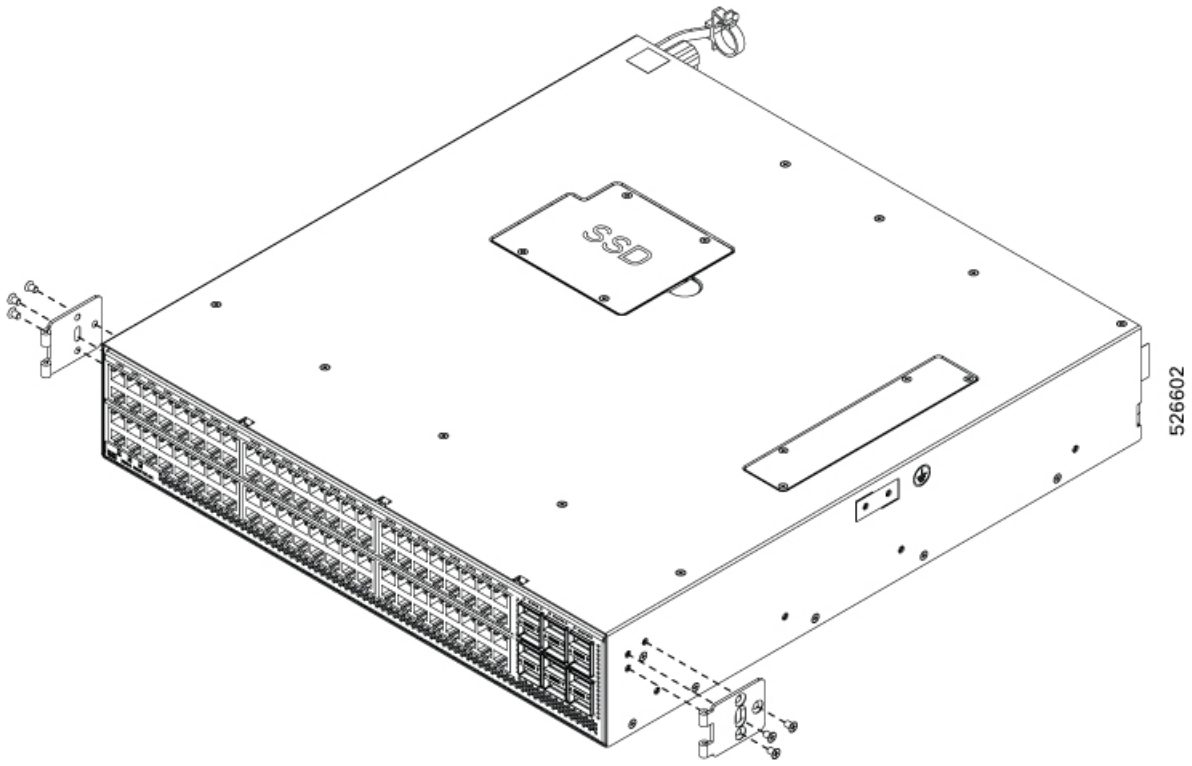


c) Repeat Step 3 to attach the other slider rail to the other side of the rack.

Make sure that the slider rails are at the same level. Use a level tool, tape measure, or carefully count the screw holes in the vertical mounting rails.

Step 4 Insert the switch into the rack and attach it.

a) Align the four holes in one side of front mount brackets to three holes on the left or right side of the chassis (see the figure).

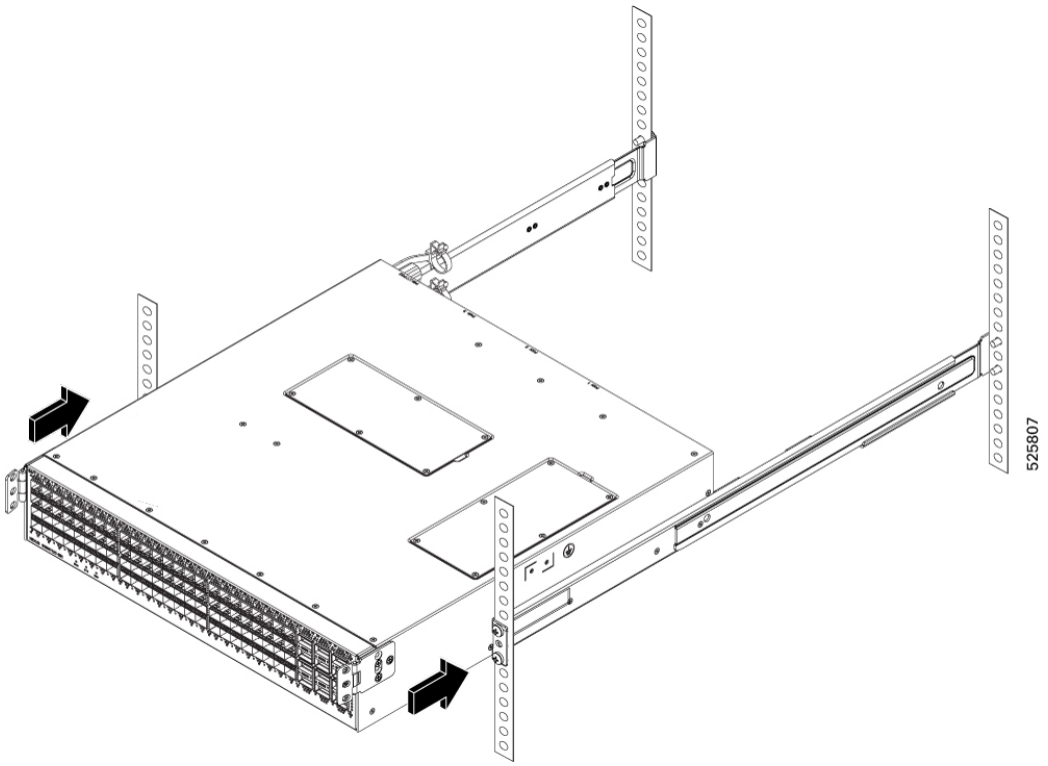


b) Use three M4 x 6 mm screws to attach the bracket to the chassis. Tighten each screw to 11 to 15 in-lb (1.2 to 1.7 N·m).

