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EX9251 Switch Hardware Guide

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YEAR 2000 NOTICE

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3 | **Initial Installation and Configuration**

About This Guide

Use this guide to install hardware and perform initial software configuration, routine maintenance, and troubleshooting for the EX9251 switch. After completing the installation and basic configuration procedures covered in this guide, refer to the Junos OS documentation for information about further software configuration.

RELATED DOCUMENTATION

EX9251 Switch Quick Start

1
CHAPTER

Overview

EX9251 System Overview

EX9251 Switch Hardware Overview

Juniper Networks EX9251 Ethernet Switch is an Ethernet-optimized switch that provides carrier-class Ethernet switching. It is a fixed configuration switch with a built-in Routing Engine. It has a throughput of up to 400 gigabits per second (Gbps).

The switch has eight 10-Gigabit Ethernet ports and four rate-selectable ports that you can configure as 100-Gigabit Ethernet ports or 40-Gigabit Ethernet ports; each rate-selectable port can be configured as four 10-Gigabit Ethernet ports by using a breakout cable. The 10-Gigabit Ethernet ports support SFP+ transceivers and rate-selectable ports support QSFP28 and QSFP+ transceivers. The switch supports two power supplies and three fan trays.

Software

Juniper Networks EX Series Ethernet Switches run Junos OS, which provides Layer 2 and Layer 3 switching, routing, and security services. The same Junos OS code base that runs on EX Series switches also runs on all Juniper Networks M Series, MX Series, and T Series routers, and SRX Series Services Gateways.

Benefits of the EX9251 Switch

Simplified network architecture—EX9251 switches deliver a simple, secure, virtualized network environment that increases business agility. They are ideal for simplifying campus, data center, and combined campus and data center network environments by collapsing network layers.

Support for Junos Fusion Enterprise—EX9251 switches support Junos Fusion Enterprise technology that enables a large number of devices deployed throughout a building to be managed as a single, logical device, thus reducing network complexity, simplifying network management, and lowering operational costs.

EX9251 Switch Models

EX9251 switch is available in two models—with AC power supply and with DC power supply. See .

Front Panel of an EX9251 Switch

shows the front panel of an EX9251 switch.

Figure 1: Front Panel of an EX9251 Switch
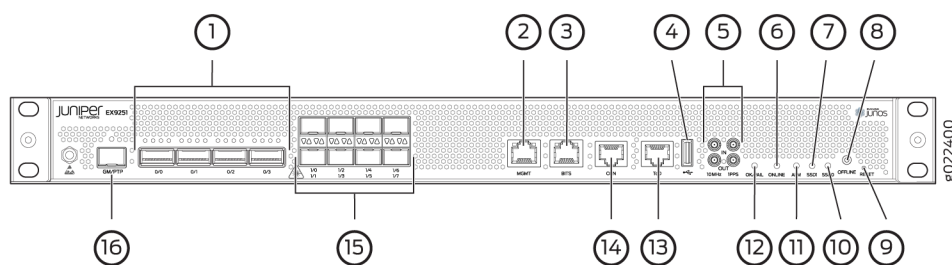
1– Rate-selectable ports—These ports can operate in 100G, 40G, and 10G speeds and support transceivers and direct attach copper (DAC) cables.

9– Reset button—button to reset the switch.

2–	Management Ethernet port—This port connects the switch to a management device (or any other device that plugs into an Ethernet connection) for out-of-band management through an Ethernet connection. The port uses an autosensing RJ-45 connector to support 10-Mbps, 100-Mbps, or 1000-Mbps connections.	10–	SSD0 LED—indicates the status of the solid-state drive labeled **SSD0**.
3–	BITS ports with LEDs—Building-integrated timing supply (BITS) external clocking port, that connects the switch to external clocking devices.	11–	Alarm LED—indicates alarms.
4–	USB port—USB port, that provides a removable media interface that you can use to install Junos OS manually. Junos OS supports USB version 1.0 and later.	12–	OK/Fail LED—indicates the status of the switch.
5–	1PPS and 10 MHz GPS input and output timing ports—1-pulse-per-second (PPS) connectors and 10-MHz timing connectors respectively (one input and one output), that connects the switch to external clock signal sources. The clocking ports provide the synchronized output clocks from any one of the reference clock inputs based on the clock's priority.	13–	Time of day (ToD) port with LED—ToD port, that connects the switch to external timing signal sources.
6–	Online LED—indicates the status of the switch and the operating system.	14–	Console port—Console port, that connects the switch to a system console through a serial cable with an RJ-45 connector.
7–	SSD1 LED—indicates the status of the solid-state drive labeled **SSD1**.	15–	10-Gigabit Ethernet SFP+ ports—support SFP+ transceivers and direct attach copper (DAC) cables.
8–	Offline button—button to turn the switch online or offline or to power on or power off the switch.	16–	PTP grandmaster clock (GM/PTP) port—PTP grandmaster clock port, that connects the switch to a timing device. Support for this port is not available in this release.

Rear Panel of an EX9251 Switch

Figure 2 on page 5 shows the rear panel of an EX9251 switch with AC power supply. Figure 3 on page 5 shows the rear panel of an EX9251 switch with DC power supply.

Figure 2: Rear Panel of an EX9251 Switch with AC Power Supply

1–	Protective earthing terminal	4–	Fan tray LEDs
2–	Electrostatic discharge (ESD) point	5–	AC power supply units
3–	Fan trays		
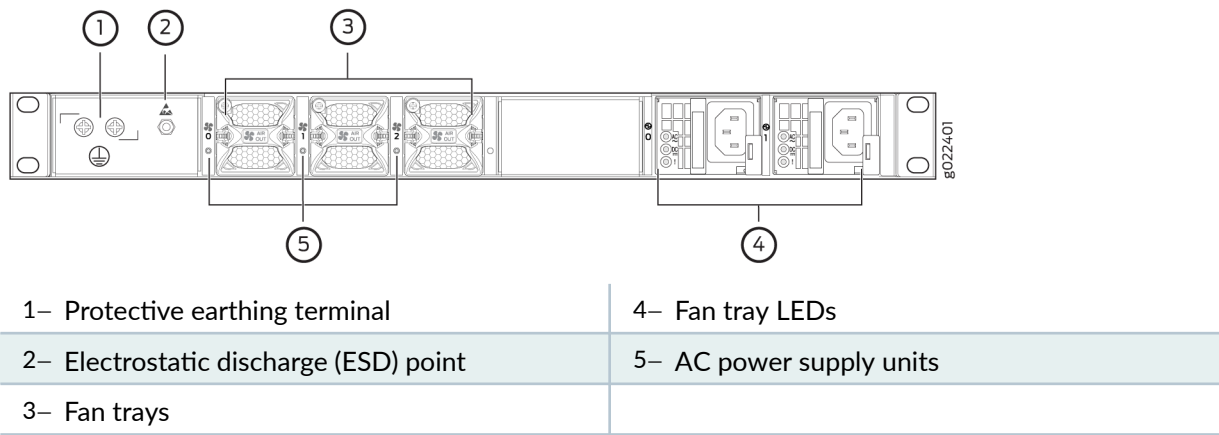
Figure 3: Rear Panel of an EX9251 Switch with DC Power Supply

1–	Fan trays	2–	DC power supply units
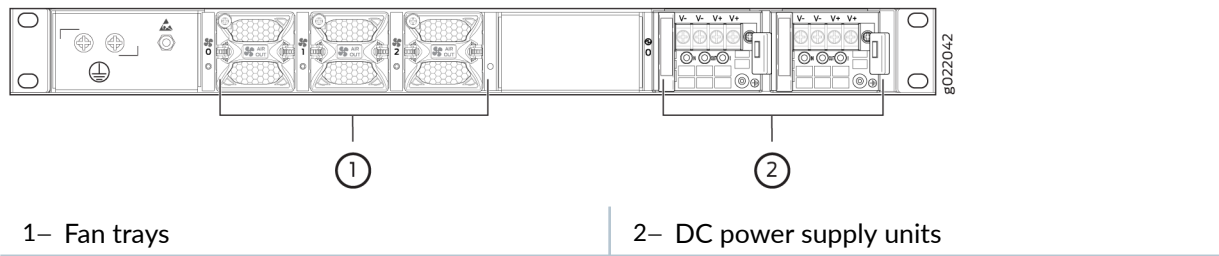
Routing Engine

EX9251 switches have a single built-in Routing Engine. It provides switching protocol processes and software processes that control the switch's interface, the chassis components, system management, and user access to the switch. These switching processes run on top of a kernel that interacts with the Packet Forwarding Engine. The Routing Engine is built-in on the baseboard and cannot be replaced.

It supports the following functionalities to manage the operation of the switch:

- System control functions such as environmental monitoring

- Routing Layer 2 and Layer 3 protocols

- Communication to components such as power supplies and fan trays

- Transparent clocking

- Alarm and logging functions

It consists of the following internal components:

- High-performance 1.6-GHz Intel 8 Core X86 CPU

- 32-GB DDR4 RAM

- 2x100-GB SATA SSD

Power Supplies

EX9251 switches support AC power supply and DC power supply. See "Power Supplies in an EX9251 Switch" on page 23.

> ⚠️ **CAUTION**: Do not mix AC and DC power supplies in the same chassis.

Cooling System

The cooling system in an EX9251 switch consists of three fan trays. The fan trays are installed on the rear panel of the chassis. Each fan tray contains one counter rotating fan. See "EX9251 Cooling System" on page 19.

Component Redundancy

A fully configured EX9251 switch is designed such that no single point of failure can cause the entire system to fail. The following major hardware components are redundant:

- Power supplies—The switch supports two power supplies. If one power supply fails in a fully configured switch, the other power supply can provide full power to the switch.

- Cooling system—The switch supports three fan trays. If one fan fails or the temperature of the chassis rises above the temperature threshold in a fully configured switch, the speed of the remaining fans is automatically adjusted to keep the temperature within the acceptable range.

> **CAUTION**: In a fully configured switch, all the three fan trays and the two power supplies must be operational. In the event of any failure, the failed component must be replaced immediately.

EX9251 Switch Models

EX9251 is available in two models—with AC power supply and with DC power supply. Table 1 on page 7 lists the models and the components included in each model.

Table 1: EX9251 Switch Models

Switch Models	Configuration Components	First Junos OS Release
EX9251-8X4C	- Chassis - Three fan trays - Two AC power supplies	18.1R1
EX9251-8X4C-DC	- Chassis - Three fan trays - Two DC power supplies	18.1R1

EX9251 Switch Hardware and CLI Terminology Mapping

This topic describes the hardware terms used in EX9251 switch documentation and the corresponding terms used in the Junos OS CLI. See Table 2 on page 8.

Table 2: CLI Equivalents of Terms Used in Documentation for EX9251 Switches

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
Chassis	EX9251	–	Switch chassis	"Chassis Physical Specifications of an EX9251 Switch" on page 10
Routing Engine	EX9251-RE	0	Routing Engine	"EX9251 Switch Hardware Overview" on page 2
CB	EX9251	0	Routing Engine	"EX9251 Switch Hardware Overview" on page 2
FPC	FPC	0	–	–
PIC (n)	Abbreviated name of the Physical Interface Card (PIC). One of the following: • 4XQSFP28 PIC • 8XSFPP PIC	n is a value in the range 0-1. The value corresponds to the PIC slot number.	–	–
Xcvr (n)	Abbreviated name of the transceiver.	n is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	Hardware Compatibility Tool page for EX9251

Table 2: CLI Equivalents of Terms Used in Documentation for EX9251 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value (CLI)	Item in Documentation	Additional Information
PEM (n)	One of the following: • AC AFO 650W PSU • JPSU-650W-DC-AFO	n is a value in the range 0-1. The value corresponds to the power supply slot number.	AC or DC power supply	"Power Supplies in an EX9251 Switch" on page 23
Fan tray (n)	Fan Tray, Front to Back Airflow - AFO	n is a value in the range 0-2. The value corresponds to the fan tray slot number.	Fan tray	"EX9251 Cooling System" on page 19

Table 3 on page 9 lists the spare parts and blank panels available for the switch. They must be ordered separately.

Table 3: Spare Parts and Blank Panels

Model Number	Description
EX9251-CHAS	EX9251 chassis, spare
JNP-PWR-BLNK-1	EX9251 power supply slot blank panel

EX9251 Chassis

IN THIS SECTION

● Chassis Physical Specifications of an EX9251 Switch | **10**

Chassis Physical Specifications of an EX9251 Switch

The EX9251 switch chassis is a rigid sheet-metal structure that houses all components of the switch. EX9251 is available in two variants—with AC power supply and with DC power supply. Table 4 on page 10 summarizes the physical specifications of the EX9251 switch chassis.

Table 4: Physical Specifications of the EX9251 Switch Chassis

Description	Weight	Width	Depth	Height
Chassis	22.7 lb (10.3 kg)	19 in. (48.26 cm)	18.5 in. (47 cm) 20.43 in. (51.89 cm) with fan tray and power supply handles	1.72 in. (4.37 cm)
Fan tray	0.29 lb (0.13 kg)	1.89 in. (4.8 cm)	5.78 in. (14.68 cm)	1.64 in. (4.17 cm)
AC power supply	2.2 lb (1 kg)	2.23 in. (5.66 cm)	14.5 in. (36.83 cm)	1.58 in. (4.01 cm)
DC power supply	2.2 lb (1 kg)	2.23 in. (5.66 cm)	14.53 in. (36.91 cm)	1.67 in. (4.24 cm)

You can mount an EX9251 switch on four posts of a 19-in. rack or an ETSI rack.

Field-Replaceable Units in an EX9251 Switch

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in EX9251 switches are hot-removable and hot-insertable. You can remove and replace them without powering off the switch. The FRUs in EX9251 switches are:

- Power supplies

- Fan trays

- Transceivers

> **NOTE**: If you have a Juniper J-Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/ . Failure to do so can result in significant delays if you need replacement parts. This note does not apply if you replace existing components with the same type of component.

To install an AC power supply in an EX9251 switch, follow instructions in "Installing an AC Power Supply in an EX9251 Switch" on page 125. To remove an AC power supply from an EX9251 switch, follow instructions in "Removing an AC Power Supply from an EX9251 Switch" on page 123.

To install a DC power supply in an EX9251 switch, follow instructions in "Installing a DC Power Supply in an EX9251 Switch" on page 128. To remove a DC power supply from an EX9251 switch, follow instructions in "Removing a DC Power Supply from an EX9251 Switch" on page 126.

To install a fan tray in an EX9251 switch, follow instructions in "Installing a Fan Tray in an EX9251 Switch" on page 119. To remove a fan tray from an EX9251 switch, follow instructions in "Removing a Fan Tray from an EX9251 Switch" on page 118.

To install a transceiver in an EX9251 switch, follow instructions in *Install a Transceiver* or *Install a QSFP28 Transceiver*. To remove a transceiver from an EX9251 switch, follow instructions in *Remove a Transceiver* or *Remove a QSFP28 Transceiver*.

LEDs on the Front Panel of an EX9251 Switch

The four rate-selectable ports on the front panel of an EX9251 switch has four LEDs each, which indicate the link status and activity on the port. Figure 4 on page 12 shows the LEDs on the rate-selectable ports. Table 5 on page 12 describes the link activity LED on those ports.

Figure 4: LEDs on the Rate-selectable Ports
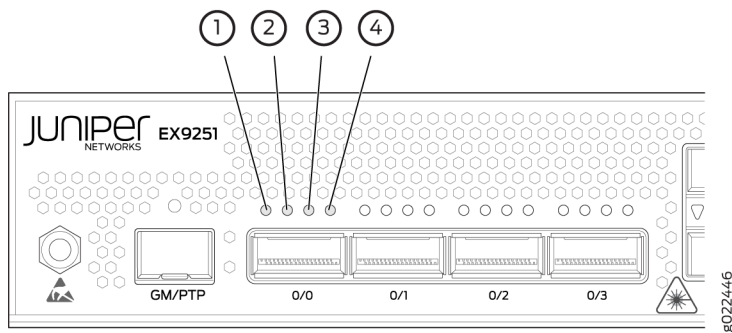
1– LED0	3– LED2
2– LED1	4– LED3

Table 5: Link/Activity LED on the Rate-Selectable Ports

LED	Color/State	Port Speed		
		100G	40G	10G
LED 0	Green	A 100G module is plugged in, the port link is up, and there is no alarm or failure.	A 40G module is plugged in, the port link is up, and there is no alarm or failure.	A 10G module is plugged in, the port link is up, and there is no alarm or failure.
	Red	The port link is down.	The port link is down.	The port link is down.
	Amber	The interface is administratively disabled.	The interface is administratively disabled.	The interface is administratively disabled.
	Off	No 100G module is plugged in.	No 40G module is plugged in.	No 10G module is plugged in.

Table 5: Link/Activity LED on the Rate-Selectable Ports *(Continued)*

LED	Color/State	Port Speed		
		100G	40G	10G
LED 1	Green	Not applicable	Not applicable	A 10G module is plugged in, the port link is up, and there is no alarm or failure.
	Red	Not applicable	Not applicable	The port link is down.
	Amber	Not applicable	Not applicable	The interface is administratively disabled.
	Off	Not applicable	Not applicable	No 10G module is plugged in.
LED 2	Green	Not applicable	Not applicable	A 10G module is plugged in, the port link is up, and there is no alarm or failure.
	Red	Not applicable	Not applicable	The port link is down.
	Amber	Not applicable	Not applicable	The interface is administratively disabled.
	Off	Not applicable	Not applicable	No 10G module is plugged in.
LED 3	Green	Not applicable	Not applicable	A 10G module is plugged in, the port link is up, and there is no alarm or failure.
	Red	Not applicable	Not applicable	The port link is down.

Table 5: Link/Activity LED on the Rate-Selectable Ports *(Continued)*

LED	Color/State	Port Speed		
		100G	40G	10G
	Amber	Not applicable	Not applicable	The interface is administratively disabled.
	Off	Not applicable	Not applicable	No 10G module is plugged in.

The eight 10-Gigabit Ethernet SFP+ ports on the front panel of an EX9251 switch has one LED each, which indicate the link status and activity on the port. Figure 5 on page 14 shows the LEDs on the SFP + ports labeled **1/0**, **1/2**, **1/4**, and **1/6**. Figure 5 on page 14 shows the LEDs on the SFP+ ports labeled **1/1**, **1/3**, **1/5**, and **1/7**. Table 6 on page 15 describes those LEDs.

Figure 5: LEDs on the SFP+ Ports Labeled 1/0, 1/2, 1/4, and 1/6
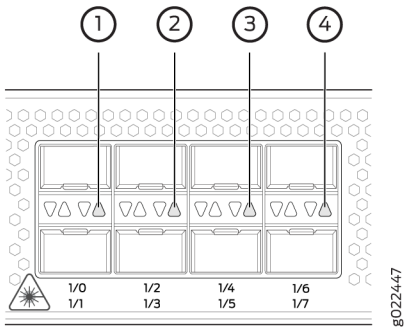
1– LED on the port labeled 1/0	3– LED on the port labeled 1/4

| 2– LED on the port labeled 1/2 | 4– LED on the port labeled 1/6 |

Figure 6: LEDs on the SFP+ Ports Labeled 1/1, 1/3, 1/5, and 1/7
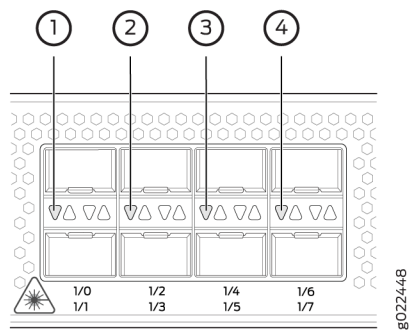
| 1– LED on the port labeled 1/1 | 3– LED on the port labeled 1/5 |
| 2– LED on the port labeled 1/3 | 4– LED on the port labeled 1/7 |

Table 6: Link/Activity LED on the 10-Gigabit Ethernet SFP+ Ports

LED	Color/State	State and Description
Link activity	Green	The port link is up and there is no alarm or failure.
	Red	The port link is down.
	Off	The port is not enabled.

Figure 7 on page 16 shows the LEDs on the management port and Figure 8 on page 16 shows the LEDs on the BITS port. Table 7 on page 16 describes the functions of the LEDs on the other ports on the front panel.

Figure 7: LEDs on the Management Port

1– Speed LED	2– Link/Activity LED
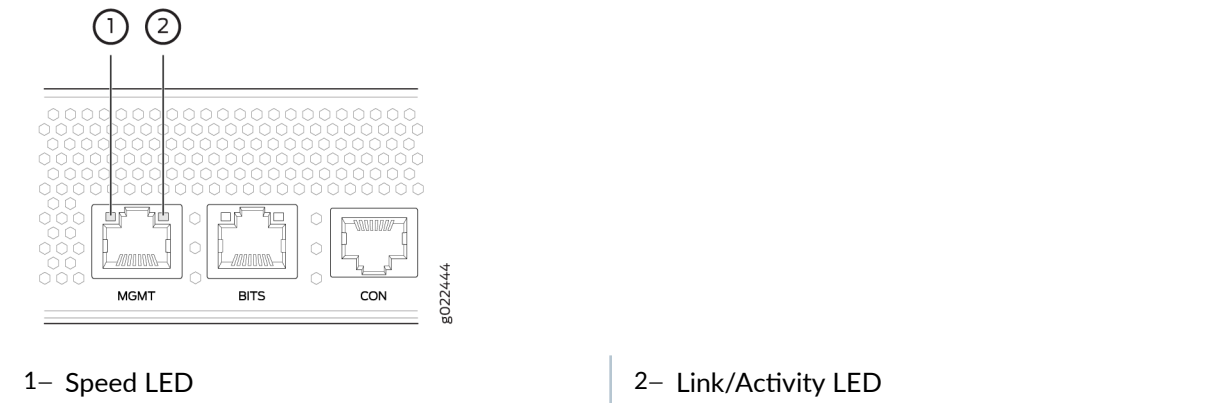
Figure 8: LEDs on the BITS Port

1– Activity LED	2– Link LED
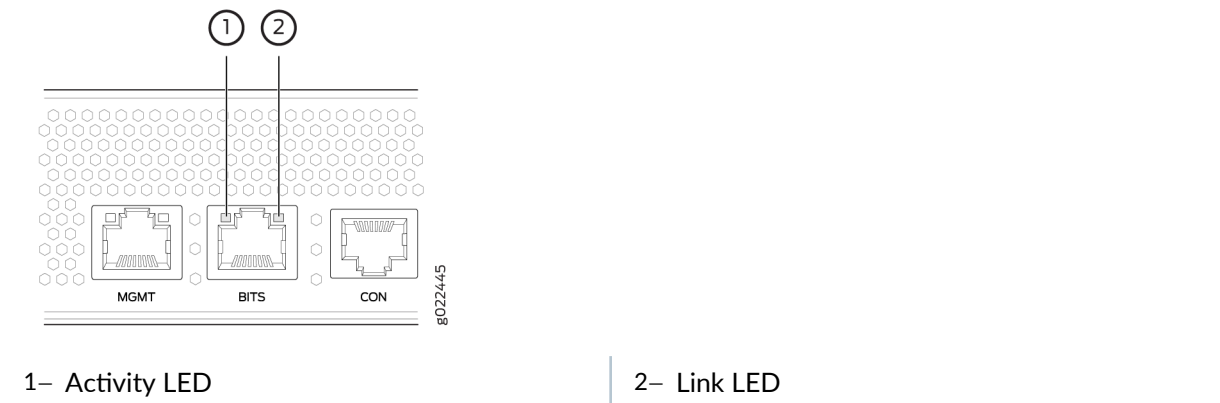
Table 7: Front Panel LEDs

LED	Color	State	Description
ONLINE	Green	On steadily	Both Junos OS and Linux are successfully loaded on the switch.
		Blinking	The switch is starting Junos OS.

Table 7: Front Panel LEDs *(Continued)*

LED	Color	State	Description
	Red	On steadily	The switch has loaded Linux.
		Blinking	The switch is starting Linux.
	–	Off	The switch is offline.
OK/FAIL	Green	On steadily	The switch is functioning normally.
	Red	Blinking	The switch has failed.
	–	Off	The switch is not powered on.
ALM	Red	On steadily	Major—Indicates a critical condition that can cause the switch to stop functioning. Possible causes include component removal, failure, or overheating, or any major software failure.
	Red	Blinking	Indicates that there is a major alarm and a minor alarm at the same time. • Major alarm—Indicates a critical condition that can cause the switch to stop functioning. Possible causes include component removal, failure, or overheating, or any major software failure. • Minor alarm—Indicates a serious but nonfatal error condition, such as a maintenance alert or a significant increase in component temperature.
	Yellow	On steadily	Minor alarm—Indicates a serious but nonfatal error condition, such as a maintenance alert or a significant increase in component temperature.
	–	Off	There is no alarm.

Table 7: Front Panel LEDs *(Continued)*

LED	Color	State	Description
SSD0	Green	Blinking	SSD0 is being accessed by the switch.
	–	Off	SSD0 is not active or not being accessed.
SSD1	Green	Blinking	SSD1 is being accessed by the switch.
	–	Off	SSD1 is not active or not being accessed.
Link/Activity LED on the **MGMT** port	Green	Blinking	The port and the link are active, and there is link activity.
		On steadily	The port and the link are active, but there is no link activity.
		Off	The port is not active.
Speed LED on the **MGMT** port	Green	On steadily	Link speed is 1000 Mbps.
	Amber	On steadily	Link speed is 100 Mbps.
	–	Off	Link speed is 10 Mbps.
Activity LED on the **BITS** port	Green	On steadily	There is no loss (BITS is in locked state).
	–	Off	There is loss of signal or loss of line.
Link LED on the **BITS** port	Amber	On steadily	There is loss of signal or loss of line.
	–	Off	There is no loss (BITS is in locked state).

EX9251 Cooling System

The cooling system components work together to keep all switch components within the acceptable temperature range.

The cooling system in an EX9251 switch consists of three fan trays. Under normal operating conditions, the fans in the fan trays run at a moderate speed. Temperature sensors inside the chassis monitor the temperature of the switch components. If a fan fails or the ambient temperature rises above the acceptable range, the system raises an alarm and the speed of the remaining fans is automatically adjusted to keep the temperature within the acceptable range. If the ambient maximum temperature is exceeded and the switch cannot be cooled adequately, the Routing Engine shuts down the switch.

Fan Trays

The fan trays are hot-insertable and hot-removable field-replaceable units (FRUs). The fan trays are installed on the rear panel of the chassis. Each fan tray contains one counter rotating fan. See Figure 9 on page 20 and Figure 10 on page 20.

Figure 9: Fan Tray in an EX9251 Switch

g022403
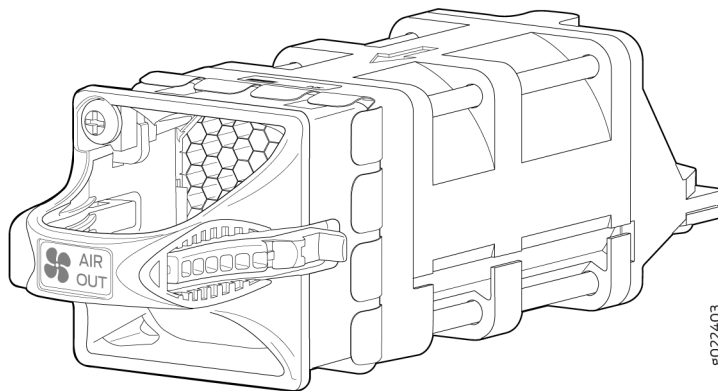
Figure 10: Faceplate of a Fan Tray in an EX9251 Switch

g022424
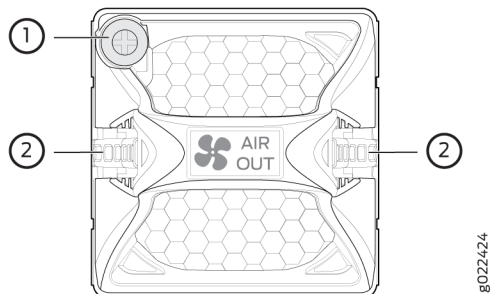
| 1– Screw | 2– Latch |

Airflow Direction in the EX9251 Switch Chassis

The switch has front-to-back (AIR OUT) airflow. The air intake to cool the chassis is through the vents on the front of the chassis. Air is pulled through the chassis towards the fan tray and hot air exhausts through the rear of the chassis. See Figure 11 on page 21.

Figure 11: Airflow Through the EX9251 Switch Chassis
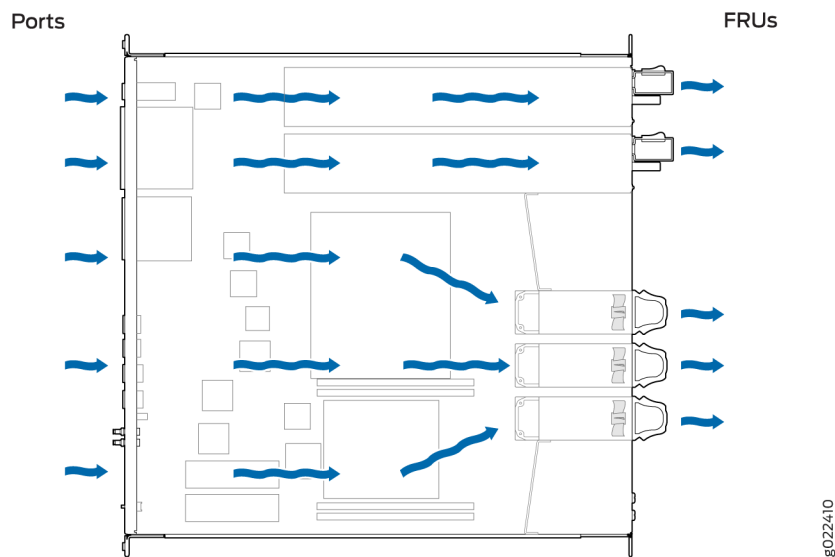
Cooling System in the Power Supplies

The power supplies are self-cooling units. Each power supply has its own built-in fan that cools the power supply. The power supplies are installed on the rear panel of the switch. The air exhaust for the power supplies are also located on the rear panel of the chassis.

Fan Tray Status LEDs

The LEDs indicating the state of the fan trays are located adjacent to the fan tray slots on the rear panel of the chassis (see Figure 12 on page 22).

Figure 12: Fan Tray Status LEDs
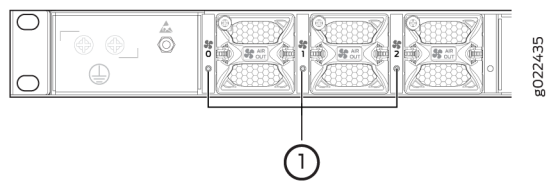
1– Fan tray status LEDs

The fan tray status LEDs are bicolor LEDs. Table 8 on page 22 describes the behavior of the fan tray status LEDs.

Table 8: Fan Tray Status LEDs

Color	State	Description
Green	Blinking	Fan tray hardware initialization is complete and software initialization is pending.
	On steadily	Software initialization is complete and the fan is functioning normally.
Red	On steadily	Fan tray is faulty and not functioning normally.
–	Off	Fan tray is not present.

