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Cisco Firepower 4112, 4115, 4125, and 4145 Hardware Installation Guide

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CHAPTER 1

Overview

Features

The Cisco Firepower 4100 series security appliance is a standalone modular security services platform. It is capable of running multiple security services simultaneously and so is targeted at the data center as a multiservice platform. The series includes the Firepower 4112, 4115, 4125, and 4145. See Product ID Numbers, on page 28 for a list of the product IDs (PIDs) associated with the 4100 series.

The Firepower 4100 series supports Cisco Firepower Threat Defense, Cisco Firepower eXtensible Operating System (FXOS), and Cisco ASA software. See Cisco Firepower 4100/9300 FXOS Compatibility, which lists software and hardware compatibility information for the Firepower 4100 series.

The following figure shows the Firepower 4100 series security appliance.

Figure 1: Firepower 4100 Series

The following table lists the features for the Firepower 4100 series.

Table 1: Firepower 4100 Series Features

Feature	4112	4115	4125	4145
Security standards certifications	—	• Common Criteria (CC) and Commercial Solutions for Classified (CSFC) for ASA 9.8.*x* and FTD 6.2.*x* • CC for the Network Device Collaborative Protection Profile (NDcPPv2.1) for ASA 9.12.*x* and FX-OS 2.6.*x* • Federal Information Processing Standards (FIPS) 140-2 on ASA 9.12.*x*, FTD 6.4.*x*, and FX-OS 2.6.*x* • Department of Defense Information Network Approved Product List (DoDIN APL) for ASA 9.12.*x* and FTD 6.4.*x*. • US Government Compliance for IPv6 (USGv6) for ASA 9.8.*x* and FTD 6.2.*x* **Note** Firepower 4112 has not yet completed the above certifications. **Note** See the "Security Certifications Compliance" chapter in the Cisco FXOS CLI Configuration Guide or Cisco FXOS Firepower Chassis Manager Configuration Guide for the procedure to enable security modes.		
Network Equipment Building Systems (NEBS) certification	—	—	Certified	—
Form factor	1 RU Fits a standard 19-in. (48.3cm) square-hole rack			
Rack mount	Slide rails, mount ears, and screws included (4-post EIA-310-D rack)			
Airflow	Front to rear Cold aisle to hot aisle			

Feature	4112	4115	4125	4145
Processor	One 12-core 2.1-GHz Intel Xeon 4116	Two 12-core 2.1-GHz Intel Xeon 4116	Two 16-core 2.1-GHz Intel Xeon 6130T	Two 22-core 2.1-GHz Intel Xeon 6152
Memory	96-GB DRAM 6 x 16-GB DDR4-2400	192-GB DRAM 12 x 16-GB DDR4-2400	192-GB DRAM 12 x 16-GB DDR4-2666	384-GB DRAM 12 x 32-GB DDR4-2666
Maximum number of interfaces	24 With two 8-port network modules installed			
Management port	One Gigabit Ethernet Supports 1-Gb fiber or copper SFPs			
Serial port	One RJ-45 console			
USB port	One USB 2.0 Type A			
Network ports	Eight fixed 1-Gb and 10-Gb SFP ports (named Ethernet 1/1 through 1/8)			
Small form-factor pluggable (SFP) ports	Eight fixed 1-Gb and 10-Gb SFP ports			
Pullout asset card	Displays the serial number; on the front panel			
Grounding lug	On rear panel			
Locator beacon	On front panel			
Power switch	On rear panel			
Network modules	Two network module slots (network module 2 and network module 3)			
Supported network modules	• 8-port 10-Gigabit Ethernet SFP+ • 4-port 40-Gigabit Ethernet QSFP+ • 8-port 1-Gigabit Ethernet copper with hardware bypass • 2-port 40-Gigabit Ethernet QSFP+ (built-in) with hardware bypass • 6-port 1-Gigabit Ethernet SX fiber SFP+ (built-in) with hardware bypass • 6-port 10-Gigabit Ethernet SR fiber SFP+ (built-in) with hardware bypass • 6-port 10-Gigabit Ethernet LR fiber SFP+ (built-in) with hardware bypass			

Feature	4112	4115	4125	4145
AC power supply	Two (1+1) power supply module slots Ships with one 1100-W AC power supply module Hot-swappable		Two (1+1) power supply module slots Ships with two 1100-W AC power supply modules Hot-swappable	
DC power supply (optional)	Two (1+1) power supply module slots 950-W DC power supply module Hot-swappable			
Redundant power	1+1			
Fan	Six fan module slots 5+1 redundancy Hot-swappable			
Storage	Two SSD slots Ships with one 400-GB SSD installed in slot 1. Slot 1 is the primary SSD and should always be present. **Note** RAID is not supported. **Caution** The SSD must be installed in slot 1. Slot 2 is reserved only for the optional Malware Storage Pack (MSP).		Two SSD slots Ships with one 800-GB SSD installed in slot 1. Slot 1 is the primary SSD and should always be present. **Note** RAID is not supported. **Caution** The SSD must be installed in slot 1. Slot 2 is reserved only for the optional MSP.	
MSP (optional)	Installed in the second SSD slot only			

Deployment Options

Here are some examples of how you can deploy the Firepower 4100:

- In a data center using NGFW and ASA

- At the core/aggregation layer of a 3-tier data center in a high availability configuration

- As a dedicated multifunctional security service within converged infrastructure stacks, for example, vBlock, FlexPod, and so forth, at the access layer

- As a high-performance data center security appliance between the WAN edge and the data center core in a high availability configuration

- Inter-DC clustering deployments

- In newer spine/leaf data center designs, deployment as a leaf that exclusively offers security functions

Package Contents

The following figure shows the package contents for the Firepower 4100. Note that the contents are subject to change and your exact contents might contain additional or fewer items.

Figure 2: Firepower 4100 Package Contents

1	Firepower 4100 chassis	2	Blue console cable PC terminal adapter
3	Two power cords (country-specific)	4	10/100/1000BASE-T SFP transceiver
5	Two slide rails	6	Tie wrap clamp
7	Artesyn tie wrap	8	Flextronics tie wrap
9	Two M3X6 mm screws used to secure the inner slide rail to the chassis	10	Ten 8-32 x .375 inch countersink screws used to secure the mounting bracket to chassis (6 screws), and the cable management brackets to the mounting brackets (4 screws). Four of the screws are in the package with the cable management brackets (optional; in separate package if brackets are ordered).
11	Two slide rail locking brackets	12	Two 10-32 x .375 inch screws used to secure the ground lug
13	One ground lug #6 AWG, 90 degree, #10 post	14	Two cable management brackets Optional; in a separate package if ordered

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This document has a URL pointing to the hardware installation guide, a URL pointing the regulatory and safety guide, and a QR code and URL pointing to the Getting Started Guide. | | |

Serial Number Location

The serial number for the Firepower 4100 series chassis is located on the pullout asset card on the front panel.

Figure 3: Serial Number on the 4100 Chassis
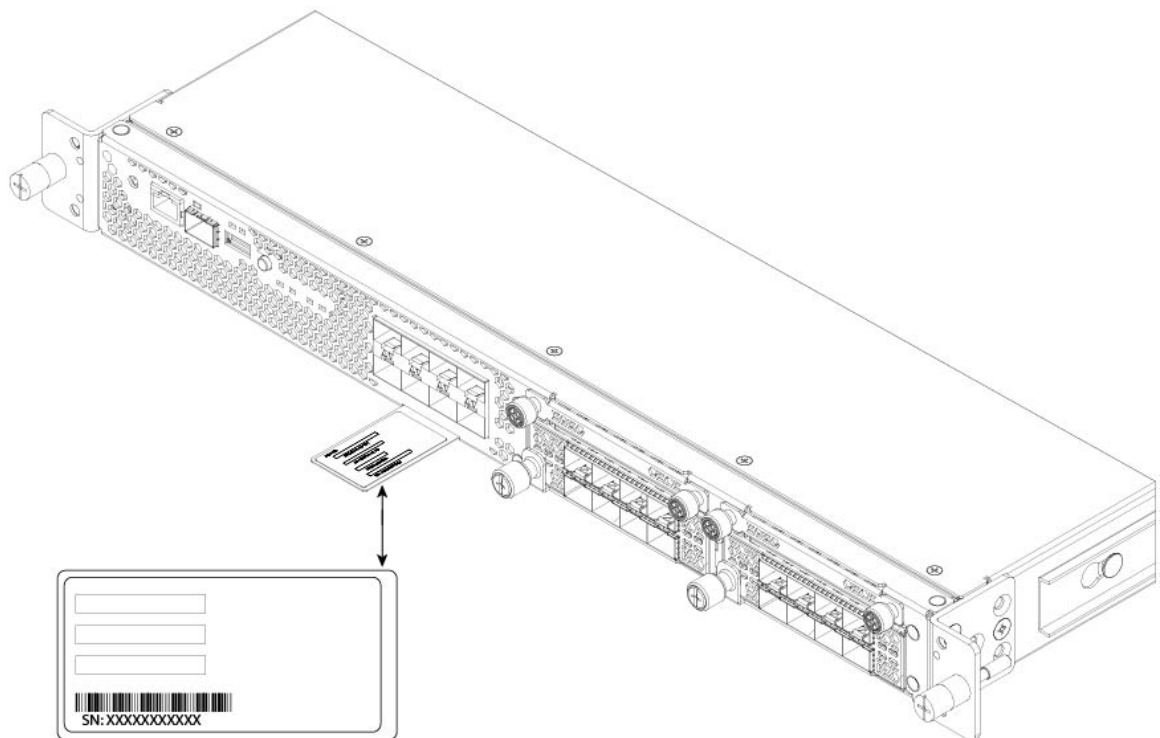
You can also view additional model information on the compliance label located on the bottom of the chassis.

Figure 4: Compliance Label on the 4100 Chassis
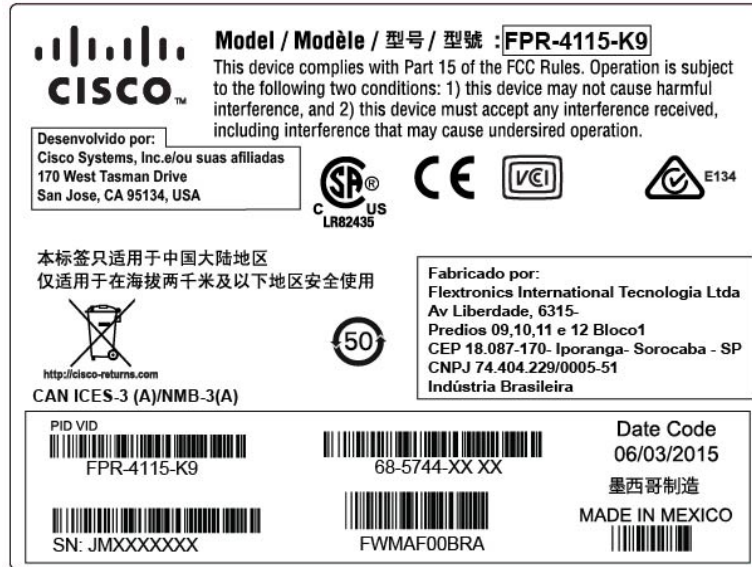
Front Panel

The following figure shows the front panel of the Firepower 4100.

Figure 5: Firepower 4100 Front Panel
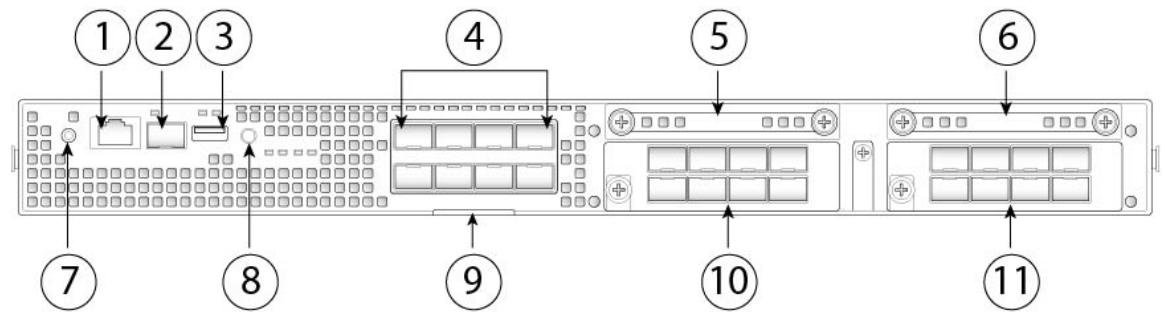
1	RJ-45 console port	2	Gigabit Ethernet management port
3	USB 2.0 Type A port	4	Eight fixed SFP+ (1-Gb/10-Gb) ports (in network module slot 1) Ethernet 1/1 through 1/8 labeled top to bottom, left to right
5	SSD 1 Reserved for the primary SSD; slot 1 must always be populated.	6	SSD 2 Reserved for the optional MSP.
7	Power LED	8	Locator LED

9	Pullout asset card	10	Network module 2
			Note The 10-Gb network module is shown.
11	Network module 3		
	Note The 10-Gb network module is shown.		

RJ-45 Console Port

The Firepower 4100 has a standard RJ-45 console port. You can use the CLI to configure your Firepower 4100 through the RJ-45 serial console port by using a terminal server or a terminal emulation program on a computer.

The RJ-45 (8P8C) port supports RS-232 signaling to an internal UART controller. The console port does not have any hardware flow control, and does not support a remote dial-in modem. The baud rate is 9600. You can use the standard cable found in your accessory kit to convert the RJ-45 to DB-9 if necessary.

Type A USB Port

You can use the external USB Type A port to attach a data storage device. The external USB drive identifier is `disk1:`. The USB Type A port supports the following:

- Hot swapping

- USB drive formatted with FAT32

- Boot kick-start image from the Supervisor ROMMON for discovery recovery purposes

- Copy files to and from workspace:/ and volatile:/ within local-mgmt. The most relevant files are:

  - Core files

  - Ethanalyzer packet captures

  - Tech-support files

  - Security module log files

- Platform bundle image upload using **download image usbA:**

The USB Type A port does *not* support Cisco Secure Package (CSP) image upload.

Network Ports

The Firepower 4100 chassis has eight fixed ports that require 1-Gb/10-Gb SFP/SFP+ transceivers (fiber or copper). They are numbered from left to right starting with 1 and are named Ethernet 1/1 through Ethernet 1/8. The 4100 also has two network module slots that support different numbers of ports depending on the network module. See Network Modules, on page 11 for the supported network modules. See for Supported SFP/SFP+ and QSFP Transceivers, on page 24 the list of supported transceivers.

Each port has LEDs that represent link/activity status.

Management Port

The Firepower 4100 chassis has a management port that requires a 1-Gb fiber or copper SFP.

Front Panel LEDs

The following figure and table describe the Firepower 4100 front panel LEDs.

Figure 6: Front Panel LEDs

1	Management	2	Health (SYS)
	• Off—No connection or port is not in use.		• Off—System is not booting yet.
	• Amber—No link or network failure.		• Green, flashing—Power-up diagnostics are complete and system is booting up.
	• Green—Link up.		• Green—The system has passed power-up diagnostics.
	• Green, flashing—Network activity.		• Amber—Power-up diagnostics has failed.
			• Amber, flashing—Alarm; power-up diagnostics are running.
3	SSD	**4**	Power
	• Off— SSD not present.		• Off—Input power not detected.
	• Green—SSD is present; no activity.		• Green, flashing—Appears only when you move the power switch from ON to OFF. System is shutting down and powers off once shutdown is completed.
	• Green, flashing—SSD is active.		
	• Amber—SSD failure.		• Amber—System is powering up.
	• Amber, flashing—Rebuilding, flashes at 1 Hz.		• Green—System fully powered up.
	• Amber, flashing—Predictive failure analysis (PFA) and hot spare; two fast flashes at 4 Hz, pause for 0.5 seconds.		• Amber, flashing—Reserved.
5	Active (ACT)	**6**	Locator LED
	This LED is not supported; reserved for future use.		• Off—Locate is off.
			• Blue—Locate is on.

7	Network activity		
	• Off—No connection or port is not in use.		
	• Amber—No link or network failure.		
	• Green—Link up.		
	• Green, flashing—Network activity.		

Rear Panel

The following figure shows the rear panel of the Firepower 4100.

Figure 7: Firepower 4100 Rear Panel
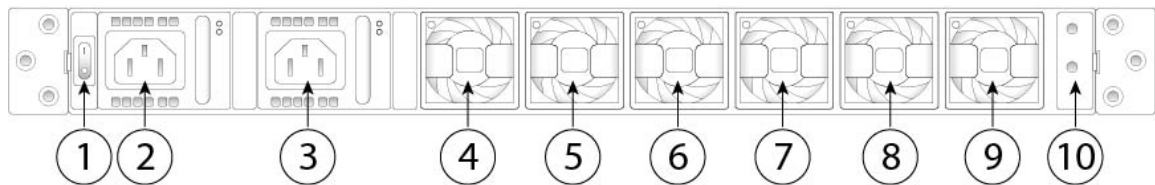
1	Power on/off switch	2	Power supply module 1
3	Power supply module 2	4	Fan module 1
5	Fan module 2	6	Fan module 3
7	Fan module 4	8	Fan module 5
9	Fan module 6	10	Location for the two-post grounding lug **Note** The two-post grounding lug is included in the accessory kit.

The power switch is located to the left of power supply module 1 on the rear of the chassis. It is a toggle switch that controls power to the system. If the power switch is in standby position, only the 3.3-V standby power is enabled from the power supply module and the 12-V main power is OFF. When the switch is in the ON position, the 12-V main power is turned on and the system boots.