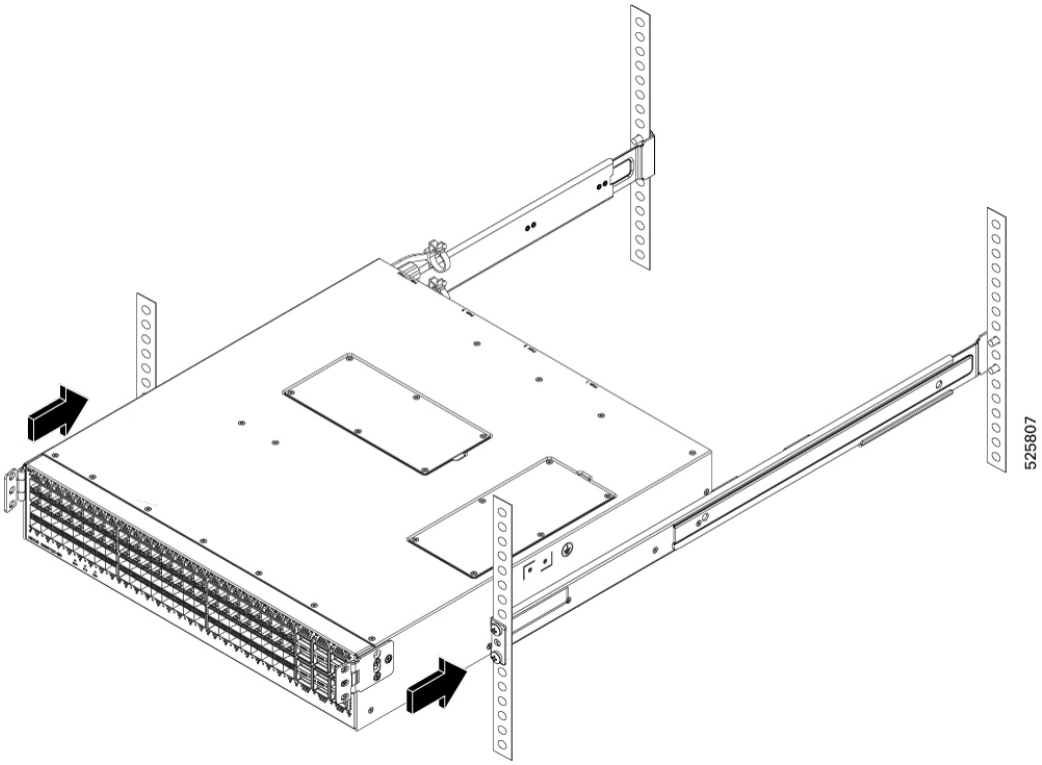
c) Repeat Steps 4 to attach the second front mount bracket to the other side of the chassis.

Step 5 Insert the switch into the rack and attach it.

a) Holding the switch with both hands, position the switch onto the rack-mount brackets and carefully slide the chassis into the rack (see the figure).



Step 6 Rotate one front mount bracket to align with the rack (see the figure).



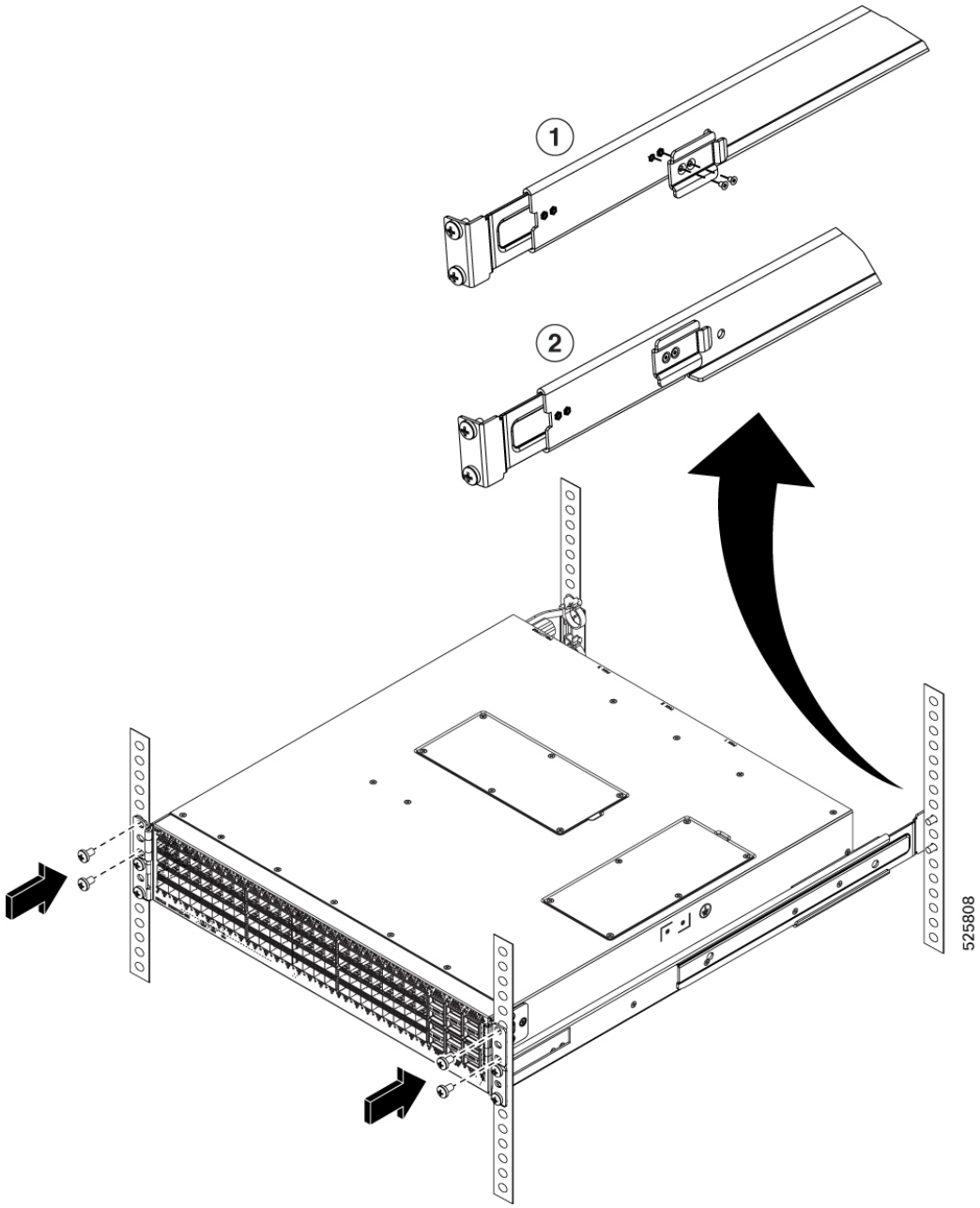
a) Tighten the 10-32 screws to 20 in-lb (2.26 N·m) or tighten the 12-24 screws to 30 in-lb (3.39 N·m).

b) Repeat Step 6 to attach the other front mount bracket on other side of the chassis.

Step 7 Insert the retainer clip to hold the chassis in place.

a) Align the retainer clip to the inside of the back of the slider rail. Make sure to hook the flange to the cutout on the bracket and align the screw holes (see the figure).

b) Attach the screws to secure the retainer clip (see the figure).



c) Repeat Step 7 to attach the other retainer clip on the other side of the chassis.

Step 8 If you attached a grounding wire to the chassis grounding pad, connect the other end of the wire to the facility ground.

Ground the chassis

The switch chassis is automatically grounded when you properly install the switch in a grounded rack with metal-to-metal connections between the switch and rack.

Note Provide an electrical conducting path between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. To ensure electrical continuity, use thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Remove any paint or other non-conductive coatings on the surfaces between the mounting hardware and the enclosure or rack. Clean the surfaces and apply an antioxidant before installation.

Ground the rack if using LVDC power supplies. If using AC or HVDC power supplies, the power cord for the AC power supplies provides grounding for the chassis. For supplemental grounding or bonding, attach a customer-supplied grounding cable to the chassis ground pad.

Ground the chassis. If you are using a 2-post rack, attach a customer-supplied grounding cable. Attach the cable to the chassis grounding pad and the facility ground. If you are using a 4-post rack, ensure that your chassis is grounded through the rack mount system or the power cable (AC or HVDC).