RELATED DOCUMENTATION

Clearance Requirements for Airflow and Hardware Maintenance for EX9251 Switches | 46

EX9251 Power System

Power Supplies in an EX9251 Switch

An EX9251 switch uses either AC or DC power supplies. You can install up to two power supplies in slots labeled **0** and **1** on the right side of the rear panel of the chassis. The power supply in EX9251 switches is a hot-insertable and hot-removable field-replaceable unit (FRU). You can install it without powering off the switch or disrupting the switching function.

The power supplies connect to the PEM board, which distributes the different output voltages produced by the power supplies to the switch components, depending on their voltage requirements. When both the power supplies are present, they share power almost equally within a fully populated system. If the first power supply in a redundant configuration fails or is removed, the second power supply assumes the entire electrical load without interruption. A single power supply provides the maximum configuration with full power for as long as the switch is operational. A second power supply can be installed for redundancy. The chassis is designed to support 1+1 feed redundancy.

CAUTION: Do not mix AC and DC power supplies in a switch.

NOTE: The switches are shipped with two power supplies pre-installed on the rear panel.

The power supplies are self-cooling units. Each power supply has its own built-in fan that cools the power supply.

AC Power Supply Description

Each AC power supply weighs approximately 2.2 lb (1 kg) and has a handle, an ejection lever, an AC appliance inlet, a fan, and LEDs to monitor the status of the power supply. Figure 13 on page 24 shows the power supply.

Each power supply requires a dedicated AC power feed and a dedicated customer-site circuit breaker. We recommend that you use a minimum 20 A (110 VAC) or 16 A (220 VAC) customer-site circuit breaker, or as required by local code.

WARNING: The switch is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal (sized for 10-32 screws) on the rear panel of the chassis in addition to the grounding pin of the power supply cord. This separate protective earthing terminal must be permanently connected to earth.

Figure 13: AC Power Supply in an EX9251 Switch
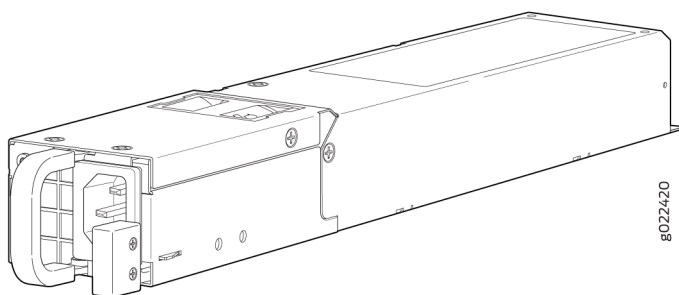
AC Power Supply LEDs and Other Components

Figure 14 on page 25 shows the LEDs and other components on an AC power supply without the AC power cord retainer installed.

Figure 14: LEDs and Other Components on an AC Power Supply Without the AC Power Cord Retainer Installed

1– Handle	4– Fault LED
2– Input status LED	5– Ejector lever
3– Output status LED	6– AC power cord retainer port
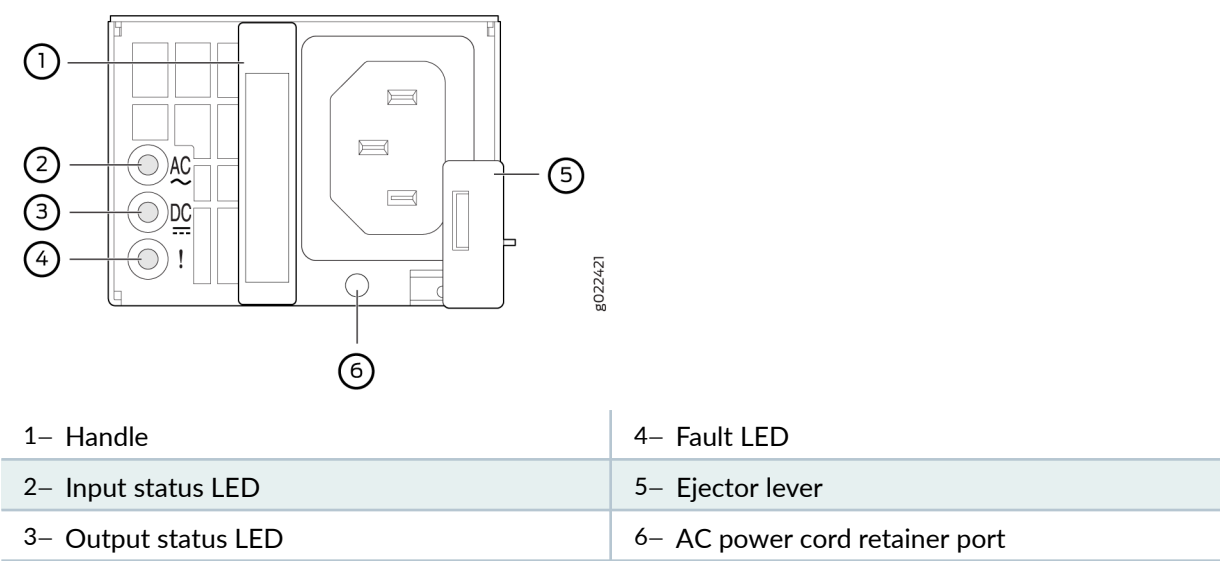
Figure 15 on page 25 shows the LEDs and other components on an AC power supply with the AC power cord retainer installed.

Figure 15: LEDs and Other Components on an AC Power Supply With the AC Power Cord Retainer Installed

1– Handle	4– Fault LED
2– Input status LED	5– AC power cord retainer
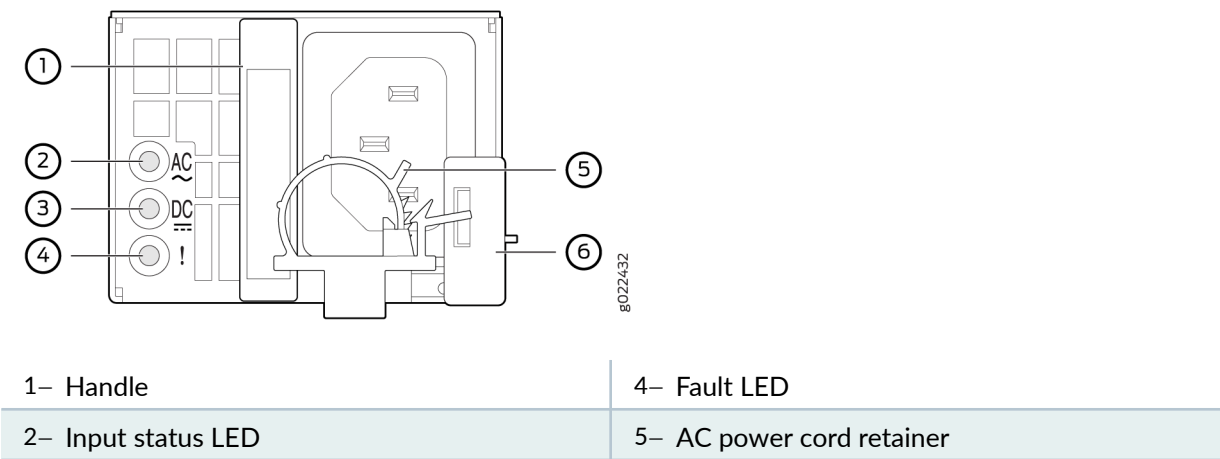
3– Output status LED	6– Ejector lever

Table 9 on page 26 describes the LEDs on the AC power supply.

Table 9: AC Power Supply LEDs

Label	Color	State	Description
AC OK	Unlit	Off	The power supply is disconnected from power source, or the power supply is not receiving power.
	Green	On steadily	Power supply is receiving power.
DC OK	Unlit	Off	Power supply output is off.
	Green	On steadily	The power supply is sending out power correctly.
! (Fault)	Amber	On steadily	An error is detected in the power supply. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.

NOTE: If the **AC OK** LED and the **DC OK** LED are unlit, either the AC power cord is not installed properly or the power supply fuse has failed. If the **AC OK** LED is lit and the **DC OK** LED is unlit, the AC power supply is installed properly, but the power supply has an internal failure.

DC Power Supply Description

Each DC power supply weighs approximately 2.2 lb (1 kg) and has a handle, an ejection lever, a fan, LEDs to monitor the status of the power supply, and a terminal block that provides a single DC input (–48 VDC and return) that requires a dedicated customer-site circuit breaker. We recommend that you use a dedicated customer-site circuit breaker rated for 25 A (–48 VDC) minimum, or as required by local code. If you plan to operate a DC-powered switch at less than the maximum configuration and do not provision a 25 A (–48 VDC) circuit breaker, we recommend that you provision a dedicated customer-site circuit breaker for each DC power supply rated for at least 125 percent of the continuous current that the system draws at –48 VDC. Figure 16 on page 27 shows the power supply.

> ⚠ **WARNING**: The switch is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal (sized for 10-32 screws) on the rear panel of the chassis. This separate protective earthing terminal must be permanently connected to earth.

Figure 16: DC Power Supply in an EX9251 Switch
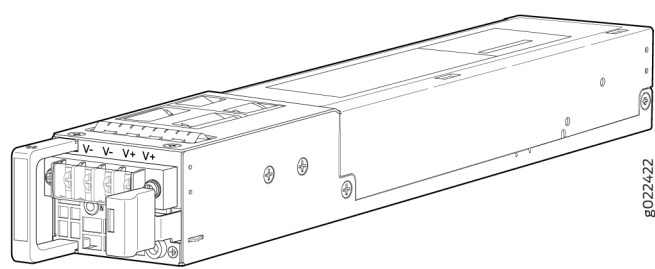
DC Power Supply LEDs and Other Components

Figure 17 on page 27 shows the DC power supply status LEDs and other components on a DC power supply.

Figure 17: DC Power Supply LEDs and Other Components on a DC Power Supply
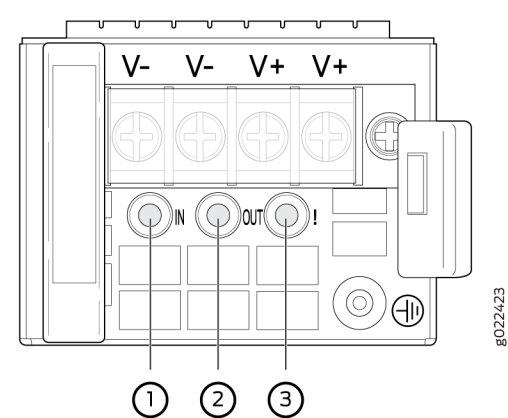
1–	Input status LED	3–	Fault LED
2–	Output status LED		

> ⚠️ **CAUTION**: On the DC power supply, the V+ terminals are shunted internally together, as are the V– terminals. Terminal with the same polarity can be wired together from the same source to provide an additional current path in a higher power chassis. Do not connect the terminals to different sources.

Table 10 on page 28 describes the LEDs on the DC power supply.

Table 10: DC Power Supply LEDs

Label	Color	State	Description
IN (Input)	Unlit	Off	The power supply is disconnected from power source, or the power supply is not receiving power.
	Green	On steadily	Power supply is receiving power.
OUT (Output)	Unlit	Off	Power supply output is off.
	Green	On steadily	The power supply is sending out power correctly.
! (Fault)	Amber	On steadily	An error is detected in the power supply. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.

AC Power Cord Specifications for an EX9251 Switch

Each AC power supply has a single AC appliance inlet located on the faceplate that requires a dedicated AC power feed. A detachable AC power cord is supplied with the AC power supply. The coupler is type C13 as described by International Electrotechnical Commission (IEC) standard 60320. The plug end of the power cord fits into the power source outlet that is standard for your geographical location.

Table 11 on page 29 provides specifications and Figure 18 on page 30 depicts the plug on the AC power cord for some of the countries or regions listed in Table 11 on page 29.

Table 11: AC Power Cord Specifications

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	CBL-EX-PWR-C13-AR
Australia	250 VAC, 10 A, 50 Hz	AS/NZZS 3112 Type SAA/3	CBL-EX-PWR-C13-AU
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	CBL-EX-PWR-C13-BR
China	250 VAC, 10 A, 50 Hz	GB 1002-1996 Type PRC/3	CBL-EX-PWR-C13-CH
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CBL-EX-PWR-C13-EU
India	250 VAC, 10 A, 50 Hz	IS 1293 Type IND/3	CBL-EX-PWR-C13-IN
Israel	250 VAC, 10 A, 50 Hz	SI 32/1971 Type IL/3G	CBL-EX-PWR-C13-IL
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CBL-EX-PWR-C13-IT
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	SS-00259 Type VCTF	CBL-EX-PWR-C13-JP
Korea	250 VAC, 10 A, 50 Hz or 60 Hz	CEE (7) VII Type VIIGK	CBL-EX-PWR-C13-KR
North America	125 VAC, 13 A, 60 Hz	NEMA 5-15 Type N5-15	CBL-EX-PWR-C13-US

Table 11: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
South Africa	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/13	CBL-EX-PWR-C13-SA
Switzerland	250 VAC, 10 A, 50 Hz	SEV 6534-2 Type 12G	CBL-EX-PWR-C13-SZ
Taiwan	125 VAC, 11 A and 15 A, 50 Hz	NEMA 5-15P Type N5-15P	CBL-EX-PWR-C13-TW
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A Type BS89/13	CBL-EX-PWR-C13-UK

Figure 18: AC Plug Types

Australia   China   Europe   Italy   Japan   North America   UK
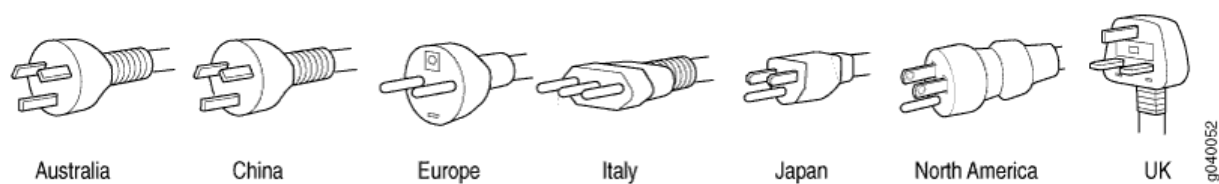
> **WARNING**: The AC power cord for the switch is intended for use with the switch only and not for any other use.

> **WARNING**:
>
> 注意
>
> 附属の電源コードセットはこの製品専用です。
> 他の電気機器には使用しないでください。
>
> Translation from Japanese: The attached power cable is only for this product. Do not use the cable for another product.

NOTE: In North America, AC power cords must not exceed 4.5 m (approximately 14.75 ft) in length, to comply with National Electrical Code (NEC) Sections 400-8 (NFPA 75, 5-2.2) and 210-52, and Canadian Electrical Code (CEC) Section 4-010(3). You can order AC power cords that are in compliance.

⚠ **CAUTION**: Ensure that power cords do not touch the switch components, block the air exhaust and access to switch components, or drape where people could trip on it.

Power Requirements for EX9251 Switch Components

IN THIS SECTION

- Power Requirements for EX9251 Switch Components | **31**
- Calculating System Thermal Output | **32**

Use the information in this topic to determine the power requirements for your switch.

Power Requirements for EX9251 Switch Components

lists the power requirements for various hardware components when the switch is operating under typical and maximum voltage conditions.

Table 12: Power Requirements for Switch Components

Component	Power Requirement at 25°C (Watts; Typical)	Power Requirement at 55°C (Watts; Maximum)
Fully loaded switch	240 W	280 W

lists the power requirements for a fully configured AC-powered switch operating under typical voltage conditions.

Table 13: Power Requirements for an AC-Powered Switch at Typical Temperature (25°C)

Chassis Configuration	Power Requirement at 25°C (Watts)	Power Requirement (Watts) with 90% Efficiency
Fully configured chassis running at high activity	240 W	266 W

Table 14 on page 32 lists the power requirements for a fully configured AC-powered switch operating under maximum voltage conditions.

Table 14: Power Requirements for an AC-Powered Switch at Maximum Temperature (55°C)

Chassis Configuration	Power Requirement at 55°C (Watts)	Power Requirement (Watts) with 90% Efficiency
Fully configured chassis running at high activity	280 W	311 W

Calculating System Thermal Output

After you have calculated the power consumption for your configuration, you can use that information to determine the system thermal output (BTUs per hour). To do so, multiply the power consumption in watts by 3.41.

For example, in Table 13 on page 32, we calculated the power consumption for a fully configured chassis running at high activity at 25°C typical temperature to be 240 W. Using that information, we can calculate the system thermal output for the configuration:

```
Power consumption in watts * 3.41 = system thermal output in BTU/hr
240 W * 3.41 = 818.4 BTU/hr
```

Power Supply Specifications for EX9251 Switches

Table 15 on page 33 lists the AC power system electrical specifications.

Table 15: AC Power System Electrical Specifications

Item	Specifications
AC input voltage	Operating range: 100 through 240 VAC
AC input line frequency	50–60 Hz (nominal)
AC system current rating	• 3.2 A @ 100 VAC • 1.37 A @ 240 VAC
AC system input power	312 W

Table 16 on page 33 lists the AC power supply electrical specifications.

Table 16: AC Power Supply Electrical Specifications

Item	Specifications
Maximum output power	650 W
AC input voltage	Operating range: • 100 through 127 VAC • 200 through 240 VAC
AC input line frequency	50–60 Hz (nominal)
AC input current rating	• 7.8 A @ 100 VAC • 3.8 A @ 240 VAC

Table 17 on page 34 lists the DC power system electrical specifications.

Table 17: DC Power System Electrical Specifications

Item	Specifications
DC input voltage	Operating range: −44 through −72 VDC
DC system input current rating	20 A@ −44 VDC (maximum)
DC system input power	• 331 W • 7.75 A @ −44 VDC

lists the DC power supply electrical specifications.

Table 18: DC Power Supply Electrical Specifications

Item	Specifications
Maximum output power	650 W
DC input voltage	• Minimum: −44 VDC • Nominal: −48 VDC, −60 VDC • Operating range: −44 to −72 VDC
DC input current rating	20 A @ −44 VDC

2

CHAPTER

Site Planning, Preparation, and Specifications

Site Preparation Checklist for an EX9251 Switch

The checklist in Table 19 on page 36 summarizes the tasks you need to perform to prepare a site for installing an EX9251 switch.

Table 19: Site Preparation Checklist

Item or Task	For More Information	Performed by	Date
Environment			
Verify that environmental factors such as temperature and humidity do not exceed switch tolerances.	"Environmental Requirements and Specifications for EX Series Switches" on page 38		
Power			
Measure distance between external power sources and switch installation site.			
Calculate the power consumption and requirements.	"Power Supply Specifications for EX9251 Switches" on page 32 "Power Requirements for EX9251 Switch Components" on page 31 *Calculating the Fiber-Optic Cable Power Budget for EX Series Devices* *Calculating the Fiber-Optic Cable Power Margin for EX Series Devices*		
Rack or Cabinet			
Select the type of rack or cabinet and verify that it meets the minimum requirements for the installation of the switch.	"Rack and Cabinet Requirements for EX9251 Switches" on page 48		

Table 19: Site Preparation Checklist *(Continued)*

Item or Task	For More Information	Performed by	Date
Plan rack or cabinet location, ensuring the required space clearances.	"Clearance Requirements for Airflow and Hardware Maintenance for EX9251 Switches" on page 46		
Secure the rack or cabinet to the floor and building structure.			
Cables			
Plan the cable routing and management. Acquire cables and connectors: • Determine the number of cables needed based on your planned configuration. • Ensure that the distance between hardware components to be connected allows for cable lengths to be within the specified maximum limits.	*Management Cable Specifications* "Specifications of Cables and Wires That Connect to Ports on the Front Panel in an EX9251 Switch" on page 62		

EX9251 Site Guidelines and Requirements

IN THIS SECTION

Environmental Requirements and Specifications for EX Series Switches

The switch must be installed in a rack or cabinet housed in a dry, clean, well-ventilated, and temperature-controlled environment.

Ensure that these environmental guidelines are followed:

- The site must be as dust-free as possible, because dust can clog air intake vents and filters, reducing the efficiency of the switch cooling system.

- Maintain ambient airflow for normal switch operation. If the airflow is blocked or restricted, or if the intake air is too warm, the switch might overheat, leading to the switch temperature monitor shutting down the switch to protect the hardware components.

Table 20 on page 38 provides the required environmental conditions for normal switch operation.

Table 20: EX Series Switch Environmental Tolerances

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX2200-C	No performance degradation up to 5,000 feet (1524 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 104° F (40° C) at altitudes up to 5,000 ft (1,524 m). For information about extended temperature SFP transceivers supported on EX2200 switches, see Pluggable Transceivers Supported on EX2200 Switches.	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX2200 (except EX2200-C switches)	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX2300-C	No performance degradation up to 5,000 feet (1524 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX2300 (except EX2300-C switches)	No performance degradation up to 13,000 feet (3962 meters) at 104° F (40° C) as per GR-63	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX3200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX3300	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX3400	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4300 The maximum thermal output for EX4300-48T is 423 BTU/ hour and for EX4300-48P is 5844 BTU/ hour.	EX4300 switches except the EX4300-48MP model— No performance degradation up to 10,000 feet (3048 meters) EX4300-48MP model— No performance degradation up to 6,000 feet (1829 meters)	EX4300 switches except the EX4300-48MP model— Normal operation ensured in the relative humidity range 10% through 85% (noncondensing) EX4300-48MP model— Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4500	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX4550	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	- EX4550-32F switches — Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C) - EX4550-32T switches — Normal operation is ensured in the temperature range 32° F through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4600	No performance degradation to 6,562 feet (2000 meters)	Normal operation ensured in the relative humidity range 5% through 90%, noncondensing Short-term operation ensured in the relative humidity range 5% through 93%, noncondensing **NOTE**: As defined in NEBS GR-63-CORE, Issue 4, short-term events can be up to 96 hours in duration but not more than 15 days per year.	- Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C) - Nonoperating storage temperature in shipping container: –40° F (–40° C) through 158° F (70° C)	Complies with Zone 4 earthquake requirements per NEBS GR-63-CORE, Issue 4.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX4650	No performance degradation to 6,000 feet (1829 meters)	Normal operation ensured in the relative humidity range 10% through 85% (condensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX6210	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX8208	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX8216	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX9204	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: – 40° F (–40° C) to 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.
EX9208	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: – 40° F (–40° C) to 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.
EX9214	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 5% through 90% (noncondensing)	Normal operation is ensured in the temperature range 32° F (0° C) through 104° F (40° C) Nonoperating storage temperature in shipping container: – 40° F (–40° C) through 158° F (70° C)	Complies with Zone 4 earthquake requirements as per GR-63.

Table 20: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX9251 The maximum thermal output is 1705 BTU/hour (500 W).	No performance degradation up to 10,000 ft (3048 m)	Normal operation ensured in relative humidity range of 5% to 90%, noncondensing	Normal operation ensured in temperature range of 32° F (0° C) to 104° F (40° C) Nonoperating storage temperature in shipping container: – 40° F (– 40° C) to 158° F (70° C)	Complies with Telcordia Technologies Zone 4 earthquake requirements
XRE200	No performance degradation up to 10,000 feet (3048 meters)	Normal operation ensured in the relative humidity range 10% through 85% (noncondensing)	Normal operation ensured in the temperature range 41° F (5° C) through 104° F (40° C)	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.

NOTE: Install EX Series switches only in restricted areas, such as dedicated equipment rooms and equipment closets, in accordance with Articles 110– 16, 110– 17, and 110– 18 of the National Electrical Code, ANSI/NFPA 70.

General Site Guidelines

Efficient device operation requires proper site planning and maintenance. It also requires proper layout of the equipment, rack or cabinet, and wiring closet.

To plan and create an acceptable operating environment for your device and prevent environmentally caused equipment failures:

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.

- Follow prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that exhaust from other equipment does not blow into the intake vents of the device.

- Follow the prescribed electrostatic discharge (ESD) prevention procedures to prevent damaging the equipment. Static discharge can cause components to fail completely or intermittently over time.

- Install the device in a secure area, so that only authorized personnel can access the device.

Site Electrical Wiring Guidelines

Table 21 on page 45 describes the factors you must consider while planning the electrical wiring at your site.

> ⚠️ **WARNING**: You must provide a properly grounded and shielded environment and use electrical surge-suppression devices.
>
> **Avertissement** Vous devez établir un environnement protégé et convenablement mis à la terre et utiliser des dispositifs de parasurtension.

Table 21: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	If your site experiences any of the following problems, consult experts in electrical surge suppression and shielding: • Improperly installed wires cause radio frequency interference (RFI). • Damage from lightning strikes occurs when wires exceed recommended distances or pass between buildings. • Electromagnetic pulses (EMPs) caused by lightning damage unshielded conductors and electronic devices.
Radio frequency interference	To reduce or eliminate RFI from your site wiring, do the following: • Use a twisted-pair cable with a good distribution of grounding conductors. • If you must exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal, when applicable.

Table 21: Site Electrical Wiring Guidelines *(Continued)*

Site Wiring Factor	Guidelines
Electromagnetic compatibility	If your site is susceptible to problems with electromagnetic compatibility (EMC), particularly from lightning or radio transmitters, seek expert advice.
	Strong sources of electromagnetic interference (EMI) can cause:
	• Destruction of the signal drivers and receivers in the device,
	• Electrical hazards as a result of power surges conducted over the lines into the equipment.

Clearance Requirements for Airflow and Hardware Maintenance for EX9251 Switches

When planning the site for installing an EX9251 switch, you must ensure sufficient clearance around the switch.

Follow these clearance requirements:

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See for reference.

Figure 19: Airflow Through the EX9251 Switch Chassis
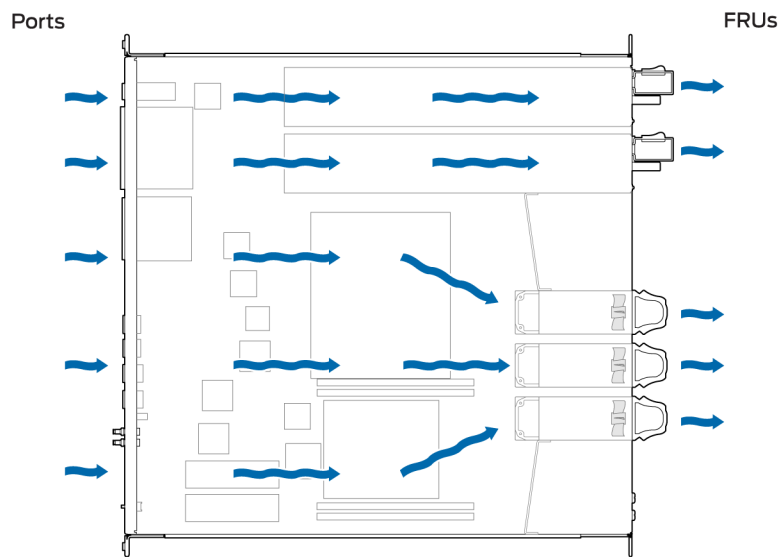
- If you are mounting the switch on a rack or cabinet along with other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.

- Leave at least 6 in. (15.2 cm) clearance in front of and behind the chassis for airflow.

- Leave at least 6 in. (15.2 cm) clearance on the left of the chassis for installing the grounding lug.

- Leave at least 24 in. (61 cm) clearance in front of and behind the switch for service personnel to remove and install hardware components. NEBS GR-63 recommends that you allow at least 30 in.

(76.2 cm) in front of the rack or cabinet and 24 in. (61 cm) behind the rack or cabinet. See .

Figure 20: Clearance Requirements for Airflow and Hardware Maintenance for an EX9251 Switch Chassis
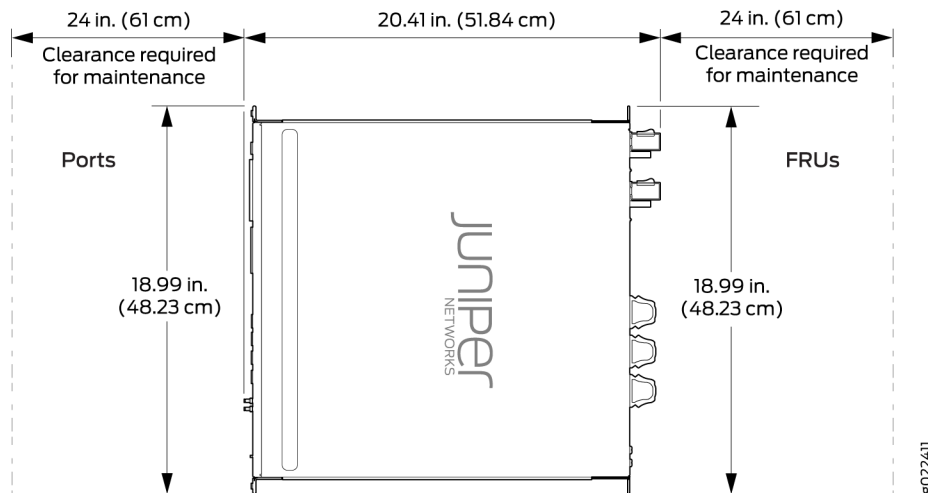
Rack and Cabinet Requirements for EX9251 Switches

You can mount an EX9251 switch on four-posts of a 19-in rack or an ETSI rack or in a cabinet that contains a 19-in. rack or an ETSI rack.

Rack requirements consist of:

- Rack type

- Mounting bracket hole spacing

- Rack size and strength

- Rack connection to the building structure

provides the rack requirements and specifications.

Table 22: Rack Requirements and Specifications

Rack Requirement	Guidelines
Rack type	You can mount the device on a rack that provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments and meets the size and strength requirements to support the weight. A U is the standard rack unit defined by the Electronic Components Industry Association (http://www.ecianow.org).
Mounting bracket hole spacing	The holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm), so that the device can be mounted in any rack that provides holes spaced at that distance.
Rack size and strength	• Ensure that the rack complies with the size and strength standards of a 19-in. rack as defined by the Electronic Components Industry Association (http://www.ecianow.org) or with the size and strength standards of an ETSI rack as defined in the European Telecommunications Standards Institute (ETS 300 119) published by the European Telecommunications Standards Institute (ETSI). • Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the device chassis. The outer edges of the front-mounting brackets extend the width of the chassis to 19 in. (48.2 cm). • The rack must be strong enough to support the weight of the device. • Ensure that the spacing of rails and adjacent racks provides for proper clearance around the device and rack.
Rack connection to building structure	• Secure the rack to the building structure. • If earthquakes are a possibility in your geographical area, secure the rack to the floor. • Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.

Cabinet requirements consist of:

• Cabinet size

• Clearance requirements

- Cabinet airflow requirements

provides the cabinet requirements and specifications.