You can shut down the chassis in one of two ways:

• Perform a graceful shutdown using the **shutdown** commands (see the FXOS CLI Configuration Guide for the procedure). This may take several minutes to complete. Then toggle the power switch to the OFF position. The power LED changes from solid green to off immediately.

⚠

Caution If you move the power switch to the OFF position before the **shutdown** command sequence is complete or if you remove the system power cords before the graceful shutdown is complete, disk corruption can occur.

• Toggle the power switch to the OFF position. The power LED changes from solid green to off.

Note After removing power from the chassis either by moving the power switch to OFF or unplugging the power cord, wait at least 10 seconds before turning power back ON.

Network Modules

The Firepower 4100 contains two network module slots that provide optical or electrical network interfaces. Network modules are optional, removable I/O modules that provide either additional ports or different interface types (1/10/40 Gb). The Firepower network modules plug into the chassis on the front panel.

For More Information

10-Gb Network Module

The following figure shows the front panel of the 10-Gb network module (FPR4K-NM-8X10G). The FPR4K-NM-8X10G is a single-wide module that supports hot swapping. The eight ports are numbered from top to bottom, left to right.

Note Make sure you have the correct firmware package and software version installed to support this network module. For instructions on how to verify your firmware package version and to upgrade the firmware if necessary, see the Cisco Firepower 4100/9300 FXOS Firmware Upgrade Guide. See Cisco Firepower 4100/9300 FXOS Compatibility for the software compatibility matrix.

Note The FPR4K-NM-8X10G is NEBS-compliant.

Note You can fit four copper SFPs in either the top row of ports or the bottom row of ports. Both rows cannot be populated at the same time, because of the port row spacing.

Figure 8: FPR4K-NM-8X10G

| 1	Captive screw/handle	2	Ethernet *X*/1
3	Ethernet *X*/3	4	Ethernet *X*/5
5	Ethernet *X*/7	6	Ethernet *X*/2
7	Ethernet *X*/4	8	Ethernet *X*/6
9	Ethernet *X*/8	10	Network activity LEDs • Off—No connection or port is not in use. • Amber—No link or network failure. • Green—Link up. • Green, flashing—Network activity.

For More Information

• For a list of copper SFPs, see Supported SFP/SFP+ and QSFP Transceivers, on page 24.

40-Gb Network Module

The following figure shows the front panel of the 40-Gb network module (FPR4K-NM-4X40G.) The FPR4K-NM-4X40G is a single-wide module that supports hot swapping. The four ports are numbered left to right.

Note   Make sure you have the correct firmware package and software version installed to support this network module. For instructions on how to verify your firmware package version and to upgrade the firmware if necessary, see the Cisco Firepower 4100/9300 FXOS Firmware Upgrade Guide. See Cisco Firepower 4100/9300 FXOS Compatibility for the software compatibility matrix.

Note   The FPR4K-NM-4X40G is NEBS-compliant.

Figure 9: FPR4K-NM-4X40G

1	Captive screw/handle	2	Network activity LEDs
			• Off—No connection or port is not in use.
			• Amber—No link or network failure.
			• Green—Link up.
			• Green, flashing—Network activity.
			• 40Gb—Only the leftmost LED indicates the port status.
			• 4x10Gb—Each of the port LEDS indicates the status of respective 10-Gb channel.
3	Ethernet X/1	4	Ethernet X/2
5	Ethernet X/3	6	Ethernet X/4

Hardware Bypass Network Modules

Hardware bypass (also known as fail-to-wire) is a physical layer (Layer 1) bypass that allows paired interfaces to go into bypass mode so that the hardware forwards packets between these port pairs without software intervention. Hardware bypass provides network connectivity when there are software or hardware failures. Hardware bypass is useful on ports where the Firepower security appliance is only monitoring or logging traffic. The hardware bypass network modules have an optical switch that is capable of connecting the two ports when needed. The hardware bypass network modules have built-in SFPs.

Hardware bypass is supported only on a fixed set of ports. You can pair Port 1 with Port 2, Port 3 with Port 4, but you cannot pair Port 1 with Port 4 for example.

Note

- FTW Ports can be used as normal ports in routed mode (not only inline NGIPS functionality).

- FTW Ports can be used to form port-channels across different network modules on the same firewall.

Note Hardware bypass is only supported in inline mode. Also, hardware bypass support depends on your software application.

Note When the appliance switches from normal operation to hardware bypass or from hardware bypass back to normal operation, traffic may be interrupted for several seconds. A number of factors can affect the length of the interruption; for example, behavior of the optical link partner such as how it handles link faults and debounce timing; spanning tree protocol convergence; dynamic routing protocol convergence; and so on. During this time, you may experience dropped connections.

There are three configuration options for hardware bypass network modules:

- Passive interfaces—Connection to a single port.

  For each network segment you want to monitor passively, connect the cables to one interface. This is how the nonhardware bypass network modules operate.

- Inline interfaces—Connection to any two like ports (10 Gb to 10 Gb for example) on one network module, across network modules, or fixed ports.

  For each network segment you want to monitor inline, connect the cables to pairs of interfaces.

- Inline with hardware bypass interfaces—Connection of a hardware bypass paired set.

  For each network segment that you want to configure inline with fail-open, connect the cables to the paired interface set.

  For the 40-Gb network module, you connect the two ports to form a paired set. For the 1/10-Gb network modules, you connect the top port to the bottom port to form a hardware bypass paired set. This allows traffic to flow even if the security appliance fails or loses power.

Note   If you have an inline interface set with a mix of hardware bypass and nonhardware bypass interfaces, you cannot enable hardware bypass on this inline interface set. You can only enable hardware bypass on an inline interface set if all the pairs in the inline set are valid hardware bypass pairs.

For More Information

- See 1-Gb Network Module with Hardware Bypass, on page 15 for a description of the 1-Gb network module.

- See 40-Gb Network Module with Hardware Bypass, on page 16 for a description of the 40-Gb network module.

- See 1-Gb SX/10-Gb SR/10-Gb LR Network Module with Hardware Bypass, on page 18 for a description of the 1-GB SX, 10-GB SR, and LR network modules.

- See Install, Remove, and Replace the Network Module, on page 55 for the procedure for removing and replacing single-wide network modules.

1-Gb Network Module with Hardware Bypass

The following figure shows the front panel view of the 1-Gb network module with hardware bypass (FPR-NM-8X1G-F). Pair ports 1 and 2, 3 and 4, 5 and 6, and 7 and 8 to form hardware bypass paired sets.

Note   Make sure you have the correct firmware package and software version installed to support this network module. For instructions on how to verify your firmware package version and to upgrade the firmware if necessary, see the Cisco Firepower 4100/9300 FXOS Firmware Upgrade Guide. See Cisco Firepower 4100/9300 FXOS Compatibility for the software compatibility matrix.

Figure 10: FPR-NM-8X1G-F

1	Bypass LEDs B1 through B4 • Green—In standby mode. • Amber, flashing—Port is in hardware bypass mode, failure event.	2	Ethernet *X*/1 Ports 1 and 2 are paired together to form a hardware bypass pair. LED B1 applies to this paired port.
3	Ethernet *X*/2 Ports 3 and 4 are paired together to form a hardware bypass pair. LED B2 applies to this paired port.	4	Ethernet *X*/2 Ports 5 and 6 are paired together to form a hardware bypass pair. LED B3 applies to this paired port.
5	Ethernet *X*/2 Ports 7 and 8 are paired together to form a hardware bypass pair. LED B4 applies to this paired port.	6	Captive screw/handle
7	Network activity LEDs • Left LED—Green indicates network activity when a 10M/100M/1G connection is made. • Right LED—Not in use at this time.		—

40-Gb Network Module with Hardware Bypass

The following figure shows the front panel of the 40-Gb hardware bypass network module (FPR4K-NM-2X40G-F). The FPR4K-NM-2X40G-F is a single-wide module that does *not* support hot swapping. The two ports are numbered left to right. Pair the two ports to create a hardware bypass paired set.

Note   Make sure you have the correct firmware package and software version installed to support this network module. For instructions on how to verify your firmware package version and to upgrade the firmware if necessary, see the Cisco Firepower 4100/9300 FXOS Firmware Upgrade Guide. See Cisco Firepower 4100/9300 FXOS Compatibility for the software compatibility matrix.

Figure 11: FPR4K-NM-2X40G-F

1	Captive screw/handle	**2**	Ethernet *X*/1 Ports 1 and 2 are paired together to form a hardware bypass pair.
3	Bypass LED BP: • Green—In standby mode. • Amber, flashing—Port is in hardware bypass mode, failure event.	**4**	Ethernet *X*/2 Ports 1 and 2 are paired together to form a hardware bypass pair.
5	Network activity LEDs for Pair 1: • Amber—No connection, or port is not in use, or no link or network failure. • Green—Link up, no network activity. • Green, flashing—Network activity.	**6**	Network activity LEDs for Pair 2: • Amber—No connection, or port is not in use, or no link or network failure. • Green—Link up, no network activity. • Green, flashing—Network activity.

The following table describes the cable specifications needed to keep the insertion loss as low as possible.

Table 2: 40-Gb BASE-SR Cable Specifications

Interface	Supported Cable
Ethernet 40-G BASE-SR4	50 microns core diameter
850 nm wavelength	2000/4700 (OM3/4) modal bandwidth (MHz*km)
MPO-12 port adapter	50 m cable distance

Note See the Cisco 40GBASE QSFP Modules Data Sheet for specifications of the QSFP for the 40-Gb BASE-SR-4.

We recommend the following Cisco OM3 MTP/MPO cables.

Table 3: Cisco Cables

Cisco Part Number	Cable Length
CAB-ETH-40G-5M	5 m
CAB-ETH-40G-10M	10 m
CAB-ETH-40G-20M	20 m

1-Gb SX/10-Gb SR/10-Gb LR Network Module with Hardware Bypass

The following figure shows the front panel of the 1-Gb SX, 10-Gb SR and 10-Gb LR hardware bypass network modules (FPR4K-NM-6X1SX-F, FPR4K-NM-6X10SR-F, FPR4K-NM-6X10LR-F). This is a single-wide module that does *not* support hot swapping. The six ports are numbered from top to bottom, left to right. Pair ports 1 and 2, 3 and 4, and 5 and 6 to form hardware bypass paired sets.

Note Make sure you have the correct firmware package and software version installed to support this network module. For instructions on how to verify your firmware package version and to upgrade the firmware if necessary, see the Cisco Firepower 4100/9300 FXOS Firmware Upgrade Guide. See Cisco Firepower 4100/9300 FXOS Compatibility for the software compatibility matrix.

Figure 12: FPR4K-NM-6X1SX-F, FPR4K-NM-6X10SR-F, FPR4K-NM-6X10LR-F

1	Captive screw/handle	2	Six network activity LEDs
			• Amber—No connection, or port is not in use, or no link or network failure.
			• Green—Link up, no network activity.
			• Green, flashing—Network activity.
3	Ethernet *X*/1 (top port)	4	Ethernet *X*/3 (top port)
	Ethernet *X*/2 (bottom port)		Ethernet *X*/4 (bottom port)
	Ports 1 and 2 are paired together to form a hardware bypass pair.		Ports 3 and 4 are paired together to form a hardware bypass pair.
5	Ethernet *X*/5 (top port)	6	Bypass LEDs B1 through B3:
	Ethernet *X*/6 (bottom port)		• Green—In standby mode.
	Ports 5 and 6 are paired together to form a hardware bypass pair.		• Amber, flashing—Port is in hardware bypass mode, failure event.

The 1-Gb SX /10-Gb SR/10-Gb LR network modules have the following insertion loss measurements. Insertion loss measurements help you to troubleshoot the network by verifying cable installation and performance.

Table 4: 1-Gb SX Network Module (FPR4K-NM-6X1SX-F)

	Operating Mode	Typical	Maximum
Insertion loss	Normal	0.9 dB	1.4 dB
	Hardware bypass	1.2 dB	1.7 dB

	Core diameter (microns)	Modal bandwidth (MHz/km)	Cable distance **Note** Half the distance specified by the IEEE standard.
Cable and operating distance	62.5	160 (FDDI)	110 m
	62.5	200 (OM1)	137 m
	50	400	250 m
	50	500 (OM2)	275 m
	50	2000 (OM3)	500 m

Table 5: 10-Gb SR Network Module (FPR4K-NM-6X10SR-F)

	Operating Mode	**Typical**	**Maximum**
Insertion loss	Normal	0.9 dB	1.4 dB
	Hardware bypass	1.2 dB	1.7 dB
	Core diameter (microns)	Modal bandwidth (MHz/km)	Cable distance **Note** Half the distance specified by the IEEE standard.
Cable and operating distance	62.5	160 (FDDI)	13 m
	62.5	200 (OM1)	16.5 m
	50	400	33 m
	50	500 (OM2)	41 m
	50	2000 (OM3)	150 m
	50	4700 (OM4)	200 m

Table 6: 10-Gb LR Network Module (FPR4K-NM-6X10LR-F)

	Operating Mode	**Typical**	**Maximum**
Insertion loss	Normal	1.2 dB	1.6 dB
	Hardware bypass	1.5 dB	1.9 dB

	Core diameter (microns)	Modal bandwidth (MHz/km)	Cable distance **Note** Half the distance specified by the IEEE standard.
Cable and operating distance	G.652	Single mode	5 km

Power Supply Modules

The Firepower 4100 supports two AC or DC power supply modules so that dual power supply redundancy protection is available. Facing the back of the chassis, the power supply modules are numbered left to right, for example, PSU1 and PSU2.

Note The system power requirements are lower than the power supply module capabilities. See Hardware Specifications, on page 27 for the system power requirements.

Note After removing power from the chassis either by moving the power switch to OFF or unplugging the power cord, wait at least 10 seconds before turning power back ON.

Attention Make sure that one power supply module is always active.

See Remove and Replace the Power Supply Module, on page 62 for the procedure for removing and replacing the power supply module.

AC Power Supply

The power supplies can supply up to 1100-W power across the input voltage range. The load is shared when both power supply modules are plugged in and running at the same time. The power supply modules are hot-swappable.

Table 7: AC Power Supply Module Hardware Specifications

Description	Specification
Input voltage	100 to 240 V AC

Maximum current	13 A (at 100 V AC)
	Note The system power requirements are lower than the power supply module capabilities. See Hardware Specifications, on page 27 for the system power requirements.
Maximum output power	1100 W
Frequency	50 to 60 Hz
Redundancy	1+1 redundant
Efficiency at 50% load	92%

DC Power Supply

The power supplies can supply up to 950 W of power across the input voltage range. The load is shared when both power supply modules are plugged in and running at the same time. The power supply modules are hot-swappable.

Table 8: DC Power Supply Module Hardware Specifications

Description	Specification
Input voltage	-40 to -60 V DC
Maximum current	26 A (at 40 V DC)
	Note The power supply module is rated at 26 A but the system power is limited to 10 A. See Hardware Specifications, on page 27 for more system specifications.
Maximum output power	950 W
Redundancy	1+1 redundant
Efficiency at 50% load	92%

Power Supply Module LEDs

The following figure shows the two-color power supply LEDs. The LEDs are located on the upper right side.

Figure 13: Power Supply Module LEDs

| 1 | Amber FAIL LED | 2 | Green OK LED |
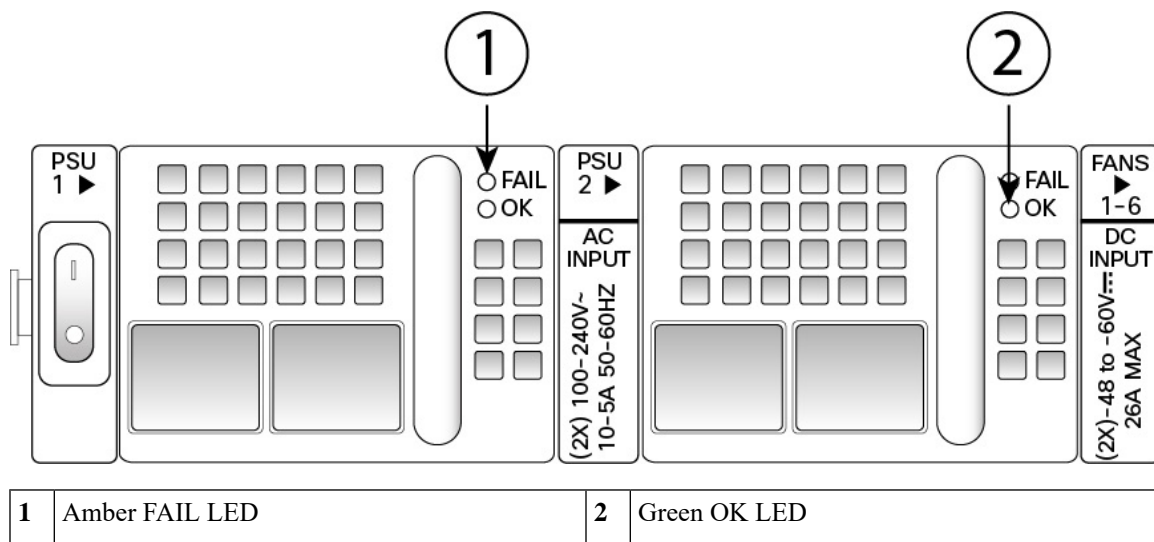
The following table describes the power module supply LEDs and their states.

