Cisco C9610 Series Smart Switches Hardware Installation Guide

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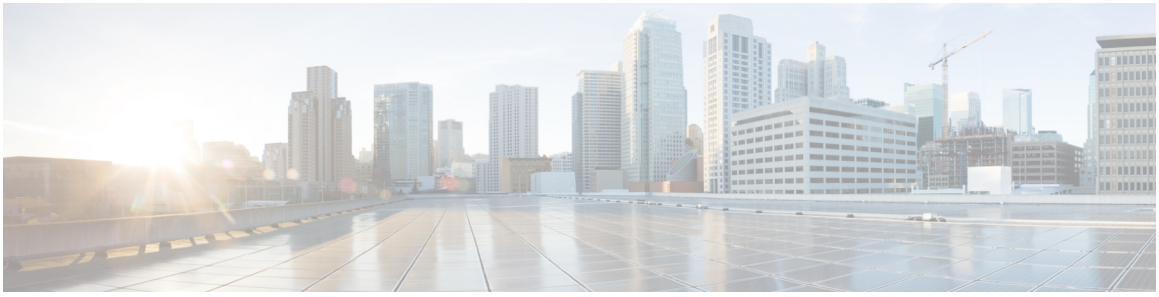

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Preface

This preface describes the conventions of this document and information on how to obtain other documentation. It also provides information on what's new in Cisco product documentation.

- Document Conventions , on page v
- Obtaining Documentation and Submitting a Service Request, on page vii

Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier` font	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier` font	**`Bold Courier`** font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.

Convention	Description
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	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.

Reader Alert Conventions

This document may use the following conventions for reader alerts:

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

Tip Means *the following information will help you solve a problem.*

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

Timesaver Means *the described action saves time.* You can save time by performing the action described in the paragraph.

Take note of the following general safety warnings:

Warning

Statement 1071—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

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

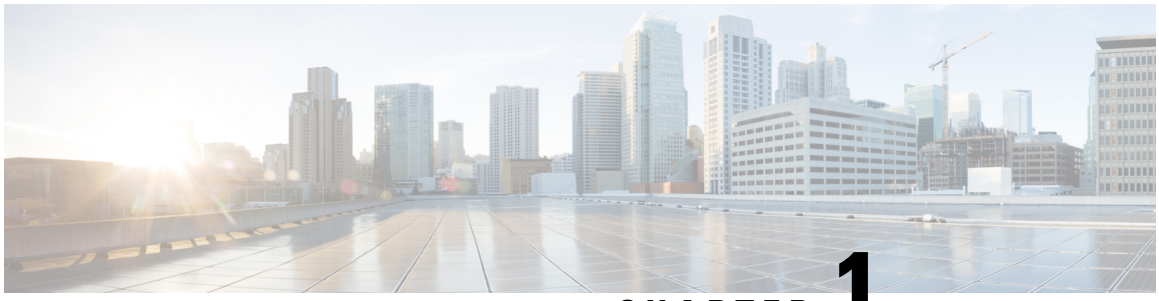
SAVE THESE INSTRUCTIONS

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.



CHAPTER 1

Introduction to Cisco C9610 series smart switches

Cisco C9610 is a high-bandwidth, 10-chassis modular switch. These switches are designed for core and aggregation layers in campus and enterprise networks.

The core network focuses on connecting multiple distribution layers to an interconnect or other network domains. The aggregation or distribution layer optimizes, secures, and manages traffic between the access (where end devices connect) and core (the high-speed backbone) layers.

- Chassis overview, on page 1
- Fan tray assembly, on page 4
- Power supply modules, on page 6
- Understanding LEDs, on page 13

Chassis overview

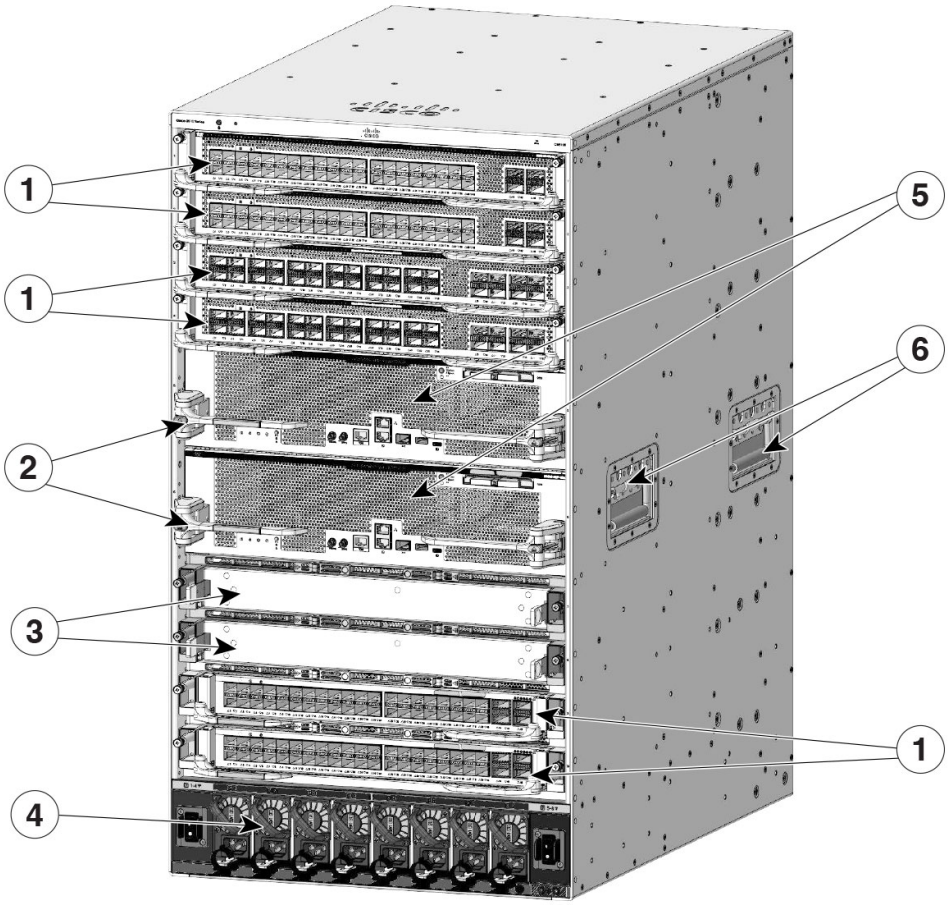
The Cisco C9610 switch is a ten-slot chassis, with two redundant supervisor module slots, eight line card slots, eight power supply modules, and four fan tray modules.

Table 1: Cisco C9610 switch features

Feature	Description
Product ID	Cisco C9610 Series Smart Switch
Chassis	Has ten horizontal slots. Slots are numbered 1 to 10 from top to bottom.
Supervisor modules	Accommodates two supervisor modules. The supported models are • Cisco C9610 series Supervisor 3 Module (C9610-SUP-3). • Cisco C9610 series Supervisor 3XL Module (C9610-SUP-3XL) For more information about installing a supervisor module, see the *Cisco C9610 Series Supervisor Engine Installation Note*.

Feature	Description
Line cards	Accommodates up to eight line cards. The supported line cards are • Cisco C9610 series 30-port 100G/40G, 2-port 400G/100G/40G (C9610-LC-32CD): 30 QSFP28 ports that support 100G/40G and 2 QSFP-DD ports that support 400G/200G/100G/40G. • Cisco C9610 series 40-port 50G, 2-port 200G/100G/40G, 2-port 400G/200G/100G/40G (C9610-LC-40YL4CD): 40 SFP56 ports of 50G/25G/10G, two QSFP56 ports of 200G/100G/40G, and two QSFP-DD ports of 400G/200G/100G/40G With the line card adapter C9610-LC-ADPT, the switch supports these line cards: • Cisco Catalyst 9600 series 40-port 50G/25G/10G, 2-port 200G/100G/40G, 2-port 400G/200G/100G/40G (C9600-LC-40YL4CD): 40 SFP56 ports of 50G/25G/10G, two QSFP56 ports of 200G/100G/40G, and two QSFP-DD ports of 400G/200G/100G/40G • Cisco Catalyst 9600 series 48-port 10G (C9600-LC-48TX): 48 Multigigabit Ethernet RJ45 copper ports that support 10G. • Cisco Catalyst 9600 series 30-port 100G/40G, 2-port 400G/100G/40G (C9600X-LC-32CD): 30 QSFP28 ports that support 100G/40G and 2 QSFP-DD ports that support 400G/100G/40G. • Cisco Catalyst 9600 series 56-port 25G/10G, 4-port 100G/40G (C9600X-LC-56YL4C): 56 SFP56 ports of 25G/10G and 4 QSFP28 ports of 100G/40G For more information about installing a line card, see the *Cisco C9610 Series Line Card Installation Note*.
Fan tray assembly	Provides 4 rear serviceable and hot-swappable fan tray with 6 fans per tray.
Power supplies	Has 8 power supply slots that supports up to 8 AC or DC power supply modules.
Backplane	Provides 6.4Tbps bandwidth per slot.

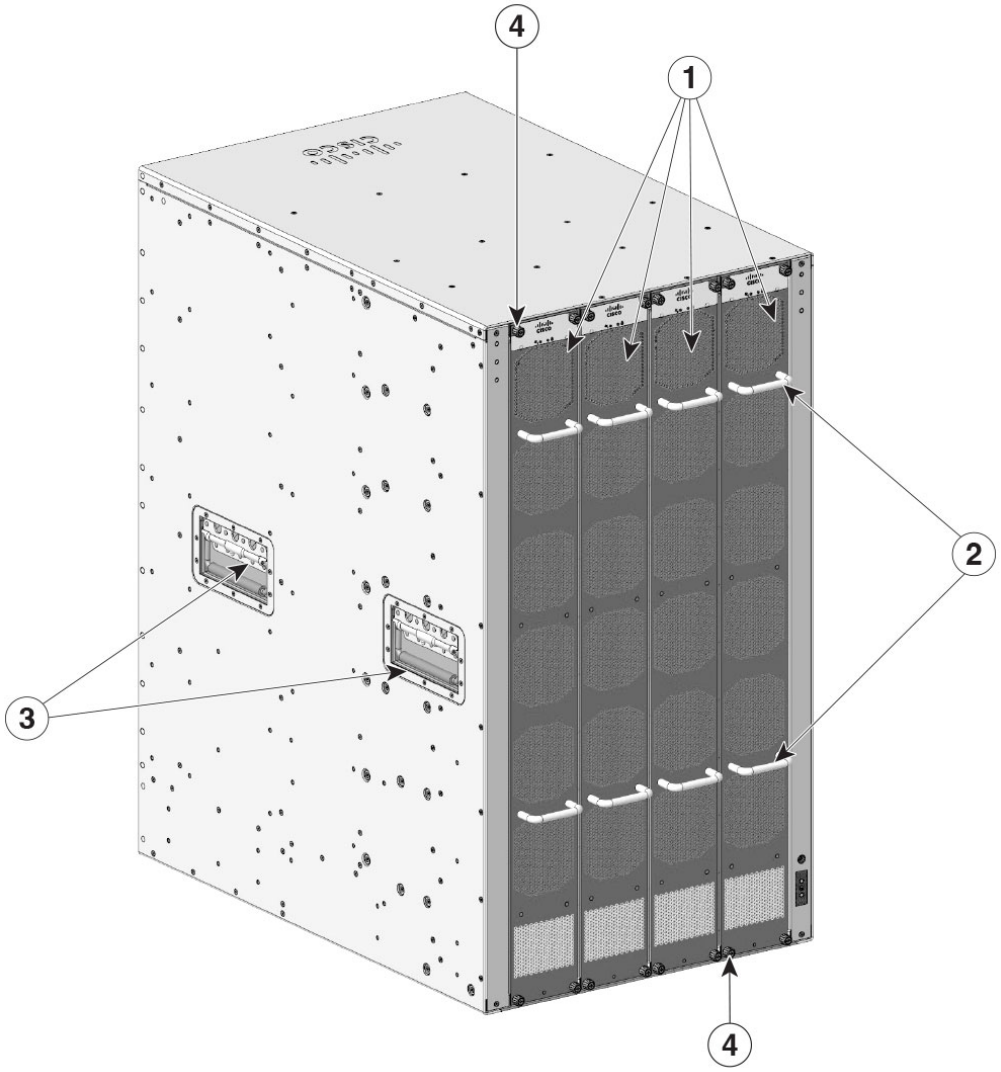
Figure 1: Front view of a Cisco C9610 Series Smart Switch



1	Line card slots	4	Power supply modules
2	Supervisor module latch	5	Supervisor module slots
3	Line card slots covered with blanks	6	Chassis handholds

The figure shows a rear view of the chassis, with the major components identified.

Figure 2: Rear view of a Cisco C9610 Series Smart Switch



1	Fan trays	3	Chassis handholds
2	Fan tray assembly handles	4	Captive installation screws

Fan tray assembly

The Cisco C9610 Series Smart Switches consist of four fan trays. Each fan tray (C9610-FAN) consists of six fans and a connector. If one of the fans is not functioning and you need to replace the fan, you must order a fan tray; individual fans cannot be ordered.

When the system is powered on, all four fan trays must be present, or the system will not initialize.

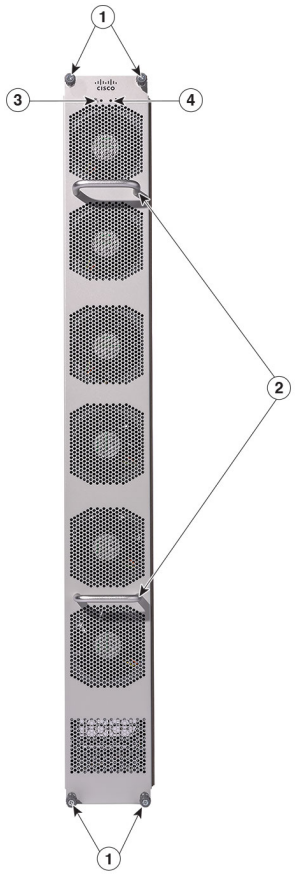
The fans cool the entire chassis and interface with environmental monitors to trigger alarms when conditions exceed thresholds. Fan trays provide cooling critical for the switch operation, which could otherwise result in the switch being nonoperational or cause permanent damage to modules or components.

The features of a Cisco C9610 fan tray include

- four fan tray slots in the rear panel of the chassis.
- six 80 x 80 x 80 mm fans per tray.
- fan tray modules are installed from the rear to enable front-to-back airflow.
- optimizes the fan-speed for temperature and pressure, and maintains the minimum fan speeds that the chassis requires, in ambient conditions.

This figure shows C9610-FAN with the major components identified.

Figure 3: Fan tray assembly



1	Captive installation screws	3	Fan tray status LED
2	Fan tray handles	6	Blue beacon LED for the fan tray

Fan high availability

To ensure high availability, the system responds to fan failures by either minimizing the impact or by compensating and operating at a worst case scenario specification.

- Boot up: When you power on the switch, all four fan trays must be present, or else, the system will not boot, and the console displays this override message.

  ```
  "[HWMSG] FAN_ABSENT: Shutdown now"
  ```

- Runtime: During system runtime if one fan tray is removed from the chassis, the system will still operate; however, the console displays this warning message, and the **show hardware led** command output will display the system and chassis fan tray status LEDs as red.

  ```
  *Aug 12 09:10:43.627 UTC: %CMRP_PFU-2-FAN_POLICY_CRITICAL: Chassis 1 R0/0:
  cmand: SYSTEM FAN POLICY Critical : MAJOR ALARM - One Fantray Missing!!
  ```

- If you remove two or more fan trays from the chassis, a 180 seconds countdown starts. The console displays this override message

  ```
  *Jun 16 09:40:07.975: %CMRP_PFU-1-FAN_POLICY_ALERT: R0/0:
  cmand: SYSTEM FAN POLICY Alert : FAN policy shutdown with reason CRITICAL ALARM:
  Two or more Fantrays missing!!. Restore working FAN or system will be
  shutdown in 180 seconds
  ```

  and the system is shut down after 180 seconds.

Thresholds, alarms, and abnormal acoustic conditions

In normal operating conditions, if no temperature alarms are triggered, the software (if IOS XE software is booted up) controls the fan speed. If the system is in ROMMON mode, the hardware controls the fan speed.

If system temperature alarms are triggered, the software displays an error message indicating that the temperature is high, and fans are operating at higher speed. See the *System Management Guide* for more information.

If two or more fans fail, you must replace the fan tray within 180 seconds or power down the system. If the temperature exceeds the shutdown threshold, software powers the system down. When the fan trays operate at full speed, increased noise levels can be expected.

The fan trays may operate at 90% of the maximum speed in these circumstances:

- If two or more fans have failed.
- If the ASIC thermal sensors hit major, critical, or shutdown thresholds.
- If one fan tray is removed (with or without additional fan failures).
- Due to high ambient temperature.

Power supply modules

The switch chassis has eight redundant power supply slots that operate with one to eight power supply modules. The chassis supports field-replaceable AC-input and DC-input power supply modules.

The power supply modules generate 12 VDC output power and distribute it to the line cards and supervisor modules. The power supplies distribute power to all slots using an internal bus-bar based power distribution mechanism. All power supply modules have internal fans and support front-to-rear airflow.

Table 2: Power supply modules

Part number (add = for spare)	Description
C9600-PWR-2KWAC (=)	Cisco 9600 Series 2000W AC power supply
C9600-PWR-2KWDC (=)	Cisco 9600 Series 2000W DC power supply
C9600-PWR-3KWAC (=)	Cisco 9600 Series 3000W AC power supply

AC power supply modules

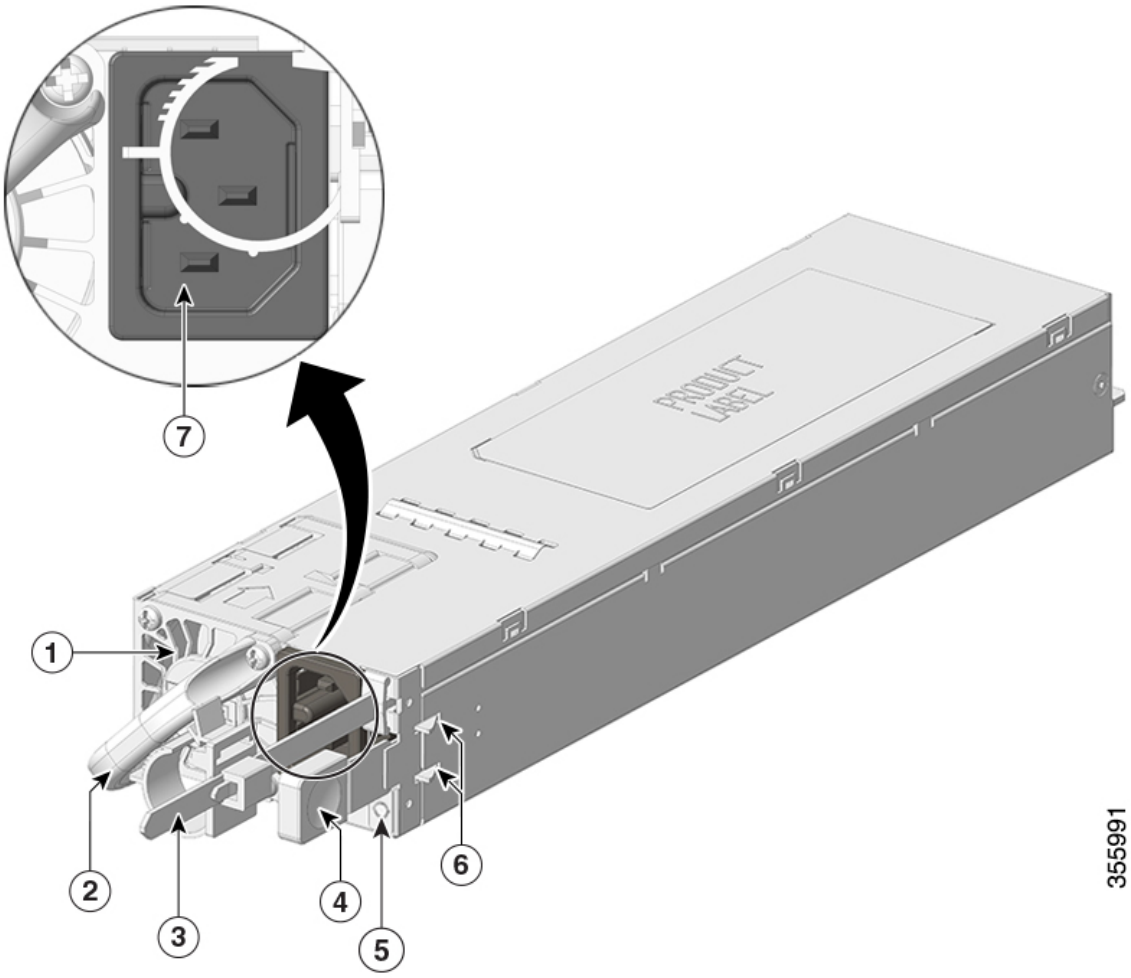
Cisco C9610 Series Smart Switches support both 2000W AC and 3000W AC power supply units (PSUs).

The switch is not designed to operate with a combination of 2000W and 3000W PSUs together in a chassis. If a combination of 2000W and 3000W is used, when the chassis is switched on, the following error message is displayed on the console:

```
*Jan 7 12:07:52.924 IST: %CMRP_PFU-2-PSU_MIX_PWR_CAPACITY: R0/0: cmand:
Power supplies of mixed power capacity is not a supported configuration.
This can lead to unstable behavior or system reload, please connect power supplies
of the same power capacity to avoid any issues.
```

The 2000W AC is Platinum-rated and meets the Platinum certification standard for energy efficiency. Platinum-based PSUs typically provide around 92% efficacy at 50% load, with only 8% lost as heat.

