



Cisco Nexus 9364C-H1 ACI-Mode Switch Hardware Installation Guide

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Preface

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Audience

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

Documentation Conventions

Command descriptions use these conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
<i>Italic</i>	Italic text indicates arguments for which the user supplies the values.
[x]	Square brackets enclose an optional element (keyword or argument).
[x y]	Square brackets enclosing keywords or arguments separated by a vertical bar indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical bar indicate a required choice.
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
variable	Indicates a variable for which you supply values, in context where italics cannot be used.

Related Documentation

Convention	Description
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Examples use these conventions:

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

Related Documentation

The Application Centric Infrastructure documentation set includes these documents that are available on Cisco.com at this URL:

https://www.cisco.com/c/en/us/support/cloud-systems-management/application-policy-infrastructure-controller-apic/tsd_products-support-series-home.html

Web-Based Documentation

- *Cisco APIC Management Information Mode Reference*
- *Cisco APIC Online Help Reference*
- *Cisco APIC Python SDK Reference*
- *Cisco ACI Compatibility Tool*
- *Cisco ACI MIB Support List*

Downloadable Documentation

- *Knowledge Base Articles* (KB Articles) are available at this URL:
https://www.cisco.com/c/en/us/support/cloud-systems-management/application-policy-infrastructure-controller-apic/tsd_products-configuration-examples-fish.html
- *Cisco Application Centric Infrastructure Controller Release Notes*
- *Cisco Application Centric Infrastructure Fundamentals Guide*
- *Cisco APIC Getting Started Guide*
- *Cisco ACI Virtualization Guide*
- *Cisco APIC REST API User Guide*
- *Cisco APIC Command Line Interface User Guide*

- *Cisco APIC Faults, Events, and System Messages Management Guide*
- *Cisco ACI System Messages Reference Guide*
- *Cisco APIC Layer 4 to Layer 7 Services Deployment Guide*
- *Cisco ACI Firmware Management Guide*
- *Cisco ACI Troubleshooting Guide*
- *Cisco ACI Switch Command Reference, NX-OS Release 11.0*
- *Cisco Verified Scalability Guide for Cisco ACI*
- *Cisco ACI MIB Quick Reference*
- *Cisco Nexus CLI to Cisco APIC Mapping Guide*
- *Application Centric Infrastructure Fabric Hardware Installation Guide*
- *Cisco NX-OS Release Notes for Cisco Nexus 9000 Series ACI-Mode Switches*
- *Cisco Nexus 9000 Series ACI Mode Licensing Guide*
- *Cisco Nexus 93108TX-EX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93108TX-FX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93120TX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93128TX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93180LC-EX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93180YC-EX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 93180YC-FX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9332PQ ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9336PQ ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9372PX and 9372PX-E ACI-Mode Switches Hardware Installation Guide*
- *Cisco Nexus 9372TX and 9372TX-E ACI-Mode Switches Hardware Installation Guide*
- *Cisco Nexus 9396PX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9396TX ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9504 ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9508 ACI-Mode Switch Hardware Installation Guide*
- *Cisco Nexus 9516 ACI-Mode Switch Hardware Installation Guide*

Cisco Application Centric Infrastructure (ACI) Simulator Documentation

The Cisco ACI Simulator documentation is available at

<https://www.cisco.com/c/en/us/support/cloud-systems-management/application-centric-infrastructure-simulator/tsd-products-support-series-home.html>

- *Cisco ACI Simulator Release Notes*

- *Cisco ACI Simulator Installation Guide*
- *Cisco ACI Simulator Getting Started Guide*

Cisco Nexus 9000 Series Switches Documentation

The Cisco Nexus 9000 Series Switches documentation is available at

<https://www.cisco.com/c/en/us/support/switches/nexus-9000-series-switches/tsd-products-support-series-home.html>.

Cisco Application Virtual Switch Documentation

The Cisco Application Virtual Switch (AVS) documentation is available at

<https://www.cisco.com/c/en/us/support/switches/application-virtual-switch/tsd-products-support-series-home.html>.

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<https://www.cisco.com/warp/public/687/Directory/DirTAC.html>.

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CHAPTER 1

Overview

- [Overview, on page 1](#)

Overview

The Cisco Nexus 9364C-H1 switch (N9K-C9364C-H1) is a 2-rack unit (RU), fixed-port switch designed for spine-leaf-APIC deployment in data centers.

The software on this switch has 6.4T traffic-processing capability.

The switch has these ports:

- 64 100-Gigabit QSFP ports
- Two management ports (one RJ-45 port and one SFP port)
- One Console port
- One USB port



Note For ports 1 through 64, every 4 ports (1-4, 5-8, 9-12, and so on, referred to as a "quad"). This switch supports mixed speeds in quad form. That is, all 4 ports can operate in a mix of 10G, 40G, or 100G.

Port Considerations

These are the port considerations:

- For this switch, a "quad" is defined as four ports in a column, beginning in the top left row and moving straight down to the bottom row, in that same column. Four ports = 1 quad.
- 10G QSA + 40G+100G can be mixed in a quad.
- Access Breakout 4X10 and 4X25 are supported only on the first port of every quad (1,5,9,13....).
- With breakout on the first port, the other 3 ports in a quad are hardware-disabled.
- The last 2 ports (1/63-64) are reserved for the default fabric links. These ports will be used mostly for discovery considerations, documented here.

- Ports 61-62 can be converted to down-link ports but port 61 will not support breakout. That is because the bottom 3 ports (under 61) will be hardware disabled. This disrupts the discovery and connectivity to the fabric.
- The Media Access Control Security (MACsec) feature is supported only on the last 16 ports, or ports 49-64.

For breakout information, see the [Cisco APIC Layer 3 Networking Configuration Guide](#).

Leaf/Spine role considerations

Here are the leaf/spine role considerations:

- The default role of this switch is as a **leaf switch**.
- The default fabric links (1/49-64) must be used for initial switch discovery using another switch.
- To change the switch from the default role, do this: the node appears as a discovered device in the fabric inventory view, set the role of the switch (spine or leaf), and the switch automatically reboots to come up in the configured role.
- If you connect a default spine (i.e., a dual-role switch that by default is a **spine switch**, such as Nexus 9316D-GX) directly to an APIC, the change of the role to leaf switch is performed automatically by APIC, as well as the reboot. After that, the node appears in “Nodes pending registration.”
- Register the node.



Note

From ACI release 6.1(2) and later, you can change the role of any **undiscovered switch** before the switch is discovered using this CLI command:

```
(none) # acidiag setrole <leaf/spine>
```

```
This command will reboot the switch, Proceed? [y/N]
```



Note

The acidiag setrole <leaf/spine> command will NOT work if the switch has been discovered. You will see an error message.

For more information about using this CLI command, see the [Cisco APIC Getting Started Guide, Release 6.1\(x\)](#).

Discovery considerations

Here are the discovery considerations:

- Leaf discovery via APIC – Connect a fully-fit APIC to one of the default downlink ports (1-48).
- Leaf discovery via spine – Connect a discovered spine to one of the default fabric links (49-64).
- Spine discovery via leaf – Connect a discovered leaf to one of the default fabric links (49-64) then convert the switch to spine (reboot is required).
- Sub leaf discovery via leaf – Connect a discovered leaf to one of the default fabric links (49-64).

- Multi-Pod first spine discovery via IPN – Connect the IPN to one of the default fabric links (49-64). Ensure the spine has at least one leaf node connected to it.

This switch includes these user-replaceable components:

- Fan modules (four—three for operations and one for redundancy [n+1]) with these airflow choices:
 - Port-side exhaust fan module with blue coloring (NXAS-FAN-160CFM2-PE)
 - Port-side intake fan module with burgundy coloring (NXAS-FAN-160CFM2-PI)



Note

Table 1: Fan Speeds for this Switch

	Port-Side Intake Fan Speed %	Port-Side Exhaust Fan Speed %
Typical/Minimum	45%	45%
Maximum	80%	80%



Note

- When more than one fan module (two rotors) fails, a major alarm is raised and a graceful shut down is performed within two minutes, unless the fan module is restored.
- The switch functions normally when only one fan tray fails. If more than one fan tray fails, the switch issues a warning and powers down within two minutes.

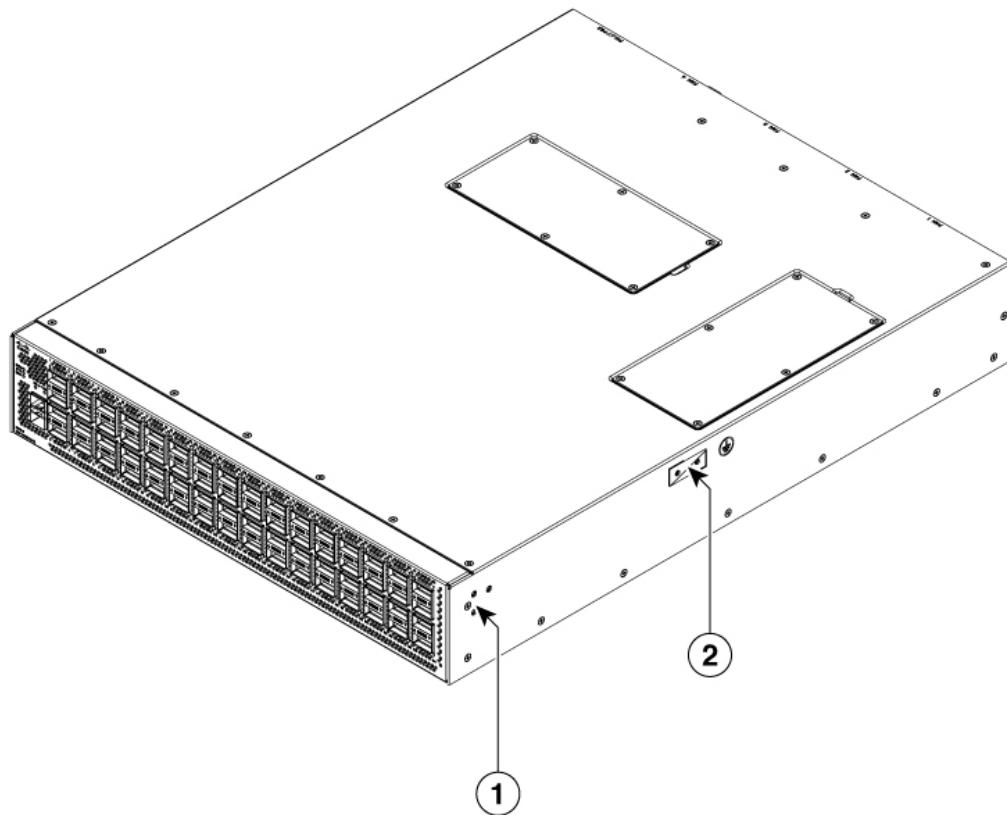
-
- Power supply modules (two—one for operations and one for redundancy [1+1]) with these choices:
 - 1400-W port-side exhaust AC power supply with blue coloring (NXA-PAC-1400W-PE)
 - 1400-W port-side intake AC power supply with burgundy coloring (NXA-PAC-1400W-PI)
 - 2000-W- HVAC/HVDC DC airflow power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