Table 9: Power Supply Module LEDs

	Amber LED (Fail Status)	Green LED (OK Status)
No power to all power supplies	Off	Off
Power supply module failure Includes overvoltage, overcurrent, overtemperature, and fan failure	On	Off
Power supply module warning events Power supply continues to operate. With high temperature, high power, and slow fan	1 Hz flashing	Off
Power is present. 3.3 VSB on (power supply module off)	Off	1 Hz flashing
Power supply module is OK and on.	Off	On

Fan Modules

The Firepower 4100 requires six fan modules, which are hot-swappable. They are installed in the rear of the chassis. The system supports operation with a single fan failure (N+1 fan redundancy), but do not run the system for an extended amount of time without all fan modules installed. Keep removal and replacement time at three minutes. Remove and replace one fan module at a time.

If you remove a fan or a fan fails, the other fans operate at full speed, which can be noisy.

The fan modules are numbered left to right, for example, FAN1, FAN2, FAN3, FAN4, FAN5, and FAN6. See Remove and Replace the Fan Module, on page 58 for the procedure for removing and replacing the fan module.

The following figure shows the location of the fan LED.

Figure 14: Fan LED
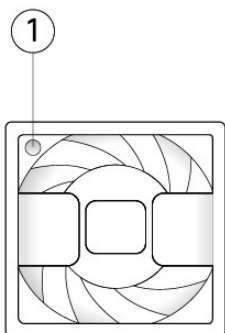
1	Two-color LED

The fan module has one two-color LED, which is located on the upper left corner of the fan.

- Amber—Fan failure.

- Green—Fan running normally. It may take up to one minute for the LED status to turn green after power is on.

Supported SFP/SFP+ and QSFP Transceivers

The SFP/SFP+ transceivers are bidirectional devices with a transmitter and receiver in the same physical package. It is a hot-swappable optical or electrical (copper) interface that plugs into the SFP/SFP+ ports on the fixed ports and the network module ports, and provides Ethernet connectivity.

Warning   Use appropriate ESD procedures when inserting the transceiver. Avoid touching the contacts at the rear, and keep the contacts and ports free of dust and dirt. Keep unused transceivers in the ESD packing that they were shipped in. The following figure shows a sample SFP transceiver.

Figure 15: SFP
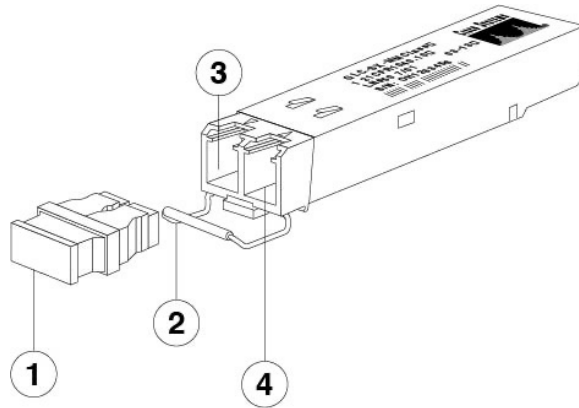
1	Dust plug	2	Bail clasp
3	Receive optical bore	4	Transmit optical bore

The following table lists the Cisco supported transceivers.

Table 10: Supported Cisco SFP/SFP+ Transceivers

Optics Type	PID	
1 Gb		
1G-SX	GLC-SX-MMD	
1G-LH/LX	GLC-LH-SMD	
1G-EX	GLC-EX-SMD	
1G-ZX	GLC-ZX-SMD	
1G 1000Base-T	GLC-T	
1G 1000Base-T	GLC-TE	
10 Gb		
10G-SR	SFP-10G-SR	
10G-SR-S	SFP-10G-SR-S	
10G-LR	SFP-10G-LR	
10G-LR-S	SFP-10G-LR-S	
10G-LRM	SFP-10G-LRM	
10G-ER	SFP-10G-ER	
10G-ER-S	SFP-10G-ER-S	

10G-ZR-S	SFP-10G-ZR-S	
10G Cu, 1m	SFP-H10GB-CU1M	
10G Cu, 1.5m	SFP-H10GB-CU1-5M	
10G Cu, 2m	SFP-H10GB-CU2M	
10G Cu, 2.5m	SFP-H10GB-CU2-5M	
10G Cu, 3m	SFP-H10GB-CU3M	
10G Cu, 5m	SFP-H10GB-CU5M	
10G Cu, 7m	SFP-H10GB-ACU7M	
10G Cu, 10m	SFP-H10GB-ACU10M	
10G AOC, 1m	SFP-10G-AOC1M	
10G AOC, 2m	SFP-10G-AOC2M	
10G AOC, 3m	SFP-10G-AOC3M	
10G AOC, 5m	SFP-10G-AOC5M	
10G AOC, 7m	SFP-10G-AOC7M	
10G AOC, 10m	SFP-10GAOC10M	
40 Gb		
40G-SR4	QSFP-40G-SR4	
40G-SR4-S	QSFP-40G-SR4-S	
40G-CSR4	QSFP-40G-CSR4	
40G-SR-BD	QSFP-40G-SR-BD	
40GE-LR4	QSFP-40GE-LR4	
40GE-LR4-S	QSFP-40GE-LR4-S	
40G-LR4L	WSP-Q40GLR4L	
40G-CU, 1M, 3M, 5M	QSFP-H40G-CU	
40G-4X10G-CU, 1M, 3M, 5M	QSFP-4SFP10G-CU	
40G-CU-A, 7M, 10M	QSFP-H40G-ACU	
40G-4X10G-CU-A, 7M, 10M	QSFP-4X10G-AC	
40G-AOC, 1M, 2M, 3M, 5M, 7M, 10M, 15M	QSFP-H40G-AOC	

Hardware Specifications

The following table contains hardware specifications for the Firepower 4100.

Table 11: Firepower 4100 Hardware Specifications

Specification	4112	4115	4125	4145
Dimensions (H x W x D)	1.75 x 16.89 x 29.7 in. (4.44 x 42.90 x 75.43 cm) 1.75 x 16.89 x 31.52 in. (4.44 x 42.90 x 80.06 cm) with fans			
Weight	39.4 lb (17.87 kg) two power supply modules, two network modules, six fans 31.4 lb (14.24 kg) no power supply modules, no network modules, no fans			
System power	AC: 100/240 V AC 10 A (at 100 V), 50 to 60 Hz DC: -40 V DC to -60 V DC, 26 A (at -40 V)			
Temperature	Operating: 32 to 104° F (0 to 40° C) at sea level 1° C reduction of maximum for every 1000 ft (305 m) above sea level Nonoperating: -40 to 149°F (-40 to 65° C)			
NEBS operating temperature Firepower 4125 only	—	—	Long term: 32 to 113° F (0 to 45° C) up to 6000 ft (1829 m) Long term: 32 to 95° F (0 to 35° C) up to 6000-13,000 ft (1829-3964 m) Short term: 23 to 131°F (-5 to 55° C) up to 6000 ft (1829 m)	—
Humidity	Operating and nonoperating: 5 to 95% noncondensing			
Altitude	Operating: 10,000 ft maximum (3048 m) Nonoperating: 15,000 ft maximum (4570 m)			
NEBS operating altitude Firepower 4125 only	—	—	0 to 13,000 ft (3962 m)	—
Sound pressure	63 dBa (typical) 74 dBa (maximum)			

Specification	4112	4115	4125	4145
Declared sound power	76 dB (typical) 87 dB (maximum)			

Product ID Numbers

The following table lists the PIDs associated with the Firepower 4100 series. All of the PIDs in the table are field-replaceable. If you need to get a return material authorization (RMA) for any component, see Cisco Returns Portal for more information.

Note See the **show inventory** command in the Cisco Firepower 4100/9300 FXOS Command Reference, in the Cisco Firepower Threat Defense Command Reference, or in the Cisco ASA Series Command Reference for the procedure to display a list of the PIDs for your Firepower 4100.

Table 12: Firepower 4100 Series PIDs

PID	Description
FPR4112-ASA-K9	Cisco Firepower 4112 ASA appliance, 1 RU, two network module bays
FPR4112-NGFW-K9	Cisco Firepower 4112 NGFW appliance, 1 RU, two network module bays
FPR4112-NGFW-K9	Cisco Firepower 4112 NGIPS appliance, 1 RU, two network module bays
FPR4115-ASA-K9	Cisco Firepower 4115 ASA appliance, 1 RU, two network module bays
FPR4115-NGFW-K9	Cisco Firepower 4115 NGFW appliance, 1 RU, two network module bays
FPR4115-NGIPS-K9	Cisco Firepower 4115 NGIPS appliance, 1 RU, two network module bays
FPR4125-ASA-K9	Cisco Firepower 4125 ASA appliance, 1 RU, two network module bays
FPR4125-NGFW-K9	Cisco Firepower 4125 NGFW appliance, 1 RU, two network module bays
FPR4125-NGIPS-K9	Cisco Firepower 4125 NGIPS appliance, 1 RU, two network module bays
FPR4145-ASA-K9	Cisco Firepower 4145 ASA appliance, 1 RU, two network module bays

PID	Description
FPR4145-NGFW-K9	Cisco Firepower 4145 NGFW appliance, 1 RU, two network module bays
FPR4145-NGIPS-K9	Cisco Firepower 4145 NGIPS appliance, 1 RU, two network module bays
FPR4K-ACC-KIT2	Firepower hardware accessory kit containing rack mounts and cables
FPR4K-ACC-KIT2=	Firepower hardware accessory kit containing rack mounts and cables (spare)
FPR4K-S-FAN	Fan
FPR4K-S-FAN=	Fan (spare)
FPR4K-NM-2X40G-F	2-port 40-Gb SR hardware bypass network module
FPR4K-NM-2X40G-F=	2-port 40-Gb SR hardware bypass network module (spare)
FPR4K-NM-4X40G	4-port 40-Gb QSFP+ network module
FPR4K-NM-4X40G=	4-port 40-Gb QSFP+ network module (spare)
FPR4K-NM-6X10LR-F	6-port 10-Gb LR hardware bypass network module
FPR4K-NM-6X10LR-F=	6-port 10-Gb LR hardware bypass network module (spare)
FPR4K-NM-6X10SR-F	6-port 10-Gb SR hardware bypass network module
FPR4K-NM-6X10SR-F=	6-port 10-Gb SR hardware bypass network module (spare)
FPR4K-NM-6X1SX-F	6-port 1-Gb SX fiber hardware bypass network module
FPR4K-NM-6X1SX-F=	6-port 1-Gb SX fiber hardware bypass network module (spare)
FPR4K-NM-8X10G	8-port 10-Gb SFP+ network module
FPR4K-NM-8X10G=	8-port 10-Gb SFP+ network module (spare)
FPR4K-NM-8X1G-F	8-port 1-Gb copper hardware bypass network module
FPR4K-NM-8X1G-F=	8-port 1-Gb copper hardware bypass network module (spare)
FPR4K-NM-BLANK	Network module blank slot cover
FPR4K-NM-BLANK=	Network module blank slot cover (spare)

PID	Description
FPR4K-PSU-BLANK	Chassis power supply module blank slot cover
FPR4K-PSU-BLANK=	Chassis power supply module blank slot cover (spare)
FPR4K-PWR-AC-1100	1100-W AC power supply module
FPR4K-PWR-AC-1100-	1100-W AC power supply module (spare)
FPR4K-PWR-DC-950	950-W DC power supply module
FPR4K-PWR-DC-950=	950-W DC power supply module (spare)
FPR4K-RACK-MNT	Rack-mount kit
FPR4K-RACK-MNT=	Rack-mount kit (spare)
FPR4K-CBL-MGMT	Cable management brackets
FPR4K-CBL-MGMT=	Cable management brackets (spare)
FPR4K-SSD-BBLKD	SSD slot carrier
FPR4K-SSD-BBLKD=	SSD slot carrier (spare)
FPR4K-SSD400	400-GB SSD for Firepower 4112, 4115, and 4125
FPR4K-SSD400=	400-GB SSD for Firepower 4112, 4115, and 4125 (spare)
FPR4K-SSD800	800-GB SSD for Firepower 4145
FPR4K-SSD800=	800-GB SSD for Firepower 4145 (spare)

Power Cord Specifications

Each power supply has a separate power cord. Standard power cords are available for connection to the security appliance.

If you do not order the optional power cord with the system, you are responsible for selecting the appropriate power cord for the product. Using a incompatible power cord with this product may result in electrical safety hazard. Orders delivered to Argentina, Brazil, and Japan must have the appropriate power cord ordered with the system.

Note Only the approved power cords or jumper power cords provided with the security appliance are supported.
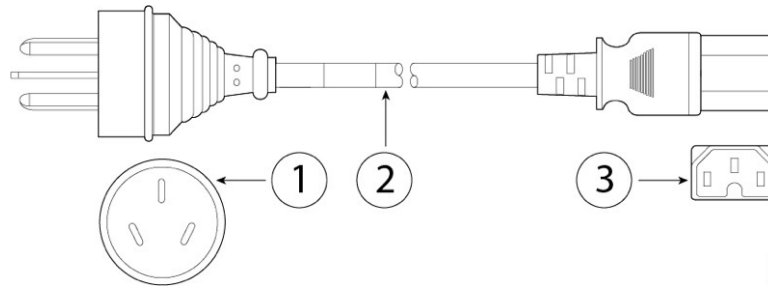
The following power cords are supported.

Figure 16: Argentina CAB-9K10A-AR
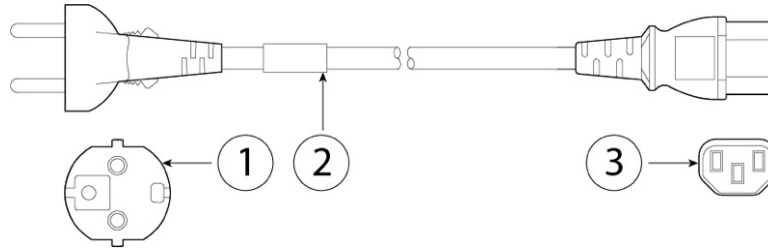
1	Plug: IRAM 2073	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 17: Australia CAB-9K10A-AU

1	Plug: A.S. 3112-2000	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 18: Brazil CAB-250V-10A-BR
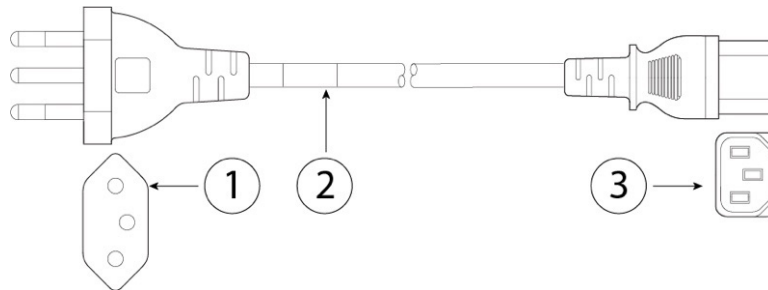
1	Plug: EL223 (NBR 14136)	2	Cord set rating: 10 A, 250 V
3	Connector: EL 701B (EN 60320/C13)		—