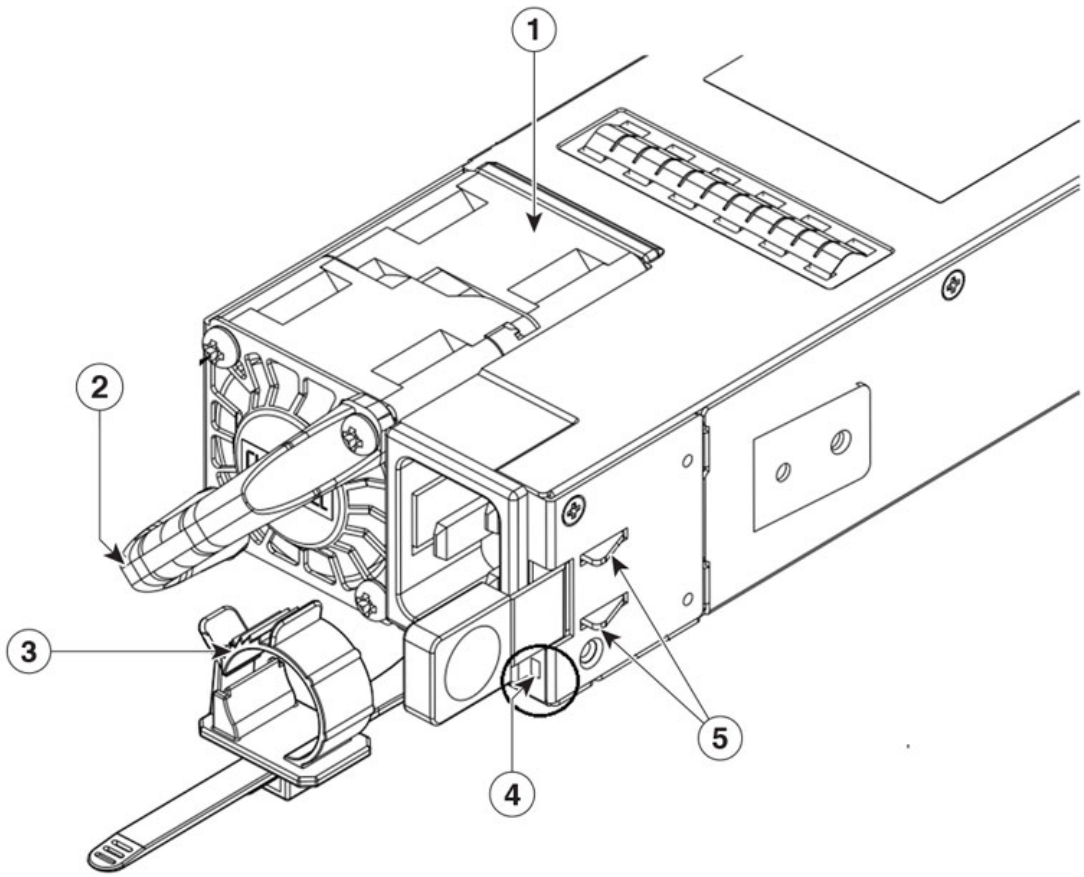
Figure 4: 2000W AC power supply



1	PSU fan	5	Status LED
2	Release handle	6	Retainer clips
3	Power cord retainer	7	Power cord connector
4	Release latch	-	-

The 3000W AC power supply module is Titanium-rated, and refers to a power supply that meets the Titanium efficiency standard. This standard ensures minimal energy loss during power conversion, and is at present, the highest efficiency rating available for server power supplies. Titanium-based power supplies typically provide 96% or higher efficiency at 50% load, and up to 94% at full load.

Figure 5: 3000W AC power supply



1	PSU fan	4	Status LED
2	Release handle	5	Latch shrapnel
3	Cable tie	-	-

The features of the AC power supply module are

- self-cooling, with a minimum airflow of 17 cubic feet per minute (CFM) at 100 percent load,
- a single-phase source AC. Source AC can be out-of-phase between multiple power supplies or multiple AC-power plugs on the same power source because all AC power supply inputs are isolated,
- a release latch and cord-retention mechanism on the front panel of the module, to avoid accidental removal of the module or the attached power cord, and
- redundant and combined configuration modes.

A single (non-redundant) or a dual (redundant) power supply configuration, can support these loads.

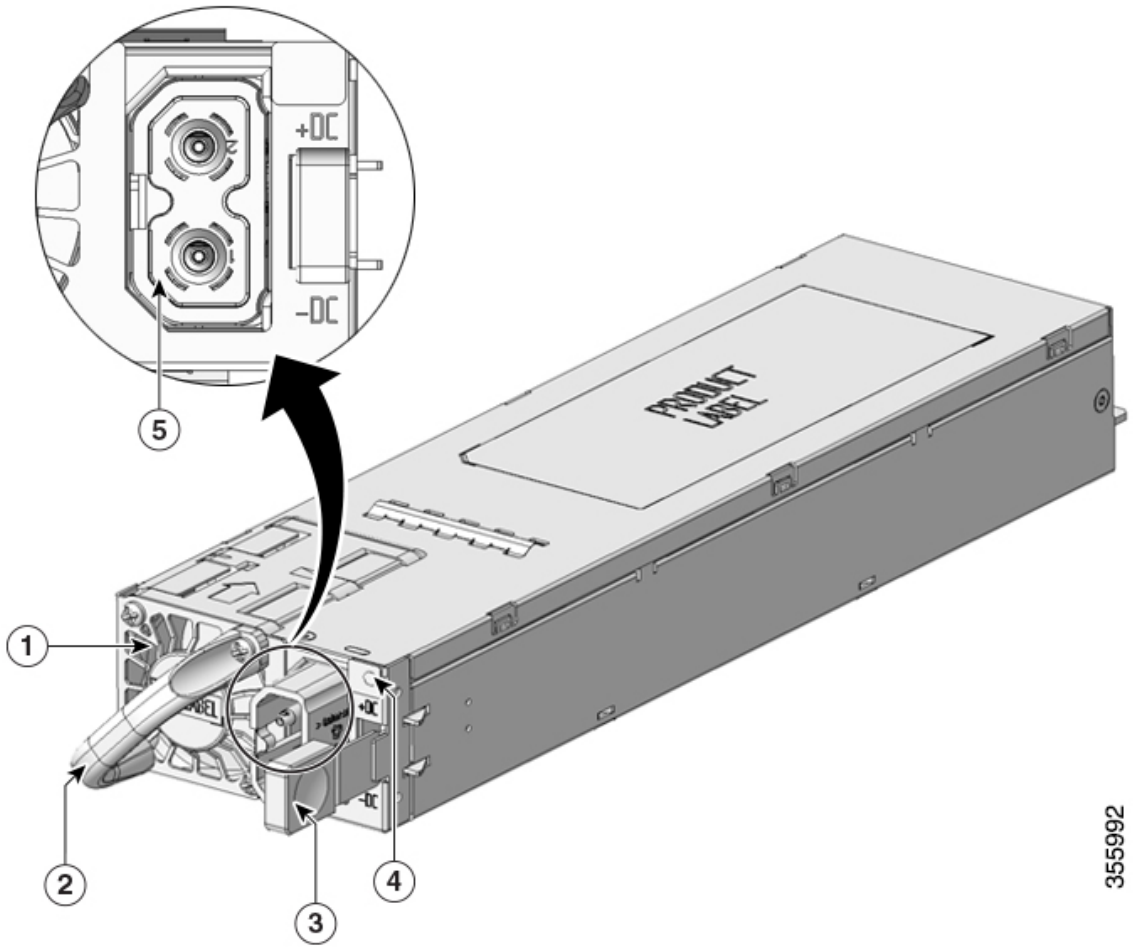
Table 3: Output power capacity of AC PSUs at different input voltage

PID	Input voltage (VAC)	Output power in Watts
C9600-PWR-2KWAC	110 VAC	1050W
	220 VAC	2000W
C9600-PWR-3KWAC	110 VAC	1500W
	220 VAC	3000W

DC power supply modules

The section describes the 2000W DC power supply module supported on Cisco C9610 series smart switches.

Figure 6: 2000W DC power supply module



1	PSU fan	4	LED

2	Release handle	5	Power cord connector
3	Release latch	-	-

The features supported by the DC power supply module are

- self-cooling, with a minimum airflow of 9.5 cubic feet per minute (CFM) at 100% load,
- a release latch mechanism on the side of the module, to avoid accidental removal of the module,
- a DC-input reversal protection such that the unit will survive this condition up to the full input voltage rating, and
- redundant and combined configuration modes.

A single (non-redundant) or a dual (redundant) power supply configuration supports these loads.

PID	Input voltage (VDC)	Output power
C9600-PWR-2KWDC	-40 to -60 VDC (with extended range to -72 VDC)	2000W

Power supply modes

Cisco C9610 series smart switches offer redundant and combined configuration modes for power supplies. In both modes, the load is equally distributed among the power supplies.

The system load and number of power supply modules installed determine the power level required by the system from each power supply module, and consequently, the suitable power supply mode. For system power budgeting estimates and to determine power supply requirements, use the Cisco Power Calculator .

To configure a power supply mode, enter the **power redundancy-mode** command in global configuration mode. If you do not configure a mode, the default mode applies. The default mode is combined mode.

Combined mode

The system operates with one to eight power supply modules. The power available to the system is the sum of the power outputs of all the power supply modules in the chassis multiplied by the share ratio. All available power supply modules are active and sharing power, and can operate at up to 100 percent capacity. Additional power supply units operate at 97 percent capacity.

In combined mode, you can use a combination of AC or DC power supplies, provided the AC input voltage is 220V and the power supplies are of equal wattage. However, you cannot combine an AC power supply unit of 110V input with an AC power supply unit of 220V input.

Total combined mode power = P + (N-1) * (P-60)

- where P is the power output of one of the power supply units and N is the number of power supply modules used.
- and 60W is the power wastage for every additional PSU, other than the first one; regardless of the PSU capacity or input voltage.

Note In case of a failure in combined mode, each operational power supply increases its output. If the output power does not meet the system requirements, all the operational power supply modules may be overloaded and go into overcurrent shutdown. All system power is then lost.

This table provides details about the power output in combined mode.

Table 4: Power output in combined mode

PID	Input voltage	One PSU	Two PSUs	Three PSUs	Four PSUs	Five PSUs	Six PSUs	Seven PSUs	Eight PSUs
C9600-PWR-2KWAC	110V	1050W	2040W	3030W	4020W	5010W	6000W	6990W	7980W
	220V	2000W	3940W	5880W	7820W	9760W	11700W	13640W	15580W
C9600-PWR-3KWAC	110V	1500W	2940W	4380W	5820W	7260W	8700W	10140	11580W
	220V	3000W	5940W	8880W	11820W	14760W	17700W	20640W	23580W

Redundant N+1 mode

In a redundant configuration, a given power supply module can either be active, or in a standby mode. You can configure either N+1 mode or N+N mode, where N is the number of active power supply modules.

In N+1 mode, N is the number of active power supply modules and +1 is the power supply module configured as the standby module.

When you configure the switch with N+1 redundancy, the Cisco IOS XE software ensures that there is a standby power supply available, and that sufficient power is available with the active power supply modules (N). All the power supplies including the active and standby shares the load equally. However, with a standby power supply installed, the system ensures that the additional output power available with a standby is always reserved for use in case of a failure. If the power supply mode is set to redundant and the total active output power is not sufficient to meet the power requirements, the switch will not enter redundant mode.

You can use a combination of AC or DC power supplies provided the AC input voltage is 220V and the power supplies are of equal wattage. However, you cannot combine an AC power supply unit of 110V input with a AC power supply unit of 220V input.

This table provides details about the power output in N+1 redundant mode.

Table 5: Power output in N+1 redundant mode

PID	Input voltage	Two PSUs	Three PSUs	Four PSUs	Five PSUs	Six PSUs	Seven PSUs	Eight PSUs
C9600-PWR-2KWAC	110V	1050W	2040W	3030W	4020W	5010W	6000W	6990W
	220V	2000W	3940W	5880W	7820W	9760W	11700W	13640W
C9600-PWR-3KWAC	110V	1500W	2940W	4380W	5820W	7260W	8700W	10140W
	220V	3000W	5940W	8880W	11820W	14760W	17700W	20640W

Redundant N+N mode

In N+N mode, *N* number of power supply modules are configured as active, and *N* number of power supply modules are configured as standby. For each active module, there is a standby power supply module.

Table 6: Power output in N+N redundant mode

PID	Input voltage	Two PSUs	Four PSUs	Six PSUs	Eight PSUs
C9600-PWR-2KWAC	110V	1050W	2040W	3030W	4020W
	220V	2000W	3940W	5880W	7820W
C9600-PWR-3KWAC	110V	1500W	2940W	4380W	5820W
	220V	3000W	5940W	8880W	11820W

Understanding LEDs

This section describes the LED positions and colors in the supervisor module, fan tray, line cards, and power supply modules.

chassis led

-
-

Table 7:

-
-

Table 8:

Table 9:

Figure 7: Figure title

Note

Supervisor module LEDs

This table describes the supervisor module LEDs and the status.

Table 10: LEDs and status

LED type	LED position or color	Description
STATUS	Green	Indicates that all diagnostic tests have passed after image booting.
	Amber	Indicates a major environmental warning.
	Red	Indicates a fault in the module due to parity error or failed diagnostic tests or hardware failure.
	Off	Indicates that the supervisor module is disabled or is not powered up.
BLUE BEACON	Blue	Identifies the supervisor module receiving the beacon signal. You can switch on this beacon through the software.
	Blink fast	Indicates that the module requires attention. Configured by the user. The LED blinks at the rate of 1.2 seconds.
	Blink slow	Indicates that the module requires attention. Configured by the user. The LED blinks at the rate of 0.6 seconds.
	Off	Indicates that the module does not require any attention.
SYSTEM	Green	Indicates that the environmental monitors are normal.
	Amber	Indicates a minor fault such as partial power supply or fan failure.
	Red	Indicates a major fault. For example, situations where the temperature of the supervisor module exceeds the critical threshold.

LED type	LED position or color	Description
ACTIVE	Green	Indicates that the supervisor module is operational and is functioning as the active supervisor (in redundant supervisor module configurations).
	Amber	Indicates one of the following: • ROMMON mode, or • Supervisor module is functioning as the standby supervisor (in redundant supervisor module configurations).
	Blinking amber	Indicates Graceful Insertion and Removal (GIR) of the module.
Solid State Drive (SSD) LED	Green	SSD is installed and working.
	Amber	SSD can be removed safely. To unmount the SSD, press the Eject/Status LED button, and wait for the LED to change the color to Amber.

Fan tray LEDs

This table describes the light-emitting diode (LED) information for the fan trays. These LEDs available on the top of the front panel of the chassis display the status of the four fan trays on the rear panel.

Table 11: Fan tray LEDs

LED type	LED position or color	Description
STATUS	Off	Fan tray is not receiving any power.
	Green	All fans are running and the fan tray is operating normally.
	Amber	One fan is not running and the fan tray is not operating properly.
	Red	Two or more fans are not working.

LED type	LED position or color	Description
LOCATE or Blue Beacon	Blue	Indicates that the module requires attention. Each of fan trays have a blue beacon, and you can switch on this beacon through the software.
	Blink fast	Indicates that the module requires attention. Configured by the user. The LED blinks at the rate of 1.2 seconds.
	Blink slow	Indicates that the module requires attention. Configured by the user. The LED blinks at the rate of 0.6 seconds.
	Off	Indicates that the module does not require any attention.

Line card LEDs

This table describes the line card LED position or color.

Table 12: Line card LEDs

LED type	LED position or color	Description
Blue beacon	Blue	Indicates that the module requires attention. Provisioned by the administrator of the system.
	Blink fast	Indicates that the module requires attention. The LED blinks at a rate of 0.6 seconds.
	Blink slow	Indicates that the module requires attention. Configured by the user, the LED blinks at a rate of 1.2 seconds.
	Off	Indicates that the module does not need any attention.
Status LED	Green	Indicates that all diagnostic tests have passed and the module is operational.
	Red	Indicates major environmental alarms, if the module is online.
	Amber	Indicates minor environmental alarms, if the module is online.
	Off	Indicates that the module is disabled or is not powered up.

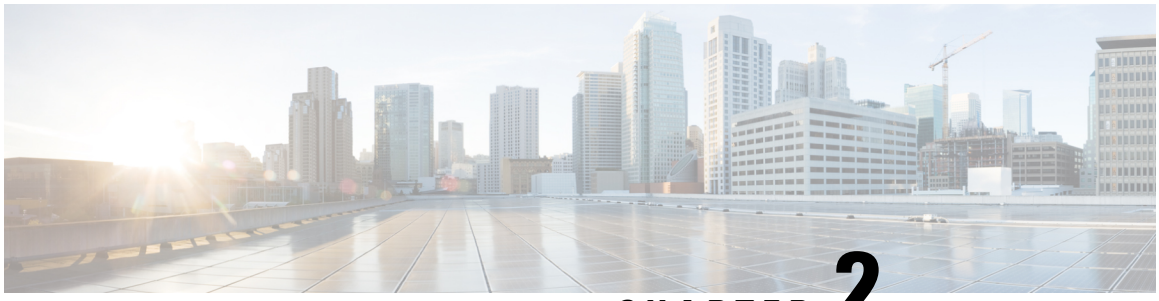
LED type	LED position or color	Description	
Port LED	Green	Port link is up.	
	Amber	Port link is disabled, that is, administratively down.	
	Off	No signal is detected, the link is down, or the port is not connected.	
	Alternating Green and Amber	Indicates port beacon.	
	Blinking Amber	Indicates link faults such as excessive collision errors.	
	Blinking Green	Indicates traffic on the port.	
		Traffic utilization	**Blinking rate**
		Less than 5%	Nil
		Between 5% and 30%	At a rate of 1.2 seconds.
		Between 30% and 70%	At a rate of 0.4 seconds.
		More than 70%	At a rate of 0.2 seconds.

Power supply module LEDs

This table describes the power supply module LED position and color.

Table 13: Power supply module LEDs

LED position or color	Description	
STATUS	Green	Indicates that the power supply module is switched on with outputs 12V main and 12Vstandby available and in regulation.
	Amber	Indicates one of the following: • No output power available • AC/DC input is below the operating range • No 12V standby from a parallel unit is available • Over voltage/over current/over temperature conditions • Over-temperature protection due to fan failure
	1Hz blinking Amber	Indicates warning events such as a power supply module that continues to operate in high temperature or high power and a fan that runs slow, and so on.
	1Hz blinking Green	Indicates bootloading mode.
	2Hz blinking Green	Indicates that power switch is turned off with AC/DC input power available or that the power supply is in standby mode.
	Off	Indicates one of the following: • No input or output power available • AC/DC input is below the operating range • No 12V standby from a parallel unit



CHAPTER 2

Prepare to Install

Describes the safety warning and checklists to adhere to, the power and cabling requirements, and site preparation before you install Cisco C9610 smart switches.

- Before you install the Cisco C9610 switch, on page 19
- Safety warnings, on page 20
- SFP and QSFP module ports, on page 24
- Site requirements, on page 25
- Power requirements, on page 35
- Cabling requirements, on page 36
- Site preparation checklist, on page 36
- Rack-mounting guidelines, on page 37
- Standard and optional accessory kit contents, on page 39
- Unpack the switch, on page 42

Before you install the Cisco C9610 switch

Before you install your Cisco C9610 switch, follow these guidelines.

- Comply with the safety warnings.
- Follow the site, cabling, and power requirements.
- Follow the site preparation checklist and rack-mounting guidelines.
- Verify the contents of the shipping box.
    - Ensure that you have the tools and equipment required to install the switch.
    - Verify the standard accessory kit that is shipped along with the switch.
    - Go through the shelf-kit contents to order accessories.
    - Go through both the rack-mounting kit contents to order any accessories.

Safety warnings

Safety warnings appear throughout this publication in procedures that may harm you if you perform them incorrectly. A warning symbol precedes each warning statement. The warnings below are general warnings that are applicable to the entire publication.

Warning

Statement 1071—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

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

SAVE THESE INSTRUCTIONS

Note

Statement 407—Japanese Safety Instruction

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

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

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

〈製品使用における安全上の注意〉

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

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Warning

Statement 445—Connect the Chassis to Earth Ground

To reduce the risk of electric shock, connect the chassis of this equipment to permanent earth ground during normal use.

Warning

Statement 1008—Class 1 Laser Product

This product is a Class 1 laser product.

Warning

Statement 1017—Restricted Area

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

Warning

Statement 1029—Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Warning

Statement 1049—Rack Installation

To reduce the risk of bodily injury, mount the chassis on a rack that is permanently affixed to the building.

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 1074—Comply with Local and National Electrical Codes

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

Note **Statement 1089—**Instructed and Skilled Person Definitions

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

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

Warning **Statement 1090—**Installation by Skilled Person

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

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

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

Warning **Statement 1099—**Before Connecting to System Power Supply

High touch/leakage current—Permanently connected protective earth ground is essential before connecting to the system power supply.

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 9001—**Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

NEBS statements

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 Copper Ethernet ports.

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: RJ-45 Copper Ethernet ports.

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

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

The following ports are considered intrabuilding ports on the equipment: RJ-45 Copper Ethernet ports.

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

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

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

This equipment is suitable for installations using the CBN.