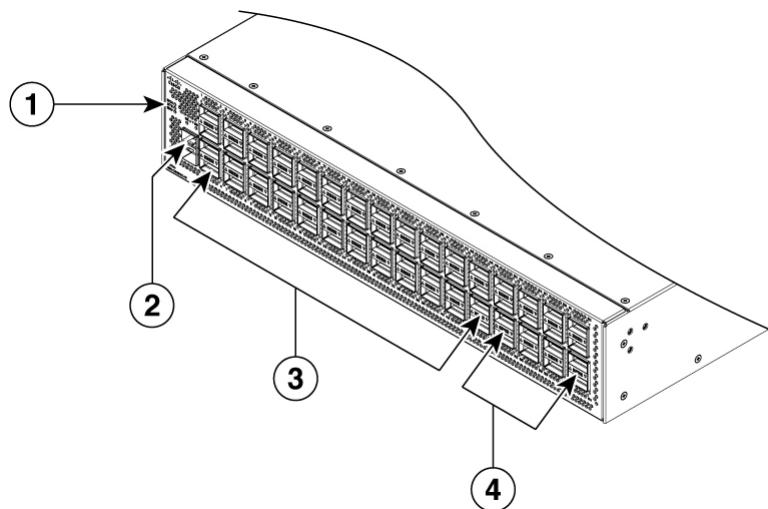
Note

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

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

**Table 2:**

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



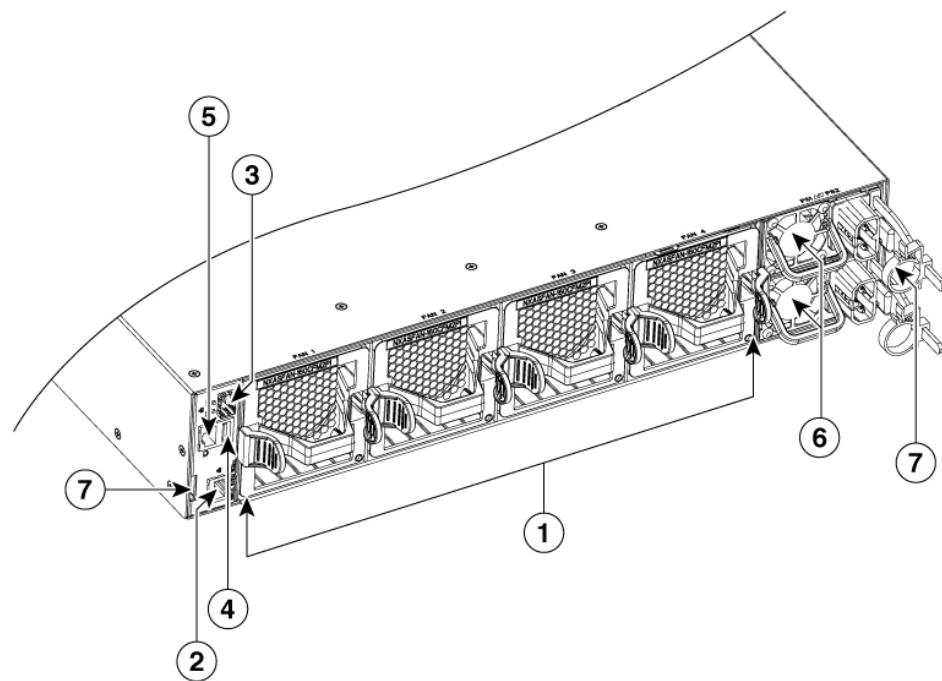
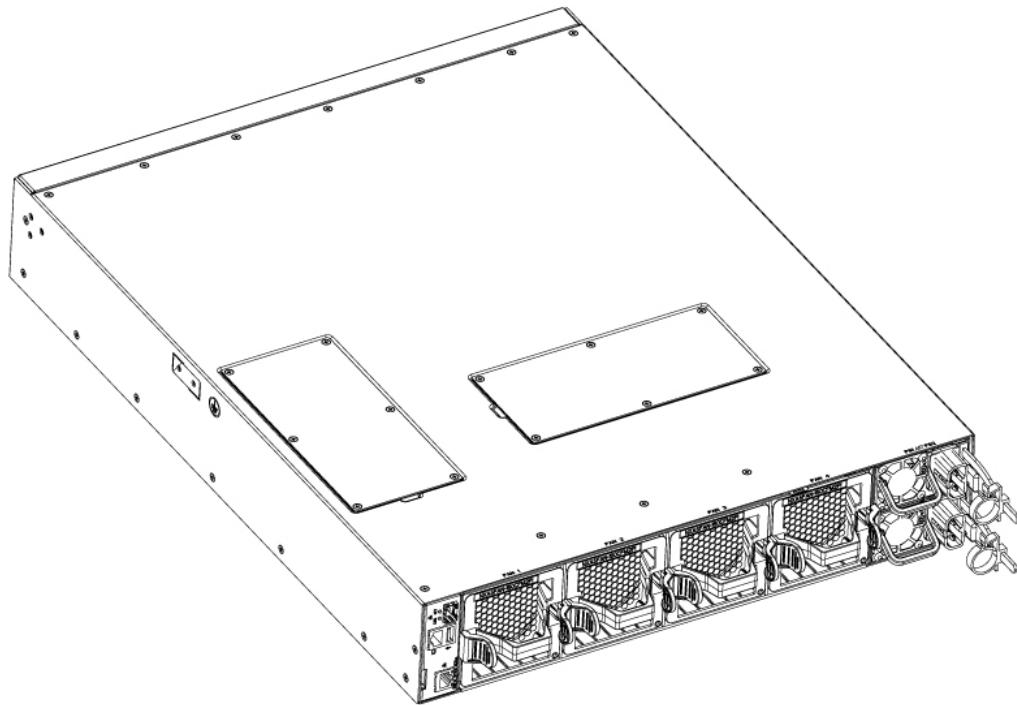
1	Beacon (BCN), Status (STS), and Environment (ENV) LEDs	3	40-/100-Gigabit QSFP28 ports (ports 1 to 48 in 4 rows of 12 ports)
2	1-/10-Gigabit SFP+ ports (2)	4	Green colored 100-Gigabit QSFP28 ports supporting MACsec (when software support is available) (ports 49 to 64 in 4 rows of 4 ports)



Note To secure QSFP-100G-SR1.2, QSFP-100G-SM-SR and QSFP-40/100-SRBD functionality and reliability, this switch can only support those type of optics on 1/3/4 row at max ambient 35°C for PSE airflow. For PSI airflow, there is no impact.

To determine which transceivers, adapters, and cables 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 (4) with slots numbered from 1 (left) to 4 (right)	5	Console port (1)
---	--	---	------------------

2	Management port (1—RJ-45 copper port)	6	Power supply modules (1 or 2) (AC power supplies shown) with slots numbered 1 (top) and 2 (bottom)
3	Management port (1—SFP optical port)	7	Notch on both sides of the chassis at the end for rack mount supporting.
4	USB port (1)		



Note The access panel for DIMM upgrade is located on the top side of the chassis and uses Phillips flat-head screws, M3 x 0.5 x 4 mm L, CSwZNwPAT,121'.

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.

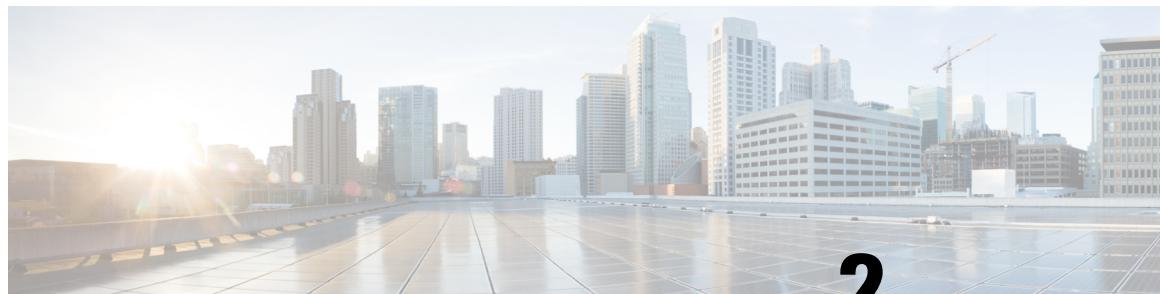
The fan and power supply modules are field replaceable. You can replace one fan module or one power supply module during operations, as long as the other modules are installed and operating. If you have only one power supply installed, install the replacement power supply in the open slot before removing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



Caution If the switch has port-side intake airflow (burgundy coloring for fan modules), locate the ports in the cold aisle. If the switch has port-side exhaust airflow (blue coloring for fan modules), 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

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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).

