

# EX3400 Switch Hardware Guide

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*EX3400 Switch Hardware Guide*

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# Table of Contents

About This Guide | ix

1

## Overview

### EX3400 System Overview | 2

EX3400 Switches Hardware Overview | 2

EX3400 Switch Models | 5

EX3400 Switch Hardware and CLI Terminology Mapping | 7

Chassis Physical Specifications for EX3400 Switches | 10

Field-Replaceable Units in EX3400 Switches | 12

### EX3400 Chassis | 12

Front Panel of an EX3400 Switch | 13

Rear Panel of an EX3400 Switch | 14

Chassis Status LEDs in EX3400 Switches | 16

Management Port LEDs in EX3400 Switches | 18

RJ-45 Network Port and Uplink Port LEDs in EX3400 Switches | 20

### EX3400 Cooling System | 24

### EX3400 Power System | 28

AC Power Supply in EX3400 Switches | 28

AC Power Supply LEDs in EX3400 Switches | 31

AC Power Cord Specifications for EX3400 Switches | 32

DC Power Supply in EX3400 Switches | 35

DC Power Supply LEDs in EX3400 Switches | 37

Power Specifications for EX3400 Switches | 38

2

## Site Planning, Preparation, and Specifications

### Site Preparation Checklist for EX3400 Switches | 41

## **EX3400 Site Guidelines and Requirements | 45**

- Environmental Requirements and Specifications for EX Series Switches | 45
- General Site Guidelines | 52
- Site Electrical Wiring Guidelines | 53
- Rack Requirements | 54
- Cabinet Requirements | 56
- Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches | 57

## **EX3400 Network Cable and Transceiver Planning | 61**

- Pluggable Transceivers Supported on EX3400 Switches | 61
- SFP+ Direct Attach Copper Cables for EX Series Switches | 62
- QSFP+ Direct Attach Copper Cables for EX Series Switches | 65
- Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 67
- Calculate the Fiber-Optic Cable Power Budget for EX Series Devices | 68
- Calculating the Fiber-Optic Cable Power Margin for EX Series Devices | 69

## **EX3400 Management Cable Specifications and Pinouts | 71**

- Management Cable Specifications | 71
- Console Port Connector Pinout Information | 72
- RJ-45 Management Port Connector Pinout Information | 73
- USB Port Specifications for an EX Series Switch | 74
- RJ-45 Port, SFP Port, SFP+ Port, QSFP+ Port, and QSFP28 Port Connector Pinout Information | 75
- SFP+ Uplink Port Connector Pinout Information for an EX3400 Switch | 81
- QSFP+ Uplink Port Connector Pinout Information for an EX3400 Switch | 83
- RJ-45 to DB-9 Serial Port Adapter Pinout Information | 86

## **EX3400 Virtual Chassis | 87**

- Planning EX3400 Virtual Chassis | 87
- Understanding EX3400 Virtual Chassis Hardware Configuration | 88

## Initial Installation and Configuration

### Unpacking and Mounting the EX3400 Switch | 93

Unpacking an EX3400 Switch | 93

Parts Inventory (Packing List) for an EX3400 Switch | 94

Update Base Installation Data | 95

Installing and Connecting an EX3400 Switch | 95

Installing and Removing EX3400 Switch Hardware Components | 96

Mounting an EX3400 Switch on a Desk or Other Level Surface | 97

Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet | 98

Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet | 102

Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet | 105

Mounting an EX3400 Switch on a Wall | 106

### Connecting the EX3400 to Power | 109

Connect Earth Ground to an EX Series Switch | 110

Ground the ORv3 Compliant Switch with Tray | 120

Connecting AC Power to an EX3400 Switch | 120

Connecting DC Power to an EX3400 Switch | 122

### Connecting the EX3400 to External Devices | 125

Connect a Device to a Network for Out-of-Band Management | 125

Connect a Device to a Management Console Using an RJ-45 Connector | 126

Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port | 128

### Register Products—Mandatory to Validate SLAs | 129

### Connecting the EX3400 to the Network | 130

Install a Transceiver | 130

Connect a Fiber-Optic Cable | 133

## Configuring Junos OS on the EX3400 | 134

EX3400 Switch Default Configuration | 134

Connecting and Configuring an EX Series Switch (CLI Procedure) | 155

Connecting and Configuring an EX Series Switch (J-Web Procedure) | 158

Reverting to the Default Factory Configuration for the EX Series Switch | 161

Reverting to the EX Series Switch Factory-Default Configuration Using the request system zeroize Command | 162

Reverting to the EX Series Switch Factory-Default Configuration Using the load factory-default Command | 163

Reverting to the Factory-Default Configuration Using the EX Series Switch LCD Panel | 164

Reverting to the Factory-Default Configuration Using the Factory Reset/Mode button on EX2300, EX3400, and EX4300-48MP Switches | 164

## Dashboard for EX Series Switches | 166

# 4

## Maintaining Components

### Maintaining the EX3400 Switch Cooling System | 205

Removing a Fan Module from an EX3400 Switch | 205

Installing a Fan Module in an EX3400 Switch | 206

### Maintaining the EX3400 Power System | 208

Removing an AC Power Supply from an EX3400 Switch | 208

Installing an AC Power Supply in an EX3400 Switch | 209

Removing a DC Power Supply from an EX3400 Switch | 211

Installing a DC Power Supply in an EX3400 Switch | 213

### Maintaining a Transceiver | 214

Install a Transceiver | 214

Remove a Transceiver | 217

### Maintaining Fiber-Optic Cables | 220

Connect a Fiber-Optic Cable | 220

Disconnect a Fiber-Optic Cable | 221

How to Handle Fiber-Optic Cables | 222

## 5

**Troubleshooting Hardware****Troubleshooting EX3400 Components | 224**

Understand Alarm Types and Severity Levels on EX Series Switches | 224

Chassis Component Alarm Conditions on EX3400 Switches | 226

Check Active Alarms with the J-Web Interface | 229

Monitor System Log Messages | 230

Troubleshooting PoE Voltage Injection Failure in EX2300, EX3400, EX4300, or EX4400 Switch Models with PoE Capability | 237

Troubleshooting Storage Issues While Upgrading Junos OS in EX2300 and EX3400 Switches | 238

Troubleshoot Temperature Alarms in EX Series Switches | 240

## 6

**Contacting Customer Support and Returning the Chassis or Components****Returning an EX3400 Chassis or Components | 249**

Returning an EX3400 Switch or Component for Repair or Replacement | 249

Locating the Serial Number on an EX3400 Switch or Component | 250

Listing the Switch and Components Details with the CLI | 250

Locating the Chassis Serial Number ID Label on an EX3400 Switch | 251

Contact Customer Support to Obtain a Return Material Authorization | 252

Packing an EX3400 Switch or Component for Shipping | 253

Packing a Switch for Shipping | 253

Packing Switch Components for Shipping | 254

## 7

**Safety and Compliance Information****General Safety Guidelines and Warnings | 257****Definitions of Safety Warning Levels | 258****Qualified Personnel Warning | 260****Warning Statement for Norway and Sweden | 260****Fire Safety Requirements | 261****Installation Instructions Warning | 262**

Chassis and Component Lifting Guidelines	263
Restricted Access Warning	263
Ramp Warning	265
Rack-Mounting and Cabinet-Mounting Warnings	265
Grounded Equipment Warning	269
Laser and LED Safety Guidelines and Warnings	270
Radiation from Open Port Apertures Warning	273
Maintenance and Operational Safety Guidelines and Warnings	274
General Electrical Safety Guidelines and Warnings	280
Action to Take After an Electrical Accident	281
Prevention of Electrostatic Discharge Damage	282
AC Power Electrical Safety Guidelines	283
AC Power Disconnection Warning	284
DC Power Electrical Safety Guidelines	285
DC Power Disconnection Warning	286
DC Power Grounding Requirements and Warning	287
DC Power Wiring Sequence Warning	288
DC Power Wiring Terminations Warning	290
Multiple Power Supplies Disconnection Warning	291
TN Power Warning	292
Agency Approvals for EX Series Switches	293
Compliance Statements for EMC Requirements for EX Series Switches	294
Compliance Statements for Acoustic Noise for EX Series Switches	298



# About This Guide

Use this guide to install hardware and perform initial software configuration, routine maintenance, and troubleshooting for the EX3400 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.

# 1

CHAPTER

## Overview

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### IN THIS CHAPTER

- EX3400 System Overview | 2
  - EX3400 Chassis | 12
  - EX3400 Cooling System | 24
  - EX3400 Power System | 28
-

# EX3400 System Overview

## IN THIS SECTION

- [EX3400 Switches Hardware Overview | 2](#)
- [EX3400 Switch Models | 5](#)
- [EX3400 Switch Hardware and CLI Terminology Mapping | 7](#)
- [Chassis Physical Specifications for EX3400 Switches | 10](#)
- [Field-Replaceable Units in EX3400 Switches | 12](#)

## EX3400 Switches Hardware Overview

### IN THIS SECTION

- [Benefits of the EX3400 Switch | 3](#)
- [EX3400 Switches First View | 3](#)
- [Uplink Ports | 3](#)
- [Virtual Chassis | 4](#)
- [Console Ports | 4](#)
- [Power over Ethernet Ports | 4](#)

Juniper Networks EX Series Ethernet Switches provide scalable connectivity for the enterprise market, including branch offices, campus locations, and data centers. The switches run the Juniper Networks Junos operating system (Junos OS), which provides Layer 2 and Layer 3 switching, routing, and security services.

In addition to the device CLI, the EX3400 switch can be managed and monitored by using Juniper Routing Director (formerly Juniper Paragon Automation).

Juniper Networks EX3400 Ethernet Switches provide connectivity for low-density environments.

## Benefits of the EX3400 Switch

High flexibility—EX3400 switches provide a flexible solution that supports converged data, voice, and video environments.

Support for MACsec—EX3400 switches support IEEE 802.1AE MACsec, providing support for link-layer data confidentiality, data integrity, and data origin authentication. The MACsec feature enables EX3400 to support 88 Gbps of near line-rate hardware-based traffic encryption on all Gigabit Ethernet and 10 Gigabit Ethernet ports.

Nondisruptive software upgrades—EX3400 switches feature a resilient operating system that supports high availability (HA) features such as graceful Routing Engine switchover (GRES), nonstop active routing (NSR), and nonstop software upgrade (NSSU), providing software upgrades and changes without disrupting network traffic.

## EX3400 Switches First View

EX3400 switches provide:

- Either 24 or 48 RJ-45 ports (labeled **0** through **23** or **0** through **47**) that support 10/100/1000BASE-T Gigabit Ethernet connectors.
- Four uplink ports (labeled **0** through **3** on the front panel) that support small form-factor pluggable (SFP) transceivers and small form-factor pluggable plus (SFP+) transceivers, and two 40-Gigabit Ethernet ports (labeled **0** through **1** on the rear panel) that support quad small form-factor pluggable plus (QSFP+) transceivers.
- *Virtual Chassis* capability—You can connect up to 10 EX3400 switches together to form one unit that you manage as a single chassis, called a *Virtual Chassis*.
- Power over Ethernet (PoE) or Power over Ethernet plus (PoE+) on all RJ-45 ports (in PoE-capable models).

## Uplink Ports

EX3400 switches have autosensing uplink ports that you can use to:

- Connect an access switch to a distribution switch
- Interconnect member switches of a Virtual Chassis

The QSFP+ uplink ports are configured as Virtual Chassis ports (VCPs) by default. You can use these ports to interconnect Virtual Chassis members. To use the QSFP+ uplink ports as network ports, you must configure them as network ports. The uplink ports on the front panel are configured as network

ports by default. To use the uplink ports on the front panel as VCPs, you must configure them as VCPs. See [Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port](#).

The uplink ports on the front panel support four 1-gigabit SFP transceivers, four 10-gigabit SFP+ transceivers, or a combination of four SFP+ and SFP transceivers. The QSFP+ uplink ports support 40-gigabit QSFP+ transceivers. For a list of supported transceivers, see ["Pluggable Transceivers Supported on EX3400 Switches" on page 61](#).



**NOTE:** You cannot form a Virtual Chassis by using SFP transceivers.

## Virtual Chassis

You can interconnect a maximum of 10 EX3400 switches to form a Virtual Chassis. You can operate these interconnected switches as a single, logical device with a single IP address.

You can use the following ports to interconnect an EX3400 switch in a Virtual Chassis:

- QSFP+ ports configured as VCPs by using QSFP+ transceivers

- 



**NOTE:** You cannot form a Virtual Chassis by using SFP transceivers.

Uplink ports on the front panel configured as VCPs by using SFP+ transceivers

By default, the QSFP+ ports are configured as VCPs.

## Console Ports

EX3400 switches have two console ports—an RJ-45 console port and a Mini-USB Type-B console port. The RJ-45 console port is on the rear panel of the switch and the mini-USB console port is on the front panel. Both console ports are labeled **CON**. The RJ-45 console port accepts a cable that has an RJ-45 connector and the Mini-USB Type-B console port accepts a Mini-B plug (5-pin) connector to connect to the console management device.

## Power over Ethernet Ports

EX3400 switches are available with or without Power over Ethernet (PoE) or Power over Ethernet Plus (PoE+) capability. Models that support PoE or PoE+ provide that support on all RJ-45 ports. PoE ports provide electrical current to devices—such as IP phones, wireless access points, and security cameras—through network cables, thus eliminating the need for separate power cords for those devices.



**NOTE:** IEEE 802.3at class 4 powered devices require category 5 or higher Ethernet cables.

The remainder of this documentation uses the term PoE for both PoE and PoE+ unless there is a need to distinguish between the two.

