

# Cisco N93360YC-FX2 ACI-Mode Switch Hardware Installation Guide

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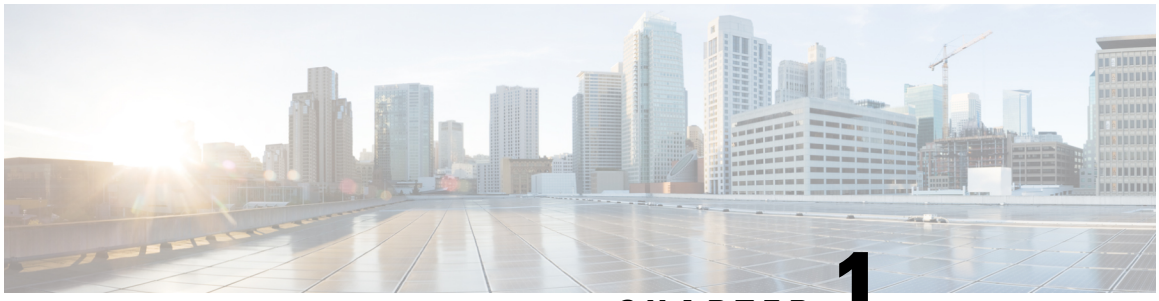
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CHAPTER 1

# Overview


- Overview, on page 1


# Overview

The Cisco N9K-C93360YC-FX2 switch is a 2-rack unit (RU), fixed-port switch designed for spine-leaf-APIC deployment in data centers. This switch has the following ports:

- 96 10-/25-Gigabit SFP28 ports
- 12 40/100-Gigabit QSFP28 ports
- Two management ports (one RJ-45 port and one SFP port)
- One console port
- 1 USB port

**Note** 1-Gigabit QSA transceivers are not supported in uplink ports.

This switch includes these user-replaceable components:

- Fan modules (three) with the following airflow choices:
  - Port-side exhaust fan module with blue coloring (NXA-FAN-160CFM-PE)
  - Port-side intake fan module with burgundy coloring (NXA-FAN-160CFM-PI)

**Note** Each fan module has two rotors. The switch can function normally if one rotor inside the any one fan module fails. In case of more than one rotor failure, the switch will issue a warning and power down in 2 minute.

- Power supply modules (two—One for operations and one for redundancy [1+1]) with the following choices:
  - 1200-W port-side exhaust AC power supply with blue coloring (NXA-PAC-1200W-PE)

- 1200-W port-side intake AC power supply with burgundy coloring (NXA-PAC-1200W-PI)
- 1200-W HVAC/HVDC dual-direction airflow power supply with white coloring (N9K-PUV-1200W)
- 930-W port-side exhaust DC power supply with blue coloring (NXA-PDC-930W-PE)
- 930-W port-side intake DC power supply with burgundy coloring (NXA-PDC-930W-PI)

**Note** 930-W DC power supply support 1+1 redundancy requires both of the following conditions:

- Ambient temperature of 104°F (40℃) or less and
- Use of 3.5 W QSFP+ transceivers or passive QSFP cables

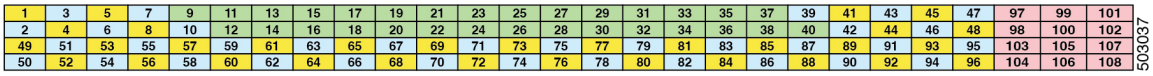
With higher temperatures or other optics, the switch requires both power supplies for operations without power redundancy.

**Note** Both power supplies are the same type. Do not mix AC, DC, or HVAC/HVDC power supplies.

**Note** All fan modules and power supplies must use the same airflow direction. If you are using the 1200-W HVAC/HVDC power supplies, those power supplies automatically use the same airflow direction as used by the fan modules.

### Deployment Scheme for SFP-10G-T-X Transceivers

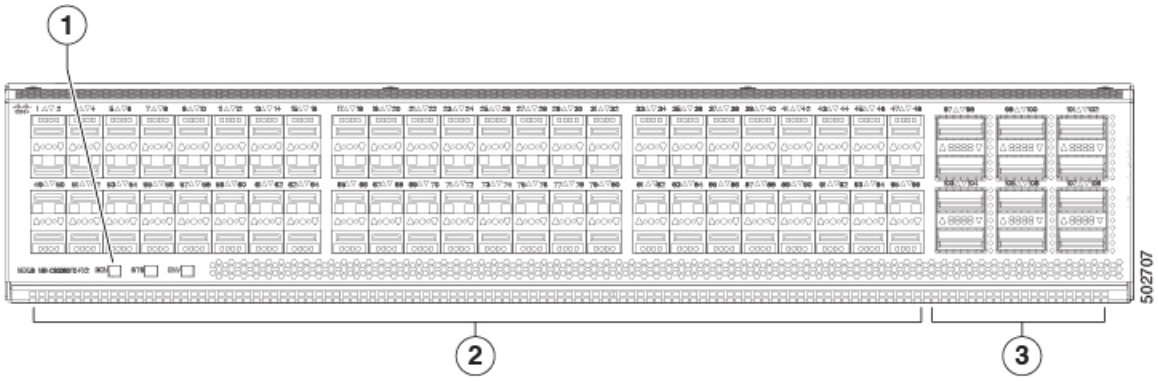
The following figure shows the maximum configuration density of SFP-10G-T-X SFP+ transceivers for this switch.




| | |
|---|---|
| | Active port deploying the SFP+ 10GBASE-T transceiver, with max power consumption up to 2.5W.<br>Once configured with “media-type 10g-tx” in NX-OS or “Link Level Policy -> Physical Media Type -> SFP 10G TX” in ACI, these ports can deploy SFP-10G-T-X. Without such configuration, they behave like normal ports. |
| | Port must either be empty or active with passive copper cables only (Max. power consumption up to 0.1W).<br>Once 10g-tx is configured on yellow ports, ports to the left, right, top and bottom of the yellow port are referenced as blue ports. These adjacent ports will then support only low power Passive Copper DAC cable, or these can be left empty to conserve power. If 10g-tx configuration is removed from adjacent yellow ports, the blue ports will revert to behaving like normal ports. |

| | |
|---|---|
| | Active port deploying any Cisco 1/10/25G optics (SFP, SFP+, SFP28) EXCLUDING SFP+ 10GBASE-T, with max power consumption up to 1.5W. These ports are not part of any scheme and can deploy all regular Cisco optics and behave like normal ports. |
| | Active Uplink QSFP+, QSFP28 ports with Incoming and outgoing traffic (40G/100G). |

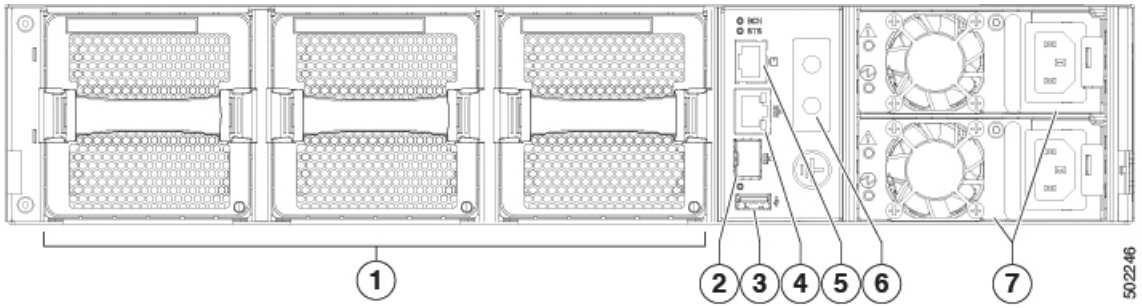
The figure shows the switch features on the port side of the chassis.




| | | | |
|---|---|---|---|
| 1 | Beacon (BCN), Status (STS), and Environment (ENV) LEDs | 3 | 12 40/100-Gigabit QSFP28 ports |
| 2 | 96 10-/25-Gigabit SFP28 ports | | |