Note **Statement 7015—**Equipment Bonding and Grounding

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

Note **Statement 7016—** Battery Return Conductor

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

Note **Statement 7018—**System Recover Time

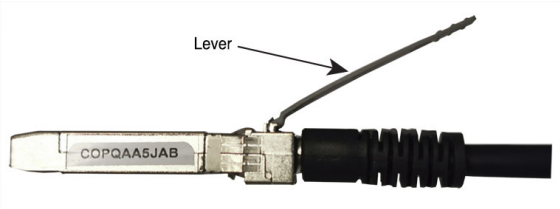
The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

SFP and QSFP module ports

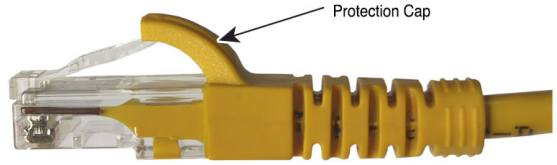
Small Form-Factor Pluggable (SFP) ports are slots that accommodate SFP transceiver modules. These ports connect network equipment using either fiber optic or copper cabling, depending on the type of SFP module. Quad Small Form-Factor Pluggable (QSFP) ports are high-speed, high-density network interfaces that accommodate QSFP transceiver modules. These ports are primarily used for data center, enterprise, and service provider environments where large amounts of data need to be transmitted quickly and efficiently.

With the C9600X-LC-56YL4C model:

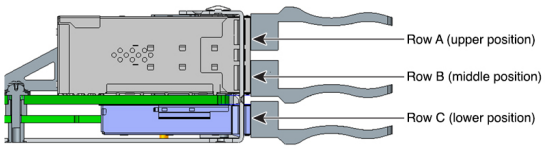
- Do not use the SFP-H10GB-CUXX (1M/1.5M/2M/2.5M/3M/5M), SFP-H10GB-ACUXX(7M/10M) and SFP-10G-AOCXX (1M/2M/3M/5M/7M/10M) types of SFP modules from TE Connectivity, because the lever on these modules might interfere with other parts of the switch.



- On an SFP-10G-T-X SFP module, do not use an RJ-45 cable with a protection cap because the protruding cap might interfere with other parts of the switch.



- Do not use the SFP-25G-SR-S, SFP-10/25G-LR-S, SFP-10/25G-CSR-S on row C, the SFP module will be removed from the SFP port, if the lower card (underneath this card) is removed from the chassis of Cisco C9610R.



Site requirements

Planning a proper location for the switch and layout of the equipment rack or wiring closet is essential for successful system operation. These sections describe some of the basic site requirements that you should be aware of as you prepare to install your switch, including the following:

- Environmental factors can adversely affect the performance and longevity of your system.
- Install the switch in an enclosed, secure area, ensuring that only qualified personnel have access to the switch and control of the environment.
- Equipment that is placed too closely together or that is inadequately ventilated may cause system over-temperature conditions, leading to premature component failure.
- Poor equipment placement can make chassis panels inaccessible and difficult to maintain.
- The switch requires a dry, clean, well-ventilated, and air-conditioned environment.
- To ensure normal operation, maintain ambient airflow. If the airflow is blocked or restricted, or if the intake air is too warm, an over-temperature condition may occur. The switch environmental monitor may then shut down the system to protect the system components.

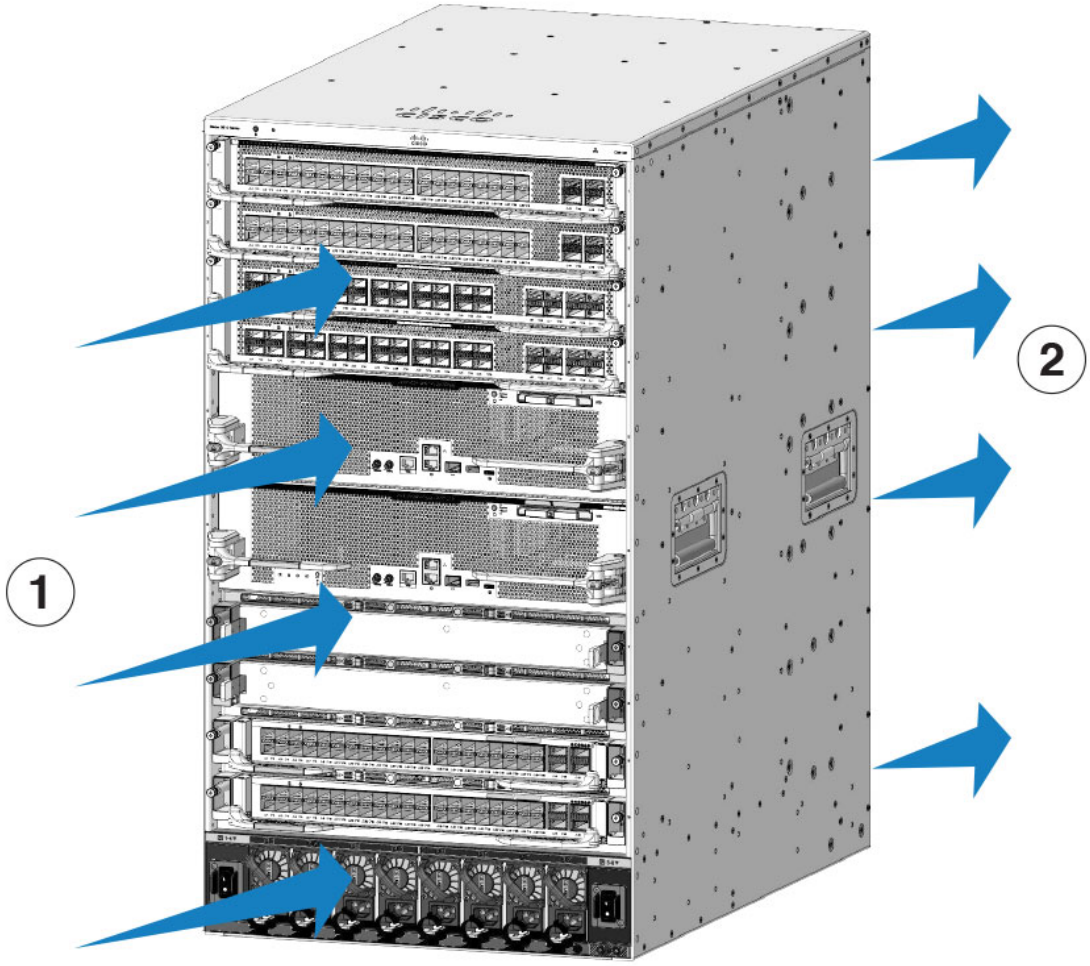
Air flow

The switch is designed to be installed in an environment where there is a sufficient volume of air available to cool the supervisor engines, modules, and power supplies. If there are any constraints with regard to the free flow of air through the chassis, or if the ambient air temperature is elevated, the switch environmental monitor may then shut down the system to protect the system components.

To maintain proper air circulation through the switch chassis, we recommend that you maintain a minimum space of 6 inches (15 cm) between a wall and the chassis and power supply unit air intakes or a wall and the chassis and power supply unit hot air exhausts. In situations where the switch chassis are installed in adjacent racks, you should allow a minimum space of 12 inches (30.5 cm) between the air intake of one chassis and the hot air exhaust of another chassis.

Note Failure to maintain adequate spacing between chassis may cause the switch chassis that is drawing in the hot exhaust air to overheat and fail.

Figure 8: Air-flow direction in Cisco C9610 series smart switches



1	Chassis and power supply air intake	2	Chassis and power supply air exhaust

If you are installing your switch in an enclosed or partially enclosed rack, we strongly recommend that you verify that your site meets these guidelines:

- There is a minimum of 6 inches (15 cm) of clearance between the sides, front, and back of any enclosure, and both the chassis air intake grill and the chassis air exhaust grill along with the power supply unit intakes and exhausts. The upright columns of a relay rack may be located less than the recommended side spacing provided there are substantial cutouts, holes, or vents in the structure to allow adequate air flow through the chassis.
- The ambient air temperature within the enclosed or partially enclosed rack is within the chassis operating temperature limits. After installing the chassis in the rack, power up the chassis and allow the chassis temperature to stabilize (approximately 2 hours).

  Measure the ambient air temperature at the chassis air intake grill by positioning an external temperature probe 1 inch (2.5 cm) away from the chassis left side, and centered on the chassis both horizontally and vertically.

Measure the ambient air temperature at the power supply unit air intake grill by positioning an external temperature probe 1 inch (2.5 cm) away from the chassis front, centered on the power supply unit section located above the card slots.

- If the ambient intake air temperature is less than 104°F (40°C) at altitudes of 6,000 feet and below, the rack meets the intake air temperature criterion.
- If the ambient intake air temperature exceeds this recommendation, the system may experience minor temperature alarms and increase fan speeds in response.
- If the ambient intake air temperature equals or is greater than 131°F (55°C), the system may experience a major temperature alarm with maximum fan speeds in response. If ambient temperature continues to increase, system will respond with protective shut down.

- Plan ahead. A switch that is currently installed in an enclosed or partially enclosed rack might meet ambient air temperature and air flow requirements at present. However, if you add more chassis to the rack or more modules to a chassis in the rack, the additional heat generated might cause the ambient air temperature at the chassis or power supply unit inlets to exceed recommended conditions which may trigger thermal alarms.

Air quality

Dust is everywhere and often invisible to the naked eye. It consists of fine particles in the air that originate from various sources, such as soil dust lifted by weather, from volcanic eruptions, or pollution. Dust at an installation site may contain small amounts of textile, paper fibers, or minerals from outdoor soil. It may also contain natural contaminants, such as chlorine from the marine environment and industrial contaminants such as sulfur. Ionized dust and debris are dangerous and get attracted to electronic equipment.

The adverse effects of the accumulation of dust and debris on electronic equipment are

- It increases the operating temperature of the equipment. According to the Arrhenius effect, an increase in the operating temperature leads to a decrease in reliability and life of the equipment.
- The moisture and corrosive elements that are present in the dust can corrode the electronic or mechanical components and cause premature board failure.

These adverse effects are further accelerated by the presence of fans in the data networking equipment that ingest dust and other particles into the equipment. Higher the volume of air that is generated by the fans for cooling, the higher the quantity of dust and particulates that get deposited and trapped inside the equipment. Remove or minimize the presence of dust and particulates at the installation site by following the guidelines mentioned in ANSI 71-04-2013 regulations.

Note In addition to the guidelines mentioned in ANSI 71-04-2013 regulations, follow all applicable guidelines as per site conditions to remove or minimize other contaminants.

Altitude

Operating a system at high altitude (low pressure) reduces the efficiency of forced and convection cooling and may result in electrical problems related to arcing and corona effects. This condition may also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

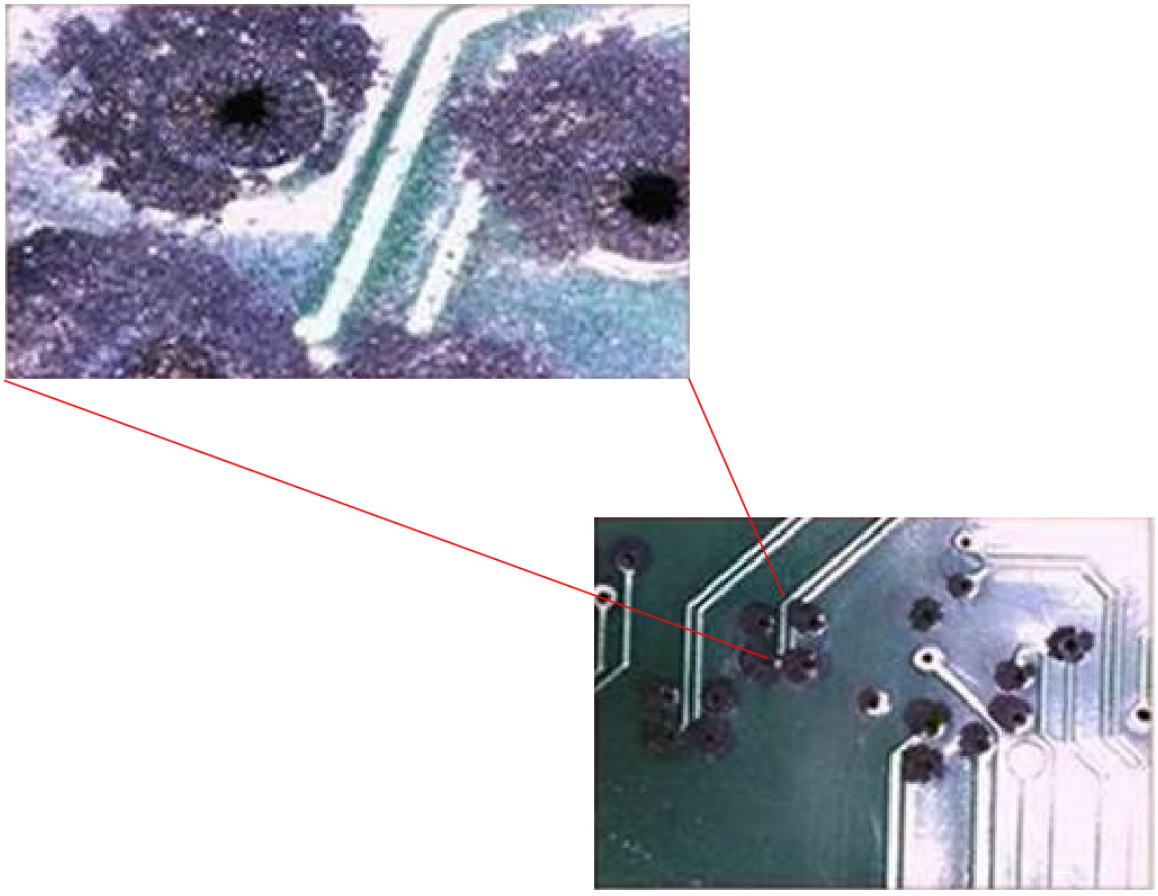
Corrosion

Corrosion is a chemical reaction that occurs between electronic components and gases which results in metal deterioration. Corrosion attacks edge connectors, pin connectors, IC plug-in sockets, wirewraps, and all other metal components. Depending on the type and concentration level of the corrosive gases, performance degradation of the components occurs either rapidly or over a period of time. It also leads to blocked currents, brittle connection points, and overheated electrical systems. Corrosion by-products form insulating layers on circuits and causes electronic failure, short circuits, pitting, and metal loss.

A type of corrosion known as creep corrosion, that primarily affects the Printed Circuit Board Assembly (PCBA) occurs when the PCBA is subjected to a harsh, and sulfur-rich (hydrogen sulfide) end-use environment over a prolonged period of time. The corrosion begins on certain exposed metals, such as copper and silver, and then creeps along the remaining metal surface either causing electrical short circuits or creating holes. Creep corrosion also occurs on electronic components such as resistors and PCBs.

To prevent corrosion, remove or minimize the presence of dust and particulates at the installation site by following the guidelines mentioned in ANSI 71-04-2013 regulations.

Figure 9: A PCB with corrosion on its metal contacts



Dust and particles

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

These standards provide guidelines for acceptable working environments and acceptable levels of suspended particulate matter:

- National Electrical Manufacturers Association (NEMA) Type 1
- International Electrotechnical Commission (IEC) IP-20

EMI and radio frequency interference

Electro-magnetic interference (EMI) and radio frequency interference (RFI) from a system can adversely affect devices such as radio and television (TV) receivers operating near the system. Radio frequencies emanating from a system can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the system monitor. RFI is defined as any EMI with a frequency above 10 kilohertz (kHz). This type of interference can travel from the system to other devices through the power cable and power source, or through the air in the form of transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of harmful interference emitted by computing equipment. Each system meets these FCC regulations. To reduce the possibility of EMI and RFI, follow these guidelines.

- Always operate the system with the chassis covers installed.
- Ensure that all chassis slots are covered by a metal filler bracket and that an unused power supply bay has a metal cover plate installed.
- Ensure that the screws on all peripheral cable connectors are securely fastened to their corresponding connectors on the back of the chassis.
- Always use shielded cables with metal connector shells for attaching peripherals to the system.

When wires are run for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires. This fact has two implications for the construction of plant wiring:

- Bad wiring practice 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 provide a remedy for strong EMI, consult experts in RFI.

If you use twisted-pair cable in your plant wiring, include a good distribution of grounding conductors to reduce EMI. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable.

Caution Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.

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

Caution The intra-building ports (Copper-based Ethernet ports) of the equipment or subassembly is suitable for connection to inside a building or unexposed wiring or cabling only. If the intra-building ports of the equipment or subassembly is metalically connected to interfaces that connect to the out side plant (OSP) or its wiring, the metallic-connection MUST NOT be more than 6 meters (approximately 20 feet). These interfaces are designed for use as intra-building interfaces only (Type 2, 4, or 4a ports as described in GR-1089-CORE) 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.

Humidity

High-humid conditions may cause moisture to enter the system, and cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and size. Extreme moisture buildup inside the system may result in electrical short circuit, which may cause serious damage to the system. Each system is rated for storage and operation in 10 to 95 percent relative humidity, non-condensing with a humidity gradation of 10 percent per hour. Buildings in which climate is controlled by air-conditioning in the warmer months and by heat during the colder months usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier should be used to maintain the humidity within an acceptable range.

Maintaining safety with electricity

When working on electrical equipment, ensure that the product is within its marked electrical ratings and follow the product usage instructions along with these guidelines.

- Do not work alone if potentially hazardous conditions exist anywhere in your work space.
- Never assume that power is disconnected from a circuit; always check the circuit before working on it.
    - When the power is switched off, put a lock-box on the circuit, so that no one can accidentally switch it on.
- Look carefully for possible hazards in your work area, such as damp floors, ungrounded power extension cables, frayed or damaged power cords, and missing safety grounds.
- Install the product in compliance with local and national electrical codes.

- Use the correct external power source. Operate the product only from the type of power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult a local electrician.
- Use approved power cables only. You have been provided with one or more power cables with your chassis power supply that are intended for use in your country, based on the shipping location. Should you need to purchase additional power cables, ensure that they are rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the power cable should be greater than the ratings marked on the label.
- To help prevent electrical shock, plug all the power cables into properly grounded electrical outlets. These power cables are equipped with three-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a power cable.
- Observe power strip ratings. Make sure that the total current rating of all products that are plugged into the power strip does not exceed 80 percent of the power strip rating.
- Do not modify power cables or plugs yourself. Consult with a licensed electrician or your power company for site modifications. Always follow your local and national wiring codes.

If an electrical accident occurs,

- use extreme caution; do not become a victim yourself,
- disconnect power from the system, and
- seek medical attention, if necessary.

If any of these conditions occur, contact the Cisco Technical Assistance Center.

- The power cable or plug is damaged.
- An object has fallen on to the product.
- The product has been exposed to water or other liquids.
- The product has been dropped or shows signs of damage.
- The product does not operate correctly when you follow the operating instructions.

Power source interruptions

Systems are especially sensitive to variations in voltage supplied by the AC power source. Overvoltage, undervoltage, and transients or spikes can erase data from memory or even cause components to fail. To protect against these types of problems, power wiring ground conductors should always be properly grounded. Also, place the system on a dedicated power circuit, rather than sharing a circuit with other heavy electrical equipment. In general, do not allow the system to share a circuit with

- copy machines,
- air conditioners,
- vacuum cleaners,
- space heaters,
- power tools,

- teletype machines,
- laser printers,
- facsimile machines, or
- any other motorized equipment.

Besides these appliances, the greatest threats to a system's power supply are surges or blackouts that are caused by electrical storms. Whenever possible, turn off the system and peripherals, if any, and unplug them from their power sources during thunderstorms. If a blackout occurs—even a temporary one—while the system is turned on, turn off the system immediately and disconnect it from the electrical outlet. Leaving the system on may cause problems when the power is restored; all other appliances left on in the area may create large voltage spikes that may damage the system.

Preventing ESD damage

An electrostatic discharge (ESD) strap, is a tool used to prevent damage to sensitive electronic components from static electricity. It is a wrist strap that connects the wearer to a grounding point, ensuring that any static charge on the body is safely dissipated to the ground, thus preventing damage to electronic components during handling.

ESD damage might occur when modules or other field replaceable units (FRUs) are improperly handled, resulting in intermittent or complete failure of the modules or FRUs. Modules consist of printed circuit boards that are fixed in metal carriers. EMI shielding and connectors are integral components of a carrier. Although the metal carrier helps to protect the board from ESD, always use an ESD-grounding strap when handling modules. To prevent ESD damage, follow these guidelines.

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component, use an available ejector lever to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component, use an available ejector lever to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static-shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Never attempt to remove the printed circuit board from the metal carrier.

Shock and vibration

The equipment complies with the Earthquake, Office, and Transportation Vibration, and Equipment Handling Criteria of GR-63-CORE.

System grounding

You must install a system ground as part of the chassis installation process. Chassis installations that rely only on the AC third-prong ground are insufficient to adequately ground the systems.

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

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

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

Proper grounding practices ensure that the buildings and the installed equipment within them have low-impedance connections and low-voltage differentials between chassis. When you install a system ground, you reduce or prevent shock hazards, chances of equipment damage due to transients, and the potential for data corruption.

Without proper and complete system grounding, you run the risk of increased component damage due to ESD. Additionally, you have a greatly increased chance of data corruption, system lockup, and frequent system reboot situations by not using a system ground.

Caution Installations that rely solely on system grounding that uses only an AC third-prong ground run a substantially greater risk of equipment problems and data corruption than those installations that use both the AC third-prong ground and a properly installed system ground.

This table lists some general grounding practice guidelines.