Humidity Requirements

Climate-controlled buildings 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).

For every 1000 feet (300 meters) elevation, the maximum ambient temperature is reduced by one degree Celsius.

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.

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) connection to the rack.

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 1400-W AC power supplies
- Two 2000-W DC power supplies
- Two 2000-W HVDC power supplies



Note For 1+1 redundancy, you must use two power sources and connect each power supply to a separate power source.



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

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



Note This Warning applies to low-voltage DC input application.



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 70A when the switch is powered with regular DC power supplies (rated 48-60VDC).
- Ensure that the protective devices are rated not greater than 15A when the switch is powered with HVDC power supplies (rated 240-380VDC).



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

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.



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.

Clearance Requirements

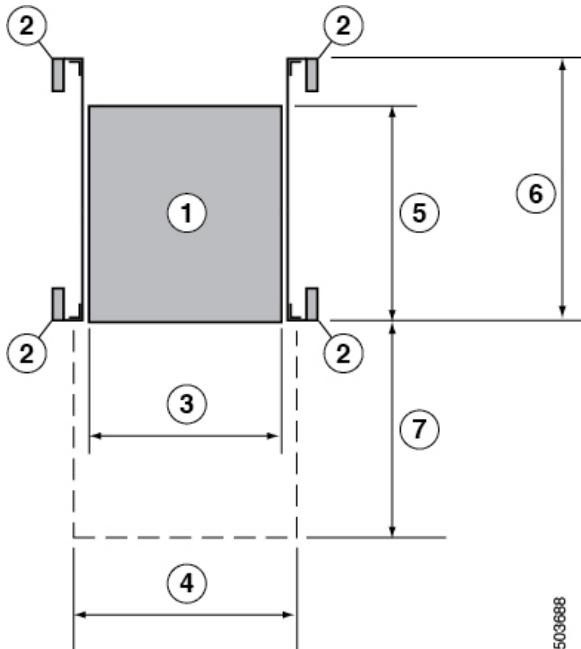
Provide the chassis with adequate clearance between the chassis and any other rack, device, or structure so that you can properly install the switch. Provide the chassis with adequate clearance to route cables, provide airflow, and maintain the switch. For the clearances required for an installation 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 36.0 in (91.4 cm)
3	Chassis width 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). 19.0 in (48.3 cm)		



Note

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



503688

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

Cautions and Regulatory Compliance Statements for NEBS

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:

RJ-45 Management Ethernet Port

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

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

Copper RJ-45 Ethernet Management port

**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:

RJ-45 Management Ethernet Port

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

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

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

This equipment is suitable for installations using the CBN.

**Note****Statement 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

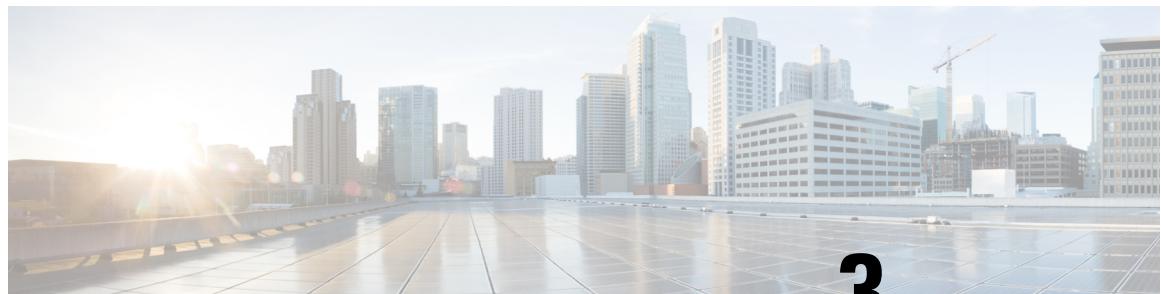
This equipment is suitable for installation in locations where the NEC applies.

**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

- Installation Options with Rack-Mount Kits, on page 17
- Install a Rack, on page 17
- Unpacking and Inspecting a New Switch, on page 18
- Planning How to Position the Chassis in the Rack, on page 19
- Installing the Switch using the NXK-ACC-RMK2-2RU Rack-Mount Kit, on page 20
- Grounding the Chassis, on page 26
- Starting the Switch, on page 28

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 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):
 - 1400-W AC power supply
 - Port-side exhaust AC power supply with blue coloring (NXA-PAC-1400W-PE)
 - Port-side intake AC power supply with burgundy coloring (NXA-PAC-1400W-PI)
 - 2000-W DC power supply
 - Port-side exhaust DC power supply with blue coloring (NXA-PDC-2KW-PE)
 - Port-side intake DC power supply with burgundy coloring (NXA-PDC-2KW-PI)
 - 2000-W HVAC/HVDC power supply
 - HVAC/HVDC DC airflow power intake with burgundy coloring (NXA-PHV-2KW-PI)
 - Four fan modules (all fan and power supply modules must have the same airflow direction)
 - Port-side exhaust airflow with blue coloring (NXASFAN-160CFM2PE)
 - Port-side intake airflow with burgundy coloring (NXASFAN-160CFM2PI)
 - Switch accessory kit

Step 2 Check the contents of the box for damage.

Step 3 If you notice any discrepancies or damage, send this information to your customer service representative by email:

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

Planning How to Position the Chassis in the Rack

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

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

Installing the Switch using the NXK-ACC-RMK2-2RU Rack-Mount Kit

- 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 these colorings:

- Red coloring on fan modules and AC power supplies
- Red coloring on 2000-W HVAC/HVDC power supplies (power supplies with their airflow direction set by the fan modules)
- Red coloring on DC power supply is also used for port-side-intake air flow.

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

- Blue coloring on fan modules and AC power supplies
- Blue coloring on DC power supplies
- Blue coloring on 2000-W HVAC/HVDC power supplies

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



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

Installing the Switch using the NXK-ACC-RMK2-2RU Rack-Mount Kit

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



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

Before you begin

- Inspect the switch shipment to ensure that you have everything ordered.
- Verify that the switch rack-mount kit includes these parts:
 - Rack-mount brackets (2)
 - Rack-mount front-mount brackets (2)

- Rack-mount slider rails (2)
 - Rack-mount retainer clips (2)
 - Phillips countersink screws (12)
 - Flat head screws M4 (6)
 - Flat head screws M3 (4)
- The rack is installed and secured to its location.

Procedure

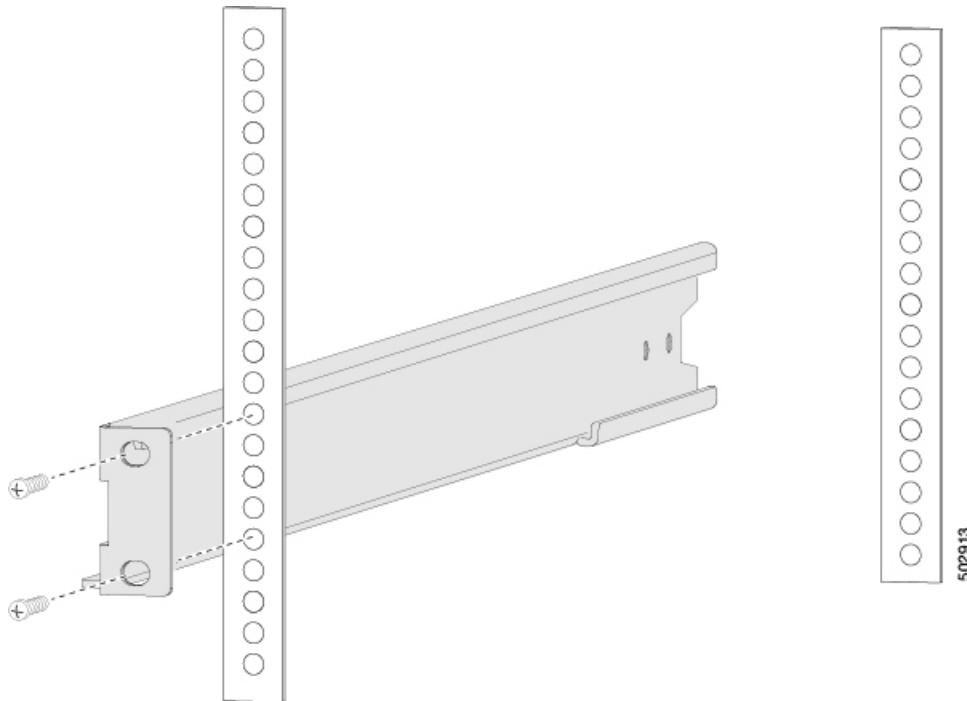
Step 1

Install two rack-mount brackets to the rack.

a) Determine which end of the chassis goes in the cold aisle:

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

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



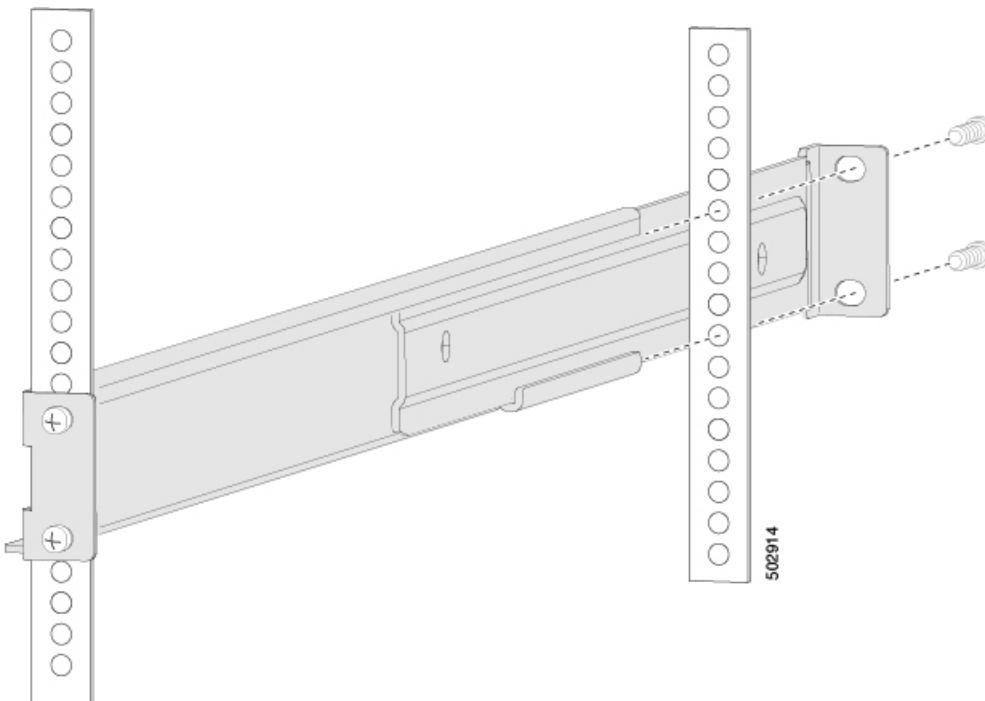
c) Repeat Step 1 for the other front rack-mount bracket on the other side of the rack and be sure to position that bracket horizontally to the same level as the first bracket.