## EX3400 Switch Models

EX3400 switch models are available:

- With 24 or 48 RJ-45 ports
- With or without PoE+ capability
- With front-to-back or back-to-front airflow
- With AC or DC power supplies

[Table 1 on page 5](#) lists the EX3400 switch models.

**Table 1: EX3400 Switch Models**

Model	Access Ports	Power Supply Provided by Default	Ports in Which PoE + Is Available	Maximum System Power Available for PoE/PoE+	Direction of Airflow	First Junos OS Release
EX3400-24T	24 Gigabit Ethernet	JPSU-150-AC-AFO	–	–	Front-to-back	15.1X53-D50

Table 1: EX3400 Switch Models *(Continued)*

Model	Access Ports	Power Supply Provided by Default	Ports in Which PoE + Is Available	Maximum System Power Available for PoE/PoE+	Direction of Airflow	First Junos OS Release
EX3400-24P	24 Gigabit Ethernet	JPSU-600-AC-AFO	All 24 ports	<ul style="list-style-type: none"> <li>720 W with two 600 W power supplies installed</li> <li>370 W with one 600 W power supply installed</li> </ul>	Front-to-back	15.1X53-D50
EX3400-24T-DC	24 Gigabit Ethernet	JPSU-150W-DC-AFO	–	–	Front-to-back	15.1X53-D51
EX3400-48T	48 Gigabit Ethernet	JPSU-150-AC-AFO	–	–	Front-to-back	15.1X53-D50
EX3400-48T-AFI	48 Gigabit Ethernet	JPSU-150-AC-AFI	–	–	Back-to-front	15.1X53-D50
EX3400-48P	48 Gigabit Ethernet	JPSU-920-AC-AFO	All 48 ports	<ul style="list-style-type: none"> <li>1440 W with two 920 W power supplies installed</li> <li>740 W with one 920 W power supply installed</li> </ul>	Front-to-back	15.1X53-D50

**Table 1: EX3400 Switch Models (Continued)**

Model	Access Ports	Power Supply Provided by Default	Ports in Which PoE + Is Available	Maximum System Power Available for PoE/PoE+	Direction of Airflow	First Junos OS Release
EX3400-48T-DC	48 Gigabit Ethernet	JPSU-150W-DC-AFO	–	–	Front-to-back	18.2R3-S4

## EX3400 Switch Hardware and CLI Terminology Mapping

This topic describes the hardware terms used in EX3400 switch documentation and the corresponding terms used in the Junos OS CLI. See [Table 2 on page 7](#).

**Table 2: CLI Equivalents of Terms Used in Documentation for EX3400 Switches**

Hardware Item (Field as Displayed in CLI)	Description (Field as Displayed in CLI)	Value (Field as Displayed in CLI)	Item in Documentation	Additional Information
Chassis	One of the following: <ul style="list-style-type: none"> <li>EX3400-24T</li> <li>EX3400-24P</li> <li>EX3400-24T-DC</li> <li>EX3400-48T</li> <li>EX3400-48T-AFI</li> <li>EX3400-48P</li> <li>EX3400-48T-DC</li> </ul>	–	Switch chassis	<a href="#">"Chassis Physical Specifications for EX3400 Switches" on page 10</a>



Table 2: CLI Equivalents of Terms Used in Documentation for EX3400 Switches *(Continued)*

Hardware Item (Field as Displayed in CLI)	Description (Field as Displayed in CLI)	Value (Field as Displayed in CLI)	Item in Documentation	Additional Information
FPC ( <i>n</i> )	<p>On standalone EX3400 switches:</p> <p>Abbreviated name of the Flexible PIC Concentrator (FPC)</p> <p>One of the following:</p> <ul style="list-style-type: none"> <li>EX3400-24T</li> <li>EX3400-24P</li> <li>EX3400-24T-DC</li> <li>EX3400-48T</li> <li>EX3400-48T-AFI</li> <li>EX3400-48P</li> <li>EX3400-48T-DC</li> </ul>	Value of <i>n</i> is always 0.	The switch does not have actual FPCs. In this case, FPC refers to the switch itself.	<a href="#">Understanding Interface Naming Conventions</a>
	On EX3400 Virtual Chassis: Member ID of the switch within the Virtual Chassis	<i>n</i> is a value in the range of 0–9.	In this case, the FPC number refers to the member ID assigned to the switch.	<a href="#">Understanding Virtual Chassis Components</a>
PIC ( <i>n</i> )	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range of 0–2.	The switch does not have actual PIC devices; see entries for PIC 0 through PIC 2 for the equivalent item on the switch.	<a href="#">Understanding Interface Naming Conventions</a>

Table 2: CLI Equivalents of Terms Used in Documentation for EX3400 Switches *(Continued)*

Hardware Item (Field as Displayed in CLI)	Description (Field as Displayed in CLI)	Value (Field as Displayed in CLI)	Item in Documentation	Additional Information
	One of the following: <ul style="list-style-type: none"> <li>• 24x 10/100/1000 BASE-T</li> <li>• 48x 10/100/1000 BASE-T</li> </ul>	PIC 0	RJ-45 ports on the front panel of the switch.	<a href="#">"Front Panel of an EX3400 Switch" on page 13</a>
	4x GE SFP+	PIC 2	SFP+ uplink ports on the front panel of the switch.	<a href="#">"Front Panel of an EX3400 Switch" on page 13</a>
	2x XE QSFP+	PIC 1	QSFP+ uplink ports on the rear panel of the switch.	<a href="#">"Rear Panel of an EX3400 Switch" on page 14</a>
Xcvr ( <i>n</i> )	Abbreviated name of the transceiver	<i>n</i> is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	<a href="#">"Pluggable Transceivers Supported on EX3400 Switches" on page 61</a>

**Table 2: CLI Equivalents of Terms Used in Documentation for EX3400 Switches (Continued)**

Hardware Item (Field as Displayed in CLI)	Description (Field as Displayed in CLI)	Value (Field as Displayed in CLI)	Item in Documentation	Additional Information
Power Supply ( <i>n</i> )	One of the following: <ul style="list-style-type: none"> <li>• JPSU-150W-AC-AFI</li> <li>• JPSU-150W-AC-AFO</li> <li>• JPSU-600W-AC-AFO</li> <li>• JPSU-920W-AC-AFO</li> <li>• JPSU-150W-DC-AFO</li> </ul>	<i>n</i> has a value 0 or 1, corresponding to the power supply slot number.	AC power supply or DC power supply	<a href="#">"AC Power Supply in EX3400 Switches" on page 28</a>  <a href="#">"DC Power Supply in EX3400 Switches" on page 35</a>
Fan Tray	One of the following: <ul style="list-style-type: none"> <li>• Fan Module, Airflow In (AFI)</li> <li>• Fan Module, Airflow Out (AFO)</li> </ul>	<i>n</i> has a value 0 or 1, corresponding to the fan module slot number.	Fan tray	<a href="#">"EX3400 Cooling System" on page 24</a>

## Chassis Physical Specifications for EX3400 Switches

The EX3400 switch chassis is a rigid sheet-metal structure that houses the hardware components. [Table 3 on page 10](#) summarizes the physical specifications of the EX3400 switch chassis.

**Table 3: Physical Specifications of the EX3400 Switch Chassis**

Description	Value
Chassis height	1.72 in. (4.37 cm)

**Table 3: Physical Specifications of the EX3400 Switch Chassis (*Continued*)**

Description	Value
Chassis width	<ul style="list-style-type: none"> <li>• 17.4 in. (44.1 cm)</li> <li>• 19 in. (48.2 cm) with mounting brackets attached</li> </ul>
Chassis depth	<ul style="list-style-type: none"> <li>• With no power supply installed: 13.78 in. (35 cm)</li> <li>• With power supply installed: 15.05 in. (38.24 cm)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• EX3400-24T (without power supply or fan modules installed): 9.76 lb (4.43 kg)</li> <li>• EX3400-24T-DC (without power supply or fan modules installed): 9.76 lb (4.43 kg)</li> <li>• EX3400-24P (without power supply or fan modules installed): 9.97 lb (4.52 kg)</li> <li>• EX3400-48T (without power supply or fan modules installed): 10.23 lb (4.64 kg)</li> <li>• EX3400-48T-AFI (without power supply or fan modules installed): 10.24 lb (4.64 kg)</li> <li>• EX3400-48P (without power supply or fan modules installed): 10.49 lb (4.76 kg)</li> <li>• EX3400-48T-DC (without power supply or fan modules installed): 10.23 lb (4.64 kg)</li> <li>• JPSU-150-AC-AFO: 1.43 lb (0.65 kg)</li> <li>• JPSU-150-AC-AFI: 1.43 lb (0.65 kg)</li> <li>• JPSU-600-AC-AFO: 1.82 lb (0.83 kg)</li> <li>• JPSU-920-AC-AFO: 1.87 lb (0.85 kg)</li> <li>• JPSU-150W-DC-AFO: 1.43 lb (0.65 kg)</li> <li>• Fan module: 1.59 lb (0.72 kg)</li> </ul>

## SEE ALSO

| [Installing and Connecting an EX3400 Switch](#) | 95

## Field-Replaceable Units in EX3400 Switches

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in EX3400 switches are hot-removable and hot-insertable: You can remove and replace them without powering off the switch. The FRUs in EX3400 switches are:

- Power supplies
- Fan modules
- 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.

## EX3400 Chassis

### IN THIS SECTION

- [Front Panel of an EX3400 Switch](#) | 13
- [Rear Panel of an EX3400 Switch](#) | 14
- [Chassis Status LEDs in EX3400 Switches](#) | 16
- [Management Port LEDs in EX3400 Switches](#) | 18
- [RJ-45 Network Port and Uplink Port LEDs in EX3400 Switches](#) | 20

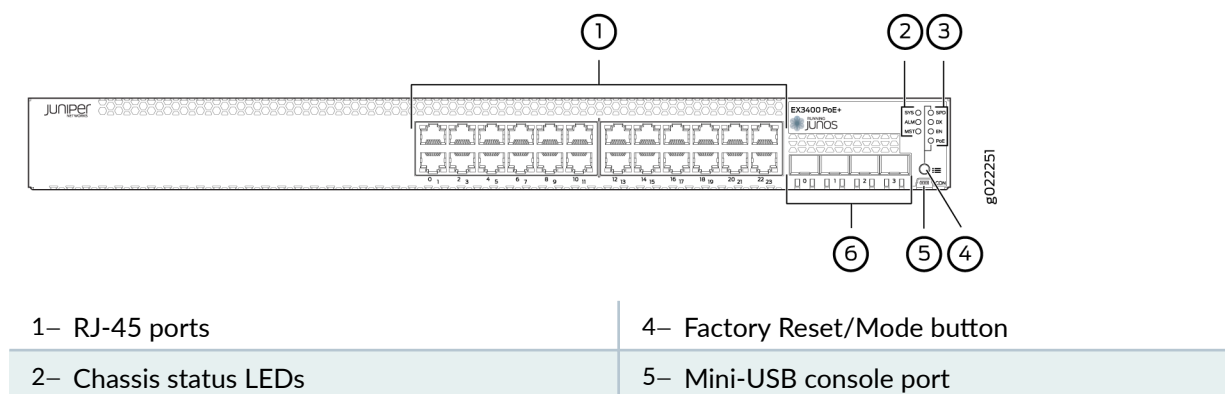
## Front Panel of an EX3400 Switch

The front panel of an EX3400 switch consists of the following components:

- RJ-45 ports:
  - Depending on the switch model, 24 or 48 RJ-45 ports (labeled **0** through **23** or **0** through **47**) that support 10/100/1000BASE-T Gigabit Ethernet connectors
  - PoE available in all RJ-45 ports in EX3400-24P and EX3400-48P models
  - PoE not available in any network port in EX3400-24T, EX3400-24T-DC, EX3400-48T, EX3400-48T-AFI, and EX3400-48T-DC models
- Three chassis status LEDs
- Four port status mode LEDs in models with PoE capability and three port status mode LEDs in models without PoE capability
- One Factory Reset/Mode button
- One Mini-USB console port (the Mini-USB Type-B console port accepts a Mini-B plug (5-pin) connector to connect to the console management device)
- Four uplink ports that support SFP+ transceivers, SFP transceivers, or a combination of these transceivers. These uplink ports are configured as network ports by default. To use the uplink ports to interconnect Virtual Chassis members, you must configure them as VCPs. See [Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port](#).

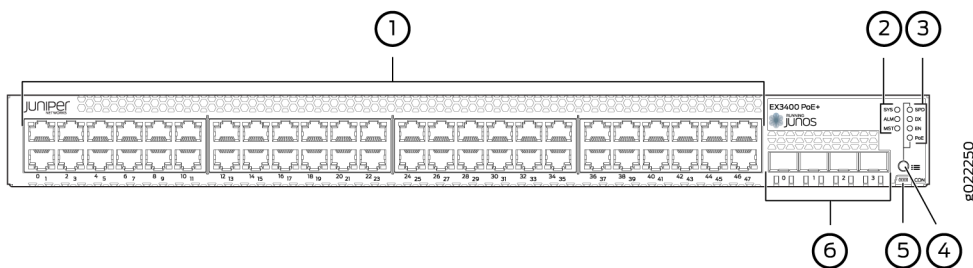
[Figure 1 on page 13](#) shows the front panel of an EX3400 switch with 24 Gigabit Ethernet ports. [Figure 2 on page 14](#) shows the front panel of an EX3400 switch with 48 Gigabit Ethernet ports.