Warning **Statement 1024**— Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning **Statement 1046**— Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

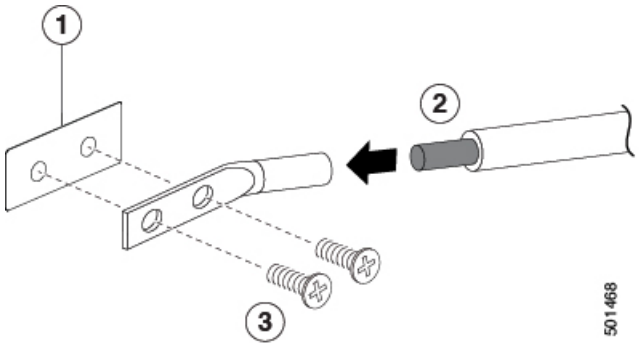
Before you begin

Before you can ground the chassis, verify the earth ground contact has a solid connection to the data center building.

Procedure

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. We recommend 6-AWG wire for the U.S. installations.

Step 2 Insert the stripped end of the grounding wire into the open end of the grounding lug. Use a crimping tool to crimp the lug to the wire. See the figure. Verify that the ground wire is securely attached to the grounding lug by attempting to pull the wire out of the crimped lug (tug test).



1	Chassis grounding pad	3	2 M4 screws are used to secure the grounding lug to the chassis
2	Grounding cable, with 0.75 in. (19 mm) of insulation that is stripped from one end, which is 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 figure 1. Tighten the screws to 11 to 15 in-lb (1.24 to 1.69 N m) of torque.

Step 4 Prepare the other end of the grounding wire and connect it to the facility ground.

Start the switch

Start the switch by connecting it to its dedicated power source. If you need *n* + *n* redundancy, connect each power supply in a switch to a different power source.

Note This equipment is designed to boot up in less than 30 minutes, dependent on its neighboring devices being fully up and running.

Before you begin

- The switch must be installed and secured to a rack or cabinet.
- The switch must be adequately grounded.
- The rack must be close enough to the dedicated power source so that you can connect the switch to the power source by using the designated power cables.
- You have the designated power cables for the power supplies that you are connecting to the dedicated power sources.

Note Depending on the outlet receptacle on your AC power distribution unit, you might need an optional jumper power cord to connect the switch to your outlet receptacle.

- The switch is not connected to the network (this includes any management or interface connections).
- The fan and power supply modules are fully secured in their chassis slots.

Procedure

Step 1 (Optional) For any AC power supply, do this:

a) Using the recommended AC power cable for your country or region, connect one end to the AC power supply.
b) Connect the other end of the power cable to the AC power source.

Step 2 (Optional) For any LV DC power supply, do this:

a) Turn off the circuit breaker for the power source.
b) When using an LV DC power supply that does not use a lug, connect the supplied wiring harness to the source. Or connect the user-supplied wires to the LV DC power source.
c) When using an LV DC power supply that does not use a lug, connect the attached plug of the supplied wiring harness to the power supply. Or attach the lugs of the user supplied wires to the power supply.
d) If there is a safety cover for the power source terminals, place and secure it over the terminals.
e) Turn on the power at the circuit breaker for the DC power source.

Step 3 Verify that the power supply LED is on and green.

Step 4 Listen for the fans; they should begin operating when the power supply is powered.

Step 5 After the switch boots, verify that these LEDs are lit:

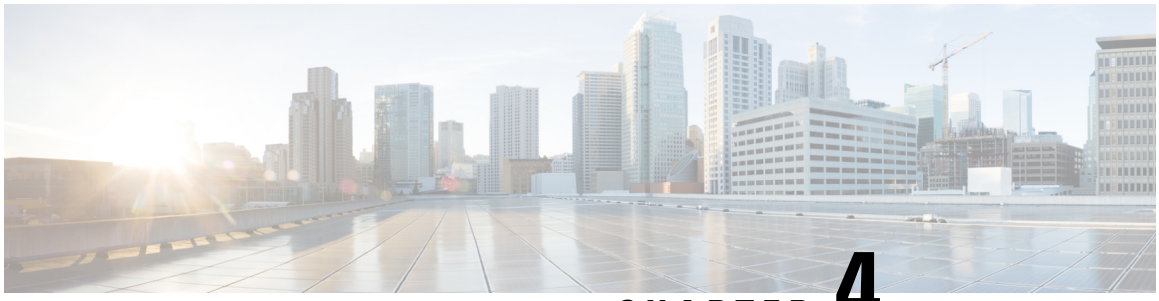
- On the fan modules, the Status (STA or STS) LED is green.

  If a fan module Status LED is not green, try reinstalling the fan module.

- After initialization, the switch chassis Status (labeled as STA or STS) LED is green.

Step 6 Verify that the system software has booted and the switch has initialized without error messages.

A setup utility automatically launches the first time that you access the switch and guides you through the basic configuration. For instructions on how to configure the switch and check module connectivity, see the appropriate Cisco Nexus 9000 Series Configuration Guides .



CHAPTER 4

Connecting the Switch to the Network

Overview of Network Connections

After you install the switch in a rack and power it up, make these network connections:

- Console connection—This is a direct local management connection that you use to initially configure the switch. Make this connection **first** to initially configure the switch and determine its IP address, which is needed for the other connections.
- Management connection—After you complete the initial configuration using a console, make this connection to manage all future switch configurations.
- Uplink and downlink interface connections—These are connections to hosts and servers in the network.

Each of these connection types is explained in one of these sections.

Note When running cables in overhead or subfloor cable trays, we strongly recommend that you locate power cables and other potential noise sources as far away as practical from network cabling that terminates on Cisco equipment. In situations where long parallel cable runs cannot be separated by at least 3.3 feet (1 meter), we recommend that you shield any potential noise sources by housing them in a grounded metallic conduit.

Connect a console to the switch

Before you create a network management connection for the switch or connect the switch to the network, create a local management connection through a console terminal. Then configure an IP address for the switch. Use the console to perform these functions, each of which can be performed through the management interface after you make that connection.

- Configure the switch using the command-line interface (CLI).
- Monitor network statistics and errors.
- Configure Simple Network Management Protocol (SNMP) agent parameters.
- Download software updates.

Make this local management connection between the asynchronous serial port on a supervisor module and a console device capable of asynchronous transmission. Typically, you use a computer terminal as the console device. On the supervisor modules, use the console serial port.

Note Before you can connect the console port to a computer terminal, make sure that the computer terminal supports VT100 terminal emulation. The terminal emulation software makes communication between the switch and the computer possible during setup and configuration.

Before you begin

- The switch must be fully installed in its rack, connected to a power source, and grounded.
- The necessary cabling for the console, management, and network connections must be available.
  - An RJ-45 rollover cable provided in the switch accessory kit.
  - Network cabling is routed to the location of the installed switch.

Procedure

Step 1 Configure the console device to match these default port characteristics:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity

Step 2 Connect an RJ-45 rollover cable to the console port on the switch.

Find this cable in the accessory kit.

Step 3 Route the RJ-45 rollover cable to the console or a modem.

Step 4 Connect the other end of the RJ-45 rollover cable to the console or to a modem.

What to do next

Create the initial switch configuration. See Create the initial switch configuration, on page 33 .

Create the initial switch configuration

Before you begin

- A console device must be connected with the switch.
- The switch must be connected to a power source.
- Determine the IP address and the netmask that is needed for the Management (Mgmt0) interface.

Procedure

Step 1 Power up the switch by connecting each installed power supply to an AC circuit.

If you are using the input-source (*n* + *n*) power mode, connect half of the power supplies to one AC circuit. Connect the other half of the power supplies to another AC circuit.

The Input and Output LEDs on each power supply light up (green) when the power supply units are sending power to the switch. The software asks you to specify a password to use with the switch.

Step 2 Enter a new password for this switch.