Installing the Switch using the NXK-ACC-RMK2-2RU Rack-Mount Kit

Step 2 If you are not installing the chassis into a grounded rack, attach a customer-supplied grounding wire to the chassis as explained in [Grounding the Chassis, on page 26](#). If you are installing the chassis into a grounded rack, skip this step.

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

- Determine which two posts of the rack or cabinet you should use for the slider rails. Of the four vertical posts in the rack or cabinet, two will be used for the front mount brackets attached to the easiest accessed end of the chassis. The other two posts will have the slider rails.
- Position a slider rail at the desired level on the back side of the rack and slide it into the front-mount bracket already installed. Secure with 12-24 screws or 10-32 screws, depending on the rack thread type (see the figure). Tighten 12-24 screws to 30 in-lb (3.39 N·m) of torque. Tighten 10-32 screws to 20 in-lb (2.26 N·m) of torque.

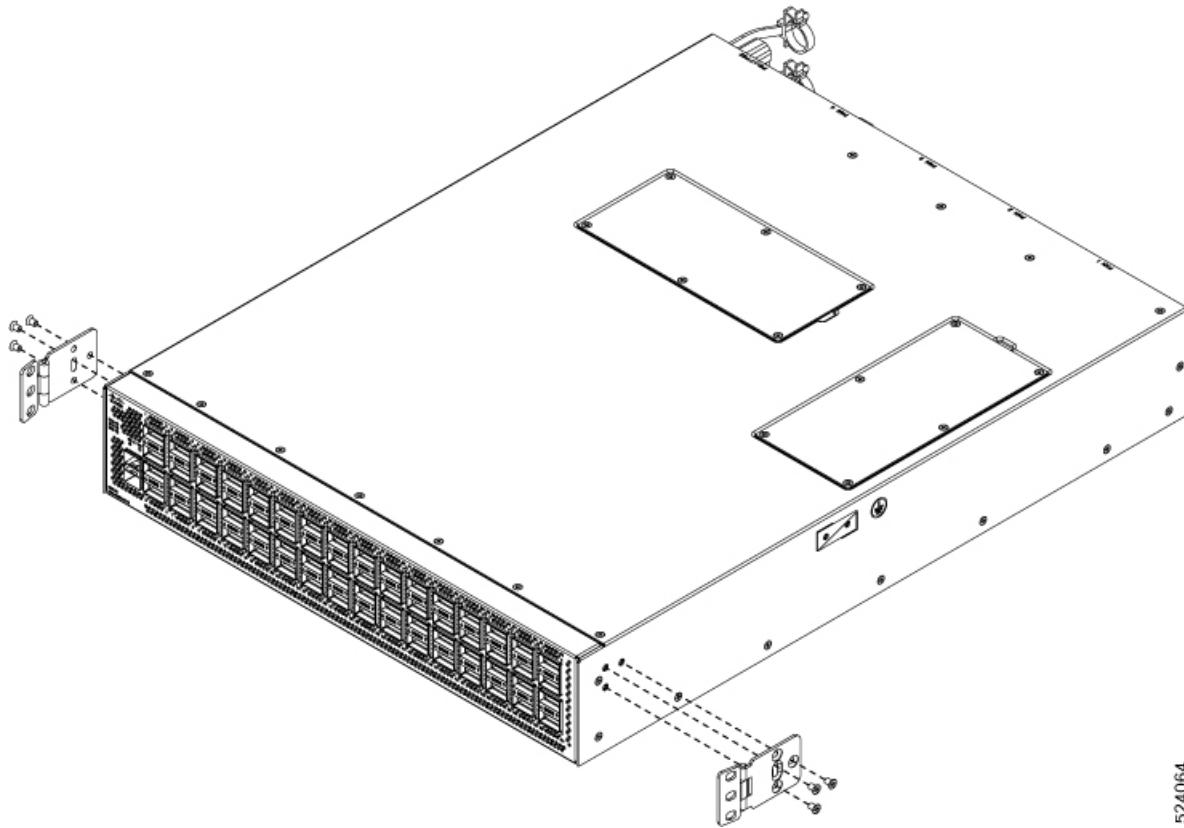


- Repeat Step 3 to attach the other slider rail to the other side of the rack.

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

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

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

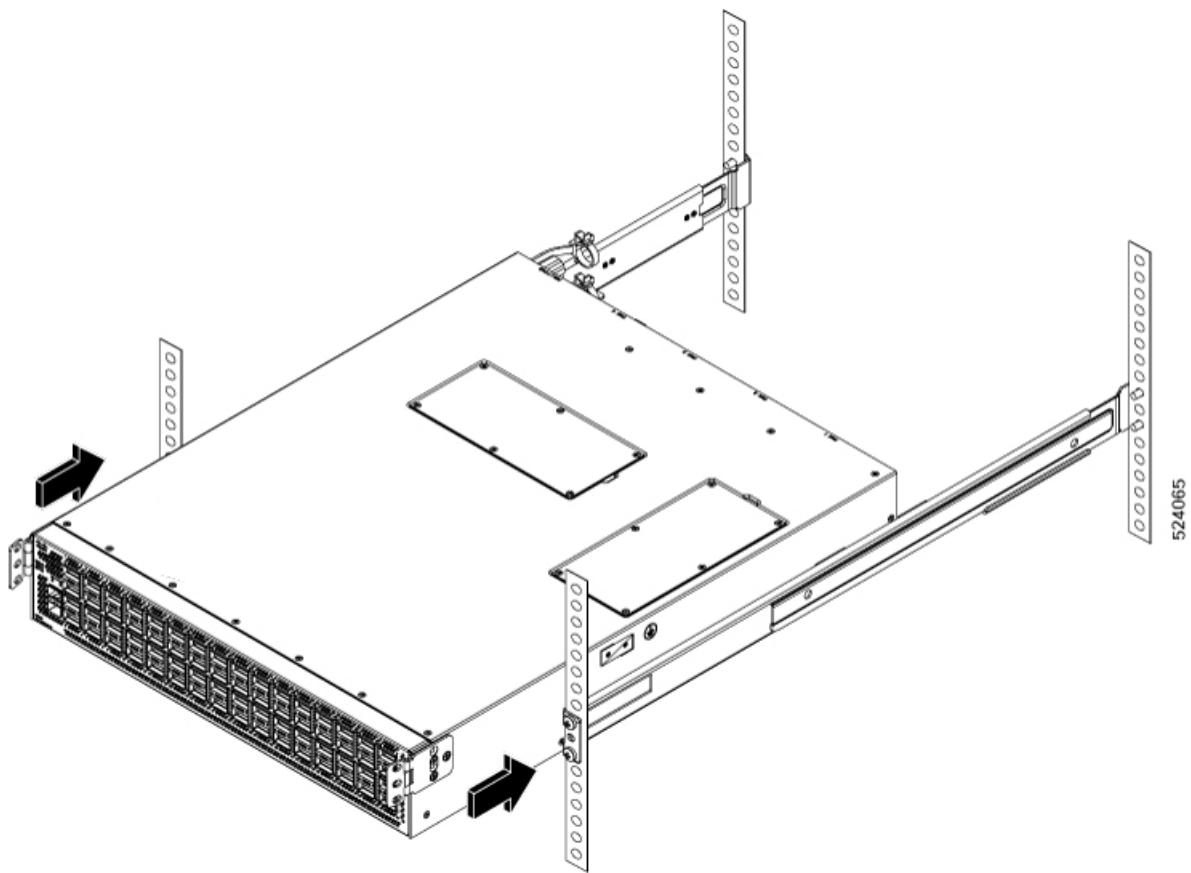


- b) Use three M4 x 6 mm screws to attach the bracket to the chassis. Tighten each screw to 11 to 15 in-lb (1.2 to 1.7 N·m).
- c) Repeat Steps 4 to attach the second front mount bracket to the other side of the chassis.