Table 14: Grounding practice guidelines

Environment	Electromagnetic noise severity level	Grounding recommendations
Commercial building is subject to direct lightning strikes. For example, some places in the United States, such as Florida, are prone to more lightning strikes than other areas.	High	All lightning protection devices must be installed in strict accordance with manufacturer recommendations. Conductors carrying lightning current should be spaced away from power and data lines in accordance with applicable recommendations and building codes. Best grounding practices must be closely followed.
Commercial building is located in an area where lightning storms occur frequently, but is not prone to direct lightning strikes.	High	Best grounding practices must be closely followed.

Environment	Electromagnetic noise severity level	Grounding recommendations
Commercial building contains a mix of information technology equipment and industrial equipment, such as welding.	Medium to High	Best grounding practices must be closely followed.
Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment. This installation has a history of malfunction due to electromagnetic noise.	Medium	Best grounding practices must be closely followed. Determine the source and cause of noise if possible, and mitigate as closely as possible at the noise source or reduce coupling from the noise source to the victim equipment.
New commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment.	Low	Best grounding practices should be followed as closely as possible. Electromagnetic noise problems are not anticipated, but installing a best-practice grounding system in a new building is often the least expensive route, and the best way to plan for the future.
Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment.	Low	Best grounding practices should be followed as much as possible. Electromagnetic noise problems are not anticipated, but installing a best-practice grounding system is always recommended.

Note In all situations, grounding practices must comply with Section 250 of the National Electric Code (NEC) requirements or local laws and regulations. A 6 American Wire Gauge (AWG) grounding wire is preferred from the chassis to the rack ground or directly to the common bonding network (CBN). The equipment rack should also be connected to the CBN with a 6 AWG grounding wire.

Note Grounding lugs must be installed on the location marked on the chassis only.

Note Always ensure that all of the modules are completely installed and that the captive installation screws are fully tightened. In addition, ensure that all the I/O cables and power cords are properly seated. These are normal installation practices and must be followed in all installations.

Caution Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.

Temperature

Temperature extremes may cause a system to operate at reduced efficiency and cause a variety of problems, including premature aging and failure of chips, and failure of mechanical devices. Extreme temperature fluctuations may also cause chips to become loose in their sockets.

Follow these guidelines.

- Ensure that the system is operating in an environment that is 23° to 104°F (-5 to +40ºC), up to 6,000 feet (1,800 m). The maximum allowable operating temperature de-rated 1°C/1,000 feet from 6,000 to 10,000 feet.
- Ensure that the chassis has adequate ventilation.
- Do not place the chassis within a closed-in wall unit or on top of cloth, which can act as thermal insulation.
- Do not place the chassis where it will receive direct sunlight, particularly in the afternoon.
- Do not place the chassis next to a heat source of any kind, including heating vents.
- Adequate ventilation is particularly important at high altitudes. Make sure that all the slots and openings on the system remain unobstructed, especially the fan vent on the chassis.
- Clean the installation site at regular intervals to avoid buildup of dust and debris, which may cause a system to overheat.
- If system is exposed to abnormally low temperatures, allow a two hour warm up period, in ambient temperature no lower than 32°F (0 °C) before turning on.

Failure to observe these guidelines may damage the internal components of the chassis.

Power requirements

Power supplies installed on the switch chassis can be all AC-input, all DC-input, or a mix of both. When preparing your site for switch installation, adhere to these requirements.

- In systems that are configured with more than one power supply, connect each of the power supplies to a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.
- To prevent loss of input power, ensure that the total maximum load on each source circuit is within the current ratings of the wiring and breakers.
- You can also use an uninterrupted power supply (UPS) to protect against power failures at your site. However, some UPS models that use ferroresonant technology may become unstable when operating with the switch power supplies that use power factor correction. This may cause the output voltage waveform to the switch to become distorted, resulting in an undervoltage situation in the system.

Cabling requirements

When running power and data cables together in overhead cable trays or subfloor cable trays,

Caution We strongly recommend that power cabling runs and other potential noise sources be located as far away as practical from LAN cabling that terminates on the Cisco equipment. In situations where this type of long parallel cable runs exist and cannot be separated by at least 3.3 feet (1 meter), we recommend that you shield these potential noise sources by housing it in a grounded metallic conduit to avoid interference.

When using Category 5e and Category 6 Ethernet cables, be aware that

Caution Category 5e, Category 6, and Category 6a cables can store large levels of static electricity because of the dielectric properties of the materials used in their construction. Always ground the cables (especially in new cable runs) to a suitable and safe earth ground before connecting them to the module.

Site preparation checklist

This table lists the site-planning activities that you must perform prior to installing the switch. Completing each activity helps ensure a successful switch installation.

Table 15: Site Preparation Checklist

Task No.	Activity	Verified By	Time	Date
1	Space evaluation • Space and layout • Floor covering • Impact and vibration • Lighting • Maintenance access			
2	Environmental evaluation • Ambient temperature • Humidity • Altitude • Atmospheric contamination • Airflow			

Task No.	Activity	Verified By	Time	Date
3	Power evaluation • Input power type • Power receptacles (Depends on power supply) [1] • Receptacle proximity to the equipment. • Dedicated (separate) circuits for redundant power supplies. • UPS for power failures [2]			
4	Grounding evaluation • Circuit breaker size • CO ground (AC powered systems)			
5	Cable and interface equipment evaluation • Cable type • Connector type • Cable distance limitations • Interface equipment (transceivers) • Cable bundling sizes			
6	EMI evaluation • Distance limitations for signaling • Site wiring • RFI levels			

1 Verify that each power supply installed in the chassis has a dedicated AC source circuit.
2 Refer to the power supply VA rating as a sizing criterion in determining the output required by the UPS. The power supply kVA rating value is listed for each power supply in the technical specifications section.

Rack-mounting guidelines

Rack specifications

Cisco C9610 series smart switches are designed to be installed in standard, 19-inch or 23-inch equipment racks that meet EIA-310-D specifications. In Network Equipment Building Systems (NEBS)-compliant installations, you can only use a 19-inch rack mount. Before rack-mounting the chassis, ensure that the equipment rack complies with all requirements and guidelines

Mounting location guidelines

Cisco C9610 series smart switches must be front-mounted.

Accordingly, you can install the chassis in either 2-post racks or 4-post racks.

Width and depth requirements

Use a tape measure to verify the interior dimensions of the rack.

- Measure the space between the inner edges of the left and right front-mounting posts. The chassis is 17.4 inches (44.20 cm) wide and must fit between the mounting posts.
- Measure the depth of the rack from the outside of the front mounting posts to the outside of the rear mounting strip. The chassis is 26.1 inches (66.29 cm) deep.

Height requirements

The rack must have sufficient clearance in terms of height, to insert the chassis. The chassis height is also measured in rack units (RU or just U) where 1 RU or 1 U equals 1.75 inches (44.45 mm). A typical server rack is 42 RU or 42 U in height.

The chassis height of Cisco C9610 switch is 18 RU with a depth of 26.1 inches.

General guidelines

Caution If the equipment rack is on wheels, ensure that the brakes are engaged and that the rack is stabilized.

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

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

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

Note To maintain proper air circulation through the switch chassis, we recommend that you maintain a minimum space of 6 inches (15 cm) between the wall and the chassis, power supply unit air intakes and the wall, and the chassis and power supply unit hot air exhausts. In situations where the switch chassis are installed in adjacent racks, you should allow a minimum space of 12 inches (30.5 cm) between the air intake of one chassis and the hot air exhaust of another chassis. Failure to maintain adequate spacing between chassis may cause the switch chassis that is drawing in the hot exhaust air to overheat and fail.

Standard and optional accessory kit contents

This section provides information about the standard accessory kit that ships along with the Cisco C9610 series smart switches and also the optional accessory kits that are available for ordering separately.

Standard accessory kit contents

The standard accessory kit contains the switch you ordered and other components needed for installation.

Note Verify that you have received these items. If any item is missing or damaged, contact your Cisco representative or reseller for instructions.

Switch model	Accessory kit part number
Cisco C9610 series smart switch	C9610-19-KIT-4= Cisco C9610 series 10 slot chassis 4 post 19-inch rack mount kit

The Cisco C9610 switches ship with a standard accessory kit, which includes these items.

Table 16: Standard accessory kit (C9610-19-KIT-4=)

Item	Quantity
10-32 x 0.75 inch M, Phillips screws	50
12-24 x 0.75 inch M, Phillips screws	50
Adjustable rack support	2
Chassis rear-mounting bracket Fabricated metal chassis bracket to secure the chassis to the rack enclosure.	2
Documentation pointer card Provides references to related documentation on cisco.com	1
Rear rack-mounting bracket Fabricated metal bracket at the rear of the rack.	2
M4 x 8mm Phillips pan-head screws	6
M6 x 19mm Phillips pan-head screws	50

Optional accessory kit contents

C9610-ACC-KIT is an optional accessory kit. You must order it separately by using the chassis-specific part number.

Switch model	Accessory kit part number
Cisco C9610 series smart switch	C9610-ACC-KIT Cisco C9610 accessory kit

This table lists the contents of the Cisco C9610 accessory kit.

Table 17: Accessory kit contents

Item and description	Quantity
Adapter, DB9F/RJ45F	1
Documentation pointer card Provides references to related documentation on cisco.com	1
Fabricated plastic cable management guide	4
M3 x 6 mm Phillips pan-head screws	4
M6 x 19 mm Phillips pan-head screws	20
Metal brackets Fabricated metal rack brackets for mounting cable management onto the chassis.	2

23-inch rack mount kit contents

The 23-inch rack mount kit (C9610-23-KIT-2=) is not part of the standard accessory kit. You must order it separately by using the chassis-specific part number.

Switch model	Accessory kit part number
Cisco C9610 series smart switch	C9610-23-KIT-2= Cisco C9610 accessory kit

The 23-inch rack mount kit consists of these items.

Table 18: Contents of the 23-Inch rack mount kit

Item	Quantity
10-32 x ¾-inch Phillips binder-head screws	50
12-24 x ¾-inch Phillips binder-head screws	50

Item	Quantity
2-post rack support left A fabricated metal chassis left bracket to secure the chassis to the rack enclosure	1
2-post rack support right A fabricated metal chassis right bracket to secure the chassis to the rack enclosure	1
Documentation pointer card Provides references to related documentation on cisco.com	1
M4 x 6mm Phillips screws	26
M4 x 8mm Phillips screws	16
M6 x 19mm Phillips pan-head screws	50
Rack brackets Fabricated metal rack brackets to support the weight of the chassis.	2

NEBS kits

The 19-inch rack mount Network Equipment-Building System (NEBS) kit is not a standard accessory kit. You must order it separately by using the chassis-specific part number.

Switch model	19-Inch rack mount NEBS kit part number
Cisco C9610 series smart switch	C9610-NEBS-KIT= Cisco C9610 series 10 slot chassis NEBS kit

The 19-inch rack mount kit for NEBS installation consists of these items.

Table 19: Contents of the NEBS kit

Item	Quantity
Top hood Module to be installed as top hood of NEBS kit.	1
Bottom hood Module to be installed as bottom of the NEBS kit.	1
Left cable management bracket Left cable management with brushes.	1

Item	Quantity
Left filter door Left door with the filter assembled.	1
Right cable management bracket Right cable management with brushes.	1
Right filter door Right door with the filter assembled.	1
Shoulder screws Shoulder screws for door installation.	4
M3x6 mm Torx flat head screws	16
M3x8 mm Phillips pan head screws	4

NEBS filter kit

The NEBS air filter is not a standard accessory kit. You must order it separately by using the chassis-specific part number.

Switch model	NEBS filter part number
Cisco C9610 series smart switch	C9610-NEBSFILTER= Cisco C9610 series 10 slot chassis NEBS filter

Table 20: Contents of the NEBS kit

Item	Quantity
Air filter door Filter	2

Unpack the switch

Check the contents of the shipping container.

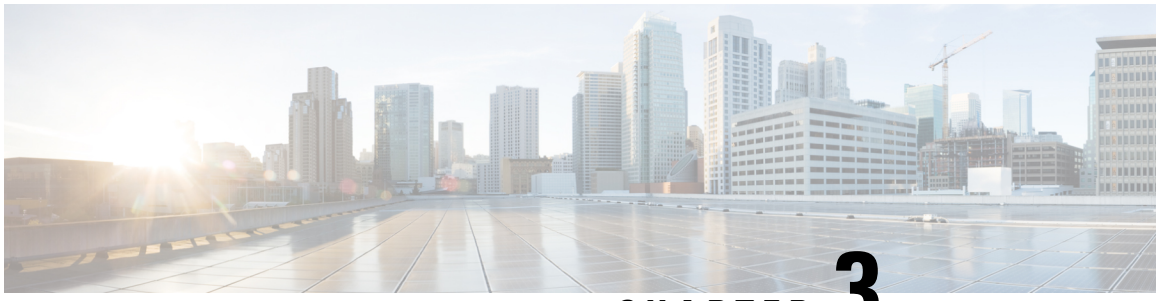
Procedure

Step 1 Check the contents of the accessory kit. Verify that you have received all the listed equipment, including any optional equipment that you have ordered, such as, network interface cables, transceivers, or special connectors.

Step 2 Check the modules in each slot. Ensure that the configuration matches the packing list and that all of the specified interfaces are included.

Step 3 Store the shipping carton.

Tip
Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them with the pallet. You will require these containers if you have to move or ship the switch in the future.



CHAPTER 3

Install the switch

This module describes

- the different methods to install the switch,
- remove and reinsert the fan modules,
- remove and reinsert the power supply modules, and
- verify the switch installation

- Install the chassis, on page 45
- Install a fan tray, on page 56
- Install a power supply module, on page 60
- Verify the switch chassis installation, on page 72

Install the chassis

This section describes the different methods to install the Cisco C9610 series smart switches.

- Install the switch on 19-inch shelf brackets.
- Install the switch on 23-inch shelf brackets.
- Install the switch in Network Equipment-Building System (NEBS)-compliant mode.

Install the switch on 19-inch shelf brackets

To install the switch on 19-inch shelf brackets

- If required, attach the cable guides on the chassis with the preinstalled L-brackets, then
- rack-mount the chassis.

Attach cable guides on the chassis with preinstalled L-brackets

You can also install the chassis on 19-inch shelf brackets, without attaching the cable guides.

The 19-inch shelf brackets are part of the standard accessory kit, C9610-19-KIT-4 that is shipped with the switch. The cable guides or cable management brackets are optional accessories.

Before you begin

Open the accessory kit and ensure that you have received all items.

Two sets of backplates are part of the 53-102061-01 kit. The backplates are not used for 19-inch rack mounting, but for 23-inch rack mounting.

Procedure

Step 1 Remove and discard the two L-brackets and the 20 mounting screws that the chassis is shipped with. Do not re-use them during any part of the installation process.

Step 2 Position the cable guides to align with the L-brackets preinstalled on the chassis.

Step 3 Secure the cable guides to the L-brackets using a screw on each side.

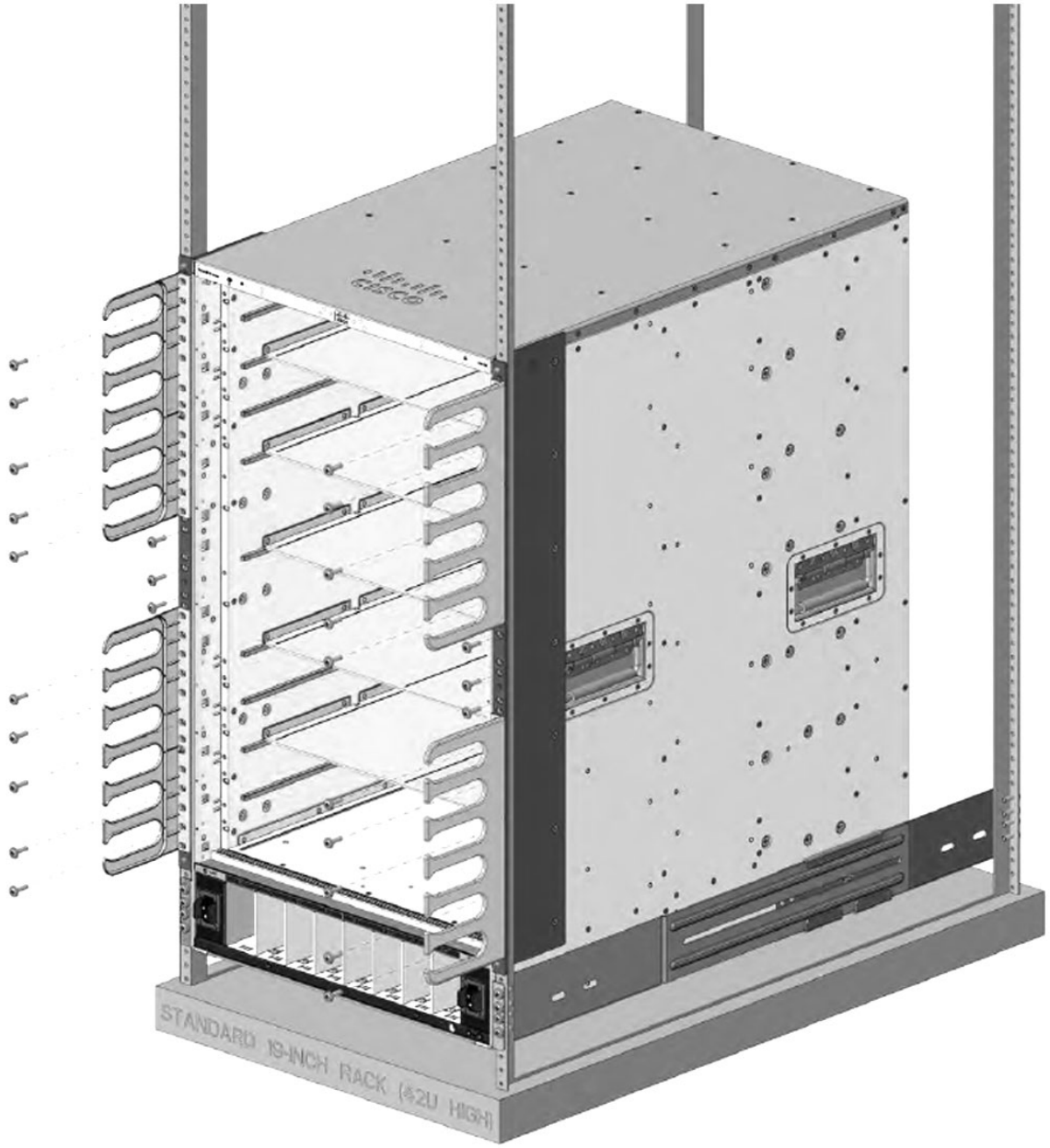
Use the M3 pan head screw from the 53-102061-01 kit.

Step 4 Position the preinstalled L-brackets on the chassis to align with the rack rails.

Step 5 Secure the L-brackets and cable guides to the rack rails by using 13 screws on each side.

Use either 10-32, 12-24, or M6 pan head screws from the C9610-19-KIT-4 kit.

Figure 10: Chassis with cable guides attached



Attaching cable guides on 19-inch shelf brackets is complete.

Rack-mounting the chassis on 19-inch brackets

Install the shelf brackets before you install the chassis in the rack to help support the weight of the chassis while you secure the L-brackets to the rack enclosure. You have to mount the shelf brackets from the front and rear.

Determine the clearance between the insides of the left and right rails of your rack system and install the shelf brackets accordingly.

Ensure that you have the required tools and accessories.

- Number 1 and number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

Before you begin

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

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

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

Warning **Statement 1032—**Lifting the Chassis

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

Warning **Statement 1098—** Lifting Requirement

Two or more people are required to lift the heavy parts of the product. To prevent injury, keep your back straight and lift with your legs, not your back.

Procedure

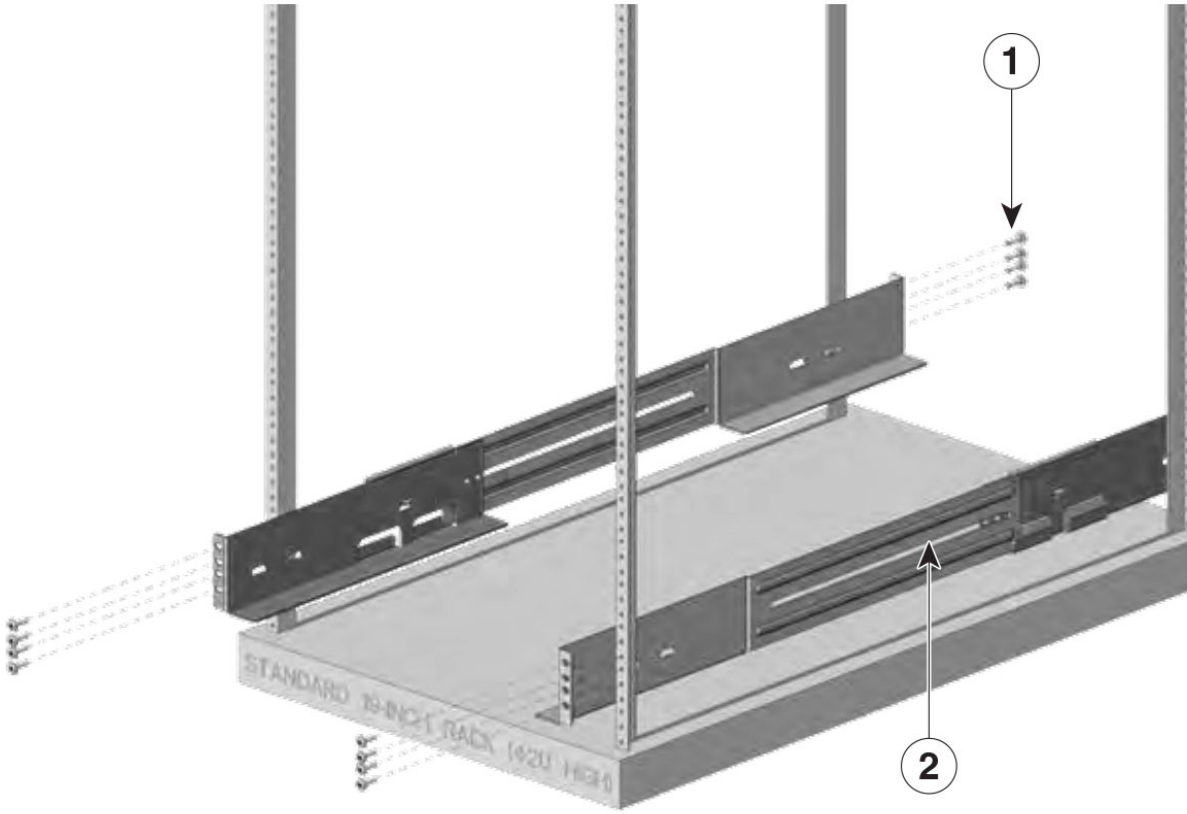
Step 1 Remove and discard the two L-brackets and the 20 mounting screws that the chassis is shipped with. Do not re-use them during any part of the installation process.