Table 23: Cabinet Requirements and Specifications

Cabinet Requirement	Guidelines
Cabinet size	- You can mount the device in a cabinet that contains a 19-in. rack as defined by the Electronic Components Industry Association (http://www.ecianow.org) or an ETSI rack as defined in the European Telecommunications Standards Institute (ETS 300 119) published by the European Telecommunications Standards Institute (ETSI). - The minimum cabinet size must be able to accommodate the maximum external dimensions of the device.
Cabinet clearance	The minimum total clearance inside the cabinet is 30 in. (76.2 cm) between the inside of the front door and the inside of the rear door.
Cabinet airflow requirements	When you mount the device in a cabinet, ensure that ventilation through the cabinet is sufficient to prevent overheating. - Ensure adequate cool air supply to dissipate the thermal output of the device or devices. - Ensure that the hot air exhaust of the chassis exits the cabinet without recirculating into the device. An open cabinet (without a top or doors) that employs hot air exhaust extraction from the top ensures the best airflow through the chassis. If the cabinet contains a top or doors, perforations in these elements assist with removing the hot air exhaust. - Install the device in the cabinet in a way that maximizes the open space on the side of the chassis that has the hot air exhaust. - Route and dress all cables to minimize the blockage of airflow to and from the chassis. - Ensure that the spacing of rails and adjacent cabinets is such that there is proper clearance around the device and cabinet. - A cabinet larger than the minimum required provides better airflow and reduces the chance of overheating.

EX9251 Network Cable and Transceiver Planning

IN THIS SECTION

Pluggable Transceivers Supported on EX9251 Switches

The network ports on the front panel in EX9251 switches support transceivers. You can find the list of transceivers supported on EX9251 switches and information about those transceivers in the Hardware Compatibility Tool page for EX9251.

NOTE: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

CAUTION: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the

third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.

Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

The Gigabit Ethernet transceivers installed in EX9251 switches support digital optical monitoring (DOM). You can view the diagnostic details for these transceivers by issuing the operational mode CLI command `show interfaces diagnostics optics`.

SEE ALSO

Connecting the EX2300 to the Network

Replacing a QSFP28 Transceiver on an SRX4600 Services Gateway

Remove a Transceiver

Replacing a QSFP28 Transceiver on an SRX4600 Services Gateway

EX9251 Switch Hardware Overview **| 2**

SFP+ Direct Attach Copper Cables for EX Series Switches

IN THIS SECTION

- Cable Specifications **| 53**
- List of DAC Cables Supported on EX Series Switches **| 54**
- Standards Supported by These Cables **| 54**

Small form-factor pluggable plus transceiver (SFP+) direct attach copper (DAC) cables, also known as Twinax cables, are suitable for in-rack connections between servers and switches. They are suitable for short distances, making them ideal for highly cost-effective networking connectivity within a rack and between adjacent racks.

> **NOTE**: We recommend that you use only SFP+ DAC cables purchased from Juniper Networks with your Juniper Networks device.

> ⚠️ **CAUTION**: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.
>
> Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

Cable Specifications

EX Series switches support SFP+ passive DAC cables. The passive Twinax cable is a straight cable with no active electronic components. EX Series switches support 1 m, 3 m, 5 m, and 7 m long SFP+ passive DAC cables. See .

Figure 21: SFP+ Direct Attach Copper Cables for EX Series Switches
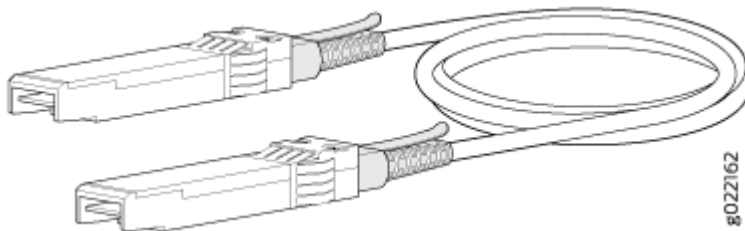
The cables are hot-removable and hot-insertable: You can remove and replace them without powering off the switch or disrupting switch functions. A cable comprises a low-voltage cable assembly that connects directly into two 10-Gigabit Ethernet (GbE) ports, one at each end of the cable. The cables use high-performance integrated duplex serial data links for bidirectional communication and are designed for data rates of up to 10 Gbps.

List of DAC Cables Supported on EX Series Switches

For the list of DAC cables supported on EX Series switches and the specifications of these cables, see the following references:

- EX2300—Hardware Compatibility Tool page for EX2300

- EX3200—Hardware Compatibility Tool page for EX3200

- EX3300—Hardware Compatibility Tool page for EX3300

- EX3400—Hardware Compatibility Tool page for EX3400

- EX4100 —Hardware Compatibility Tool for EX4100

- EX4200—Hardware Compatibility Tool page for EX4200

- EX4300—Hardware Compatibility Tool page for EX4300

- EX4400—Hardware Compatibility Tool page for EX4400

- EX4500—Hardware Compatibility Tool page for EX4500

- EX4550—Hardware Compatibility Tool page for EX4550

- EX4600—Hardware Compatibility Tool page for EX4600

- EX8208—Hardware Compatibility Tool page for EX8208

- EX8216—Hardware Compatibility Tool page for EX8216

- EX9251—Hardware Compatibility Tool page for EX9251

- EX9253—Hardware Compatibility Tool page for EX9253

Standards Supported by These Cables

The cables comply with the following standards:

- SFP mechanical standard SFF-843— see ftp://ftp.seagate.com/sff/SFF-8431.PDF.

- Electrical interface standard SFF-8432— see ftp://ftp.seagate.com/sff/SFF-8432.PDF.

- SFP+ Multi-Source Alliance (MSA) standards

QSFP+ Direct Attach Copper Cables for EX Series Switches

IN THIS SECTION

Quad small form-factor pluggable plus (QSFP+) direct attach copper (DAC) cables are suitable for in-rack connections between QSFP+ ports on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 switches. They are suitable for short distances, making them ideal for highly cost-effective networking connectivity within a rack and between adjacent racks.

NOTE: We recommend that you use only QSFP+ DAC cables purchased from Juniper Networks with your Juniper Networks device.

CAUTION: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.

Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

Cable Specifications

QSFP+ passive DAC cables are hot-removable and hot-insertable. A cable consists of a cable assembly that connects directly into two QSFP+ modules, one at each end of the cable. The cables use integrated duplex serial data links for bidirectional communication and are designed for data rates up to 40 Gbps.

Passive DAC cables have no signal amplification built into the cable assembly. See .

Figure 22: QSFP+ Direct Attach Copper Cables
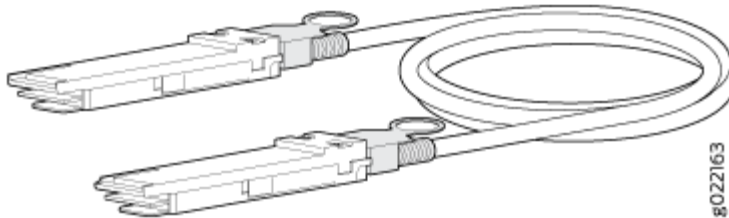
DAC Cables Supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 Switches

For the list of DAC cables supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 switches and the specifications of these cables, see:

- EX3400—Hardware Compatibility Tool page for EX3400

- EX4300—Hardware Compatibility Tool page for EX4300

- EX4550—Hardware Compatibility Tool page for EX4550

- EX4600—Hardware Compatibility Tool page for EX4600

- EX9251—Hardware Compatibility Tool page for EX9251

- EX9253—Hardware Compatibility Tool page for EX9253

Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion

IN THIS SECTION

To determine the power budget and power margin needed for fiber-optic connections, you need to understand how signal loss, attenuation, and dispersion affect transmission. EX Series switches use various types of network cables, including multimode and single-mode fiber-optic cable.

Signal Loss in Multimode and Single-Mode Fiber-Optic Cable

Multimode fiber is large enough in diameter to allow rays of light to reflect internally (bounce off the walls of the fiber). Interfaces with multimode optics typically use LEDs as light sources. However, LEDs are not coherent light sources. They spray varying wavelengths of light into the multimode fiber, which reflects the light at different angles. Light rays travel in jagged lines through a multimode fiber, causing signal dispersion. When light traveling in the fiber core radiates into the fiber), higher-order mode loss (HOL) occurs. (Cladding consists of layers of lower-refractive index material in close contact with a core material of higher refractive index.) Together, these factors reduce the transmission distance of multimode fiber compared to that of single-mode fiber.

Single-mode fiber is so small in diameter that rays of light reflect internally through one layer only. Interfaces with single-mode optics use lasers as light sources. Lasers generate a single wavelength of light, which travels in a straight line through the single-mode fiber. Compared to multimode fiber, single-mode fiber has a higher bandwidth and can carry signals for longer distances. Single-mode fiber is consequently more expensive than multimode fiber.

Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission.

Attenuation and Dispersion in Fiber-Optic Cable

An optical data link functions correctly provided that modulated light reaching the receiver has enough power to be demodulated correctly. *Attenuation* is the reduction in strength of the light signal during transmission. Passive media components such as cables, cable splices, and connectors cause attenuation. Although attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode transmissions. An efficient optical data link must transmit enough light to overcome attenuation.

Dispersion is the spreading of the signal over time. The following two types of dispersion can affect signal transmission through an optical data link:

- Chromatic dispersion, which is the spreading of the signal over time caused by the different speeds of light rays

- Modal dispersion, which is the spreading of the signal over time caused by the different propagation modes in the fiber

For multimode transmission, modal dispersion usually limits the maximum bit rate and link length. Chromatic dispersion or attenuation is not a factor.

For single-mode transmission, modal dispersion is not a factor. However, at higher bit rates and over longer distances, chromatic dispersion limits the maximum link length.

An efficient optical data link must have enough light to exceed the minimum power that the receiver requires to operate within its specifications. In addition, the total dispersion must be within the limits specified for the type of link in Telcordia Technologies document GR-253-CORE (Section 4.3) and International Telecommunications Union (ITU) document G.957.

When chromatic dispersion is at the maximum allowed, you can consider its effect as a power penalty in the power budget. The optical power budget must allow for the sum of component attenuation, power penalties (including those from dispersion), and a safety margin for unexpected power loss.

Calculate the Fiber-Optic Cable Power Budget for EX Series Devices

To ensure that fiber-optic connections have sufficient power for correct operation, calculate the link's power budget when planning fiber-optic cable layout and distances. This planning helps you ensure that fiber-optic connections have sufficient power for correct operation. The power budget is the maximum amount of power the link can transmit. When you calculate the power budget, you use a worst-case analysis to provide a margin of error. You use a worst-case analysis even though not all the parts of an actual system operate at the worst-case levels.

To calculate the worst-case estimate for a fiber-optic cable power budget (P_B) for the link:

1. Determine values for the link's minimum transmitter power (P_T) and minimum receiver sensitivity (P_R). In the following example, we measure both (P_T) and (P_R) in decibels relative to one milliwatt (dBm).

   P_T = − 15 dBm

   P_R = − 28 dBm

   > **NOTE**: See the specifications for your transmitter and receiver to find the minimum transmitter power and minimum receiver sensitivity.

2. Calculate the power budget (P_B) by subtracting (P_R) from (P_T):

   − 15 dBm − (−28 dBm) = 13 dBm

Calculating the Fiber-Optic Cable Power Margin for EX Series Devices

Before calculating the power margin, calculate the power budget (see *Calculating the Fiber-Optic Cable Power Budget for EX Series Devices*).

Calculate the link's power margin when planning fiber-optic cable layout and distances to ensure that fiber-optic connections have sufficient signal power to overcome system loss and still satisfy the minimum input requirements of the receiver for the required performance level. The power margin (P_M) is the amount of power available after you subtract attenuation or link loss (LL) from the power budget (P_B).

When you calculate the power margin, you use a worst-case analysis to provide a margin of error, even though not all parts of an actual system operate at worst-case levels. A power margin (P_M) greater than zero indicates that the power budget is sufficient to operate the receiver and that it does not exceed the maximum receiver input power. This means that the link will work. A (P_M) that is zero or negative indicates insufficient power to operate the receiver. See the specification for your receiver to find the maximum receiver input power.

To calculate the worst-case estimate for the power margin (P_M) for the link:

1. Determine the maximum value for link loss (LL) by adding estimated values for applicable link-loss factors—for example, use the sample values for various factors as provided in Table 24 on page 59 (here, the link is 2 km long and multimode, and the (P_B) is 13 dBm):

    Table 24: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Higher-order mode losses (HOL)	• Multimode—0.5 dBm • Single mode—None	• 0.5 dBm • 0 dBm
Modal and chromatic dispersion	• Multimode—None, if product of bandwidth and distance is less than 500 MHz/km • Single mode—None	• 0 dBm • 0 dBm
Connector	0.5 dBm	This example assumes 5 connectors. Loss for 5 connectors: (5) * (0.5 dBm) = 2.5 dBm

Table 24: Estimated Values for Factors Causing Link Loss *(Continued)*

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Splice	0.5 dBm	This example assumes 2 splices. Loss for two splices: (2) * (0.5 dBm) = 1 dBm
Fiber attenuation	• Multimode—1 dBm/km • Single mode—0.5 dBm/km	This example assumes the link is 2 km long. Fiber attenuation for 2 km: • (2 km) * (1.0 dBm/km) = 2 dBm • (2 km) * (0.5 dBm/km) = 1 dBm
Clock Recovery Module (CRM)	1 dBm	1 dBm

NOTE: For information about the actual amount of signal loss caused by equipment and other factors, see your vendor documentation for that equipment.

2. Calculate the (P_M) by subtracting (LL) from (P_B):

$P_B - LL = P_M$

(13 dBm) – (0.5 dBm [HOL]) – ((5) * (0.5 dBm)) – ((2) * (0.5 dBm)) – ((2 km) * (1.0 dBm/km)) – (1 dB [CRM]) = P_M

13 dBm – 0.5 dBm – 2.5 dBm – 1 dBm – 2 dBm – 1 dBm = P_M

P_M = 6 dBm

The calculated power margin is greater than zero, indicating that the link has sufficient power for transmission. Also, the power margin value does not exceed the maximum receiver input power. Refer to the specification for your receiver to find the maximum receiver input power.

EX9251 Management Cable Specifications and Pinouts

Management Cable Specifications

Table 25 on page 61 lists the specifications for the cables that connect the console and management ports to management devices.

Table 25: Specifications of Cables to Connect to Management Devices

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console port	CAT5e UTP (unshielded twisted pair) cable	RJ-45	*Connect a Device to a Management Console Using an RJ-45 Connector*
Management Ethernet port	Ethernet cable with an RJ-45 connector	RJ-45	*Connect a Device to a Network for Out-of-Band Management*

Table 25: Specifications of Cables to Connect to Management Devices *(Continued)*

Ports	Cable Specifications	Receptacle	Additional Information
Mini-USB Type-B Console port	Mini-USB cable with standard-A and Mini-USB Type-B (5-pin) connector	Mini-USB	

Specifications of Cables and Wires That Connect to Ports on the Front Panel in an EX9251 Switch

Table 26 on page 62 lists the specifications for the cables that connect to management port, console port, and auxiliary port.

Table 26: Cable and Wire Specifications for Ports on the Front Panel

Port	Cable Specification	Cable/Wire Supplied	Maximum Length	Receptacle
Console or auxiliary port	RS-232 (EIA-232) serial cable	1.83-m length with RJ-45/DB-9 connectors	1.83 m	RJ-45 socket
Management Ethernet port	Category 5 cable or equivalent suitable for 100Base-T operation	One 4.57-m length with RJ-45/RJ-45 connectors	100 m	RJ-45 autosensing

Grounding Cable and Lug Specifications for EX9251 Switches

IN THIS SECTION

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect an EX9251 switch to earth ground before you connect power to the switch. You must use the protective earthing terminal on the rear panel of the switch chassis to connect the switch to earth ground.

> **WARNING**: The switch is installed in a restricted-access location. It has a separate protective earthing terminal on the rear panel of the chassis that must be permanently connected to earth ground to adequately ground the chassis and protect the operator from electrical hazards.

> **CAUTION**: Before switch installation begins, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable that you supply. Using a grounding cable with an incorrectly attached lug can damage the switch.

Grounding Points Specifications for an EX9251 Switch

Two threaded holes are provided on the rear left side of the chassis for connecting the switch to earth ground. The grounding points fit 10–32 screws and are spaced at 0.63 in. (16 mm) centers.

> **NOTE**: Additional grounding is provided to an AC-powered switch when you plug its power supplies into grounded AC power receptacles.

Grounding Cable Specifications for an EX9251 Switch

The grounding cable that you provide must meet the specifications in .

Table 27: Grounding Cable Specifications

Cable Type	Quantity and Specification
Grounding	The grounding lug accommodates 14–10 AWG (2–5.3 mm²) stranded wire. The grounding cable that you provide for the chassis must be the same size or heavier than the input wire of each power supply. Minimum recommendations are 14–10 AWG (2–5.3 mm²) stranded wire, 60° C wire, or one that complies with the local code.

Grounding Lug Specifications for an EX9251 Switch

The accessory box shipped with the switch includes two screws used to secure the grounding cable to the grounding points.

USB Port Specifications for an EX Series Switch

Juniper Networks tested and officially supports the following USB flash drives for the USB port on all EX Series switches:

- RE-USB-1G-S

- RE-USB-2G-S

- RE-USB-4G-S

> ⚠️ **CAUTION**: Any USB memory product not listed as supported for EX Series switches has not been tested by Juniper Networks. The use of any unsupported USB memory product could expose your EX Series switch to unpredictable behavior. Juniper Networks Technical Assistance Center (JTAC) can provide only limited support for issues related to unsupported hardware. We strongly recommend that you use only supported USB flash drives.

All USB flash drives used on EX Series switches must have the following features:

- USB 2.0 or later.

- Formatted with a FAT or MS-DOS file system.

- If the switch is running Junos OS Release 9.5 or earlier, the formatting method must use a primary boot record. Microsoft Windows formatting, by default, does not use a primary boot record. See the documentation for your USB flash drive for information about how your USB flash drive is formatted.

Console Port Connector Pinout Information for an EX9251 Switch

The console port on an EX9251 switch are RS-232 serial interfaces. This port connects the switch to a console management port.

provides the pinout information for the RJ-45 connector. An RJ-45 cable and an RJ-45 to DB-9 serial port adapter are supplied with the switch.

> **NOTE**: If your laptop or PC does not have a DB-9 plug connector pin and you want to connect your laptop or PC directly to an EX9251 switch, use a combination of the RJ-45 to DB-9 socket adapter supplied with the switch and a USB to DB-9 plug adapter. You must provide the USB to DB-9 plug adapter.

Table 28: EX9251 Switches Console Port Connector Pinout Information

Pin	Signal	Description
1	RTS	Request to send
2	DTR	Data terminal ready
3	TxD	Transmit data
4	Ground	Signal ground
5	Ground	Signal ground
6	RxD	Receive data
7	DSR/DCD	Data set ready
8	CTS	Clear to send

SEE ALSO

| *Connect a Device to a Management Console Using an RJ-45 Connector*

RJ-45 to DB-9 Serial Port Adapter Pinout Information

The console port on a Juniper Networks device is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a laptop or a desktop PC. If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC to the device, use a combination of the RJ-45 to DB-9 socket adapter along with a USB to DB-9 plug adapter.

Table 29 on page 66 provides the pinout information for the RJ-45 to DB-9 serial port adapter.

Table 29: RJ-45 to DB-9 Serial Port Adapter Pinout Information

RJ-45 pin	Signal	DB-9 pin	Signal
1	RTS	8	CTS
2	DTR	6	DSR
3	TxD	2	RxD
4	GND	5	GND
6	RxD	3	TxD
7	DSR	4	DTR
8	CTS	7	RTS

RJ-45 Management Port Connector Pinout Information

Table 30 on page 67 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 30: RJ-45 Management Port Connector Pinout Information

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

3

CHAPTER

Initial Installation and Configuration

Unpacking and Mounting the EX9251 Switch

Unpacking an EX9251 Switch

EX9251 switches are shipped in a cardboard carton, secured with foam packing material. The carton has an accessory compartment and contains the quick start instructions.

> ⚠ **CAUTION**: EX9251 switches are maximally protected inside the shipping carton. Do not unpack the switches until you are ready to begin installation.

To unpack the switch:

1. Move the shipping carton to a staging area as close to the installation site as possible, but where you have enough room to remove the system components.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Remove the accessory box, and verify the contents against the parts inventory on the label attached to the carton.
5. Pull out the packing material holding the switch in place.
6. Verify the parts received against the inventory on the label attached to the carton. See "Parts Inventory (Packing List) for an EX9251 Switch" on page 70.
7. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Parts Inventory (Packing List) for an EX9251 Switch

The switch shipment includes a packing list. Check the parts you receive in the switch shipping crate against the items on the packing list. The packing list specifies the part number and provides description of each part in your order. The parts shipped depend on the configuration you order. See "EX9251 Switch Models" on page 7 for more information.

If any part on the packing list is missing, contact your customer service representative or contact Juniper customer care from within the U.S. or Canada by telephone at 1-888-314-5822. For international-dial or direct-dial options in countries without toll-free numbers, see https://www.juniper.net/support/ requesting-support.html .

Table 31 on page 70 lists the parts and their quantities in the packing list for a fully configured switch. Table 32 on page 70 lists the parts contained in the accessory box.

Table 31: Parts List for a Fully Configured EX9251 Switch

Component	Quantity
Chassis	1
AC or DC power supplies	2
Fan trays	3
Documentation Roadmap	1

Table 32: Accessory Box Parts List

Part	Quantity
Front-mounting brackets	2

Table 32: Accessory Box Parts List *(Continued)*

Part	Quantity
Rear-mounting brackets	2
Screws to attach the front-mounting brackets to the chassis	16
ETSI brackets	4
M5 Pan Head screws with integrated washers to secure the ETSI brackets to the front-mounting brackets and rear-mounting brackets	8
10-32 screws to secure the ground cable lug	2
Ring lugs to connect to DC power source cables	2
AC power cord appropriate for your geographical location	1
Label, "Small Parts Enclosed"	1
Label, "Accessories Contents"	1
USB flash drive with Junos OS	1
Read me first document	1
Affidavit for T1 connection	1
Juniper Networks Product Warranty	1
End User License Agreement	1
Document sleeve	1

Table 32: Accessory Box Parts List *(Continued)*

Part	Quantity
3 in. x 5 in. pink bag	2
9 in. x 12 in. pink bag, ESD	2
Ethernet cable with an RJ-45 connector attached	1
RJ-45 to DB-9 serial port adapter	1
Electrostatic discharge (ESD) wrist strap with cable	1

Register Products—Mandatory to Validate SLAs

Register all new Juniper Networks hardware products and changes to an existing installed product using the Juniper Networks website to activate your hardware replacement service-level agreements (SLAs).

> **CAUTION**: Register product serial numbers on the Juniper Networks website. Update the installation base data if any addition or change to the installation base occurs or if the installation base is moved. Juniper Networks is not responsible for not meeting the hardware replacement service-level agreement for products that do not have registered serial numbers or accurate installation base data.
>
> Register your product(s) at https://tools.juniper.net/svcreg/SRegSerialNum.jsp.
> Update your installation base at https://www.juniper.net/customers/csc/management/updateinstallbase.jsp.

Installing and Connecting an EX9251 Switch

The EX9251 switch chassis is a rigid sheet-metal structure that houses all components of the switch. The switch is shipped in a cardboard carton, secured with foam packing material. The carton has an accessory compartment and contains the quick start instructions.

To install and connect an EX9251 switch:

1. Unpack the switch by following instructions in "Unpacking an EX9251 Switch" on page 69.
2. Mount the switch by following instructions in "Mounting an EX9251 Switch on a Rack or Cabinet" on page 73.
3. Connect the switch to earth ground by following instructions in *Connect Earth Ground to an EX Series Switch*.
4. Connect power to the switch by following instructions as appropriate for your model:

   - "Connecting AC Power to an EX9251 Switch and Powering on the Switch" on page 92

   - "Connecting DC Power to an EX9251 Switch and Powering on the Switch" on page 95
5. Perform initial configuration of the switch by following instructions in "Connecting and Configuring an EX9251 Switch (CLI Procedure)" on page 110.
6. Set the switch's management options by following the appropriate instructions:

   - *Connect a Device to a Network for Out-of-Band Management*

   - *Connect a Device to a Management Console Using an RJ-45 Connector*

SEE ALSO

Mounting an EX9251 Switch on a Rack or Cabinet

IN THIS SECTION

You can mount an EX9251 switch on four posts of a rack that complies with either of the following standards or in a cabinet with a rack that complies with either of the following standards by using the mounting brackets provided with the switch:

- 19-in. rack—A 19-in. (450 mm) rack as defined by the Electronic Components Industry Association (http://www.ecianow.org).

- ETSI rack—A 21-in. (500 mm) ETSI rack as defined in the European Telecommunications Standards Institute (ETS 300 119) published by the European Telecommunications Standards Institute (ETSI).

The remainder of this topic uses *rack* to mean *rack* or *cabinet*.

Before mounting the switch:

- Verify that the site meets the requirements described in "Site Preparation Checklist for an EX9251 Switch" on page 36.

- Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.

- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.

- Remove the switch from the shipping carton (see "Unpacking an EX9251 Switch" on page 69).

WARNING: Ensure that you understand how to prevent ESD damage. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

CAUTION: If you are mounting multiple switches on a rack, mount a switch in the bottom of the rack first and proceed to mount the rest of the switches from bottom to top.

NOTE: One person must be available to lift the switch while another secures the switch to the rack. The weight of a fully configured chassis is 22.7 lb (10.3 kg).

We recommend that you install cover panels in the unused power supply slots.

Mounting an EX9251 Switch on a 19-in. Rack

Before you begin mounting the switch on a 19-in. rack, ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)

- Two front-mounting brackets and 16 screws to secure the brackets to the chassis (provided in the accessory box shipped with the switch)

- Two rear-mounting brackets (provided in the accessory box shipped with the switch)

- Eight screws to secure the chassis to the rack (not provided)

- Cover panels for power supply slots

To mount the switch on a 19-in. rack:

1. Place the switch on a flat, stable surface.
2. Align the front-mounting brackets along the front panel of the switch chassis (see Figure 1).

Figure 23: Attaching the Front-Mounting Brackets to the Switch Chassis
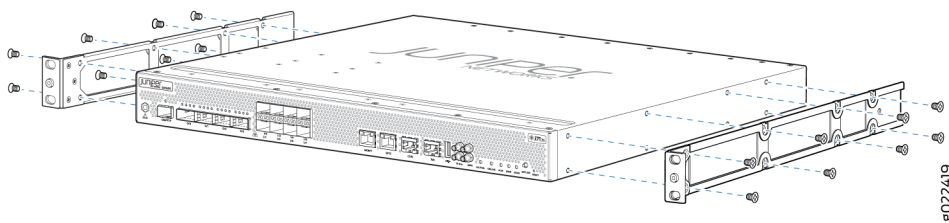
3. Align the bottom holes in the front-mounting brackets with the holes on the side panels of the switch chassis.
4. Insert mounting screws into the aligned holes. Tighten the screws by using the Phillips (+) screwdriver, number 2.
5. Ensure that the other holes in the front-mounting brackets are aligned with the holes in the side panels. Insert a screw in each hole and tighten the screws by using the Phillips (+) screwdriver, number 2.
6. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the front-mounting bracket holes with the threaded holes in the rack posts. Align the bottom hole in both the mounting brackets with a hole in each rack post, making sure the chassis is level.

7. Have a second person secure the switch to the rack by using the appropriate screws. Tighten the screws (see Figure 2).

Figure 24: Mounting an EX9251 Switch on a Rack by Using Front-Mounting Brackets
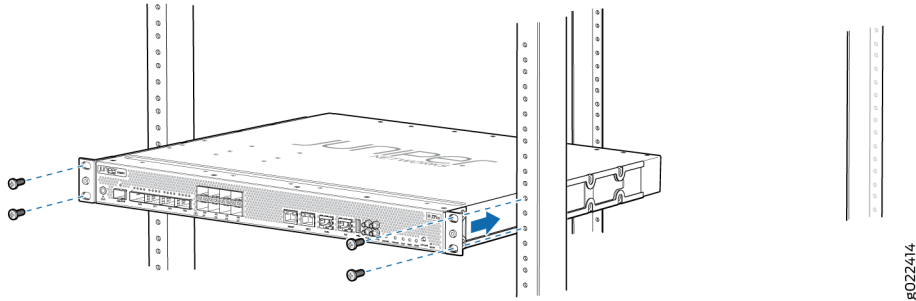
8. Ensure that the switch chassis is level by verifying that all screws on one side of the rack are aligned with the screws on the other side. Figure 3 shows the switch mounted on a rack by using front-mounting brackets.

Figure 25: An EX9251 Switch Mounted on Rack by Using Front-Mounting Brackets
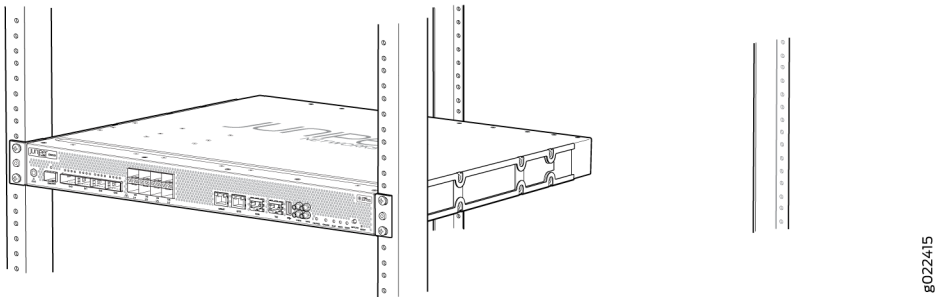
9. On the rear of the chassis, slide the rear-mounting brackets on either side of the chassis until the rear-mounting brackets contact the rack rails (see Figure 4).

Figure 26: Mounting the Rear-Mounting Brackets
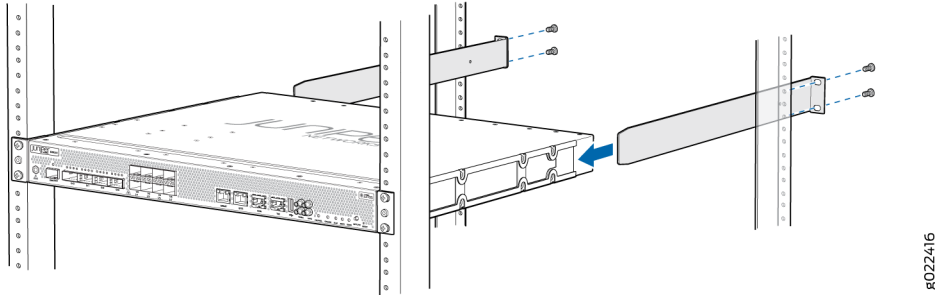
10. Insert the screws to secure the chassis to the rack into the holes in the bracket aligned to the holes in the rack post, starting from the bottom. Tighten the screws by using the Phillips (+) screwdriver, number 2.

11. Visually inspect the alignment of the chassis. If the chassis is installed properly in the rack, all the mounting screws on one side of the rack are aligned with the mounting screws on the opposite side and the switch is level. Figure 5 shows the switch fully secured and installed on four posts of a rack.