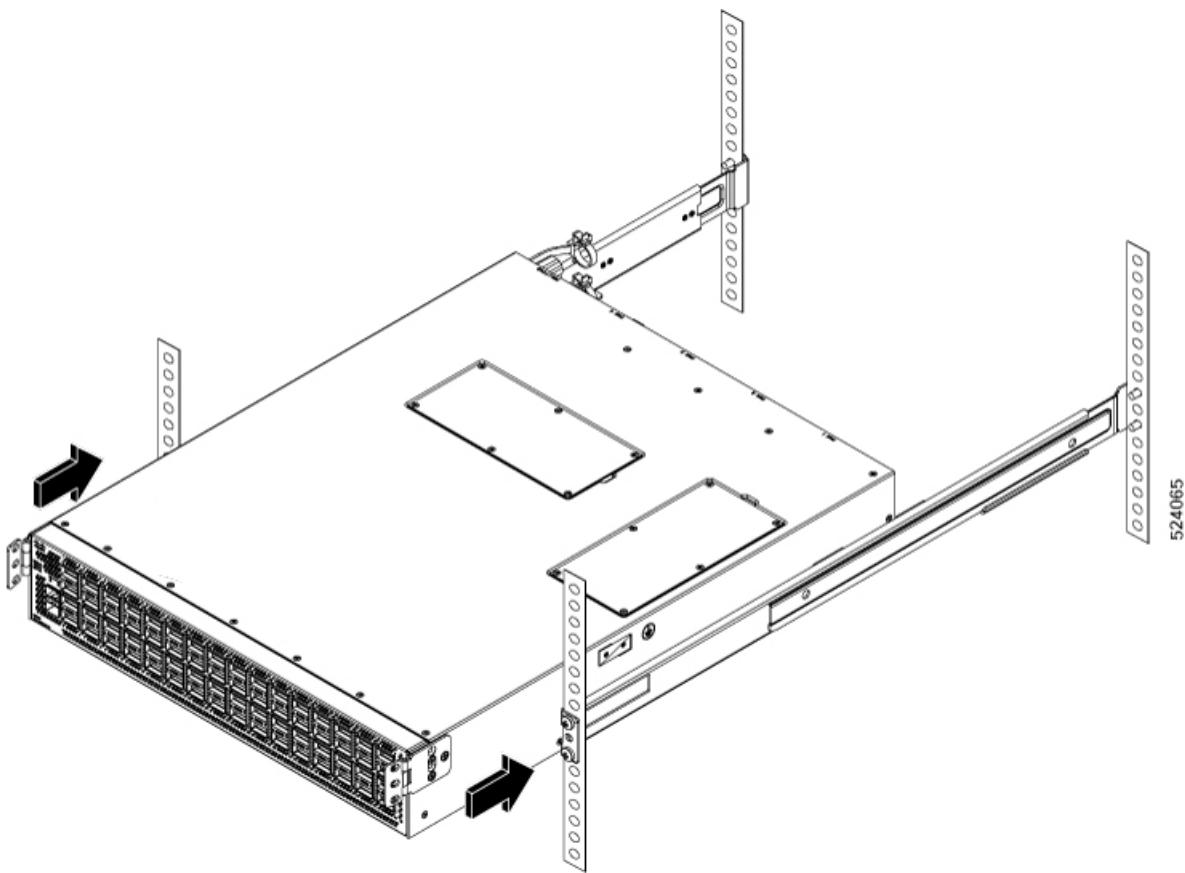
Step 5

Insert the switch into the rack and attach it.

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

Installing the Switch using the NXK-ACC-RMK2-2RU Rack-Mount Kit

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



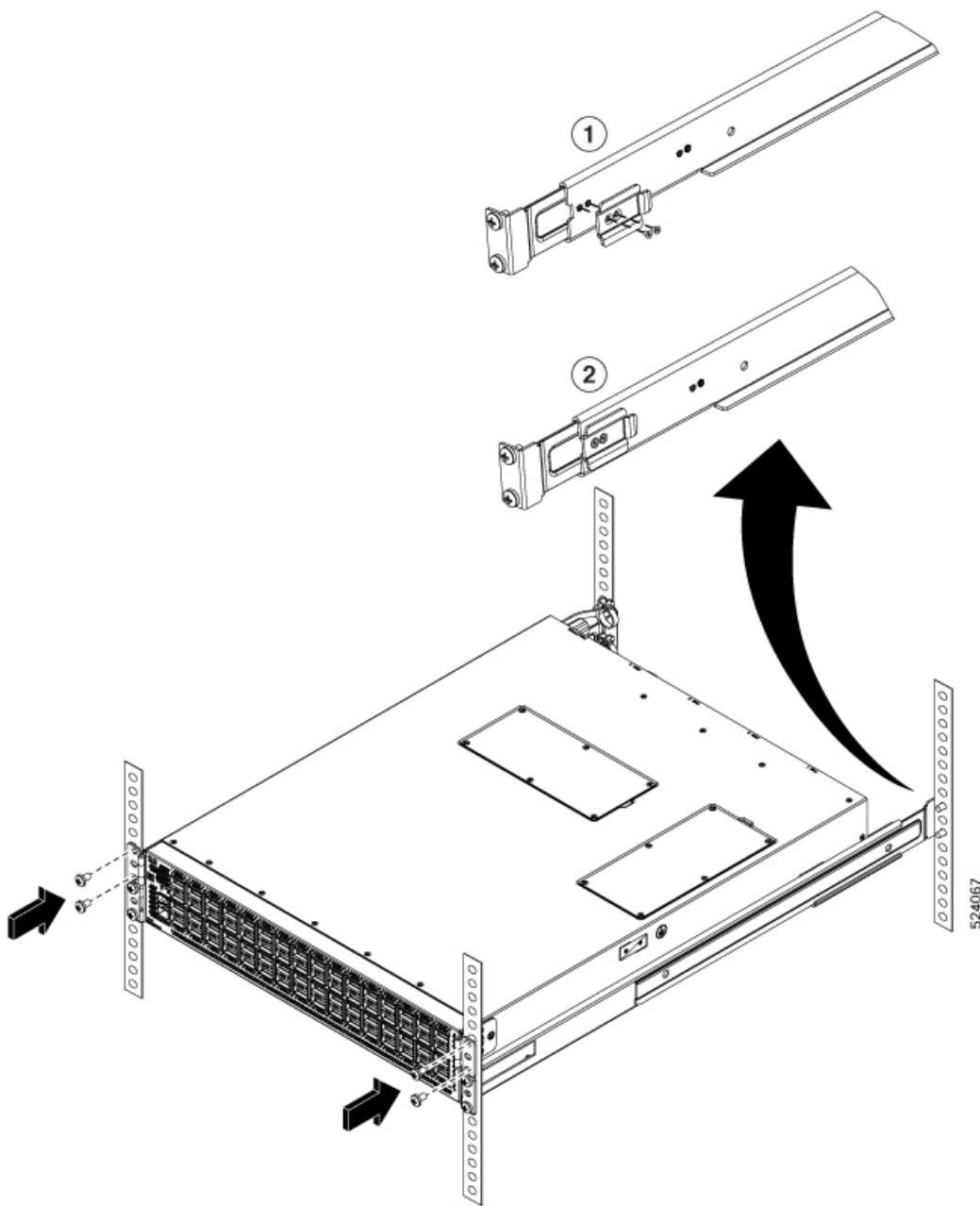
- a) Tighten the 10-32 screws to 20 in-lb (2.26 N·m) or tighten the 12-24 screws to 30 in-lb (3.39 N·m).
- b) Repeat Step 6 to attach the other front mount bracket on other side of the chassis.

Step 7

Insert the retainer clip to hold the chassis in place.

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

Grounding the Chassis



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

Step 8

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

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 chassis provides grounding.

Ground the rack if using AC power supplies. The power cord for AC power supplies provides the chassis grounding.

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

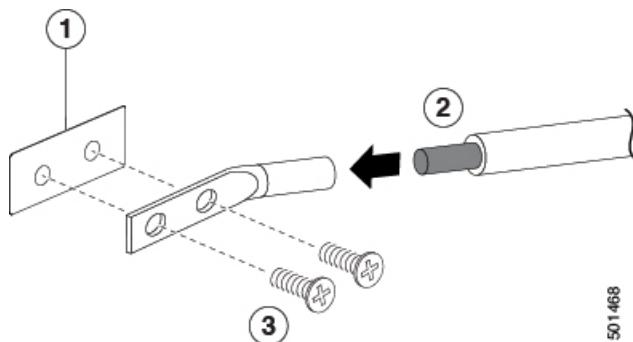
Before you can ground the chassis, connect to earth ground of the data center building.

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).

Starting the Switch



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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.

Starting 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 this:

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

Step 2 For any HVAC/HVDC power supply, connect it to a power source like this:

- a) Using the recommended high voltage power cable for your country or region, connect the Anderson Power Saf-D-Grid connector on the power cable to the power receptacle on the power supply. Make sure that the connector clicks when fully pushed into the receptacle.
- b) Connect the other end of the power cable to a power source.
 - When connecting to an HVAC power source, insert the plug in a receptacle for the HVAC power source.
 - When connecting to an HVDC power source, do this:
 1. Verify that the power is turned off at a circuit breaker for the power source terminals.
 2. Remove the nuts from each of the terminal posts for the power source.
 3. Place the power cable ground-wire terminal ring on the ground terminal for the power source and secure them with a terminal nut.
 4. Place the power cable negative-wire terminal ring on the negative terminal for the power source and secure them with a terminal nut.
 5. Place the power cable positive-wire terminal ring on the positive terminal for the power source and secure them with a terminal nut.
 6. If there is a safety cover for the power source terminals, place and secure it over the terminals.
 7. Turn on the power at the power source circuit breaker.

Step 3 For any LVDC power supply, do this:

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

Step 4 Verify that the power supply LED is on and green.

Step 5 Listen for the fans; they should begin operating when the power supply is powered.