Step 2 Assemble the left and right shelf brackets on to the rack.

a) Position the support flanges of the left and right shelf brackets onto the front and rear of the left and right rails respectively.
b) Align and secure the brackets to the rack by using 16 screws on each side.

Use 10-32, 12-24, or M6 pan head screws from the standard accessory kit. Use the same type of screws for the left and right shelf brackets.

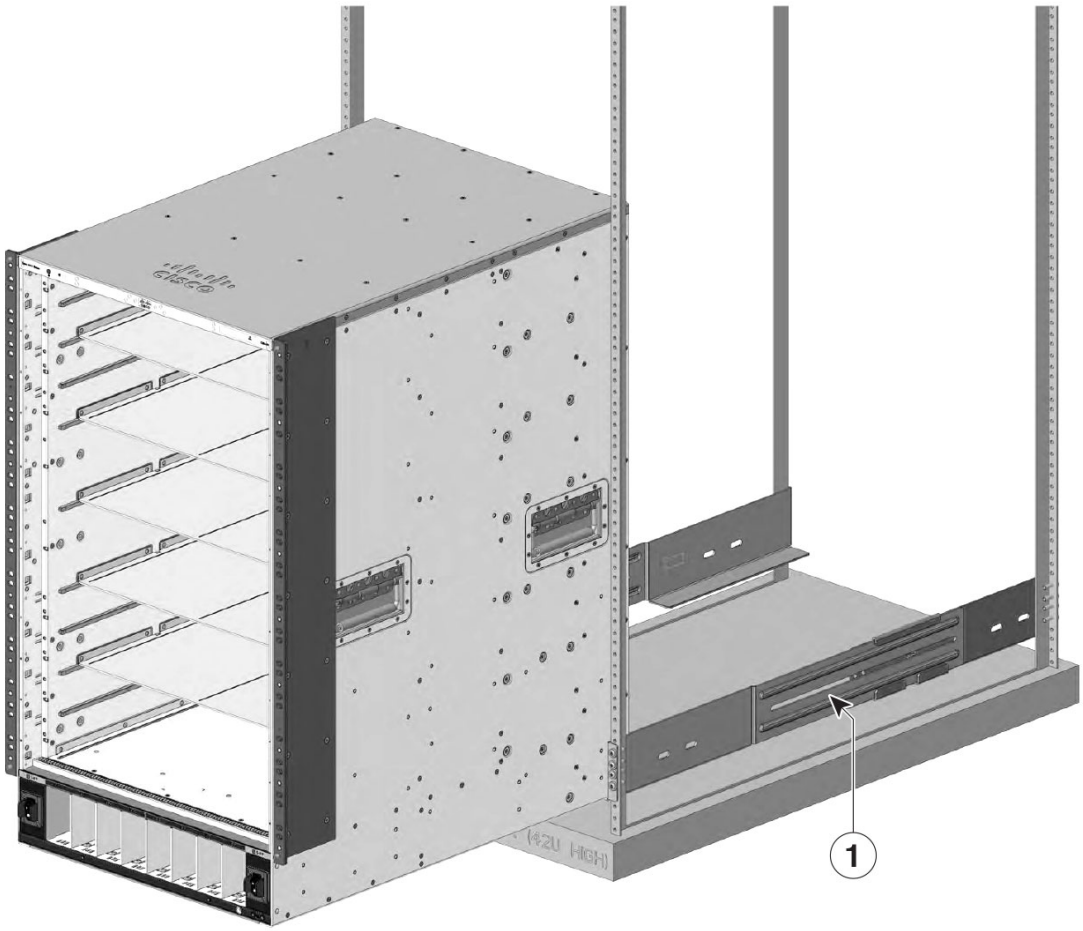
Figure 11: Assembling the shelf brackets on the rack



1	Pan head screws	2	Shelf brackets

Step 3 Insert the chassis between the shelf brackets and slide it in.

Figure 12: Inserting the chassis between the shelf brackets



1	Shelf brackets	-	-

Step 4 Align the mounting holes in the L-brackets with the rack rails or on the cable mount (if installed) with the mounting holes in the equipment rack.

Use 13 screws on each side to mount the brackets.

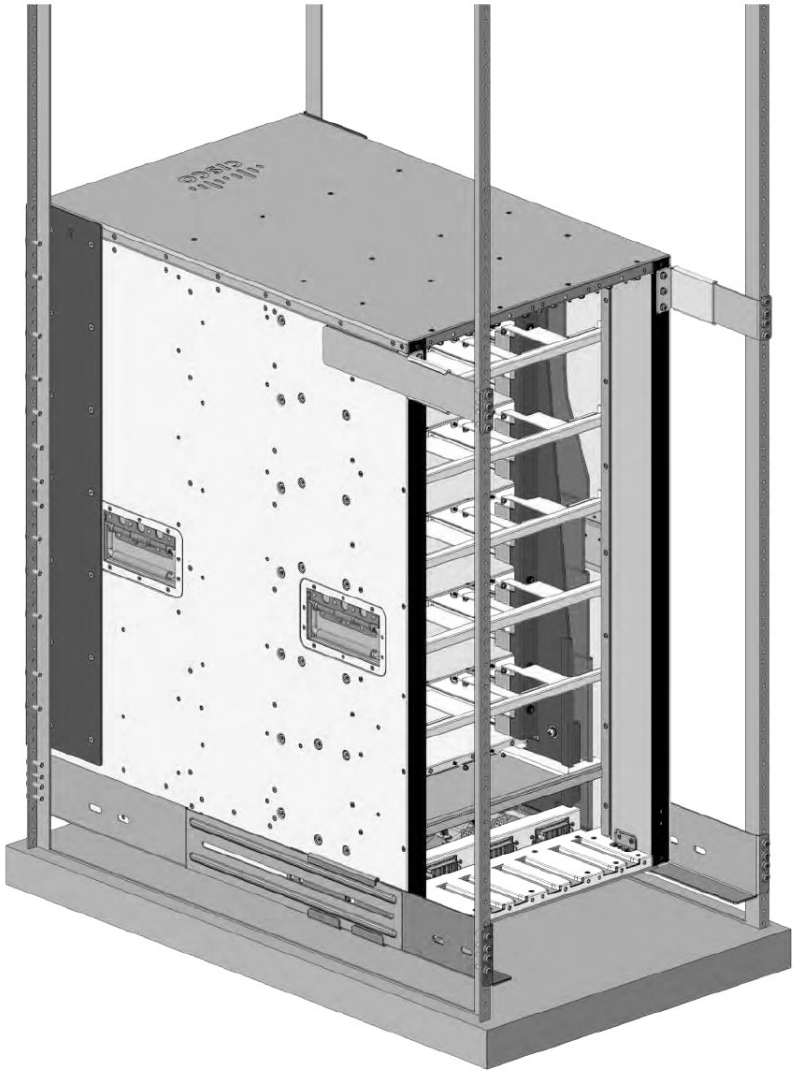
Step 5 Assemble and mount both the chassis rear-mounting brackets on to the chassis from rear.

Mount the brackets using three screws on each side.

Step 6 Assemble and mount both the rear rack-mounting brackets on to the rack.

Mount the brackets using four screws on each side.

Figure 13: Attaching the rear rack-mounting brackets



Step 7 Use a tape measure and level to ensure that the chassis is installed straight and level.

What to do next

After installing the chassis in its location, complete the installation process by

1. connecting the chassis to system ground,
2. installing and connecting the power supplies to the power source,
3. connecting the network interface cables to the supervisor module and line card modules. This may involve installing transceivers before you attach the network interface cables, and
4. powering up the chassis and verifying the installation.

Install the switch in NEBS-compliant mode

This section describes

- The NEBS-compliant air filter.
- How to install the NEBS-compliant cable guides.
- How to rack mount the Cisco C9610 series smart switches in NEBS-compliant mode.

NEBS-compliant air filter

An NEBS-compliant installation allows filtered, front-to-rear airflow. To mount the chassis in NEBS-compliant mode with the air filter, use a 19-inch rack mount. Filter brackets that are mounted on the side of the chassis to hold the air filter.

A 19-inch rack mount is used for mounting the switch in a standard 19 inches (48.26 cms) equipment rack with two unobstructed outer posts. This kit is not suitable for racks with obstructions (such as a power strip) that could impair access to the field-replaceable units (FRUs) of the switch.

Rack mount the chassis in NEBS-compliant mode

Before you begin

- Read the safety warnings carefully before starting any installation procedure to make sure you understand the hazards and precautions.
- Place the chassis on the floor or on a sturdy table as close as possible to the rack. Leave enough clearance to allow you to move around the chassis.
- Open the NEBS rack-mount kit (C9610-NEBS-KIT=) and verify that all parts are included.
- Make sure that you have the required tools and accessories.
  - Phillips screwdriver with a torque capability
  - Cable management brackets

Note Some equipment racks provide a power strip along the length of one of the rear posts. If your rack has this feature, consider the position of the strip when planning fastener points. Before installing the brackets on the chassis, determine whether to install the chassis from the front or the rear of the rack.

Perform this task to rack mounting the switch in NEBS-compliant mode.

Procedure

Step 1 Attach the cable guides on the chassis.

For more information, see Attach cable guides on the chassis with preinstalled L-brackets, on page 45 task.

Step 2 Position the cable guides to align with the vertical mounting brackets preinstalled on the chassis and secure the cable guides to the vertical mounting brackets.

Use the M3 pan head screws from the C9610-NEBS-KIT to secure the cable guides to the vertical mounting brackets.

Step 3 Secure the left and right cable guides to the chassis.

Use the pan head screws provided in the standard accessory kit, C9610-19-KIT-4.

Step 4 Install the top and bottom hood covers.

Position the top and bottom hood assembly in between the left and right cable guides, and secure the hoods.

Use flat head M3 screws from the C9610-NEBS-KIT to secure the top and bottom hood assembly.

Step 5 Install the right and the left doors.

a) Position the door frames to align with the cable guides, and pull in the two protruding spring pins so that the pins are held inside the door frames.
b) Align the spring pins to the holes in the bottom of the door plates, and then release the spring pins, so that the spring pins are inserted into the holes.

Ensure the spring pins are properly inserted into the holes so that the doors can freely swing open on the spring pins.

Step 6 Install the shoulder screws at the top and bottom of both the door frames to secure the door.

Use the number 4 Allen tool to fix the four screws.

Step 7 Attach the grounding cable on the left and right to the cable guides.

Use M3 pan head screws from C9610-NEBS-KIT.

Step 8 To replace the NEBS air filter, open either the right or left door assembly, and remove the air filter.

a) Use the Philips screwdriver to remove screws of the door assembly.

Step 9 Install the new air filter from C9610-NEBSFILTER kit, and then install the removed door assembly

a) Use the screws removed in Step 8 to install the doors.

Establish system ground

Perform these steps to attach the grounding lug and cable to the grounding pad.

Grounding lug can be installed on the front and rear of the chassis.

Before you begin

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

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

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

To connect the system ground, you require these tools and materials:

- Grounding lug: a two-hole grounding lug, which supports up to 6 American Wire Gauge (AWG) size. Supplied as part of the standard accessory kit.
- Grounding screws: two M4 x 8 mm (metric) pan-head screws. Supplied as part of the standard accessory kit.
- Grounding wire: the grounding wire should be sized according to local and national installation requirements. Depending on the power supply and system, a 12 to 6 AWG copper conductor is required for U.S. installations. Commercially available 6-AWG wire is recommended. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- No. 1 Phillips screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

Procedure

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

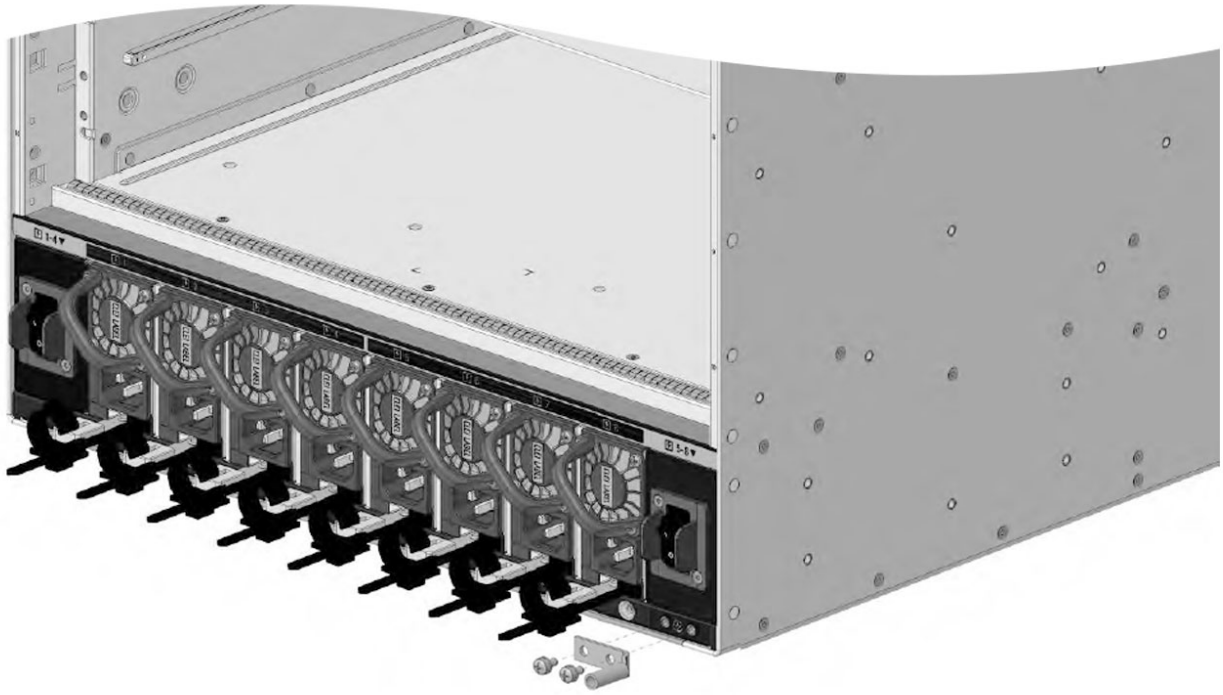
Step 2 Insert the stripped end of the grounding wire into the open end of the grounding lug.

Step 3 Crimp the grounding wire in the barrel of the grounding lug. Verify that the ground wire is securely attached to the ground lug.

Step 4 Secure the grounding lug to the system ground connector with two M4 screws. Ensure that the grounding lug and the grounding wire do not interfere with other switch hardware or rack equipment.

Step 5 Prepare the other end of the grounding wire, and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the switch.

Figure 14: Installing the ground lug from the front of the chassis



Attach an ESD strap

After you install the system ground lug, follow these steps to correctly attach the electrostatic discharge (ESD) wrist strap.

Procedure

Step 1 Attach the ESD wrist strap to bare skin.

a) If you are using the ESD wrist strap supplied with the FRUs, open the wrist strap package and unwrap the ESD wrist strap. Place the black conductive loop over your wrist and tighten the strap such that it touches your bare skin well.

b) If you are using an ESD wrist strap equipped with an alligator clip, open the package and remove the ESD wrist strap. Locate the end of the wrist strap that attaches to your body and secure it to your bare skin.

Step 2 Grasp the spring or alligator clip on the ESD wrist strap and momentarily touch the clip to a bare metal spot (unpainted surface) on the rack. We recommend that you touch the clip to an unpainted rack rail so that any built-up static charge is then safely dissipated to the entire rack.

Step 3 Attach either the spring clip or the alligator clip to the ground lug screw as follows:

a) If you are using the ESD wrist strap that is supplied with the FRUs, squeeze the spring clip jaws open, position the spring clip to one side of the system ground lug screw head, and slide the spring clip over the lug screw head so that the spring clip jaws close behind the lug screw head.

Note
The spring clip jaws do not open wide enough to fit directly over the head of the lug screw or the lug barrel.

b) f you are using an ESD wrist strap that is equipped with an alligator clip, attach the alligator clip directly over the head of the system ground lug screw or to the system ground lug barrel.

Follow these guidelines, when handling modules.

- Handle carriers using the available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board side (refers to the side of the switch where the main circuit board [PCB] is located) up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
- Never attempt to remove the printed circuit board from the metal carrier.

Caution
For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohm (Mohm).

Install a fan tray

The Cisco C9610 series smart switches ship with preinstalled fan trays. Before removing or installing a fan tray ensure that you follow the guidelines and safety warnings.

Caution When removing a fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan tray.

Online insertion and removal

While the fan tray is designed to be removed and installed while the system is operational (powered on) without presenting an electrical hazard or damage to the system, there is a time constraint when you remove and replace the fan tray in a system that is powered on.

Caution The system can safely run without a fan tray only for a few minutes, until the critical temperature threshold is exceeded. Watch for any alarms triggered in the software. After the critical temperature threshold exceeds without sufficient cooling, the system shuts down if the alarm is not cleared.

You can remove and replace the fan tray only from the rear of the chassis.

When you remove and replace a fan tray in a non-operating system, there is no time constraint.

When you order a spare, a fan tray that contains six fans and a connector are shipped. Even if one of the fans is not functioning and you need to replace the fan, you must order a fan tray; individual fans cannot be ordered.

Remove a fan tray

Fan trays are hot-swappable. You do not need to power down the system to remove fan trays.

Before you begin

- Read the safety instructions in the Install a fan tray, on page 56 section.
- Ensure that you have these tools and accessories available
  - Phillips-head screwdriver, and an
  - anti-static mat.

Procedure

Step 1 Keep the replacement fan tray ready by removing it from the shipping packaging. Place it on an anti-static mat and within arm's reach. Do not detach the connector module.

Note
When you remove and replace the fan tray in a system that is powered on, there is a time constraint. The system can safely run without a fan tray only for 2 minutes. So it is important to complete this first step before you remove the fan tray from the rear of the chassis.

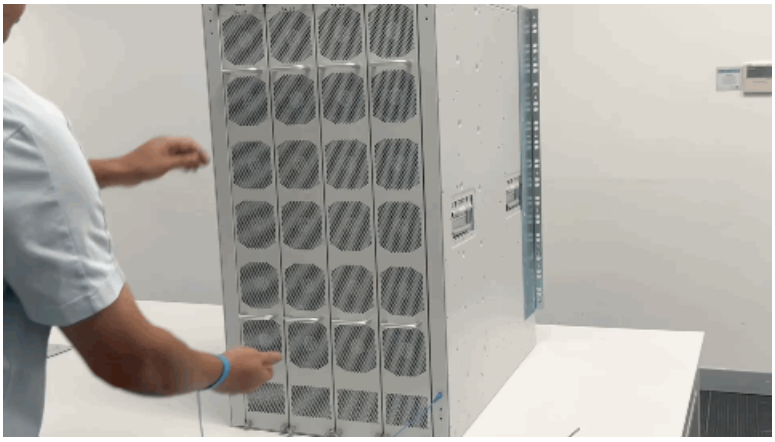
Step 2 Proceed with removing the fan tray from the chassis. Loosen the four captive installation screws on the fan tray until the screws are free of the chassis.

Figure 15: Removing the captive installation screws on the fan tray

In PDF, to view the animation, click this link.

Step 3 Hold both the handles of the fan tray and remove the fan tray assembly completely out of the bay.

Figure 16: Removing the fan tray assembly



In PDF, to view the animation, click this link.

What to do next

Set the removed fan tray on an anti-static mat and proceed with installing the replacement or spare fan tray.

Install a fan tray

When inserting the fan tray, make sure that the Cisco logo on the fan tray must be on the top.

Before you begin

- Read the safety warnings.
- Ensure that you have the following tools and accessories available:
  - Phillips-head screwdriver
  - Anti-static mat

Procedure

Step 1 On the replacement fan tray assembly, ensure that the four screws securing the fan tray to the connector are tight. Be careful not to overtighten the screws.

Step 2 Hold both the fan tray assembly handles.