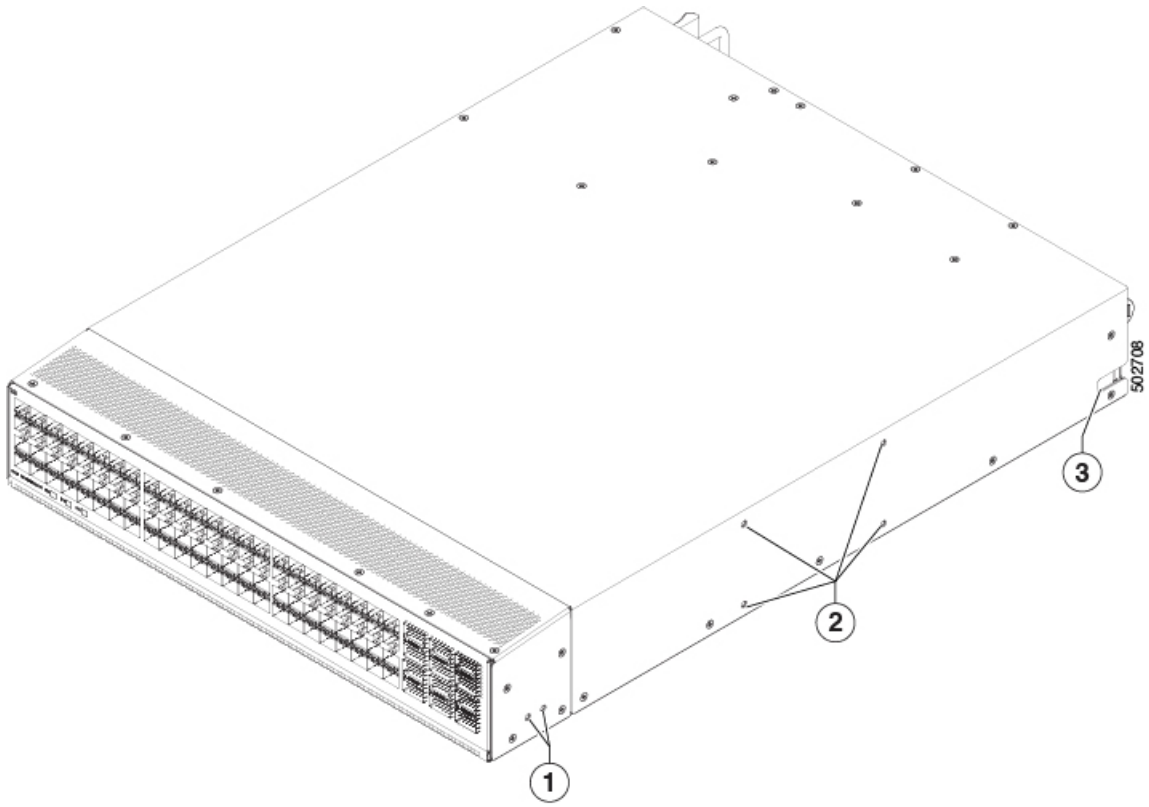
To determine which transceivers, adapters, and cables are support this switch, see the Cisco Transceiver Modules Compatibility Information document.

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




| | | | |
|---|---|---|---|
| 1 | Fan modules (3) with slots numbered from 1 (left) to 3 (right) | 5 | Console port (1) |
| 2 | Management port (1—SFP optical port) | 6 | Grounding pad |
| 3 | USB port (1) | 7 | Power supply modules (1 or 2) (AC power supplies shown) with slots numbered 1 (top) and 2 (bottom) |
| 4 | Management port (1—RJ-45 copper port) | | |

The figure shows the side of the chassis.




| | | | |
|---|---|---|---|
| 1 | Screw holes for front mounting brackets (4-post rack installations) | 3 | Notch on both sides of the chassis for locking the power supply end of the chassis to the bottom support rails (4-post rack installations). |
| 2 | Screw holes for center-mount bracket (2-post rack installations) | | |

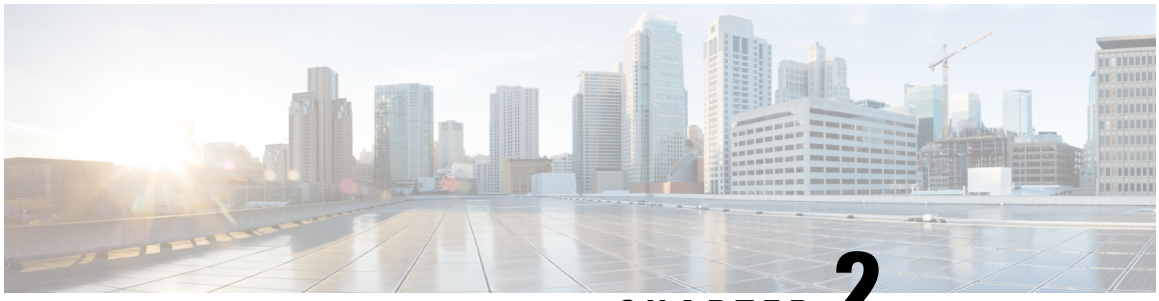
Depending on whether you plan to position the ports in a hot or cold aisle, you can order the fan and power supply modules with port-side intake or port-side exhaust airflow. For port-side intake airflow, the fan and AC power supply modules have burgundy coloring. For port-side exhaust airflow, the fan and AC power supplies have blue coloring. You can also order the 1200-W HVAC/HVDC power supply which has dual-direction airflow with white coloring. Dual-direction airflow modules automatically use the airflow direction of the other modules installed in the switch.

The fan and power supply modules are field replaceable. You can replace one fan module or one power supply module during operations so long as the other modules are installed and operating. If you have only one power supply installed, you can install the replacement power supply in the open slot before removing the original power supply.

**Note** All fan and power supply modules must have the same direction of airflow. Otherwise, the switch can overheat and shut down. If you are installing a dual-direction power supply, that module automatically uses the same airflow direction as the other modules in the switch.



**Caution** If the switch has port-side intake airflow (burgundy 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


- Temperature Requirements, on page 7
- Humidity Requirements, on page 8
- Altitude Requirements, on page 8
- Dust and Particulate Requirements, on page 8
- Minimizing Electromagnetic and Radio Frequency Interference, on page 9
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## Temperature Requirements

The operating temperature of the switch is 32 to 104 degrees Fahrenheit (0 to 40 degrees Celsius) at sea level. For every 300 meters (1000 feet) above sea level, the maximum temperature is reduced by 1 degree Celsius. The non-operating temperature of the switch is -40 to 158 degrees Fahrenheit (-40 to 70 degrees Celsius).

**Overview of Module Temperatures**

Built-in, automatic sensors in all switches in the Cisco N9000 Series monitor your switch at all times. Each module (supervisor, I/O, and fabric) has temperature sensors with two thresholds:

**Note** For any Major temperature alarms from the sensors, the switch powers down in 2 minutes. Power on the switch after fixing the temperature issue.

- Minor temperature threshold—If exceeded, a minor alarm occurs and these actions happen for all four sensors:
  - System messages display.
  - System sends Call Home alerts (if configured).

- System sends SNMP notifications (if configured).
- System fan speed will increment.

- Major temperature threshold—If 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:

  - System messages display.
  - System sends Call Home alerts (if configured).
  - System sends SNMP notifications (if configured).
  - System fan speed will increment.
  - 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, only that supervisor module is shut down and 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 interval, the software monitors the temperature every 5 seconds and continuously sends system messages every 10 seconds, as configured.

# 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 withstand from 5- to 95-percent (nonoperating) and 5- to 90-percent (operating) relative humidity.

Climate-controlled buldings usually maintain an acceptable level of humidity for the switch equipment. If the switch is located in an unusually humid location, use a dehumidifier to maintain the humidity within an acceptable range.

# Altitude Requirements

Altitude rating is 10,000 ft (3048 m). For China, it is 6,562 ft (2000 m).

# 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:

- Do not smoke near the switch.
- Do not eat 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. 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 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:

- 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 to the signals on the wires with these 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, consult experts in radio frequency interference (RFI).

The wiring is unlikely to emit radio interference if you use a twisted-pair cable with a good distribution of grounding conductors. Copper cables should not be longer than maximum distances for the media type.



**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 that is caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to 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. Not exercising the 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) and ensure that it makes adequate skin contact.



**Note** Check the resistance value of the ESD-preventive strap periodically. The measurement should be 1–10 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 variations in voltage that is supplied by the power sources. Overvoltage, undervoltage, and transients (spikes) can erase data from memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the switch.

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

When the chassis is properly installed in a grounded rack, the switch is grounded because it has a metal-to-metal (no paint, stain, dirt, or anything else on it) contact to the rack. See Note to ensure proper conductivity between rack and switch is maintained.

Alternatively, ground the chassis by using a customer-supplied grounding cable that meets your local and national installation requirements. For U.S. installations, we recommend 6-AWG wire. Connect your grounding cable to the chassis with a grounding lug (provided in the switch accessory kit) and to the facility ground.



**Note** Create 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. 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 (1-to-1 redundancy with current sharing) in one of these combinations:

- Two 1200-W AC power supplies
- Two 1200-W HVAC/HVDC power supplies
- Two 930-W DC power supplies

**Note** For 1+1 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 1200 W (AC and HVAC/HVDC power supplies) to the switch, but the switch requires less than that amount of power from the power supply. To operate the switch, you must provision enough power from the power source to cover the requirements of both the switch and a power supply. Typically, this switch and a power supply require about 429 W of power input from the power source, but you must provision as much as 1245 W 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.

**Note** In any power redundancy mode, the total power is shared across the populated Power Supply Units (PSUs). Multiple PSUs are always load-sharing regardless of the mode used. If a PSU has an active input power, the PSU provides a fraction of the total power to the system. This ensures that all active power supplies contribute to the power load, sharing it proportionally to maintain power redundancy.

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

**Warning** **Statement 1005—**Circuit Breaker when using DC power supplies

This product relies on the building's installation for short-circuit (overcurrent) protection.

- Ensure that the protective devices are rated not greater than 30A when the switch is powered with regular DC power supplies (rated 48-60VDC).
- Ensure that the protective devices are rated not greater than 10A when the switch is powered with HVDC power supplies (rated 240-350VDC).

# 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, see the user-replaceable

components in the *Overview* section of this document. Position the fan and power supply modules to move the coolant air from the cold aisle to the hot aisle in one of these ways:

- 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 direction of the installed fan modules determines the airflow.