The software checks the security strength of your password. It rejects your password if it does not meet these guidelines:

- At least eight characters.
- Minimizes or avoids the use of consecutive characters (such as "abcd").
- Minimizes or avoids repeating characters (such as "aaabbb").
- Does not contain recognizable words from the dictionary.
- Does not contain proper names.
- Contains both uppercase and lowercase characters.
- Contains numbers and letters.

Examples of strong passwords are:

- If2CoM18
- 2004AsdfLkj30
- Cb1955S21

Note
Clear text passwords cannot include the dollar sign ($) special character.

Tip
If a password is trivial (such as a short, easy-to-decipher password), the software will reject your password configuration. Configure a strong password as explained in this step. Passwords are case-sensitive.

When you enter a strong password, the software asks you to confirm the password.

Step 3 Enter the same password again.

If you enter the same password, the software accepts the password and begins asking a series of configuration questions.

Step 4 Until you are asked for an IP address, enter the default configuration for each question.

Repeat this step for each question until you are asked for the Mgmt0 IPv4 address.

Step 5 Enter the IP address for the management interface.

The software asks for the Mgmt0 IPv4 netmask.

Step 6 Enter a network mask for the management interface.

The software asks if you need to edit the configuration.

Step 7 Enter **no** , to not edit the configuration.

The software asks if you need to save the configuration.

Step 8 Enter **yes** to save the configuration.

What to do next

Set up the management interface for each supervisor module on the switch.

Set up the management interface

Before you begin

The switch must be powered on.

Procedure

Connect the management cable into the management port on the switch. For shorter connections, you can use a cable with RJ-45 connectors.

Connecting Interface Ports to Other Devices

After you perform the initial configuration for the switch and create a management connection, you are ready to connect the interface ports on the switch to other devices. Depending on the types of interface ports on the switch, use interface cables with QSFP28, QSFP+, SFP+, SFP transceivers, or RJ-45 connectors to connect the switch to other devices.

If the transceivers that you are using can be separated from their optical cables, install the transceivers without their cables before inserting the cables into the transceivers. This helps to prolong the life of both the transceiver and cables. When removing transceivers from the switch, remove the optical cable first and then remove the transceiver.

To determine which transceivers, adapters, and cables are supported by this switch, see the Cisco Transceiver Modules Compatibility Information document.

Note When using SFP+ or SFP transceivers in a QSFP+ or QSFP28 uplink port, install a QSFP-to-SFP adapter, such as the CVR-QSFP-SFP10G adapter, in the QSFP port and then install the SFP+ or SFP transceiver. The switch automatically sets the port speed to the speed of the installed transceiver.

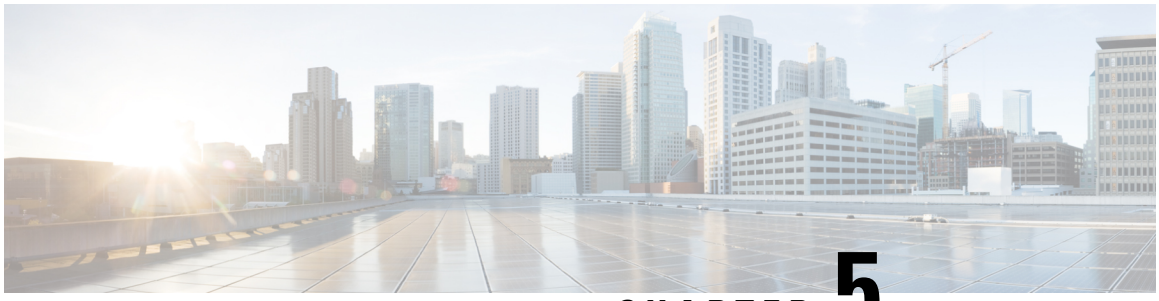
Maintaining Transceivers and Optical Cables

Keep transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and prevent damage to the connectors. Contamination increases attenuation (loss of light) and should be below 0.35 dB.

Consider these 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 the fiber-optic connection cleaning procedures for your site.
- 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.

Note When you need to remove a fiber-optic transceiver, first remove the fiber-optic cable from the transceiver **before**you remove the transceiver from the port.



CHAPTER 5

Replacing Components

Replace a fan module during operations

All fan and power supply modules must have the same airflow direction or else an error can occur with the switch overheating and shutting down. You can determine the airflow direction of a fan module by the color of the stripe on the front of the module. If the fan module has a red stripe for port-side intake airflow, the power supplies must have red coloring for the same airflow direction. To avoid over heating the switch, make sure that the fan modules are positioned this way:

- For port-side intake airflow with red coloring, position the fans in a cold aisle.
- For port-side exhaust airflow with blue coloring, position the fans in a cold aisle.

Before you begin

Before you can replace a fan module, ensure that these conditions exist:

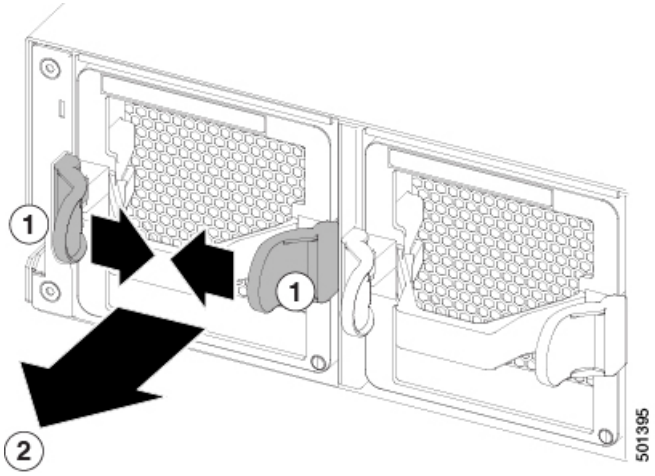
- There are three functioning fan modules in the other fan slots. In order to replace a fan module during operations, there must be two fan modules circulating air in the chassis at all times. The other fan module is redundant and can be replaced.
- The replacement fan module must have the same airflow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

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

Procedure

Step 1 Remove the fan module that you need to replace.

a) Press the two colored sides of the fan module handle towards each other and pull the handle to slide the module out of the chassis.



1	Press inward on both colored slides of the handle.	2	While holding the sides inward, pull on the handle to remove the module from the chassis.

b) 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.
c) As you press the latches, pull the fan module fully out of the chassis.
d) 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 2 Use these steps to replace the missing fan module within two minutes to avoid a shutdown.

a) Remove the replacement fan module 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.

b) Verify that you have the right fan module for the chassis. The correct fan module has one of these part numbers:

- NXASFAN-160CFM2PE (port-side exhaust airflow direction and a blue stripe)
- NXASFAN-160CFM2PI (port-side intake airflow direction and a red stripe)

Note
Be sure that the airflow direction of the new fan module matches the airflow direction of the other fan and AC power supply modules already installed in the chassis. Port-side intake airflow is indicated with red coloring, and port-side exhaust airflow is indicated with blue coloring. Power supplies with dual-direction airflow (airflow direction is set by the fan modules) have white coloring.

c) Position the fan module in front of the open fan 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 this step to reinstall the module.

d) 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 the previous step to reinstall the module.

Replacing a power supply module

The switch requires two power supplies for redundancy. With one power supply providing the necessary power for operations, replace the other power supply during operations as long as the new power supply has the same airflow direction as the other modules in the chassis.

Replace a power supply with another supported power supply that has the same power source type as the other installed power supply. Additionally, the airflow direction of the power supply must match or conform to the airflow direction of the installed fan modules. For the airflow direction used by the switch, see the coloring of the fan modules.