**Figure 1: Front Panel of an EX3400 Switch with 24 Gigabit Ethernet Ports**



3– Port status mode LEDs. The LED labeled <b>PoE</b> is present only on models with PoE capability.	6– Uplink ports
---	-----------------

Figure 2: Front Panel of an EX3400 Switch with 48 Gigabit Ethernet Ports



1– RJ-45 ports	4– Factory Reset/Mode button
2– Chassis status LEDs	5– Mini-USB console port
3– Port status mode LEDs. The LED labeled <b>PoE</b> is present only on models with PoE capability.	6– Uplink ports

## Rear Panel of an EX3400 Switch

The rear panel of the EX3400 switch consists of the following components:

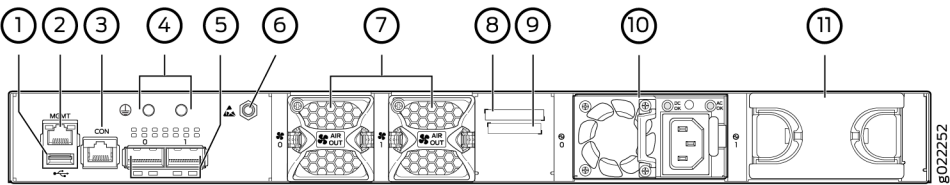
- 1 USB port
- 1 management Ethernet port that supports an RJ-45 connector
- 1 RJ-45 console port (the RJ-45 console port accepts a cable with an RJ-45 connector to connect to the console management device)
- 1 protective earthing terminal
- 2 QSFP+ uplink ports. These uplink ports are configured as Virtual Chassis ports (VCPs) by default. You can use these uplink ports to interconnect Virtual Chassis members. To use the QSFP+ uplink ports as network ports, you must configure them as network ports.
- 1 ESD point
- 2 fan modules

- CLEI code label
- Serial Number ID Label
- 1 AC power supply or DC power supply
- Empty slot for power supply covered by a blank panel or DC power supply

Figure 3 on page 15 shows the rear panel of an EX3400 switch with AC power supply.

The power cord retainer extends out of the chassis by 3 in. (7.62 cm). The fan module handle extends out of the chassis by 1.2 in. (3 cm).

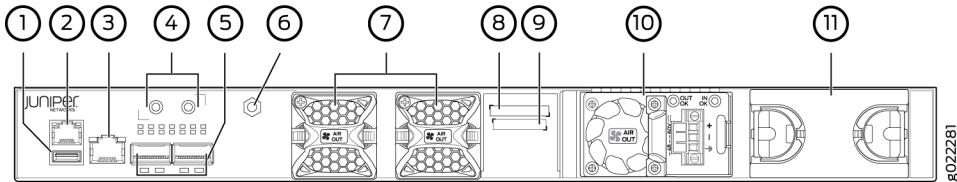
Figure 3: Rear Panel of an EX3400 Switch with an AC Power Supply



1– USB port	7– Fan modules
2– Management Ethernet port	8– CLEI code label
3– RJ-45 console port	9– Serial Number ID Label
4– Protective earthing terminal	10– AC power supply
5– QSFP+ uplink ports	11– Empty slot for power supply covered by a blank panel
6– ESD point	

Figure 4 on page 15 shows the rear panel of an EX3400 switch with DC power supply.

Figure 4: Rear Panel of an EX3400 Switch with a DC Power Supply



1– USB port	7– Fan modules
2– Management Ethernet port	8– CLEI code label
3– RJ-45 console port	9– Serial Number ID Label



4– Protective earthing terminal	10– DC power supply
5– QSFP+ uplink ports	11– Empty slot for power supply covered by a blank panel
6– ESD point	

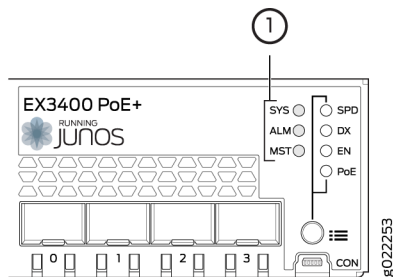


**NOTE:** EX3400 switches shipped after 2 February, 2017 have serial number ID label on the side panel of the chassis and on the rear panel of the chassis. EX3400 switches shipped before 2 February, 2017 have the serial number ID label only on the side panel of the chassis.

## Chassis Status LEDs in EX3400 Switches

The front panel of an EX3400 switch has three chassis status LEDs labeled **SYS**, **ALM**, and **MST** (see [Figure 5 on page 16](#)).

**Figure 5: Chassis Status LEDs in an EX3400 Switch**



1– Chassis Status LEDs

[Table 4 on page 17](#) describes the chassis status LEDs in an EX3400 switch, their colors and states, and the status they indicate.

Table 4: Chassis Status LEDs in an EX3400 Switch

LED Label	Color	State and Description
SYS	Green	<ul style="list-style-type: none"> <li>On steadily—Junos OS for EX Series switches has been loaded on the switch.</li> <li>Blinking—The switch is booting.</li> <li>Off—The switch is powered off or is halted.</li> </ul>
ALM	Red	<p>There is a major alarm.</p> <p><b>NOTE:</b> When you connect power to the switch, the alarm LED (<b>ALM</b>) glows red. This behavior is normal. Plugging an active Ethernet cable into the management port (<b>MGMT</b>) on the switch completes the network link and turns off the <b>ALM</b> LED. (See <i>Connect a Device to a Network for Out-of-Band Management</i>.)</p> <p>Connecting the switch to a dedicated management console instead of a network does not affect the <b>ALM</b> LED. The LED remains red until the switch is connected to a network.</p>
	Yellow	<p>There is a minor alarm.</p> <p><b>NOTE:</b> The <b>ALM</b> LED glows yellow if you commit a configuration to make it active on the switch without creating a rescue configuration to back it up. To save the most recently committed configuration as the rescue configuration, enter the operational mode command <code>request system configuration rescue save</code>.</p>
	Unlit	There is no alarm or the switch is halted.

Table 4: Chassis Status LEDs in an EX3400 Switch (*Continued*)

LED Label	Color	State and Description
<b>MST</b>	Green	<p>In a standalone EX3400 switch:</p> <ul style="list-style-type: none"> <li>On steadily—The switch is functioning normally as the primary.</li> <li>Off—The switch is powered off or is halted.</li> </ul> <p>In a Virtual Chassis configuration:</p> <ul style="list-style-type: none"> <li>On steadily—The switch is functioning normally and is the primary in the Virtual Chassis configuration.</li> <li>Blinking—The switch is functioning normally and is the backup in the Virtual Chassis configuration.</li> <li>Off—The switch is a linecard member in the Virtual Chassis configuration or is halted.</li> </ul>

A major alarm (red) indicates a critical error condition that requires immediate action.

A minor alarm (yellow) indicates a noncritical condition that requires monitoring or maintenance. A minor alarm that is left unchecked might cause interruption in service or performance degradation.

All three LEDs can be lit simultaneously.

You can view the colors of the two LEDs remotely through the CLI by issuing the operational mode command `show chassis led`.

## SEE ALSO

[Understand Alarm Types and Severity Levels on EX Series Switches](#) | 224

## Management Port LEDs in EX3400 Switches

The management port, which is on the rear panel of an EX3400 switch, has two LEDs that indicate link/activity and port status (see [Figure 6 on page 19](#)).



## RJ-45 Network Port and Uplink Port LEDs in EX3400 Switches

Each RJ-45 network port and the uplink port on an EX3400 switch have two LEDs each that indicate link/activity and port status. See [Figure 7 on page 20](#), [Figure 8 on page 20](#), and [Figure 9 on page 20](#).

Figure 7: LEDs on the RJ-45 Network Ports

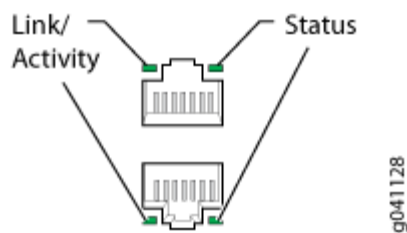
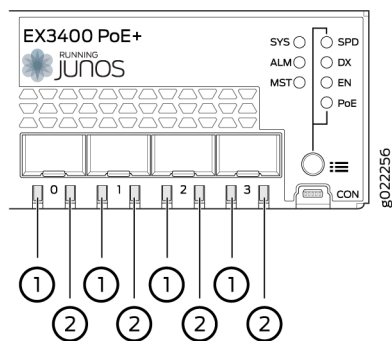
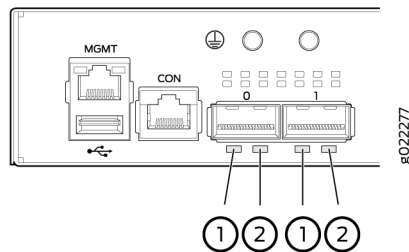


Figure 8: LEDs on the SFP+ Uplink Ports



- |   |  |
|---|--|
| 1– Link/Activity LED on the SFP+ uplink ports | 2– Status LED on the SFP+ uplink ports |
|---|--|

Figure 9: LEDs on the QSFP+ Uplink Ports



- |  |   |
|--|---|
| 1– Link/Activity LED on the QSFP+ uplink ports | 2– Status LED on the QSFP+ uplink ports |
|--|---|

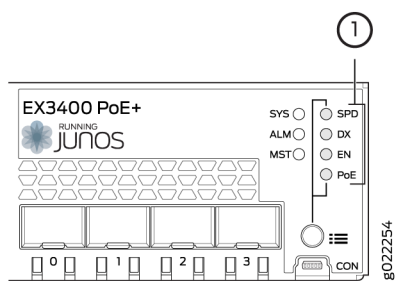
Table 7 on page 21 describes the Link/Activity LED.

Table 7: Link/Activity LED on the RJ-45 Network Ports and the Uplink Ports

LED	Color	State and Description
Link/Activity	Green	<ul style="list-style-type: none"><li>• Blinking—The port and the link are active, and there is link activity; or the switch is transitioning to the EZSetup mode.</li><li>• On steadily—The port and the link are active, but there is no link activity; or the switch is reverting to the factory default configuration.</li><li>• Off—The port is not active.</li></ul>

Figure 10 on page 21 shows the LEDs that indicate the status of one of the four port parameters—speed, duplex mode, administrative status, and Power over Ethernet (PoE) status. Use the Factory Reset/ Mode button on the far right side of the front panel to toggle the Status LED to show the different port parameters for RJ-45 network ports. You can tell which port parameter is indicated by the Status LED by looking at which port status mode LED (**SPD**, **DX**, **EN**, and **PoE**) is lit. The LED labeled **PoE** is not available on switch models with RJ-45 network ports that do not provide PoE.

Figure 10: Port Mode LEDs on EX3400 Switches



1– Port mode LEDs

Table 8 on page 22 describes the Status LED on the RJ-45 network ports.

Table 8: Status LED on the RJ-45 Network Ports in EX3400 Switches

Port Parameters	State and Description
Speed ( <b>SPD</b> )	<p>Indicates the speed. The speed indicators are:</p> <ul style="list-style-type: none"> <li>• Unlit—10 Mbps</li> <li>• Blinking—100 Mbps</li> <li>• On steadily—1000 Mbps</li> </ul>
Duplex mode ( <b>DX</b> )	<p>Indicates the duplex mode. The status indicators are:</p> <ul style="list-style-type: none"> <li>• Green—Port is set to full-duplex mode.</li> <li>• Unlit—Port is set to half-duplex mode.</li> </ul>
Administrative status ( <b>EN</b> )	<p>Indicates the administrative status. The status indicators are:</p> <ul style="list-style-type: none"> <li>• Green—Port is administratively enabled.</li> <li>• Unlit—Port is administratively disabled.</li> </ul>

Table 8: Status LED on the RJ-45 Network Ports in EX3400 Switches (*Continued*)

Port Parameters	State and Description
PoE status ( <b>PoE</b> )	<p>Indicates the PoE status. The status indicators for are:</p> <ul style="list-style-type: none"> <li>On steadily—PoE is available on the port, a device that draws power from the port is connected to the port, and the device is drawing power from the port.</li> <li>Blinking—PoE is available on the port, but no power is drawn from the port because of one of the following: <ul style="list-style-type: none"> <li>No device that draws power from the port is connected to the port.</li> <li>A device that draws power from the port is connected to the port, but the device is not drawing any power from the port.</li> </ul> </li> <li>Unlit—PoE is not available on the port.</li> </ul> <p><b>NOTE:</b> PoE Status LED is available on the following EX3400 switch models:</p> <ul style="list-style-type: none"> <li>EX3400-24P</li> <li>EX3400-48P</li> </ul>

Starting in Junos OS Release 19.4R1, you can use the `request chassis beacon` command on EX3400 switches to identify the switch or a port on the switch. When you execute the command, the status LEDs on the RJ-45 network ports blink two times per second irrespective of the mode the ports are operating in (see [How to Locate a Device or Port Using the Chassis Beacon](#)).

The uplink ports operate in full-duplex mode and PoE is not applicable on uplink ports. The Status LED on uplink ports indicate the Speed (**SPD**) and Administrative status (**EN**). [Table 9 on page 24](#) describes the Status LED on the uplink ports.



**Table 9: Status LED on the Uplink Ports in EX3400 Switches**

Port Parameters	State and Description
Status LED	<p>Indicates the speed and administrative status.</p> <ul style="list-style-type: none"> <li>• The indicators for SFP+ uplink ports are: <ul style="list-style-type: none"> <li>• On steadily—10 Gbps</li> <li>• Blinking—1000 Mbps</li> <li>• Unlit—The port is administratively disabled or the link is down</li> </ul> </li> <li>• The indicators for QSFP+ uplink ports are: <ul style="list-style-type: none"> <li>• On steadily—40-Gigabit port is up</li> <li>• Unlit—40-Gigabit port is down</li> </ul> </li> </ul>

You can tell which port parameter is indicated by the Status LED on RJ-45 network ports and uplink ports by issuing the operational mode command `show chassis led` .