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

**Note** To prevent the switch from overheating and shutting down, position the air intake for the switch in a cold aisle. The fan and power supply modules must have the same direction of airflow. To change the airflow direction for the switch, shutdown 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)
- Standard open four-post Telco racks

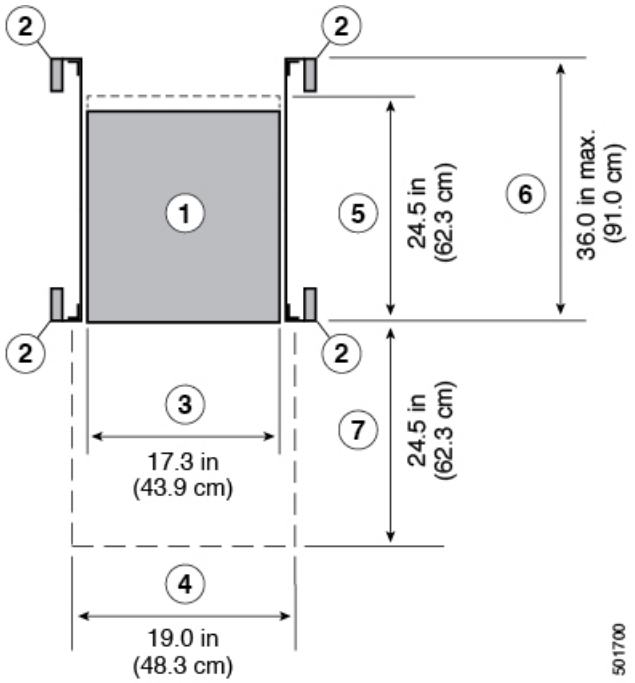
Work with your cabinet vendors to determine which of their cabinets meet these requirements or see the Cisco Technical Assistance Center (TAC) for recommendations:

- 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 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

Provide the chassis with adequate clearance between the chassis and any other rack, device, or structure so that you can properly install the switch. Provide the chassis with adequate clearance to 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 figure.




| | | | |
|---|---|---|---|
| 1 | Chassis | 5 | Depth of the chassis |
| 2 | Vertical rack-mount posts and rails | 6 | Maximum extension of the bottom-support rails<br>36.0 in (91.4 cm) |
| 3 | Chassis width<br>17.3 in (43.9 cm) | 7 | Depth of the front clearance area (equal to the depth of the chassis). |
| 4 | Width of the front clearance area (equal to the width of the chassis with two rack-mount brackets that are attached to it).<br>19.0 in (48.3 cm) | | |

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

# Network Equipment-Building System (NEBS) Statements

The regulatory compliance statements and requirements for the Network Equipment Building System (NEBS) certification are listed here.

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 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:

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:

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

The intrabuilding port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring for more than 6 meters (approximately 20 feet). These interfaces are designed for use as intrabuilding interfaces only (Type 2, 4, or 4a ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metallically to an OSP wiring system.

The following ports are considered intrabuilding ports on the equipment:

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 7015—**Equipment Bonding and Grounding

When you use thread-forming screws to bond equipment to its mounting metalwork, remove any paint and nonconductive coatings and clean the joining surfaces. Apply an antioxidant compound before joining the surfaces between the equipment and mounting metalwork.



**Note** **Statement 7016—**Battery Return Conductor

Treat the battery return conductor of this equipment as



**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.



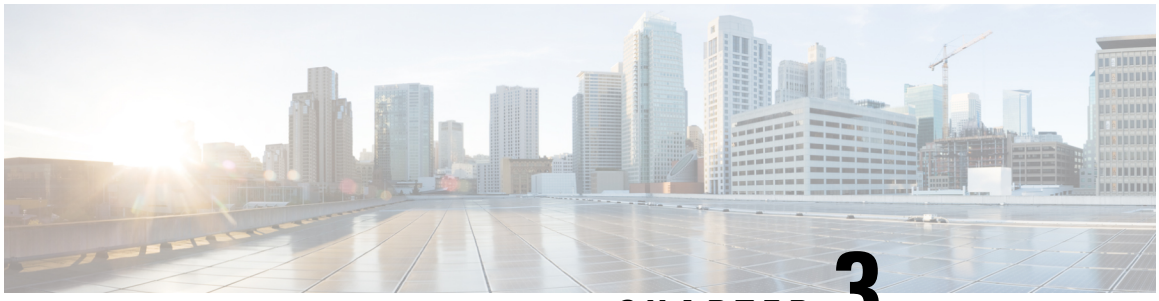
**Warning** **Statement 1056—**Unterminated Fiber Cable

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.



CHAPTER 3

# Installing the Chassis


- Safety, on page 17
- Installation Options with Rack-Mount Kits, on page 21
- Install a Rack, on page 21
- Unpacking and Inspecting a New Switch, on page 22
- Planning How to Position the Chassis in the Rack, on page 23
- Installing the Chassis in a Four-Post Rack, on page 23
- Installing the Airflow Vent NXA-ACC-BAV4, on page 29
- Grounding the Chassis, on page 31
- Start the switch, on page 33


## Safety

Before you install, operate, or service the switch, see the *Regulatory, Compliance, and Safety Information for the Cisco N9000 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 at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS



**Note** **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.

**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**

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**Warning** **Statement 1017—**Restricted Area

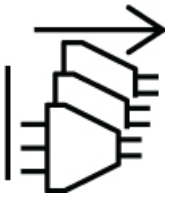
This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area.

**Warning** **Statement 1091—**Installation by an Instructed Person or Skilled 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 person or skilled person.

**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—**DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC 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.



**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.



**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 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).

# 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 these rack-mount options:

- Rack-mount kit (N9K-C9300-RMK) which you can order from Cisco.

  For four post racks.

The rack or cabinet that you use must meet the requirements listed the in General Requirements for Cabinets and Racks, on page 51 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 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 51.

### Procedure

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

**Warning**
**Statement 1048**—Rack Stabilization

The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before installation or servicing. Failure to stabilize the rack can cause bodily injury.

**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.

**Warning**
**Statement 1018—**Supply Circuit

To reduce risk of electric shock and fire, take care when connecting units to the supply circuit so that wiring is not overloaded.

**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.

# Unpacking and Inspecting 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.

**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):
  - fan modules (all fan and power supply modules must have the same airflow direction)
- 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 the two following 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 and AC power supply modules with one or more of the following colorings:

- Burgundy coloring on fan modules and AC power supplies

For port-side exhaust airflow, the switch must have port-side exhaust fan and AC power supply modules with one or more of the following colorings:

- Blue coloring on fan modules and AC power supplies

You can 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, and then 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 and the air intake portion of the switch must be located in a cold aisle.

# Installing the Chassis in a Four-Post Rack

Before you install the chassis, be sure that the rack is fully secured to the data center floor.

The table lists the items contained in the rack-mount kit.

## Installing the Switch using the N9K-C9300-RMK Rack-mount Kit

### 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 direction of the chassis airflow, position the

rail half with the chassis stop so that the fan and power supply modules end up in the appropriate aisle as follows:

- Port-side intake (burgundy coloring for fan modules) airflow requires that the bottom-support rail with the chassis stop be located on the hot aisle side of the rack.
- Port-side exhaust (blue coloring for fan modules) airflow requires that the bottom-support rail with the chassis stop be located on the cold aisle side of the rack.



**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.

### Before you begin

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

- 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.
- 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** **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.

### Procedure

**Step 1** Look at the fan and power supply modules installed in the chassis to determine how you must position the bottom-support rails on the rack.

- If the fan modules have blue coloring (port-side exhaust modules), position the bottom support rails so that the chassis stop is positioned by the cold aisle.

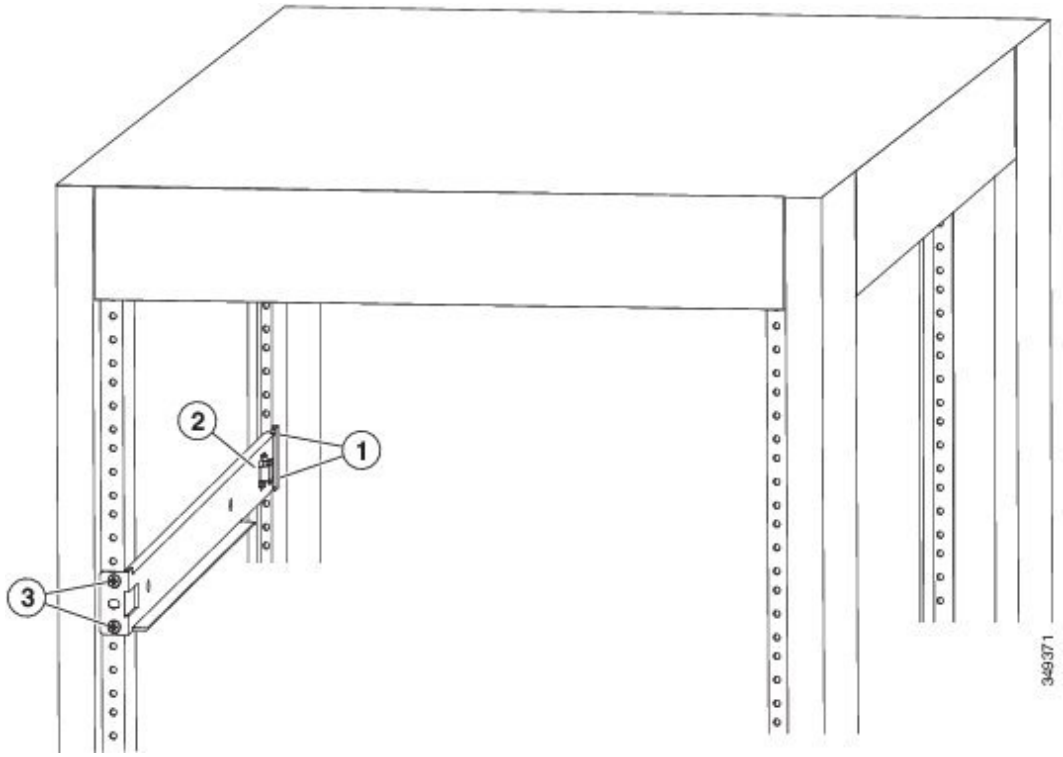
- If the fan modules have burgundy (port-side intake modules), position the bottom support rails so that the chassis stop is positioned by the hot aisle.