Remove a DC power supply

You can remove one power supply while the other one provides power to the switch.

To disconnect the power supply from its power cables, shut off the power from the power source and disconnect the connector for the power cables.

Procedure

Step 1 Turn off the circuit breaker for the power feed to the power supply that you are replacing.

Verify that the LEDs turn off on the power supply that you are removing.

Step 2 Remove the power cable from the power supply by pressing the latch on the Cisco-supplied power cord to allow removal from the power supply.

- Use the supplied cable to connect the power supply to external power.

Step 3 Grasp the power supply handle while pressing the release latch towards the power supply handle.

Step 4 Pull the power supply out of the bay.

What to do next

Install a DC power supply in the open slot.

Install an AC power supply

You can replace one power supply while the other one provides power to the switch.

Before you begin

- The power supply that you are installing must be capable of using the same airflow direction as the fan trays installed in the same switch. It must use the same type of power source as the other power supply installed in the same switch. A mix of AC and DC power supplies in the same switch are supported for hot swapping purposes within a time limit of 15 minutes

Note If the power supply that you are replacing has a different color handle than the replacement power supply, verify that it has or will have the same airflow direction as the other modules in the switch.

- An AC power source must be within reach of the power cable that will be used with the replacement power supply. If you are using *n* +*n* power redundancy, there must be a separate power source for each power supply installed in the chassis. Otherwise, only one power source is required.
- There must be an earth-ground connection to the chassis that you are installing the replacement module. Typically, the chassis is grounded by its metal-to-metal connection with a grounded rack. If you need to ground the chassis, see Ground the chassis, on page 28 .

Procedure

Step 1 Holding the replacement power supply with one hand underneath the module and the other hand holding the handle, turn the power supply so that its release latch is on the right side. Align the back end of the power supply (the end with the electrical connections) to the open power supply slot. Carefully slide the power supply all the way into the slot until it clicks into place.

Note
If the power supply does not fit into the open slot, turn the module over, before sliding it carefully into the open slot.

Step 2 Test the installation by trying to pull the power supply out of the slot without using the release latch.

If the power supply does not move out of place, it is secured in the slot. If the power supply moves, carefully press it all the way into the slot until it clicks into place.

Step 3 Attach the power cable to the electrical inlet on the front of the power supply.

Step 4 Verify that the other end of the power cable is attached to the appropriate power source for the power supply.

Step 5 Verify that the power supply is operational by making sure that the power supply LED is green.

Install a DC power supply

You can replace one power supply while the other one provides power to the switch.

Before you begin

- The circuit breaker for the DC power source for the power supply must be turned off.
- The power supply that you are installing must be capable of using the same airflow direction as the fan trays installed in the same switch.
- A DC power source must be within reach of the power cable that will be used with the replacement power supply. If you are using *n* + *n* power redundancy, there must be a separate power source for each power supply installed in the chassis. A mix of AC and DC power supplies in the same switch are supported for hot swapping purposes within a time limit of 15 minutes. Otherwise, only one power source is required.
- There must be an earth-ground connection to the chassis that you are installing the replacement module. Typically, the chassis is grounded by its metal-to-metal connection to a grounded rack. If you need to ground this chassis by another means, see Ground the chassis, on page 28 .
- All DC power supplies have reverse polarity protection. When you inadvertently connect the input power (+) to the DC PSU's – terminal and the input power – to the DC PSU's (+) terminal, the PSU will not be damaged and will operate fine after the input power feeds are correctly wired.

Procedure

Step 1 Holding the replacement power supply with one hand underneath the module and the other hand holding the handle, turn the power supply so that its release latch is on the right side. Align the back end of the power supply (the end with the electrical connections) to the open power supply slot. Carefully slide the power supply all the way into the slot until it clicks into place.

Note
If the power supply does not fit into the open slot, turn the module over. Carefully slide it into the open slot.

Step 2 Verify the rack is properly grounded, so that when the chassis is installed in the rack, it will be grounded.

Step 3 Turn on the circuit breaker for the DC power source connected to the power supply.

Note
Ensure that you have inserted the cable back in before you turn on the circuit breaker. You must connect and secure the DC connection first before turning on the circuit breaker.

Step 4 Verify that the power supply is operational by making sure that the power supply LED is green.

Install and remove small-form pluggable modules

Before you begin

See the Cisco Nexus 9396T12C-SE1 switch datasheet on cisco.com for a list of supported SFP, SFP+, and QSFP modules. Use only supported SFP/SFP+ modules on the platform.

Warning **Statement 1008**—Class 1 Laser Product

This product is a Class 1 laser product.

Note We recommend that you wait 30 seconds between removal and insertion of an SFP on an interface module. This allows the transceiver software to initialize and synchronize with the standby RSP. Changing an SFP more quickly could result in transceiver initialization issues that disable the SFP.

- Do not remove the dust plugs from the SFP and SFP+ modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP and SFP+ module can shorten its useful life. Do not remove and insert any SFP/SFP+ module more often than is necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.
- When you insert several SFP and SFP+ modules in multiple ports, wait for 5 seconds between inserting each SFP/SFP+. This will prevent the ports from going into error / disabled mode. Similarly, when you remove an SFP and SFP+ from a port, wait for 5 seconds before reinserting it.

Procedure

Step 1 Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.

Step 2 Find the send (TX) and receive (RX) markings that identify the top of the SFP/SFP+ module.

On some SFP/SFP+ modules, the send and receive (TX and RX) markings might be shown by arrows that show the direction of the connection.

Step 3 If the SFP/SFP+ module has a bale-clasp latch, move it to the open, unlocked position.

Step 4 Align the module in front of the slot opening and push until you feel the connector snap into place.

Step 5 If the module has a bale-clasp latch, close it to lock the SFP/SFP+ module in place.

Step 6 Remove the SFP and SFP+ dust plugs and save.

Step 7 Connect the SFP and SFP+ cables.

Install and remove OSFP/QSFP transceiver modules

This section provides the installation, cabling, and removal instructions for the Quad Small Form-Factor Pluggable transceiver modules. Refer to the Cisco Transceiver Modules Compatibility Information for additional details on optical transceivers.

Installing the Transceiver Module

Warning This icon is a hot surface warning. To avoid personal injury, do not touch without proper protection.

Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with system modules.

Caution Protect the transceiver ports by inserting clean dust caps (8000-QSFP-DCAP) into any ports not in use or that do not have optical modules plugged in. If optical modules are plugged in but not in use, use the dust caps that were supplied with the optical modules to protect the TX and RX surfaces of the optical module.

Clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another module.

The switch ships with dust caps plugged in. We **highly** recommend you keep the dust caps plugged in until you are ready to plug an optic. The dust caps protect the ports from possible EMI interference and also avoid contamination due to dust collection.

Caution To meet the EMI interference requirements, use the metal dust caps when the ports are not in use by optical modules.

Before you begin

Required Tools and Equipment

- Wrist strap or other personal grounding device to prevent ESD occurrences
- Antistatic mat or antistatic foam to set the transceiver on
- Fiber-optic end-face cleaning tools and inspection equipment

Procedure

Step 1 Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.