Figure 27: EX9251 Mounted on Four Posts of a 19-in. Rack
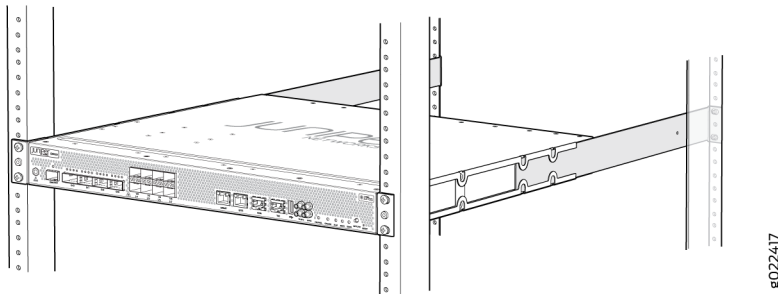
Installing an EX9251 Switch in an ETSI Rack

Before you begin mounting the switch on an ETSI rack, ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)

- Two front-mounting brackets and 16 screws to secure the brackets to the chassis (provided in the accessory box shipped with the switch)

- Two rear-mounting brackets (provided in the accessory box shipped with the switch)

- Four ETSI brackets. Figure 28 on page 78 shows the ETSI brackets provided with EX9251 switches.

Figure 28: ETSI Brackets
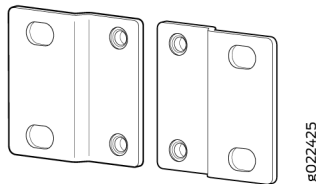
- Eight screws to secure the chassis to the rack (not provided)

- Cover panels for power supply slots

To mount the switch on an ETSI rack:

1. Position the switch in front of the rack.

2. Align the front-mounting brackets along the front panel of the switch chassis (see Figure 29 on page 78.

Figure 29: Attaching the Front-Mounting Brackets to the Switch Chassis
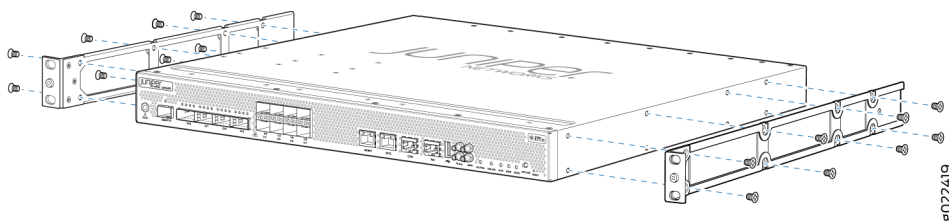
3. Align the bottom holes in the front-mounting brackets with the holes on the side panels of the switch chassis.

4. Insert mounting screws into the aligned holes. Tighten the screws by using the Phillips (+) screwdriver, number 2.

5. Ensure that the other holes in the front-mounting brackets are aligned with the holes in the side panels. Insert a screw in each hole and tighten the screws by using the Phillips (+) screwdriver, number 2.

6. Attach two ETSI brackets to the front-mounting brackets by using the M5 Pan Head screws with integrated washers (see).

Figure 30: Attaching ETSI Brackets to the Front-Mounting Brackets
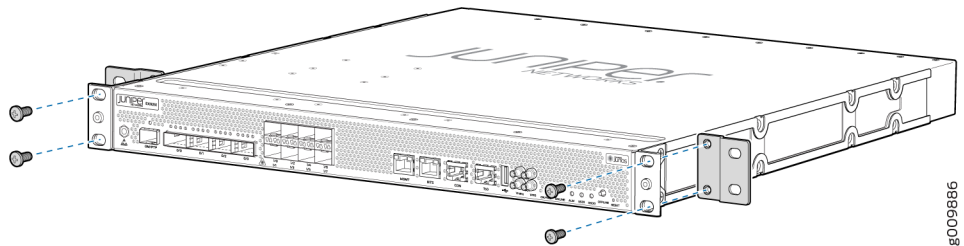
7. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the holes in the ETSI brackets attached to the front-mounting brackets with the threaded holes in the rack posts. Align the bottom hole in both the ETSI brackets with a hole in each rack post, making sure the chassis is level.

8. Have a second person secure the switch to the rack by using the appropriate screws. Tighten the screws (see).

Figure 31: Mounting an EX9251 Switch on an ETSI Rack by Using Front-Mounting Brackets
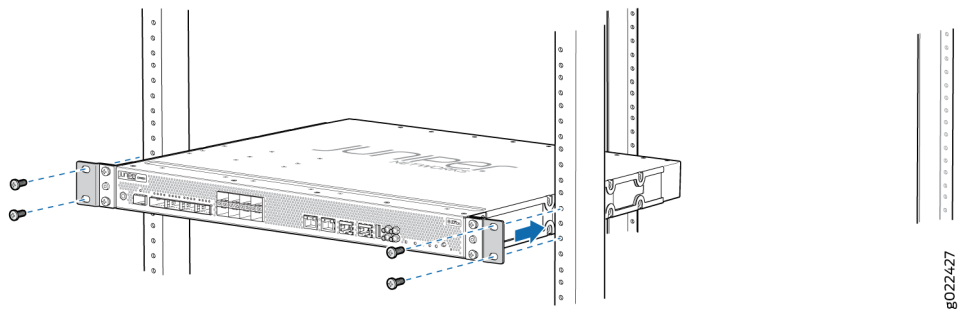
9. Ensure that the switch chassis is level by verifying that all screws on one side of the rack are aligned with the screws on the other side. shows the switch mounted on a rack by using ETSI brackets attached to the front-mounting brackets.

Figure 32: An EX9251 Switch Mounted on an ETSI Rack by Using Front-Mounting Brackets
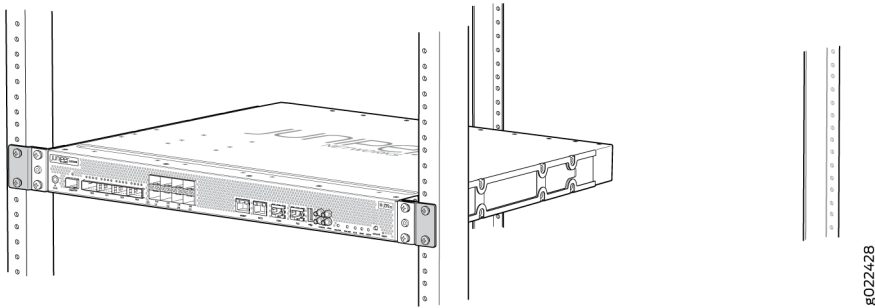
10. Attach two ETSI brackets to the rear-mounting brackets by using the M5 Pan Head screws with integrated washers (see

Figure 33: Attaching ETSI Brackets to the Rear-Mounting Brackets
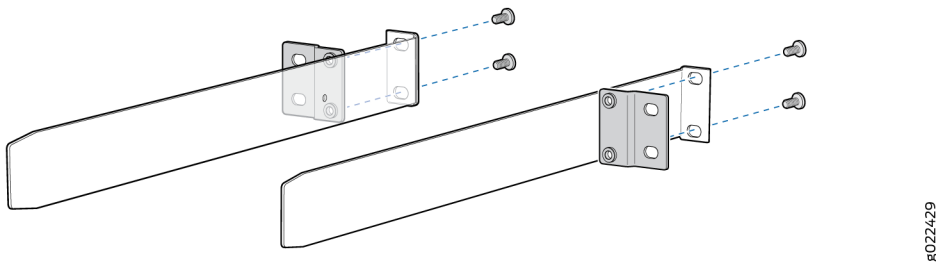
11. On the rear of the chassis, slide the rear-mounting brackets (with the ETSI brackets attached) on either side of the chassis until the rear-mounting brackets contact the rack posts (see Figure 34 on page 81).

Figure 34: Mounting the Rear-Mounting Brackets by Using ETSI Brackets
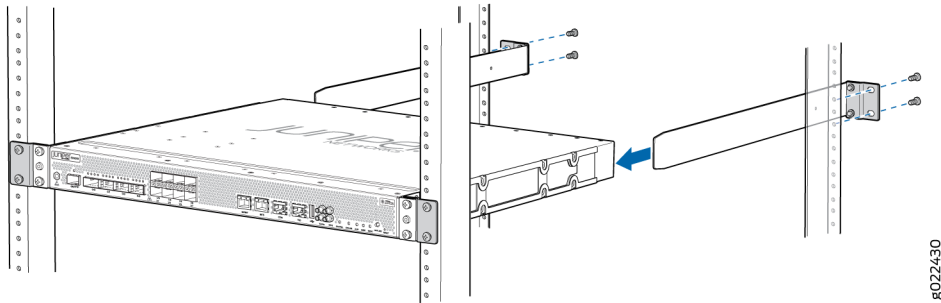
12. Insert the screws to secure the chassis to the rack into the holes in the bracket aligned to the holes in the rack post, starting from the bottom. Tighten the screws by using the Phillips (+) screwdriver, number 2.

13. Visually inspect the alignment of the chassis. If the chassis is installed properly in the rack, all the mounting screws on one side of the rack are aligned with the mounting screws on the opposite side and the switch is level. Figure 35 on page 81 shows the switch fully secured and installed on four posts of a rack.

Figure 35: EX9251 Mounted on Four Posts of an ETSI Rack
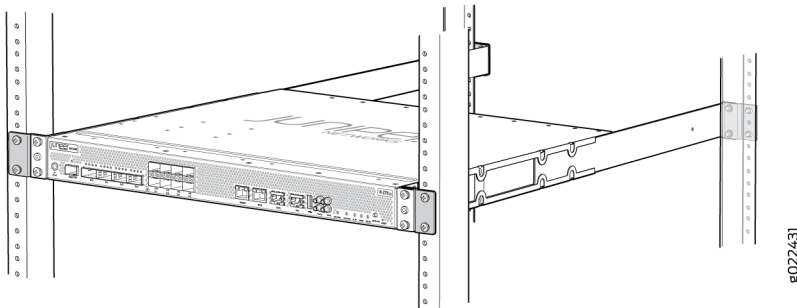
RELATED DOCUMENTATION

Rack-Mounting and Cabinet-Mounting Warnings | 174

Connecting the EX9251 to Power

Connect Earth Ground to an EX Series Switch

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect an EX Series switch to earth ground before you connect power to the switch. You must use the protective earthing terminal on the switch chassis to connect the switch to earth ground (see Figure 37 on page 91).

You must install the EX Series switch in a restricted–access location and ensure that the chassis is always properly grounded. EX Series switches have a two–hole protective grounding terminal provided on the chassis. See Table 33 on page 83 for the location of the earthing terminals on various EX Series switches. Under all circumstances, use this grounding connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

Ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable you supply. Using a grounding cable with an incorrectly attached lug can damage the switch.

Parts and Tools Required for Connecting an EX Series Switch to Earth Ground

Before you begin connecting an EX Series switch to earth ground, ensure you have the parts and tools required for your switch.

Table 33 on page 83 lists the earthing terminal location, grounding cable and lug specifications, and parts needed for connecting an EX Series switch to earth ground.

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX2200	Rear panel of the chassis	14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer—not provided • Two #10 flat washers—not provided	
EX2300-C	Rear panel of the chassis	14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14AW-L or equivalent—not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer—not provided • Two #10 flat washers—not provided	

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information

EX2300	Rear panel of the chassis	• EX2300 switches except EX2300-24 MP and EX2300-48 MP models —14 AWG (2 mm²), minimum 90°C wire, or as permitted by the local code
		
		• EX2300-24 MP and EX2300-48 MP models —14-10 AWG STR (2.5-6 mm²), 12-10 AWG SOL (4-6 mm²) minimum 90°C wire, or as permitted by the local code—not provided
			• EX2300 switches except EX2300-24MP and EX2300-48MP models—Panduit LCC10-14AW-L or equivalent— not provided
			
			• EX2300-24MP and EX2300-48MP models—Panduit LCA10-10L or equivalent—not provided
				• EX2300 switches except EX2300-24 MP and EX2300-48 MP models
				
				  • Two 10-32 x .25 in. screws with #10 split-lock washer— not provided
				
				  • Two #10 flat washers —not provided
				
				• EX2300-24 MP and EX2300-48 MP models
				
				  • One Pan Phillips M 4 x 6 mm Nickel plated screw— provided	

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX3200 and EX3300	Rear panel of the chassis	14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer— not provided • Two #10 flat washers— not provided	For EX3200 Switches, see "Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch" on page 89.
EX3400	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-10A-L or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer— not provided • Two #10 flat washers— not provided	
EX4200	Left side of the chassis	14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer— not provided • Two #10 flat washers— not provided	See "Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch" on page 89.

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX4300 switches except EX4300-48MP and EX4300-48MP-S switches	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-10A-L or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer — not provided • Two #10 flat washers— not provided	
EX4300-48MP and EX4300-48MP-S switches	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-14B-L, LCC10-BW-L, or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer — not provided • Two #10 flat washers— not provided	
EX4500 and EX4550	Left side of the chassis	14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent— not provided	• Two 10-32 x .25 in. screws with #10 split-lock washer — not provided • Two #10 flat washers— not provided	See "Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch" on page 89.

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX6210	Rear panel of the chassis (on lower left side)	The grounding cable must be the same gauge as the power feed cables and as permitted by the local code.	Panduit LCD2-14A-Q or equivalent —provided	- Two ¼ -20 x 0.5 in. screws with #¼" split-washer —provided - Two #¼" flat washers— provided	
EX8208	Left side of the chassis	6 AWG (13.3 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent —provided	- Two ¼ -20 x 0.5 in. screws with #¼" split-washer —provided - Two #¼" flat washers— provided	

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX8216	Two earthing terminals: • Left side of the chassis • Rear panel of the chassis **NOTE**: You must use only one of the two protective earthing terminals.	2 AWG (33.6 mm²), minimum 90° C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent —provided	• Two ¼ -20 x 0.5 in. screws with #¼" split-washer —provided • Two #¼" flat washers— provided	
EX9204, EX9208, and EX9214	Rear panel of the chassis	One 6 AWG (13.3 mm²), minimum 90° C wire, or one that complies with the local code	Thomas& Betts LCN6-14 or equivalent— provided	• Two ¼ -20 x 0.5 in. screws with #¼" split-washer— provided • Two #¼" flat washers— provided	See Grounding Cable and Lug Specifications for EX9200 Switches.

Table 33: Parts Required for Connecting an EX Series Switch to Earth Ground *(Continued)*

Switch	Earthing Terminal Location	Grounding Cable Requirements	Grounding Lug Specifications	Screws and Washers	Additional Information
EX9251	Rear panel of the chassis	12 AWG (2.5 mm²), minimum 90° C wire, or one that complies with the local code— not provided	Panduit LCD10-10A-L or equivalent— not provided	Two 10-32 screws— provided	See Grounding Cable and Lug Specifications for EX9200 Switches.
EX9253	Right side of the chassis	14-10 AWG (2-5.3 mm²), minimum 90° C wire, or one that complies with the local code— not provided	Panduit LCD10-14B-L or equivalent— provided	Two M5 Pan Head screws— provided	

Tools required for connecting an EX Series switch to earth ground:

- An electrostatic discharge grounding strap (provided)

- A Phillips (+) number 2 screwdriver to tighten the screws.

An AC–powered EX Series switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location.

Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch

Table 34 on page 90 lists the special instructions that you might need to follow before connecting earth ground to a switch.

Table 34: Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch

Switch	Special Instructions
EX3200 and EX4200	Some early variants of EX3200 and EX4200 switches for which the Juniper Networks model number on the label next to the protective earthing terminal is from 750-021*xxx* through 750-030*xxx* require 10-24x.25 in. screws.
EX4200, EX4500, and EX4550	If you plan to mount your switch on four posts of a rack or cabinet, mount your switch in the rack or cabinet before attaching the grounding lug to the switch.

NOTE: The protective earthing terminal on switches mounted on four posts of a rack is accessible through the slot on the left rear bracket only if the rack is 27.5 in. (69.85 cm) through 30.5 in. (77.47 cm) deep for a switch mounted flush with the rack front and 29.5 in. (74.93 cm) through 32.5 in. (82.55 cm) deep for a switch mounted 2 in. (5.08 cm) recessed from the rack front. See Figure 36 on page 90.

Figure 36: Connecting the Grounding Lug to a Switch Mounted on Four Posts of a Rack

1—	Protective earthing terminal	3—	Grounding lug
2—	Side mounting-rail	4—	Rear mounting-blade

NOTE: The brackets must be attached to the chassis before the grounding lug is attached. (The brackets are shown pulled away from the chassis so that the protective earthing terminal is seen.)

Connecting Earth Ground to an EX Series Switch

To connect earth ground to an EX Series switch:

1. Verify that a licensed electrician has attached the cable lug to the grounding cable.

2. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.

3. Attach an ESD grounding strap to your bare wrist, and connect the strap to the ESD grounding point on the switch.

4. Place the grounding lug attached to the grounding cable over the protective earthing terminal. See .

Figure 37: Connecting a Grounding Cable to an EX Series Switch
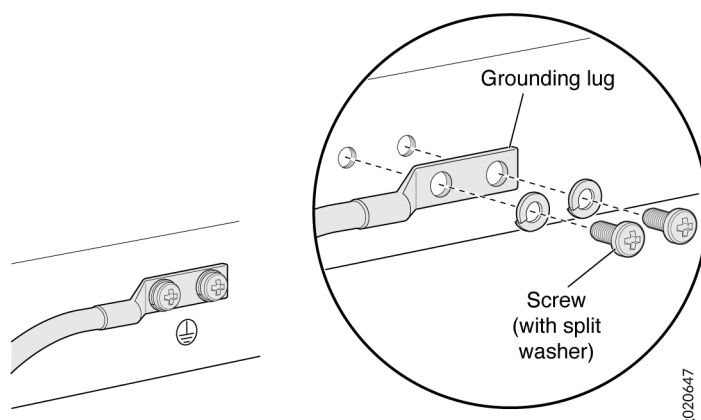
5. Secure the grounding lug to the protective earthing terminal with the washers and screws.

6. Dress the grounding cable and ensure that it does not touch or block access to other switch components and that it does not drape where people could trip over it.

SEE ALSO

General Safety Guidelines and Warnings

Grounded Equipment Warning

Connecting AC Power to an EX9251 Switch and Powering on the Switch

Before you begin to connect power to the switch:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

- Ensure that you have connected the device chassis to earth ground.

> ⚠️ **CAUTION**: For installations that require a separate grounding conductor to the chassis, have a licensed electrician complete this connection before you connect the switch to power. For instructions on connecting earth ground, see *Connect Earth Ground to an EX Series Switch*.

- Install AC power supplies in the switch. See "Installing an AC Power Supply in an EX9251 Switch" on page 125.

Ensure that you have the following parts and tools available to connect power to the switch and to power it on:

- An ESD wrist strap

- Power cords appropriate for your geographical location (provided). See "AC Power Cord Specifications for an EX9251 Switch" on page 28.

- An external management device

You can install up to two AC power supplies in an EX9251 switch. The AC power supply in an EX9251 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. The power supplies install in the slots on the rear panel of the chassis.

> ⚠️ **CAUTION**: Do not mix AC and DC power supplies in the same chassis.

> **NOTE**: Each power supply must be connected to a dedicated AC power feed with a dedicated customer-site circuit breaker. We recommend that you use a dedicated customer-site circuit breaker rated for 20 A (110 VAC) or 16 A (220 VAC) minimum, or as required by local code.

To connect AC power to an EX9251 switch (see Figure 40 on page 94):

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

2. Ensure that the power supply is fully inserted and latched securely in the chassis. See "Installing an AC Power Supply in an EX9251 Switch" on page 125.

3. If the AC power source outlet has a power switch, set it to the off position.

4. Push the end of the AC power cord retainer strip into the AC power cord retainer port (see Figure 38 on page 93) next to the inlet on the power supply faceplate until it snaps into place. Ensure that the loop in the retainer strip faces toward the power cord.

Figure 38: Power Cord Retainer Port on the AC Power Supply Faceplate

1– Handle	4– Fault LED
2– Input status LED	5– Ejector lever
3– Output status LED	6– AC power cord retainer port
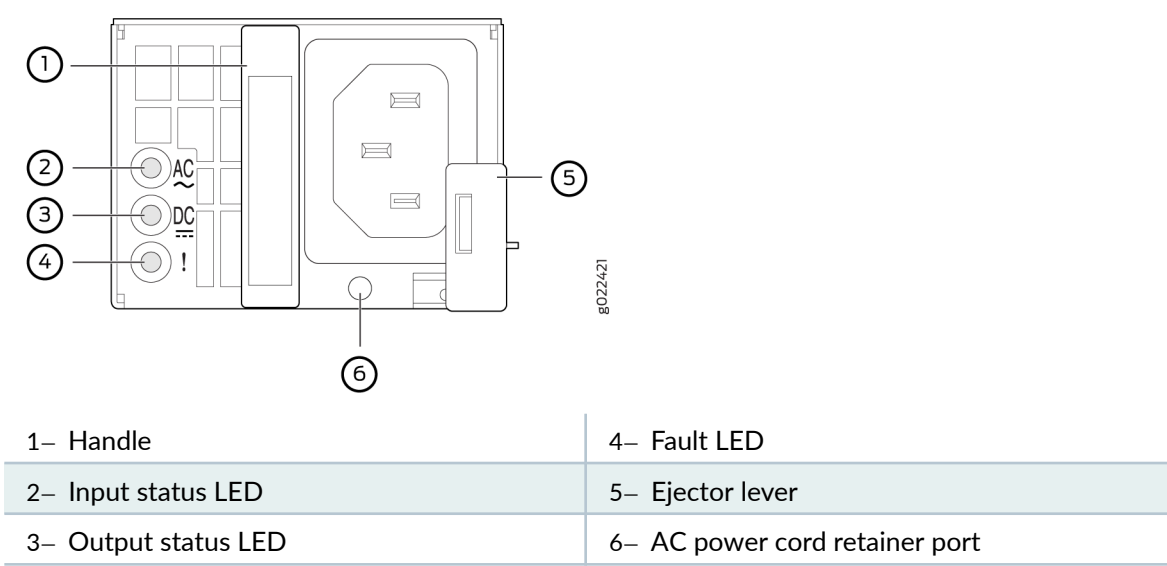
Figure 39 on page 93 shows the power cord retainer installed on the AC power supply.

Figure 39: Power Cord Retainer Installed on the AC Power Supply
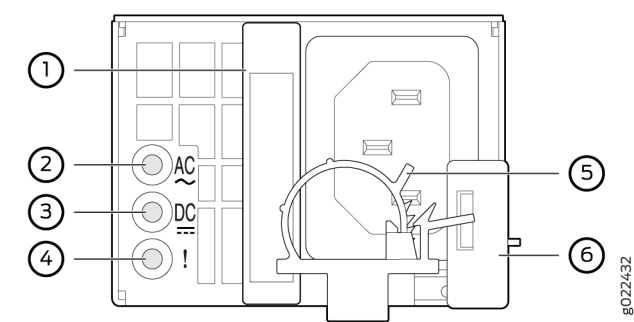
1– Handle	4– Fault LED
2– Input status LED	5– AC power cord retainer
3– Output status LED	6– Ejector lever

5. Press the small tab on the retainer strip to loosen the loop. Slide the loop until you have enough space to insert the power cord coupler into the inlet.

6. Insert the power cord plug firmly into the power cord inlet.

7. Slide the loop toward the power supply until it is snug against the base of the coupler.

8. Press the tab on the loop and draw out the loop into a tight circle (see Figure 40 on page 94).

Figure 40: Connecting the AC Power Supply Cord to an AC-Powered Switch
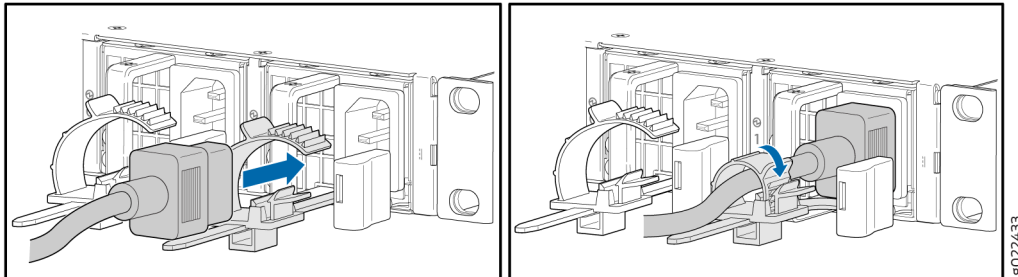
9. Dress the power cord appropriately. Verify that the power cords do not block access to switch components or drape where people can trip on them.

10. Insert the power cord plug into the power source outlet.

11. Connect the console port on the switch (labeled **CON**) to the external management device.

12. Turn on power to the external management device.

13. Switch on the dedicated customer-site circuit breakers for the power supply. Follow the instructions for your site.

14. If the AC power source outlet has a power switch, set it to the on position.

> **NOTE**: After powering off a power supply, wait at least five seconds before turning it back on. After powering on a power supply, wait at least five seconds before turning it off.
>
> If the switch is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system again, first issue the CLI `request vmhost power-off` command. After a power supply is powered on, it can take up to five seconds for status indicators—such as the LEDs on the power supply and the `show chassis` command display—to indicate that the power supply is functioning normally. Ignore error indicators that appear during the first five seconds.

15. If the power supply is installed correctly and functioning normally, the input status LED labeled **AC** and output status LED labeled **DC** on the power supply faceplate are on and steadily lit green, and the alarm LED (labeled **!**) is not lit.

16. On the external management device, monitor the startup process to verify that the switch has booted properly.

SEE ALSO

Power Supplies in an EX9251 Switch | **23**

Connecting DC Power to an EX9251 Switch and Powering on the Switch

Before you begin connecting DC power to an EX9251 switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

- Ensure that you have connected the switch chassis to earth ground.

> ⚠ **CAUTION**: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect EX9251 switches to earth ground before you connect them to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to earth ground. For instructions on connecting an EX9251 switch to ground using a separate grounding conductor, see *Connect Earth Ground to an EX Series Switch*.

- Install DC power supplies in the chassis. See "Installing a DC Power Supply in an EX9251 Switch" on page 128.

Ensure that you have the following parts and tools available to connect DC power to an EX9251 switch:

- An ESD wrist strap

- DC power source cables (minimum 12 AWG (2.5 mm^2), minimum 60°C wire or as permitted by local code)

- Two ring lugs (Molex 01907000969 or equivalent)—provided with the switch

- An external management device

- Phillips (+) screwdriver, number 2

- A multimeter

You can install up to two DC power supplies in an EX9251 switch. The DC power supply in an EX9251 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. The power supplies install in the slots on the rear panel of the chassis.

⚠ **CAUTION**: Do not mix AC and DC power supplies in the same chassis.

⚡ **WARNING**: Before you perform DC power procedures, ensure there is no power to the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position.

⚠ **CAUTION**: Before you connect power to the switch, a licensed electrician must attach cable lugs to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).

NOTE: Each power supply input feed must be connected to a dedicated DC power source outlet.

To connect DC power to an EX9251 switch (see):

1. Switch off the dedicated customer site circuit breakers. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

3. Remove the plastic cover from the terminal block on the power supply faceplate.

4. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the **–48V** and **RTN** DC cables to chassis ground:

   - The cable with very large resistance (indicating an open circuit) to chassis ground is **–48V**.

   - The cable with very low resistance (indicating a closed circuit) to chassis ground is **RTN**.

> ⚠️ **CAUTION**: Ensure that power connections maintain the proper polarity. The power source cables might be labeled **(+)** and **(–)** to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminal studs on each power supply.

5. Install heat-shrink tubing insulation around the power cables.

   To install heat-shrink tubing:

   a. Slide the tubing over the portion of the cable where it is attached to the lug barrel. Ensure that tubing covers the end of the wire and the barrel of the lug attached to it.

   b. Shrink the tubing with a heat gun. Ensure that you heat all sides of the tubing evenly so that it shrinks around the cable tightly.

   Figure 41 on page 97 shows the steps to install heat-shrink tubing.

   > ℹ️ **NOTE**: Do not overheat the tubing.

Figure 41: How to Install Heat-Shrink Tubing
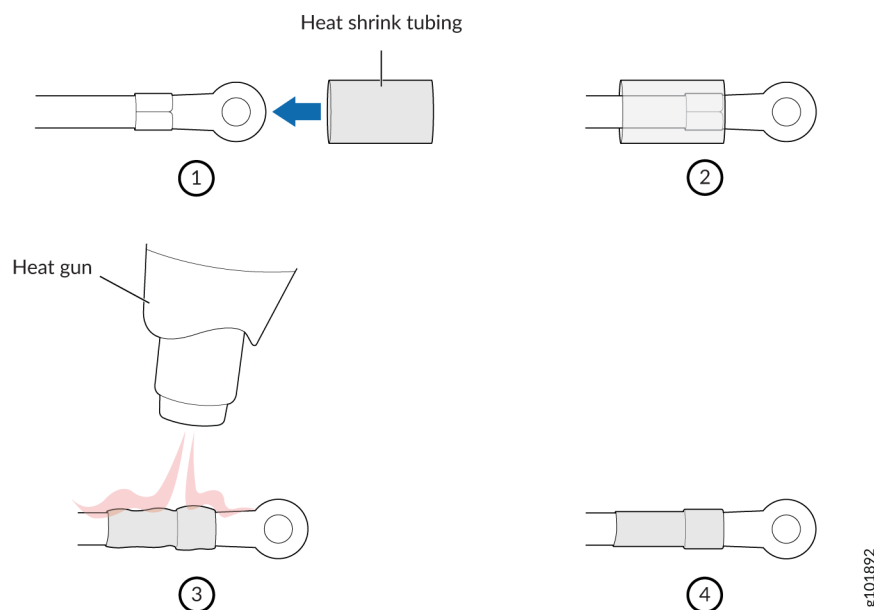
6. Remove the screws from the terminals. Save the screws.

> ⚠️ **CAUTION**: Ensure that each power cable lug seats flush against the surface of the terminal block as you tighten the screws. Ensure that each screw is properly threaded into the terminal block. Before tightening each screw that you insert into the terminal block, ensure that you are able to spin the screw freely with your fingers. Applying installation torque to the screw when improperly threaded might damage the terminal block.
>
> The maximum torque rating of the terminal block on the DC power supply is 6 lb-in. (0.7 Nm). Excessive torque can damage the terminal block. Use only a Phillips (+) number 2 screwdriver to tighten screws on the DC power supply terminal block.

7. Secure each power cable lug to the terminal block by using the screws and a Phillips (+) number 2 screwdriver. Do not overtighten the screws. Apply between 5 lb-in. (0.6 Nm) and 6 lb-in. (0.7 Nm) of torque to each screw (see Figure 42 on page 98).

    When connecting DC power, the proper wiring sequence is ground to ground, then +RTN to +RTN, and finally −48 V to −48 V.

Figure 42: Connect Power to a DC-Powered Switch
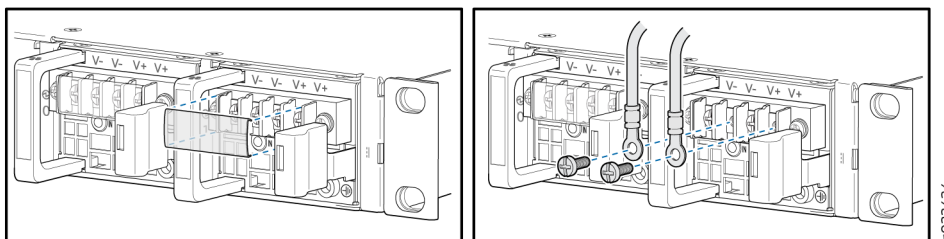
a. Secure the positive (+) DC source power cable lug to the return terminal (labeled **V+**).

b. Secure the negative (−) DC source power cable lug to the −48V terminal (labeled **V−**).