Step 6 After the switch boots, verify that these LEDs are lit:

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

Starting the Switch

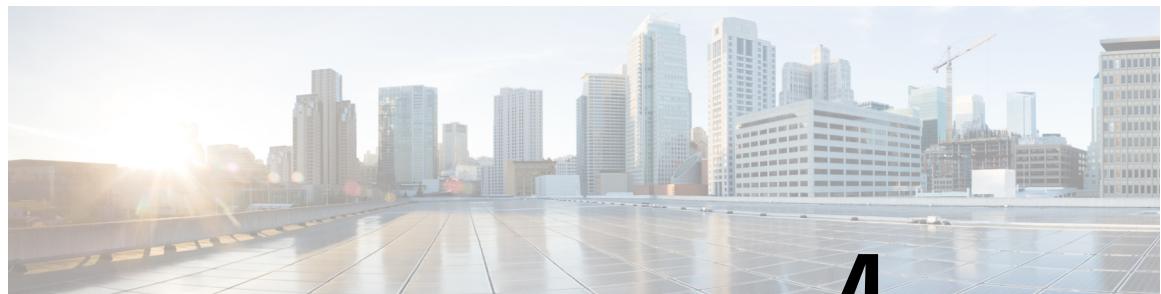
If a fan module Status LED is not green, try reinstalling the fan module.

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

Step 7

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

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



CHAPTER 4

Connecting the Switch to the ACI Fabric

- [ACI Fabric Topology, on page 31](#)
- [Preparing to Connect to Other Devices, on page 32](#)
- [Connecting Leaf Switches to APICs, on page 33](#)
- [Connecting Leaf Switches to Spine Switches, on page 35](#)
- [Replacing an Existing Switch in the ACI Fabric, on page 36](#)
- [Setting Up an Optional Console Interface, on page 36](#)
- [Setting Up an Optional Management Connection, on page 37](#)
- [Maintaining Transceivers and Optical Cables, on page 37](#)

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](#))

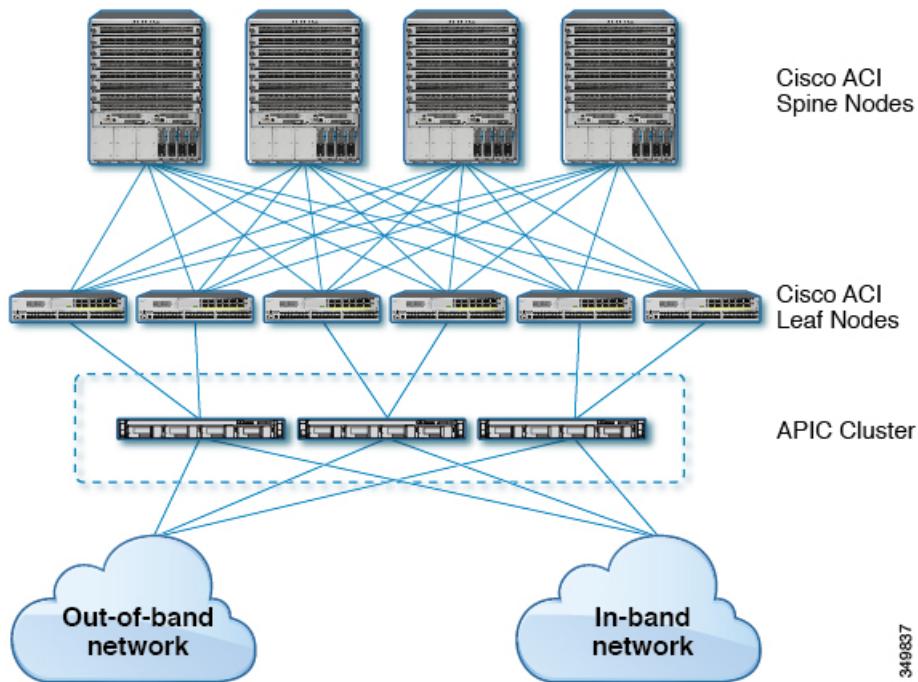
For additional information, please see the [Cisco APIC Installation, Upgrade, and Downgrade Guide](#).



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 1: Connections Between APIC Clusters, Leaf Nodes, and Spine Nodes



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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 Nexus 9408 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 Nexus 9300 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 Nexus 93108TC-FX switch).
- The **VIC 1225** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco Nexus 93600CD-GX switch).
- The **VIC 1455** module supports optical transceivers, optical cables, and switches with optical downlink ports (such as: Cisco Nexus 93600CD-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-AOCxM [where $x=1, 3, 5, 7$ for lengths in meters])
 - Cisco SFP+ Twinax Cables (SFP-H10GB-CUxM [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-AOCxM [where $x=1, 2, 3, 5, 7$, or 10 for lengths in meters])
 - Cisco SFP+ Twinax Cables (SFP-H10GB-CUxM [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)

**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.

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.

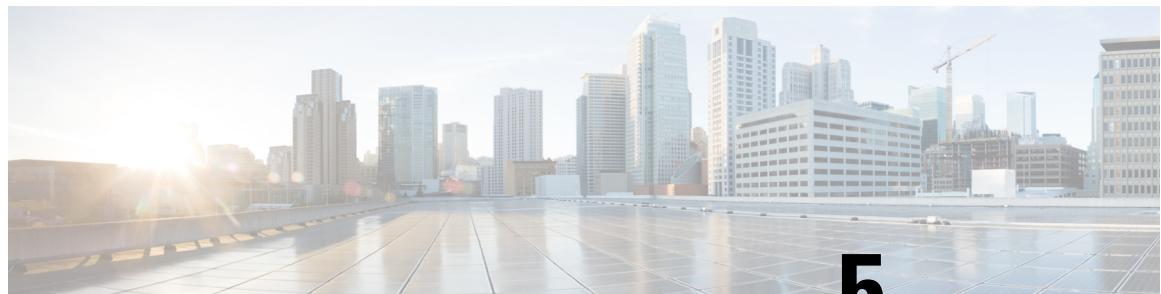
Consider these maintenance guidelines:

- 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 39
- Replacing a Power Supply Module, on page 41
- Installing and Removing Small-Form Pluggable Modules, on page 46
- Install and Remove OSFP/QSFP Transceiver Modules, on page 47
- Attaching the Optical Network Cable, on page 49
- Removing the Transceiver Module, on page 50

Replacing a Fan Module During Operations

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

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

Before you begin

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

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

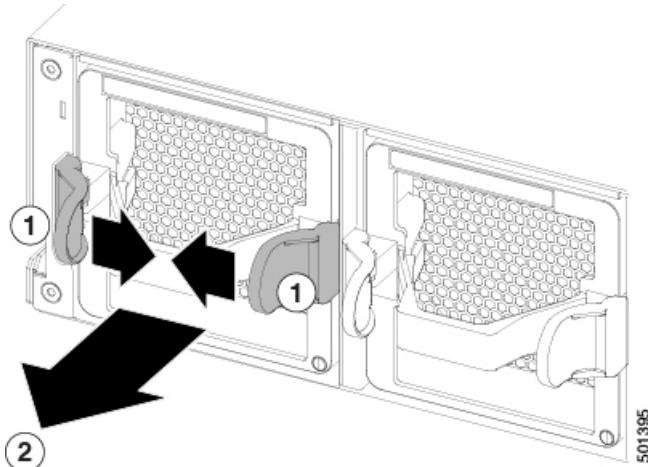
If you must replace the fan module during operations and the above conditions are not met, leave the fan module that you need to replace in the chassis to preserve the designed airflow until you have the required module.

Procedure

Step 1

Remove the fan module that you need to replace.

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



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

- 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.
- As you press the latches, pull the fan module fully out of the chassis.
- Place the removed module on an antistatic surface or in an antistatic bag. If possible, repack the module in its packing materials for safe shipping or storage.

Step 2

Use these steps to replace the missing fan module within two minutes to avoid a shutdown.

- 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.

- Verify that you have the right fan module for the chassis. The correct fan module has one of these part numbers:
 - NXASFAN-160CFM2PE (port-side exhaust airflow direction and a blue stripe)
 - NXASFAN-160CFM2PI (port-side intake airflow direction and a red stripe)

Note

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

- Position the fan module in front of the open fan slot (be sure that the backside of the module with the electrical connectors is positioned to enter the slot first) and slide the module all the way into the chassis until its front side

comes in contact with the chassis. For the last 0.2 inches (0.5 cm), carefully mount the module onto the chassis connectors by pushing more firmly, but do not force the module if it does not move further (excessive force can damage the connectors).

Note

If you are not able to push the module all the way into the slot, carefully slide the module out of the slot and check its electrical connectors for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat this step to reinstall the module.

- d) Verify that the STS LED turns on and becomes green.

If the STS LED does not turn on, slide the module out of the chassis, and visually check the electrical connectors on the back side of the chassis for damage. If damaged, contact Cisco Technical Assistance for help. If undamaged, repeat the previous step to reinstall the module.

Replacing a Power Supply Module

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

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

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 26](#).

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.

■ Removing an HVAC/HVDC Power Supply

- 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.

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

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

Step 4 Pull the power supply out of the bay.

What to do next

Install a DC power supply in the open slot.

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.) A mix of AC and DC power supplies in the same switch are supported for hot swapping purposes within a time limit of 15 minutes



Note

HVAC/HVDC power supply with red coloring have the same port-side intake airflow direction as the power supplies with red coloring . 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 26](#).

Procedure

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

Note

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

Step 2

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

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

Step 3

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

Step 4

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

Step 5

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

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 26](#).

Procedure

Step 1

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

Note

If the power supply does not fit into the open slot, turn the module over. 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

This topic is for installing the 48-V DC power supply into the switch chassis.

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

Before you begin

- The circuit breaker for the DC power source for the power supply must be turned off.
- The power supply that you are installing must be capable of using the same airflow direction as the fan trays installed in the same switch.
- A DC power source must be within reach of the power cable that will be used with the replacement power supply. If you are using $n+n$ power redundancy, there must be a separate power source for each power supply installed in the chassis. A mix of AC and DC power supplies in the same switch are supported for hot swapping purposes within a time limit of 15 minutes. Otherwise, only one power source is required.
- There must be an earth-ground connection to the chassis that you are installing the replacement module. Typically, the chassis is grounded by its metal-to-metal connection to a grounded rack. If you need to ground this chassis by another means, see [Grounding the Chassis, on page 26](#).
- All DC power supplies have reverse polarity protection. When you inadvertently connect the input power (+) to the DC PSU's – terminal and the input power – to the DC PSU's (+) terminal, the PSU will not be damaged and will operate fine after the input power feeds are correctly wired.