## EX3400 Cooling System

### IN THIS SECTION

- [Airflow Direction in EX3400 Switch Models | 25](#)
- [Front-to-Back Airflow | 25](#)
- [Back-to-Front Airflow | 26](#)

The cooling system in an EX3400 switch consists of two fans along the rear of the chassis and a fan each in the power supplies. The fans provide front-to-back or back-to-front chassis cooling depending on the switch model.

## Airflow Direction in EX3400 Switch Models

Table 10 on page 25 shows the different EX3400 switch models and their direction of airflow.

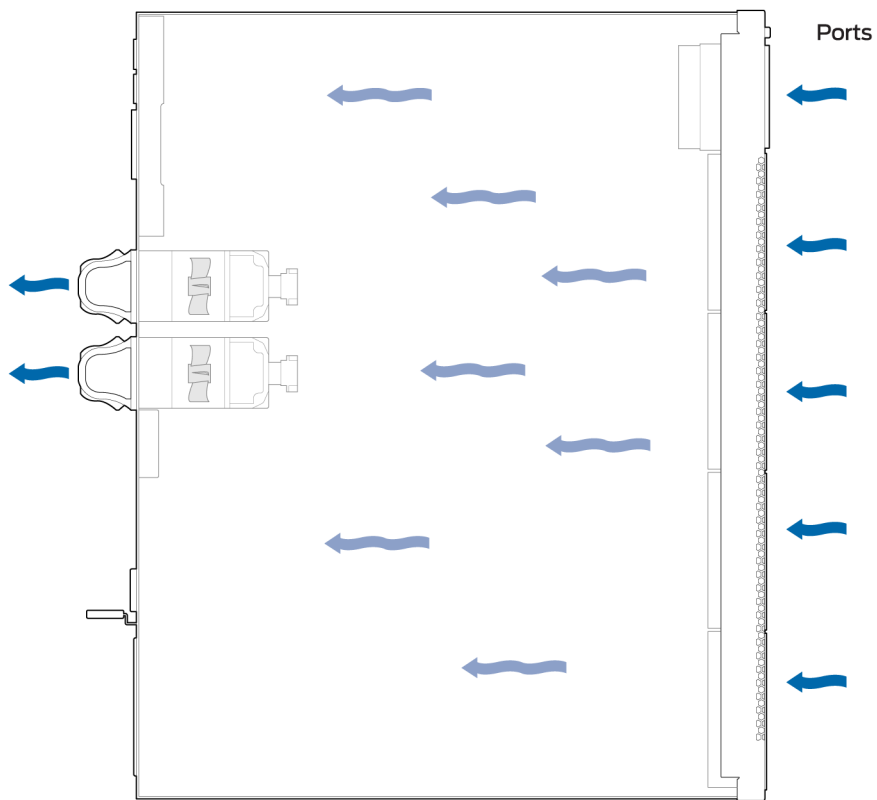
**Table 10: Airflow Direction in EX3400 Switch Models**

Model	Direction of Airflow
EX3400-24T	Front-to-back
EX3400-24P	Front-to-back
EX3400-24T-DC	Front-to-back
EX3400-48T	Front-to-back
EX3400-48T-AFI	Back-to-front
EX3400-48P	Front-to-back
EX3400-48T-DC	Front-to-back

## Front-to-Back Airflow

In switch models with front-to-back airflow, the air intake is located on the front of the chassis. Cool air is pulled into the chassis and pushed toward the rear of the chassis. Hot air exhausts from the rear of the chassis. See [Figure 11 on page 26](#).

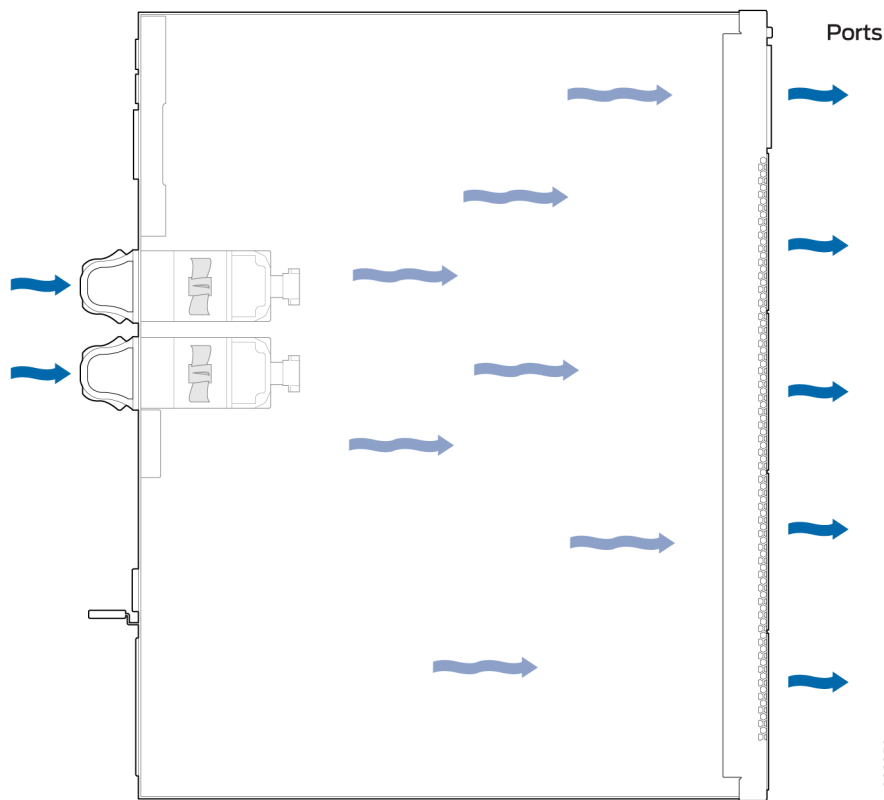
Figure 11: Front-to-Back Airflow Through the EX3400 Switch Chassis



## Back-to-Front Airflow

In switch models with back-to-front airflow, the air intake is located on the rear of the chassis. Cool air is pulled into the chassis and pushed toward the front of the chassis. Hot air exhausts from the front of the chassis. See [Figure 12 on page 27](#).

Figure 12: Back-to-Front Airflow Through the EX3400 Switch Chassis



Under normal operating conditions, the fans operate at moderate speeds for minimal noise. Temperature sensors in the chassis monitor the temperature within the chassis. If any fan fails or if the temperature inside the chassis rises above the threshold, the switch raises an alarm and all functioning fans operate at a higher speed than normal. If the temperature inside the chassis rises above the threshold, the switch shuts down automatically.

## RELATED DOCUMENTATION

*Understand Alarm Types and Severity Levels on EX Series Switches*

[Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches](#) | 57

*Prevention of Electrostatic Discharge Damage*

# EX3400 Power System

## IN THIS SECTION

- AC Power Supply in EX3400 Switches | 28
- AC Power Supply LEDs in EX3400 Switches | 31
- AC Power Cord Specifications for EX3400 Switches | 32
- DC Power Supply in EX3400 Switches | 35
- DC Power Supply LEDs in EX3400 Switches | 37
- Power Specifications for EX3400 Switches | 38

## AC Power Supply in EX3400 Switches

### IN THIS SECTION

- Characteristics of a AC Power Supply | 29

The AC power supplies in EX3400 switches are hot-insertable and hot-removable field-replaceable units (FRUs): You can install them without powering off the switch or disrupting the switching function. The switch is shipped with one power supply installed.



**NOTE:** After powering on the switch, wait for at least 60 seconds before powering it off. After powering off the switch, wait for at least 60 seconds before powering it back on. If only one power supply is installed in your EX3400 switch, you need to power off the switch before removing the power supply.

Table 11 on page 29 lists the power consumed by each EX3400 switch model. The maximum power available on a PoE+ port is 30 W.

**Table 11: Power Consumed by EX3400 Switches**

Model Number	Number of PoE-Enabled Ports	Maximum Power Consumed by the Switch	Maximum System Power Available for PoE
EX3400-24T	–	100 W	–
EX3400-24P	24	110 W	<ul style="list-style-type: none"> <li>• 720 W with two 600 W power supplies installed</li> <li>• 370 W with one 600 W power supply installed</li> </ul>
EX3400-48T	–	120 W	–
EX3400-48T-AFI	–	120 W	–
EX3400-48P	48	120 W	<ul style="list-style-type: none"> <li>• 1440 W with two 920 W power supplies installed</li> <li>• 740 W with one 920 W power supply installed</li> </ul>



**NOTE:** In EU countries, Egypt, Nigeria, Saudi Arabia, Serbia, South Korea, and South Africa, you must ensure that the redundant power supply is installed in the switch chassis.

## Characteristics of a AC Power Supply

EX3400 switches support 150 W, 600 W, 920 W AC power supply. Power supplies are installed in the power supply slots labeled **PSU 0** and **PSU 1** in the rear panel of the chassis. The following table lists the details of the AC power supplies used in EX3400 switches.

**Table 12: Details of the AC Power Supplies in EX3400 Switches**

Details	150 W AC Power Supply	150 W AC Power Supply	600 W AC Power Supply	920 W AC Power Supply
Model number	JPSU-150-AC-AFO	JPSU-150-AC-AFI	JPSU-600-AC-AFO	JPSU-920-AC-AFO
Field-replaceable unit (FRU) type	Hot-insertable and hot-removable	Hot-insertable and hot-removable	Hot-insertable and hot-removable	Hot-insertable and hot-removable
Power supply weight	1.433 lb (0.65 kg)	1.433 lb (0.65 kg)	1.82 lb (0.83 kg)	1.87 lb (0.85 kg)
Minimum installed in chassis	1	1	1	1
Maximum installed in chassis	2	2	2	2
Power supply slots	Install in power supply slots in the rear panel of the chassis.	Install in power supply slots in the rear panel of the chassis.	Install in power supply slots in the rear panel of the chassis.	Install in power supply slots in the rear panel of the chassis.
Fans	Internal	Internal	Internal	Internal
Airflow	Front-to-back, indicated by label <b>AIR OUT</b>	Back-to-front, indicated by label <b>AIR IN</b>	Front-to-back, indicated by label <b>AIR OUT</b>	Front-to-back, indicated by label <b>AIR OUT</b>

Table 12: Details of the AC Power Supplies in EX3400 Switches *(Continued)*

Details	150 W AC Power Supply	150 W AC Power Supply	600 W AC Power Supply	920 W AC Power Supply
Power supply status LEDs	IN OK and OUT OK	IN OK and OUT OK	IN OK and OUT OK	IN OK and OUT OK

SEE ALSO

- Connecting AC Power to an EX3400 Switch | 120
- Connecting DC Power to an EX3400 Switch | 122

AC Power Supply LEDs in EX3400 Switches

Figure 13 on page 31 shows the location of the LEDs on an AC power supply for an EX3400 switch.

Figure 13: AC Power Supply LEDs in an EX3400 Switch

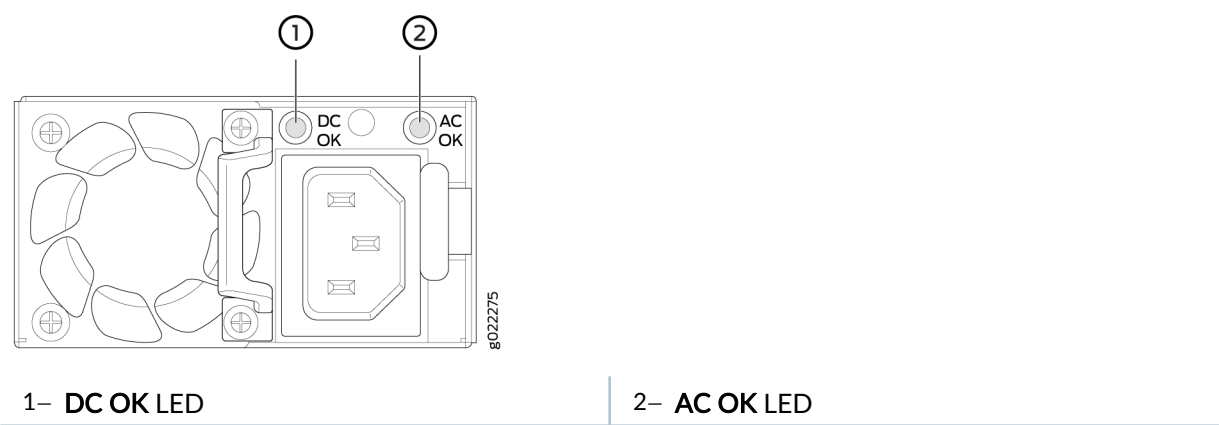


Table 13 on page 32 describes the AC power supply LEDs.



Table 13: AC Power Supply LEDs in EX3400 Switches

LED	Color	Description
AC OK	Unlit	Indicates one of the following: <ul style="list-style-type: none"> <li>AC power input voltage is not within normal operating range.</li> <li>No AC power input.</li> </ul>
	Green	Power supply is receiving proper input power.
DC OK	Unlit	Indicates one of the following: <ul style="list-style-type: none"> <li>IN OK LED is unlit.</li> <li>The power supply is not delivering power correctly.</li> </ul>
	Green	The power supply is delivering power and is functioning correctly.
	Red	The power supply has failed and must be replaced.