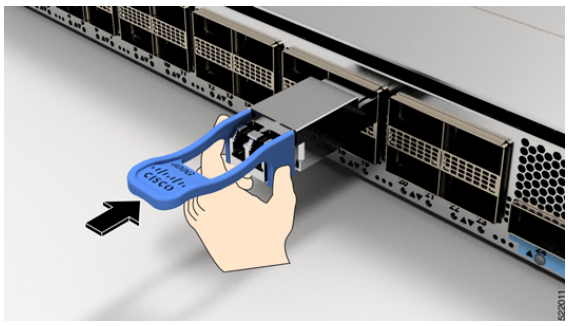
Step 2 Remove the transceiver module from its protective packaging.

Step 3 Check the label on the transceiver module body to verify that you have the correct model for your network. Do not remove the dust plug until you're ready to attach the network interface cable. The dust plug is not shown in the images.

Step 4 Hold the transceiver by the pull-tab so that the identifier label is on the top.

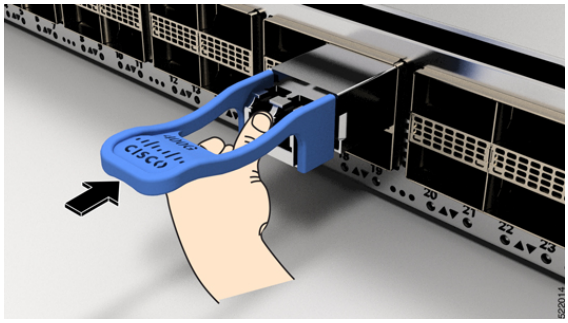
Step 5 Align the transceiver module in front of the module's transceiver socket opening and carefully slide the transceiver into the socket until the transceiver contacts the socket electrical connector.

Figure 1: Installing the QSFP Transceiver Module



Step 6 Press firmly on the front of the transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see figure Seating the QSFP Transceiver Module).

Figure 2: Seating the QSFP Transceiver Module



IMPORTANT: If the latch isn't fully engaged, you might accidentally disconnect the transceiver module.

Attach the optical network cable

Before you begin

Before you remove the dust plugs and make any optical connections, use these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the optical connector end faces just before you make any connections.
- Grasp the optical connector only by the housing to plug or unplug a fiber-optic cable.

Note

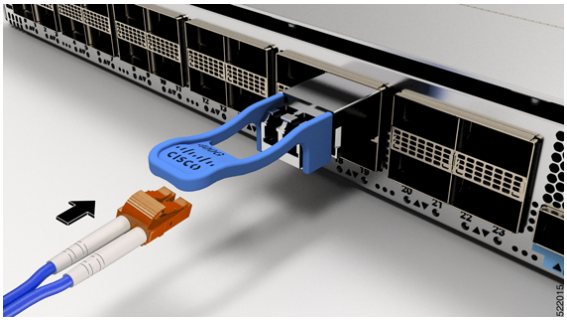
- The transceiver modules and fiber connectors are keyed to prevent incorrect insertion.
- The multiple-fiber push-on (MPO) connectors on the optical transceivers support network interface cables with either physical contact (PC) or ultra-physical contact (UPC) flat polished face types. The MPO connectors on the optical transceivers do not support network interface cables with an angle-polished contact (APC) face type.
- Inspect the MPO connector for the correct cable type, cleanliness, and any damage. For complete information on inspecting and cleaning fiber-optic connections, see the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document.

Procedure

Step 1 Remove the dust plugs from the optical network interface cable MPO connectors and from the transceiver module optical bores. Save the dust plugs for future use.

Step 2 Attach the network interface cable MPO connectors immediately to the transceiver module.

Figure 3: Cabling a Transceiver Module



Remove the transceiver module

Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

To remove a transceiver module, use these steps:

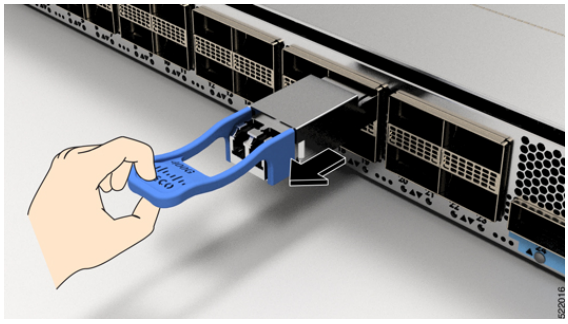
Procedure

Step 1 Disconnect the network interface cable from the transceiver connector.

Step 2 Install the dust plug immediately into the transceiver's optical bore.

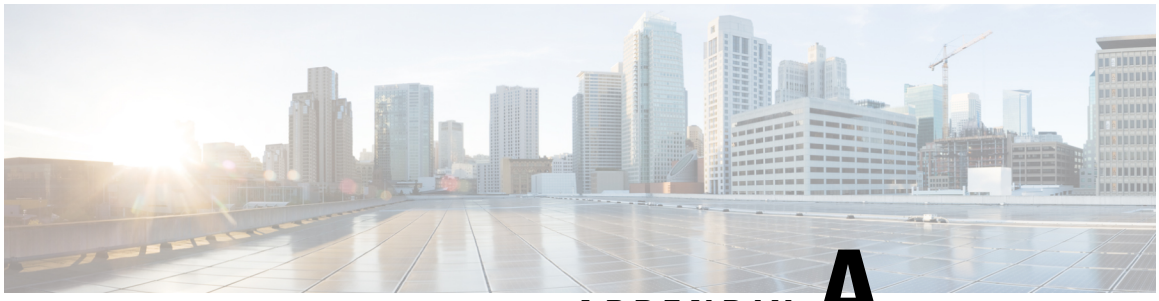
Step 3 Grasp the pull-tab and gently pull to release the transceiver from the socket.

Figure 4: Removing the QSFP Transceiver Module



Step 4 Slide the transceiver out of the socket.

Step 5 Place the transceiver module into an antistatic bag.



APPENDIX A

Rack Specifications

Overview of racks

Install the switch in these types of cabinets and racks, assuming an external ambient air temperature range of 32°F ~ 113°F (0 to 45°C):

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

Note

- If you are using an enclosed cabinet, we recommend one of the thermally validated types, either standard perforated or solid-walled with a fan tray.
- We do not recommend using racks that have obstructions (such as power strips). The obstructions could impair access to field-replaceable units (FRUs).

General requirements for cabinets and racks

The cabinet or rack must meet these 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). For more information, see Requirements specific to perforated cabinets, on page 48 .

  The spacing between the posts of the rack must be (EIA-310-D-1992 19-inch rack compatible) wide enough to accommodate the width of the chassis.

- The minimum vertical rack space requirement per chassis is:
  - For a one RU (rack unit) switch, 1.75 inches (4.4 cm)
  - For a one and a half RU (rack unit) switch, 2.63 (6.68 cm)
  - For a two RU (rack unit) switch, 3.5 inches (8.8 cm)
  - For a three RU (rack unit) switch, 5.25 inches (13.3 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 these 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

If you are mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets these requirements:

- The minimum vertical rack space per chassis must be equal to the rack unit (RU) of the chassis. One rack unit is equal to 1.75 inches (4.4 cm).
- The distance between the chassis air vents and any walls should be 2.5 inches (6.4 cm).