Figure 19: Brazil PWR-CORD-G2A-BZ
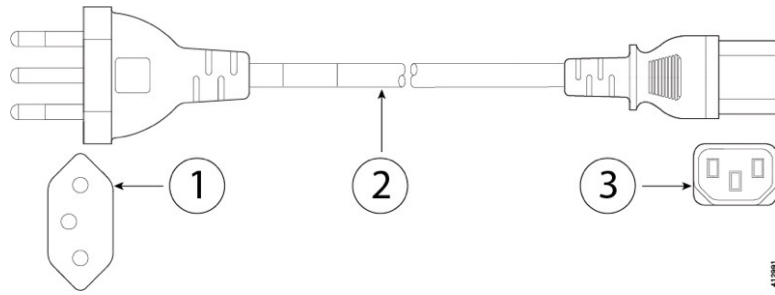
1	Plug: NBR 14136	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 20: China CAB-9K10A-CH
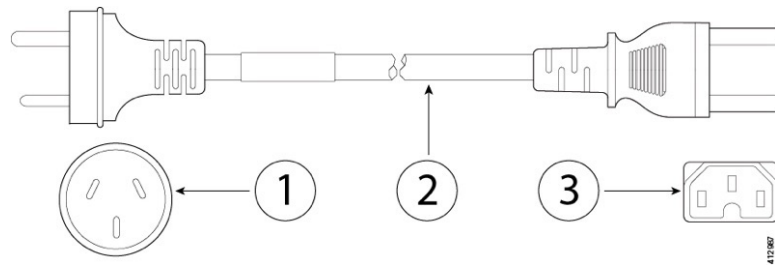
1	Plug: CCC GB2099.1, GB1002	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 21: Denmark CAB-TA-DN
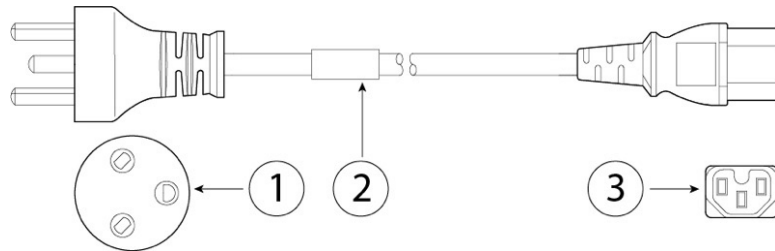
1	Plug: DK3	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 22: Europe CAB-AC-EUR
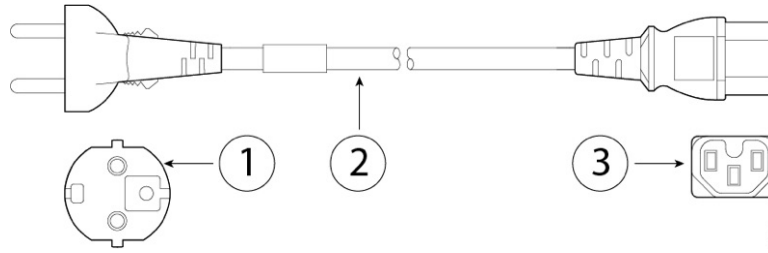
1	Plug: CEE 7/7	**2**	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 23: India CAB-250V-10A-ID
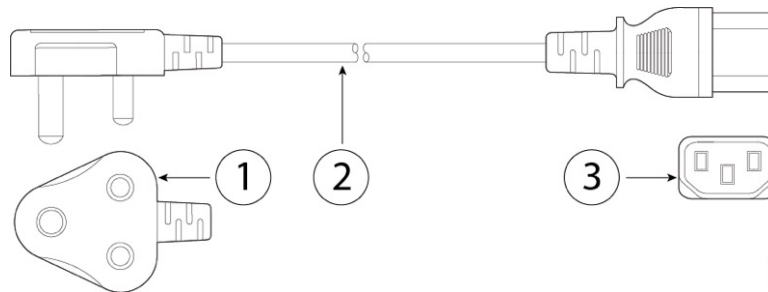
1	Plug: IS 6538-1971	**2**	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 24: Israel CAB-250V-10A-IS
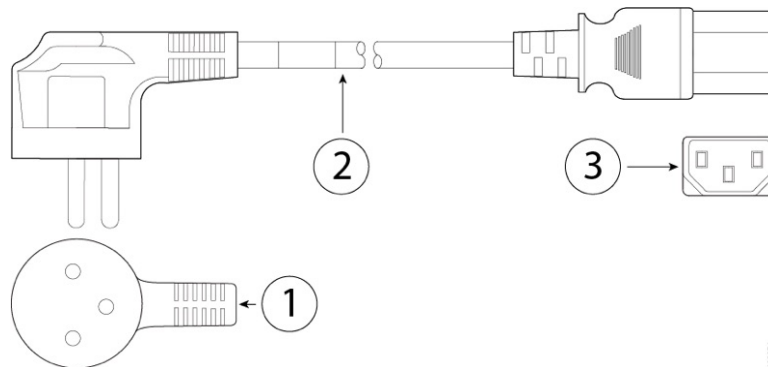
1	Plug: SI-32	**2**	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 25: Italy CAB-9K10A-IT
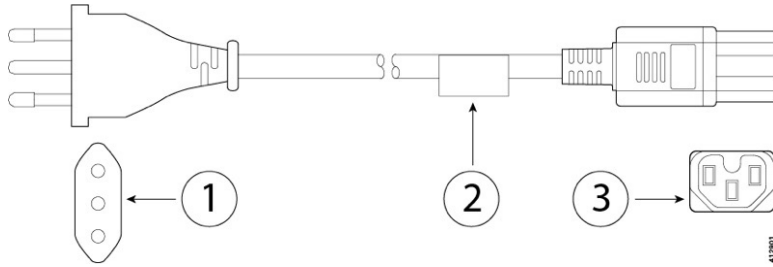
1	Plug: CEI 23-16/VII	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 26: Korea CAB-9K10A-KOR
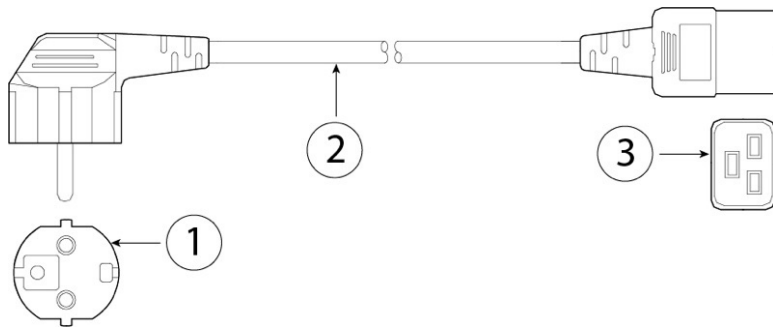
1	Plug: CEE 7/7	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C19		—

Figure 27: Japan CAB-L620P-C13-JPN
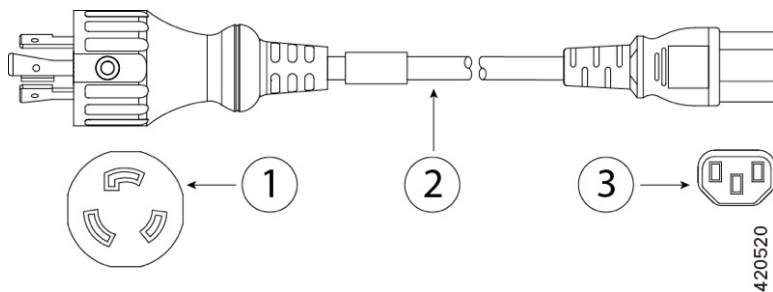
1	Plug: NEMA L6-20P	2	Cord set rating: 15 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 28: Japan CAB-TA-JP
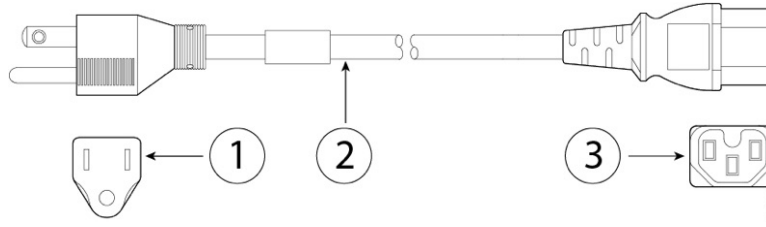
1	Plug: NEMA5-15P/JIS 8303	2	Cord set rating: 12 A, 125 V
3	Connector: IEC 60320-C15		—

Figure 29: North America CAB-TA-NA
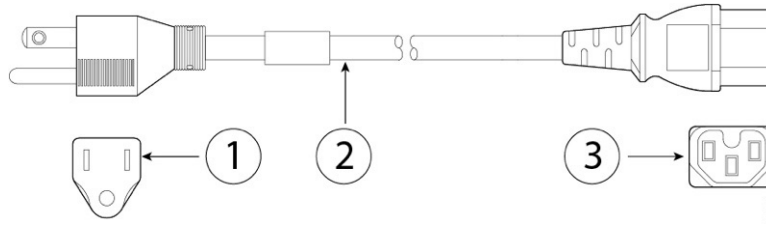
1	Plug: NEMA5-15P	2	Cord set rating: 12 A, 125 V
3	Connector: IEC 60320-C15		—

Figure 30: Saudi Arabia ATA187PWRCORD-SAUD
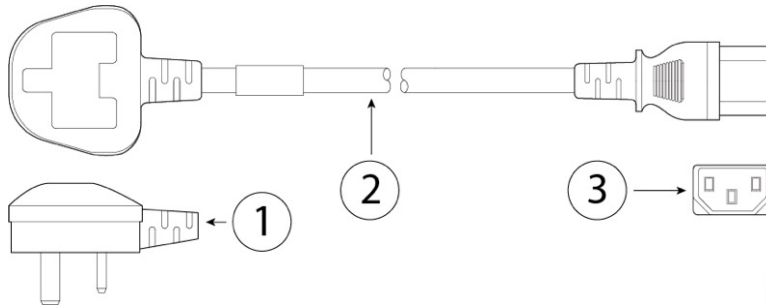
1	Plug: BS1363A/SS145	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—

Figure 31: South Africa CAB-9K10A-SA
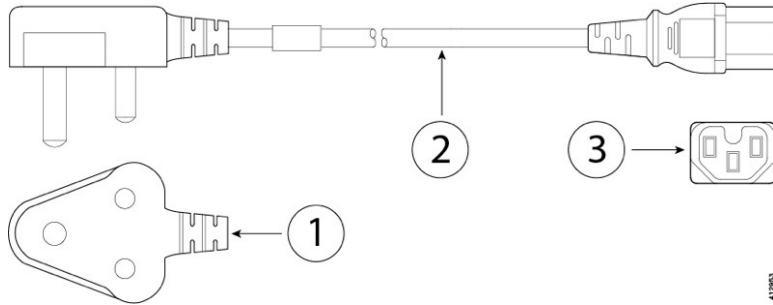
1	Plug: SABS 164	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 32: Switzerland CAB-9K10A-SW
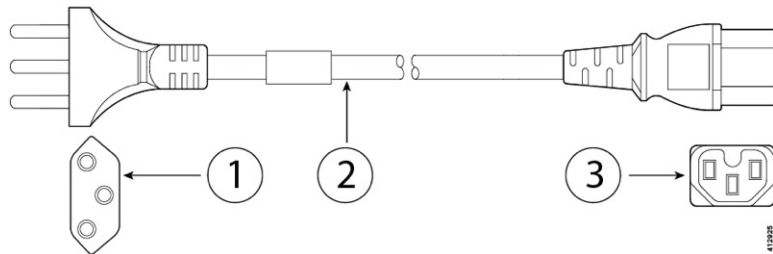
1	Plug: SEV 1011	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C15		—

Figure 33: Taiwan CAB-9K10A-TWN
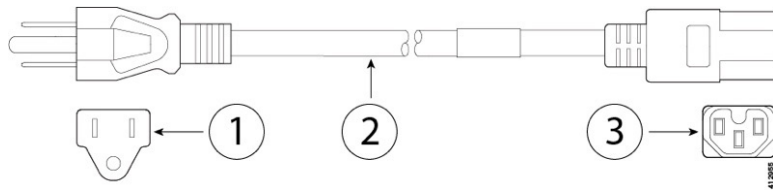
1	Plug: CNS10917-2	2	Cord set rating: 10 A, 125 V
3	Connector: IEC 60320-C15		—

Figure 34: United Kingdom CP-PWR-CORD-UK
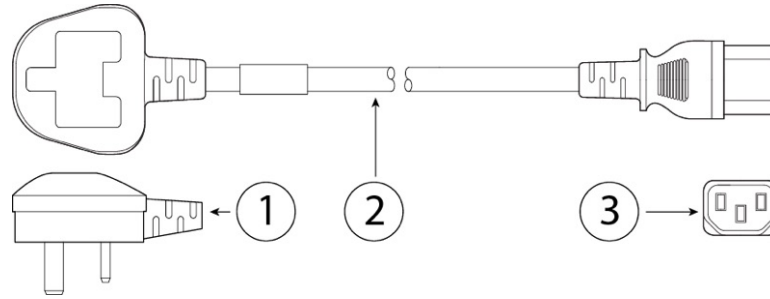
1	Plug: BS1363A/SS145	2	Cord set rating: 10 A, 250 V
3	Connector: IEC 60320-C13		—
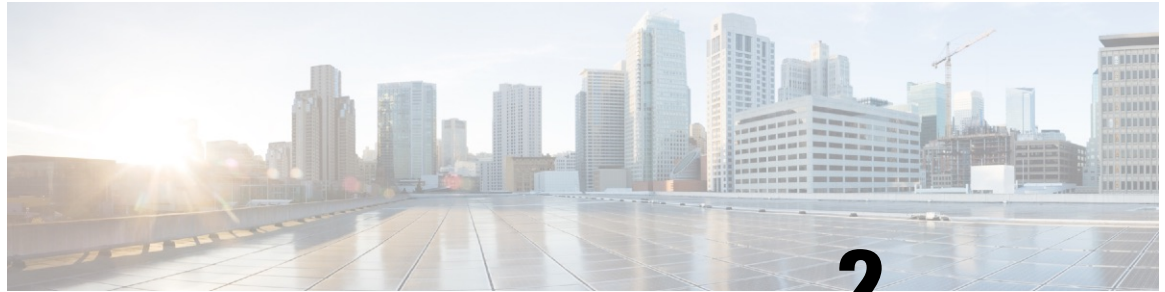
Installation Preparation

Installation Warnings

Be sure to read the Regulatory and Compliance Safety Information document before installing the security appliance.

Take note of the following 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 provided at the end of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS

Warning   **Statement 12**—Power Supply Disconnection Warning

Before working on a chassis or working near power supplies, unplug the power cord on AC units. Disconnect the power at the circuit breaker on DC units.

Warning   **Statement 19**—TN Power Warning

The device is designed to work with TN power systems.

Warning   **Statement 43**—Jewelry Removal Warning

Before working on equipment that is connected to power lines, remove jewelry including rings, necklaces, and watches. Metal objects heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

Warning   **Statement 94**—Wrist Strap Warning

During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

Warning   **Statement 1004**—Installation Instructions

Read the installation instructions before using, installing, or connecting the system to the power source.

Warning   **Statement 1005**—Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 20 A, 120 V, and 16 A, 250 V

Warning   **Statement 1015**—Battery Handling

To reduce risk of fire, explosion or leakage of flammable liquid or gas:

- Replace the battery only with the same or equivalent type recommended by the manufacturer.
- Do not dismantle, crush, puncture, use sharp tool to remove, short external contacts, or dispose of in fire.
- Do not use if battery is warped or swollen.
- Do not store or use battery in a temperature > 60° C.
- Do not store or use battery in low air pressure environment < 69.7 kPa.

Warning   **Statement 1017**—Restricted Area

This unit is intended for installation in restricted access areas. A restricted access area can be accessed by skilled, instructed, or qualified personnel.

Warning   **Statement 1021**—SELV Circuit

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

Warning   **Statement 1024**—Ground Conductor

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

Warning   **Statement 1028**—More Than One Power Supply

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

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 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Warning   **Statement 1040**—Product Disposal

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

Warning   **Statement 1045**—Short-Circuit Protection

This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

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.

Network Equipment-Building System (NEBS) Statements

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

The following NEBS statements apply to the Firepower 4125:

Warning   **Statement 7003**—Telcordia GR-1089 NEBS Standard for Electromagnetic Compatibility and Safety

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

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

The intrabuilding port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

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

This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC).

Note   **Statement 7013**—Equipment Bonding Networks CBN

This equipment is suitable for installations utilizing the insert CBN.

Note   **Statement 7016**—Battery Return Conductor

The battery return conductor of this equipment shall be treated as DC-1.

Note   **Statement 7017**—Minimum Steady State DC Input Voltage

This equipment operates without degradation at a minimum steady state voltage of -40.5 VDC. The nominal DC input voltage rating is -48 VDC.

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.

Safety Recommendations

Observe these safety guidelines:

- Keep the area clear and dust free before, during, and after installation.

- Keep tools away from walkways, where you and others might trip over them.

- Do not wear loose clothing or jewelry, such as earrings, bracelets, or chains that could get caught in the chassis.

- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.

- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

- Never attempt to lift an object that is too heavy for one person.

Maintain Safety with Electricity

⚠

Warning   Before working on a chassis, be sure the power cord is unplugged.

Read the Regulatory and Compliance Safety Information document before installing the chassis.

Follow these guidelines when working on equipment powered by electricity:

- Before beginning procedures that require access to the interior of the chassis, locate the emergency power-off switch for the room in which you are working. Then, if an electrical accident occurs, you can act quickly to turn off the power.

- Do not work alone if potentially hazardous conditions exist anywhere in your work space.

- Never assume that power is disconnected; always check.

- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.

- If an electrical accident occurs:

    - Use caution; do not become a victim yourself.

    - Disconnect power from the system.

    - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim, and then call for help.

    - Determine whether the person needs rescue breathing or external cardiac compressions; then take appropriate action.

- Use the chassis within its marked electrical ratings and product usage instructions.

- The chassis is equipped with an AC-input power supply, which is shipped with a three-wire electrical cord with a grounding-type plug that fits into a grounding-type power outlet only. Do not circumvent this safety feature. Equipment grounding should comply with local and national electrical codes.

Prevent ESD Damage

ESD occurs when electronic components are improperly handled, and it can damage equipment and impair electrical circuitry, which can result in intermittent or complete failure of your equipment.

Always follow ESD-prevention procedures when removing and replacing components. Ensure that the chassis is electrically connected to an earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the grounding clip to an unpainted surface of the chassis frame to safely ground ESD voltages. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

For safety, periodically check the resistance value of the antistatic strap, which should be between one and 10 megohms.

Site Environment

See Hardware Specifications, on page 27 for information about physical specifications.

To avoid equipment failures and reduce the possibility of environmentally caused shutdowns, plan the site layout and equipment locations carefully. If you are currently experiencing shutdowns or unusually high error rates with your existing equipment, these considerations may help you isolate the cause of failures and prevent future problems.

Site Considerations

Considering the following helps you plan an acceptable operating environment for the chassis, and avoid environmentally-caused equipment failures.

- Electrical equipment generates heat. Ambient air temperature might not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Make sure that the room in which you operate your system has adequate air circulation.

- Ensure that the chassis cover is secure. The chassis is designed to allow cooling air to flow effectively within it. An open chassis allows air leaks, which may interrupt and redirect the flow of cooling air from the internal components.

- Always follow ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Power Supply Considerations

See Power Supply Modules, on page 21 for more detailed information about the power supply in the chassis.

When installing the chassis, consider the following:

- Check the power at the site before installing the chassis to ensure that it is free of spikes and noise. Install a power conditioner, if necessary, to ensure proper voltages and power levels in the appliance-input voltage.

- Install proper grounding for the site to avoid damage from lightning and power surges.

- The chassis does not have a user-selectable operating range. Refer to the label on the chassis for the correct appliance input-power requirement.

- Several styles of AC-input power supply cords are available for the chassis; make sure that you have the correct style for your site.

- If you are using dual redundant (1+1) power supplies, we recommend that you use independent electrical circuits for each power supply.

- Install an uninterruptible power source for your site, if possible.

Rack Configuration Considerations

See Rack-Mount the Chassis, on page 47 for the procedure for rack-mounting the chassis.

Consider the following when planning a rack configuration:

- Standard 19-in. (48.3 cm) 4-post EIA rack with mounting rails that conform to English universal hole spacing according to section 1 of ANSI/EIA-310-D-1992.