8. Replace the clear plastic cover over the terminal block.

9. Verify that the power cables are connected correctly, that they do not touch or block access to switch components, and that they do not drape where people could trip on them.

10. Connect the console port on the switch (labeled **CON**) to the external management device.

11. Turn on power to the external management device.

12. If the DC power source outlet has a power switch, set it to the on position.

> **NOTE**: After powering off a power supply, wait at least five seconds before turning it back on. After powering on a power supply, wait at least five seconds before turning it off.
>
> If the switch is completely powered off when you power on the power supply, the Routing Engine boots as the power supply completes its startup sequence. If the Routing Engine finishes booting and you need to power off the system again, first issue the CLI `request vmhost power-off` command. After a power supply is powered on, it can take up to five seconds for status indicators—such as the LEDs on the power supply and the `show chassis` command display—to indicate that the power supply is functioning normally. Ignore error indicators that appear during the first five seconds.

13. If the power supply is installed correctly and functioning normally, the input status LED labeled **IN** and output status LED labeled **OUT** on the power supply faceplate are on and steadily lit green, and the alarm LED (labeled **!**) is not lit.

14. On the external management device, monitor the startup process to verify that the switch has booted properly.

Connecting the EX9251 to External Devices

IN THIS SECTION

Connect a Device to a Network for Out-of-Band Management

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end. shows the RJ-45 connector of the Ethernet cable supplied with the device.

Figure 43: RJ-45 Connector on an Ethernet Cable

You can monitor and manage these devices by using a dedicated management channel. Each device has a management port to which you can connect an Ethernet cable with an RJ-45 connector. Use the management port to connect the device to the management device.

To connect a device to a network for out-of-band management (see):

1. Connect one end of the Ethernet cable to the management port on the device.
2. Connect the other end of the Ethernet cable to the management device.

Figure 44: Connect a Device to a Network for Out-of-Band Management
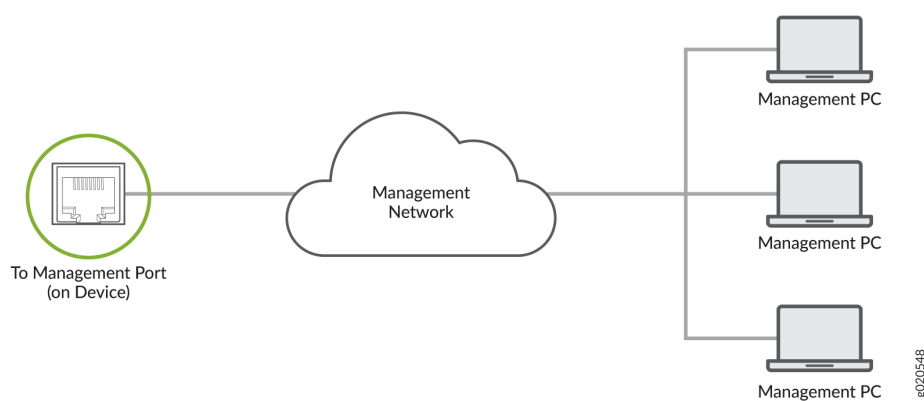
Connect a Device to a Management Console Using an RJ-45 Connector

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end. One such cable and an RJ-45-to-DB-9 serial port adapter are supplied with the device.

shows the RJ-45 connector on the Ethernet cable.

Figure 45: RJ-45 Connector on an Ethernet Cable

> **NOTE**: If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC directly to the device, use a combination of the RJ-45-to-DB-9 socket adapter supplied with the device and a USB-to-DB-9 plug adapter. You must provide the USB-to-DB-9 plug adapter.

You can configure and manage devices using a dedicated management channel. Each device has a console port that you can connect to using an Ethernet cable with an RJ-45 connector. Use the console port to connect the device to the console server or management console. The console port accepts a cable that has an RJ-45 connector.

To connect the device to a management console (see and):

1. Connect one end of the Ethernet cable to the console port (labeled **CON**, **CONSOLE**, or **CON1**) on the device.

2. Connect the other end of the Ethernet cable to the console server (see) or management console (see).

Figure 46: Connect a Device to a Management Console Through a Console Server
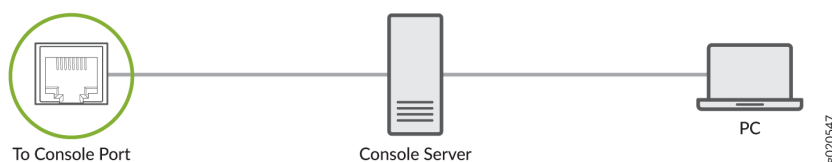
Figure 47: Connect a Device Directly to a Management Console
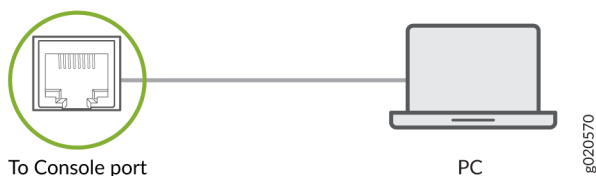
Connecting the EX9251 Switch to External Clocking and Timing Devices

IN THIS SECTION

-
-
-

EX9251 switches support external clock synchronization for Synchronous Ethernet and external inputs. The connections to the switch are made through the front panel. shows the ports that are used to connect the switch to external clocking and timing devices.

Figure 48: Ports Used to Connect the Switch to External Clocking and Timing Devices

1– PTP grandmaster clock (GM/PTP) port	4– 10 MHz GPS input and output timing ports
2– BITS ports with LEDs	5– 1PPS GPS input and output timing ports
3– Time of day (ToD) port with LED	
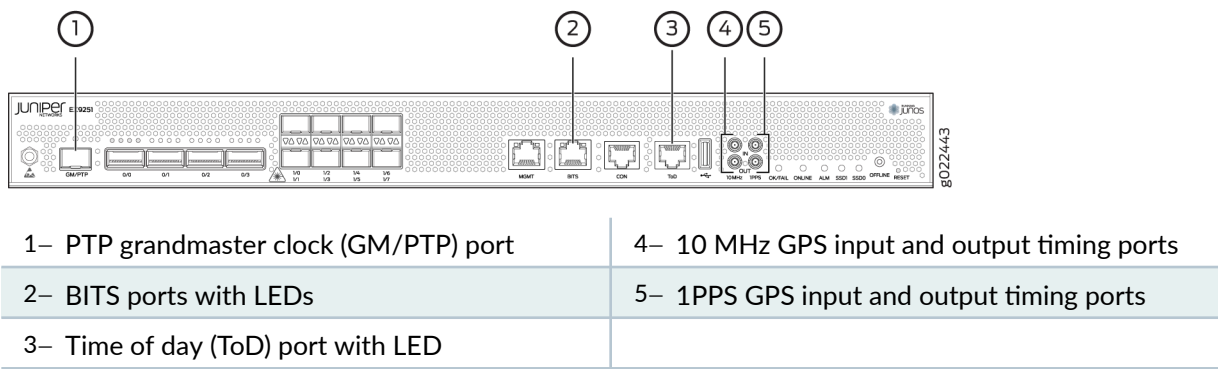
Connecting 1-PPS and 10-MHz Timing Devices to the Switch

The switch has four SubMiniature B (SMB) connectors that support 1-PPS and 10-MHz timing devices.

> **NOTE**: Ensure that a cable of 3 m or less in length is used for the 10-MHz and 1-PPS connectors.

To connect the SMB coaxial cable to the external clocking input port:

1. Connect one end of the SMB coaxial cable to either the 1-PPS SMB connector or the 10-MHz SMB connector on the switch.
2. Connect the other end of the SMB coaxial cable to the 10-MHz or 1-PPS source network equipment.

> **NOTE**: Ensure that the 10-MHz or 1-PPS source network equipment contains low voltage complementary metal oxide semiconductor (LVCMOS) or is compatible with low-voltage (3.3 V) transistor–transistor logic (LVTTL).

Table 35: Clocking Port on an EX9251 Switch

Callout	Label	Description
4 and 5 (See Figure 48 on page 103)	10MHz 1PPS	GPS input and output ports.

Connecting a Time-of-Day Device to the Switch

A time-of-day port labeled **ToD**, on the front panel of the switch enables you to connect external timing devices.

To connect the switch to a ToD external timing device:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Plug one end of an RJ-45 cable into the **ToD** port on the front panel of the switch.
3. Plug the other end of the RJ-45 cable into the ToD timing device.
4. Verify that the LEDs for the **ToD** port on the switch are lit steadily green.
5. Configure the port.

Table 36: Time-of-Day Port on an EX9251 Switch

Callout	Label	Description
3 (See Figure 48 on page 103)	**ToD**	ToD RJ-45 port with LED.

Connecting a BITS External Clocking Device to the Switch

The switch has an external building-integrated timing supply (BITS) port, labeled **BITS**, on the front panel of the switch.

To connect the switch to a BITS external clocking device:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Plug one end of an RJ-45 cable into the internal clock port on the front panel.
3. Plug the other end of the RJ-45 cable into the BITS external clocking device.

4. Verify that the LEDs for the **BITS** port are lit steadily green.

5. Configure the port.

Table 37: BITS Port on an EX9251 Switch

Callout	Label	Description
2 (See Figure 48 on page 103)	**BITS**	Building-Integrated Timing Supply (BITS) clock interface port with LED.

Connect a Device to a Network for Out-of-Band Management

Connect a Device to a Management Console Using an RJ-45 Connector

Connecting the EX9251 to the Network

IN THIS SECTION

- Install a Transceiver | **105**
- Connect a Fiber-Optic Cable | **108**

Install a Transceiver

Before you install a transceiver in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

Ensure that you have a rubber safety cap available to cover the transceiver.

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting the device functions.

NOTE: After you insert a transceiver or after you change the media-type configuration, wait for 6 seconds for the interface to display operational commands.

NOTE: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

CAUTION: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.

Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To install a transceiver:

CAUTION: To prevent electrostatic discharge (ESD) damage to the transceiver, do not touch the connector pins at the end of the transceiver.

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

2. Remove the transceiver from its bag.

3. Check to see whether the transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a rubber safety cap.

> ☀ **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

4. If the port in which you want to install the transceiver is covered with a dust cover, remove the dust cover and save it in case you need to cover the port later. If you are hot-swapping a transceiver, wait for at least 10 seconds after removing the transceiver from the port before installing a new transceiver.

5. Using both hands, carefully place the transceiver in the empty port. The connectors must face the chassis.

> ⚠ **CAUTION**: Before you slide the transceiver into the port, ensure that the transceiver is aligned correctly. Misalignment might cause the pins to bend, making the transceiver unusable.

6. Slide the transceiver in gently until it is fully seated. If you are installing a CFP transceiver, hand tighten the captive screws on the transceiver.

7. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

> ☀ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

> ⚠ **CAUTION**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

8. If there is a cable management system, arrange the cable in the cable management system to prevent the cable from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs toward the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

> ⚠️ **CAUTION**: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

> ⚠️ **CAUTION**: Avoid bending fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

Figure 49: Install a Transceiver
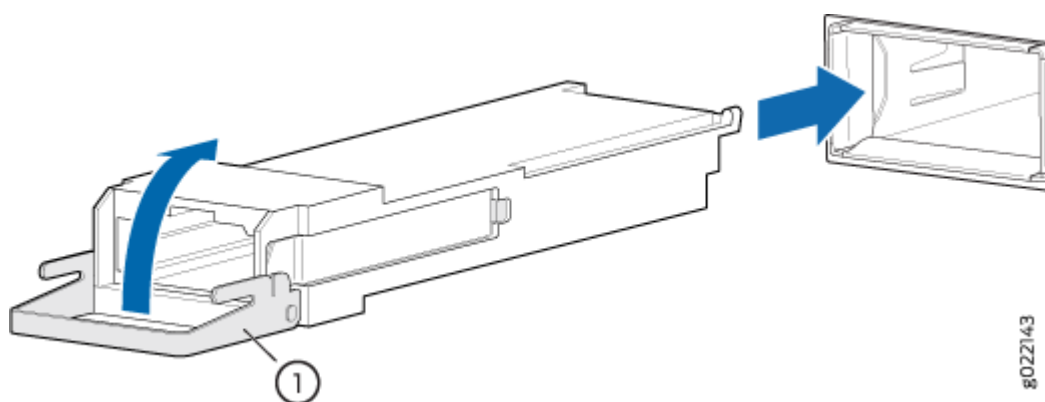
1– Ejector lever

Connect a Fiber-Optic Cable

Before you connect a fiber-optic cable to an optical transceiver installed in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

To connect a fiber-optic cable to an optical transceiver installed in a device:

> ⚠️ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

1. If the fiber-optic cable connector is covered with a rubber safety cap, remove the cap. Save the cap.

2. Remove the rubber safety cap from the optical transceiver. Save the cap.

3. Insert the cable connector into the optical transceiver (see).

Figure 50: Connect a Fiber-Optic Cable to an Optical Transceiver Installed in a Device
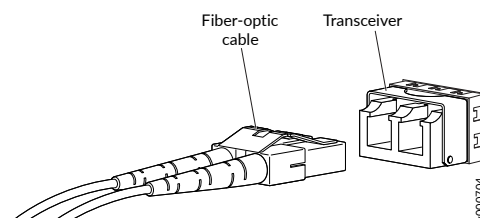
4. Secure the cables so that they do not support their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps cables maintain their shape.

> ⚠️ **CAUTION**: Do not bend fiber-optic cables beyond their minimum bend radius. An arc smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.
>
> Do not let fiber-optic cables hang free from the connector. Do not allow fastened loops of cables to dangle, which stresses the cables at the fastening point.

Configuring Junos OS on the EX9251

IN THIS SECTION

EX9251 Switch Default Configuration

Each EX9251 switch is programmed with a factory default configuration that contains the values set for each configuration parameter when a switch is shipped. The default configuration file sets values for system parameters such as the system log and file messages.

When you commit changes to the configuration, a new configuration file is created that becomes the active configuration. You can always revert to the factory default configuration. See *Reverting to the Default Factory Configuration for the EX Series Switch*.

This topic shows the factory default configuration file of an EX9251 switch:

```
system {
    syslog {
        user * {
            any emergency;
        }
        file messages {
            any notice;
            authorization info;
        }
        file interactive-commands {
            interactive-commands any;
        }
    }
    commit {
        factory-settings;
    }
}
```

Connecting and Configuring an EX9251 Switch (CLI Procedure)

Before you begin connecting and configuring an EX9251 switch, gather the following information:

- Name the switch will use on the network

- Domain name the switch will use

- IP address and prefix length information for the Ethernet interface

- IP address of a default switch

- IP address of a DNS server

- Password for the root user

The EX9251 switch is shipped with the Junos OS preinstalled and ready to be configured when the switch is powered on. There are two 16-MB internal NAND Flash memory devices located on the

baseboard for BIOS storage. You can insert the USB storage device into the USB slot on the front panel. The switch also has two built-in M.2-based solid-state drives (SSDs) (labeled **SSD0** and **SSD1**). There are three copies of the software: one each on the SSD drives and one on a USB flash drive that can be inserted into the slot in the faceplate of the RE module.

When the switch boots, it first attempts to start the image on the USB flash drive. If there is no USB flash drive installed or if the attempt otherwise fails, the switch next attempts to start the software from the SSD installed in slot **SSD0**, and finally from the SSD installed in slot **SSD1**.

You configure the switch by issuing Junos OS command-line interface (CLI) commands, either on a console device attached to the console (**CON**) port on the front panel, or over a telnet connection to a network connected to the Ethernet management (**MGMT**) port on the front panel.

This procedure connects the switch to the network, but does not enable it to forward traffic. For complete information about enabling the switch to forward traffic, including examples, see the Junos OS configuration guides.

To configure the software:

1. Verify that the switch is powered on.
2. Log in as the *root* user. There is no password.
3. Start the CLI.

```
root# cli
root@>
```

4. Enter configuration mode.

```
cli> configure
[edit]
root@#
```

5. Set the root authentication password by entering either a clear-text password, an encrypted password, or an SSH public key string (DSA or RSA).

```
[edit]
root@# set system root-authentication plain-text-password
New password: password
Retype new password: password
```

or

```
[edit]
root@# set system root-authentication encrypted-password encrypted-password
```

or

```
[edit]
root@# set system root-authentication ssh-dsa public-key
```

or

```
[edit]
root@# set system root-authentication ssh-rsa public-key
```

6. Configure the name of the switch. If the name includes spaces, enclose the name in double quotation marks (" ").

```
[edit]
root@# set system host-name host-name
```

7. Create a user account.

```
[edit]
root@# set system login user user-name authentication plain-text-password
New password: password
Retype new password: password
```

8. Set the user account class to super-user.

```
[edit]
root@# set system login user user-name class super-user
```

9. Configure the switch's domain name.

```
[edit]
root@# set system domain-name domain-name
```

10. Configure the IP address and prefix length for the switch's Ethernet interface.

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

11. Configure the IP address of a backup router, which is used only while the routing protocol is not running.

```
[edit]
root@# set system backup-router address
```

12. Configure the IP address of a DNS server.

```
[edit]
root@# set system name-server address
```

13. (Optional) Configure the static routes to remote subnets with access to the management port. Access to the management port is limited to the local subnet. For more information about static routes, see the Junos OS Administration Library for Routing Devices.

```
[edit]
root@# set routing-options static route remote-subnet next-hop destination-IP retain no-
readvertise
```

14. Configure the telnet service at the [edit system services] hierarchy level.

```
[edit]
root@# set system services telnet
```

15. (Optional) Display the configuration to verify that it is correct.

```
[edit]
root@# show
system {
    host-name host-name;
    domain-name domain-name;
    root-authentication {
        authentication-method (password | public-key);
    }
```

```
        name-server {
            address;
        }
    }
    interfaces {
        fxp0 {
            unit 0 {
                family inet {
                    address address/prefix-length;
                }
            }
        }
    }
```

16. Commit the configuration to activate it on the switch.

```
[edit]
root@# commit
```

17. (Optional) Configure additional properties by adding the necessary configuration statements. Then commit the changes to activate them on the switch.

```
[edit]
root@switch# commit
```

18. When you have finished configuring the switch, exit configuration mode.

```
[edit]
root@switch# exit
root@switch>
```

NOTE: Ensure that the removable storage media that contains a copy of Junos OS is not installed in the switch except when you want to install Junos OS from the storage media. If the storage media is installed during normal operation and if the switch is rebooted intentionally or accidentally (for example, as a result of a power outage), the configuration in the switch is deleted and the copy of the software in the storage media is installed in the switch.

4

CHAPTER

Maintaining Components

Routine Maintenance Procedures for EX9251 Switches

Routine Maintenance Procedures for EX9251 Switches

Purpose

For optimum performance of an EX9251 switch, perform preventive maintenance procedures.

Action

- Inspect the installation site for moisture, loose wires or cables, and excessive dust. Make sure that airflow is unobstructed around the switch and into the air intake vents.

- Check the status-reporting devices on the front panel in EX9251 switches—alarms and LEDs.

- Inspect the air filter or fan tray at the rear of the switch, replacing it every 6 months for optimum cooling system performance. Do not run the switch for more than a few minutes without the air filter or fan tray in place.

Maintaining the Routing Engine in EX9251 Switches

For optimum switch performance, verify the condition of the Routing Engine on a regular basis.

On a regular basis:

- Check the LEDs on the front panel to view information about the status of the Routing Engine.

- To check the status of the Routing Engine on the switch, issue the `show chassis routing-engine` command. The output is similar to the following:

```
user@host> show chassis routing-engine
Routing Engine status:
    Temperature                 42 degrees C / 107 degrees F
    CPU temperature             42 degrees C / 107 degrees F
    DRAM                      16340 MB (16384 MB installed)
    Memory utilization           6 percent
    5 sec CPU utilization:
      User                       2 percent
      Background                 0 percent
      Kernel                    19 percent
      Interrupt                  0 percent
      Idle                      79 percent
    1 min CPU utilization:
      User                       2 percent
      Background                 0 percent
      Kernel                    19 percent
      Interrupt                  0 percent
      Idle                      79 percent
    5 min CPU utilization:
      User                       2 percent
      Background                 0 percent
      Kernel                    19 percent
      Interrupt                  0 percent
    15 min CPU utilization:
      User                       2 percent
      Background                 0 percent
      Kernel                    19 percent
      Interrupt                  0 percent
      Idle                      79 percent
    Model                         EX9251-RE
    Start time                    2018-03-07 11:37:14 UTC
    Uptime                        5 days, 22 hours, 35 minutes, 51 seconds
```

```
Last reboot reason              0x2000:hypervisor reboot
Load averages:                  1 minute   5 minute  15 minute
                                   1.02       1.03      1.0533
```

Maintaining the EX9251 Cooling System

Removing a Fan Tray from an EX9251 Switch

Before you remove a fan tray:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- Phillips (+) screwdriver, number 2

- A replacement fan tray

The fan tray in an EX9251 switch is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions.

> ⚠️ **CAUTION**: Do not remove the fan tray unless you have a replacement fan tray available.

To remove a fan tray from an EX9251 switch chassis (see Figure 51 on page 119):

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

2. Loosen the screw on the fan tray faceplate using the Phillips (+) screwdriver, number 2.

> ⚡ **WARNING**: To avoid injury, keep tools and your fingers away from the fans as you slide the fan tray out of the chassis. The fans might still be spinning.

3. Hold and press the latch located on the inside of the fan tray to release it from the chassis.

4. Grasp the fan tray handle, and pull it out approximately 1 to 3 inches.

5. Place one hand under the fan tray to support it, and pull the fan tray completely out of the chassis.

Figure 51: Removing a Fan Tray from an EX9251 Switch
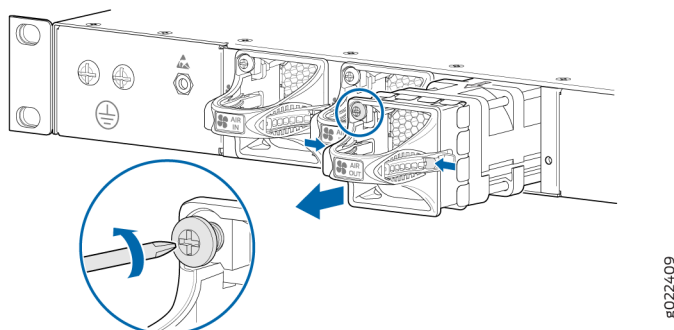
Installing a Fan Tray in an EX9251 Switch

Before you begin to install a fan tray:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- Phillips (+) screwdriver, number 2

> ⚠ **CAUTION**: You can remove and replace the fan tray while the switch is operating. However, you must replace the fan tray within two minutes of removing the fan tray to prevent the chassis from overheating.

The fan tray in an EX9251 switch is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions.

To install a fan tray in an EX9251 switch (see Figure 52 on page 120):

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Grasp the fan tray handle, and place one hand under the fan tray for support.
3. Place the fan tray on the respective slot, and carefully push the fan tray into the chassis until the socket lock snaps into place and holds it.
4. Tighten the screw on the fan tray faceplate using the Phillips (+) screwdriver, number 2 to secure the fan tray in the chassis.

Figure 52: Installing a Fan Tray in an EX9251 Switch
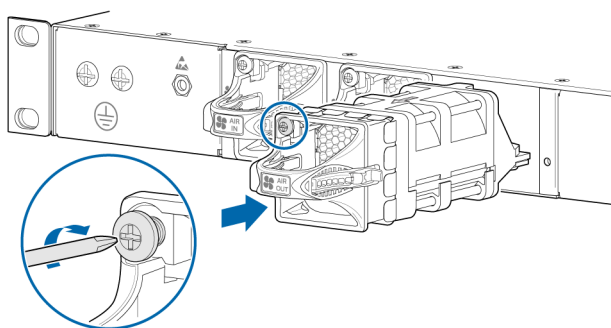
> **NOTE**: If you have a Juniper J-Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/ . Failure to do so can result in significant delays if you need replacement parts. This note does not apply if you replace existing components with the same type of component.

Maintaining Fan Trays in EX9251 Switches

Purpose

For optimum cooling, verify the condition of the fans.

Action

- Monitor the status of the fans. A fan tray contains multiple fans that work in unison to cool the switch components. If one fan fails, the speed of the remaining fans is adjusted to maintain proper cooling. A major alarm is triggered when a fan fails and a minor alarm and a major alarm are triggered when a fan tray is removed.

- To display the status of the cooling system, issue the `show chassis environment` command. The output for EX9251 switches is similar to the following:

```
user@switch> show chassis environment
Class Item                         Status     Measurement
Temp  CB 0 Top Right Inlet Sensor    OK         6 degrees C / 42 degrees F
      CB 0 Top Left Inlet Sensor     OK         7 degrees C / 44 degrees F
      CB 0 Top Right Exhaust Sensor  OK         13 degrees C / 55 degrees F
      CB 0 Top Left Exhaust Sensor   OK         29 degrees C / 84 degrees F
      CB 0 CPU Core-0 Temp           OK         17 degrees C / 62 degrees F
      CB 0 CPU Core-1 Temp           OK         17 degrees C / 62 degrees F
      CB 0 CPU Core-2 Temp           OK         17 degrees C / 62 degrees F
      CB 0 CPU Core-3 Temp           OK         17 degrees C / 62 degrees F
      CB 0 CPU Core-4 Temp           OK         15 degrees C / 59 degrees F
      CB 0 CPU Core-5 Temp           OK         16 degrees C / 60 degrees F
```

```
        CB 0 CPU Core-6 Temp          OK          16 degrees C / 60 degrees F
        CB 0 CPU Core-7 Temp          OK          16 degrees C / 60 degrees F
        FPC 0 EA0_HMC0 Logic die      OK          42 degrees C / 107 degrees F
        FPC 0 EA0_HMC0 DRAM botm      OK          39 degrees C / 102 degrees F
        FPC 0 EA0_HMC1 Logic die      OK          45 degrees C / 113 degrees F
        FPC 0 EA0_HMC1 DRAM botm      OK          42 degrees C / 107 degrees F
        FPC 0 EA0 Chip                OK          58 degrees C / 136 degrees F
        FPC 0 EA0-XR0 Chip            OK          34 degrees C / 93 degrees F
        FPC 0 EA0-XR1 Chip            OK          34 degrees C / 93 degrees F
Power PEM 0                           OK
      PEM 1                           OK
Fans  Fan Tray 0 Fan 0               OK          Spinning at normal speed
      Fan Tray 0 Fan 1               OK          Spinning at normal speed
      Fan Tray 1 Fan 0               OK          Spinning at normal speed
      Fan Tray 1 Fan 1               OK          Spinning at normal speed
      Fan Tray 2 Fan 0               OK          Spinning at normal speed
      Fan Tray 2 Fan 1               OK          Spinning at normal speed
```

Maintaining the EX9251 Power System

IN THIS SECTION

Powering Off an EX9251 Switch

Before you power off an EX9251 switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

- Ensure that you have the following parts and tools available to power off an EX9251 switch:

  - An ESD wrist strap

  - An external management device such as a PC

  - The appropriate cable to connect the external management device to the console port labeled **CON** on the switch

> **NOTE**: After powering off a power supply, wait at least five seconds before turning it back on.

To power off the switch:

1. Connect a management device to the console (see *Connect a Device to a Management Console Using an RJ-45 Connector*).

2. On the external management device connected to the switch, issue the `request vmhost power-off` command.

```
user@host> request vmhost power-off
Power-off the vmhost ? [yes,no] (no) yes
```

The switch shuts down and the console displays the message `Power down`.

To power on the switch again, press the button labeled **OFFLINE** on the front panel of the switch for one second.

You can take the switch offline by pressing the button labeled **OFFLINE** on the front panel of the switch for three seconds. If the switch is offline, you can bring it online by pressing the button labeled **OFFLINE** for one second.

You can reset the switch by pressing the button labeled **RESET** on the front panel of the switch. You must not use any sharp object to press the **RESET** button. You can use any blunt object of 1.5 mm diameter to operate the **RESET** button.

Removing an AC Power Supply from an EX9251 Switch

Before you remove an AC power supply from the switch:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage 9(ee *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- A replacement power supply or a cover panel for the power supply slot

The AC power supply in an EX9251 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You remove AC power supplies from the rear of the chassis.

> ⚠️ **CAUTION**: Before you remove a power supply, ensure that you have power supplies sufficient to power the switch that remains in the chassis (see "Power Requirements for EX9251 Switch Components" on page 31).

> ⚠️ **CAUTION**: Do not leave the power supply slot empty for a long time while the switch is operational. Either replace the power supply unit promptly or install a cover panel over the empty slot.

> **NOTE**: After powering off a power supply, wait for at least 60 seconds before turning it back on.

To remove an AC power supply from an EX9251 switch (see Figure 53 on page 125):

1. Switch off the dedicated customer-site circuit breaker for the power supply, and remove the power cord from the AC power source. Follow the instructions for your site.
2. Verify that the input status LED on the power supply is not lit.
3. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
4. Remove the power cord from the AC appliance inlet on the AC power supply faceplate.
5. Press the release latch on the side of the AC power supply to disconnect the power supply from the chassis.
6. Pull the power supply straight out of the chassis.

7. Either replace the power supply promptly or install a cover panel over the empty slot.

Figure 53: Removing an AC Power Supply from an EX9251 Switch
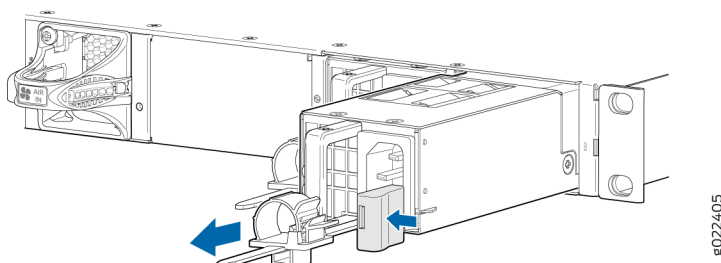
Installing an AC Power Supply in an EX9251 Switch

Before you install an AC power supply in the switch:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- Phillips (+) screwdriver, number 2 (not provided)

The AC power supply in an EX9251 switch is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You can install up to two AC power supplies in an EX9251 switch. The power supplies install in the slots on the rear panel of the chassis.

> ⚠ **CAUTION**: EX9251 switches use either AC or DC power supplies. Do not mix AC and DC power supplies in a switch.

> **NOTE**: Each AC power supply must be connected to a dedicated AC power source outlet.

To install an AC power supply in an EX9251 switch (see):

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

2. If the power supply slot has a cover panel on it, unscrew the screw on the side of the cover panel in the counterclockwise direction using the screwdriver, and remove the cover panel. Save the cover panel for later use.

3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.

4. Using both hands, hold and slide the AC power supply straight into the chassis until the power supply is fully seated in the power supply slot. The power supply faceplate must align with the power supply faceplate or the cover panel installed in the adjacent power supply slot.