**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 and power supply modules. Leave at least 1 rack unit 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).

***Figure 1: Positioning an Expanding Bottom-Support Rail Set***




| | | | |
|---|---|---|---|
| 1 | 2 screws holding one end of the bottom-support bracket to the rear of the rack | 3 | 2 screws holding the front end of the bottom-support bracket to the front side of the rack |
| 2 | Chassis stop on the expanding bottom-support bracket | | |

**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

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

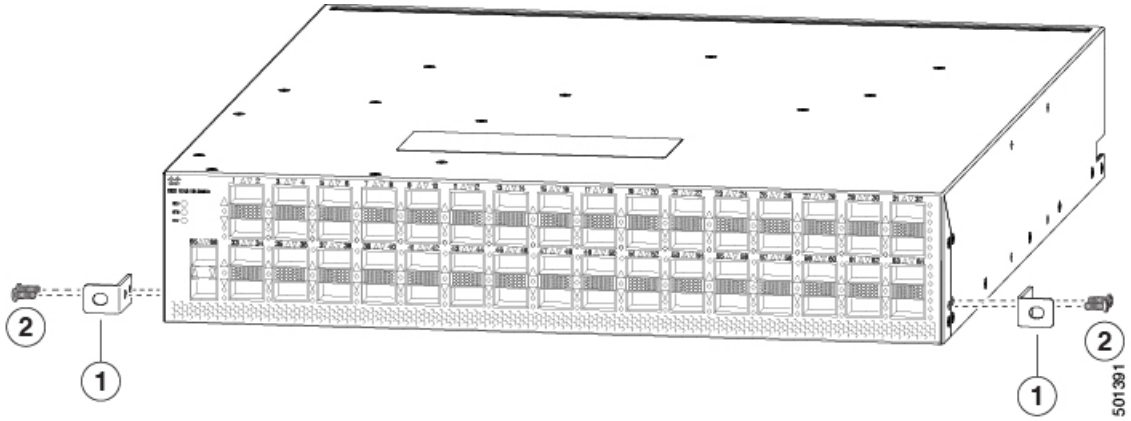
### Before you begin

- You need these tools and equipment:
  - Manual Phillips-head torque screwdriver
  - Front-mount brackets (2) and screws (4). Check the switch accessory kit.

### Procedure

**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 figure).

Be sure that the other side of the bracket is facing toward the front (port end) 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 Nm).

**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

Slide the chassis onto the bottom-support rails so that the power supply end 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** **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.



**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.

### 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 fan modules will be in the appropriate aisle as follows:
  - Burgundy (port-side intake airflow) fan modules are positioned in a hot aisle (the chassis stop on the bottom-support rails is positioned by the hot aisle).
  - Blue colored (port-side exhaust airflow) fan 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** **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:

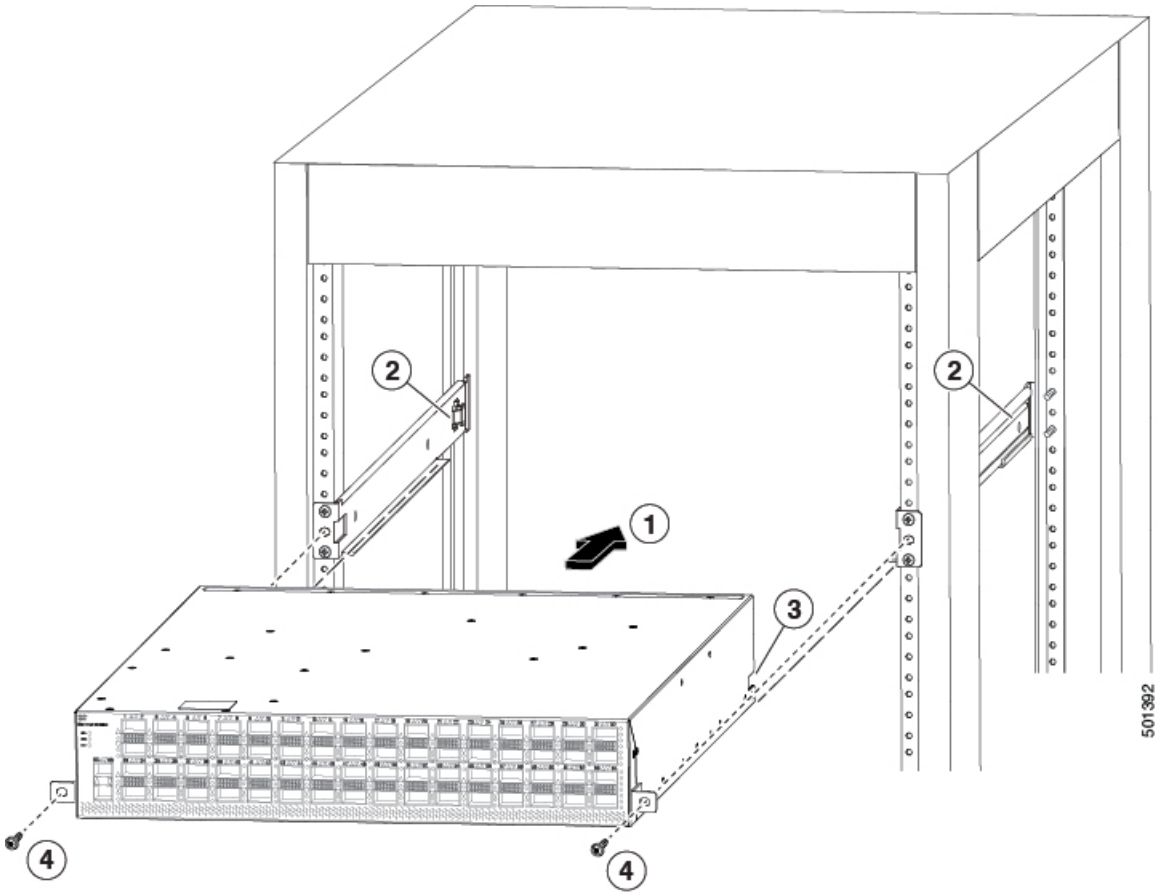
- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install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

### Procedure

**Step 1** Slide the power supply 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 power supplies clip into the chassis stops on the bottom-support rails and the front-mount brackets come in contact with the rack. See the 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.




| | | | |
|---|---|---|---|
| 1 | Slide the 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 and power supply modules). | 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).

# Installing the Airflow Vent NXA-ACC-BAV4

The airflow vent bracket (NXA-ACC-BAV4) is required for NEBS (Network Equipment-Building System) compliance.

**Note** An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Any paint or other non-conductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.

**Note** You supply the 10-32 or 12-24 screws to mount the vent bracket and airflow sleeve.

### Before you begin

- Verify that your shipment is complete.
- Install your rack in a secure location.

## SUMMARY STEPS

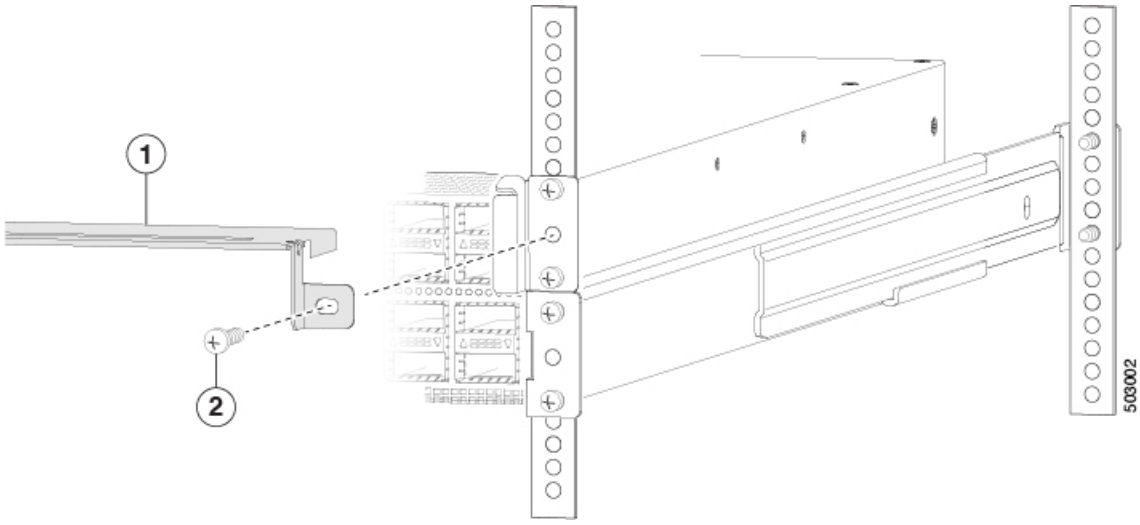
1. Insert the vent bracket and attach it as follows:

## DETAILED STEPS

### Procedure

Insert the vent bracket and attach it as follows:

a) Holding the vent bracket (NXA-ACC-BAV4), position it in front and above the switch (see item 1 in the following figure).
b) Holding the vent bracket level, insert screws (12-24 or 10-32, depending on the rack type) in each of the front rack-mount flanges (using a total of two screws) and into the cage nuts or threaded holes in the vertical rack-mounting rails (see item 2 in the following figure).




c) 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).