- The rack-mounting posts need to be 2 to 3.5 mm thick to work with the slide rail rack mounting.

- If you are mounting a chassis in an open rack, make sure that the rack frame does not block the intake or exhaust ports.

- If your rack includes closing front and rear doors, the doors must have 65 percent open perforated area evenly distributed from top to bottom to permit adequate airflow.

- Be sure enclosed racks have adequate ventilation. Make sure that the rack is not overly congested as each chassis generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air.

- In an enclosed rack with a ventilation fan in the top, heat generated by equipment near the bottom of the rack can be drawn upward and into the intake ports of the equipment above it in the rack. Ensure that you provide adequate ventilation for equipment at the bottom of the rack.

- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack. Experiment with different arrangements to position the baffles effectively.

Rack-Mount and Ground the Chassis

Unpack and Inspect the Chassis

Note The chassis is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately. Keep the shipping container in case you need to send the chassis back due to damage.

See Package Contents, on page 5 for a list of what shipped with the chassis.

Step 1 Remove the chassis from its cardboard container and save all packaging material.

Step 2 Compare the shipment to the equipment list provided by your customer service representative. Verify that you have all items.

Step 3 Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:

- Invoice number of shipper (see the packing slip)

- Model and serial number of the damaged unit

- Description of damage

- Effect of damage on the installation

Rack-Mount the Chassis

This procedure describes how to install the Firepower 4100 series security appliance in a rack using the rack kit that shipped with the chassis.

The rack is a standard Electronic Industries Association (EIA) rack. It is a 4-post-EIA-310-D, which is the current revision as specified by EIA. The vertical hole spacing alternates at .50 inches (12.70 mm) to .625 inches (15.90 mm) to .625 inches (15.90 mm) and repeats. The start and stop space is in the middle of the .50-inch holes. The horizontal spacing is 18.312 inches (465.1 mm), and the rack opening is specified as a minimum of 17.75 inches (450 mm).

You need the following to install the chassis in a rack (4-post EIA-310-D rack):

- #1 Phillips screwdriver

- Firepower 4100 rack-mount kit that contains the slide rails, mounting ears, and screws

Slide rail assemblies work with 4-post racks and cabinets with square slots, round 7.1-mm holes and 10-32-inch threaded holes on the rack post front. The slide rail works with front to back spacing of rack posts from 24 to 36 inches. The rack-mounting posts need to be 2 to 3.5 mm thick to work with the slide rail rack mounting.

Note   Internal obstructions between rails can make slide rail installation more complicated. Use racks that do not have internal obstructions between rails for unhindered slide rail installation.

Safety Warnings

Take note of the following warnings:

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 1018**—Supply Circuit

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

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.

Step 1   Attach a rack mount bracket to each side of the chassis using the six 8-32 x .375-inch Phillips screws provided in the accessory kit.

Figure 35: Attach the Rack Mount Bracket to the Side of the Chassis
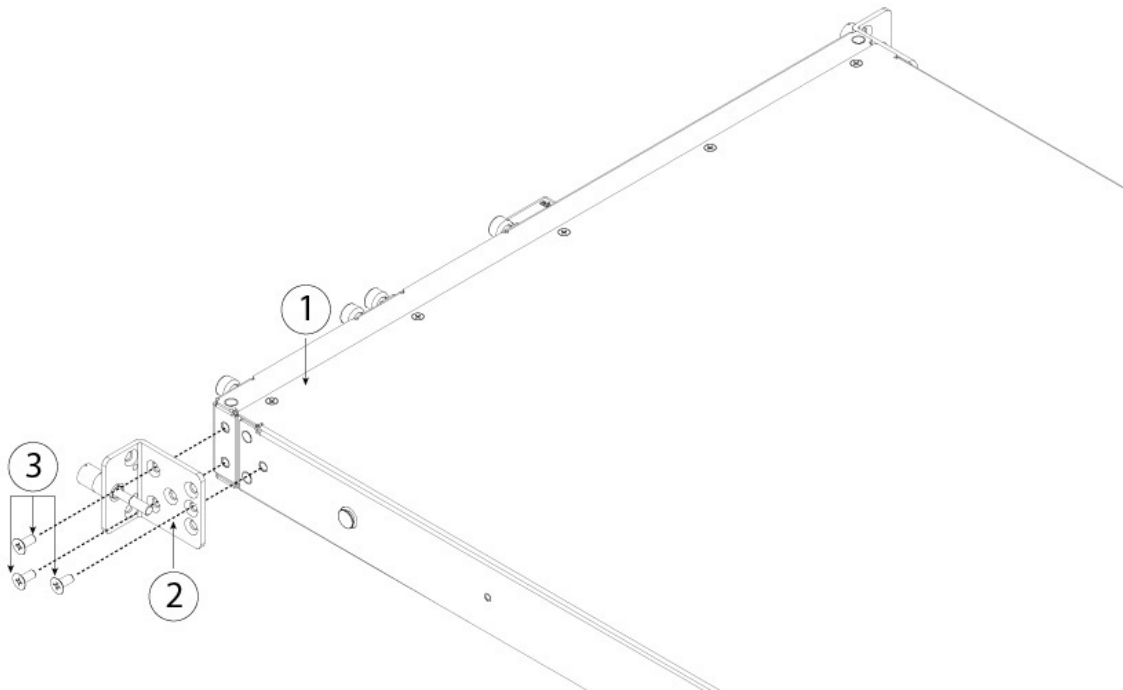
1	Chassis	2	Rack-mount bracket
3	8-32 x .375-inch Phillips screws (three per side)		

Step 2   Attach the inner rails to the sides of the chassis:

a) Remove the inner rails from the slide rail assemblies.

b) Align an inner rail with one side of the chassis so that the three keyed slots in the rail align with the three pegs on the side of the chassis.

c) Set the keyed slots over the pegs, and then slide the rail toward the front to lock it in place on the pegs. The rear key slot has a metal clip that locks over the peg.

d) Secure the inner rail to the side of the chassis using one M3 x 6 mm screw.

e) Install the second inner rail to the opposite side of the chassis and secure with the other M3 x 6 mm screw.

Figure 36: Attach the Inner Rail to the Side of the Chassis
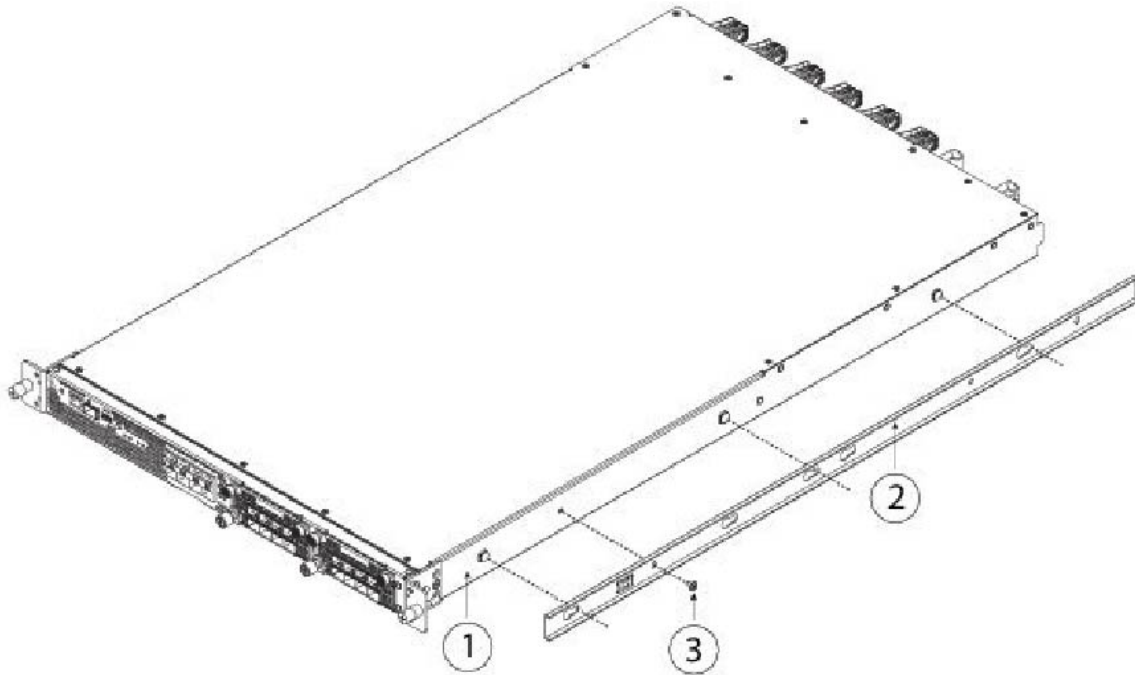
1	Front of chassis	2	Inner rail
3	M3 x 6-mm screw (one per side)		

Step 3   Open the front securing plate on both slide-rail assemblies. The front end of the slide-rail assembly has a spring-loaded securing plate that must be open before you can insert the mounting pegs into the rack-post holes.

On the outside of the assembly, push the green arrow button toward the rear to open the securing plate.

Figure 37: Front Securing Mechanism Inside the Front End
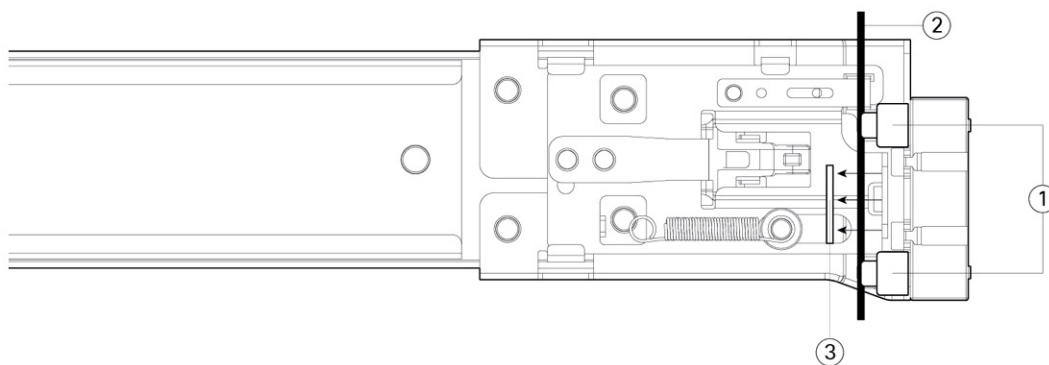
1	Front mounting pegs	**2**	Securing plate shown pulled back to open position
	Note Works with square slots, 7.1-mm holes, and 10-32-threaded holes		
3	Rack post		—

Step 4 Install the slide rails into the rack:

    a) Align one slide-rail assembly front end with the front rack-post holes that you want to use.

       The slide rail front end wraps around the outside of the rack post and the mounting pegs enter the rack-post holes from the outside front.

          Note The rack post must be between the mounting pegs and the open securing plate.

    b) Push the mounting pegs into the rack-post holes from the outside front.

    c) Press the securing plate release button marked *PUSH*. The spring-loaded securing plate closes to lock the pegs in place.

    d) Adjust the slide-rail length, and then push the rear mounting pegs into the corresponding rear rack-post holes. The slide rail must be level front-to-rear.

       The rear mounting pegs enter the rear rack-post holes from the inside of the rack post.

    e) Attach the second slide-rail assembly to the opposite side of the rack. Make sure that the two slide-rail assemblies are at the same height with each other and are level front-to-back.

    f) Pull the inner slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place.

Step 5 Insert the chassis into the slide rails.

    a) Align the rear of the inner rails that are attached to the chassis sides with the front ends of the empty slide rails on the rack.

    b) Push the inner rails into the slide rails on the rack until they stop at the internal stops.

    c) Slide the release clip toward the rear on both inner rails, and then continue pushing the chassis into the rack until the mounting brackets meet the front of the slide rail.

Figure 38: Inner Rail Release Clip
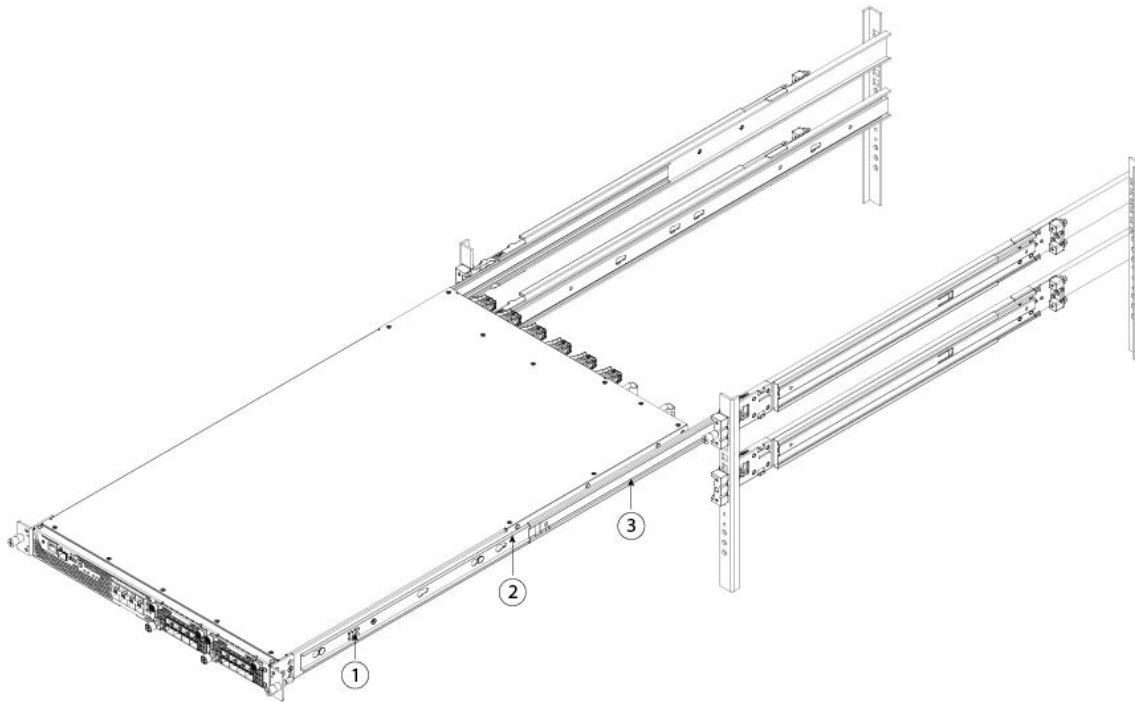
1	Inner rail release clip	2	Inner rail attached to chassis
3	Outer rail attached to rack post		

Step 6   Use the captive screws on the front of the mounting brackets to fully secure the chassis to the rack.

What to do next

Ground the chassis. See Ground the Chassis, on page 52 for the procedure.

Install the FIPS opacity shield if necessary. See Install the FIPS Opacity Shield, on page 75 for the procedure.

Install the cables according to your software configuration as described in the Cisco Firepower 4100 Getting Started Guide.

Ground the Chassis

Note   Grounding the chassis is required, even if the rack is already grounded. A grounding pad with two threaded M4 holes is provided on the chassis for attaching a grounding lug. The grounding lug must be Nationally Recognized Testing Laboratory (NRTL)-listed. In addition, a copper conductor (wires) must be used and the copper conductor must comply with National Electrical Code (NEC) code for ampacity.

You need the following items that you provide:

- Wire-striping tool

- Crimping tool

- Grounding cable

- Two star lock washers for the 10-32 x 0.375-inch screws used to secure the ground lug

- You need the following items from the accessory kit:

  - Grounding lug #6 AWG, 90 degree, #10 post

  - Two 10-32 x 0.375-inch screws used to secure the grounding lug

Safety Warnings

Take note of the following warnings:

Warning **Statement 1024**—Ground Conductor

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

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

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

**Warning** **Statement 1025**—Use Copper Conductors Only

To reduce risk of fire, use copper conductors only.

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

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

Figure 39: Insert the Cable into the Grounding Lug
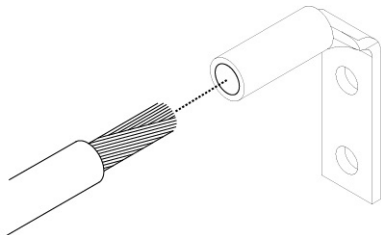
Step 3   Use the crimping tool to secure the grounding cable in the grounding lug.

Step 4   Remove the adhesive label from the grounding pad on the chassis.

Step 5   Place the grounding lug against the grounding pad so that there is solid metal-to-metal contact, and insert the two screws with washers through the holes in the grounding lug and into the grounding pad.

Step 6   Make sure that the lug and cable do not interfere with other equipment.

Step 7   Prepare the other end of the grounding cable and connect it to an appropriate grounding point in your site to ensure adequate earth ground.

What to do next

Install the FIPS opacity shield if necessary. See Install the FIPS Opacity Shield, on page 75 for the procedure.

Install the cables according to your default software configuration as described in the Cisco Firepower 4100 Getting Started Guide.

CHAPTER **4**

Installation, Maintenance, and Upgrade

Install, Remove, and Replace the Network Module

Hot Swapping

Starting with FXOS 2.3.1, the Firepower 10-Gb and 40-Gb network modules (without hardware bypass support) support hot swapping, but you must hot swap with an identical network module, that is, a network module with the same PID. See Product ID Numbers, on page 28 for the network module PIDs. You must bring the network module offline using the appropriate CLI commands before removing the network module from the chassis so that all network module configuration is saved. See the "Taking a Network Module Offline or Online" topic in the Security Module/Engine Management chapter in the Cisco FXOS Firepower Chassis Manager Configuration Guide.

⚠️ **Caution** We do not recommend that you remove the network module without bringing it properly offline using the appropriate CLI commands.