Figure 54: Installing an AC Power Supply in an EX9251 Switch
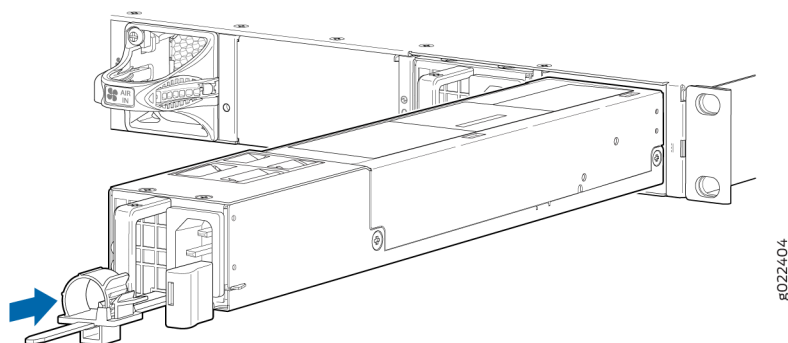
NOTE: If you have a Juniper J-Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/ . Failure to do so can result in significant delays if you need replacement parts. This note does not apply if you replace existing components with the same type of component.

To connect power to an AC power supply, see "Connecting AC Power to an EX9251 Switch and Powering on the Switch" on page 92.

SEE ALSO

Power Supplies in an EX9251 Switch | 23

Removing a DC Power Supply from an EX9251 Switch

Before you remove a DC power supply from the switch:

- Ensure that you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- A socket screwdriver

- A replacement power supply or cover panel for the power supply slot

The DC power supply in an EX9251 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You remove DC power supplies from the rear of the chassis.

> ⚠️ **CAUTION**: Before you remove a power supply, ensure that you have power supplies sufficient to power the switch that remains in the chassis. See "Power Requirements for EX9251 Switch Components" on page 31.

> ⚠️ **CAUTION**: Do not leave the power supply slot empty for a long time while the switch is operational. Either replace the power supply unit promptly or install a cover panel over the empty slot.

> ⚡ **WARNING**: Before you perform DC power procedures, ensure there is no power to the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position.

> **NOTE**: After powering off a power supply, wait for at least five seconds before turning it back on.

To remove a DC power supply from an EX9251 switch (see Figure 56 on page 128):

1. Switch off the dedicated customer site circuit breaker for the power supply being removed. Follow your site's procedures for ESD.
2. Make sure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cables might become active during the removal process.
3. Verify that the input status LED on the power supply is not lit.
4. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
5. Move the DC circuit breaker on the DC power supply faceplate to the off position.

6. Remove the clear plastic cover protecting the terminal studs on the faceplate.

7. Using a socket screwdriver, remove the screws from the DC power terminals.

8. Remove the cable lugs from the terminal studs.

9. Carefully move the power cables out of the way (see Figure 55 on page 128).

Figure 55: Removing DC Power Cables
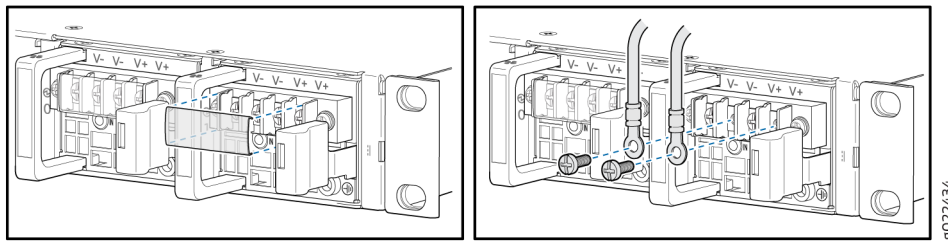
10. Press the latch located on the DC power supply, to release it from the chassis.

11. Pull the power supply straight out of the chassis.

12. Either replace a power supply promptly or install a cover panel over the empty slot.

Figure 56: Removing a DC Power Supply from an EX9251 Switch
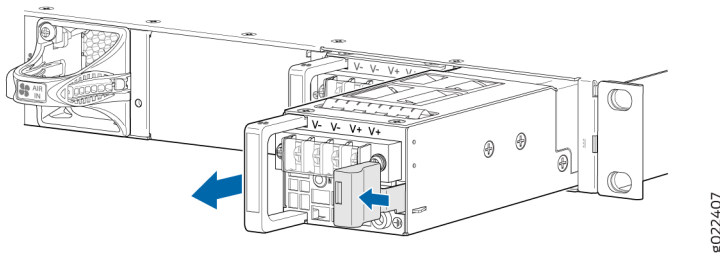
Installing a DC Power Supply in an EX9251 Switch

Before you install a DC power supply in the switch:

- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

- Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.

Ensure that you have the following parts and tools available:

- An ESD wrist strap

- Phillips (+) screwdriver, number 1 and 2

The DC power supply in an EX9251 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it while the switch is running without turning off power to the switch or disrupting switching functions. You can install up to two DC power supplies in an EX9251 switch. All DC power supplies install in the slots on the rear panel of the chassis.

CAUTION: EX9251 switches use either AC or DC power supplies. Do not mix AC and DC power supplies in a switch.

WARNING: Before you perform DC power procedures, ensure there is no power to the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position.

To install a DC power supply in an EX9251 switch (see):

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

2. If the power supply slot has a cover panel on it, unscrew the screw on the side of the cover panel in the counterclockwise direction using the screwdriver, and remove the cover panel. Save the cover panel for later use.

3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.

4. Move the DC circuit breaker on the power supply faceplate to the off position.

5. Using both hands, hold and slide the DC power supply straight into the chassis until the power supply is fully seated in the power supply slot. The power supply faceplate must align with the power supply faceplate or the cover panel installed in the adjacent power supply slot.

Figure 57: Installing a DC Power Supply in an EX9251 Switch
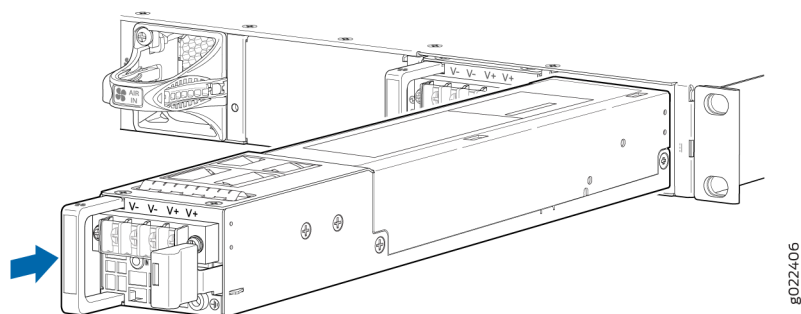
NOTE: If you have a Juniper J-Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/ . Failure to do so can result in significant delays if you need replacement parts. This note does not apply if you replace existing components with the same type of component.

To connect power to a DC power supply, see "Connecting DC Power to an EX9251 Switch and Powering on the Switch" on page 95.

SEE ALSO

Power Supplies in an EX9251 Switch | **23**

Maintaining Power Supplies in EX9251 Switches

IN THIS SECTION

- Purpose | **131**
- Action | **131**

Purpose

For optimum switch performance, verify the condition of the installed power supplies.

Action

On a regular basis:

- Check the status of the power supplies by issuing the `show chassis environment pem` command. The output for EX9251 switches is similar to the following:

```
user@switch> show chassis environment pem
PEM 0 status:
  State                    Online
  Airflow                  Front to Back
  Temperature              OK   21 degrees C / 69 degrees F
  Temperature              OK   13 degrees C / 55 degrees F
  Fan Sensor               4200 RPM
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                        12.00     8              96        3
PEM 1 status:
  State                    Online
  Airflow                  Front to Back
  Temperature              OK   19 degrees C / 66 degrees F
  Temperature              OK   15 degrees C / 59 degrees F
  Fan Sensor               4260 RPM
  DC Output           Voltage(V) Current(A)  Power(W)  Load(%)
                        12.06     7              84        2
```

- Make sure that the power and grounding cables are arranged so that they do not obstruct access to other switch components.

- Routinely check the status LEDs on the power supply faceplates and the front panel in EX9251 switches to determine whether the power supplies are functioning normally.

- Check the alarm LEDs on the front panel in EX9251 switches. Power supply failure or removal triggers an alarm that causes one or both of the LEDs to light. You can display the associated error messages by issuing the following command:

```
user@switch> show chassis alarms
```

- Periodically inspect the site to ensure that the grounding and power cables connected to the switch are securely in place and that there is no moisture accumulating near the switch.

Maintaining Transceivers

IN THIS SECTION

Remove a Transceiver

Before you remove a transceiver from a device, ensure that you have taken the necessary precautions for the safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

Ensure that you have the following parts and tools available:

- An antistatic bag or an antistatic mat

- Rubber safety caps to cover the transceiver and fiber-optic cable connector

- A dust cover to cover the port or a replacement transceiver

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting device functions.

> **NOTE**: After you remove a transceiver, or when you change the media-type configuration, wait for 6 seconds for the interface to display the operational commands.

shows how to remove a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To remove a transceiver from a device:

1. Place the antistatic bag or antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
3. Label the cable connected to the transceiver so that you can reconnect it correctly.

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

> ⚠ **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

> ⚠ **CAUTION**: Do not bend fiber-optic cables beyond their minimum bend radius. An arc smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.

4. Remove the cable connected to the transceiver (see *Disconnect a Fiber-Optic Cable*). Cover the transceiver and the end of each fiber-optic cable connector with a rubber safety cap immediately after disconnecting the fiber-optic cables.
5. If there is a cable management system, arrange the cable in the cable management system to prevent it from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

> ⚠ **CAUTION**: Do not bend the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

6. To remove an SFP, SFP+, XFP, or a QSFP+ transceiver:
   a. Using your fingers, pull open the ejector lever on the transceiver to unlock the transceiver.

> ⚠️ **CAUTION**: Before removing the transceiver, make sure that you open the ejector lever completely until you hear it click. This prevents damage to the transceiver.

b. Grasp the transceiver ejector lever and gently slide the transceiver approximately 0.5 in. (1.3 cm) straight out of the port.

> ⚠️ **CAUTION**: To prevent ESD damage to the transceiver, do not touch the connector pins at the end of the transceiver.

Figure 58: Remove a QSFP+ Transceiver
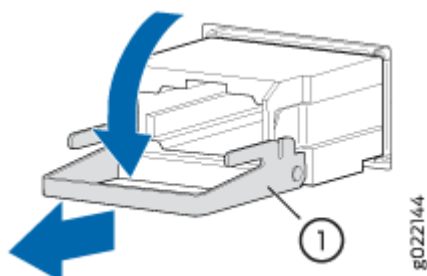
1– Ejector lever

To remove a CFP transceiver:

a. Using your fingers, loosen the screws on the transceiver.

b. Grasp the screws on the transceiver and gently slide the transceiver approximately 0.5 in. (1.3 cm) straight out of the port.

> ⚠️ **CAUTION**: To prevent ESD damage to the transceiver, do not touch the connector pins at the end of the transceiver.

7. Using your fingers, grasp the body of the transceiver and pull it straight out of the port.

8. Place the transceiver in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

9. Place the dust cover over the empty port, or install the replacement transceiver.

Install a Transceiver

Before you install a transceiver in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

Ensure that you have a rubber safety cap available to cover the transceiver.

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting the device functions.

> **NOTE**: After you insert a transceiver or after you change the media-type configuration, wait for 6 seconds for the interface to display operational commands.

> **NOTE**: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

> ⚠️ **CAUTION**: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.
>
> Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

Figure 59 on page 137 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers. Note that this procedure is the same for SFP+ and SFP28 transceivers which will be used in EX4100.

To install a transceiver:

> **CAUTION**: To prevent electrostatic discharge (ESD) damage to the transceiver, do not touch the connector pins at the end of the transceiver.

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Remove the transceiver from its bag.
3. Check to see whether the transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a rubber safety cap.

> **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

4. If the port in which you want to install the transceiver is covered with a dust cover, remove the dust cover and save it in case you need to cover the port later. If you are hot-swapping a transceiver, wait for at least 10 seconds after removing the transceiver from the port before installing a new transceiver.
5. Using both hands, carefully place the transceiver in the empty port. The connectors must face the chassis.

> **CAUTION**: Before you slide the transceiver into the port, ensure that the transceiver is aligned correctly. Misalignment might cause the pins to bend, making the transceiver unusable.

6. Slide the transceiver in gently until it is fully seated. If you are installing a CFP transceiver, hand tighten the captive screws on the transceiver.
7. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

> **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

⚠ **CAUTION**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

8. If there is a cable management system, arrange the cable in the cable management system to prevent the cable from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs toward the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

⚠ **CAUTION**: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

⚠ **CAUTION**: Avoid bending fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

Figure 59: Install a Transceiver
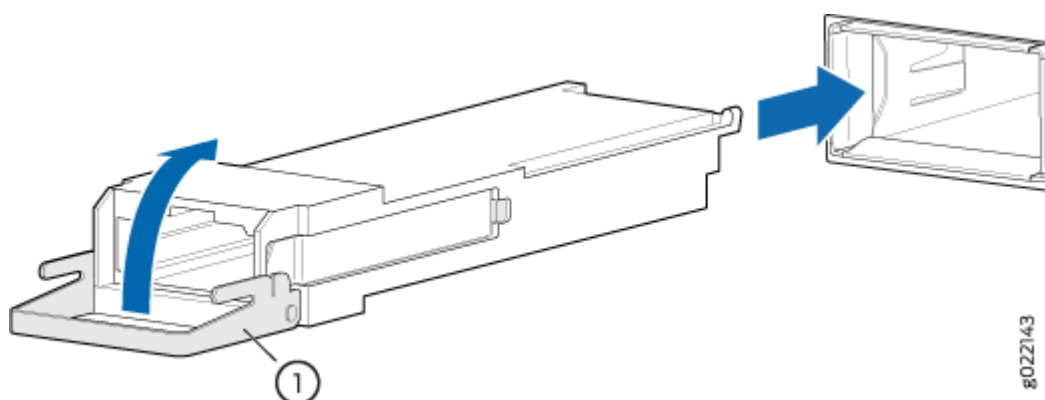
1– Ejector lever

Remove a QSFP28 Transceiver

Before you remove a transceiver from a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

Ensure that you have the following parts and tools available:

- An antistatic bag or an antistatic mat

- Rubber safety caps to cover the transceiver and fiber-optic cable connector

- A dust cover to cover the port or a replacement transceiver

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting the device functions.

> **NOTE**: After you insert a transceiver, or after you change the media-type configuration, wait for 6 seconds for the interface to display operational commands.

> **NOTE**: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

To remove a QSFP28 transceiver (see):

1. Place an antistatic bag or antistatic mat on a flat, stable surface to receive the QSFP28 transceiver. Have a rubber safety cap ready for the QSFP28 transceiver and the cable.

2. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.

3. Label the cable connected to the QSFP28 transceiver so that you can later reconnect it to the correct QSFP28 transceiver.

4. Disconnect the cable from the transceiver. Immediately cover the transceiver and the end of the cable with a rubber safety cap.

> ⚠ **CAUTION**: Do not leave a fiber-optic transceiver uncovered, except when inserting or removing a cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

5. If there is a cable management system, arrange the cable in the cable management system to prevent it from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

> ⚠️ **CAUTION**: Do not bend the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

Figure 60: Remove a QSFP28 Transceiver

Ejector tab   Locking pin   g100163
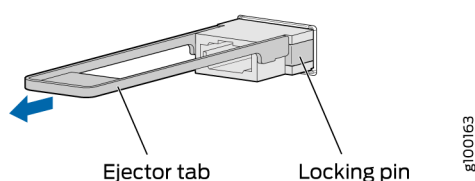
6. Pull the ejector tab straight back. The locking pins on the transceiver automatically release the transceiver.

7. Place the transceiver on the antistatic mat or in the antistatic bag.

8. Place the dust cover over the empty port, or install the replacement transceiver.

Install a QSFP28 Transceiver

Before you install a transceiver in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

Ensure that you have a rubber safety cap available to cover the transceiver.

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting the device functions.

> **NOTE**: After you insert a transceiver or after you change the media-type configuration, wait for 6 seconds for the interface to display operational commands.

> **NOTE**: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

> **CAUTION**: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.
>
> Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

To install a QSFP28 transceiver (see):

1. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
2. Verify that a rubber safety cap covers the QSFP28 transceiver.
3. Position the transceiver in front of the port on the device so that the QSFP28 connector faces the port.

Figure 61: Install a QSFP28 Transceiver

Locking pin

Ejector tab
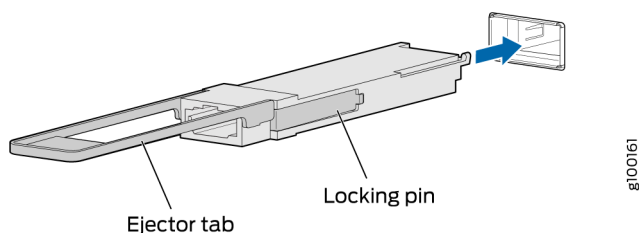
4. Slide the transceiver into the port until the locking pins lock in place. If there is resistance, remove the transceiver and flip it so that the connector faces the other direction.
5. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

> ⚠ **CAUTION**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

6. If there is a cable management system, arrange the cable in the cable management system to prevent the cable from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

> ⚠ **CAUTION**: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

> ⚠ **CAUTION**: Avoid bending fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

Maintain Fiber-Optic Cables

IN THIS SECTION

Connect a Fiber-Optic Cable

Before you connect a fiber-optic cable to an optical transceiver installed in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

To connect a fiber-optic cable to an optical transceiver installed in a device:

> **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

1. If the fiber-optic cable connector is covered with a rubber safety cap, remove the cap. Save the cap.
2. Remove the rubber safety cap from the optical transceiver. Save the cap.
3. Insert the cable connector into the optical transceiver (see Figure 62 on page 142).

Figure 62: Connect a Fiber-Optic Cable to an Optical Transceiver Installed in a Device
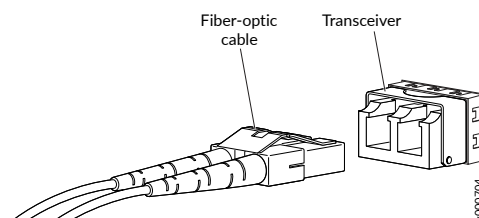
4. Secure the cables so that they do not support their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps cables maintain their shape.

> **CAUTION**: Do not bend fiber-optic cables beyond their minimum bend radius. An arc smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.
>
> Do not let fiber-optic cables hang free from the connector. Do not allow fastened loops of cables to dangle, which stresses the cables at the fastening point.

Disconnect a Fiber-Optic Cable

Before you disconnect a fiber-optic cable from an optical transceiver, ensure that you have taken the necessary precautions for safe handling of lasers. See *Laser and LED Safety Guidelines and Warnings*.

Ensure that you have the following parts and tools available:

- A rubber safety cap to cover the transceiver

- A rubber safety cap to cover the fiber-optic cable connector

Juniper Networks devices have optical transceivers to which you can connect fiber-optic cables.

To disconnect a fiber-optic cable from an optical transceiver installed in the device:

1. Disable the port in which the transceiver is installed by issuing the following command:

   ```
   [edit interfaces]
   user@device# set interface-name disable
   ```

   LASER WARNING: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

2. Carefully unplug the fiber-optic cable connector from the transceiver.
3. Cover the transceiver with a rubber safety cap.

   LASER WARNING: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

4. Cover the fiber-optic cable connector with the rubber safety cap.

How to Handle Fiber-Optic Cables

Fiber-optic cables connect to optical transceivers that are installed in Juniper Networks devices.

Follow these guidelines when handling fiber-optic cables:

- When you unplug a fiber-optic cable from a transceiver, place rubber safety caps over the transceiver and on the end of the cable.

- Anchor fiber-optic cables to prevent stress on the connectors. When attaching a fiber-optic cable to a transceiver, be sure to secure the fiber-optic cable so that it does not support its own weight as it hangs to the floor. Never let a fiber-optic cable hang free from the connector.

- Avoid bending fiber-optic cables beyond their minimum bend radius. Bending fiber-optic cables into arcs smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.

- Frequent plugging and unplugging of fiber-optic cables in and out of optical instruments can damage the instruments, which are expensive to repair. To prevent damage from overuse, attach a short fiber extension to the optical equipment. The short fiber extension absorbs wear and tear due to frequent plugging and unplugging, which is easier and less expensive to replace than the instruments.

- Keep fiber-optic cable connections clean. Microdeposits of oil and dust in the canal of the transceiver or cable connector can cause loss of light, reduction in signal power, and possibly intermittent problems with the optical connection.

  - To clean the transceiver canal, use an appropriate fiber-cleaning device such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the instructions in the cleaning kit you use.

  - After cleaning the transceiver, make sure that the connector tip of the fiber-optic cable is clean. Use only an approved alcohol-free fiber-optic cable cleaning kit such as the Opptex Cletop-S®Fiber Cleaner. Follow the instructions in the cleaning kit you use.

5
CHAPTER

Troubleshooting Hardware

Troubleshooting EX9251 Components

Troubleshooting the Cooling System in an EX9251 Switch

Problem

Description

The fans in the fan trays are not functioning normally.

Cause

Solution

Follow these guidelines to troubleshoot the fans:

- Check the fan tray status LEDs and alarm LED.

If the fan tray status LED glows in red color or the alarm LED glows in red or yellow color, use the CLI to get information about the source of an alarm condition:

```
user@switch> show chassis alarms
```

If the CLI output lists only one fan failure and the other fans are functioning normally, the fan is most likely faulty and you must replace the fan tray.

- Place your hand near the exhaust vents at the side of the chassis to determine whether the fans are pushing air out of the chassis.

- If a fan tray is removed, both a warning alarm and a critical alarm may be displayed.

- The following conditions automatically cause the fans to run at full speed and also trigger the indicated alarm:

  - A fan fails (critical alarm).

  - The switch temperature exceeds the *temperature warm* threshold (warning alarm).

  - The temperature of the switch exceeds the *temperature hot* threshold (critical alarm and automatic shutdown of the power supplies).

SEE ALSO

Maintaining Fan Trays in EX9251 Switches | **121**

Troubleshooting Power Supplies in an EX9251 Switch

IN THIS SECTION

- Problem | **148**
- Cause | **148**
- Solution | **148**

Problem

Description

The power system is not functioning normally.

Cause

Solution

- Check the LEDs on each power supply faceplate.

  - If an AC power supply is correctly installed and functioning normally, the **AC OK** and **DC OK** LEDs light steadily, and the **PS FAIL** LED is not lit.

  - If a DC power supply is correctly installed and functioning normally, the **PWR OK**, **BRKR ON**, and **INPUT OK** LEDs glow steady green.

- Issue the CLI `show chassis environment pem` command to check the status of installed power supplies. As shown in the sample output, the value `Online` in the rows labeled `State` must indicate that each of the power supplies is functioning normally.

  The output for EX9251 switches is similar to the following:

```
user@switch> show chassis environment pem
PEM 0 status:
  State                   Online
  Airflow                 Front to Back
  Temperature             OK   21 degrees C / 69 degrees F
  Temperature             OK   13 degrees C / 55 degrees F
  Fan Sensor              4200 RPM
  DC Output          Voltage(V) Current(A)  Power(W)  Load(%)
                        12.00     8            96        3
PEM 1 status:
  State                   Online
  Airflow                 Front to Back
  Temperature             OK   19 degrees C / 66 degrees F
  Temperature             OK   15 degrees C / 59 degrees F
  Fan Sensor              4260 RPM
  DC Output          Voltage(V) Current(A)  Power(W)  Load(%)
                        12.06     7            84        2
```

If a power supply is not functioning normally, perform the following steps to diagnose and correct the problem:

- If a major alarm condition occurs, issue the `show chassis alarms` command to determine the source of the problem.

- If all power supplies have failed, the system temperature might have exceeded the threshold, causing the system to shut down.

> **NOTE**: If the system temperature exceeds the threshold, Junos OS shuts down all power supplies so that no status is displayed.
>
> Junos OS also can shut down one of the power supplies for other reasons. In this case, the remaining power supplies provide power to the switch , and you can still view the system status through the CLI or display.

- Check that the DC circuit breaker or AC input switch is in the on position and that the power supply is receiving power.

- Verify that the source circuit breaker has the proper current rating. Each power supply must be connected to a separate source circuit breaker.

- Verify that the AC power cord or DC power cables from the power source to the switch are not damaged. If the insulation is cracked or broken, immediately replace the cord or cable.

- Connect the power supply to a different power source with a new power cord or power cables. If the power supply status LEDs indicate that the power supply is not operating normally, the power supply is the source of the problem. Replace the power supply with a spare.

Troubleshoot Temperature Alarms in EX Series Switches

IN THIS SECTION

- Problem | **150**
- Cause | **150**
- Solution | **150**

Problem

Description

EX Series switches trigger a temperature alarm `FPC 0 EX-PFE1 Temp Too Hot` when the switch temperature becomes too hot.

Cause

Temperature sensors in the chassis monitor the temperature of the chassis. The switch triggers an alarm if a fan fails or if the temperature of the chassis exceeds permissible levels for some other reason.

Solution

When the switch triggers a temperature alarm such as the `FPC 0 EX-PFE1 Temp Too Hot` alarm, use the `show chassis environment` and the `show chassis temperature-thresholds` commands to identify the condition that triggered the alarm.

> ⚠️ **CAUTION**: To prevent the switch from overheating, operate it in an area with an ambient temperature within the recommended range. To prevent airflow restriction, allow at least 6 inches (15.2 cm) of clearance around the ventilation openings.

1. Connect to the switch by using Telnet, and issue the `show chassis environment` command. This command displays environmental information about the switch chassis, including the temperature. The command also displays information about the fans, power supplies, and Routing Engines. Following is a sample output on an EX9208 switch. The output is similar on other EX Series switches.

   show chassis environment (EX9208 Switch)

   ```
   user@switch> show chassis environment

   Class Item                      Status     Measurement
   Temp  PEM 0                     OK         40 degrees C / 104 degrees F
         PEM 1                     OK         40 degrees C / 104 degrees F
         PEM 2                     Absent
         PEM 3                     Absent
         Routing Engine 0          OK         37 degrees C / 98 degrees F
         Routing Engine 0 CPU      OK         35 degrees C / 95 degrees F
         Routing Engine 1          Absent
         Routing Engine 1 CPU      Absent
   ```

	CB 0 Intake	OK	36 degrees C / 96 degrees F
	CB 0 Exhaust A	OK	34 degrees C / 93 degrees F
	CB 0 Exhaust B	OK	40 degrees C / 104 degrees F
	CB 0 ACBC	OK	39 degrees C / 102 degrees F
	CB 0 XF A	OK	46 degrees C / 114 degrees F
	CB 0 XF B	OK	45 degrees C / 113 degrees F
	CB 1 Intake	Absent	
	CB 1 Exhaust A	Absent	
	CB 1 Exhaust B	Absent	
	CB 1 ACBC	Absent	
	CB 1 XF A	Absent	
	CB 1 XF B	Absent	
	FPC 3 Intake	OK	48 degrees C / 118 degrees F
	FPC 3 Exhaust A	OK	46 degrees C / 114 degrees F
	FPC 3 Exhaust B	OK	51 degrees C / 123 degrees F
	FPC 3 XL TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XL Chip	OK	58 degrees C / 136 degrees F
	FPC 3 XL_XR0 TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XL_XR0 Chip	OK	51 degrees C / 123 degrees F
	FPC 3 XL_XR1 TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XL_XR1 Chip	OK	63 degrees C / 145 degrees F
	FPC 3 XQ TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XQ Chip	OK	63 degrees C / 145 degrees F
	FPC 3 XQ_XR0 TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XQ_XR0 Chip	OK	68 degrees C / 154 degrees F
	FPC 3 XM TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XM Chip	OK	76 degrees C / 168 degrees F
	FPC 3 XF TSen	OK	67 degrees C / 152 degrees F
	FPC 3 XF Chip	OK	75 degrees C / 167 degrees F
	FPC 3 PLX PCIe Switch TSe	OK	51 degrees C / 123 degrees F
	FPC 3 PLX PCIe Switch Chi	OK	54 degrees C / 129 degrees F
	FPC 3 Aloha FPGA 0 TSen	OK	51 degrees C / 123 degrees F
	FPC 3 Aloha FPGA 0 Chip	OK	70 degrees C / 158 degrees F
	FPC 3 Aloha FPGA 1 TSen	OK	51 degrees C / 123 degrees F
	FPC 3 Aloha FPGA 1 Chip	OK	75 degrees C / 167 degrees F
	FPC 5 Intake	Testing	
	FPC 5 Exhaust A	Testing	
	FPC 5 Exhaust B	Testing	
Fans	Top Rear Fan	OK	Spinning at intermediate-speed
	Bottom Rear Fan	OK	Spinning at intermediate-speed
	Top Middle Fan	OK	Spinning at intermediate-speed
	Bottom Middle Fan	OK	Spinning at intermediate-speed

```
     Top Front Fan                    OK          Spinning at intermediate-speed
     Bottom Front Fan                 OK          Spinning at intermediate-speed
```

lists the output fields for the `show chassis environment` command. The table lists output fields in the approximate order in which they appear.

Table 38: `show chassis environment` Output Fields

Field Name	Field Description
Class	Information about the category or class of chassis component: • `Temp`: Temperature of air flowing through the chassis in degrees Celsius (°C) and degrees Fahrenheit (°F) • `Fans`: Information about the status of fans and blowers
Item	Information about the chassis components: • Flexible PIC Concentrators (FPCs)—that is, the line cards • Control Boards (CBs) • Routing Engines • Power entry modules (PEMs)—that is, the power supplies
Status	Status of the specified chassis component. For example, if `Class` is `Fans`, the fan status can be: • `OK`: The fans are operational. • `Testing`: The fans are being tested during initial power-on. • `Failed`: The fans have failed or the fans are not spinning. • `Absent`: The fan tray is not installed.
Measurement	Depends on the Class. For example, if `Class` is `Temp`, indicates the temperature in degrees Celsius (°C) and degrees Fahrenheit (°F). If the `Class` is `Fans`, indicates actual fan RPM.

2. Issue the command `show chassis temperature-thresholds` . This command displays the chassis temperature threshold settings. Following is a sample output on an EX9208 switch. The output is similar on other EX Series switches.

`show chassis temperature-thresholds` **(EX9208 Switch)**

```
user@ host> show chassis temperature-thresholds
              Fan speed       Yellow alarm       Red alarm       Fire Shutdown
              (degrees C)      (degrees C)       (degrees C)       (degrees C)
Item            Normal  High   Normal  Bad fan   Normal  Bad fan    Normal
Chassis default  48     54      65      55        80      65         100
Routing Engine 0 70     80      95      95        110     110        112
FPC 3            55     60      75      65        105     80         110
FPC 5            55     60      75      65        90      80         95
```

Table 39 on page 153 lists the output fields for the `show chassis temperature-thresholds` command. The table lists output fields in the approximate order in which they appear.