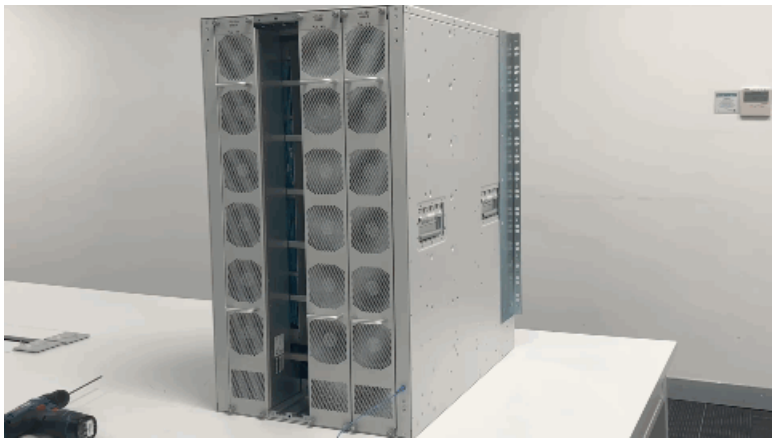
Step 3 Position the fan tray with its rear (the side with the electrical connectors) at the opening of the fan tray slot in the chassis.

Step 4 Align the two tracks on the top of the fan tray with the two sets of rails at the top of the fan tray slot in the chassis.

Note

If you try to insert the fan tray in inverse, you will not be able to insert it into the bay. Ensure that the top and bottom of the fan tray is aligned to the top and bottom of the bay.

Figure 17: Inserting the fan tray



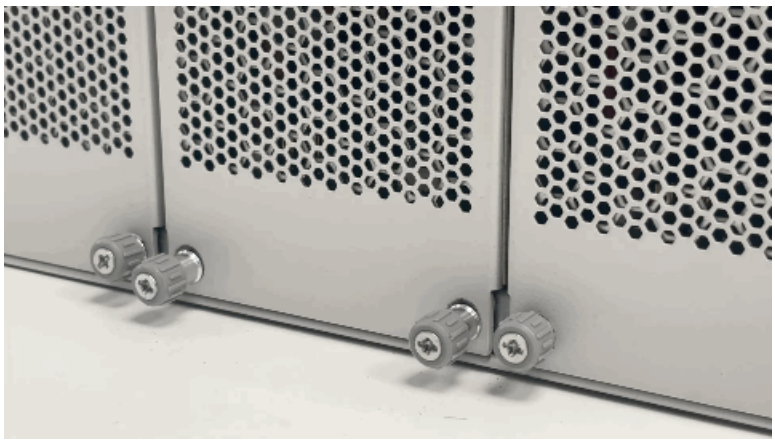
In PDF, to view the animation, click this link.

Step 5 Slide the fan tray slowly into the chassis with both your hands, until the four captive installation screws make contact with the chassis.

Do not slam in the fan tray into the slot. Plug in the fan tray slowly

Step 6 Tighten the four (two at the top and two at the bottom of the fan tray) captive installation screws and secure the fan tray assembly in the chassis.

Figure 18: Tightening the captive screws on the fan tray



In PDF, to view the animation, click this link.

What to do next

Verify that the fan tray status LED turns green within 20 seconds after the installation.

Verify the fan tray installation

Follow these steps to verify that the new fan tray is installed correctly and is operating properly.

Before you begin

To check the operation of the fans, you have to power up the chassis.

Procedure

Step 1 Listen to the sound of the fans; you should immediately hear them operating. If you do not hear the sound, ensure that the

a) fan tray is inserted completely in the chassis,
b) faceplate is flush with the chassis panel, and
c) captive installation screws are sufficiently tightened.

Important
If the fan tray is not installed correctly, the fans may not run at all, or they may run at full speed. When the fan tray operates at full speed, increased noise levels may be expected.

Step 2 Check if the fan tray LED is lit and is green.

Step 3 Even after several attempts if the fans do not operate, or if you experience trouble with the installation (for instance, if the captive installation screws do not align with the chassis holes), contact the Cisco TAC for assistance.

Install a power supply module

Cisco C9610 series smart switches ship with preinstalled power supply modules. This section describes how to remove and install the power supply modules.

Required tools and equipments

To install a power supply unit on a Cisco C9610 switch, you need

- Phillips-head screwdriver
- 10-mm torque driver (with a 3-inch shaft, at a minimum)
- Wire-stripping tool
- Wire-crimping tool

Remove and reinstall power supply modules

The chassis supports field-replaceable and hot-swappable AC-input and DC-input power supply modules. You can install a mix of AC-input and DC-input modules in the chassis. This section describes how to remove and install both kinds of modules and safety warnings to adhere to.

- In redundant mode, you do not have to power down the switch to replace or upgrade the power supplies.
- In combined mode, the module is still hot-swappable as long as the difference between total output power and the total used power is greater than the capacity of the module being removed.

  Total output power: Total used > Capacity of power supply module being removed.

Warning **Statement 1003—**DC Power Disconnection

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

Warning **Statement 1005—** Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than: 20A for AC and 60A for DC.

Warning **Statement 1017—**Restricted Area

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

Warning **Statement 1022—**Disconnect Device

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

Warning **Statement 1073—**No User-Serviceable Parts

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

Remove a power supply module

Before you begin

Warning **Statement 1073—**No User-Serviceable Parts

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

Procedure

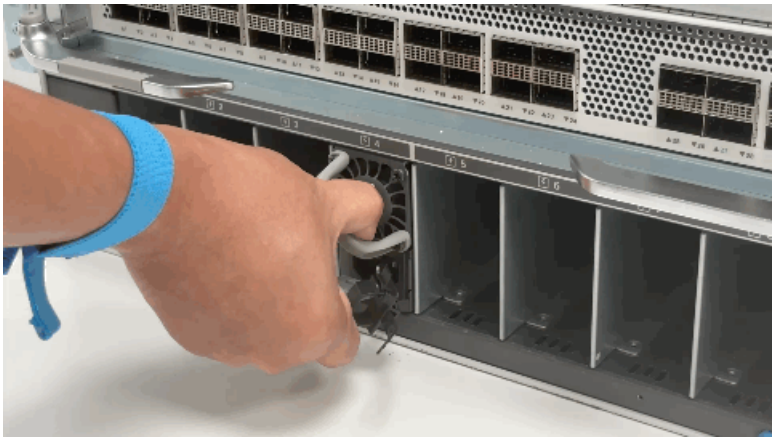
Step 1 Turn the power switch of the designated power supply module to OFF (0) position.

Step 2 Loosen and remove the retainer strip that is around the power cord.

Step 3 Remove the power cord from the power receptacle on the power supply.

Step 4 Press the release latch at the bottom of the power supply module upwards.

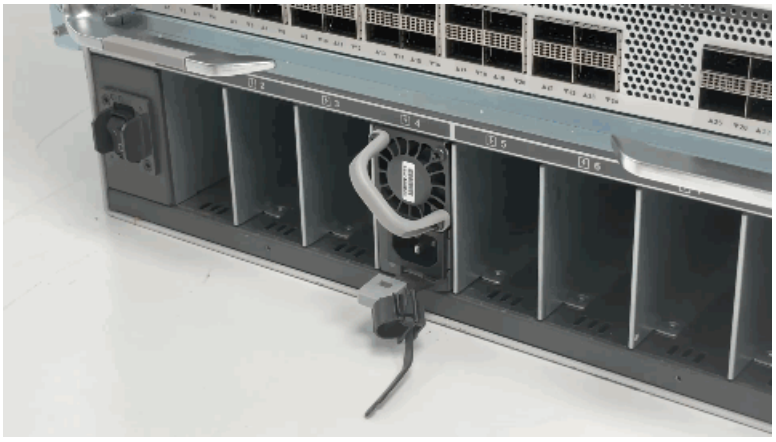
Figure 19: Detaching the power supply module from the slot



In PDF, to view the animation, click this link.

Step 5 Grasp the power supply module handle with one hand, and slide the power supply module out fully.

Figure 20: Sliding the power supply module out

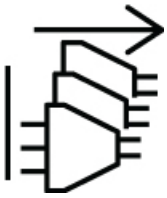


In PDF, to view the animation, click this link.

Caution
Do not leave any power supply slot open for any amount of time while the system is powered up. Before inserting a new power supply unit, for instance, when replacing the unit, ensure that there are no foreign, conductive or other objects, or debris in the slot.

Warning
Statement 1028—More Than One Power Supply

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



What to do next

Set the power supply aside and proceed with installing the new or replacement power supply module. Install blank covers in all power supply bays that are to remain empty (C9600-PWR-BLANK). For information about installing blank covers, see Remove and reinstall power supply blanks, on page 68.

Install a power supply module

Before you begin

Warning **Statement 1073—**No User-Serviceable Parts

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

Ensure that you have installed the cable guide before you begin this procedure. This is to properly guide and arrange the power cords that you will attach as part of the installation.

Procedure

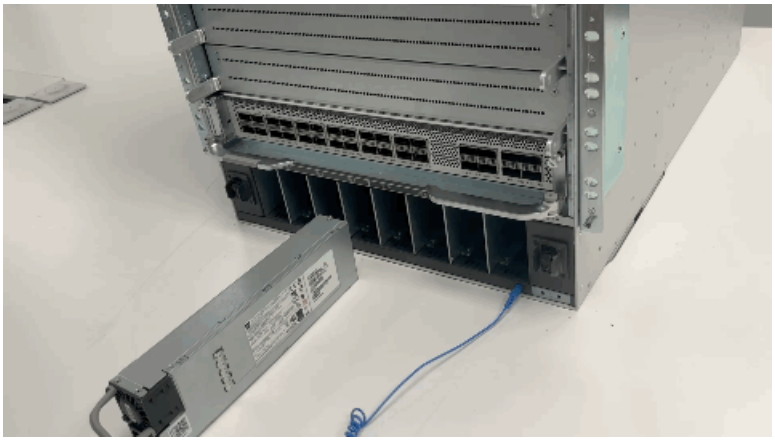
Step 1 Remove the replacement power supply from its shipping packaging.

Step 2 Verify that the power switch of the replacement power supply is in the OFF (0) position.

Step 3 If installed, remove the blank power supply cover from the empty power supply bay. For information about removing blank covers, see Remove and reinstall power supply blanks, on page 68. Save the blank cover for future use.

Step 4 Grasp the power supply handle with one hand and slide the power supply all the way into the power supply bay. Make sure that the power supply is fully seated in the bay.

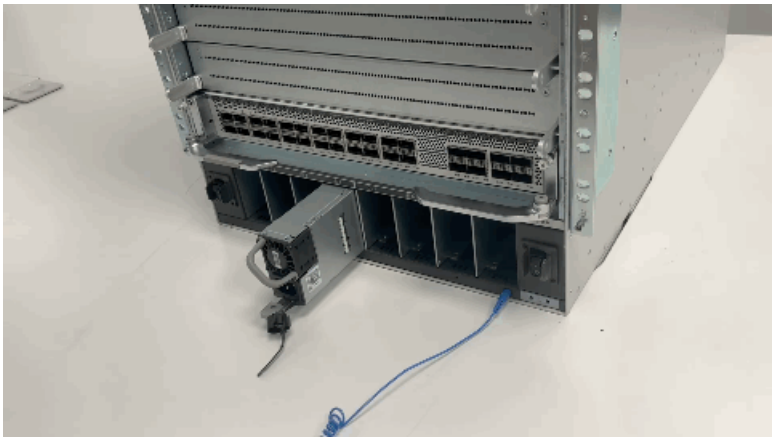
Figure 21: Inserting the power supply into the power supply bay



In PDF, to view the animation, click this link.

a) When correctly installed, the latch on the power supply locks-in the module, to avoid accidental removal of the module.

Figure 22: Locking-in the PSU



In PDF, to view the animation, click this link.

Step 5 Verify that all site power and grounding requirements have been met.

Step 6 Verify that you have the correct power cord for your location and power supply rating and only then plug the power cord connector into the power supply receptacle.

Step 7 Follow the steps to install the power cord retainer, to hold it in place and avoid accidental removal.

a) Fix the strap in the power cord retainer to the power supply module, to hold the clamp in place.

b) Slide the retainer clamp around the power cord and position the retainer closest to the power supply.

Depending on the width of the power cord, adjust the size of the retainer clamp, if required.

c) Press the tabs on the retainer clamp towards each other to secure the power cord.

Step 8 Set the power switch to the ON (|) position

What to do next

Connect the power supply to the power source.

Connect to an AC power source

Procedure

Step 1 Prior to connecting the power supply to a power source, ensure that the chassis is properly grounded.

Step 2 Plug the power cable into the AC power receptacle on the power supply module.

Step 3 Plug the other end of the power cable into a power source supplied by the data center.

Note
When using redundant mode, connect each power supply to a separate power source.

Step 4 Verify that the power supply is receiving power by checking that the LED is on and is green. For more information about the power supply LEDs and the conditions that they indicate, see Power supply module LEDs, on page 17.

When you first activate the power supply, you can verify the functionality of the LED by checking that LED turns on for a couple of seconds. If the LED is flashing amber or green, check the power connections on the power supply and the power source.

Connect to a DC power source

To connect the DC power supply directly to one or two DC power sources, follow these steps.

Before you begin

Warning **Statement 1022—**Disconnect Device

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

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

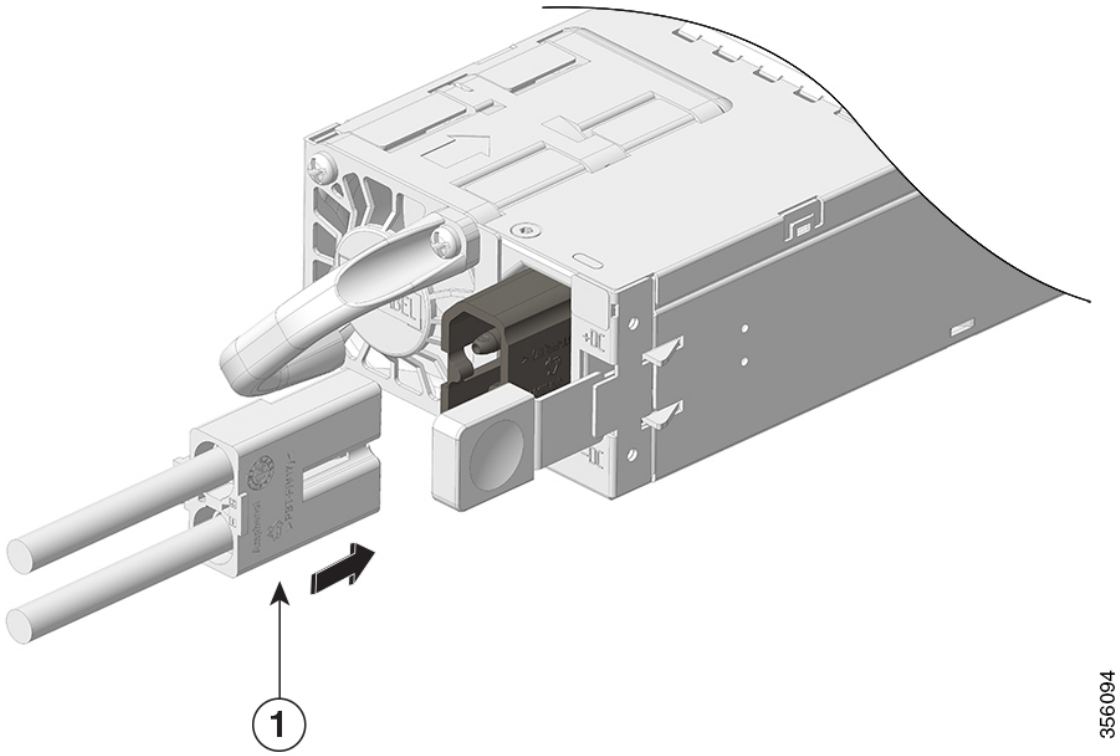
To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

Procedure

Step 1 Prior to connecting the power supply to a power source, ensure that the chassis is properly grounded.

Step 2 Plug the DC power cable into the DC power receptacle on the power supply module.

Figure 23: Plugging in the DC power cable



1	power cable

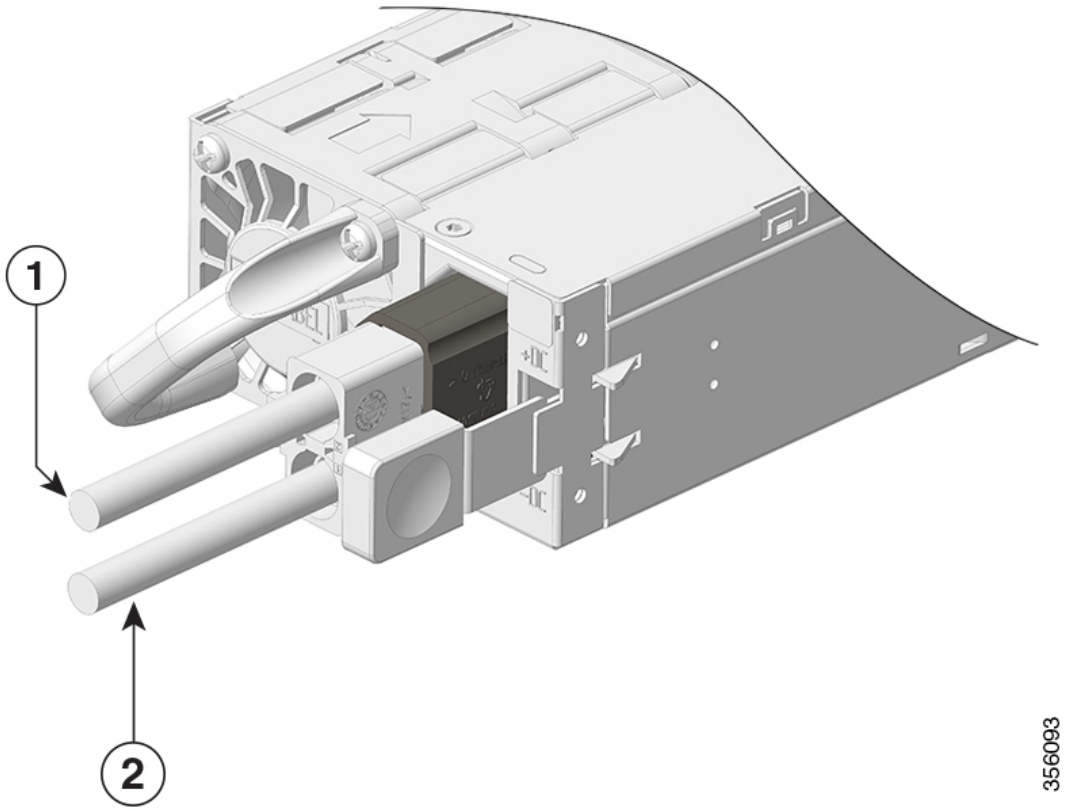
Step 3 Turn off the power at the circuit breakers for the portions of the DC grid power that you are connecting to and verify that all of the LEDs on the DC grid power supplies are off.

Step 4 Install the two cables from the DC power cable to a DC power source as follows:

a) If the unconnected end of each power cable is not stripped of its insulation for the last 0.75 inches (19 mm), use wire strippers to remove that amount of insulation.

b) Attach the negative cables to the negative terminals of a DC power source, and attach the positive cables to the positive terminals of the same power source.

Figure 24: Attaching the cable to the power source



1	positive terminal	2	negative terminal

Note
If you are using combined power mode or power supply redundancy mode, connect all the power supplies in the chassis to the same power source. If you are using input source redundancy mode or full redundancy mode, connect half the power supplies to one DC power source and the other half of the power supplies to another DC power source.

Step 5 Verify that the power supply is receiving power by checking that the LED is on and is green.

When you first activate the power supply, you can verify the functionality of the LED by checking that LED turns on for a couple of seconds. If the LED is flashing amber or green, check the power connections on the power supply and the power source.

Verify the power supply installation

Procedure

Step 1 Verify the power supply operation by checking the power supply's front-panel LED. See Power supply module LEDs, on page 17.

Step 2 Check the power supply and system status from the system console by entering **show power** command in privileged EXEC mode.

```
Switch# show power
```

Step 3 If the LEDs or **show power** command output indicate a power problem or other system problem.

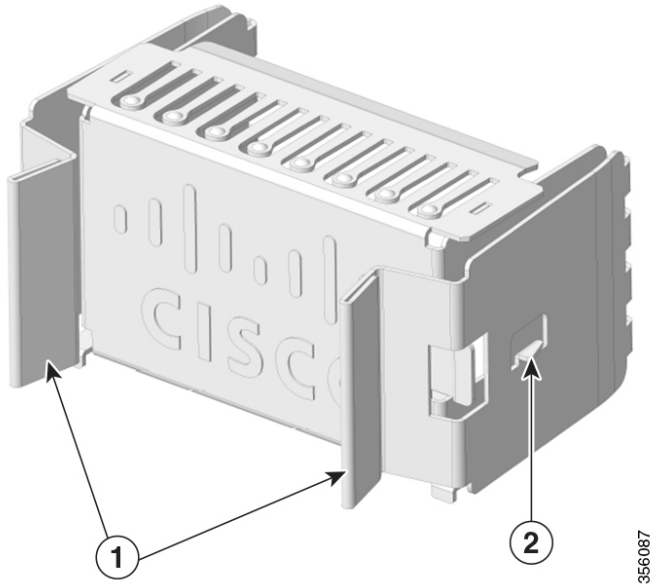
Remove and reinstall power supply blanks

If a power supply bay in a chassis is unused, you must cover it with a power supply blank cover to maintain proper airflow through the chassis. Part number of the power supply blank is C9606-PWR-BLANK=.