# Grounding 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.

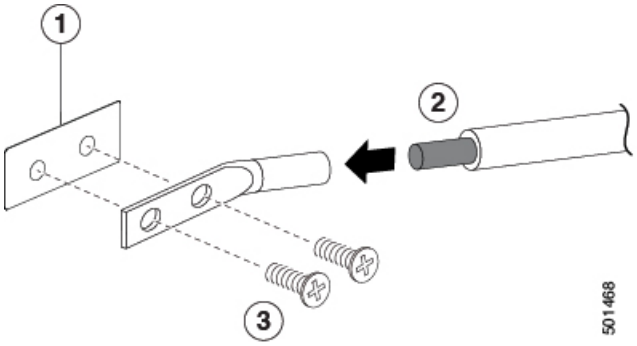
### Before you begin

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** For any AC power supply, do the following:

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** For any DC power supply, do the following:

a) Turn off the circuit breaker for the power source to avoid an electrical shock hazard.
b) Verify that the power cable wires from the power source are connected to a connector block.
c) Insert the connector block into the receptacle on the power supply. Make sure that the connector block clicks when fully inserted in the receptacle and does not pull out.
d) If there is a safety cover for the terminals, place and secure it over the terminals to avoid an electrical shock hazard.
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:

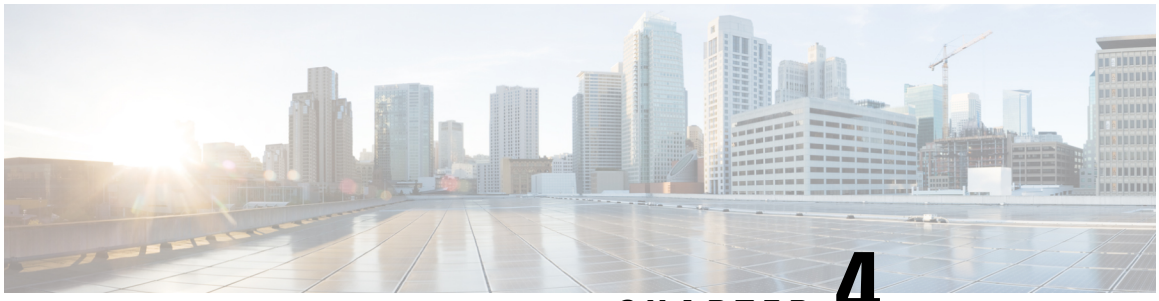
- On the fan modules, the Status (STA or STS) LED is green.

  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 N9000 Series Configuration Guides.



CHAPTER 4

# Connecting the Switch to the ACI Fabric


- ACI Fabric Topology, on page 35
- Preparing to Connect to Other Devices, on page 36
- Connecting Leaf Switches to APICs, on page 37
- Connecting Leaf Switches to Spine Switches, on page 39
- Installing a Gigabit Ethernet module (GEM), on page 40
- Replacing an Existing Switch in the ACI Fabric, on page 41
- Setting Up an Optional Console Interface, on page 41
- Setting Up an Optional Management Connection, on page 42
- Maintaining Transceivers and Optical Cables, on page 42


## ACI Fabric Topology

The ACI fabric topology includes these major components:

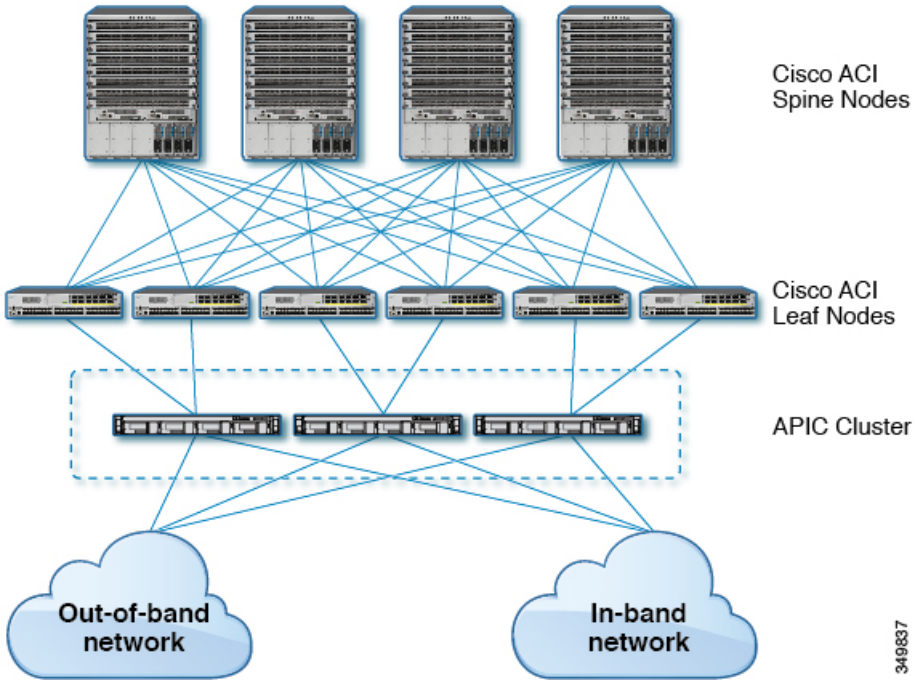
- Application Centric Infrastructure Controller (APIC) appliance (cluster of APICs)
- Leaf switches (for switch compatibility, please see the data sheets)
- Spine switches (for switch compatibility, please see the data sheets)

For additional information, please see the Cisco APIC Installation, Upgrade, and Downgrade Guide.

**Note** To prevent sub-optimal forwarding between endpoints, connect every leaf switch in the fabric to every spine switch in the same fabric.

As shown in the figure, each APIC is connected to one or two leaf switches and each leaf switch should be connected to every spine switch in the same fabric.

*Figure 2: Connections Between APIC Clusters, Leaf Nodes, and Spine Nodes*




# Preparing to Connect to Other Devices

When preparing to connect the fabric devices, consider these items for each type of interface, and gather all of the required equipment before making the connections:

- Cabling type required for each interface type
- Distance limitations for each signal type
- Additional interface equipment required

**Note** When running power and data 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.

The optical transceivers that are not already assembled to their cables come separate from their cables. To prevent these transceivers and their cables from being damaged, we recommend that you keep the transceivers disconnected from their cables when installing them in ports and then insert the optical cable into the transceiver. When removing transceivers from ports, remove their cables before removing the transceivers.

For more information about removing and installing the transceivers, see the Cisco N9408 ACI-Mode Switch Hardware Installation Guide, "*Optic Transceiver Removal Using the Optics Extraction Tool*".

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

- Wear an ESD-preventative wrist strap that is connected to an earth ground whenever handling transceivers. The switch is typically grounded when you install transceivers and provides an ESD port to which you can connect your wrist strap. If you cannot find an ESD port, connect the wrist strap to an earth ground (such as the grounding connection for the chassis).
- Do not remove or insert a transceiver more often than 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) increases with contamination and should be kept below 0.35 dB.
  - Clean these parts before installing them 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.

# Connecting Leaf Switches to APICs

Downlink one or two (recommended for redundancy) Cisco N9000 platform ACI-mode leaf switches to each Application Policy Infrastructure Controller (APIC) in your ACI fabric. The type of virtual interface card (VIC) installed on the APIC determines the types of interface cables that you use to connect the leaf switches to the APICs.

- The **VIC 1225T** module supports copper connectors, copper cables, and switches with copper downlink ports (such as: Cisco N93108TC-FX switch).
- The **VIC 1225** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco N93600CD-GX switch).
- The **VIC 1455** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco N93600CD-GX switch).



**Note** You cannot use breakout ports for Cisco APIC connectivity.

### Before you begin

The APIC and leaf switches in the fabric must be fully installed in their racks and grounded.

### Procedure

**Step 1** Connect an interface cable to one of the two to four ports on the virtual interface card (VIC) installed on the APIC. If the cable is not already assembled to its transceiver, insert the transceiver into the VIC port. Connect the optical interface cable to the transceiver.