Table 39: `show chassis temperature-thresholds` **Output Fields**

Field Name	Field Description
Item	Chassis component. You can configure the threshold information for components such as the chassis, the Routing Engines, and FPC for each slot in each FRU to display in the output. By default, information is displayed only for the chassis and the Routing Engines.
Fan speed	Temperature thresholds, in degrees Celsius, for the fans to operate at normal and at high speed. • **Normal**—The temperature threshold at which the fans operate at normal speed and when all the fans are present and functioning normally. • **High**—The temperature threshold at which the fans operate at high speed or when a fan has failed or is missing. **NOTE**: An alarm is triggered when the temperature exceeds the threshold settings for a yellow, amber, or red alarm.

Table 39: `show chassis temperature-thresholds` **Output Fields** *(Continued)*

Field Name	Field Description
Yellow or amber alarm	Temperature threshold, in degrees Celsius, that triggers a yellow or amber alarm. • **Normal**—The temperature threshold that must be exceeded on the device to trigger a yellow or amber alarm when the fans are running at full speed. • **Bad fan**—The temperature threshold that must be exceeded on the device to trigger a yellow or amber alarm when one or more fans have failed or are missing.
Red alarm	Temperature threshold, in degrees Celsius, that triggers a red alarm. • **Normal**—The temperature threshold that must be exceeded on the device to trigger a red alarm when the fans are running at full speed. • **Bad fan**—The temperature threshold that must be exceeded on the device to trigger a red alarm when one or more fans have failed or are missing.
Fire shutdown	Temperature threshold, in degrees Celsius, at which the switch shuts down in case of fire.

When a temperature alarm is triggered, you can identify the condition that triggered it by running the `show chassis environment` command to display the chassis temperature values for each component and comparing those with the temperature threshold values. You can display the temperature threshold values by running the `show chassis temperature-thresholds` command.

For example, for `FPC 3`:

• If the temperature of `FPC 3` exceeds 55° C, the output indicates that the fans are operating at a high speed (no alarm is triggered).

• If the temperature of `FPC 3` exceeds 65° C, a yellow alarm is triggered to indicate that one or more fans have failed.

• If the temperature of `FPC 3` exceeds 75° C, a yellow alarm is triggered to indicate that the temperature threshold limit is exceeded.

- If the temperature of `FPC 3` exceeds 80° C, a red alarm is triggered to indicate that one or more fans have failed.

- If the temperature of `FPC 3` exceeds 105° C, a red alarm is triggered to indicate that the temperature threshold limit is exceeded.

- If the temperature of `FPC 3` exceeds 110° C, the switch is powered off.

Table 40 on page 155 lists the possible causes for the switch to generate a temperature alarm. It also lists the respective remedies.

Table 40: Causes and Remedies for Temperature Alarms

Cause	Remedy
Ambient temperature is above threshold temperature.	Ensure that the ambient temperature is within the threshold temperature limit. See *Environmental Requirements and Specifications for EX Series Switches*.
Fan module or fan tray has failed.	Perform the following steps: 1. Check the fan. 2. Replace the faulty fan module or fan tray. 3. If the above two checks show no problems, open a support case using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).
Restricted airflow through the switch due to insufficient clearance around the installed switch.	Ensure that there is sufficient clearance around the installed switch.

6
CHAPTER

Contacting Customer Support and Returning the Chassis or Components

Returning an EX9251 Chassis or Components

Returning an EX9251 Switch or Component for Repair or Replacement

If you need to return a switch or hardware component to Juniper Networks for repair or replacement, follow this procedure:

1. Determine the serial number of the chassis if you need to return the switch. If you need to return one or more components, determine the serial number for each component. For instructions, see "Locating the Serial Number on an EX9251 Switch or Component" on page 158.

2. Obtain an RMA number from JTAC as described in *Contact Customer Support to Obtain Return Material Authorization*.

   > **NOTE**: Do not return any component to Juniper Networks unless you have first obtained an RMA number. Juniper Networks reserves the right to refuse shipments that do not have an RMA. Refused shipments are returned to the customer through collect freight.

3. Pack the switch or component for shipping as described in "Packing an EX9251 Switch or Component" on page 161.

For more information about return and repair policies, see the customer support page at https://www.juniper.net/support/guidelines.html .

Locating the Serial Number on an EX9251 Switch or Component

IN THIS SECTION

If you are returning a switch or hardware component to Juniper Networks for repair or replacement, you must locate the serial number of the switch or component. You must provide the serial number to the Juniper Networks Technical Assistance Center (JTAC) when you contact them to obtain Return Materials Authorization (RMA). See *Contact Customer Support to Obtain Return Material Authorization*.

If the switch is operational and you can access the command-line interface (CLI), you can list serial numbers for the switch and for some components with a CLI command. If you do not have access to the CLI or if the serial number for the component does not appear in the command output, you can locate the serial number ID label on the physical switch or component.

NOTE: If you want to find the serial number on the physical switch component, you will need to remove the component from the switch chassis, for which you must have the required parts and tools available.

Locating the Serial Number ID Label on an EX9251 Switch Chassis

The serial number ID label is located on the top of the chassis on an EX9251 switch (ee Figure 1).

Figure 63: Location of the Serial Number ID Label on EX9251 Switch Chassis
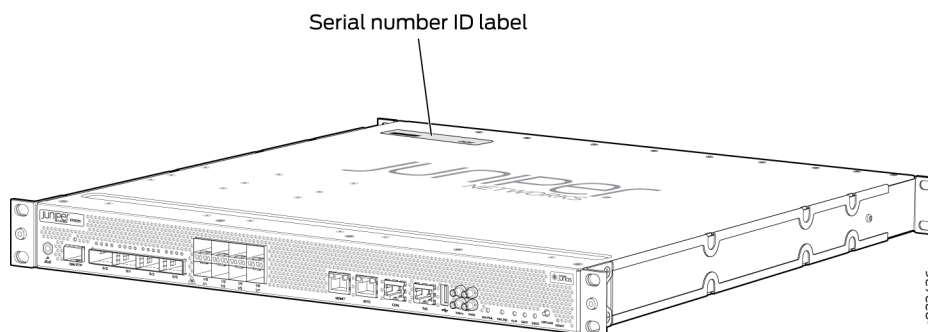
Locating Serial Number ID Labels on FRU Components

The power supplies and fan trays installed in EX9251 switches are field-replaceable units (FRUs). You can remove and replace them without powering off the switch. For each of these FRUs, you must remove the FRU from the switch chassis to see the FRU's serial number ID label.

- Fan tray—The serial number ID label is on the top of the fan tray (see Figure 64 on page 159).

Figure 64: Location of the Serial Number ID Label on a Fan Tray

Serial number ID label

g022437
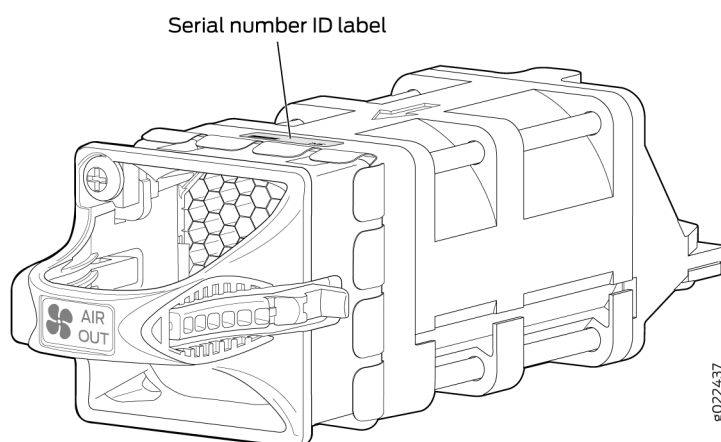
- AC power supply—The serial number ID label is on the top of the AC power supply (see Figure 65 on page 159).

Figure 65: Location of the Serial Number ID Label on an AC Power Supply

Serial number ID label

g022438
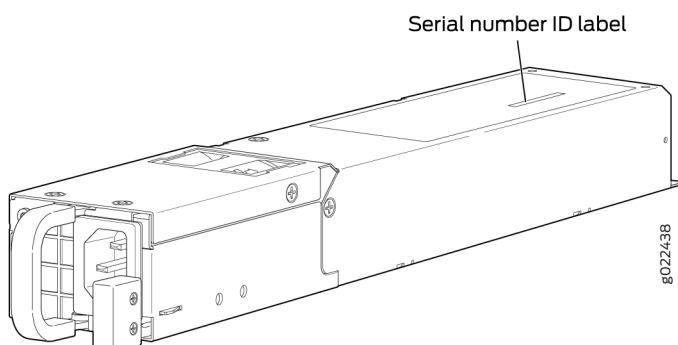
- DC power supply—The serial number ID label is on the top of the DC power supply (see).

Figure 66: Location of the Serial Number ID Label on a DC Power Supply
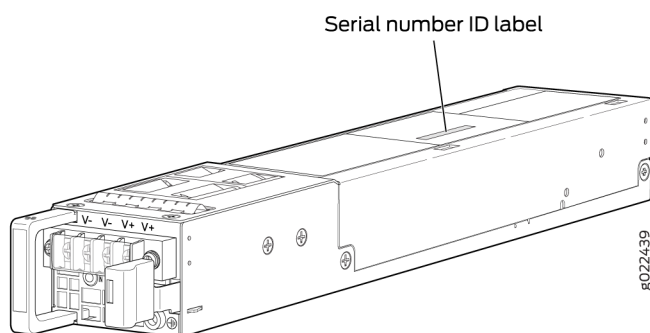
RELATED DOCUMENTATION

Removing an AC Power Supply from an EX9251 Switch **| 123**

Removing a DC Power Supply from an EX9251 Switch **| 126**

Removing a Fan Tray from an EX9251 Switch **| 118**

Contact Customer Support to Obtain a Return Material Authorization

If you need to return a device or hardware component to Juniper Networks for repair or replacement, obtain a Return Material Authorization (RMA) number from Juniper Networks Technical Assistance Center (JTAC). You must obtain an RMA number before you attempt to return the component.

After locating the serial number of the device or hardware component you want to return, open a service request with the Juniper Networks Technical Assistance Center (JTAC) on the Web or by telephone.

Before you request an RMA number from JTAC, be prepared to provide the following information:

- Your existing service request number, if you have one

- Serial number of the component

- Your name, organization name, telephone number, fax number, and shipping address

- Details of the failure or problem

- Type of activity being performed on the device when the problem occurred

- Configuration data displayed by one or more show commands

You can contact JTAC 24 hours a day, seven days a week on the Web or by telephone:

- Service Request Manager: https://support.juniper.net/support

- Telephone: +1-888-314-JTAC (+1-888-314-5822), toll free in U.S., Canada, and Mexico

> **NOTE**: For international or direct-dial options in countries without toll free numbers, see https://support.juniper.net/support.

If you are contacting JTAC by telephone, enter your 12-digit service request number followed by the pound (#) key for an existing case, or press the star (*) key to be routed to the next available support engineer.

The support representative validates your request and issues an RMA number for return of the component.

Packing an EX9251 Switch or Component

IN THIS SECTION

- Packing an EX9251 Switch | **162**
- Packing EX9251 Switch Components for Shipping | **163**

If you are returning an EX9251 switch or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you begin packing the switch or component, ensure you have:

- Followed all the steps listed in *Contact Customer Support to Obtain Return Material Authorization*.

- Retrieved the original shipping carton and packing materials. Contact your JTAC representative if you do not have these materials, to learn about approved packing materials. See *Contact Customer Support to Obtain Return Material Authorization*.

- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

Ensure that you have the following parts and tools available:

- An ESD wrist strap

Packing an EX9251 Switch

If you need to transport the switch to another location or return the switch to Juniper Networks, you need to pack the switch securely in its original packaging to prevent damage during transportation.

To pack the switch for shipment:

1. Retrieve the shipping carton and packing materials in which the switch was originally shipped. If you do not have these materials, contact your Juniper Networks representative about approved packaging materials.
2. On the console or other management device connected to the switch, enter CLI operational mode and issue the following command to shut down the switch software.

```
user@switch> request system halt
```

   Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see the CLI Explorer.
3. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
4. Shut down power to the switch by pressing the AC input switch or DC circuit breaker for all power supplies to the off position.
5. Disconnect power from the switch.
6. Remove the cables that connect to all external devices.
7. Remove all field replaceable units (FRUs) from the switch.
8. Remove the switch from the rack.
9. Place the switch in the shipping carton or onto the pallet. If on a pallet, bolt the switch to the pallet.
10. Cover the switch with an antistatic bag and place the packing foam on top of and around the switch.
11. Replace the accessory box on top of the packing foam.
12. Securely tape the box closed or place the carton cover over the switch.
13. Write the RMA number on the exterior of the box to ensure proper tracking.

Packing EX9251 Switch Components for Shipping

Before you begin packing a switch component, ensure that you have the following parts and tools available:

- Antistatic bag, one for each component

- An ESD wrist strap

To pack EX9251 switch components, follow the instructions here.

> ⚠️ **CAUTION**: Do not stack switch components. Return individual components in separate boxes if they do not fit together on one level in the shipping box.

To pack EX9251 switch components:

- Place individual components in antistatic bags.

- Use the original packing materials if they are available. If the original packing materials are not available, ensure the component is adequately packed to prevent damage during transit. The packing material you use must be able to support the weight of the component.

- Ensure that the components are adequately protected by wrapping them well with packing materials. Pack the component in an oversized box (if the original box is not available) with extra packing material around the unit so that the component is prevented from moving around inside the box.

- Securely tape the box closed.

- Write the RMA number on the exterior of the box to ensure proper tracking.

7
CHAPTER

Safety and Compliance Information

General Safety Guidelines and Warnings

The following guidelines help ensure your safety and protect the device from damage. The list of guidelines might not address all potentially hazardous situations in your working environment, so be alert and exercise good judgment at all times.

- Perform only the procedures explicitly described in the hardware documentation for this device. Make sure that only authorized service personnel perform other system services.

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

- Keep tools away from areas where people could trip over them while walking.

- Do not wear loose clothing or jewelry, such as rings, bracelets, or chains, which could become caught in the device.

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

- Do not perform any actions that create a potential hazard to people or make the equipment unsafe.

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

- Never install or manipulate wiring during electrical storms.

- Never install electrical jacks in wet locations unless the jacks are specifically designed for wet environments.

- Operate the device only when it is properly grounded.

- Follow the instructions in this guide to properly ground the device to earth.

- Replace fuses only with fuses of the same type and rating.

- Do not open or remove chassis covers or sheet-metal parts unless instructions are provided in the hardware documentation for this device. Such an action could cause severe electrical shock.

- Do not push or force any objects through any opening in the chassis frame. Such an action could result in electrical shock or fire.

- Avoid spilling liquid onto the chassis or onto any device component. Such an action could cause electrical shock or damage the device.

- Avoid touching uninsulated electrical wires or terminals that have not been disconnected from their power source. Such an action could cause electrical shock.

- Some parts of the chassis, including AC and DC power supply surfaces, power supply unit handles, SFB card handles, and fan tray handles might become hot. The following label provides the warning for hot surfaces on the chassis:

- Always ensure that all modules, power supplies, and cover panels are fully inserted and that the installation screws are fully tightened.

Definitions of Safety Warning Levels

The documentation uses the following levels of safety warnings (there are two *Warning* formats):

NOTE: You might find this information helpful in a particular situation, or you might overlook this important information if it was not highlighted in a Note.

CAUTION: You need to observe the specified guidelines to prevent minor injury or discomfort to you or severe damage to the device.
Attention Veillez à respecter les consignes indiquées pour éviter toute incommodité ou blessure légère, voire des dégâts graves pour l'appareil.

LASER WARNING: This symbol alerts you to the risk of personal injury from a laser.
Avertissement Ce symbole signale un risque de blessure provoquée par rayon laser.

WARNING: This symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry, and familiarize yourself with standard practices for preventing accidents.

Waarschuwing Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.

Varoitus Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.

Avertissement Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.

Warnung Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.

Avvertenza Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

Advarsel Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

Aviso Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.

¡Atención! Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

Qualified Personnel Warning

WARNING: Only trained and qualified personnel should install or replace the device.

Waarschuwing Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.

Varoitus Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.

Avertissement Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.

Warnung Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.

Avvertenza Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Advarsel Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.

Aviso Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.

¡Atención! Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.

Varning! Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Warning Statement for Norway and Sweden

WARNING: The equipment must be connected to an earthed mains socket-outlet.

Advarsel Apparatet skal kobles til en jordet stikkontakt.

Varning! Apparaten skall anslutas till jordat nätuttag.

Fire Safety Requirements

In the event of a fire emergency, the safety of people is the primary concern. You should establish procedures for protecting people in the event of a fire emergency, provide safety training, and properly provision fire-control equipment and fire extinguishers.

In addition, you should establish procedures to protect your equipment in the event of a fire emergency. Juniper Networks products should be installed in an environment suitable for electronic equipment. We recommend that fire suppression equipment be available in the event of a fire in the vicinity of the equipment and that all local fire, safety, and electrical codes and ordinances be observed when you install and operate your equipment.

Fire Suppression

In the event of an electrical hazard or an electrical fire, you should first turn power off to the equipment at the source. Then use a Type C fire extinguisher, which uses noncorrosive fire retardants, to extinguish the fire.

Fire Suppression Equipment

Type C fire extinguishers, which use noncorrosive fire retardants such as carbon dioxide and Halotron™, are most effective for suppressing electrical fires. Type C fire extinguishers displace oxygen from the point of combustion to eliminate the fire. For extinguishing fire on or around equipment that draws air from the environment for cooling, you should use this type of inert oxygen displacement extinguisher instead of an extinguisher that leaves residues on equipment.

Do not use multipurpose Type ABC chemical fire extinguishers (dry chemical fire extinguishers). The primary ingredient in these fire extinguishers is monoammonium phosphate, which is very sticky and

difficult to clean. In addition, in the presence of minute amounts of moisture, monoammonium phosphate can become highly corrosive and corrodes most metals.

Any equipment in a room in which a chemical fire extinguisher has been discharged is subject to premature failure and unreliable operation. The equipment is considered to be irreparably damaged.

> **NOTE**: To keep warranties effective, do not use a dry chemical fire extinguisher to control a fire at or near a Juniper Networks device. If a dry chemical fire extinguisher is used, the unit is no longer eligible for coverage under a service agreement.

We recommend that you dispose of any irreparably damaged equipment in an environmentally responsible manner.

Installation Instructions Warning

> **WARNING**: Read the installation instructions before you connect the device to a power source.
>
> **Waarschuwing** Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.
>
> **Varoitus** Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.
>
> **Avertissement** Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.
>
> **Warnung** Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.
>
> **Avvertenza** Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.
>
> **Advarsel** Les installasjonsinstruksjonene før systemet kobles til strømkilden.
>
> **Aviso** Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.
>
> **¡Atención!** Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.
>
> **Varning!** Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Chassis and Component Lifting Guidelines

- Before moving the device to a site, ensure that the site meets the power, environmental, and clearance requirements.

- Before lifting or moving the device, disconnect all external cables and wires.

- As when lifting any heavy object, ensure that your legs bear most of the weight rather than your back. Keep your knees bent and your back relatively straight. Do not twist your body as you lift. Balance the load evenly and be sure that your footing is firm.

- Use the following lifting guidelines to lift devices and components:

  - Up to 39.7 lb (18 kg): One person.

  - From 39.7 lb (18 kg) to 70.5 lb (32 kg): Two or more people.

  - From 70.5 lb (32 kg) to 121.2 lb (55 kg): Three or more people.

  - Above 121.2 lb (55 kg): Use material handling systems (such as levers, slings, lifts, and so on). When this is not practical, engage specially trained persons or systems (such as riggers or movers).

Restricted Access Warning

WARNING: This unit is intended for installation in restricted access areas. A restricted access area is an area to which access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and which is controlled by the authority responsible for the location.

Waarschuwing Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.

Varoitus Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Paikka, johon pääsy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pääsee jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.

Avertissement Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.

Warnung Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.

Avvertenza Questa unità deve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autorità responsabile della zona.

Advarsel Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.

Aviso Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado, que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.

¡Atención! Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.

Varning! Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträdas av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.

Ramp Warning

WARNING: When installing the device, do not use a ramp inclined at more than 10 degrees.

Waarschuwing Gebruik een oprijplaat niet onder een hoek van meer dan 10 graden.

Varoitus Älä käytä sellaista kaltevaa pintaa, jonka kaltevuus ylittää 10 astetta.

Avertissement Ne pas utiliser une rampe dont l'inclinaison est supérieure à 10 degrés.

Warnung Keine Rampen mit einer Neigung von mehr als 10 Grad verwenden.

Avvertenza Non usare una rampa con pendenza superiore a 10 gradi.

Advarsel Bruk aldri en rampe som heller mer enn 10 grader.

Aviso Não utilize uma rampa com uma inclinação superior a 10 graus.

¡Atención! No usar una rampa inclinada más de 10 grados.

Varning! Använd inte ramp med en lutning på mer än 10 grader.

Rack-Mounting and Cabinet-Mounting Warnings

Ensure that the rack or cabinet in which the device is installed is evenly and securely supported. Uneven mechanical loading could lead to a hazardous condition.

WARNING: To prevent bodily injury when mounting or servicing the device in a rack, take the following precautions to ensure that the system remains stable. The following directives help maintain your safety:

- Install the device in a rack that is secured to the building structure.

- Mount the device at the bottom of the rack if it is the only unit in the rack.

- When mounting the device on 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 equipment, install the stabilizers before mounting or servicing the device in the rack.

Waarschuwing Om lichamelijk letsel te voorkomen wanneer u dit toestel in een rek monteert of het daar een servicebeurt geeft, moet u speciale voorzorgsmaatregelen nemen om ervoor te zorgen dat het toestel stabiel blijft. De onderstaande richtlijnen worden verstrekt om uw veiligheid te verzekeren:

- De Juniper Networks switch moet in een stellage worden geïnstalleerd die aan een bouwsel is verankerd.

- Dit toestel dient onderaan in het rek gemonteerd te worden als het toestel het enige in het rek is.

- Wanneer u dit toestel in een gedeeltelijk gevuld rek monteert, dient u het rek van onderen naar boven te laden met het zwaarste onderdeel onderaan in het rek.

- Als het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.

Varoitus Kun laite asetetaan telineeseen tai huolletaan sen ollessa telineessä, on noudatettava erityisiä varotoimia järjestelmän vakavuuden säilyttämiseksi, jotta vältytään loukkaantumiselta. Noudata seuraavia turvallisuusohjeita:

- Juniper Networks switch on asennettava telineeseen, joka on kiinnitetty rakennukseen.

- Jos telineessä ei ole muita laitteita, aseta laite telineen alaosaan.

- Jos laite asetetaan osaksi täytettyyn telineeseen, aloita kuormittaminen sen alaosasta kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.

- Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.

Avertissement Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:

- Le rack sur lequel est monté le Juniper Networks switch doit être fixé à la structure du bâtiment.

- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.

- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.

- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

Warnung Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:

- Der Juniper Networks switch muß in einem Gestell installiert werden, das in der Gebäudestruktur verankert ist.

- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.

- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.

- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

Avvertenza Per evitare infortuni fisici durante il montaggio o la manutenzione di questa unità in un supporto, occorre osservare speciali precauzioni per garantire che il sistema rimanga stabile. Le seguenti direttive vengono fornite per garantire la sicurezza personale:

- Il Juniper Networks switch deve essere installato in un telaio, il quale deve essere fissato alla struttura dell'edificio.

- Questa unità deve venire montata sul fondo del supporto, se si tratta dell'unica unità da montare nel supporto.

- Quando questa unità viene montata in un supporto parzialmente pieno, caricare il supporto dal basso all'alto, con il componente più pesante sistemato sul fondo del supporto.

- Se il supporto è dotato di dispositivi stabilizzanti, installare tali dispositivi prima di montare o di procedere alla manutenzione dell'unità nel supporto.

Advarsel Unngå fysiske skader under montering eller reparasjonsarbeid på denne enheten når den befinner seg i et kabinett. Vær nøye med at systemet er stabilt. Følgende retningslinjer er gitt for å verne om sikkerheten:

- Juniper Networks switch må installeres i et stativ som er forankret til bygningsstrukturen.

- Denne enheten bør monteres nederst i kabinettet hvis dette er den eneste enheten i kabinettet.

- Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinettet lastes fra bunnen og opp med den tyngste komponenten nederst i kabinettet.

- Hvis kabinettet er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinettet.

Aviso Para se prevenir contra danos corporais ao montar ou reparar esta unidade numa estante, deverá tomar precauções especiais para se certificar de que o sistema possui um suporte estável. As seguintes directrizes ajudá-lo-ão a efectuar o seu trabalho com segurança:

- O Juniper Networks switch deverá ser instalado numa prateleira fixa à estrutura do edificio.

- Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.

- Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.

- Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.

¡Atención! Para evitar lesiones durante el montaje de este equipo sobre un bastidor, oeriormente durante su mantenimiento, se debe poner mucho cuidado en que el sistema quede bien estable. Para garantizar su seguridad, proceda según las siguientes instrucciones:

- El Juniper Networks switch debe instalarse en un bastidor fijado a la estructura del edificio.

- Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.

- Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.

- Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.

Varning! För att undvika kroppsskada när du installerar eller utför underhållsarbete på denna enhet på en ställning måste du vidta särskilda försiktighetsåtgärder för att försäkra dig om att systemet står stadigt. Följande riktlinjer ges för att trygga din säkerhet:

- Juniper Networks switch måste installeras i en ställning som är förankrad i byggnadens struktur.

- Om denna enhet är den enda enheten på ställningen skall den installeras längst ned på ställningen.

- Om denna enhet installeras på en delvis fylld ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.

- Om ställningen är försedd med stabiliseringsdon skall dessa monteras fast innan enheten installeras eller underhålls på ställningen.

Grounded Equipment Warning

WARNING: This device must be properly grounded at all times. Follow the instructions in this guide to properly ground the device to earth.

Waarschuwing Dit apparaat moet altijd goed geaard zijn. Volg de instructies in deze gids om het apparaat goed te aarden.

Varoitus Laitteen on oltava pysyvästi maadoitettu. Maadoita laite asianmukaisesti noudattamalla tämän oppaan ohjeita.

Avertissement L'appareil doit être correctement mis à la terre à tout moment. Suivez les instructions de ce guide pour correctement mettre l'appareil à la terre.

Warnung Das Gerät muss immer ordnungsgemäß geerdet sein. Befolgen Sie die Anweisungen in dieser Anleitung, um das Gerät ordnungsgemäß zu erden.

Avvertenza Questo dispositivo deve sempre disporre di una connessione a massa. Seguire le istruzioni indicate in questa guida per connettere correttamente il dispositivo a massa.

Advarsel Denne enheten på jordes skikkelig hele tiden. Følg instruksjonene i denne veiledningen for å jorde enheten.

Aviso Este equipamento deverá estar ligado à terra. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

¡Atención! Este dispositivo debe estar correctamente conectado a tierra en todo momento. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

Varning! Den här enheten måste vara ordentligt jordad. Följ instruktionerna i den här guiden för att jorda enheten ordentligt.

Radiation from Open Port Apertures Warning

LASER WARNING: Because invisible radiation might be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures.

Waarschuwing Aangezien onzichtbare straling vanuit de opening van de poort kan komen als er geen fiberkabel aangesloten is, dient blootstelling aan straling en het kijken in open openingen vermeden te worden.

Varoitus Koska portin aukosta voi emittoitua näkymätöntä säteilyä, kun kuitukaapelia ei ole kytkettynä, vältä säteilylle altistumista äläkä katso avoimiin aukkoihin.

Avertissement Des radiations invisibles à l'il nu pouvant traverser l'ouverture du port lorsqu'aucun câble en fibre optique n'y est connecté, il est recommandé de ne pas regarder fixement l'intérieur de ces ouvertures.

Warnung Aus der Port-Öffnung können unsichtbare Strahlen emittieren, wenn kein Glasfaserkabel angeschlossen ist. Vermeiden Sie es, sich den Strahlungen auszusetzen, und starren Sie nicht in die Öffnungen!

Avvertenza Quando i cavi in fibra non sono inseriti, radiazioni invisibili possono essere emesse attraverso l'apertura della porta. Evitate di esporvi alle radiazioni e non guardate direttamente nelle aperture.

Advarsel Unngå utsettelse for stråling, og stirr ikke inn i åpninger som er åpne, fordi usynlig stråling kan emiteres fra portens åpning når det ikke er tilkoblet en fiberkabel.

Aviso Dada a possibilidade de emissão de radiação invisível através do orifício da via de acesso, quando esta não tiver nenhum cabo de fibra conectado, deverá evitar an EXposição à radiação e não deverá olhar fixamente para orifícios que se encontrarem a descoberto.

¡Atención! Debido a que la apertura del puerto puede emitir radiación invisible cuando no existe un cable de fibra conectado, evite mirar directamente a las aperturas para no exponerse a la radiación.

Varning! Osynlig strålning kan avges från en portöppning utan ansluten fiberkabel och du bör därför undvika att bli utsatt för strålning genom att inte stirra in i oskyddade öppningar.

Laser and LED Safety Guidelines and Warnings

IN THIS SECTION

Juniper Networks devices are equipped with laser transmitters, which are considered a Class 1 Laser Product by the U.S. Food and Drug Administration and are evaluated as a Class 1 Laser Product per IEC/EN 60825-1 requirements.

Observe the following guidelines and warnings:

General Laser Safety Guidelines

When working around ports that support optical transceivers, observe the following safety guidelines to prevent eye injury:

* Do not look into unterminated ports or at fibers that connect to unknown sources.

* Do not examine unterminated optical ports with optical instruments.

* Avoid direct exposure to the beam.

> **LASER WARNING**: Unterminated optical connectors can emit invisible laser radiation. The lens in the human eye focuses all the laser power on the retina, so focusing the eye directly on a laser source—even a low-power laser—could permanently damage the eye.
>
> **Avertissement** Les connecteurs à fibre optique sans terminaison peuvent émettre un rayonnement laser invisible. Le cristallin de l'œil humain faisant converger toute la puissance du laser sur la rétine, toute focalisation directe de l'œil sur une source laser, —même de faible puissance—, peut entraîner des lésions oculaires irréversibles.

Class 1 Laser Product Warning

> **LASER WARNING**: Class 1 laser product.
> **Waarschuwing** Klasse-1 laser produkt.
>
> **Varoitus** Luokan 1 lasertuote.
>
> **Avertissement** Produit laser de classe I.
>
> **Warnung** Laserprodukt der Klasse 1.
>
> **Avvertenza** Prodotto laser di Classe 1.
>
> **Advarsel** Laserprodukt av klasse 1.
>
> **Aviso** Produto laser de classe 1.
>
> **¡Atención!** Producto láser Clase I.
>
> **Varning!** Laserprodukt av klass 1.

Class 1 LED Product Warning

LASER WARNING: Class 1 LED product.
Waarschuwing Klasse 1 LED-product.

Varoitus Luokan 1 valodiodituote.

Avertissement Alarme de produit LED Class I.

Warnung Class 1 LED-Produktwarnung.

Avvertenza Avvertenza prodotto LED di Classe 1.

Advarsel LED-produkt i klasse 1.

Aviso Produto de classe 1 com LED.

¡Atención! Aviso sobre producto LED de Clase 1.