Warning **Statement 1029—**Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Figure 25: Front view of a power supply blank cover

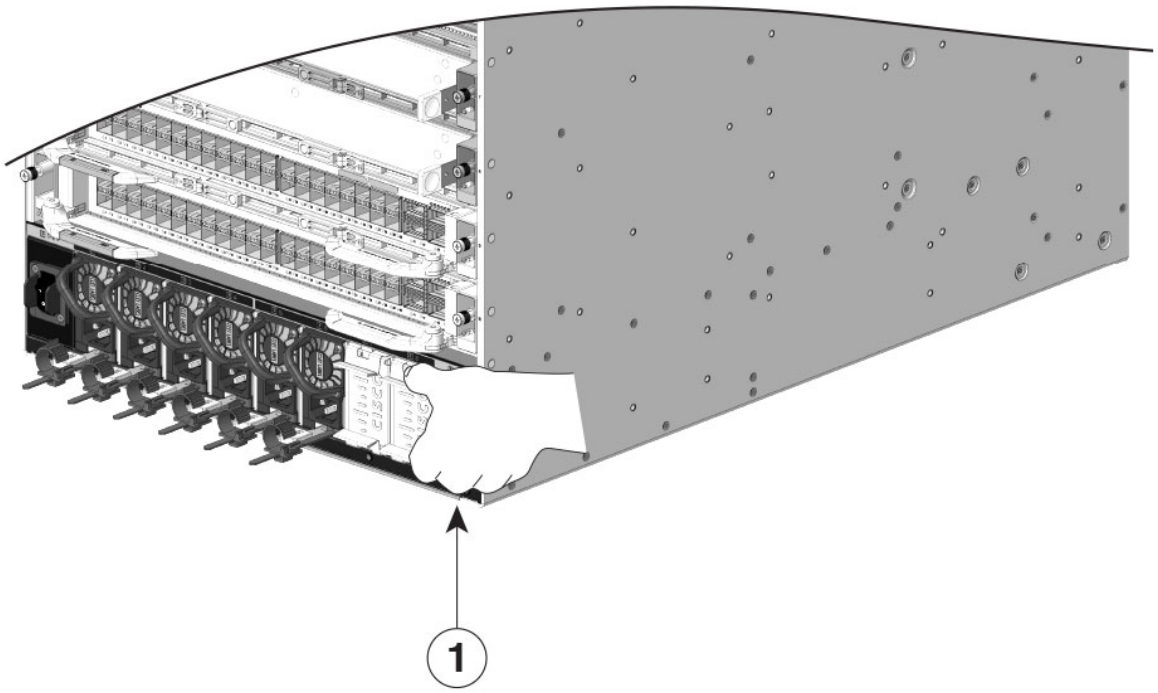


1	Release handles	2	Retainer clip

Remove a power supply blank cover

To remove the blank cover from a bay, use the release handles to hold the blank cover (with your thumb and index fingers), squeeze both the handles toward each other and slide the cover out of the bay.

Figure 26: Removing a power supply blank cover



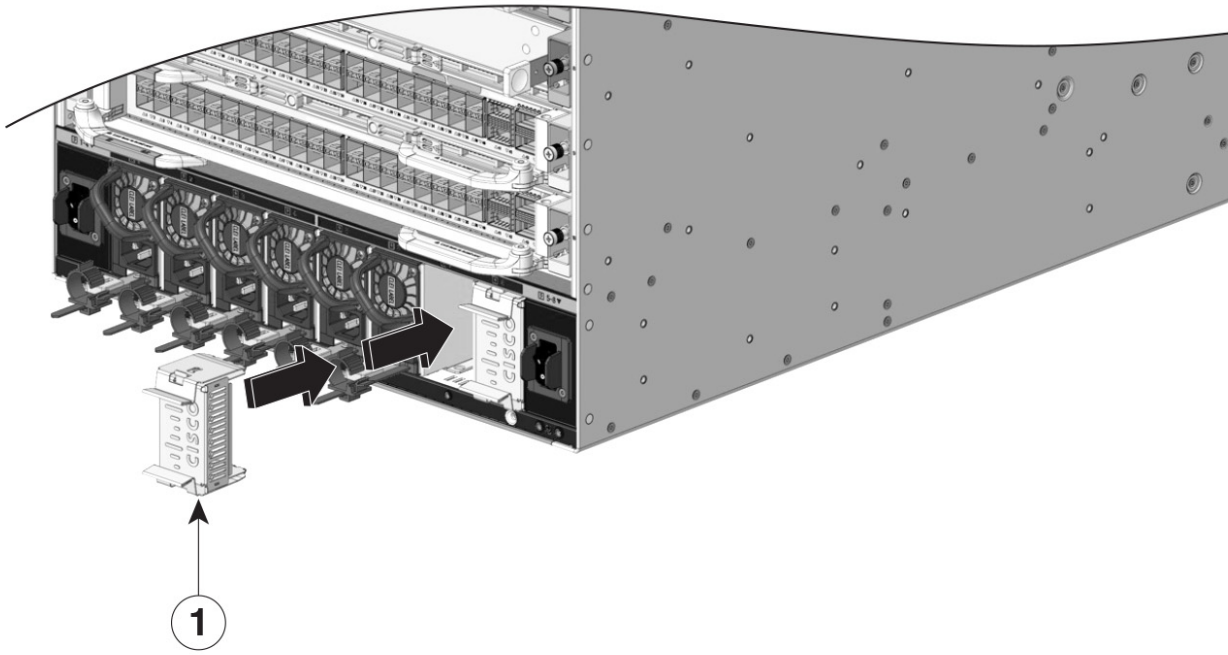
1	Release handles that are squeezed toward each other

Caution Do not leave any power supply slot open for any amount of time while the system is powered up. Prior to inserting a new power supply unit, for instance, when replacing the unit, ensure there are no foreign, conductive or other objects, or debris in the slot.

Install a power supply blank cover

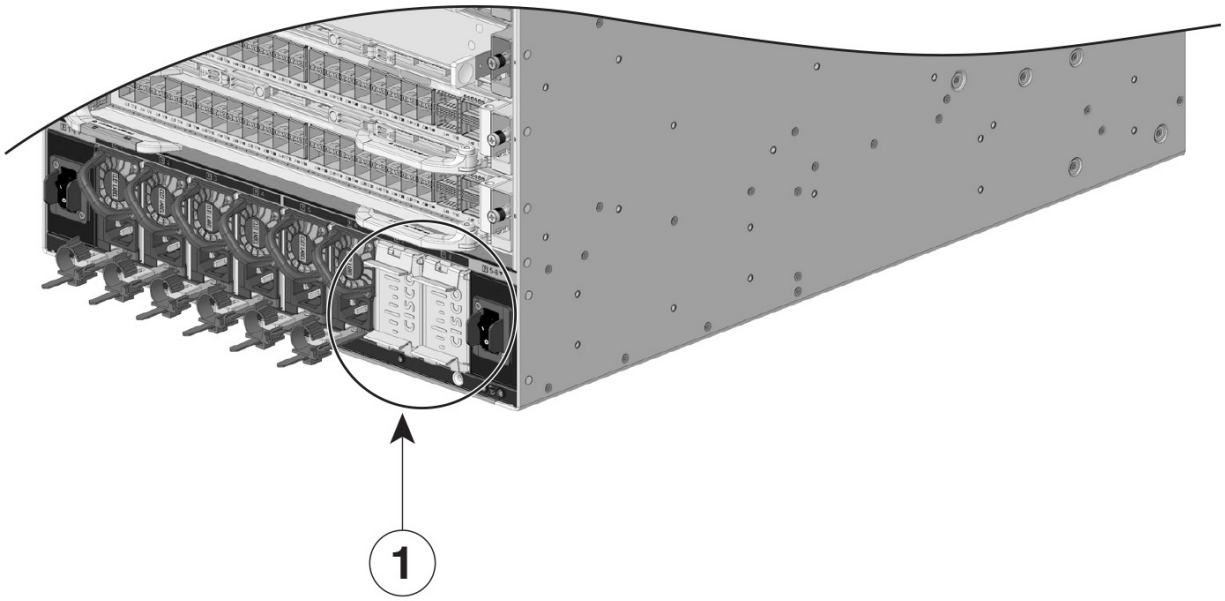
To install a power supply blank cover, push the blank cover straight and into the bay. You will hear retainer clips snap into place when installed correctly. You can hold the blank cover by the outside edges when you perform this task; alternatively, use the release handles to hold the blank cover.

Figure 27: Installing a power supply blank cover



1	Power supply blank

Figure 28: Power supply blank cover installed



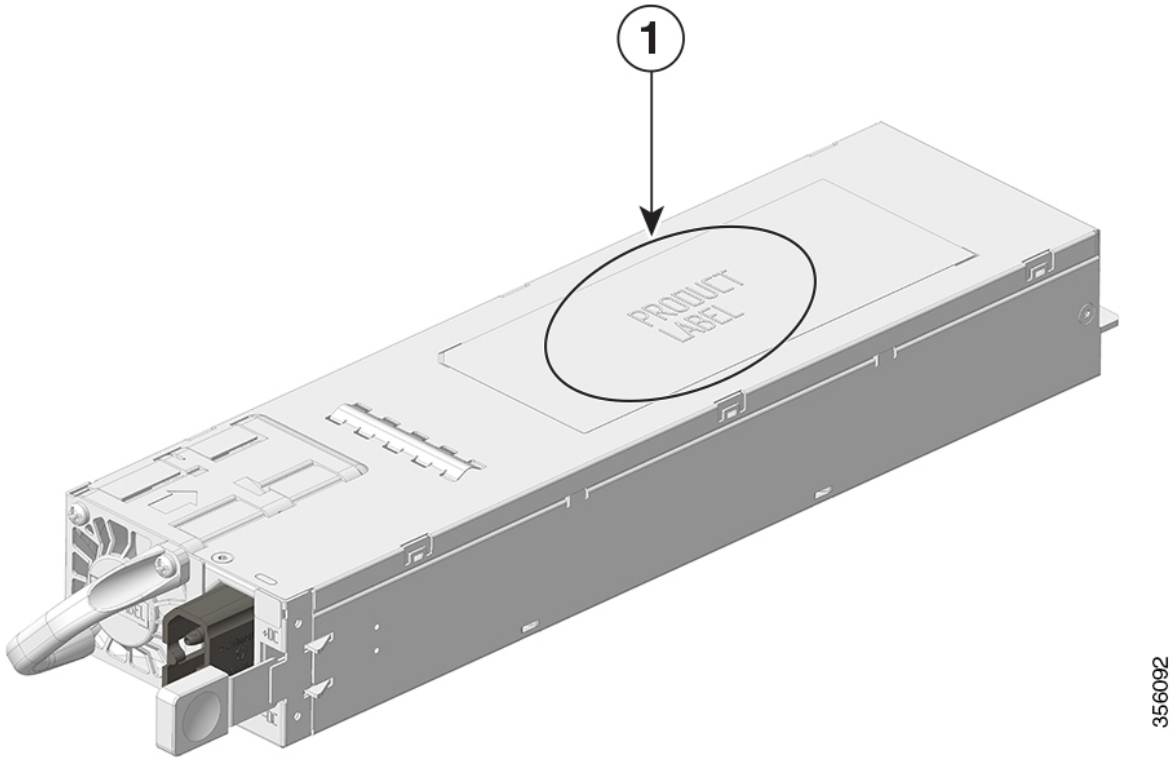
1	Power supply blanks after installation

Note Power supply blank covers can be placed in any slot when fewer than 4 power supplies are installed in a chassis.

Find the power supply serial number

If you contact Cisco Technical Assistance, you need to know the serial number. These figures show where the serial number is located. You can also use the **show version** privileged EXEC command to see the serial number.

Figure 29: Serial number on the power supply module



1	Power supply module serial number	-	-

Verify the switch chassis installation

To make sure that your Cisco C9610R chassis is installed correctly, follow these steps.

Procedure

Step 1 Verify that the ejector levers of each module are fully closed (parallel to the faceplate) to ensure that the supervisor and all the line cards are fully seated in the backplane connectors.

Step 2 Verify that all empty module slots and power supply bays have blanks installed properly. The blanks optimize the air flow through the chassis and contain EMI.

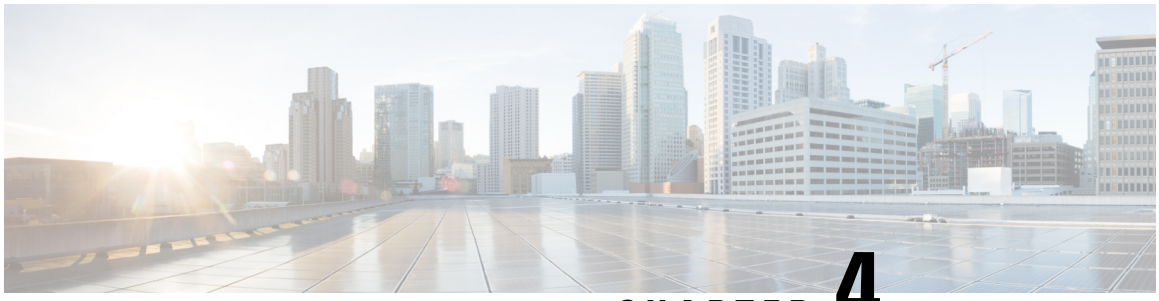
Step 3 Switch on the power supply modules to power up the system. During the power-up sequence, the system performs a series of bootup diagnostic tests.

The switch is designed to boot up in less than 30 minutes, provided that the neighboring devices are in fully operational state.

What to do next

Additional system diagnostic tests are also available. These tests allow you to perform a complete sanity check on the system prior to inserting the system into your network, and to monitor the health of the system while the system is running.

Tip When prestaging systems in a nonproduction environment, we recommend that you run all the diagnostic tests, including the disruptive tests, to prescreen the systems for failures, if any.



CHAPTER 4

Technical specifications

- Cisco C9610R switch chassis specifications, on page 75
- Power supply specifications, on page 77
- Power and heat values, on page 87
- Weight specifications, on page 88

Cisco C9610R switch chassis specifications

This section provides information about the physical and environmental specifications of the Cisco C9610R chassis.

Table 21: Physical specifications of the chassis

Item	Specification
Dimensions (H x W x D)	31.47 x 17.4 x 26.1 inches (79.93 x 44.20 x 66.29 cms)
Rack units (RU [3])	18 RU
Weight (Chassis with eight 3000W power supplies and four fan trays)	266.0 lbs 120.7 kg

[3] The chassis height is measured in rack units (RU or just U), where 1 RU or 1 U equals 1.75 in (44.45 mm).

Table 22: Environmental specifications of the chassis

Item	Specification
Ambient temperature and altitude for normal operations [4]	23° to 104°F (-5 to +40ºC), up to 6,000 feet (1,800 m). Maximum allowable operating temperature de-rated 1°C/1,000 feet from 6,000 to 10,000 feet.
Transportation and storage temperature and altitude	-40° to 158°F (-40° to 70°C), up to 10,000 feet (3,000 m)
Thermal transition	Hot to cold—at a maximum rate of 86°F (30°C) per hour Cold to hot—at maximum rate of 204.8°F (96°C) per hour

Item	Specification		
Humidity (RH), ambient (noncondensing)	Operating—10% to 90% non-condensing Nonoperating—10% to 95% non-condensing		
Altitude (operating and nonoperating)	-197 to 10,000 feet (-60 to 3,000 m)		
Sound power level (LwAD)	LwAD—82 dBA		
Airflow	Chassis: front to back (when facing the front of the chassis) Power supply: front to back (forward air flow)		
Shock	Operating—5G 11ms (half-sine) Nonoperating and storage—15G 11ms (half-sine)		
Sine vibration	• Operating—0.2Grms (5Hz-500Hz) • Nonoperating and storage(FRUs)—0.8Grms (5Hz-500Hz) Grms is the root mean square (RMS) acceleration value derived from a sine vibration test. Sine vibration is a type of vibration testing where the test item is subjected to a controlled, single-frequency sinusoidal vibration.		
Random vibration for FRUs/system (operating—0.33Grms)	**Spectral break point frequencies**	**Acceleration spectral density**	**Slope**
	2.5–5 Hz	(0.001 g²/Hz)	6 db/ octave
	5–100 Hz		-24 db/ octave
	100–200 Hz		
Random vibration for FRUs (nonoperating and transportation—1.05Grms)	**Spectral break point frequencies**	**Acceleration spectral density**	**Slope**
	2.5–5 Hz	(0.01 g²/Hz)	6 db/ octave
	5–100 Hz		
	100–200 Hz		-24 db/ octave
Random vibration for system (nonoperating and transportation—1.04Grms)	**Frequency (Hz)**	**PSD (G^2/Hz)**	-
	3	0.0005	
	4	0.008	
	100	0.008	
	300	0.0002	

[4] Minimum ambient temperature for cold startup is 32ºF or 0ºC

Power supply specifications

These sections describe the 2000W AC, 2000W DC, and 3000W AC power supply specifications and the supported AC power cords.

2000W AC-input power supply specifications

This section describes the specifications of C9600-PWR-2KWAC.

Table 23: 2000W AC-input power supply specifications

Specification	Description
AC-input type	Wide-ranging input with power factor correction. **Note** Power factor correction is a standard feature on AC-input power supplies. Power factor correction reduces the reactive component in the source AC current, allowing higher power factors and lower harmonic current components.
AC-input voltage	Low-line (115 VAC nominal)—90 VAC (min) to 140 VAC (max) High-line (230 VAC nominal)—180 VAC (min) to 264 VAC (max)
AC-input current	12A at 115 VAC 10A at 230 VAC
AC-input frequency	50/60Hz nominal (47 to 63Hz full range)

Branch circuit requirement	Each chassis power supply should have its own dedicated, fused-branch circuit:
	• North America—15 A.
	• International—Circuits sized to local and national codes.
	• All AC power supply inputs are fully isolated.
	  • Source AC can be out-of-phase between multiple power supplies in the same chassis, which means that PS1 can be operating from phase A and PS2 can be operating from phase B.
	  • For high-line operation, the power supply operates with the line conductor wired to a source AC phase, and the neutral conductor wired either to a neutral, single-phase power system, or to another source AC phase as long as the net input voltage is in the range of 180 to 264 VAC.

Specification	Description
Power supply output	• 100 to 120 VAC operation • 12V output—1050W • 200 to 240 VAC operation • 12V output—2000W
Output holdup time	20 ms minimum with 1200W output
kVA rating (kilovolt-amperes is the measure of apparent power in electrical systems, indicating the total power output.) [5]	2 kVA maximum (total output power)
Heat dissipation (in British Thermal Units [BTU])	683 BTU per hour
Weight	2.60 lb (1.18 kg)

[5] The kVA rating listed for the power supply should be used as the sizing criteria for both UPS outputs as well as standard circuits and transformers to power a switch

AC power cords for 2000W AC power supply units

This table lists the specifications for the AC power cords that are available for the 2000W AC-input power supply. The table also includes references to power cord illustrations.

Note All 2000W AC power supply power cord

- Lengths range from 9.84 to 14 feet (3.0 to 4.293 meters); with most cord lengths between 13 and 14 feet (4.013 and 4.293 meters)
- Have an IEC60320/C15 appliance connector at one end.