- For a **VIC 1225T** 10GBASE-T copper module, use 10GBASE-T cables with RJ-45 connectors.
- For a **VIC 1225** optical module, use one of these sets of transceivers and cables:
  - Cisco 10GBASE-LR transceivers (SFP-10G-LR) supporting a link length of up to 6.1 miles (10 km)
  - Cisco 10GBASE-SR transceivers (SFP-10G-SR) supporting these link lengths:
    - Using 2000 MHz MMF (OM3) for up to 984 feet (300 m)
    - Using 4700 MHz MMF (OM4) for up to 1312 feet (400 m)
  - Cisco SFP+ Active Optical Cables (SFP-10G-AOC*x*M [where *x*=1, 3, 5, 7 for lengths in meters])
  - Cisco SFP+ Twinax Cables (SFP-H10GB-CU*x*M [where *x*=7 for lengths in meters])
- For a **VIC 1455** SFP28 module, 10-Gigabit only, use one of these sets of transceivers and cables:
  - Cisco 10GBASE-LR transceivers (SFP-10G-LR) supporting a link length of up to 6.1 miles (10 km)
  - Cisco 10GBASE-SR transceivers (SFP-10G-SR) supporting these link lengths:
    - Using 2000 MHz MMF (OM3) for up to 984 feet (300 m)
    - Using 4700 MHz MMF (OM4) for up to 1312 feet (400 m)
  - Cisco SFP+ Active Optical Cables (SFP-10G-AOC*x*M [where *x*=1, 2, 3, 5, 7, or 10 for lengths in meters])
  - Cisco SFP+ Twinax Cables (SFP-H10GB-CU*x*M [where *x*=1, 2, 3, 5, 7, or 10 for lengths in meters])

**Note**
The VIC 1455 has 4 ports: port-1, port-2, port-3, and port-4 from left to right.

- All ports must have the same speed, either 10-Gigabit or 25-Gigabit.
- Port-1 and port-2 is one pair, corresponding to eth2-1 on APIC and port-3 and port-4 is another pair, corresponding to eth2-2 on APIC. Only one connection is allowed for each pair. For example, connect one cable to either port-1 or port-2. Connect another cable to either port-3 or port-4. **Do not connect two cables on any pair**.

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

To see the transceiver specifications and installation information, see Transceiver Module Installation Guides.

**Step 2** Connect the other end of the interface cable to a downlink port on a leaf switch.

- For a Cisco 10GBASE-LR or -SR transceiver and cable, insert the transceiver into a downlink optical port on a leaf switch before connecting the cable to the transceiver.

- For Cisco SFP+ Active Optical Cables, insert the transceiver on the cable into a downlink optical port on a leaf switch.
- For a 10GBASE-T copper cable, insert the RJ-45 connector on the cable into a downlink BASE-T port on a leaf switch.

**Note**
To determine which transceivers, adapters, and cables support this switch, see the Cisco Transceiver Modules Compatibility Information document.

# Connecting Leaf Switches to Spine Switches

For optimal forwarding between endpoints, connect each leaf switch to every spine switch in the same ACI fabric.

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

To see the transceiver specifications and installation information, see Transceiver Module Installation Guides.

**Warning** **Statement 1055—**Class 1/1M Laser

Invisible laser radiation is present. Do not expose to users of telescopic optics. This applies to Class 1/1M laser products.




**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.

### Before you begin

- The leaf and spine switches in the fabric (such as: N9K-C9364C, N9K-C9332C, N9K-C9316D-GX, and N9K-C9332D-GX2B) must be fully installed in their racks and grounded.
- If there are modular switches in the fabric, their ACI-mode line cards must already be installed. The line cards can be of these types:
  - 32-port 100-Gigabit (such as: N9K-X9732C-EX)
  - 36-port 100-Gigabit (such as: N9K-X9736C-FX)
  - N9K-X9400-22L linecard expansion module (LEM)
  - N9K-X9400-16W LEM
  - N9K-X9400-8D LEM

**Note**
- You cannot include NX-OS line cards in the same chassis when running in ACI mode.
- Multiple uplinks from a leaf switch to a spine switch is supported. A symmetrical topology is recommended so that all devices have equal access to resources.

### Procedure

**Step 1** For the transceivers with removable cables, separate the transceivers from their interface cables.

**Step 2** Insert the appropriate transceiver into an active uplink port on the leaf switch.

**Step 3** Insert the same type of transceiver in the spine switch port on the line card.

**Step 4** For transceivers with removable cables, insert the interface cable into the open end of each of those transceivers.

**Step 5** Repeat Steps 1 through 4 for each spine switch in the ACI fabric.
The leaf switch is connected to each spine switch in the ACI fabric.

**Step 6** Repeat Steps 1 through 5 for each leaf switch in the ACI fabric.
Each leaf switch in the ACI fabric is connected to each spine switch in the network.

The fabric automatically implements Equal Cost Multi-Pathing (ECMP) and enables all links. You do not need to configure the links.

# Installing a Gigabit Ethernet module (GEM)

### Procedure

**Step 1** Clear the switch's current configuration. Use the `setup-clean-config` command.

**Step 2** Power off the switch; disconnect the power.

**Step 3** Replace the current GEM card with the new GEM card.

**Step 4** Power on the switch.

# Replacing an Existing Switch in the ACI Fabric

To replace an existing switch in the ACI fabric, see "Upgrading the Switch Hardware" in the Cisco APIC Installation and ACI Upgrade and Downgrade Guide.

# Setting Up an Optional Console Interface

Optionally set up a console interface for performing the initial configuration of the switch. Use the interface cable provided in the accessory kit to connect the switch to your console device. Connect the console port on the switch to a modem. If you do not connect it to a modem, make the connection either before powering up the switch or after completing the boot process for the switch.

### Before you begin

The console device must support VT100 terminal emulations and asynchronous transmissions.

### Procedure

**Step 1** Configure the terminal emulator program to match each of these default port characteristics:

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

**Step 2** Insert the RJ-45 connector on the interface cable found in the accessory kit into the RS-232 port on the switch. Insert the DB-9 connector on the other end of the cable to the serial port on the console device.

### What to do next

Perform the initial configuration for the switch (see the *Cisco ACI Getting Started Guide*).

# Setting Up an Optional Management Connection

Optionally set up an out-of-band management connection for monitoring and troubleshooting purposes. Depending on your switch, connect either the RJ-45 management port or the SFP management port on the switch to an external hub, switch, or router.

### Before you begin

To prevent an IP address conflict, complete the initial configuration for the switch and establish an IP address before you create the management connection.

### Procedure

**Step 1** Connect the interface cable to a management port on the switch.

**Step 2** Connect the other end of the cable to an external hub, switch, or router.

# Maintaining Transceivers and Optical Cables

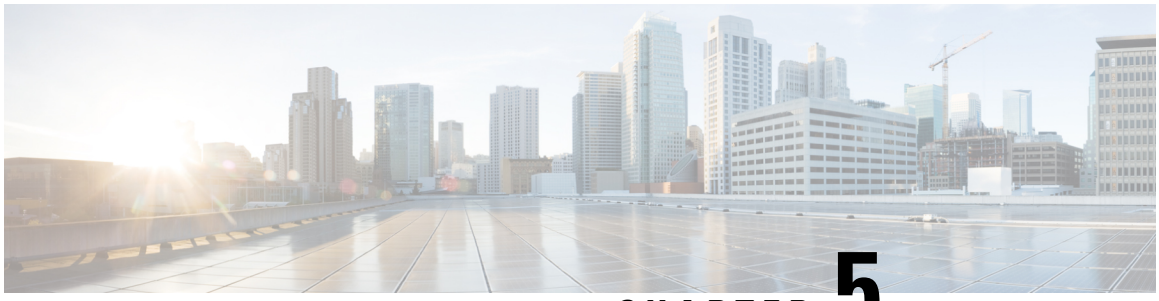
Keep transceivers and fiber-optic cables clean and dust free to maintain high signal accuracy and prevent damage to the connectors. Contamination increases attenuation (loss of light) and should be below 0.35 dB.

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


- Replacing a Fan Module During Operations, on page 43
- Replacing a Power Supply Module, on page 45


# Replacing a Fan Module During Operations

### Before you begin

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

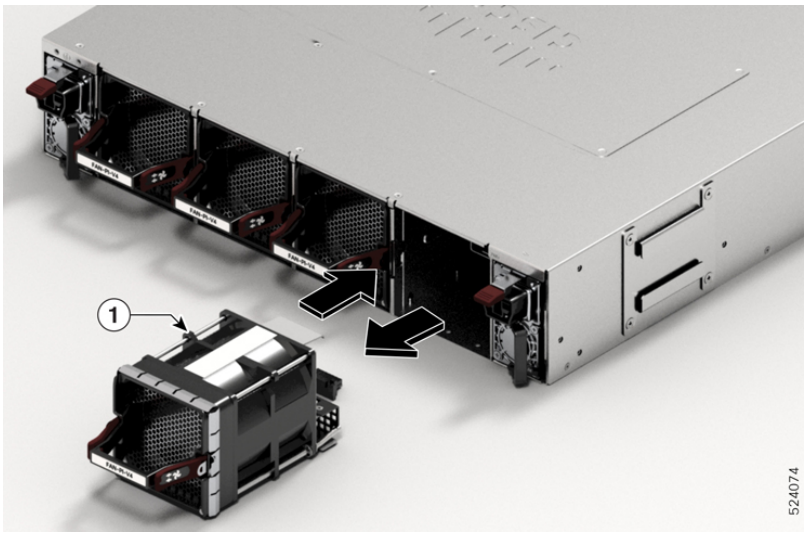
- The replacement fan module must have the same airflow direction as the other modules in the chassis.