**NOTE:** If the **AC OK** LED and the **DC OK** LED are not lit green, either the AC power cord is not installed properly or the power input voltage is not within normal operating range. If the **AC OK** LED is lit green and the **DC OK** LED is unlit or lit red, the AC power supply is installed properly, but the power supply has an internal failure.

## AC Power Cord Specifications for EX3400 Switches

A detachable AC power cord is supplied with the AC power supplies. 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.



**CAUTION:** The AC power cord provided with each power supply is intended for use with that power supply only and not for any other use.



**NOTE:** In North America, AC power cords must not exceed 4.5 meters (approximately 14.75 feet) 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). The cords supplied with the switch are in compliance.

Table 14 on page 33 gives the AC power cord specifications for the countries and regions listed in the table.

**Table 14: AC Power Cord Specifications**

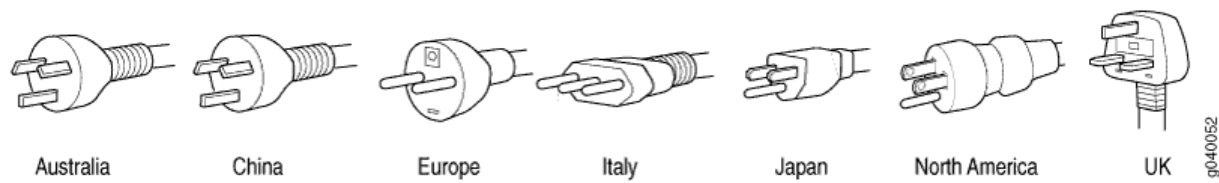
Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	CBL-EX-PWR-C13-AR
Australia	250 VAC, 10 A, 50 Hz	AS/NZZS 3112 Type SAA/3	CBL-EX-PWR-C13-AU
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	CBL-EX-PWR-C13-BR
China	250 VAC, 10 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

Table 14: AC Power Cord Specifications (Continued)

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	JIS 8303	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
	125 VAC, 15 A, 60 Hz	NEMA 5-15 Type N5-15	CBL-PWR-C13-US-48P
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 14 on page 34 illustrates the plug on the power cord for some of the countries or regions listed in Table 14 on page 33.

Figure 14: AC Plug Types



## DC Power Supply in EX3400 Switches

IN THIS SECTION

- [Characteristics of a DC Power Supply | 35](#)
- [DC Power Supply Airflow | 36](#)

The DC power supplies in EX3400 switches are hot-insertable and hot-removable field-replaceable units (FRUs): You can install them without powering off the switch or disrupting the switching function. The switch is shipped with one power supply installed.



**NOTE:** After powering on the switch, wait for at least 60 seconds before powering it off. After powering off the switch, wait for at least 60 seconds before powering it back on. If only one power supply is installed in your EX3400 switch, you need to power off the switch before removing the power supply.

[Table 15 on page 35](#) lists the power consumed by a DC-powered EX3400 switch model.

**Table 15: Power Consumed by a DC-Powered EX3400 Switch**

Model Number	Number of PoE-Enabled Ports	Maximum Power Consumed by the Switch	Maximum System Power Available for PoE
EX3400-24T-DC	–	110 W	–
EX3400-48T-DC	–	120 W	–

### Characteristics of a DC Power Supply

EX3400 switches support 150 W DC power supply.

You can install up to two DC power supplies in an EX3400 switch. Power supplies are installed in the power supply slots labeled **PSU 0** and **PSU 1** in the rear panel of the chassis.

[Table 16 on page 36](#) lists the details of the power supplies used in EX3400 switches.

**Table 16: Details of the DC Power Supplies in EX3400 Switches**

Details	150 W DC Power Supply
Model number	JPSU-150-DC-AFO
Field-replaceable unit (FRU) type	Hot-insertable and hot-removable
Power supply weight	1.433 lb (0.65 kg)
Minimum installed in chassis	1
Maximum installed in chassis	2
Power supply slots	Install in power supply slots in the rear panel of the chassis.
Fans	Internal
Airflow	Front-to-back, indicated by label <b>AIR OUT</b>
Power supply status LEDs	<b>IN OK</b> and <b>OUT OK</b>

To prevent electrical injury while installing or removing DC power supplies, carefully follow the instructions given in ["Installing a DC Power Supply in an EX3400 Switch" on page 213](#) and ["Removing a DC Power Supply from an EX3400 Switch" on page 211](#).

## DC Power Supply Airflow

Each power supply has its own fan and is cooled by its own internal cooling system.

Each power supply has a label **AIR OUT** on the faceplate of the power supply that indicates the direction of airflow in the power supply.

[Table 17 on page 37](#) lists the DC power supply models and the direction of airflow in them.

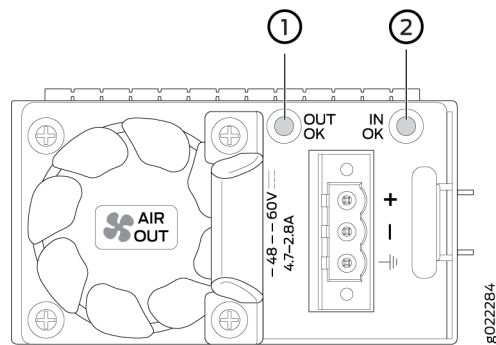
Table 17: Airflow Direction in DC Power Supply Models for EX3400 Switches

Model	Label on Power Supply	Direction of Airflow
JPSU-150-DC-AFO	AIR OUT	Front-to-back—that is, air intake to cool the chassis is through the vents on the front panel of the chassis and hot air exhausts through the vents on the rear panel of the chassis.

DC Power Supply LEDs in EX3400 Switches

Figure 15 on page 37 shows the LEDs on a DC power supply for an EX3400 switch.

Figure 15: LEDs on the DC Power Supply for EX3400 Switches



1– OUT OK LED

2– IN OK LED

Table 18 on page 38 describes the LEDs on the DC power supplies.

**Table 18: DC Power Supply LEDs on an EX3400 Switch**

Name	Color	Description
<b>IN OK</b>	Unlit	Indicates one of the following: <ul style="list-style-type: none"> <li>• The power supply is disconnected from the DC power feed.</li> <li>• The DC power input voltage is not within the normal operating range.</li> <li>• No DC power input.</li> </ul>
	Green	The power supply is receiving power.
<b>OUT OK</b>	Unlit	Indicates one of the following: <ul style="list-style-type: none"> <li>• <b>IN OK</b> LED is unlit.</li> <li>• The power supply is not delivering power correctly.</li> </ul>
	Green	The power supply is functioning correctly.
	Red	The power supply has failed and must be replaced.

## Power Specifications for EX3400 Switches

This topic describes the power supply electrical specifications for EX3400 switches.

[Table 19 on page 38](#) provides the AC power supply electrical specifications for EX3400 switches.

**Table 19: AC Power Supply Electrical Specifications for EX3400 Switches**

Item	Specification
AC input voltage	100 through 240 VAC
AC input line frequency	50 Hz/60 Hz nominal

**Table 19: AC Power Supply Electrical Specifications for EX3400 Switches (Continued)**

Item	Specification
AC system current rating	<ul style="list-style-type: none"> <li>EX3400-24P: 8.5 A at 100 VAC</li> <li>EX3400-24P: 4.25 A at 240 VAC</li> <li>EX3400-24T: 3 A at 100 VAC</li> <li>EX3400-24T: 1.5 A at 240 VAC</li> <li>EX3400-48P: 12 A at 100 VAC</li> <li>EX3400-48P: 6.5 A at 240 VAC</li> <li>EX3400-48T: 3 A at 100 VAC</li> <li>EX3400-48T: 1.5 A at 240 VAC</li> </ul>

Table 20 on page 39 provides the DC power supply electrical specifications for EX3400 switches.

**Table 20: DC Power Supply Electrical Specifications for EX3400 Switches**

Item	Specification
DC input voltage	-48 through -60 VDC
DC input current rating	4.7 A maximum at -48 VDC
Power supply output	150 W



**NOTE:** For DC power supplies, we recommend that you provide at least 4.7 A at 48 VDC and use a facility circuit breaker rated for 10 A minimum. Doing so enables you to operate the switch in any configuration without upgrading the power infrastructure, and enables the switch to function at full capacity using multiple power supplies.



# 2

CHAPTER

## Site Planning, Preparation, and Specifications

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### IN THIS CHAPTER

- Site Preparation Checklist for EX3400 Switches | 41
  - EX3400 Site Guidelines and Requirements | 45
  - EX3400 Network Cable and Transceiver Planning | 61
  - EX3400 Management Cable Specifications and Pinouts | 71
  - EX3400 Virtual Chassis | 87
-

# Site Preparation Checklist for EX3400 Switches

The checklist in [Table 21 on page 41](#) summarizes the tasks you need to perform when preparing a site for EX3400 switch installation.

**Table 21: Site Preparation Checklist**

Item or Task	For More Information	Performed by	Date
<b>Environment</b>			
Verify that environmental factors such as temperature and humidity do not exceed switch tolerances.	<a href="#">"Environmental Requirements and Specifications for EX Series Switches" on page 45</a>		
<b>Power</b>			
Measure distance between external power sources and switch installation site.			
Locate sites for connection of system grounding.			
Calculate the power consumption and requirements.	<a href="#">"Power Specifications for EX3400 Switches" on page 38</a>		

Table 21: Site Preparation Checklist (*Continued*)

Item or Task	For More Information	Performed by	Date
<b>Hardware Configuration</b>			
Choose the number and types of switches you want to install.	<a href="#">"EX3400 Switches Hardware Overview" on page 2</a>		
<b>Rack or Cabinet</b>			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.	<ul style="list-style-type: none"> <li>• <a href="#">"Rack Requirements" on page 54</a></li> <li>• <a href="#">"Cabinet Requirements" on page 56</a></li> </ul>		
Plan rack or cabinet location, including required space clearances.	<a href="#">"Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches" on page 57</a>		
Secure the rack or cabinet to the floor and building structure.			
<b>Wall</b>			

**Table 21: Site Preparation Checklist (Continued)**

Item or Task	For More Information	Performed by	Date
Verify that the wall meets the minimum requirements for the installation of the switch.	<a href="#">Requirements for Mounting an EX3400 Switch on a Desktop or Wall</a>		
Verify that there is appropriate clearance in your selected location.	<a href="#">"Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches" on page 57</a>		
<b>Cables</b>			

**Table 21: Site Preparation Checklist (Continued)**

Item or Task	For More Information	Performed by	Date
<p>Acquire cables and connectors:</p> <ul style="list-style-type: none"> <li>• Determine the number of cables needed based on your planned configuration.</li> <li>• Review the maximum distance allowed for each cable. Choose the length of cable based on the distance between the hardware components being connected.</li> </ul>			
Plan the cable routing and management.			

**RELATED DOCUMENTATION**

# EX3400 Site Guidelines and Requirements

## IN THIS SECTION

- [Environmental Requirements and Specifications for EX Series Switches | 45](#)
- [General Site Guidelines | 52](#)
- [Site Electrical Wiring Guidelines | 53](#)
- [Rack Requirements | 54](#)
- [Cabinet Requirements | 56](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches | 57](#)

## 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 22 on page 46](#) provides the required environmental conditions for normal switch operation.

Table 22: 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 <a href="#">Pluggable Transceivers Supported on EX2200 Switches</a> .	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
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.

Table 22: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
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.
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.
EX4100	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 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.



Table 22: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX4300	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.
EX4400	No performance degradation up to 6,000 feet (1829 meters)	Normal operation ensured in the relative humidity range 10% 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 22: 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)	<ul style="list-style-type: none"> <li>EX4550-32F switches—Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)</li> <li>EX4550-32T switches—Normal operation is ensured in the temperature range 32° F through 104° F (40° C)</li> </ul>	Complies with Zone 4 earthquake requirements as per GR-63, Issue 4.
EX4600	No performance degradation to 6,562 feet (2000 meters)	<p>Normal operation ensured in the relative humidity range 5% through 90%, noncondensing</p> <ul style="list-style-type: none"> <li>Short-term operation ensured in the relative humidity range 5% through 93%, noncondensing</li> </ul> <p><b>NOTE:</b> 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.</p>	<ul style="list-style-type: none"> <li>Normal operation ensured in the temperature range 32° F (0° C) through 113° F (45° C)</li> <li>Nonoperating storage temperature in shipping container: - 40° F (- 40° C) through 158° F (70° C)</li> </ul>	Complies with Zone 4 earthquake requirements per NEBS GR-63-CORE, Issue 4.

Table 22: 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 22: 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 22: EX Series Switch Environmental Tolerances *(Continued)*

Switch or device	Environment Tolerance			
	Altitude	Relative Humidity	Temperature	Seismic
EX9251	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. For the device to operate properly, you must ensure maintenance and 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 the prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that the 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 23 on page 53 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 23: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	<p>If your site experiences any of the following problems, consult experts in electrical surge suppression and shielding:</p> <ul style="list-style-type: none"><li>• Radio frequency interference (RFI) because of improperly installed wires.</li><li>• Damage from lightning strikes occurring when wires exceed recommended distances or pass between buildings.</li><li>• Damage to unshielded conductors and electronic devices as a result of electromagnetic pulses (EMPs) caused by lightning.</li></ul>
Radio frequency interference	<p>To reduce or eliminate RFI from your site wiring, do the following:</p> <ul style="list-style-type: none"><li>• Use a twisted-pair cable with a good distribution of grounding conductors.</li><li>• If you need to exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal, when applicable.</li></ul>

**Table 23: Site Electrical Wiring Guidelines (Continued)**

Site Wiring Factor	Guidelines
Electromagnetic compatibility	<p>If your site is susceptible to problems with electromagnetic compatibility (EMC), particularly from lightning or radio transmitters, seek expert advice.</p> <p>Strong sources of electromagnetic interference (EMI) can cause:</p> <ul style="list-style-type: none"> <li>• Destruction of the signal drivers and receivers in the device.</li> <li>• Electrical hazards as a result of power surges conducted over the lines into the equipment.</li> </ul>

## Rack Requirements

You can mount the device on two-post racks or four-post racks.