Figure 30: IEC60320/C15 appliance connector

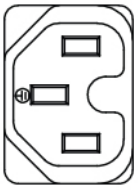
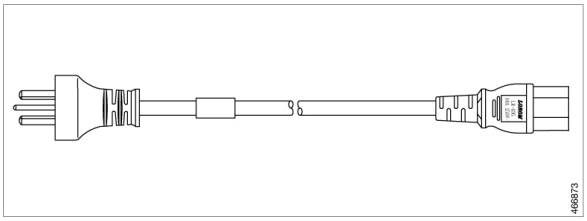
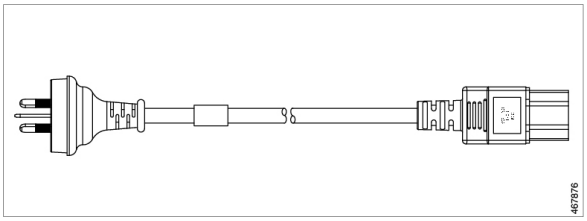
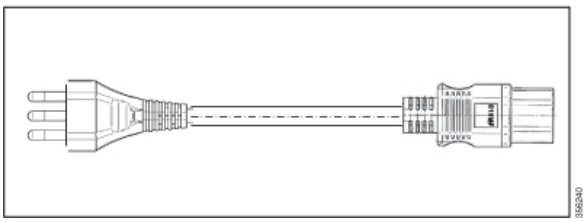
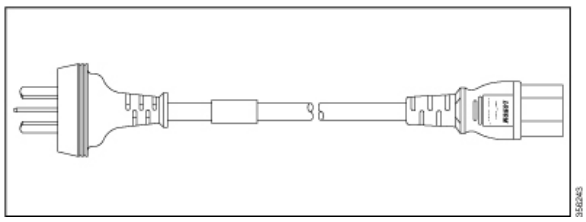
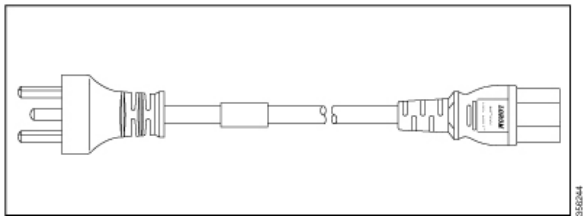
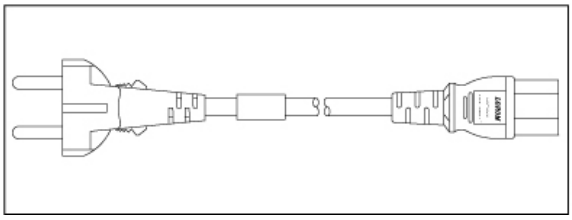
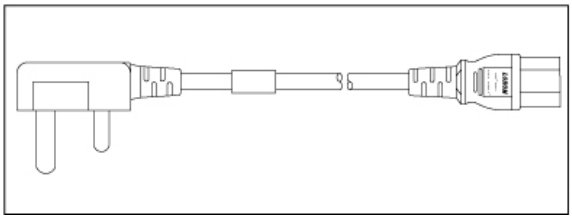
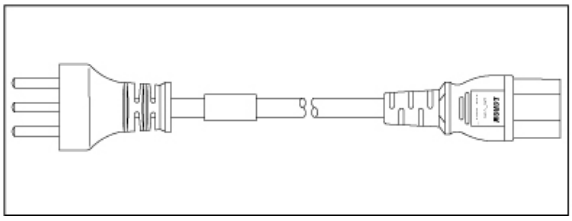
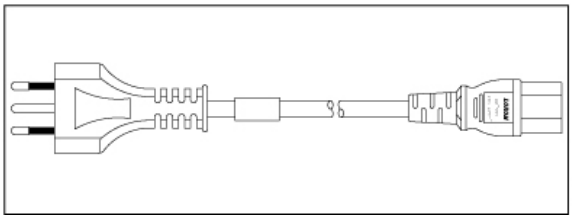
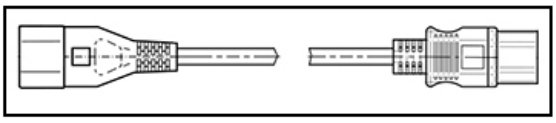
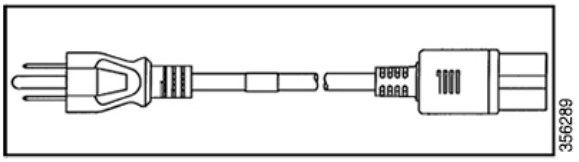
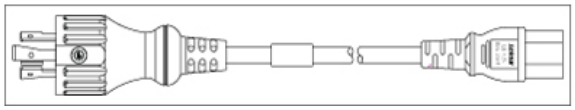
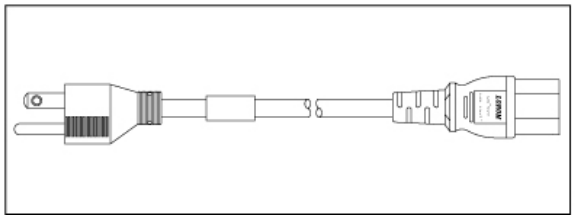
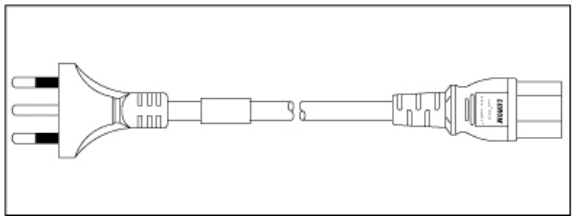
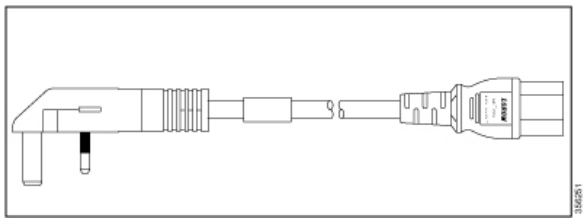
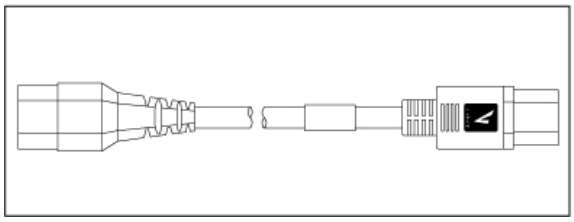


Table 24: AC power cords for 2000W AC PSUs

Locale	Part number	Cordset rating	Length in meters	AC source plug type
Argentina	CAB-TA-AR	125 VAC, 12 A	2.5 m	*Figure 31: CAB-TA-AR= (Argentina)* 
Australia	CAB-TA-AP	125 VAC, 12 A	2.5 m	*Figure 32: CAB-TA-AP= (Australia)* 
Brazil	CAB-ACBZ-12A	125 VAC, 12 A	2.5 m	*Figure 33: CAB-ACBZ-12A= (Brazil)* 
China	CAB-TA-CN	250 VAC, 10 A	2.5 m	*Figure 34: CAB-TA-CN= (China)* 
Denmark	CAB-TA-DN	250 VAC, 10 A	2.5 m	*Figure 35: CAB-TA-DN= (Denmark)* 

Locale	Part number	Cordset rating	Length in meters	AC source plug type
Europe	CAB-TA-EU	250 VAC, 10 A	2.5 m	*Figure 36: CAB-TA-EU= (Europe)* 
India	CAB-TA-IN	250 VAC, 10 A	2.5 m	*Figure 37: CAB-TA-IN= (India)* 
Israel	CAB-TA-IS	250 VAC, 16 A	2.5 m	*Figure 38: CAB-TA-IS= (Israel)* 
Italy	CAB-TA-IT	250 VAC, 10 A	2.5 m	*Figure 39: CAB-TA-IT= (Italy)* 
Japan	CAB-C15-CBN-JP	250 VAC, 12 A	3.05 m	*Figure 40: CAB-C15-CBN-JP=(Japan)* 

Locale	Part number	Cordset rating	Length in meters	AC source plug type
Japan	CAB-TA-250V-JP	250 VAC, 15 A	2.5 m	*Figure 41: CAB-TA-250V-JP= (Japan)*
Japan	CAB-TA-JP	125 VAC, 12 A	2.5 m	*Figure 42: CAB-TA-JP= (Japan)* 
North America	CAB-AC-2KW-CBL	250 VAC, 13 A	4.25 m	*Figure 43: CAB-AC-2KW-CBL= (North America)* 
North America	CAB-TA-NA	125 VAC, 15 A	2.5 m	*Figure 44: CAB-TA-NA= (North America)* 
Switzerland	CAB-TA-SW	250 VAC, 10 A	2.5 m	*Figure 45: CAB-TA-SW= (Switzerland)* 
United Kingdom	CAB-TA-UK	250 VAC, 10 A	2.5 m	*Figure 46: CAB-TA-UK= (United Kingdom)* 

Locale	Part number	Cordset rating	Length in meters	AC source plug type
Cabinet jumper power cord; supported in all countries except Japan	CAB-C15-CBN	250 VAC, 13 A	1.22 m	*Figure 47: CAB-C15-CBN=* 

2000W DC-input power supply specifications

This table lists the specifications for C9600-PWR-2KWDC.

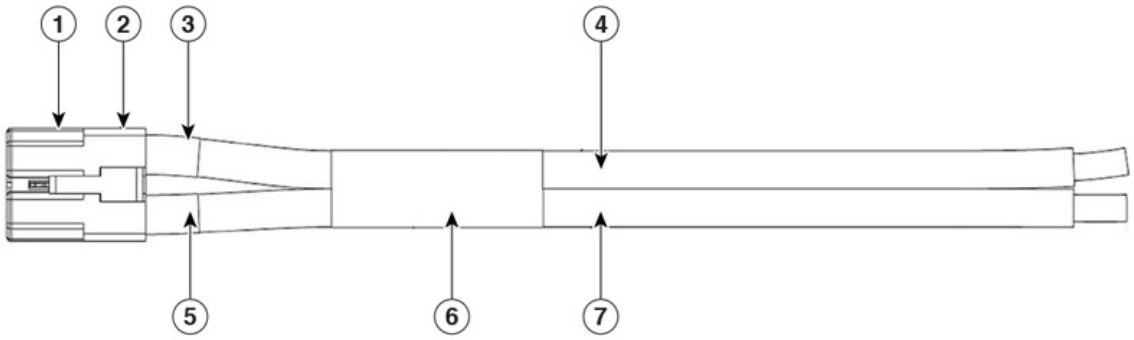
Table 25: 2000W DC-input power supply specifications

Specification	Description
DC-input voltage	-40 to -60 VDC, with extended range to -72 VDC
DC-input current	Maximum: 60A
Power supply output capacity	For 12 VDC output—2000W
Output holdup time	5ms with 1200W output
Heat dissipation (in British Thermal Units [BTU])	750 BTU per hour
Weight	2.82 lb (1.28 kg)

DC power cords for 2000W DC power supply units

When you order the DC power supply units, you have the option to order the DC power cord (part number 71-100992-01). The length of all 2000W DC power supply cords range from 9.84 to 14 feet (3.0 to 4.293 meters); with most cord lengths between 13 and 14 feet (4.013 and 4.293 meters)

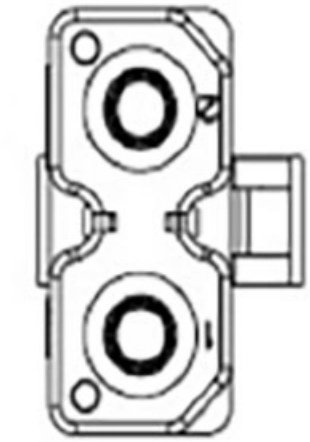
Figure 48: 2000W DC power supply cord



1	Appliance connector (C10-638974-000)	5	6 AWG ultra flex cable or equivalent (red in color)
2	Plug housing (C10-638978)	6	Label
3	Socket contact	7	2x shrink wrap
4	6 AWG ultra flex cable or equivalent (black in color)	-	-

These power cords have a C10-638974-000 appliance connector at one end.

Figure 49: C10-638974-000 appliance connector



3000W AC-input power supply specifications

This table lists specifications for C9600-PWR-3KWAC.

Table 26: 3000W AC-input power supply specifications

Specification	Description
AC-input type	Wide-ranging input with power factor correction. **Note** Power factor correction is a standard feature on AC-input power supplies. Power factor correction reduces the reactive component in the source AC current, allowing higher power factors and lower harmonic current components.
AC-input voltage	Low-line (115 VAC nominal)—90 VAC (min) to 140 VAC (max) High-line (230 VAC nominal)—180 VAC (min) to 264 VAC (max)
AC-input current	16A at 115 VAC 16A at 230 VAC
AC-input frequency	50/60Hz nominal (47 to 63Hz full range)

Branch circuit requirement	Each chassis power supply should have its own dedicated, fused-branch circuit:
	• North America—20 A.
	• International—Circuits sized to local and national codes.
	• All AC power supply inputs are fully isolated.
	  • Source AC can be out of phase between multiple power supplies in the same chassis, which means that PS1 can be operating from phase A and PS2 can be operating from phase B.
	  • For high-line operation, the power supply operates with the line conductor wired to a source AC phase, and the neutral conductor wired either to a neutral, single-phase power system, or to another source AC phase as long as the net input voltage is in the range of 180 to 264 VAC.

Power supply output	• 90 to 140 VAC operation
	  • 12V output—1500W
	• 180 to 264 VAC operation
	  • 12V output—3000W

Output holdup time	20 ms minimum with 1800W output at high line input
kVA rating (kilovolt-amperes is the measure of apparent power in electrical systems, indicating the total power output.) [6]	3 kVA maximum (total output power)

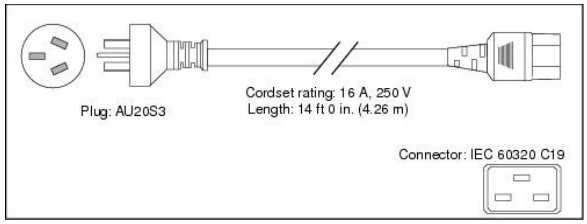
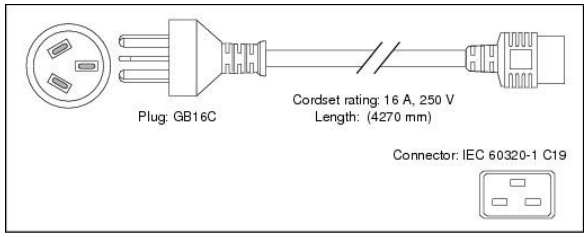
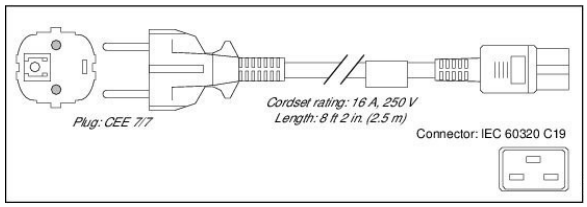
Specification	Description
Heat dissipation (in British Thermal Units [BTU])	655 BTU per hour
Weight	3.09 lb (1.48 kg)

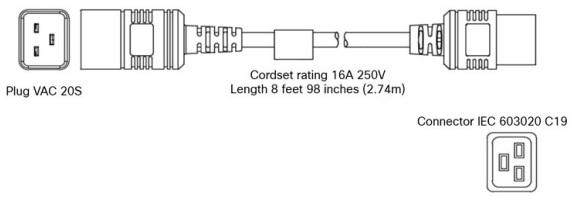
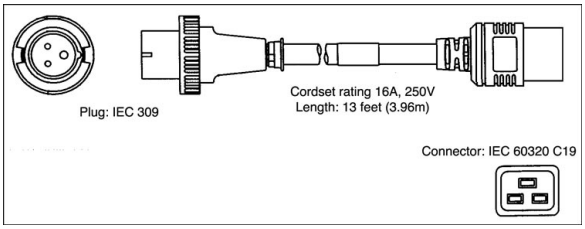
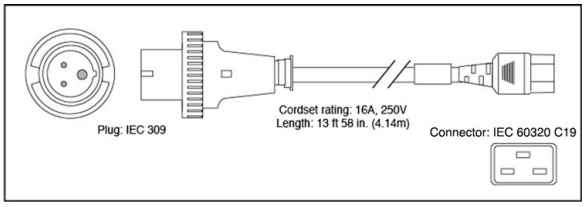
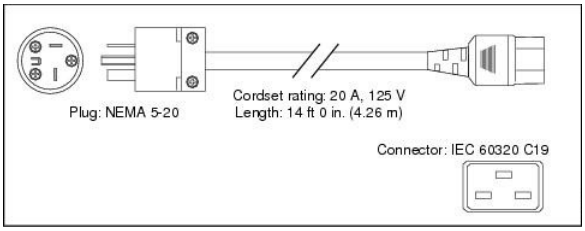
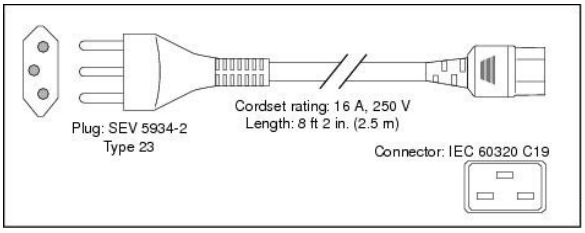
[6] The kVA rating listed for the power supply should be used as the sizing criteria for both UPS outputs as well as standard circuits and transformers to power a switch

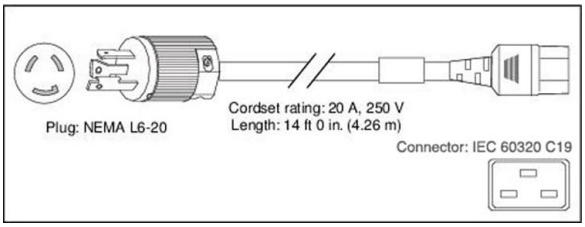
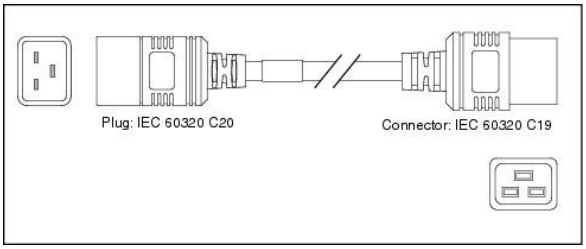
AC power cords for 3000W AC power supply units

This table lists the specifications for the AC power cords that are available for the 3000W AC-input power supply. The table also includes references to power cord illustrations.

Table 27: AC power cords for 3000W AC PSUs

Locale	Part number	Cordset rating	Length	AC source plug type
Australia	CAB-9K16A-AUS	250 VAC,16 A	4.26 m	***Figure 50: CAB-9K16A-AUS= (Australia)*** 
China	CAB-9K16A-CH	250 VAC, 16 A	4.27 m	***Figure 51: CAB-9K16A-CH= (China)*** 
Europe	CAB-9K16A-EU	250 VAC, 16 A	2.5 m	***Figure 52: CAB-9K16A-EU= (Europe)*** 

Locale	Part number	Cordset rating	Length	AC source plug type
India	CAB-C19-C20-IND	250 VAC, 16 A	2.74 m	***Figure 53: CAB-C19-C20-IND= (India)*** 
International	CAB-I309-C19-INTL	250 VAC, 16 A	3.96 m	***Figure 54: CAB-I309-C19-INTL= (International*** 
International	CAB-9K16A-INT	250 VAC, 16 A	4.14 m	***Figure 55: CAB-9K16A-INT= (International)*** 
North America and Japan	CAB-9K20A-NA	125 VAC, 20 A,	4.26 m	***Figure 56: CAB-9K20A-NA= (North America and Japan)*** 
Switzerland	CAB-9K16A-SW	250 VAC, 16 A	2.5 m	***Figure 57: CAB-9K16A-SW= (Switzerland)*** 

Locale	Part number	Cordset rating	Length	AC source plug type
US and Japan	CAB-9K16A-US2	250 VAC, 20 A	4.26 m	*Figure 58: CAB-9K16A-US2= (US/Japan)* 
Cabinet jumper power cord	CAB-C19-CBN	250 VAC, 16 A	2.74 m	*Figure 59: CAB-C19-CBN=(Cabinet Jumper Power Cord)* 

Power and heat values

These tables provide the power and heat dissipation data. Unless otherwise noted, the information in the tables is measured under fully loaded conditions (with transceivers installed).

Table 28: Fan tray power requirements and heat dissipation

PID	AC-input power in Watts	DC-output in Watts	Current @ 90V	Current @ 120V	Current @ 180V	Current @ 240V	Heat Diss. in BTU / hr.
C9610-FAN	1111	1000	12.4	9.3	6.2	4.7	3791

Table 29: Line card power requirements and heat dissipation

PID	AC-input power in Watts	DC-output in Watts (Power requested)	Current @ 90V	Current @ 120V	Current @ 180V	Current @ 240V	Heat Diss. in BTU / hr.
C9610-LC-40YL4CD	466	420	5.2	3.9	2.6	1.95	1590
C9610-LC-32CD	495	450	5.6	4.2	2.8	2.1	1689
C9600-LC-40YL4CD	466	420	5.2	3.9	2.6	1.95	1590
C9600-LC-48TX	350	315	3.9	3.0	2.0	1.5	1195

PID	AC-input power in Watts	DC-output in Watts (Power requested)	Current @ 90V	Current @ 120V	Current @ 180V	Current @ 240V	Heat Diss. in BTU / hr.
C9600X-LC-32CD	495	450	5.6	4.2	2.8	2.1	1689
C9600X-LC-56YL4C	495	450	5.6	4.2	2.8	2.1	1689

Table 30: Supervisor module power requirements and heat dissipation

PID	AC-input power in Watts	DC-output in Watts (Power requested)	Current @ 90V	Current @ 120V	Current @ 180V	Current @ 240V	Heat Diss. in BTU / hr.
C9610-SUP-3	2444	2200	27.15	20.37	13.58	10.18	8339
C9610-SUP-3XL	2444	2200	27.15	20.37	13.58	10.18	8339

Weight specifications

The total weight of a fully configured chassis will depend on the type of chassis, the number of modules, and power supplies installed. Use the corresponding weights in the tables to arrive at the total chassis weight for your hardware configuration.

Weight measurement for the chassis

PID (add = for spare)	Weight (Chassis without fan trays and power supply units)
C9610R=	184.0 lbs (83.5kg)

Weight measurements for the supervisor module

PID (add = for spare)	Weight
C9610-SUP-3	31.1 lb (14.1 kg)
C9610-SUP-3XL	31.1 lb (14.1 kg)

Weight measurements for line cards

PID (add = for spare)	Weight
C9610-LC-32CD	13.45 lb (6.1 kg)
C9610-LC-40YL4CD	13.89 lb (6.3kg)
C9600-LC-40YL4CD	8.27 lb (3.75 kg)

PID (add = for spare)	Weight
C9600-LC-48TX	8.88 lb (4.03 kg)
C9600X-LC-32CD	8.71 lb (3.95 kg)
C9600X-LC-56YL4C	9.14 lbs (4.15 kg)

Weight measurements for power supply modules

PID (add = for spare)	Weight
C9600-PWR-2KWAC	2.60 lb (1.18 kg)
C9600-PWR-2KWDC	2.82 lb (1.28 kg)
C9600-PWR-3KWAC	3.09 lb (1.48 kg)

Weight measurements for the fan tray

PID (add = for spare)	Weight
C9610-FAN=	13.98 lbs (6.34 kg)

Blank covers

PID (add = for spare)	Weight
C9610-ADPT-BLANK= (Cisco C9610 series blank for line card adapter)	3.78 lb (1.7153 kg)
C9610-LC-BLANK= (Cisco C9610 series blank for line card slot)	4.54 lb (2.06 kg)
C9606-PWR-BLANK= (Cisco C9610 series blank for chassis power supply slot)	0.18 lb (0.08 kg)
C9610-SSD-BLANK= (Cisco C9610 series blank for SSD)	0.20 lb (0.0913 kg)
C9610-SUP-BLANK= (Cisco C9610 series blank for supervisor module slot)	6.08 lb (2.76 kg)

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