Procedure

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

Note

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

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

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

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

Installing and Removing Small-Form Pluggable Modules

Before you begin

See the Cisco Nexus 9364C-H1 switch [datasheet on cisco.com](#) for a list of supported SFP and SFP+ modules. Use only supported SFP/SFP+ modules on the platform.



Warning Statement 1008—Class 1 Laser Product

This product is a Class 1 laser product.



Note

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

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

SUMMARY STEPS

1. Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
2. Find the send (TX) and receive (RX) markings that identify the top of the SFP/SFP+ module.
3. If the SFP/SFP+ module has a bale-clasp latch, move it to the open, unlocked position.
4. Align the module in front of the slot opening and push until you feel the connector snap into place.
5. If the module has a bale-clasp latch, close it to lock the SFP/SFP+ module in place.
6. Remove the SFP and SFP+ dust plugs and save.
7. Connect the SFP and SFP+ cables.

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.	
Step 2	Find the send (TX) and receive (RX) markings that identify the top of the SFP/SFP+ module.	On some SFP/SFP+ modules, the send and receive (TX and RX) markings might be shown by arrows that show the direction of the connection.
Step 3	If the SFP/SFP+ module has a bale-clasp latch, move it to the open, unlocked position.	
Step 4	Align the module in front of the slot opening and push until you feel the connector snap into place.	
Step 5	If the module has a bale-clasp latch, close it to lock the SFP/SFP+ module in place.	
Step 6	Remove the SFP and SFP+ dust plugs and save.	
Step 7	Connect the SFP and SFP+ cables.	

Install and Remove OSFP/QSFP Transceiver Modules

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

Installing the Transceiver Module


Warning
Statement 1079—Hot Surface

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


Caution

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

**Caution**

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

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

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

**Caution**

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

Before you begin**Required Tools and Equipment**

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

Procedure

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

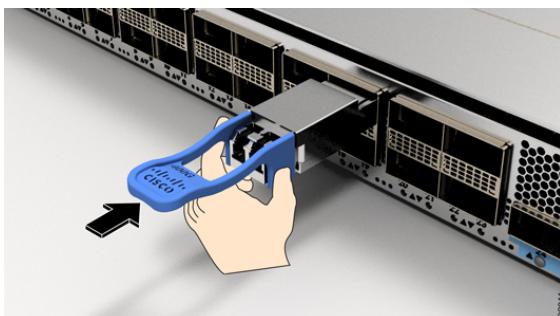
Step 2 Remove the transceiver module from its protective packaging.

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

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

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

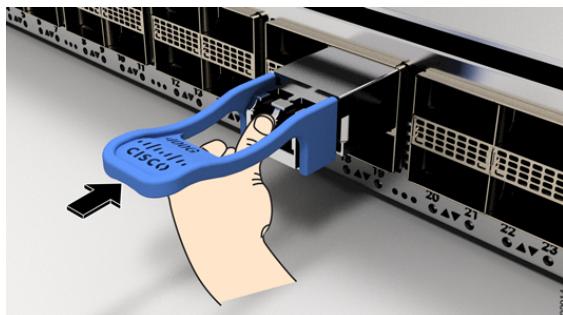
Figure 2: Installing the QSFP Transceiver Module



Step 6

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

Figure 3: Seating the QSFP Transceiver Module



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

Attaching the Optical Network Cable

Before you begin

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

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



Note

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

Procedure

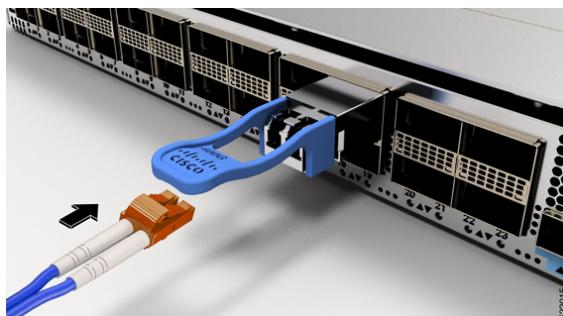
Step 1

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

Removing the Transceiver Module**Step 2**

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

Figure 4: Cabling a Transceiver Module



Removing the Transceiver Module



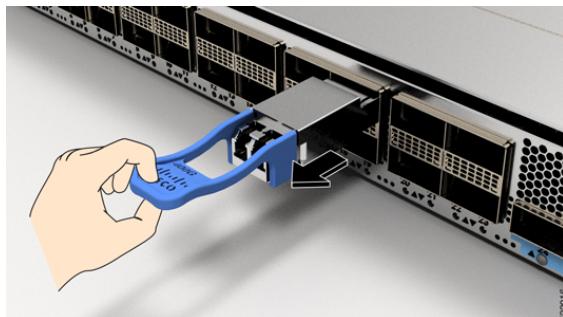
Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

To remove a transceiver module, use these steps:

Procedure

- Step 1** Disconnect the network interface cable from the transceiver connector.
- Step 2** Install the dust plug immediately into the transceiver's optical bore.
- Step 3** Grasp the pull-tab and gently pull to release the transceiver from the socket.

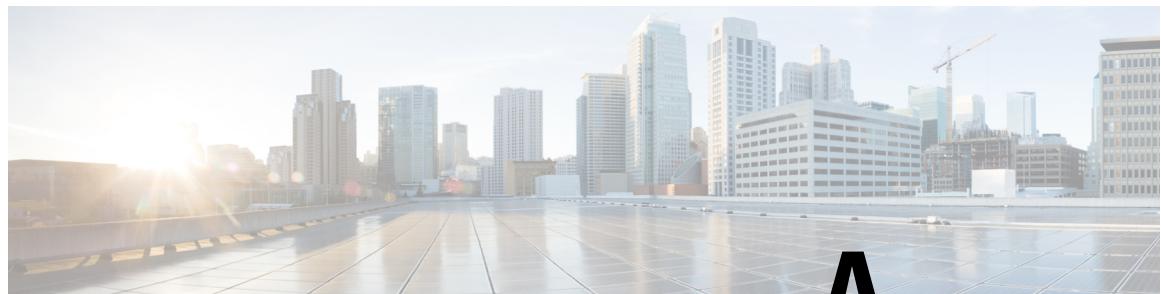
Figure 5: Removing the QSFP Transceiver Module

**Step 4**

Slide the transceiver out of the socket.

Step 5

Place the transceiver module into an antistatic bag.



APPENDIX A

Rack Specifications

- [Overview of Racks, 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.

Requirements Specific to Standard Open Racks

- 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

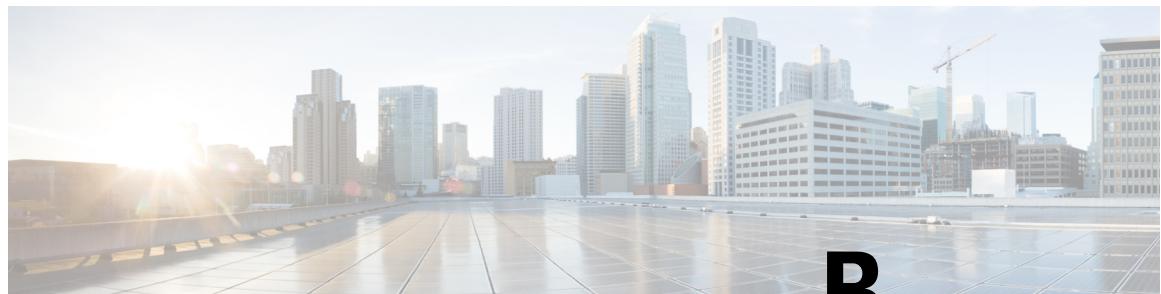
A perforated cabinet has perforations in its front and rear doors and side walls. Perforated cabinets must meet these requirements:

- 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 53
- Transceiver and Cable Specifications, on page 54
- Switch Power Input Requirements, on page 54
- Power Specifications, on page 54
- Power Cable Specifications, on page 56
- Regulatory Standards Compliance Specifications, on page 58

Environmental Specifications

Switch Dimensions

Switch	Width	Depth	Height
Cisco Nexus 9364C-H1	17.41 inches (44.23 cm)	22.27 inches (56.58 cm)	3.4 inches (8.6 cm) (2 RU)

Switch and Module Weights and Quantities

Component	Weight per Unit	Quantity
Cisco Nexus 9364C-H1 Chassis (N9K-C9364C-H1)	44 lb (20 kg)	1
Fan Module	—	4
– 2 Port-side exhaust (blue) (NXASFAN-160CFM2PE)	1.3 lb (0.59 kg)	
– 2 Port-side intake (red) (NXAS-FAN-160CFM2PI)	1.3 lb (0.59 kg)	

Component	Weight per Unit	Quantity
Power Supply module	—	2 (1 for operations and 1 for redundancy)
– 1400-W AC port-side exhaust (blue) (NXA-PAC-1400W-PE)	2.64 lb (1.2 kg)	
– 1400-W AC port-side intake (red) (NXA-PAC-1400W-PI)	2.64 lb (1.2 kg)	
– 2000-W HVAC/HVDC port intake (red) (NXA-PHV-2KW-PI)	2.42 lb (1.1 kg)	
– 2000-W DC port-side exhaust (blue) (NXA-PDC-2KW-PE)	2.42 lb (1.1 kg)	
– 2000-W DC port-side intake (red) (NXA-PDC-2KW-PI)	2.42 lb (1.1 kg)	

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.