✎ **Note** You must have ROMMON 1.0.10 or later on the Supervisor to support hot swapping. For the ROMMON upgrade procedure, see the "Firmware Upgrade" topic in the Image Management chapter in the Cisco FXOS Firepower Chassis Manager Configuration Guide for your software version.

To remove and replace the network modules that do *not* currently support hot swapping, power off the chassis, replace the network module, and then power the chassis back on.

Acknowledgment is necessary if you decommission and physically remove a network module and do not replace it, or if you replace it with another PID. See the "Acknowledging a Security Module/Engine"

topic in the Security Module/Engine Management chapter in the Cisco FXOS Firepower Chassis Manager Configuration Guide.

Safety Warnings

Take note of the following warnings:

Warning   **Statement 60**—UL- and CSA-Certified Equipment Warning

This card is intended to be installed in UL- and CSA-certified equipment in the field by the user in the manufacturer's defined operator access area. Check the equipment manufacturer to verify/confirm that your equipment is suitable for user-installed application cards.

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 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Warning   **Statement 1040**—Product Disposal

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

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

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

Warning   **Statement 1077**—Do Not Operate Unit Without Covers

The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.

This procedure describes how to install a network module into an empty slot that has never contained a network module, and how to remove an installed network module and replace it with another network module.

Step 1   To install a new network module for the first time into an empty slot, do the following:

a) Power down the chassis by moving the power switch to the OFF position.

See Rear Panel, on page 10 for more information about the power switch.

b) Follow Steps 4 through 7 to install the new network module.

c) Power on the chassis by moving the power switch to the ON position.

The state for the new network module is `OIR Failed`.

d) To change the status of the network module to `Online`, reboot the chassis. See the "Rebooting the Firepower 4100/9300 Chassis" topic in the System Administration chapter in the FXOS Configuration Guide for your software version.

**Step 2** To remove and replace an existing network module, do one of the following:

a) Save your configuration.

b) Power down the chassis by moving the power switch to the OFF position (if removing a network module that does *not* support hot swapping).

See Rear Panel, on page 10 for more information about the power switch.

c) Bring the network module offline using the appropriate CLI command (if removing a network module that *supports* hot swapping). All network module configuration is saved. See the "Taking a Network Module Offline or Online" topic in the Security Module/Engine Management chapter in the FXOS Configuration Guide for your software version.

d) Continue with Step 3.

Step 3 To remove a network module from the chassis, loosen the captive screw on the lower left side of the network module and pull out the handle that is connected to the screw. This mechanically ejects the network module from the slot.

Figure 40: Remove the Network Module
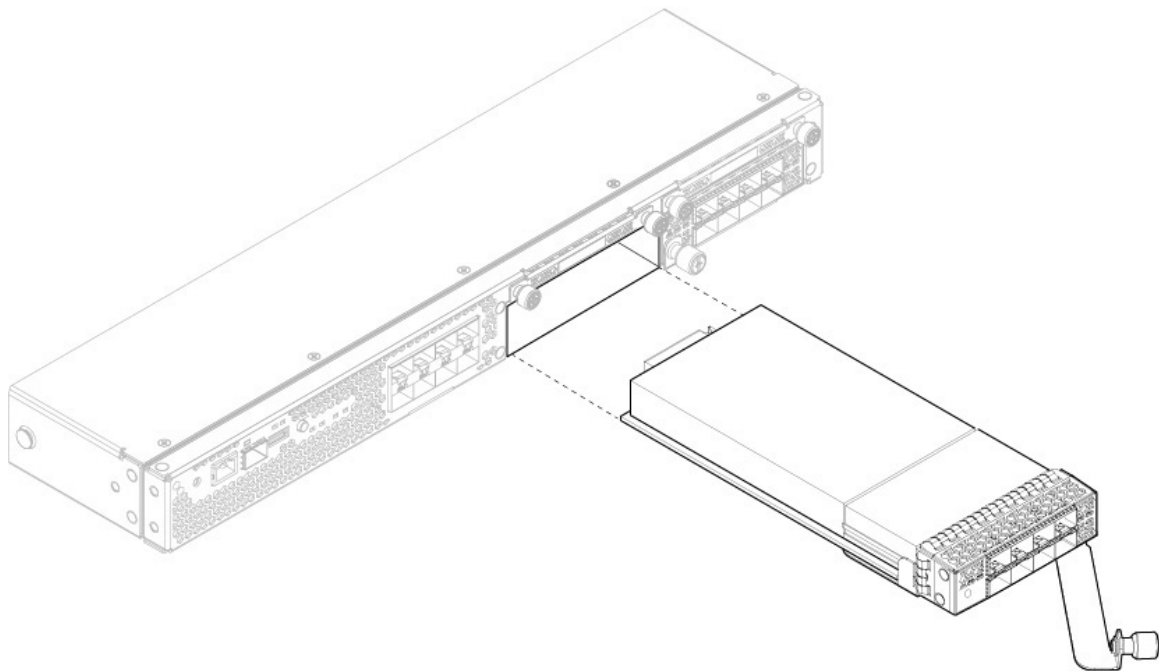
If the slot is to remain empty, install a blank faceplate to ensure proper airflow and to keep dust out of the chassis; otherwise, install another network module.

Step 4 To replace a network module, hold the network module in front of the network module slot on the right of the chassis and pull the network module handle out.

Step 5 Slide the network module into the slot and push it firmly into place until the handle is flush with the front of the network module.

Step 6 Tighten the captive screw on the lower left side of the network module.

Step 7 Do one of the following:

a) Power up the chassis so that the new network module is recognized (if the new network module does *not* support hot swapping).

b) Bring the new network module online using the appropriate CLI command (if the new network module *supports* hot swapping). The saved network module configuration is automatically reapplied when the network module is back online.

> **Note** If you install a network module that is a different PID than the original network module, the saved configuration is deleted and the default configuration is applied. You must enter the **acknowledge** command to confirm the network module PID change.

What to do next

Follow the procedures in the FXOS Configuration Guide to connect to the network module and make sure that it has been discovered correctly by the Firepower 4100.

Remove and Replace the Fan Module

You can remove and replace fan modules while the system is running. The air flow moves from front to back. If you remove a fan or a fan fails, the other fans operate at full speed, which can be noisy.

> **Note** The system supports operation with a single fan failure (N+1 fan redundancy), but do not run the system for an extended amount of time without all fan modules installed. Keep removal and replacement time at three minutes. Remove and replace one fan module at a time.

Safety Warnings

Take note of the following warnings:

> **Warning** **Statement 60**—UL- and CSA-Certified Equipment Warning
>
> This card is intended to be installed in UL- and CSA-certified equipment in the field by the user in the manufacturer's defined operator access area. Check the equipment manufacturer to verify/confirm that your equipment is suitable for user-installed application cards.

> **Warning** **Statement 1030**—Equipment Installation
>
> Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

⚠

Warning   **Statement 1040**—Product Disposal

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

⚠

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

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

⚠

Warning   **Statement 1077**—Do Not Operate Unit Without Covers

The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.

Step 1   To remove a fan module, face the rear of the chassis, and grasp the handle of the fan module.

Step 2   Squeeze the handle to disengage the latches on the left and right of the fan module.

Step 3   Pull the fan module out of the chassis.

Figure 41: Remove the Fan Module
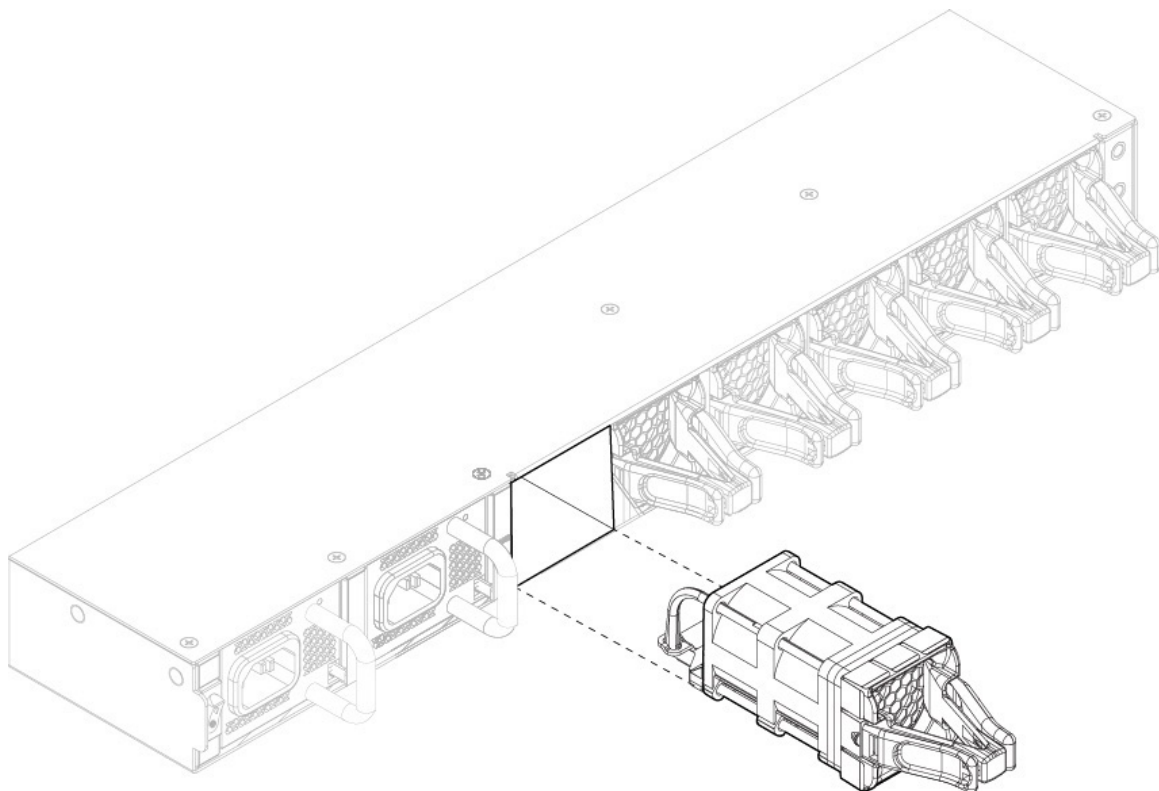
Step 4   To replace a fan module, hold the fan module in front of the fan slot.

Step 5 Push the fan module into the chassis until it is properly seated and the latches snap into place.
If the system is powered on, listen for the fans. You should immediately hear the fans operating. If you do not hear the fans, make sure the fan module is inserted completely into the chassis and the faceplate is flush with the outside surface of the chassis.

Step 6 Verify that the fan is operational by checking the fan module LED. See for a description of the fan LEDs.

Remove and Replace the SSD

Although the hardware supports removing and replacing SSDs while the system is running, the software does not currently support hot swapping. You must power down the chassis to remove and replace SSDs.

Note If your Firepower 4100 is running Firepower Threat Defense software, we recommend that you upgrade to the latest version to take advantage of software updates that enhance SSD management performance and longevity.

You storage SSD must be installed in slot 1 and must be present. Only an optional MSP can be installed in the second SSD slot (SSD slot 2). The MSP stores threat detection results for use in future analysis. It supports the Advanced Malware Protection software feature. The MSP is supported beginning in FXOS 2.0.1. It is used as both storage and as the Malware application repository. RAID is not supported.

Caution Do not switch the two SSDs. The storage SSD must be installed in slot 1. The optional MSP SSD must be installed in slot 2. If you remove it and install it in slot 1, all stored file capture data is lost.

Safety Warnings

Take note of the following warnings:

Warning **Statement 60**—UL- and CSA-Certified Equipment Warning

This card is intended to be installed in UL- and CSA-certified equipment in the field by the user in the manufacturer's defined operator access area. Check the equipment manufacturer to verify/confirm that your equipment is suitable for user-installed application cards.

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 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

⚠

Warning **Statement 1040**—Product Disposal

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

⚠

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

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

⚠

Warning **Statement 1077**—Do Not Operate Unit Without Covers

The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.

Step 1 Save your configuration.

Step 2 Power down the chassis by moving the power switch to the OFF position. See Features, on page 1 for more information about the power switch.

Step 3 To remove an SSD, face the front of the chassis, loosen the two captive screws on the SSD, and gently pull it out of slot 1 of the chassis.

Figure 42: Remove the SSD
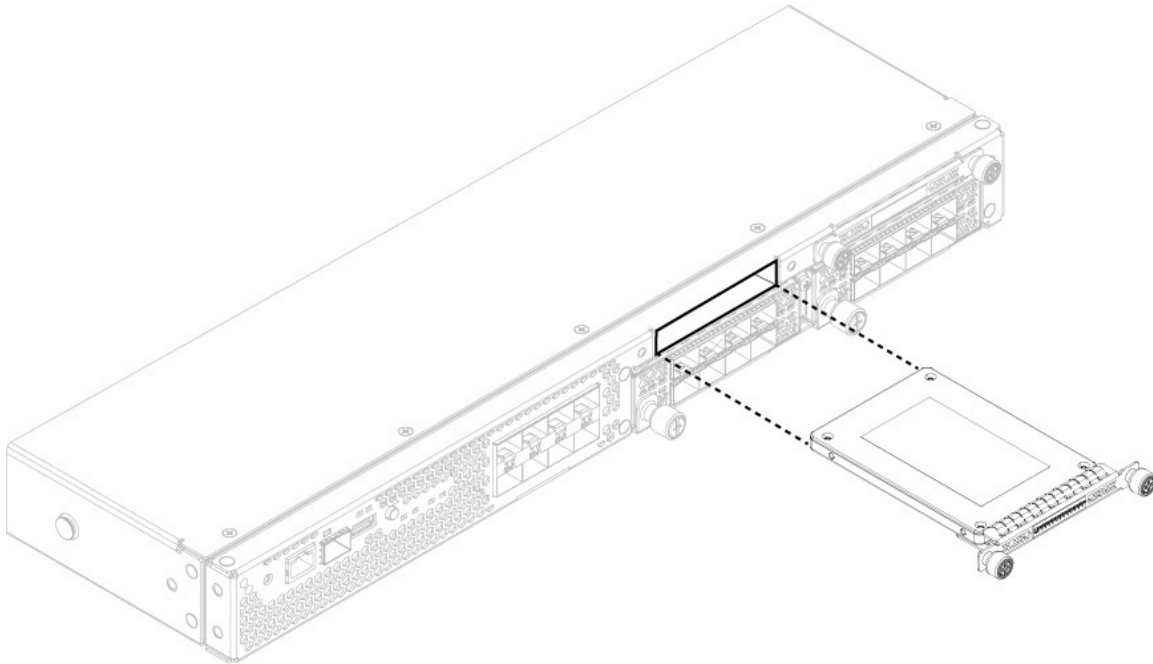
Step 4 To replace the SSD, make sure the power switch is still in the OFF position, and then hold the SSD in front of slot 1 and push it in gently until it is seated.

Step 5 To install the MSP SSD, make sure the power switch is still in the OFF position and then remove the blank faceplate in slot 2 by loosening the captive screws on either side of the faceplate.

Step 6 Hold the MSP SSD in front of slot 2 and push it in gently until it is seated.

Caution Do not switch the two SSDs. Only the optional MSP SSD can be installed in slot 2. If you remove it and install it in slot 1, all stored file capture data is lost.

Step 7 Tighten the captive screws on either side of the SSD.

Step 8 Verify that the SSD is operational by checking the SSD LED. See Front Panel LEDs, on page 9 for a description of the fan LEDs.

Remove and Replace the Power Supply Module

You can remove and replace power supply modules while the system is running.

Safety Warnings

Take note of the following warnings:

Warning **Statement 1002**—DC Power Supply

When stranded wiring is required, use approved wiring terminations such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.

Warning **Statement 1003**—DC Power Disconnection

Before performing any of the following procedures, ensure that power is removed from the DC circuit.

Warning **Statement 1005**—Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not great than: AC power 120 V AC, 20 A (US), 240 V AC, 16 A (EU), DC power 60 V, 35 A.

Warning **Statement 1022**—Disconnect Device
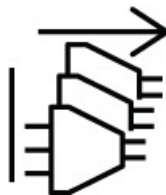
To reduce risk of electric shock and fire, a readily accessible two-poled disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1025**—Use Copper Conductors Only

To reduce risk of fire, use copper conductors only.

Warning **Statement 1028**—More Than One Power Supply

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

Warning **Statement 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Warning   **Statement 1040**—Product Disposal

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

Warning   **Statement 1045**—Short-Circuit Protection

This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

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.

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

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

Warning   **Statement 1077**—Do Not Operate Unit Without Covers

The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.

Step 1   To remove a power supply module, face the back of the chassis and grasp the handle.

Step 2   Press the latch found on the lower right of the power supply to disengage the power supply.