Rack Requirement	Guidelines
Rack type	<p>A U is the standard rack unit defined by the Electronic Components Industry Association (ECIA) (<a href="http://www.ecianow.org">http://www.ecianow.org</a>).</p> <p>You can mount the device on a rack that provides bracket holes or hole patterns spaced at 1U (1.75 in. or 4.45 cm) increments and meets the size and strength requirements to support the weight.</p>
Mounting bracket hole spacing	<p>The holes in the mounting brackets are spaced at 1U (1.75 in. or 4.45 cm) so that the device can be mounted in any rack that provides holes spaced at that distance.</p>

*(Continued)*

Rack Requirement	Guidelines
Rack size and strength	<p>Ensure that the:</p> <ul style="list-style-type: none"> <li>• Rack complies with the size and strength standards of a 19-in. rack as defined by the ECIA (<a href="http://www.ecianow.org">http://www.ecianow.org</a>).</li> <li>• Rack rails are spaced widely enough to accommodate the external dimensions of the device chassis. Also ensure that the outer edges of the front mounting brackets extend the width of the chassis to 19 in. (48.2 cm).</li> <li>• Rack is strong enough to support the weight of the device.</li> <li>• Spacing of rails and adjacent racks provides for proper clearance around the device and rack.</li> <li>• The EX4100-F 12 port switches can be mounted on a 2 post rack by using 2-post rack mount kit.</li> </ul> <p>The EX4100-F 24 and 48 port Switches can be mounted on a 2 post rack using 2-post rack mount kit or on a 4-post rack using either 2-post rack mount kit or 4-post rack mount kit.</p> <ul style="list-style-type: none"> <li>• EX4400 Switches can be mounted on a 2 post rack using 2-post rack mount kit or on a 4-post rack using either 2-post rack mount kit or 4-post rack mount kit.</li> </ul> <p>For Installations using 4-post rack mount kit:</p> <ul style="list-style-type: none"> <li>• If you are mounting a switch flush with the front posts of a rack, ensure the minimum distance between front and rear post shall be 24 in. (60.96 cm) and extendable upto 31.5 in. (80 cm).</li> <li>• If you are mounting a switch in a recessed position (using the EX-4PST-RMK) from the front posts of a rack, ensure the minimum distance between front and rear post shall be 26 in. (66.04 cm) and extendable upto 31.5 in. (80 cm).</li> </ul>
Rack connection to building structure	<ul style="list-style-type: none"> <li>• Secure the rack to the building structure.</li> <li>• If your geographical area is earthquake-prone, secure the rack to the floor.</li> <li>• Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.</li> </ul>



## Cabinet Requirements

You can mount the device in a cabinet that contains a 19-in. rack.

**Table 24: Cabinet Requirements and Specifications**

Cabinet Requirement	Guidelines
Cabinet size and clearance	<ul style="list-style-type: none"> <li>The minimum cabinet size is 27.7 in. (70.35 cm) between cabinet front door and cabinet rear wall. It is recommended to have minimum of 6 in. clearance from the cabinet front door and switch front panel minimum of 6 in. clearance from the cabinet rear wall and switch rear panel. Large cabinets improve airflow and reduce chances of overheating.</li> <li>The outer edges of the front mounting brackets extend the width of the chassis to 19 in. (48.2 cm).</li> <li>The EX4400 switches can be mounted on the front posts of a rack inside a cabinet by using the 2-post RMK or on a 4-post rack inside the cabinet using 4-post rack mount kit.</li> </ul> <p>For installations using 4-post rack mount kit:</p> <ul style="list-style-type: none"> <li>If you are mounting a device/switch flush with the front posts of a rack inside the cabinet, ensure the minimum distance between front and rear post shall be 24.0 in. (60.96 cm) and extendable upto 31.50 in (80.0 cm).</li> <li>If you are mounting a switch in a recessed position (using the EX-4PST-RMK) from the front posts of a rack, ensure the minimum distance between front and rear post shall be 26.0 in. (66.04cm) and extendable upto 31.5 in. (80.00 cm).</li> </ul>

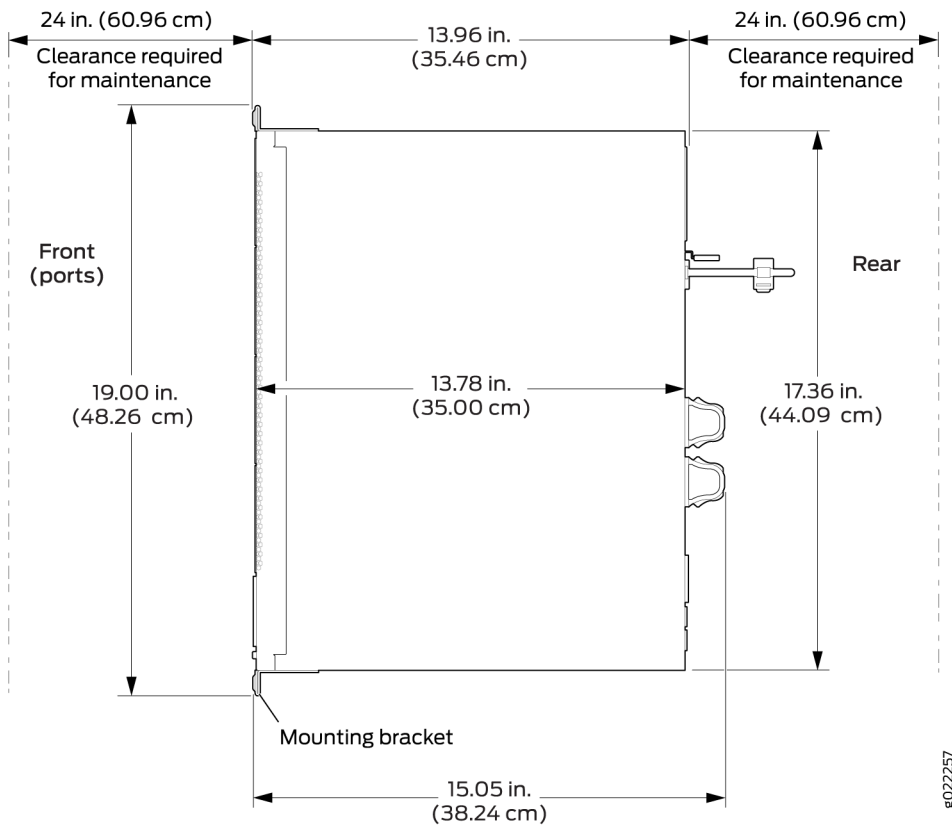
**Table 24: Cabinet Requirements and Specifications** *(Continued)*

Cabinet Requirement	Guidelines
Cabinet airflow requirements	<p>When you mount the device in a cabinet:</p> <ul style="list-style-type: none"> <li>• Ensure that ventilation through the cabinet is sufficient to prevent overheating.</li> <li>• Ensure that there is adequate cool air supply to dissipate the thermal output of the device or devices.</li> <li>• 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.</li> <li>• 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.</li> <li>• Route and secure all cables to minimize the blockage of airflow to and from the chassis.</li> <li>• Ensure that the spacing of rails and adjacent cabinets is such that proper clearance exists around the device and cabinet.</li> <li>• A cabinet larger than the minimum required provides better airflow and reduces the chance of overheating.</li> </ul>

## Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches

When planning the site for installing an EX3400 switch, you must allow sufficient clearance around the installed switch (see [Figure 16 on page 58](#)).

**Figure 16: Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches**



The power cord retainer extends out of the rear of the chassis by 3 in. (7.62 cm). The fan module handle extends out of the chassis by 1.2 in. (3 cm).

Follow these clearance requirements:

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See [Figure 17 on page 59](#) and [Figure 18 on page 60](#).

Figure 17: Front-to-Back Airflow Through the EX3400 Switch Chassis

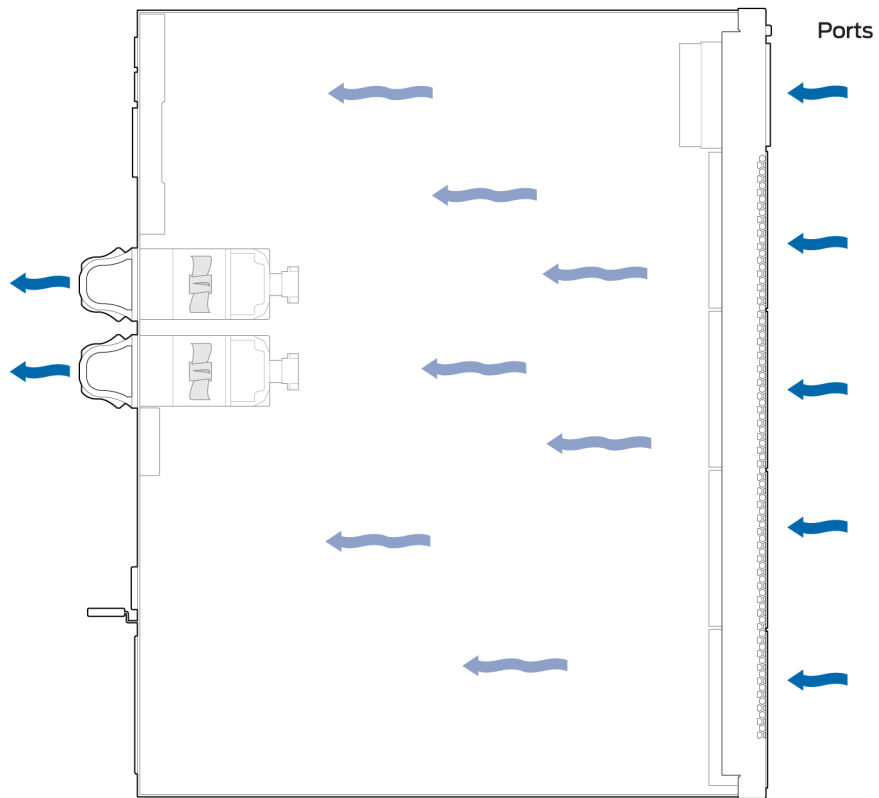
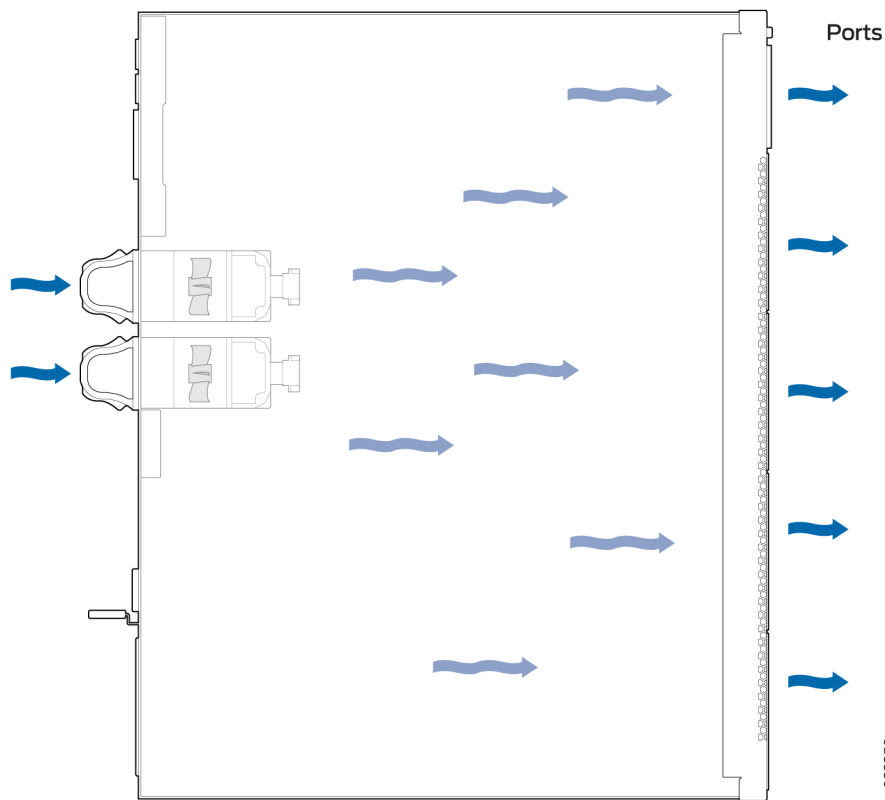


Figure 18: Back-to-Front Airflow Through the EX3400 Switch Chassis



- If you are mounting an EX3400 switch in a rack or cabinet with other equipment, or if you are placing it on the desktop or floor near other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.
- Leave at least 24 in. (61 cm) in front of the switch and behind the switch. For service personnel to remove and install hardware components, you must leave adequate space at the front and back of the switch. 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.

# EX3400 Network Cable and Transceiver Planning

## IN THIS SECTION

- Pluggable Transceivers Supported on EX3400 Switches | 61
- SFP+ Direct Attach Copper Cables for EX Series Switches | 62
- QSFP+ Direct Attach Copper Cables for EX Series Switches | 65
- Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 67
- Calculate the Fiber-Optic Cable Power Budget for EX Series Devices | 68
- Calculating the Fiber-Optic Cable Power Margin for EX Series Devices | 69

## Pluggable Transceivers Supported on EX3400 Switches

Uplink ports on EX3400 switches support SFP, SFP+, and QSFP+ transceivers. You can find the list of transceivers supported on EX3400 switches and information about those transceivers at the [Hardware Compatibility Tool page for EX3400](#).