Switch	Typical Power Consumption (AC or DC)	Maximum Power Consumption (AC or DC)	Heat Dissipation Requirement
Cisco Nexus 9364C-H1	605 W	1100 W	4248.116 BTUs per hour

Power Specifications

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

1400-W AC Power Supply Specifications

Property	Specification
Power	1400 W

Property	Specification
Input Voltage Range	100 VAC to 127 VAC 200 VAC to 240 VAC
Frequency	50 to 60 Hz
Efficiency	90% or greater (20 to 100% load)
Output Power	1,000W/36W 1,450W/36W
Redundancy Modes	1+1
RoHS Compliance	Yes
Hot Swappable	Yes

2000-W HVAC/HVDC Power Supply Specifications

These specifications apply to the NXA-PHV-2KW power supplies.

Property	Specification
Power	2000 W
Input Voltage Range	200 to 277 VAC 240 VDC to 380 VDC
Output Power	2000W (36W standby)
Frequency	50 to 60 Hz (200 to 277 VAC)
Efficiency	90% or greater (20 to 100% load)
Redundancy Modes	1+1
RoHS Compliance	Yes
Hot Swappable	Yes

2000-W DC Power Supply Specifications

These specifications apply to the NXA-PDC-2KW power supplies.

Property	Specification
Power	2000 W
Input Voltage Range	Nominal: -48 to -60 VDC
Frequency	-

Property	Specification
Efficiency	90% or greater (20 to 100% load)
Output Power	2000W (36W standby)
Redundancy Modes	1+1
RoHS Compliance	Yes
Hot Swappable	Yes

Power Cable Specifications

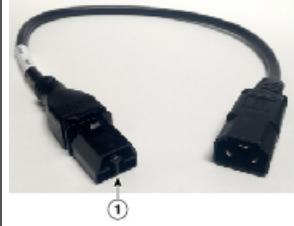
These sections show the power cables that you can order and use with this switch.

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)

Locale	Power Cord Part Number	Cord Set Description
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 2-foot (0.6 m) cable with Saf-D-Grid and SD connectors 277V AC	
CAB-HVAC-C14-2M	HVAC 6.6-foot (2.0 m) cable with Saf-D-Grid and C14 (use for up to 240 V) connector 250V AC	
CAB-HVAC-RT-0.6M	HVAC 2-foot (0.6 m) cable with Saf-D-Grid and RT connector 277V AC	
CAB-HVDC-3T-2M	HVDC 6.6-foot (2.0 m) cable with Saf-D-Grid and three terminal connectors 300V AC / 400V DC (+200/-200 V DC)	

Part Number	Cord Set Description	Photo
NO-POWER-CORD	All except Argentina, Brazil, and Japan No power cord included with switch	Not applicable

Table 3: HVAC/HVDC Power Cables Callout Table

1	Connect this end to the power supply unit.
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DC Power Cable Specifications

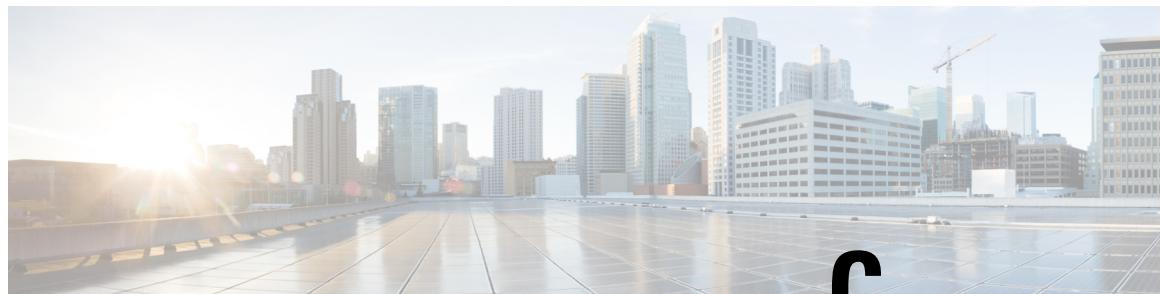
Regulatory Standards Compliance Specifications

This table lists the regulatory standards compliance for the switch.

Table 4: 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	<ul style="list-style-type: none"> • CAN/CSA-C22.2 No. 60950-1 Second Edition • CAN/CSA-C22.2 No. 62368-1-19 Third Edition • ANSI/UL 60950-1 Second edition • IEC 62368-1 • EN 62368-1 • AS/NZS 62368-1 • GB4943 • UL 62368-1

Specification	Description
EMC: Emissions	<ul style="list-style-type: none">• 47CFR Part 15 (CFR 47) Class A• AS/NZS CISPR22 Class A• CISPR22 Class A• EN55022 Class A• ICES003 Class A• VCCI Class A• EN61000-3-2• EN61000-3-3• KN22 Class A• CNS13438 Class A
EMC: Immunity	<ul style="list-style-type: none">• EN55024• CISPR24• EN300386• 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.



APPENDIX C

LEDs

- [Switch Chassis LEDs, on page 61](#)
- [Uplink Module LEDs, on page 62](#)
- [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.

Uplink Module LEDs

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.

Uplink Module LEDs

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

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

Fan Module LEDs

The fan module status LED is located below the air holes on the front of the fan module. Every fan module has an LED.

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

Power Supply LEDs

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

OK LED	FAIL or FAIL/ID LED	Status
Green	Off	Power supply is on and outputting power to the switch.
Flashing green	Off	Power supply is connected to a power source but not outputting power to the switch. The power supply may not be properly installed in the chassis.
Off	Off	Either all the installed power supplies are not receiving power or an uninstalled power supply is not receiving power.
Off	Flashing amber	<p>Power supply is operating but a warning condition has occurred—possibly one of these conditions:</p> <ul style="list-style-type: none"> • High temperature • High power • Slow power supply fan • Low voltage • Power supply is installed in the chassis but was disconnected from the power source.
Off	Flashing amber (10 seconds) then amber	Power supply is installed without a connection to a power source.
Off	Amber	<p>Power supply failure—possibly one of these conditions:</p> <ul style="list-style-type: none"> • Over voltage • Over current • Over temperature • Power supply fan failure



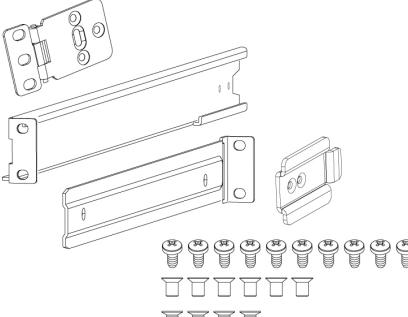
APPENDIX D

Additional Kits

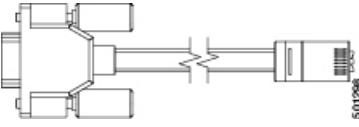
- [Rack Mount Kit NXK-ACC-RMK2-2RU, on page 65](#)

Rack Mount Kit NXK-ACC-RMK2-2RU

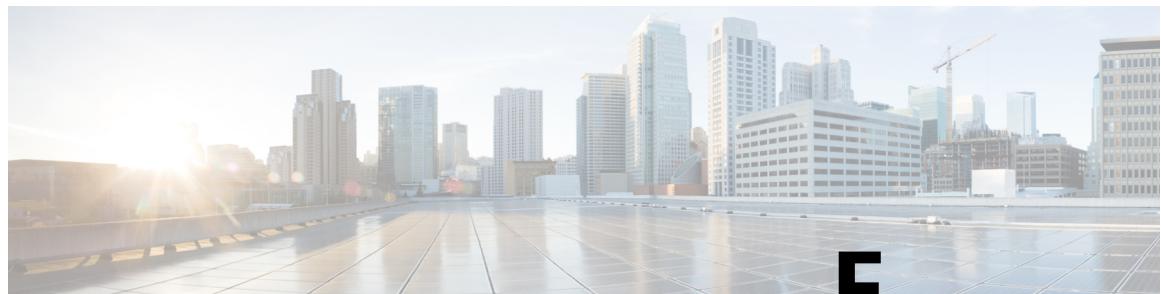
The table lists and illustrates the contents for the 2-RU rack-mount kit (NXK-ACC-RMK2-2RU).

Illustration	Description	Quantity
	Rack-mount kit <ul style="list-style-type: none">• Rack-mount brackets (2)• Rack-mount front-mount brackets (2)• Rack-mount slider rails (2)• Rack-mount retainer clips (2)• Phillips countersink screws (12)• Flat head screws M4 (6)• Flat head screws M3 (4)	1
Not applicable	EAC Compliance document	1
Not applicable	Hazardous substances list for customers in China	1

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

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

Additional Kits



APPENDIX E

Site Preparation and Maintenance Records

- Site Preparation Checklist, on page 67
- Contact and Site Information, on page 68
- Chassis and Module Information, on page 69

Site Preparation Checklist

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

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

Planning Activity	Verification Time and Date
Space evaluation:	
Space and layout	
Floor covering	
Impact and vibration	
Lighting	
Physical access	
Maintenance access	
Environmental evaluation:	
Ambient temperature	
Humidity	
Altitude	
Atmospheric contamination	
Airflow	

Contact and Site Information

Planning Activity	Verification Time and Date
Power evaluation:	
Input power type	
Power receptacles	
Receptacle proximity to the equipment	
Dedicated (separate) circuits for power redundancy	
UPS for power failures	
Grounding: proper wire gauge and lugs	
Circuit breaker size	
Grounding evaluation:	
Data center ground	
Cable and interface equipment evaluation:	
Cable type	
Connector type	
Cable distance limitations	
Interface equipment (transceivers)	
EMI evaluation:	
Distance limitations for signaling	
Site wiring	
RFI levels	

Contact and Site Information

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

Contact person	
Contact phone	

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

Chassis and Module Information

Use the worksheet to record information about the switch.

Contract number	
Chassis serial number	
Product Identification (PID) number	

Use the worksheet to record network-related information.

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

Use the worksheet to record information about the modules in the switch.

Module Slot	Module Type	Module Serial Number	Notes
QSFP/QSFP-DD Tranceiver			

Site Preparation and Maintenance Records

Module Slot	Module Type	Module Serial Number	Notes
SFP/SFP+ Tranceiver			