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

Figure 43: Remove the Power Supply Module
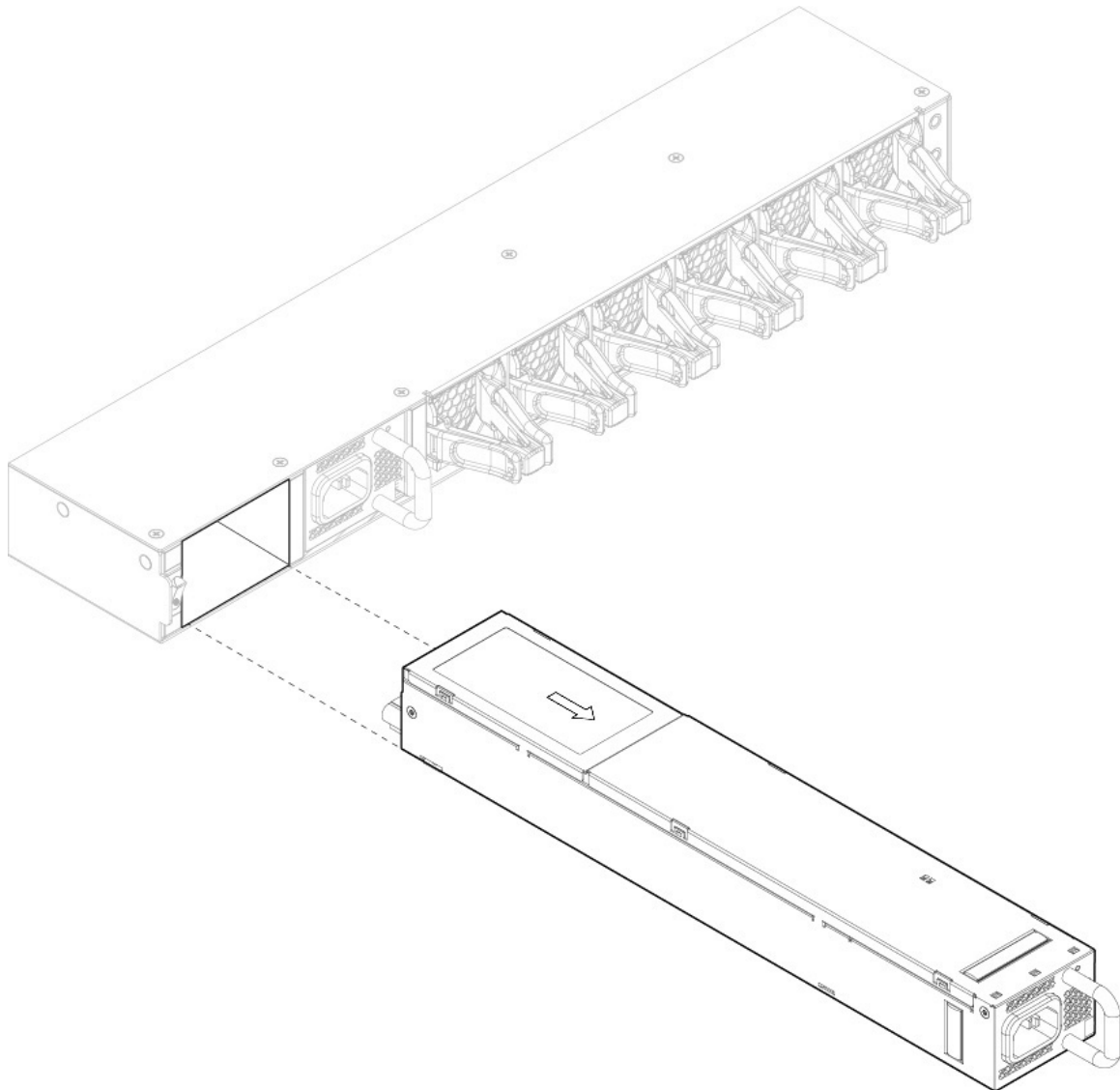
If the slot is to remain empty, install a blank faceplate to ensure proper airflow and to keep dust out of the chassis; otherwise, install another power supply module.

Step 4 To replace a power supply module, hold the power supply module with both hands and slide it into the power supply module bay.

Step 5 Push in the power supply module gently until you hear the latch engage and it is seated. Verify the power supply module is operating correctly by checking the power supply module LED. See Power Supply Modules, on page 21 for a description of the power supply module LEDs.

Connect the DC Power Supply Module

This procedure describes how to install the DC power supply input power leads to the Firepower 4100 DC input power supply on the rear PDU of the chassis.

Before You Begin

- The color coding of the DC input power supply leads depends on the color coding of the DC power source at your site. Make sure that the lead color coding you choose for the DC input power supply matches the lead color coding used at the DC power source and verify that the power source is connected to the negative (–) terminal and to the positive (+) terminal on the power supply.

- For DC input power cables, the wire gauge is based on the National Electrical Code (NEC) and local codes for 26 amp service at nominal DC input voltage (–40/–72 VDC). One pair of cable leads, source DC (–) and source DC return (+), are required for each power distribution unit (PDU). These cables are available from any commercial cable vendor. All DC input power cables for the chassis should be 10 gauge wire and cable lengths should match within 10 percent of deviation.

- Tools needed:

    - Phillips head screwdriver

    - 10-mm wrench or socket

    - Connectors and wire for the DC circuit or circuits

Each DC input power cable is terminated at the PDU by a cable lug, as shown in the following figure.

Note   DC input power cables must be connected to the PDU terminal studs in the proper positive (+) and negative (–) polarity. In some cases, the DC cable leads are labeled, which is a relatively safe indication of the polarity. However, you must verify the polarity by measuring the voltage between the DC cable leads. When making the measurement, the positive (+) lead and the negative (–) lead must always match the (+) and (–) labels on the power distribution unit.

Figure 44: DC Input Power Cable Lug
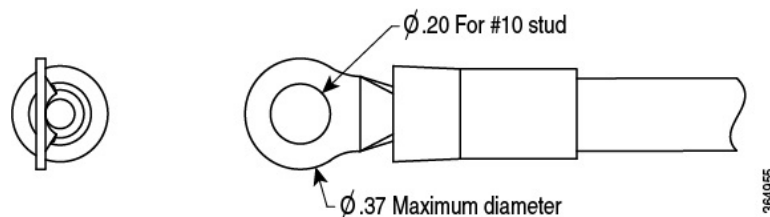
Note   To avoid hazardous conditions, all components in the area where DC input power is accessible must be properly insulated. Therefore, before installing the DC cable lugs, be sure to insulate the lugs according to the manufacturer's instructions

Safety Warnings

Take note of the following warnings:

⚠

Warning   **Statement 1002**—DC Power Supply

When stranded wiring is required, use approved wiring terminations such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.

⚠

Warning   **Statement 1003**—DC Power Disconnection

Before performing any of the following procedures, ensure that power is removed from the DC circuit.

⚠

Warning   **Statement 1005**—Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not great than: AC power 120 V AC, 20 A (US), 240 V AC, 16 A (EU), DC power 60 V, 35 A.

⚠

Warning   **Statement 1017**—Restricted Area

This unit is intended for installation in restricted access areas. A restricted access area can be accessed by skilled, instructed, or qualified personnel.

⚠

Warning   **Statement 1022**—Disconnect Device

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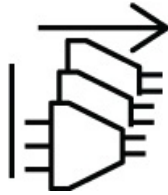
⚠

Warning   **Statement 1025**—Use Copper Conductors Only

To reduce risk of fire, use copper conductors only.

Warning **Statement 1028**—More Than One Power Supply

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

Warning **Statement 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Warning **Statement 1040**—Product Disposal

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

Warning **Statement 1045**—Short-Circuit Protection

This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

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.

Warning **Statement 1077**—Do Not Operate Unit Without Covers

The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.

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

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

⚠

**Warning**   **Statement 1086**—Power Terminals, Replace Cover

Hazardous voltage or energy may be present on power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.

Step 1   Install the DC power supply module in the chassis and make note of the bay number so you can connect the wiring to the correct terminals on the DC power supply module at the rear of the chassis. See for the procedure.

Step 2   Verify that the power is off to the DC circuit on the power supply module that you are installing.

Step 3   Make sure that all site power and grounding requirements have been met.

Step 4   To remove the plastic cover from the terminal block, insert a flat screw driver on the side of the plastic cover and pry it off.

Figure 45: Remove the Plastic Cover
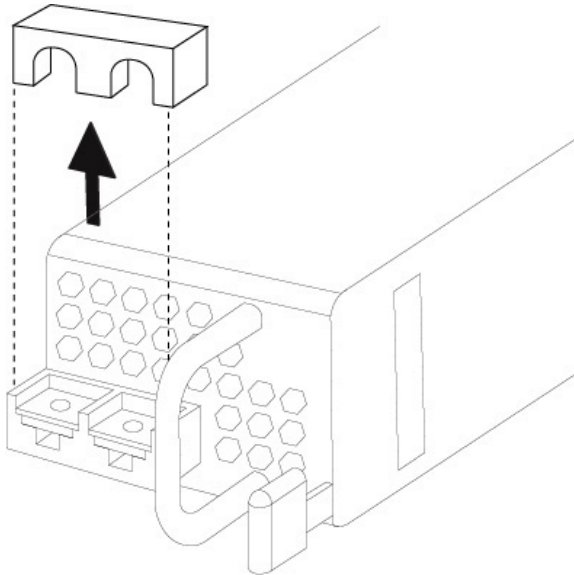
Step 5   To prevent any contact with metal lead on the ground wire and the plastic cover, you must wrap the positive and negative lead cables with sleeving. Insulate the lug with shrink sleeving for each lead wire if using noninsulated crimp terminals. Sleeving is not required for insulated terminals.

Step 6   Remove the two M5 screws.

Figure 46: Remove the M5 Screws
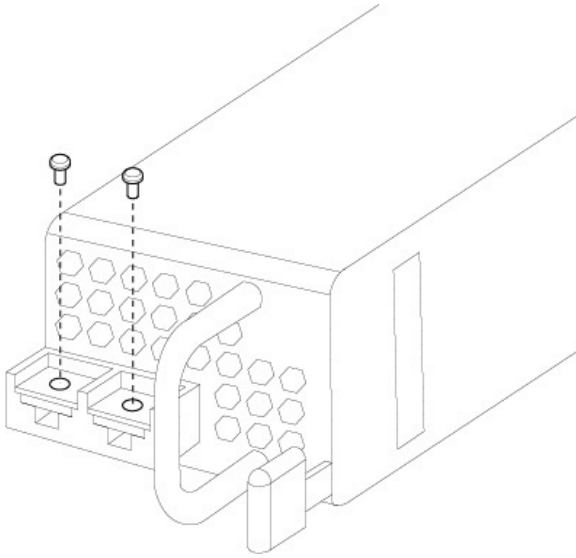
Step 7   For easier cable management, insert the negative lead cable first. Replace the grounding lug with the cable in the following order—wire terminal, then the screw with the captive washer.

Figure 47: Insert the Cables
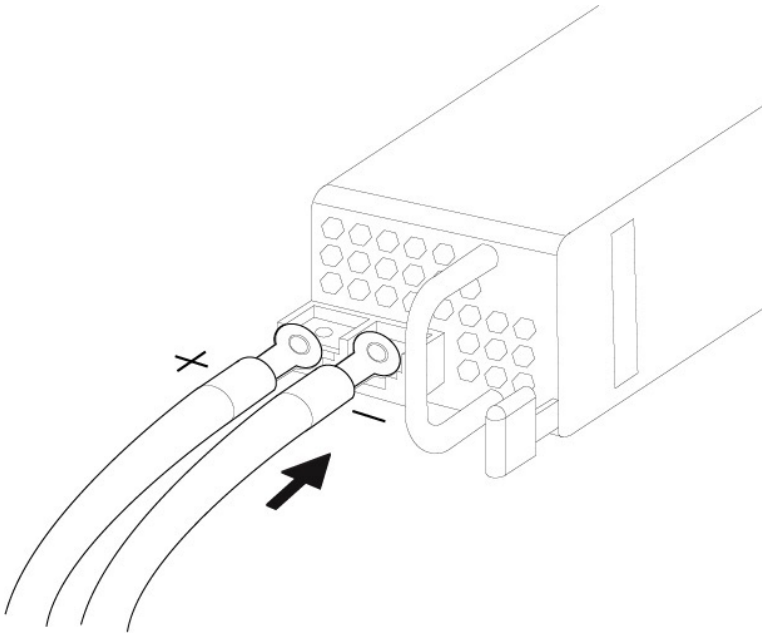
Step 8   Tighten the M5 screw with the captive washer to the recommended torque of 5 in-lbs for the positive stud and wire. Secure the wires coming in from the terminal block so that they cannot be disturbed by casual contact.
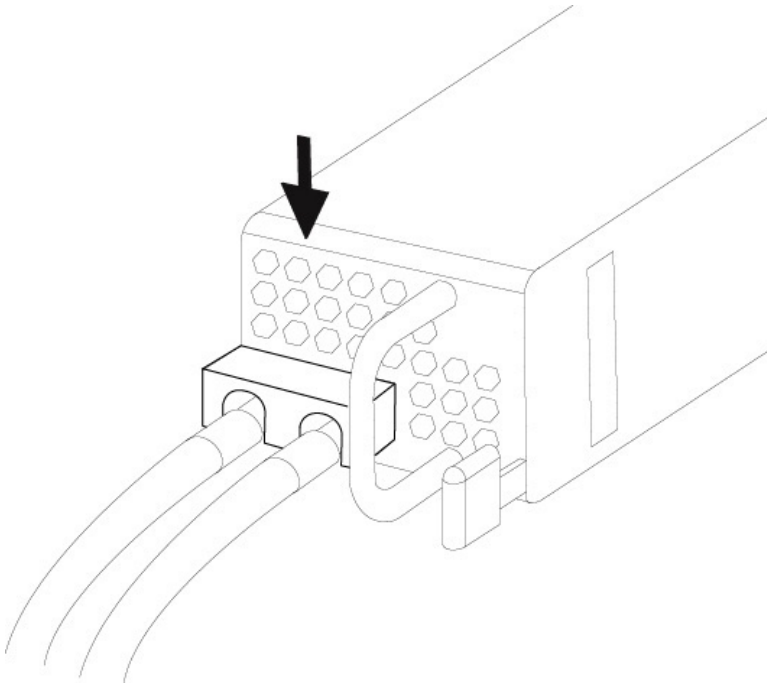
Figure 48: Tighten the M5 Screws
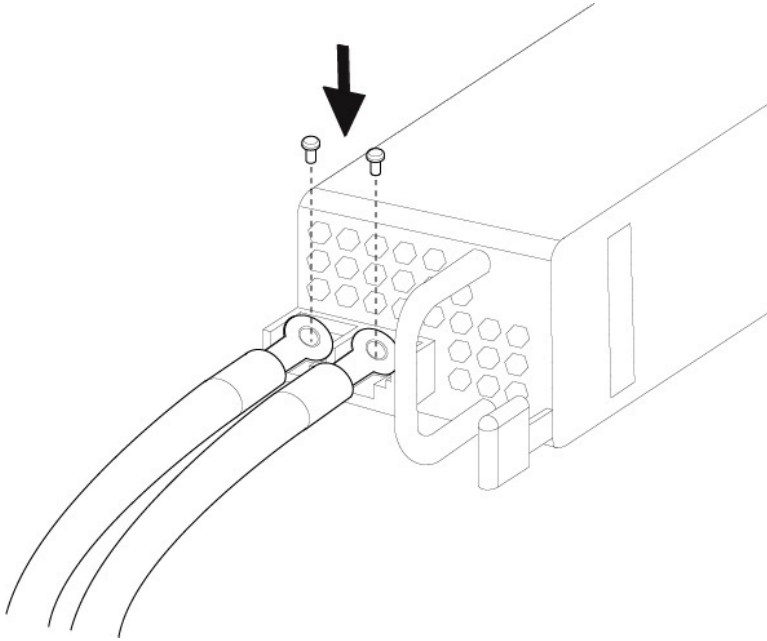
Step 9   Replace the terminal block plastic cover. The plastic cover is slotted and keyed to fit correctly over the terminal block. This cover should always be in place when power is applied to the terminals.

Figure 49: Replace the Plastic Cover

Step 10   Set the DC disconnect switch in the circuit to ON. In a system with multiple power supplies, connect each power supply to a separate DC power source. In the event of a power source failure, if the second source is still available, it can maintain system operation.

Step 11   Verify power supply operation by checking the power supply LED on the front of the chassis. See for a description of the LEDs.

Secure the Power Cord on the AC Power Supply Module

Tie Wrap and Clamp

To secure the power supply module against accidental removal and thus prevent disrupting system performance, use the tie wrap and clamp provided in the accessories kit that ships with your Firepower 4100. There are two different tie wrap and clamp combinations to be used with either the Flextronics or Artesyn power supply module.

To verify which power supply module you have, look at the vendor name on the top of the power supply module. If you cannot remove the power supply module, you can count the number of full hexagonal vent holes on the front of the power supply module in the row directly next to the word 'FAIL.' Flextronics has five holes and Artesyn has four holes.

The black tie wrap is used with the Flextronics power supply module and the off-white tie wrap is used with the Artesyn power supply module. The black clamp works with both. See the figures below.

Safety Warnings

Take note of the following warnings:

Warning   **Statement 1030**—Equipment Installation

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

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

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

Step 1   Attach the clamp to the tie wrap by holding the clamp with the loop side on the bottom and sliding the tie wrap through the box-shaped channel above the clamp (see the following figure).

One side of the tie wrap has evenly spaced ridges and the other is smooth. Be sure the ridged side is face up and that you slide it through the open side of the channel. You will hear a click as the tie slides through—it moves in one direction only. To remove the tie wrap from the clamp, push the lever on the closed side of the box-shaped channel and slide out the tie wrap.

Figure 50: Tie Wrap Through the Box Channel of the Clamp
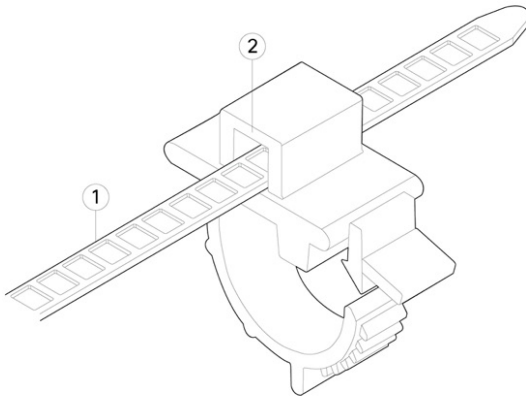
| 1	Tie wrap	2	Box channel

Step 2 Attach the clamp to the power supply module:

a) Locate the hexagonal ventilation hole on the power supply module at the center of the plug just below the power connector body (see the following figures).

b) Plug the snapping portion of the tie wrap into the hexagonal hole.

c) With the clamp side facing up, push the tie wrap in until it is fully engaged.