Requirements specific to perforated cabinets

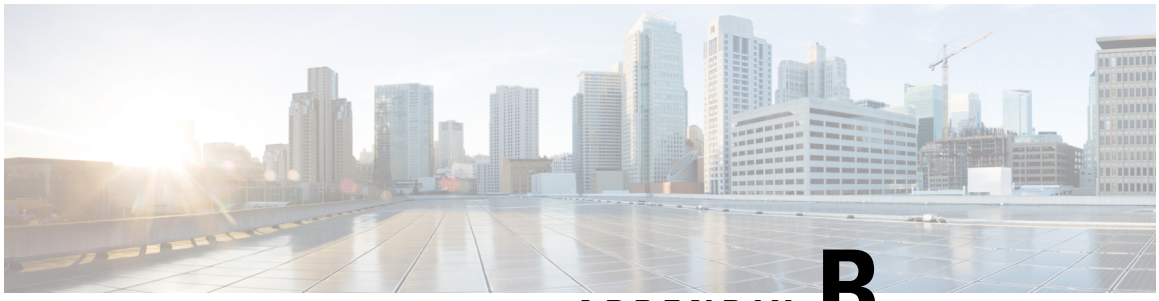
A perforated cabinet has perforations in its front and rear doors and side walls. Perforated cabinets must meet these requirements:

- 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, 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

Environmental specifications

The following table shows the server's environmental specifications.

Table 2: Environmental specifications

Environment		Specification
Temperature	Ambient operating temperature	32 to 104°F (0 to 40°C)
	Ambient nonoperating	–40 to 158°F (–40 to 70°C)
Humidity	Ambient operating humidity	8 to 80%
	Ambient nonoperating	5 to 95%
	Ambient operating altitude	0 to 10,000 feet (0 to 3,048 meters) For China, 6,562 ft (2000 m)
	Ambient nonoperating	-1000 to 30,000 feet (-304 to 15,150 meters)
* The Cisco Nexus switch functions in operating temperatures of up to 40°C at sea level. For every 300 meters (1000 ft) above sea level, the maximum temperature is reduced by 1°C. For more details on environmental requirements, see the Cisco Datasheet.		

Switch dimensions

The following table shows the server's switch dimensions.

Table 3: Switch dimensions

Switch	Width	Depth	Height
Cisco Nexus 9396T12C-SE1 switch	17.41 inches (44.23 cm)	18.53 inches (47.06cm)	3.4 inches (8.6 cm) (2 RU)

Switch and Module Weights and Quantities

The following table shows the server's switch and module weights and quantities.

Table 4: Switch and module weights and quantities

Component	Weight per Unit	Quantity
Cisco Nexus 9396T12C-SE1 chassis (N9396T12C-SE1)	40 lb (18.8kg)	1
Fan Module – 2 Port-side exhaust (blue) (NXASFAN-160CFM2PE) – 2 Port-side intake (red) (NXASFAN-160CFM2PI)	— 1.3 lb (0.59 kg) 1.3 lb (0.59 kg)	3
Power Supply module – 1400-W AC port-side exhaust (blue) (NXA-PAC-1400W-PE) – 1400-W AC port-side intake (red) (NXA-PAC-1400W-PI) – 2000-W DC port-side intake (red) (NXA-PDC-2KW-PI)	— 2.64 lb (1.2 kg) 2.64 lb (1.2 kg) 2.42 lb (1.1 kg)	2 (1 for operations and 1 for redundancy)

Transceiver and cable specifications

To see the transceiver specifications and installation information, see https://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html .

Switch Power Input Requirements

This table lists the typical amount of power that the switch consumes. It also lists the maximum amount of power that you must provision for the switch and power supply for peak conditions.

Note Some power supplies have capabilities that are greater than the maximum power requirements for a switch. To determine the power consumption characteristics for the switch, use the typical and maximum requirements that are listed here.

Table 5: Switch power input requirements

Switch	Typical Power Consumption (AC or DC)	Maximum Power Consumption (AC or DC)	Heat Dissipation Requirement
Cisco Nexus 9396T12C-SE1	583.5 W	794 W	2763.84 BTUs per hour

Specifications for power supplies and power cords

These sections describe the 1400W AC and 2000W DC power supply specifications and the supported AC and DC power cords.

1400-W AC-input power supply specifications

This section describes the specifications of NXA-PAC-1400W-PI and NXA-PAC-1400W-PE.

Table 6: 1400-W AC power supply specifications

Property	Specification
Input Voltage Range	100 VAC to 127 VAC 200 VAC to 240 VAC
Input Frequency	50 to 60 Hz
Efficiency	90% or greater (20 to 100% load)
Output Power	1,000 W/36 W 100-127 VAC 1,400 W/36 W 200-240 VAC
Redundancy Modes	1 +1
RoHS Compliance	Yes
Hot Swappable	Yes

AC power cords for 1400W AC power supply units

This table lists the specifications for the AC power cords that are available for the 1400W AC-input power supply.

Table 7: Power Cable Specifications for AC Power Supplies

Power Type	Power Cord Part Number	Cord Set Description
	CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 6.6 feet (2.0 m)
	CAB-C13-CBN	Cabinet jumper power cord, 250 VAC, 10 A, C14-C13 connectors, 2.3 feet (0.7 m)
Argentina	CAB-250V-10A-AR	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)
Brazil	CAB-250V-10A-BR	250 V, 10 A, 6.9 feet (2.1 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)
India	CAB-C13-C14-2M-IN	Power Cord Jumper, C13-C14 Connectors, 6.6 feet (2.0 m)
India	CAB-C13-C14-3M-IN	Power Cord Jumper, C13-C14 Connectors, 9.8 feet (3.0 m)
Israel	CAB-250V-10A-IS	250 V, 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)
Japan	CAB-C13-C14-2M-JP	Power Cord Jumper, C13-C14 Connectors, 6.6 feet (2.0 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)
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)
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)
All except Argentina, Brazil, and Japan	NO-POWER-CORD	No power cord included with switch

2000-W DC-input power supply specifications

This section describes the specifications of NXA-PDC-2KW-PI.

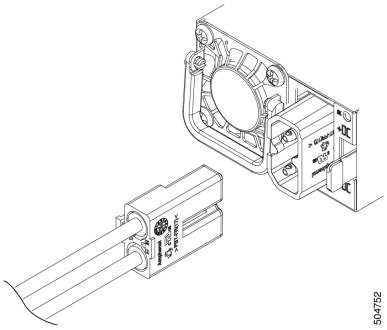
Table 8: 2000-W DC Power Supply Specifications

Property	Specification
Power	2000 W
Input Voltage Range	Nominal: -48 to -60 VDC
Frequency	-
Efficiency	90% or greater (20 to 100% load)
Output Power	2000W (36W standby)
Redundancy Modes	1+1
RoHS Compliance	Yes
Hot Swappable	Yes

DC power cords for 2000W DC power supply units

This table lists the specifications for the DC power cords that are available for the 2000W DC-input power supply.

Table 9: DC Power Cable Callout Table

Part ID Number	Description	Photo
NXA-PDC-2KW-PI	The 2000W DC power supply (NXA-PDC-2KW-PI) is not shipped with a connector. You must purchase the cable (PWR-2KW-DC-CBL) separately.	

Regulatory Standards Compliance Specifications

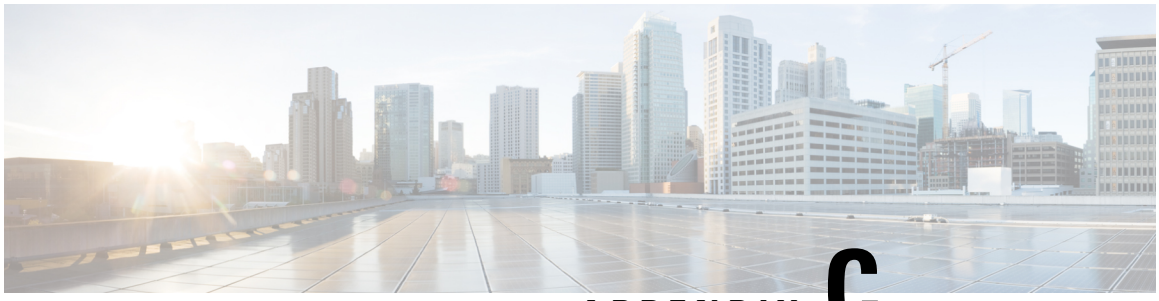
This table lists the regulatory standards compliance for the switch.