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 two latches on the fan module and grasp the handle of fan module.




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.

| | |
|---|---|
| 1 | Latched Fan Module |

**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) 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.

c) 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.

## Removing an AC Power Supply

To remove an AC power supply, disconnect the power cable and remove the module from the chassis.

### Before you begin

- To replace a power supply during operations, there must be a functioning power supply providing power to the switch while you replace the other power supply. If there is only one power supply installed in the switch and you need to replace it, install the new power supply in the open slot and power it up before removing the original power supply.
- Ensure that the chassis is grounded. For grounding instructions, see Grounding the Chassis, on page 31.

### Procedure

**Step 1** Disconnect the power cord from the power receptacle on the power supply to be removed. Verify that the LED turns off.

**Note**
The LED might be on and amber colored. This indicates that the input power has been disconnected.

**Step 2** Remove the power supply from the chassis by pushing and holding its thumb latch to the left and pulling the power supply part way out of the chassis.

**Step 3** Place your other hand under the power supply to support it while you slide it out of the chassis.

Either place the power supply on an antistatic surface or pack it in its packing materials.

### What to do next

Install the replacement power supply.

## Removing an HVAC/HVDC 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** Remove the power cable from the power supply by pressing the tab of the Anderson Power SAF-D-Grid connector and pull the cable and connector out of the power supply.

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

**Step 2** Grasp the power supply handle while pressing the release latch towards the power supply handle.

**Step 3** Place your other hand under the power supply to support it while you slide it out of the chassis.

**Caution**
Do not touch the electrical connectors on the back side of the module. Prevent anything else from coming into contact with or damaging the connectors.

### What to do next

Install an HVAC/HVDC power supply in the open slot.

# Removing 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.

**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.

# Installing 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. (Do not mix AC and DC power supplies in the same switch.)

**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 Grounding the Chassis, on page 31.

### 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 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.

# Installing an HVAC/HVDC Power Supply

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

**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.

### Before you begin

- If you are using *n*+*n* power redundancy, there must be a separate power source for each power supply installed in the chassis. Power sources must be of the same type—do not mix AC and DC power sources for the same switch. 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 Grounding the Chassis, on page 31.

### 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 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. Slide it 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** Insert the power supply cord Anderson SAF-D-Grid connector into the power supply inlet. Ensure the connector is locked. Gently tug on the cord near the connector to ensure the locking tab is engaged.

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

**Step 5** If using an HVDC power source, turn on the circuit breaker for the DC power source connected to the power supply.

**Step 6** Verify that the power supply is operational by making sure that the power supply LED is green.

# Installing 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. 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 Grounding the Chassis, on page 31.

- 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

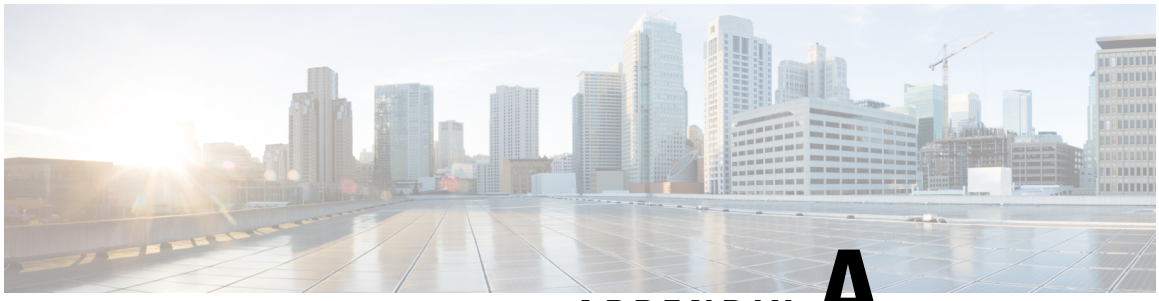
**Step 1** Holding the replacement power supply with one hand underneath the module and the other hand holding the handle, turn the power supply so that its release latch is on the side. Align the back end of the power supply (the end with the electrical connections) to the open power supply slot. Carefully 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.

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



APPENDIX A

# Rack Specifications


- Overview of Racks, on page 51
- General Requirements for Cabinets and Racks, on page 51
- Requirements Specific to Standard Open Racks, on page 52
- Requirements Specific to Perforated Cabinets, on page 52
- Cable Management Guidelines, on page 52


## Overview of Racks

Install the switch in these 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 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 52.

  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

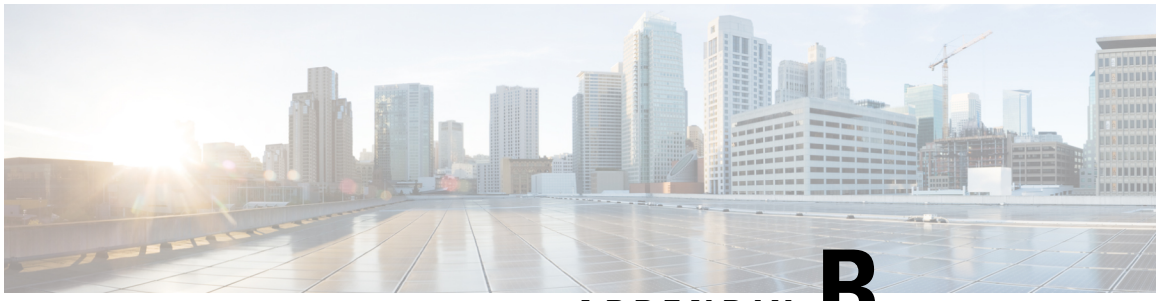
A perforated cabinet has perforations in its front and rear doors and side walls. Perforated cabinets must meet these requirements:

- 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, on page 53
- Switch Dimensions, on page 53
- Switch and Module Weights and Quantities, on page 54
- Transceiver and Cable Specifications, on page 54
- Switch Power Input Requirements, on page 54
- Power Specifications, on page 55
- Power Cable Specifications, on page 56
- Regulatory Standards Compliance Specifications, on page 58


## 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) |
| Relative humidity | Nonoperating | 5 to 95% |
| | Operating | 5 to 90% |
| Altitude | Operating | 0 to 13,123 feet (0 to 4,000 meters) |

## Switch Dimensions

| Switch | Width | Depth | Height |
|---|---|---|---|
| Cisco N93360YC-FX2 | 17.4 inches (44.2 cm) | 24.14 inches (61.31 cm) | 3.38 inches (8.59 cm) (2 RU) |

# Switch and Module Weights and Quantities

| Component | Weight per Unit | Quantity |
|---|---|---|
| Cisco N93360YC-FX2 Chassis (N9K-C93360YC-FX2) | 27.4 lb (12.4 kg) | 1 |
| Fan Module<br>– Port-side exhaust (blue) (NXA-FAN-160CFM-PE)<br>– Port-side intake (burgundy) (NXA-FAN-160CFM-PI) | —<br>1.3 lb (0.59 kg) | 3 |
| Power Supply module<br>– 1200-W AC port-side exhaust (blue) (NXA-PAC-1200W-PE)<br>– 1200-W AC port-side intake (burgundy) (NXA-PAC-1200W-PI)<br>– 1200-W HVAC/HVDC dual-direction (white) (N9K-PUV-1200W)<br>– 930-W DC port-side exhaust (blue) (NXA-PDC-930W-PE)<br>– 930-W DC port-side intake (burgundy) (NXA-PDC-930W-PI) | —<br>2.64 lb (1.2 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.

**Note** If you want to use optics that consume **5W or more power on all the 36 ports**, you must install 1100W power supplies.

| Switch | Typical Power Consumption (AC or DC) | Maximum Power Consumption (AC or DC) | Heat Dissipation Requirement |
|---|---|---|---|
| Cisco N93360YC-FX2 | 404 W | 900 W | 3070.928 BTUs per hour |

# Power Specifications

Power specifications include the specifications for each type of power supply module.