**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 SFP, SFP+, and QSFP+ transceivers installed in EX3400 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`.



**NOTE:** The transceivers support DOM even if they are installed in uplink ports configured as Virtual Chassis ports.

## SEE ALSO

[Front Panel of an EX3400 Switch | 13](#)

[Install a Transceiver | 214](#)

[Remove a Transceiver | 217](#)

## SFP+ Direct Attach Copper Cables for EX Series Switches

### IN THIS SECTION

- [Cable Specifications | 63](#)
- [List of DAC Cables Supported on EX Series Switches | 64](#)
- [Standards Supported by These Cables | 64](#)

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.



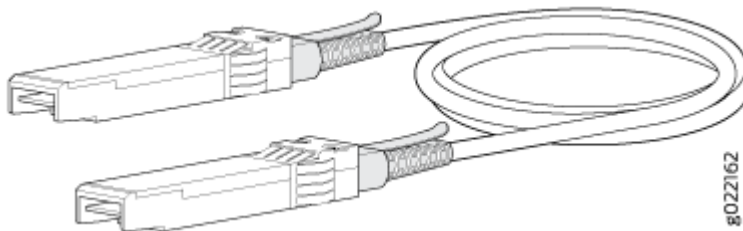
**CAUTION:** The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem 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 19 on page 63](#).

**Figure 19: 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](#)
- EX4100-F —[Hardware Compatibility Tool for EX4100-F](#)
- EX4100-H—[Hardware Compatibility Tool for EX4100-H](#)
- EX4000—[Hardware Compatibility Tool for EX4000](#)
- 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

- [Cable Specifications | 66](#)
- [DAC Cables Supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 Switches | 66](#)

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.



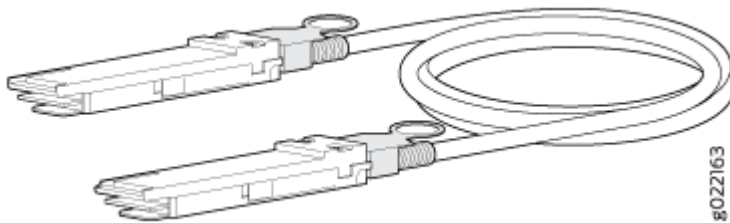
**CAUTION:** The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem 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 20 on page 66](#).

**Figure 20: 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

- [Signal Loss in Multimode and Single-Mode Fiber-Optic Cable | 67](#)
- [Attenuation and Dispersion in Fiber-Optic Cable | 67](#)

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).

$$P_T = -15 \text{ dBm}$$

$$P_R = -28 \text{ dBm}$$



**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 25 on page 69](#) (here, the link is 2 km long and multimode, and the ( $P_B$ ) is 13 dBm):

**Table 25: Estimated Values for Factors Causing Link Loss**

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Higher-order mode losses (HOL)	<ul style="list-style-type: none"><li>• Multimode—0.5 dBm</li><li>• Single mode—None</li></ul>	<ul style="list-style-type: none"><li>• 0.5 dBm</li><li>• 0 dBm</li></ul>

Table 25: Estimated Values for Factors Causing Link Loss *(Continued)*

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Modal and chromatic dispersion	<ul style="list-style-type: none"> <li>Multimode—None, if product of bandwidth and distance is less than 500 MHz/km</li> <li>Single mode—None</li> </ul>	<ul style="list-style-type: none"> <li>0 dBm</li> <li>0 dBm</li> </ul>
Connector	0.5 dBm	This example assumes 5 connectors. Loss for 5 connectors: $(5) * (0.5 \text{ dBm}) = 2.5 \text{ dBm}$
Splice	0.5 dBm	This example assumes 2 splices. Loss for two splices: $(2) * (0.5 \text{ dBm}) = 1 \text{ dBm}$
Fiber attenuation	<ul style="list-style-type: none"> <li>Multimode—1 dBm/km</li> <li>Single mode—0.5 dBm/km</li> </ul>	This example assumes the link is 2 km long. Fiber attenuation for 2 km: <ul style="list-style-type: none"> <li><math>(2 \text{ km}) * (1.0 \text{ dBm/km}) = 2 \text{ dBm}</math></li> <li><math>(2 \text{ km}) * (0.5 \text{ dBm/km}) = 1 \text{ dBm}</math></li> </ul>
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 ( $P_B$ ):

$$P_B - LL = P_M$$

$$(13 \text{ dBm}) - (0.5 \text{ dBm [HOL]}) - ((5) * (0.5 \text{ dBm})) - ((2) * (0.5 \text{ dBm})) - ((2 \text{ km}) * (1.0 \text{ dBm/km})) - (1 \text{ dB [CRM]}) = P_M$$

$$13 \text{ dBm} - 0.5 \text{ dBm} - 2.5 \text{ dBm} - 1 \text{ dBm} - 2 \text{ dBm} - 1 \text{ dBm} = P_M$$

$$P_M = 6 \text{ dBm}$$

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.

# EX3400 Management Cable Specifications and Pinouts

IN THIS SECTION

- [Management Cable Specifications | 71](#)
- [Console Port Connector Pinout Information | 72](#)
- [RJ-45 Management Port Connector Pinout Information | 73](#)
- [USB Port Specifications for an EX Series Switch | 74](#)
- [RJ-45 Port, SFP Port, SFP+ Port, QSFP+ Port, and QSFP28 Port Connector Pinout Information | 75](#)
- [SFP+ Uplink Port Connector Pinout Information for an EX3400 Switch | 81](#)
- [QSFP+ Uplink Port Connector Pinout Information for an EX3400 Switch | 83](#)
- [RJ-45 to DB-9 Serial Port Adapter Pinout Information | 86](#)

## Management Cable Specifications

[Table 26 on page 71](#) lists the specifications for the cables that connect the console and management ports to management devices.

**Table 26: Specifications of Cables to Connect to Management Devices**

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console port	Rollover cable	RJ-45	<i>Connect a Device to a Management Console Using an RJ-45 Connector</i>



Table 26: Specifications of Cables to Connect to Management Devices (*Continued*)

Ports	Cable Specifications	Receptacle	Additional Information
Management Ethernet port	Ethernet cable with an RJ-45 connector	RJ-45	<i>Connect a Device to a Network for Out-of-Band Management</i>
Mini-USB Type-B Console port	Mini-USB cable with standard-A and Mini-USB Type-B (5-pin) connector	Mini-USB	

## Console Port Connector 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 console management device. The default baud rate for the console port is 9600 baud.

Table 27 on page 73 provides the pinout information for the RJ-45 console connector.



**NOTE:** We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:

- RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, <https://ftdichip.com/drivers/vcp-drivers/> to download the driver.



**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 a device, use a combination of the

RJ-45-to-DB-9 socket adapter and a USB-to-DB-9 plug adapter. You must provide the USB-to-DB-9 plug adapter.

**Table 27: Console Port Connector Pinout Information**

Pin	Signal	Description
1	NC	No connect
2	NC	No connect
3	TxD Output	Transmit data
4	GND	Signal ground
5	GND	Signal ground
6	RxD Input	Receive data
7	DCD Input	Data carrier detect
8	NC	No connect

## RJ-45 Management Port Connector Pinout Information

[Table 28 on page 73](#) provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

**Table 28: RJ-45 Management Port Connector Pinout Information**

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1

Table 28: RJ-45 Management Port Connector Pinout Information (*Continued*)

Pin	Signal	Description
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

## 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 FAT32 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.

## RJ-45 Port, SFP Port, SFP+ Port, QSFP+ Port, and QSFP28 Port Connector Pinout Information

The tables in this topic describe the connector pinout information for the RJ-45, QSFP+, QSFP28, SFP+, and SFP ports.

- [Table 29 on page 75](#)—10/100/1000BASE-T Ethernet network port connector pinout information
- [Table 30 on page 76](#)—SFP network port connector pinout information
- [Table 31 on page 77](#)—SFP+ network port connector pinout information
- [Table 32 on page 79](#)—QSFP+ and QSFP28 network module ports connector pinout information

**Table 29: 10/100/1000BASE-T Ethernet Network Port Connector Pinout Information**

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1 Negative Vport (in PoE models)
2	TRP1-	Transmit/receive data pair 1 Negative Vport (in PoE models)
3	TRP2+	Transmit/receive data pair 2 Positive Vport (in PoE models)
4	TRP3+	Transmit/receive data pair 3

**Table 29: 10/100/1000BASE-T Ethernet Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2 Positive Vport (in PoE models)
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

**Table 30: SFP Network Port Connector Pinout Information**

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disabled
4	SDA	2-wire serial interface data line
5	SCL-	2-wire serial interface clock
6	MOD_ABS	Module absent
7	RS	Rate select
8	RX_LOS	Receiver loss of signal indication
9	VeeR	Module receiver ground

**Table 30: SFP Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver noninverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3 V supply
16	VccT	Module transmitter 3.3 V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter noninverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

**Table 31: SFP+ Network Port Connector Pinout Information**

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disabled

**Table 31: SFP+ Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
4	SDA	2-wire serial interface data line
5	SCL-	2-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0, optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1, optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver noninverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3-V supply
16	VccT	Module transmitter 3.3-V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter noninverted data input

**Table 31: SFP+ Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

**Table 32: QSFP+ and QSFP28 Network Port Connector Pinout Information**

Pin	Signal
1	GND
2	TX2n
3	TX2p
4	GND
5	TX4n
6	TX4p
7	GND
8	ModSelL
9	LPMode_Reset
10	VccRx
11	SCL
12	SDA



Table 32: QSFP+ and QSFP28 Network Port Connector Pinout Information *(Continued)*

Pin	Signal
13	GND
14	RX3p
15	RX3n
16	GND
17	RX1p
18	RX1n
19	GND
20	GND
21	RX2n
22	RX2p
23	GND
24	RX4n
25	RX4p
26	GND
27	ModPrsL

Table 32: QSFP+ and QSFP28 Network Port Connector Pinout Information *(Continued)*

Pin	Signal
28	IntL
29	VccTx
30	Vcc1
31	Reserved
32	GND
33	TX3p
34	TX3n
35	GND
36	TX1p
37	TX1n
38	GND

## SFP+ Uplink Port Connector Pinout Information for an EX3400 Switch

EX3400 switches have four uplink ports that support 1-gigabit SFP transceivers and 10-gigabit SFP+ transceivers.

[Table 33 on page 82](#) provides the pinout information for the SFP+ uplink port connector.

**Table 33: Connector Pinout Information for the 10-Gigabit Ethernet Uplink Port**

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disabled
4	SDA	2-wire serial interface data line
5	SCL-	2-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0, optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1, optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver noninverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3 V supply

**Table 33: Connector Pinout Information for the 10-Gigabit Ethernet Uplink Port (Continued)**

Pin	Signal	Description
16	VccT	Module transmitter 3.3 V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter noninverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

## QSFP+ Uplink Port Connector Pinout Information for an EX3400 Switch

EX3400 switches have two 40-Gigabit Ethernet uplink ports that support 40-gigabit QSFP+ transceivers.

[Table 34 on page 83](#) provides the pinout information for the QSFP+ uplink port connector.

**Table 34: Connector Pinout Information for the 40-Gigabit Ethernet Uplink Port**

Pin	Signal
1	GND
2	TX2n
3	TX2p
4	GND
5	TX4n

**Table 34: Connector Pinout Information for the 40-Gigabit Ethernet Uplink Port (*Continued*)**

Pin	Signal
6	TX4p
7	GND
8	ModSelL
9	LPMode_Reset
10	VccRx
11	SCL
12	SDA
13	GND
14	RX3p
15	RX3n
16	GND
17	RX1p
18	RX1n
19	GND
20	GND

Table 34: Connector Pinout Information for the 40-Gigabit Ethernet Uplink Port *(Continued)*

Pin	Signal
21	RX2n
22	RX2p
23	GND
24	RX4n
25	RX4p
26	GND
27	ModPrsL
28	IntL
29	VccTx
30	Vcc1
31	Reserved
32	GND
33	TX3p
34	TX3n
35	GND

**Table 34: Connector Pinout Information for the 40-Gigabit Ethernet Uplink Port *(Continued)***

Pin	Signal
36	TX1p
37	TX1n
38	GND

## 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 35 on page 86](#) provides the pinout information for the RJ-45 to DB-9 serial port adapter.

**Table 35: RJ-45 to DB-9 Serial Port Adapter Pinout Information**

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

Table 35: RJ-45 to DB-9 Serial Port Adapter Pinout Information (*Continued*)

RJ-45 pin	Signal	DB-9 pin	Signal
8	NC	7	RTS

## EX3400 Virtual Chassis

### IN THIS SECTION

- [Planning EX3400 Virtual Chassis | 87](#)
- [Understanding EX3400 Virtual Chassis Hardware Configuration | 88](#)
- [Virtual Chassis Cabling Configuration Examples for EX3400 Switches | 88](#)

## Planning EX3400 Virtual Chassis

Before interconnecting EX3400 switches in a Virtual Chassis configuration, you must consider the following factors:

- The number of switches in the Virtual Chassis and their location—You can interconnect a maximum of 10 EX3400 switches to form a Virtual Chassis composed exclusively of EX3400 switches.
- Mounting—You can mount the switches in a single rack or install them on multiple racks. For information about the size and strength of racks, see *Rack Requirements*.
- Cabling requirements for Virtual Chassis—You can interconnect EX3400 switches into a Virtual Chassis by using the uplink ports configured as Virtual Chassis ports (VCPs). By default, the QSFP+ uplink ports are configured as VCPs.