Table 10: Regulatory Standards Compliance: Safety and EMC

Specification	Description
Regulatory compliance	Products should comply with CE Markings according to directives 2004/108/EC and 2006/95/EC.
Safety	• IEC 62368-1 3rd Edition • UL 60950-1, Second Edition • UL 62368-1 3rd Edition • AS/NZS 62368-1 3rd Edition • CAN/CSA-C22.2 No.60950-1-07 • CAN/CSA-C22.2 No.62368-1-19 3rd Edition • CNS15598-1:2020
EMC: Emissions	• 47 CFR Part 15:2016 • CISPR32:2012:Ed:1 • CISPR32:2015:Ed:2 • CNS 15936:2016 • EN 55032:2012 • EN 55032:2015 • EN 55032:2015/A11:2020 • EN 61000-3-3:2013+A1:2019 • EN IEC 61000-3-2:2019+A1:2020 • EN300 386:2012:V1.6.1 • EN300 386:2021:V2.1.23 • ICES-003:2020:Iss:7 • KS C 9610-3-2:2020 • KS C 9610-3-3:2020 • KS C 9832:2019 • VCCI-CISPR 32:2016

Specification	Description
EMC: Immunity	• CISPR24:2010+A1:2015 • CISPR35:2016:Ed:1 • EN 55035:2017 • EN 55035:2017/A11:2020 • EN IEC61000-6-1:2019 • EN300 386:2012:V1.6.1 • EN300 386:2021:V2.1.23 • EN61000-6-1:2007 • EN61000-6-2:2005 • EN61000-6-2:2019 • IEC61000-6-1:2016:Ed:3 • IEC61000-6-2:2016:Ed:3 • KS C 9835:2019
RoHS	The product is RoH-6 compliant with exceptions for leaded-ball grid-array (BGA) balls and lead press-fit connectors.

System Specifications



APPENDIX C

LEDs

Switch Chassis LEDs

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

Table 11: Switch Chassis LEDs Callout Table

LED	Color	Status
BCN	Flashing blue	The operator has activated this LED to identify this switch in the chassis.
	Off	This switch is not being identified.
STS	Green	The switch is operational.
	Flashing amber	The switch is booting up.
	Amber	Temperature exceeds the minor alarm threshold.
	Red	Temperature exceeds the major alarm threshold.
	Off	The switch is not receiving power.
ENV	Green	Fans and power supply modules are operational.
	Amber	At least one fan or power supply module is not operating.
	Off	No alarm

LED	Color	Status
(port)	Green	Port admin state is 'Enabled', SFP is present and the interface is connected (that is, cabled, and the link is up).
	Amber	Port admin state is 'Disabled, or the SFP is absent, or both.
	Off	Port admin state is 'Enabled' and SFP is present, but interface is not connected.

Uplink Module LEDs

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

Table 12: Uplink Module LEDs Callout Table

LED	Color	Status
STS	Green	This module is operational.
	Red	Temperature is not operational.
	Off	The module is not receiving power.
(port)	Green	The port is connected with a transceiver or other connector.
	Off	The port is not connected.

Fan Module LEDs

This table lists the status for the fan module LEDs.

Table 13: Fan Module LEDs Callout Table

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

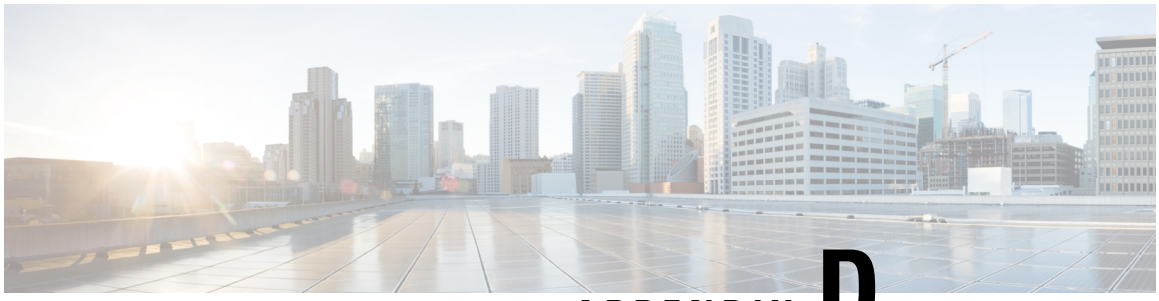
Power Supply LEDs

The power supply LEDs are located on the right portion of the power supply. Combinations of states indicated by the **OK** and **Fault** LEDs signify the status for the module as shown in this table.

Table 14: Power Supply LEDs Callout Table

OK LED	FAIL or FAIL/ID LED	Status
Green	Off	Power supply is on and outputting power to the switch.
Flashing green	Off	Power supply is connected to a power source but not outputting power to the switch. The power supply may not be properly installed in the chassis.
Off	Off	Either all the installed power supplies are not receiving power or an uninstalled power supply is not receiving power.
Off	Flashing amber	Power supply is operating but a warning condition has occurred—possibly one of these conditions: • High temperature • High power • Slow power supply fan • Low voltage • Power supply is installed in the chassis but was disconnected from the power source.
Off	Flashing amber (10 seconds) then amber	Power supply is installed without a connection to a power source.
Off	Amber	Power supply failure—possibly one of these conditions: • Over voltage • Over current • Over temperature • Power supply fan failure

LEDs



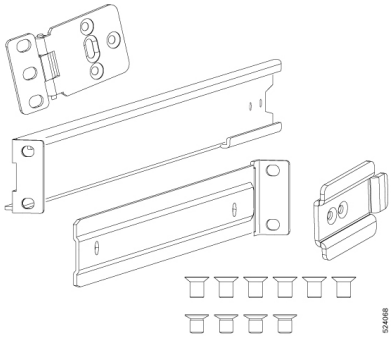
APPENDIX D

Additional Kits

Rack Mount Kit NXK-ACC-RMK2-2RU

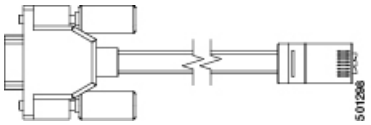
The table lists and illustrates the contents for the 2-RU rack-mount kit (NXK-ACC-RMK2-2RU).

Table 15: Rack Mount Kit NXK-ACC-RMK2-2RU Callout Table

Illustration	Description	Quantity
	Rack-mount kit • Rack-mount brackets (2) • Rack-mount front-mount brackets (2) • Rack-mount slider rails (2) • Rack-mount retainer clips (2) • Phillips countersink screws (12) • Flat head screws M4 (6) • Flat head screws M3 (4)	1
Not applicable	EAC Compliance document	1
Not applicable	Hazardous substances list for customers in China	1

The table lists and illustrates the console cable (CAB-CONSOLE-RJ45) that can be ordered.

Table 16: CAB-CONSOLE-RJ45 Callout Table

Illustration	Description	Quantity
	Console cable with DB-9F and RJ-45F connectors	1