## 1200-W AC Power Supply Specifications

These specifications apply to the following 1200-W AC power supplies:

| Characteristic | Specification |
|---|---|
| AC input voltage | Nominal range: 100-120 VAC, 200-240 VAC |
| AC input frequency | Nominal range: 50 to 60 Hz (Range: 47-63 Hz) |
| Maximum AC input current | 10 A at 100-120 VAC<br>8 A at 200-240 VAC |
| Maximum output power per power supply | 800 W at 100-120 VAC<br>1200 W at 200-240 VAC |
| Maximum hold-up time | 12 ms at 650 W |
| Power supply output voltage | 12 VDC |
| Power supply standby voltage | 12 VDC |
| Efficiency rating | Climate Savers Platinum Efficiency (80Plus Platinum certified) |
| Form factor | RSP1 |

## 1200-W HVAC/HVDC Power Supply Specifications

These specifications apply to the N9K-PUV-1200W power supplies.

| Characteristic | Specification |
|---|---|
| Input voltage<br>• AC (for 1230 W output)<br>• DC (for 1230 W output) | • Nominal range: 100-240 Vac (Range: 90-264 Vac)<br>• Nominal range: 200-277 Vac (Range: 180-305 Vac)<br>• Nominal range: 240-380 Vdc (Range: 1204-400 Vdc) |
| AC input frequency | Nominal: 50 to 60 Hz (Range: 47-63 Hz) |

| Characteristic | Specification |
|---|---|
| Maximum AC input current | 10 A at 100 Vac |
| Maximum inrush current | 35 A (cold turn on); 70 A (hot turn on) |
| Maximum output Watts<br>• For 200 to 277 VAC<br>• For 192 to 400 VDC | Per power supply<br>• 1230 W<br>• 1230 W |
| Power supply output voltage<br>• For 200 to 277 VAC<br>• For 192 to 400 VDC | Per power supply<br>• 12 Vdc at 100 A<br>• 12 Vdc at 100 A |
| Power supply standby voltage | 12 V at 2.5 A |
| Efficiency rating | Climate Savers Platinum Efficiency (80Plus Platinum certified) |
| Form factor | RSP1 |

## 930-W DC Power Supply Specifications

These specifications apply to the NXA-PDC-930W power supplies.

| Characteristic | Specification |
|---|---|
| DC input voltage range | Nominal range: -48 to -72 Vdc nominal (Range: -40 to -60 Vdc |
| Maximum DC input current | 23 A at -48 Vdc |
| Maximum output power per power supply | 930 W |
| Maximum inrush current | 35 A (sub-cycle duration) |
| Maximum hold-up time | 8 ms at 930 W |
| Power supply output voltage | 12 Vdc |
| Power supply standby voltage | 12 Vdc |
| Efficiency rating | Greater than 92% at 50% load |
| Form factor | RSP1 |

# Power Cable Specifications

These sections show the power cables that you can order and use with this switch.

# Power Cable Specifications for AC Power Supplies

| Locale | 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 |

# HVAC/HVDC Power Cables Supported by ACI-Mode and NX-OS Mode Switches

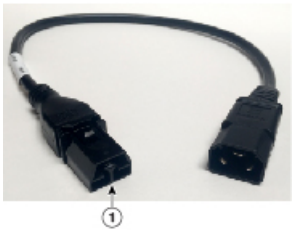
| Part Number | Cord Set Description | Photo |
|---|---|---|
| CAB-HVAC-SD-0.6M | HVAC<br>2-foot (0.6 m) cable with Saf-D-Grid and SD connectors<br>277V AC |  |
| CAB-HVAC-C14-2M | HVAC<br>6.6-foot (2.0 m) cable with Saf-D-Grid and C14 (use for up to 240 V) connector<br>250V AC |  |
| CAB-HVAC-RT-0.6M | HVAC<br>2-foot (0.6 m) cable with Saf-D-Grid and RT connector<br>277V AC |  |
| CAB-HVDC-3T-2M | HVDC<br>6.6-foot (2.0 m) cable with Saf-D-Grid and three terminal connectors<br>300V AC / 400V DC (+200/-200 V DC) |  |
| NO-POWER-CORD | All except Argentina, Brazil, and Japan<br>No power cord included with switch | Not applicable |

***Table 1: HVAC/HVDC Power Cables Callout Table***

| | |
|---|---|
| 1 | Connect this end to the power supply unit. |

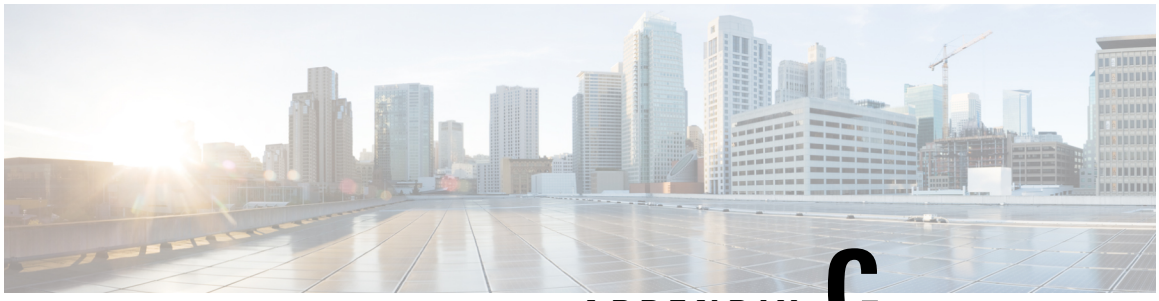
# Regulatory Standards Compliance Specifications

This table lists the regulatory standards compliance for the switch.

*Table 2: 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 | • CAN/CSA-C22.2 No. 60950-1 Second Edition<br>• CAN/CSA-C22.2 No. 62368-1-19 Third Edition<br>• ANSI/UL 60950-1 Second edition<br>• IEC 62368-1<br>• EN 62368-1<br>• AS/NZS 62368-1<br>• GB4943<br>• UL 62368-1 |
| EMC: Emissions | • 47CFR Part 15 (CFR 47) Class A<br>• AS/NZS CISPR22 Class A<br>• CISPR22 Class A<br>• EN55022 Class A<br>• ICES003 Class A<br>• VCCI Class A<br>• EN61000-3-2<br>• EN61000-3-3<br>• KN22 Class A<br>• CNS13438 Class A |
| EMC: Immunity | • EN55024<br>• CISPR24<br>• EN300386<br>• KN 61000-4 series |
| 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, on page 61
- Fan Module LEDs, on page 62
- Power Supply LEDs, on page 62


## 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.

| 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. |
| (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. |

| LED | Color | Status |
|---|---|---|
| (GPS) | Green | GPS interface provisioned and ports are turned on. ToD, 1PPS, 10MHz are all valid. |
| | Off | Either the interface is not provisioned, or the ports are not turned on. ToD, 1PPS, 10MHz are not valid. |

# Fan Module LEDs

| 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

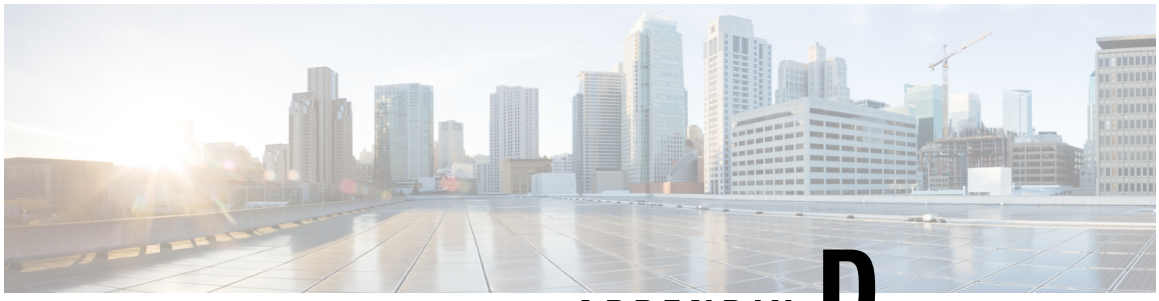
The power supply LEDs are located on the right portion of the power supply.

***Table 3: Power Supply LEDs***

| LEDs | Status |
|---|---|
| Off | The power supply is not functioning due to lack of input or output power. The input voltage is below the acceptable operating range. There is no 12 V standby from a parallel power supply unit. |
| Solid Amber | Failure (no output) or one of these possible conditions:<br>• AC input below operating range, but 12V standby power is being supplied from a parallel power supply unit,<br>• Over voltage,<br>• Over current,<br>• Over temperature, or<br>• OTP due to fan failure. |
| Blinking Amber (1 Hz) | Power supply is operating but a warning condition has occurred—possibly one of these conditions:<br>• High temperature,<br>• High power, or<br>• Slow fan. |

| LEDs | Status |
|---|---|
| Blinking Green (2 Hz) | Input is present and its voltage is within the operating range. The power supply is in standby mode due to PSON_L=High. |
| Blinking Green (1 Hz) | The power supply is Bootloading (startup mode).<br>**Note**<br>This applies only to NXA-PDC-2KW-PI and NXA-PDC-2KW-PE power supplies. |
| Solid Green | The power supply provides a regulated 12 V main output and a 12 V standby output. |

LEDs



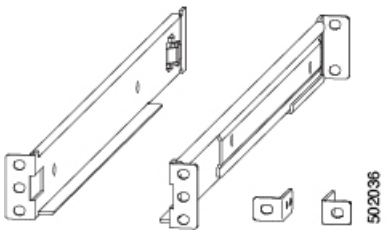
APPENDIX D

# Additional Kits


- Rack Mount Kit N9K-C9300-RMK, on page 65
- Vent Bracket, on page 65


## Rack Mount Kit N9K-C9300-RMK

The following table lists and illustrates the contents for the 2-RU rack-mount kit (N9K-C9300-RMK).

| Illustration | Description | Quantity |
|---|---|---|
|  | Rack-mount kit<br>• Bottom support rails (2)<br>• Front-mount brackets (2) | 1 |

## Vent Bracket

The following table lists and illustrates the vent bracket (NXA-ACC-BAV4).

**Note** You require the vent bracket (NXA-ACC-BAV4) for NEBS (Network Equipment-Building System) compliance only.

| Illustration | Description | Quantity |
|---|---|---|
|  | Vent bracket | 1 |