Caution Make sure you have the correct location because you cannot remove the tie wrap from the power supply module once you have installed it without damaging the tie wrap.

Figure 51: Flextronics Power Supply Module
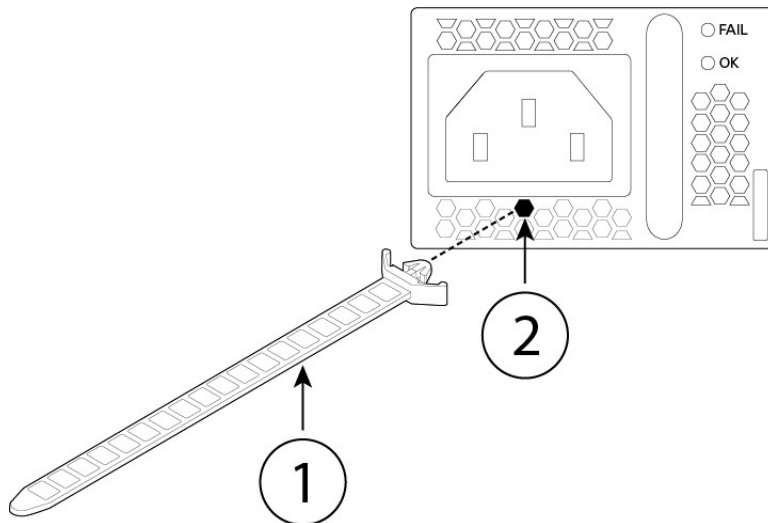
| 1	Flextronics tie wrap	2	Hexagonal hole

Figure 52: Artesyn Power Supply Module
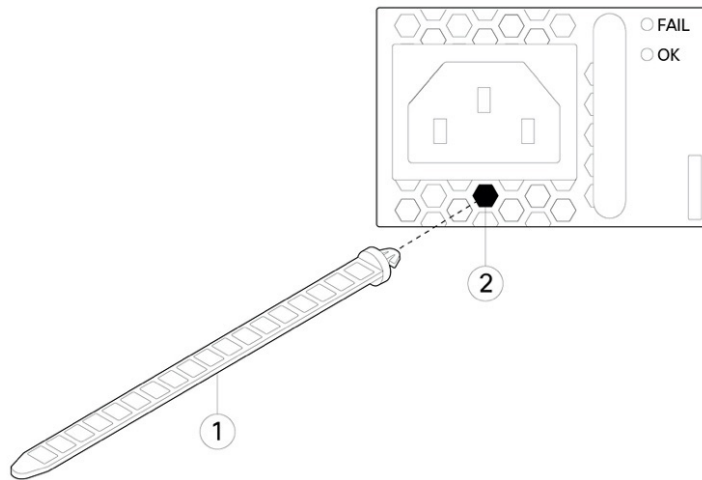
1	Artesyn tie wrap	2	Hexagonal hole

Step 3 Secure the clamp:

    a) Plug in the power supply power cord and wrap the clamp around the over mold portion of the power cord.

    b) Squeeze the clamp ends together to the power supply so that the annular teeth engage with the mate on the clamp.

    c) Make sure the clamp fits snugly into the over mold.

    d) Adjust the clamp position on the tie wrap so that the clamp is tight against the front of the over mold and the power cord cannot be removed by lightly pulling on it.

Figure 53: Clamp on Over Mold of Power Cord
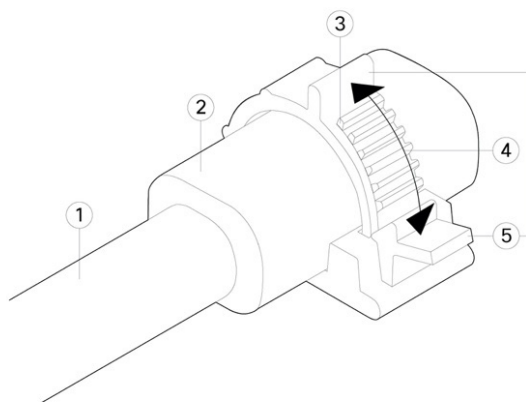
1	Power cord	2	Power cord over mold
3	Tie clamp annular teeth	4	Direction to squeeze the clamp tabs

5	Clamp release tabs		—

Step 4   If you need to remove the power cord, push the release tab on the clamp to force the annular clamp teeth to disengage and the clamp opens up. You can then remove the clamp from the power cord.

Install the FIPS Opacity Shield

⚠

Caution   This procedure should be performed only by the Crypto Officer.

✎

Note   Because the FIPS opacity shield covers the serial number on the chassis, you need to copy the serial number on a label and attach it to the chassis where it can be retrieved or viewed easily before you install the FIPS opacity shield. You need the serial number when you call Cisco TAC.

Before you begin

You need the following to install the FIPS opacity shield:

- #1 Phillips screwdriver

- The following items from the FIPS kit:

    - One FIPS opacity shield

    - Four 8-32 x 0.375-inch screws used to attach the FIPS opacity shield to the cable management brackets

    - 15 tamper-evident labels (TELs)

- The following items from the Firepower 4100 series accessory kit:

    - Two cable management brackets

    - Four 8-32 x 0.375-inch screws used to attach the cable management brackets to the slide rail locking brackets

Step 1   Copy the serial number on a label and attach it to the chassis where it can be retrieved easily for future use if needed. To find the serial number, see .

Step 2   Pull the chassis out of the rack until the release latches catch.

Step 3   If you have not already done so, attach a slide rail locking bracket to each side of the chassis using the six 8-32 x 0.375-inch Phillips screws provided in the accessory kit.

Note   You should have completed this step while preforming the procedure described in .

Figure 54: Attach the Slide Rail Locking Bracket to the Side of the Chassis
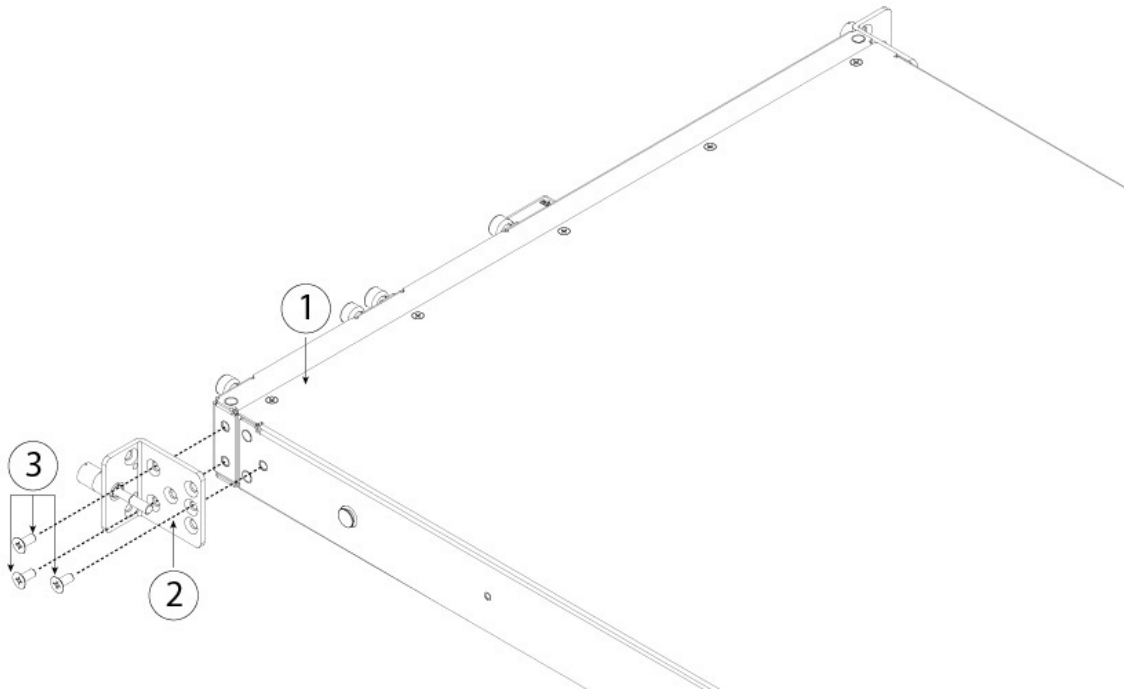
1	Chassis	2	Slide rail locking bracket
3	8-32 x 0.375-inch Phillips screws (three per side)		

Step 4   Attach a cable management bracket to each slide rail locking bracket using the four 8-32 x 0.375-inch Phillips screws provided in the accessory kit.

Figure 55: Attach the Cable Management Bracket to the Slide Rail Locking Bracket
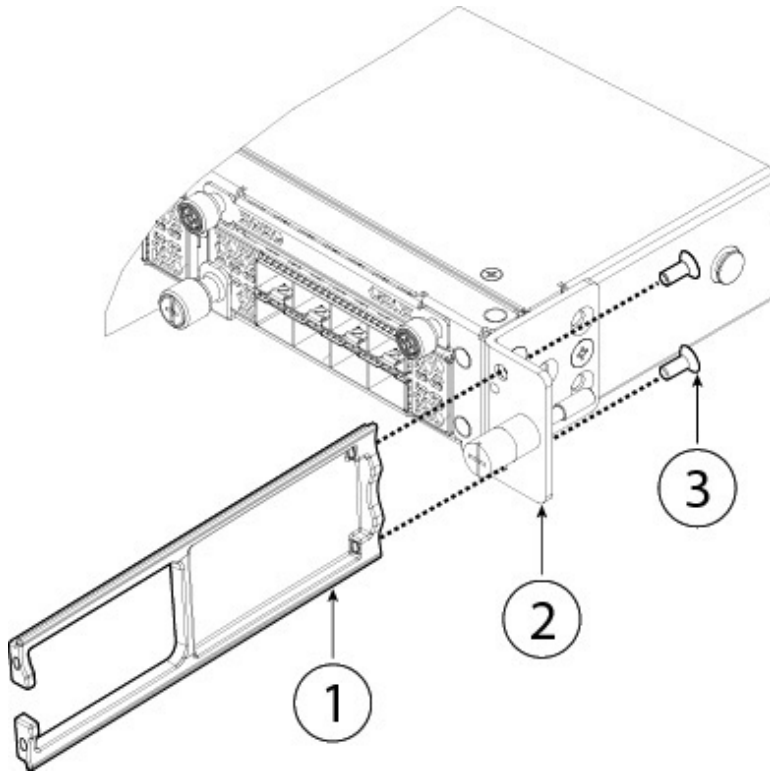
| 1	Cable management bracket	2	Slide rail locking bracket
3	8-32 x 0.375 inch Phillips screws (two per side)		

Step 5   Connect the cables to the ports. Install the cables according to your default software configuration as described in the Cisco Firepower 4100 Getting Started Guide. Make sure that the cables have enough slack to route them through the cable mounting brackets (as shown in Step 6 below).

Note   If you are installing the FIPS opacity shield after the initial product installation, the cables are connected. If the attached cables do not have enough slack to route them through the cable mounting brackets (as shown below), you will have to turn the power off on the appliance, remove the cables, route the cables through the cable mounting brackets, reattach the cables, and continue with Step 7 below.
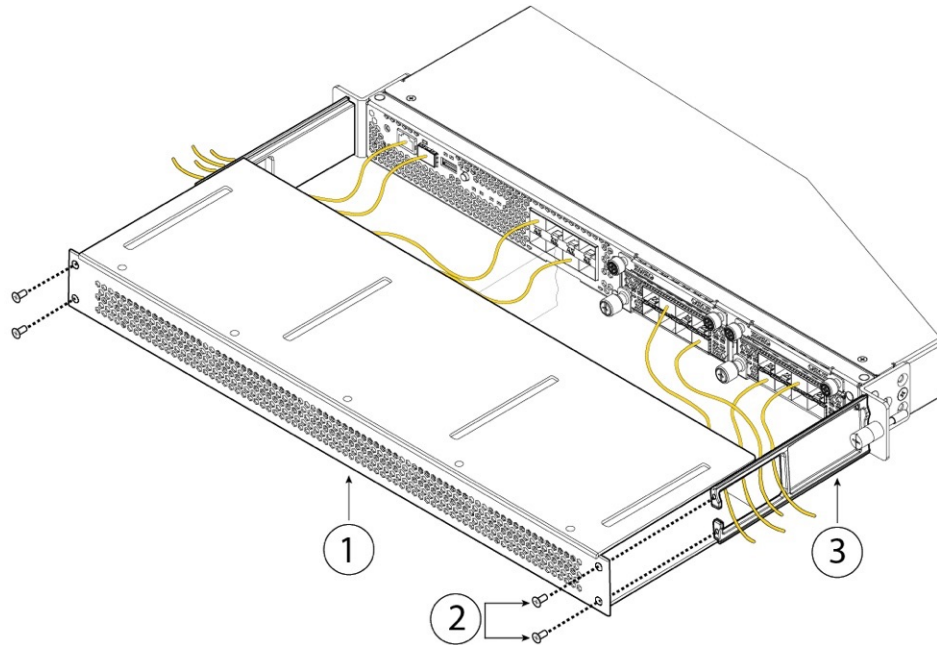
Step 6   Route the cables through the openings in the cable management brackets.

Figure 56: Route the Cables Through the Cable Management Brackets
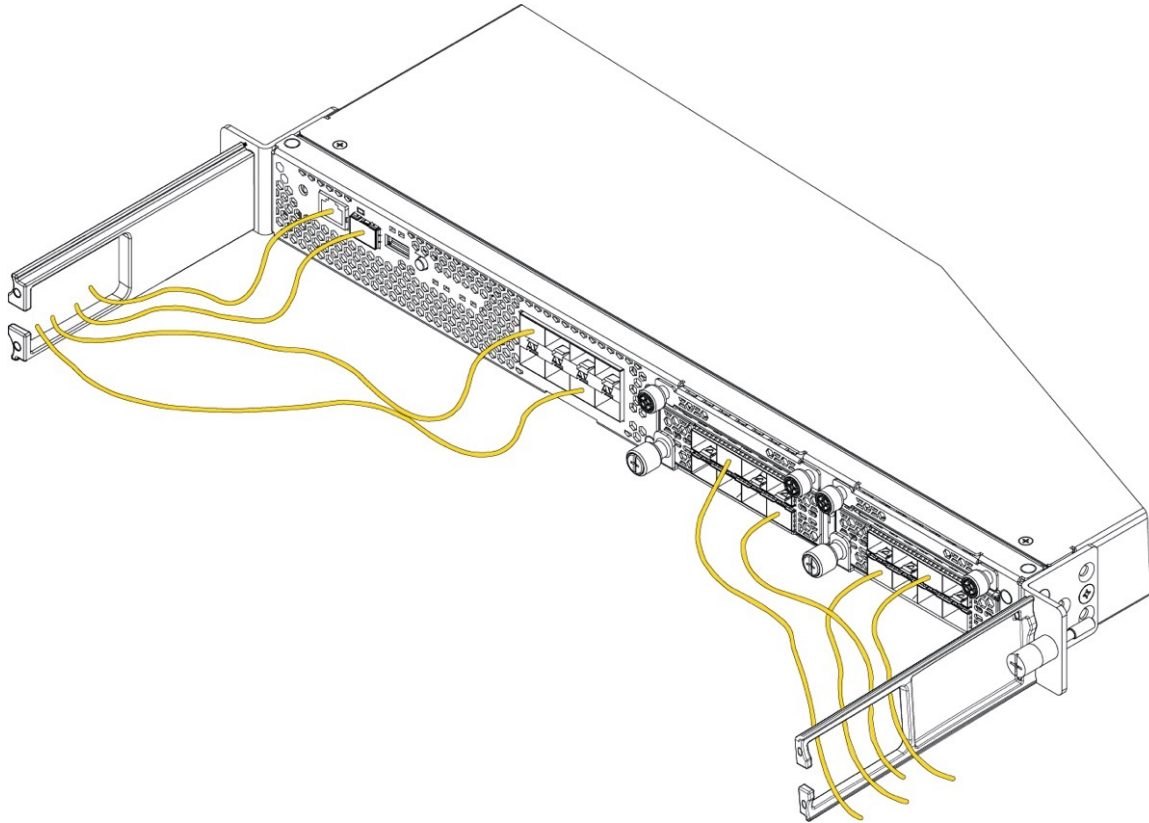
Step 7   Attach the FIPS opacity shield to the cable management brackets using the four 8-32 x 0.375-inch Phillips screws provided in the FIPS kit.

Figure 57: Attach the FIPS Opacity Shield to the Cable Management Brackets

1	FIPS opacity shield	2	8-32 x 0.375-inch Phillips screws (two per side)
3	Cable management bracket		

Step 8 Attach the 15 TELs. For information on the procedure and correct placement of the TELs, see the Tamper Evidence Label (TEL) Placement section (section 2.13) in the FIPS 140-2 Non Proprietary Security Policy Level 2 Validation document.

Step 9 Attach the power cable to the chassis and connect it to an electrical outlet.

Step 10 Press the power switch on the rear panel.

Step 11 Check the power LED on the front panel. See Front Panel LEDs, on page 9 for a description of the power LED. Solid green indicates that the chassis is powered on.

> **Note** When you toggle the power switch from ON to OFF, it takes several seconds for the system to power down. Do not remove the power cable until the power LED is off. After removing power from the chassis either by moving the power switch to OFF or unplugging the power cord, wait at least 10 seconds before turning power back ON.

Step 12 See the Cisco Firepower 4100 Getting Started Guide for further configuration information.