Varning! Lysdiodprodukt av klass 1.

Laser Beam Warning

LASER WARNING: Do not stare into the laser beam or view it directly with optical instruments.
Waarschuwing Niet in de straal staren of hem rechtstreeks bekijken met optische instrumenten.

Varoitus Älä katso säteeseen äläkä tarkastele sitä suoraan optisen laitteen avulla.

Avertissement Ne pas fixer le faisceau des yeux, ni l'observer directement à l'aide d'instruments optiques.

Warnung Nicht direkt in den Strahl blicken und ihn nicht direkt mit optischen Geräten prüfen.

Avvertenza Non fissare il raggio con gli occhi né usare strumenti ottici per osservarlo direttamente.

Advarsel Stirr eller se ikke direkte p strlen med optiske instrumenter.

Aviso Não olhe fixamente para o raio, nem olhe para ele directamente com instrumentos ópticos.

¡Atención! No mirar fijamente el haz ni observarlo directamente con instrumentos ópticos.

Varning! Rikta inte blicken in mot strålen och titta inte direkt på den genom optiska instrument.

Maintenance and Operational Safety Guidelines and Warnings

IN THIS SECTION

While performing the maintenance activities for devices, observe the following guidelines and warnings:

Battery Handling Warning

WARNING: Replacing a battery incorrectly might result in an explosion. Replace a battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Waarschuwing Er is ontploffingsgevaar als de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type dat door de fabrikant

aanbevolen is. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften weggeworpen te worden.

Varoitus Räjähdyksen vaara, jos akku on vaihdettu väärään akkuun. Käytä vaihtamiseen ainoastaan saman- tai vastaavantyyppistä akkua, joka on valmistajan suosittelema. Hävitä käytetyt akut valmistajan ohjeiden mukaan.

Avertissement Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

Warnung Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Advarsel Det kan være fare for eksplosjon hvis batteriet skiftes på feil måte. Skift kun med samme eller tilsvarende type som er anbefalt av produsenten. Kasser brukte batterier i henhold til produsentens instruksjoner.

Avvertenza Pericolo di esplosione se la batteria non è installata correttamente. Sostituire solo con una di tipo uguale o equivalente, consigliata dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

Aviso Existe perigo de explosão se a bateria for substituída incorrectamente. Substitua a bateria por uma bateria igual ou de um tipo equivalente recomendado pelo fabricante. Destrua as baterias usadas conforme as instruções do fabricante.

¡Atención! Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la baterían EXclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

Varning! Explosionsfara vid felaktigt batteribyte. Ersätt endast batteriet med samma batterityp som rekommenderas av tillverkaren eller motsvarande. Följ tillverkarens anvisningar vid kassering av använda batterier.

Jewelry Removal Warning

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 can be welded to the terminals.

Waarschuwing Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.

Varoitus Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sähkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitäntänapoihin.

Avertissement Avant d'accéder à cet équipement connecté aux lignes électriques, ôter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés à l'alimentation et reliés à la terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.

Warnung Vor der Arbeit an Geräten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließlich Ringe, Ketten und Uhren) abnehmen. Metallgegenstände erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschlußklemmen angeschweißt werden.

Avvertenza Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo può saldarsi ai terminali.

Advarsel Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.

Aviso Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.

¡Atención! Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.

Varning! Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brännskador; metallobjekt kan också sammansvetsas med kontakterna.

Lightning Activity Warning

WARNING: Do not work on the system or connect or disconnect cables during periods of lightning activity.

Waarschuwing Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.

Varoitus Älä työskentele järjestelmän parissa äläkä yhdistä tai irrota kaapeleita ukkosilmalla.

Avertissement Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.

Warnung Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.

Avvertenza Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.

Advarsel Utfør aldri arbeid på systemet, eller koble kabler til eller fra systemet når det tordner eller lyner.

Aviso Não trabalhe no sistema ou ligue e desligue cabos durante períodos de mau tempo (trovoada).

¡Atención! No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.

Varning! Vid åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

Operating Temperature Warning

WARNING: To prevent the device from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature. To prevent airflow restriction, allow at least 6 in. (15.2 cm) of clearance around the ventilation openings.

Waarschuwing Om te voorkomen dat welke switch van de Juniper Networks router dan ook oververhit raakt, dient u deze niet te bedienen op een plaats waar de maximale aanbevolen omgevingstemperatuur van 40° C wordt overschreden. Om te voorkomen dat de luchtstroom wordt beperkt, dient er minstens 15,2 cm speling rond de ventilatie-openingen te zijn.

Varoitus Ettei Juniper Networks switch-sarjan reititin ylikuumentuisi, sitä ei saa käyttää tilassa, jonka lämpötila ylittää korkeimman suositellun ympäristölämpötilan 40° C. Ettei ilmanvaihto estyisi, tuuletusaukkojen ympärille on jätettävä ainakin 15,2 cm tilaa.

Avertissement Pour éviter toute surchauffe des routeurs de la gamme Juniper Networks switch, ne l'utilisez pas dans une zone où la température ambiante est supérieure à 40° C. Pour permettre un flot d'air constant, dégagez un espace d'au moins 15,2 cm autour des ouvertures de ventilations.

Warnung Um einen Router der switch vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene Maximum von 40° C überschreitet. Um Lüftungsverschluß zu verhindern, achten Sie darauf, daß mindestens 15,2 cm lichter Raum um die Lüftungsöffnungen herum frei bleibt.

Avvertenza Per evitare il surriscaldamento dei switch, non adoperateli in un locale che ecceda la temperatura ambientale massima di 40° C. Per evitare che la circolazione dell'aria sia impedita, lasciate uno spazio di almeno 15.2 cm di fronte alle aperture delle ventole.

Advarsel Unngå overoppheting av eventuelle rutere i Juniper Networks switch Disse skal ikke brukes på steder der den anbefalte maksimale omgivelsestemperaturen overstiger 40° C (104° F). Sørg for at klaringen rundt lufteåpningene er minst 15,2 cm (6 tommer) for å forhindre nedsatt luftsirkulasjon.

Aviso Para evitar o sobreaquecimento do encaminhador Juniper Networks switch, não utilize este equipamento numa área que exceda a temperatura máxima recomendada de 40° C. Para evitar a restrição à circulação de ar, deixe pelo menos um espaço de 15,2 cm à volta das aberturas de ventilação.

¡Atención! Para impedir que un encaminador de la serie Juniper Networks switch se recaliente, no lo haga funcionar en un área en la que se supere la temperatura ambiente máxima recomendada de 40° C. Para impedir la restricción de la entrada de aire, deje un espacio mínimo de 15,2 cm alrededor de las aperturas para ventilación.

Varning! Förhindra att en Juniper Networks switch överhettas genom att inte använda den i ett område där den maximalt rekommenderade omgivningstemperaturen på 40° C överskrids. Förhindra att luftcirkulationen inskränks genom att se till att det finns fritt utrymme på minst 15,2 cm omkring ventilationsöppningarna.

Product Disposal Warning

WARNING: Disposal of this device must be handled according to all national laws and regulations.

Waarschuwing Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.

Varoitus Tämän tuotteen lopullisesta hävittämisestä tulee huolehtia kaikkia valtakunnallisia lakeja ja säännöksiä noudattaen.

Avertissement La mise au rebut définitive de ce produit doit être effectuée conformément à toutes les lois et réglementations en vigueur.

Warnung Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.

Avvertenza L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia

Advarsel Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.

Aviso A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.

¡Atención! El desecho final de este producto debe realizarse según todas las leyes y regulaciones nacionales

Varning! Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

General Electrical Safety Guidelines and Warnings

⚡ **WARNING**: Certain ports on the device are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in *GR-1089-CORE*) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS (Network Equipment-Building System) requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be metallically connected to interfaces that connect to the OSP or its wiring. The intrabuilding ports on the device are suitable for connection to intrabuilding or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metallically to OSP wiring.

Avertissement Certains ports de l'appareil sont destinés à un usage en intérieur uniquement (ports Type 2 ou Type 4 tels que décrits dans le document *GR-1089-CORE*) et doivent être isolés du câblage de l'installation extérieure exposée. Pour respecter les exigences NEBS et assurer une protection contre la foudre et les perturbations de tension secteur, les ports pour intérieur *ne doivent pas* être raccordés physiquement aux interfaces prévues pour la connexion à l'installation extérieure ou à son câblage. Les ports pour intérieur de l'appareil sont réservés au raccordement de câbles pour intérieur ou non exposés uniquement. L'ajout de protections ne constitue pas une précaution suffisante pour raccorder physiquement ces interfaces au câblage de l'installation extérieure.

⚠ **CAUTION**: Before removing or installing components of a device, connect an electrostatic discharge (ESD) grounding strap to an ESD point and wrap and fasten the other end of the strap around your bare wrist. Failure to use an ESD grounding strap could result in damage to the device.

Attention Avant de retirer ou d'installer des composants d'un appareil, raccordez un bracelet antistatique à un point de décharge électrostatique et fixez le bracelet à votre poignet nu. L'absence de port d'un bracelet antistatique pourrait provoquer des dégâts sur l'appareil.

- Install the device in compliance with the following local, national, and international electrical codes:

  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.

  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.

  - Evaluated to the TN power system.

- Canada—Canadian Electrical Code, Part 1, CSA C22.1.

- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

- Locate the emergency power-off switch for the room in which you are working so that if an electrical accident occurs, you can quickly turn off the power.

- Make sure that you clean grounding surface and give them a bright finish before making grounding connections.

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

- Never assume that power is disconnected from a circuit. Always check the circuit before starting to work.

- Carefully look for possible hazards in your work area, such as moist floors, ungrounded power extension cords, and missing safety grounds.

- Operate the device within marked electrical ratings and product usage instructions.

- To ensure that the device and peripheral equipment function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

You can remove and replace many device components without powering off or disconnecting power to the device, as detailed elsewhere in the hardware documentation for this device. Never install equipment that appears to be damaged.

Action to Take After an Electrical Accident

If an electrical accident results in an injury, take the following actions in this order:

1. Use caution. Be aware of potentially hazardous conditions that could cause further injury.

2. Disconnect power from the device.

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

Prevention of Electrostatic Discharge Damage

Device components that are shipped in antistatic bags are sensitive to damage from static electricity. Some components can be impaired by voltages as low as 30 V. You can easily generate potentially damaging static voltages whenever you handle plastic or foam packing material or if you move components across plastic or carpets. Observe the following guidelines to minimize the potential for electrostatic discharge (ESD) damage, which can cause intermittent or complete component failures:

- Always use an ESD wrist strap when you are handling components that are subject to ESD damage, and make sure that it is in direct contact with your skin.

  If a grounding strap is not available, hold the component in its antistatic bag (see) in one hand and touch the exposed, bare metal of the device with the other hand immediately before inserting the component into the device.

  > ⚡ **WARNING**: For safety, periodically check the resistance value of the ESD grounding strap. The measurement must be in the range 1 through 10 Mohms.
  >
  > **Avertissement** Par mesure de sécurité, vérifiez régulièrement la résistance du bracelet antistatique. Cette valeur doit être comprise entre 1 et 10 mégohms (Mohms).

- When handling any component that is subject to ESD damage and that is removed from the device, make sure the equipment end of your ESD wrist strap is attached to the ESD point on the chassis.

  If no grounding strap is available, touch the exposed, bare metal of the device to ground yourself before handling the component.

- Avoid contact between the component that is subject to ESD damage and your clothing. ESD voltages emitted from clothing can damage components.

- When removing or installing a component that is subject to ESD damage, always place it component-side up on an antistatic surface, in an antistatic card rack, or in an antistatic bag (see Figure 67 on page 192). If you are returning a component, place it in an antistatic bag before packing it.

Figure 67: Placing a Component into an Antistatic Bag
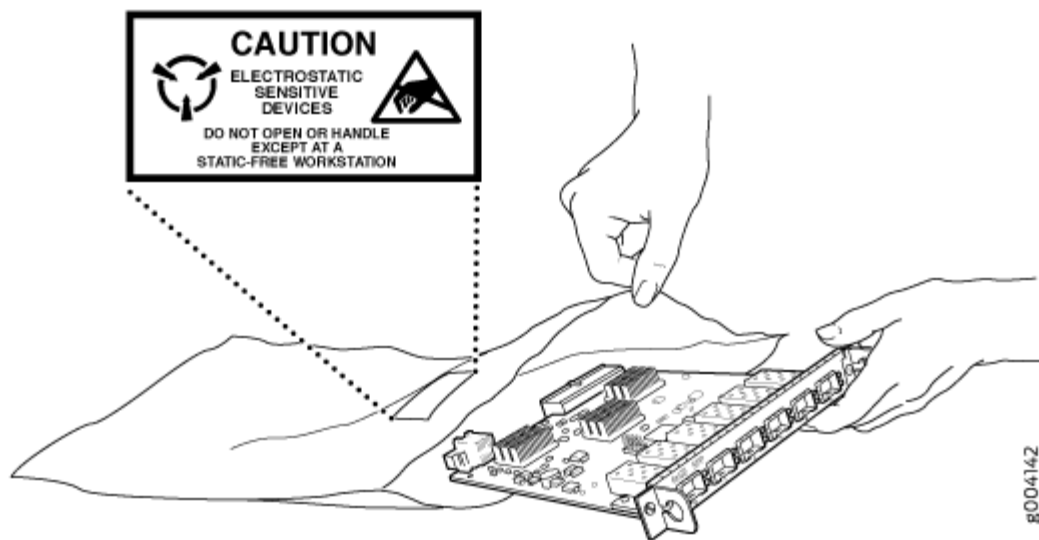
> ⚠️ **CAUTION**: ANSI/TIA/EIA-568 cables such as Category 5e and Category 6 can get electrostatically charged. To dissipate this charge, always ground the cables to a suitable and safe earth ground before connecting them to the system.
>
> **Attention** Les câbles ANSI/TIA/EIA-568, par exemple Cat 5e et Cat 6, peuvent emmagasiner des charges électrostatiques. Pour évacuer ces charges, reliez toujours les câbles à une prise de terre adaptée avant de les raccorder au système.

AC Power Electrical Safety Guidelines

The following electrical safety guidelines apply to AC-powered devices:

- Note the following warnings printed on the device:

  "**CAUTION:** THIS UNIT HAS MORE THAN ONE POWER SUPPLY CORD. DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICING TO AVOID ELECTRIC SHOCK."

"**ATTENTION:** CET APPAREIL COMPORTE PLUS D'UN CORDON D'ALIMENTATION. AFIN DE PRÉVENIR LES CHOCS ÉLECTRIQUES, DÉBRANCHER TOUT CORDON D'ALIMENTATION AVANT DE FAIRE LE DÉPANNAGE."

- AC-powered devices are shipped with a three-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. Do not circumvent this safety feature. Equipment grounding must comply with local and national electrical codes.

- You must provide an external certified circuit breaker (2-pole circuit breaker or 4-pole circuit breaker based on your device) rated minimum 20 A in the building installation.

- The power cord serves as the main disconnecting device for the AC-powered device. The socket outlet must be near the AC-powered device and be easily accessible.

- For devices that have more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed to prevent electric shock. To disconnect power, unplug all power cords (one for each power supply).

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

AC Power Disconnection Warning

WARNING: Before working on the device or near power supplies, unplug all the power cords from an AC-powered device.

Waarschuwing Voordat u aan een frame of in de nabijheid van voedingen werkt, dient u bij wisselstroom toestellen de stekker van het netsnoer uit het stopcontact te halen.

Varoitus Kytke irti vaihtovirtalaitteiden virtajohto, ennen kuin teet mitään asennuspohjalle tai työskentelet virtalähteiden läheisyydessä.

Avertissement Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif.

Warnung Bevor Sie an einem Chassis oder in der Nähe von Netzgeräten arbeiten, ziehen Sie bei Wechselstromeinheiten das Netzkabel ab bzw.

Avvertenza Prima di lavorare su un telaio o intorno ad alimentatori, scollegare il cavo di alimentazione sulle unità CA.

Advarsel Før det utføres arbeid på kabinettet eller det arbeides i nærheten av strømforsyningsenheter, skal strømledningen trekkes ut på vekselstrømsenheter.

Aviso Antes de trabalhar num chassis, ou antes de trabalhar perto de unidades de fornecimento de energia, desligue o cabo de alimentação nas unidades de corrente alternada.

¡Atención! Antes de manipular el chasis de un equipo o trabajar cerca de una fuente de alimentación, desenchufar el cable de alimentación en los equipos de corriente alterna (CA).

Varning! Innan du arbetar med ett chassi eller nära strömförsörjningsenheter skall du för växelströmsenheter dra ur nätsladden.

DC Power Electrical Safety Guidelines

- A DC-powered device is equipped with a DC terminal block that is rated for the power requirements of a maximally configured device.

- For permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment.

- For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.

- Be sure to connect the ground wire or conduit to a solid central office earth ground.

- A closed loop ring is recommended for terminating the ground conductor at the ground stud.

- Run two wires from the circuit breaker box to a source of 48 VDC.

- A DC-powered device that is equipped with a DC terminal block is intended only for installation in a restricted-access location. In the United States, a restricted-access area is one in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code ANSI/NFPA 70.

> **NOTE**: Primary overcurrent protection is provided by the building circuit breaker. This breaker must protect against excess currents, short circuits, and earth grounding faults in accordance with NEC ANSI/NFPA 70.

- Ensure that the polarity of the DC input wiring is correct. Under certain conditions, connections with reversed polarity might trip the primary circuit breaker or damage the equipment.

- The marked input voltage of −48 VDC for a DC-powered device is the nominal voltage associated with the battery circuit, and any higher voltages are only to be associated with float voltages for the charging function.

- Because the device is a positive ground system, you must connect the positive lead to the terminal labeled **RTN**, the negative lead to the terminal labeled −48 VDC, and the earth ground to the device grounding points.

DC Power Disconnection Warning

> **WARNING**: Before performing any of the DC power procedures, ensure that power is removed from the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the device handle of the circuit breaker in the OFF position.
>
> **Waarschuwing** Voordat u een van de onderstaande procedures uitvoert, dient u te controleren of de stroom naar het gelijkstroom circuit uitgeschakeld is. Om u ervan te verzekeren dat alle stroom UIT is geschakeld, kiest u op het schakelbord de stroomverbreker die het gelijkstroom circuit bedient, draait de stroomverbreker naar de UIT positie en plakt de schakelaarhendel van de stroomverbreker met plakband in de UIT positie vast.
>
> **Varoitus** Varmista, että tasavirtapiirissä ei ole virtaa ennen seuraavien toimenpiteiden suorittamista. Varmistaaksesi, että virta on KATKAISTU täysin, paikanna tasavirrasta huolehtivassa kojetaulussa sijaitseva suojakytkin, käännä suojakytkin KATKAISTU-asentoon ja teippaa suojakytkimen varsi niin, että se pysyy KATKAISTU-asennossa.
>
> **Avertissement** Avant de pratiquer l'une quelconque des procédures ci-dessous, vérifier que le circuit en courant continu n'est plus sous tension. Pour en être sûr, localiser le disjoncteur situé sur le panneau de service du circuit en courant continu, placer le

disjoncteur en position fermée (OFF) et, à l'aide d'un ruban adhésif, bloquer la poignée du disjoncteur en position OFF.

Warnung Vor Ausführung der folgenden Vorgänge ist sicherzustellen, daß die Gleichstromschaltung keinen Strom erhält. Um sicherzustellen, daß sämtlicher Strom abgestellt ist, machen Sie auf der Schalttafel den Unterbrecher für die Gleichstromschaltung ausfindig, stellen Sie den Unterbrecher auf AUS, und kleben Sie den Schaltergriff des Unterbrechers mit Klebeband in der AUS-Stellung fest.

Avvertenza Prima di svolgere una qualsiasi delle procedure seguenti, verificare che il circuito CC non sia alimentato. Per verificare che tutta l'alimentazione sia scollegata (OFF), individuare l'interruttore automatico sul quadro strumenti che alimenta il circuito CC, mettere l'interruttore in posizione OFF e fissarlo con nastro adesivo in tale posizione.

Advarsel Før noen av disse prosedyrene utføres, kontroller at strømmen er frakoblet likestrømkretsen. Sørg for at all strøm er slått AV. Dette gjøres ved å lokalisere strømbryteren på brytertavlen som betjener likestrømkretsen, slå strømbryteren AV og teipe bryterhåndtaket på strømbryteren i AV-stilling.

Aviso Antes de executar um dos seguintes procedimentos, certifique-se que desligou a fonte de alimentação de energia do circuito de corrente contínua. Para se assegurar que toda a corrente foi DESLIGADA, localize o disjuntor no painel que serve o circuito de corrente contínua e coloque-o na posição OFF (Desligado), segurando nessa posição a manivela do interruptor do disjuntor com fita isoladora.

¡Atención! Antes de proceder con los siguientes pasos, comprobar que la alimentación del circuito de corriente continua (CC) esté cortada (OFF). Para asegurarse de que toda la alimentación esté cortada (OFF), localizar el interruptor automático en el panel que alimenta al circuito de corriente continua, cambiar el interruptor automático a la posición de Apagado (OFF), y sujetar con cinta la palanca del interruptor automático en posición de Apagado (OFF).

Varning! Innan du utför någon av följande procedurer måste du kontrollera att strömförsörjningen till likströmskretsen är bruten. Kontrollera att all strömförsörjning är BRUTEN genom att slå AV det överspänningsskydd som skyddar likströmskretsen och tejpa fast överspänningsskyddets omkopplare i FRÅN-läget.

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors but is identifiable by green and yellow stripes is installed as part of the branch circuit that supplies the device. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When you install the device, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Avertissement Lors de l'installation de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.

Warnung Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.

Avvertenza In fase di installazione dell'unità, eseguire sempre per primo il collegamento a massa e disconnetterlo per ultimo.

Advarsel Når enheten installeres, må jordledningen alltid tilkobles først og frakobles sist.

Aviso Ao instalar a unidade, a ligação à terra deverá ser sempre a primeira a ser ligada, e a última a ser desligada.

¡Atención! Al instalar el equipo, conectar la tierra la primera y desconectarla la última.

Varning! Vid installation av enheten måste jordledningen alltid anslutas först och kopplas bort sist.

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then −48 V to −

48 V. When disconnecting power, the proper wiring sequence is −48 V to −48 V, +RTN to +RTN, then ground to ground. Note that the ground wire must always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en −48 V naar − 48 V. De juiste bedradingsvolgorde losgemaakt is en −48 naar − 48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, −48 V varten − 48 V. Oikea irrotettava kytkentajarjestys on −48 V varten − 48 V, +RTN varten +RTN, maajohto maajohtoon.

Avertissement Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis −48 V à −48 V. En débranchant la puissance, l'ordre approprié de câblage est −48 V à −48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, −48 V til − 48 V. Riktig frakoples tilkoplingssekvens er −48 V til − 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se muele para moler, +RTN a +RTN, entonces −48 V a −48 V. Al desconectar potencia, la secuencia apropiada del cableado es −48 V a −48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados nan EXtremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então −48 V a −48 V. Ao desconectar a potência, a seqüência apropriada da fiação é −48 V a −48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, −48 V till −48 V. Korrekt kopplas kopplingssekvens ar −48 V till −48 V, +RTN till +RTN, jord till jord.

DC Power Wiring Terminations Warning

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

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Avertissement Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

Warnung Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsabschlüsse, z.B. für einen geschlossenen Regelkreis oder gabelförmig, mit nach oben gerichteten Kabelschuhen zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Multiple Power Supplies Disconnection Warning

WARNING: The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

Waarschuwing Deze eenheid heeft meer dan één stroomtoevoerverbinding; alle verbindingen moeten volledig worden verwijderd om de stroom van deze eenheid volledig te verwijderen.

Varoitus Tässä laitteessa on useampia virtalähdekytkentöjä. Kaikki kytkennät on irrotettava kokonaan, jotta virta poistettaisiin täysin laitteesta.

Avertissement Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

Warnung Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

Avvertenza Questa unità ha più di una connessione per alimentatore elettrico; tutte le connessioni devono essere completamente rimosse per togliere l'elettricità dall'unità.

Advarsel Denne enheten har mer enn én strømtilkobling. Alle tilkoblinger må kobles helt fra for å eliminere strøm fra enheten.

Aviso Este dispositivo possui mais do que uma conexão de fonte de alimentação de energia; para poder remover a fonte de alimentação de energia, deverão ser desconectadas todas as conexões existentes.

¡Atención! Esta unidad tiene más de una conexión de suministros de alimentación; para eliminar la alimentación por completo, deben desconectarse completamente todas las conexiones.

Varning! Denna enhet har mer än en strömförsörjningsanslutning; alla anslutningar måste vara helt avlägsnade innan strömtillförseln till enheten är fullständigt bruten.

TN Power Warning

WARNING: The device is designed to work with a TN power system.
Waarschuwing Het apparaat is ontworpen om te functioneren met TN energiesystemen.

Varoitus Koje on suunniteltu toimimaan TN-sähkövoimajärjestelmien yhteydessä.

Avertissement Ce dispositif a été conçu pour fonctionner avec des systèmes d'alimentation TN.

Warnung Das Gerät ist für die Verwendung mit TN-Stromsystemen ausgelegt.

Avvertenza Il dispositivo è stato progettato per l'uso con sistemi di alimentazione TN.

Advarsel Utstyret er utfomet til bruk med TN-strømsystemer.

Aviso O dispositivo foi criado para operar com sistemas de corrente TN.

¡Atención! El equipo está diseñado para trabajar con sistemas de alimentación tipo TN.

Varning! Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

Agency Approvals for EX9251 Switches

IN THIS SECTION

● Compliance Statement for Argentina | **203**

EX9251 switches comply with the following standards:

- Safety

  - CAN/CSA-C22.2 No. 60950-1 Safety of Information Technology Equipment

  - UL 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements

  - EN 60950-1 European Norm, Safety of Information Technology Equipment

  - IEC 60950-1 Information Technology Equipment - Safety - Part 1: General Requirements (with country deviations)

  - EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements, and User's Guide

- EMC

  - EN 300 386 V1.6.1 (2012-09) Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electromagnetic Compatibility (EMC) requirements

  - EN 300 386 V2.1.1 (2016-07) Telecommunication network equipment; Electromagnetic Compatibility (EMC) requirements; Harmonized Standard covering the essential requirements of the Directive 2014/30/EU

  - EN 55032:2012 (CISPR 32:2012) Electromagnetic compatibility of multimedia equipment - Emission requirements

- EN 55024:2010 (CISPR 24:2010) Information technology equipment - Immunity characteristics - Limits and methods of measurement

- IEC/EN 61000 Immunity Test

- AS/NZS CISPR 32:2015 Australia/New Zealand Radiated and Conducted Emissions

- FCC 47 CFR Part 15 USA Radiated and Conducted Emissions

- IC ICES-003 Canada Radiated and Conducted Emissions

- VCCI-CISPR 32:2016 Japanese Radiated and Conducted Emissions

- BSMI CNS 13438 Taiwan Radiated and Conducted Emissions (at 10 meters)

- KN32/KN35 Korea Radiated Emission and Immunity Characteristics (at 10 meters)

- KN61000 Korea Immunity Test

- TEC/SD/DD/EMC-221/05/OCT-16 (Supersedes No. TEC/EMI/TEL-001/01/FEB-09) India EMC standard

- EN 61000-3-2 Power Line Harmonics

- EN 61000-3-3 Voltage Fluctuations and Flicker

- EN 61000-4-2 ESD

- EN 61000-4-3 Radiated Immunity

- EN 61000-4-4 EFT

- EN 61000-4-5 Surge

- EN 61000-4-6 Low Frequency Common Immunity

- EN 61000-4-11 Voltage Dips and Sags

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.

RELATED DOCUMENTATION

Compliance Statements for EMC Requirements for EX Series Switches

Compliance Statements for EMC Requirements for EX Series Switches

IN THIS SECTION

This topic applies to hardware devices in the EX Series product family, which includes EX Series switches, the EX Series Redundant Power System (RPS), and the XRE200 External Routing Engine.

This topic describes the EMC requirements for these hardware devices.

Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. Industry Canada does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should ensure that it is permissible to connect the equipment to the facilities of the local telecommunications company. The equipment must also be installed using an

acceptable method of connection. In some cases, the inside wiring associated with a single line individual service can be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, might give the telecommunications company cause to request the user to disconnect the equipment.

> ⚠️ **CAUTION**: Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution might be particularly important in rural areas.

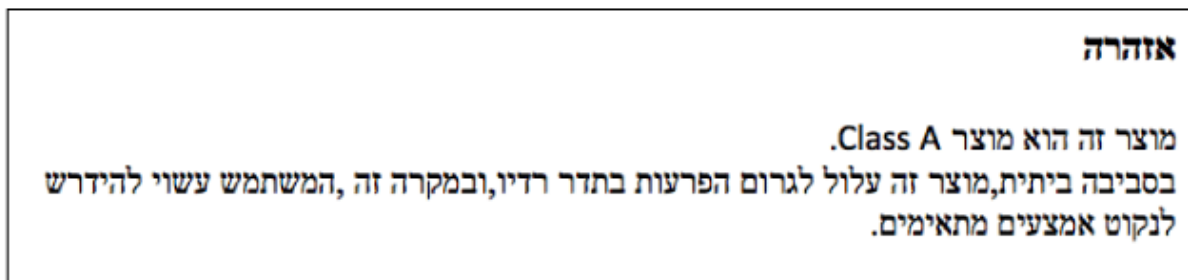## Taiwan

此為甲類資訊技術設備。於一般家居環境使用時，本設備可能導致射頻干擾，用⬚請採取相應措施。

The preceding translates as follows:

This is a Class A device. In a domestic environment, this device might cause radio interference, in which case the user needs to take adequate measures.

European Community

This is a Class A device. In a domestic environment this device might cause radio interference, in which case the user needs to take adequate measures.

Israel

אזהרה

.Class A מוצר זה הוא מוצר
בסביבה ביתית,מוצר זה עלול לגרום הפרעות בתדר רדיו,ובמקרה זה, המשתמש עשוי להידרש
לנקוט אמצעים מתאימים.

The preceding translates as follows:

Warning: This product is Class A. In residential environments, the product may cause radio interference, and in such a situation, the user may be required to take adequate measures.

Japan

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。　　　　　VCCI-A

The preceding translates as follows:

This is a Class A device. In a domestic environment this device might cause radio interference, in which case the user needs to take adequate measures.
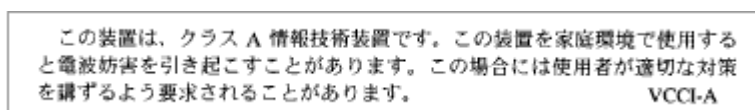
VCCI-A

Korea

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Korean Class A Warning

g040913

The preceding translates as follows:

This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home

United States

The device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users need to correct the interference at their own expense.

FCC Part 15 Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, might cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or TV technician for help.

Compliance Statements for Acoustic Noise for EX Series Switches

This topic applies to hardware devices in the EX Series product family, which includes EX Series switches, the EX Series Redundant Power System (RPS), and the XRE200 External Routing Engine.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäss EN ISO 7779

Translation: The emitted sound pressure is below 70 dB(A) per EN ISO 7779.