For information about uplink port cabling requirements, see *Management Cable Specifications*.

- Power requirements—You must plan the installation site to meet the power requirements of the switches in a Virtual Chassis. See ["Power Specifications for EX3400 Switches" on page 38](#).



- License requirements—You must have license keys for all the devices. See [Understanding Software Licenses for EX Series Switches](#).

## SEE ALSO

[Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches](#) | 57

## Understanding EX3400 Virtual Chassis Hardware Configuration

*Virtual Chassis* is a feature in Juniper Networks EX3400 Ethernet Switches that allows you to interconnect two or more EX3400 switches, enabling them to operate as a unified, single, high-bandwidth switch. You can interconnect a maximum of 10 EX3400 switches by using the uplink ports configured as Virtual Chassis ports (VCPs) to form a Virtual Chassis. By default, the QSFP+ uplink ports are configured as VCPs.

All EX3400 switch models support Virtual Chassis, and you can interconnect different models, which allows you to choose among a range of possible port configurations within the same Virtual Chassis.

The Virtual Chassis configuration includes a primary switch and a backup switch, with all other switches in the configuration designated as *linecard* member switches. Virtual Chassis operation is managed through the primary switch. Each switch in the Virtual Chassis is assigned a unique member ID.

## Virtual Chassis Cabling Configuration Examples for EX3400 Switches

You can install EX3400 switches on a single rack or in multiple racks, or in different wiring closets, and interconnect them to form a Virtual Chassis.

You form an EX3400 Virtual Chassis by using uplink ports configured as Virtual Chassis ports (VCPs). By default, the QSFP+ uplink ports are configured as VCPs.

The physical location of the switches in a Virtual Chassis is restricted only by the maximum length supported for cables to connect the VCPs—in this case, the maximum length of the uplink port cables. For the maximum cable length for the uplink port cables supported by an EX3400 switch, see ["Pluggable Transceivers Supported on EX3400 Switches" on page 61](#).

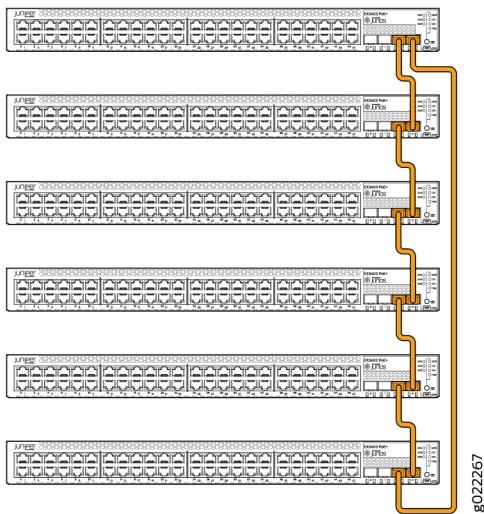
The following illustrations show examples of Virtual Chassis cabling configuration using SFP+ ports. The examples are applicable to configuration using QSFP+ ports also.



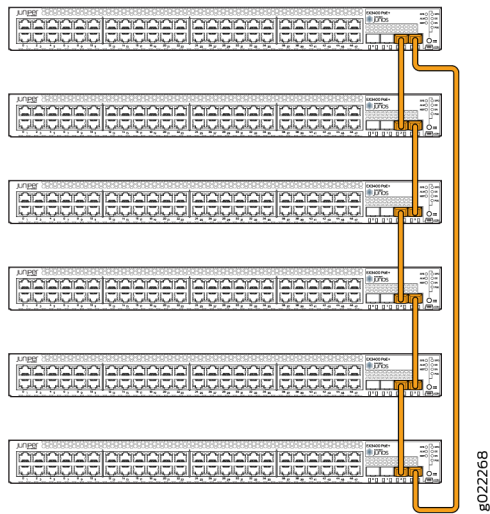
**NOTE:** For increased availability and redundancy, we recommend that you always configure your Virtual Chassis in a ring topology.

Figure 21 on page 89, Figure 22 on page 90, and Figure 23 on page 90 show six EX3400 switches stacked vertically in a rack and interconnected in a ring topology.

**Figure 21: EX3400 Switches Mounted on a Single Rack and Connected in a Ring Topology: Example 1**



**Figure 22: EX3400 Switches Mounted on a Single Rack and Connected in a Ring Topology: Example 2**



**Figure 23: EX3400 Switches Mounted on a Single Rack and Connected in a Ring Topology: Example 3**

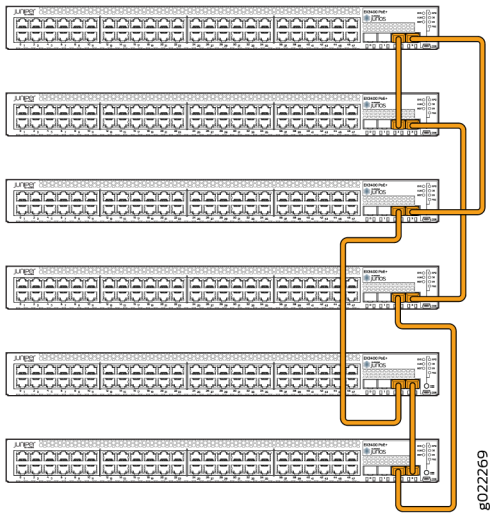
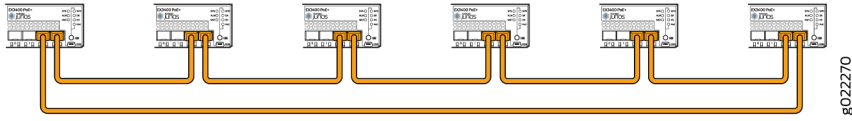
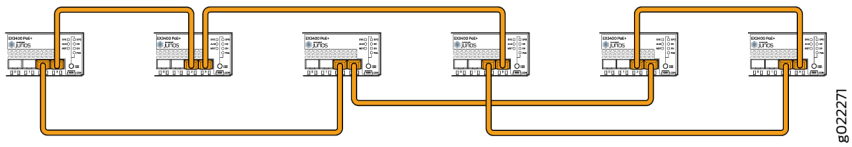


Figure 24 on page 91 and Figure 25 on page 91 show six EX3400 switches mounted on the top rows of adjacent racks and interconnected in a ring topology.

**Figure 24: EX3400 Switches Mounted on Adjacent Racks and Connected in a Ring Topology Using Medium and Long Cables: Example 1**



**Figure 25: EX3400 Switches Mounted on Adjacent Racks and Connected in a Ring Topology Using Medium and Long Cables: Example 2**



# 3

CHAPTER

## Initial Installation and Configuration

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### IN THIS CHAPTER

- [Unpacking and Mounting the EX3400 Switch | 93](#)
  - [Connecting the EX3400 to Power | 109](#)
  - [Connecting the EX3400 to External Devices | 125](#)
  - [Register Products—Mandatory to Validate SLAs | 129](#)
  - [Connecting the EX3400 to the Network | 130](#)
  - [Configuring Junos OS on the EX3400 | 134](#)
  - [Dashboard for EX Series Switches | 166](#)
-

# Unpacking and Mounting the EX3400 Switch

## IN THIS SECTION

- [Unpacking an EX3400 Switch | 93](#)
- [Parts Inventory \(Packing List\) for an EX3400 Switch | 94](#)
- [Update Base Installation Data | 95](#)
- [Installing and Connecting an EX3400 Switch | 95](#)
- [Installing and Removing EX3400 Switch Hardware Components | 96](#)
- [Mounting an EX3400 Switch on a Desk or Other Level Surface | 97](#)
- [Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet | 98](#)
- [Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet | 102](#)
- [Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet | 105](#)
- [Mounting an EX3400 Switch on a Wall | 106](#)

## Unpacking an EX3400 Switch

The EX3400 switches are shipped in a cardboard carton, secured with foam packing material. The carton also contains an accessory box.



**CAUTION:** EX3400 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 in it 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 chassis components received against the packing list included with the switch. An inventory of parts provided with the switch is provided in ["Parts Inventory \(Packing List\) for an EX3400 Switch" on page 94](#).
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 EX3400 Switch

The EX3400 switches are shipped in a cardboard carton, secured with foam packing material. The carton also contains an accessory box.

The switch shipment includes a packing list. Check the parts you receive in the switch shipping carton against the items on the packing list. The parts shipped depend on the configuration you order.

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 36 on page 94](#) lists the parts and their quantities in the packing list.

**Table 36: Parts List for an EX3400 Switch**

Component	Quantity
Switch with one power supply and two fan modules	1
AC power cord appropriate for your geographical location (only for AC switch models)	1
Power cord retainer clip (only for AC switch models)	1
Mounting brackets	2
Mounting screws to attach the mounting brackets to the switch chassis	8
Rubber feet	4
Documentation Roadmap	1

Table 36: Parts List for an EX3400 Switch (*Continued*)

Component	Quantity
Juniper Networks Product Warranty	1
End User License Agreement	1



**NOTE:** You must provide mounting screws that are appropriate for your rack or cabinet to mount the chassis on a rack or a cabinet.

## Update Base Installation Data



**CAUTION:** 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 SLA for products that do not have accurate installation base data.

Update your installation base at <https://supportportal.juniper.net/s/CreateCase>.

## Installing and Connecting an EX3400 Switch

To install and connect an EX3400 switch:

1. Follow instructions in "[Unpacking an EX3400 Switch](#)" on page 93.
2. Mount the switch by following instructions appropriate for your site:
  - "[Mounting an EX3400 Switch on a Desk or Other Level Surface](#)" on page 97 (using the rubber feet provided)
  - "[Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet](#)" on page 98 (using the mounting brackets provided)
  - "[Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet](#)" on page 102 (using the separately orderable four-post rack-mount kit)



- ["Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet" on page 105](#) (using the 2-in.-recess front-mounting brackets from the separately orderable four-post rack-mount kit)
  - ["Mounting an EX3400 Switch on a Wall" on page 106](#) (using the separately orderable wall-mount kit)
3. Follow instructions in *Connect Earth Ground to an EX Series Switch*.
  4. Follow instructions in ["Connecting AC Power to an EX3400 Switch" on page 120](#) or ["Connecting DC Power to an EX3400 Switch" on page 122](#).
  5. Perform initial configuration of the switch by following instructions in *Connecting and Configuring an EX Series Switch (CLI Procedure)*.
  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

[Rack Requirements | 54](#)

[Cabinet Requirements | 56](#)

[Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches | 57](#)

## Installing and Removing EX3400 Switch Hardware Components

The EX3400 switch chassis is a rigid sheet-metal structure that houses the hardware components. The field-replaceable units (FRUs) in EX3400 switches are:

- Power supplies
- Fan modules
- Transceivers

The power supplies and fan modules are hot-removable and hot-insertable: You can remove and replace them without powering off the switch or disrupting switch functions.

See these topics for instructions for installing and removing components:

- ["Installing an AC Power Supply in an EX3400 Switch" on page 209](#)
- ["Removing an AC Power Supply from an EX3400 Switch" on page 208](#)

- ["Installing a Fan Module in an EX3400 Switch" on page 206](#)
- ["Removing a Fan Module from an EX3400 Switch" on page 205](#)
- ["Installing a DC Power Supply in an EX3400 Switch" on page 213](#)
- ["Removing a DC Power Supply from an EX3400 Switch" on page 211](#)
- *Install a Transceiver*
- *Remove a Transceiver*

## SEE ALSO

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[EX3400 Cooling System | 24](#)

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[AC Power Supply in EX3400 Switches | 28](#)

---

[Pluggable Transceivers Supported on EX3400 Switches | 61](#)

## Mounting an EX3400 Switch on a Desk or Other Level Surface

Before mounting the switch on a desk or other level surface:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX3400 Switches" on page 41](#).
- Place the desk 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*.

Ensure that you have the following parts and tools available:

- 4 rubber feet to stabilize the chassis on a desk or other level surface (provided in the accessory box in the switch carton)

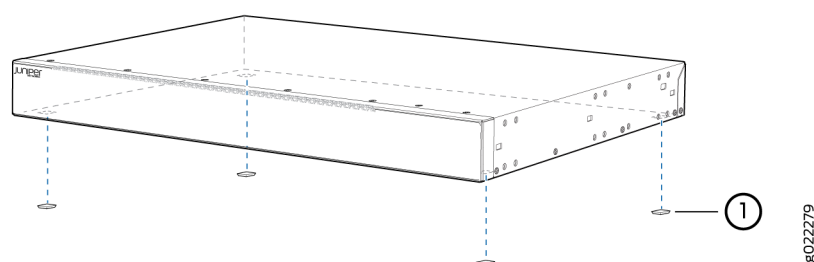
You can mount an EX3400 switch on a desk or other level surface by using the four rubber feet that are shipped with the switch. The rubber feet stabilize the chassis.

To mount a switch on a desk or other level surface:

1. Remove the switch from the shipping carton (see ["Unpacking an EX3400 Switch" on page 93](#)).
2. Turn the chassis upside down on the desk or the level surface where you intend to mount the switch.

3. Attach the rubber feet to the bottom of the chassis, as shown in [Figure 26 on page 98](#).
4. Turn the chassis right side up on the desk or the level surface.
5. Ensure that the switch rests firmly on the desk or the level surface.

**Figure 26: Attaching Rubber Feet to a Switch Chassis**



1– Rubber feet

## SEE ALSO

[Connecting AC Power to an EX3400 Switch | 120](#)

[Connecting DC Power to an EX3400 Switch | 122](#)

[Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)

[Clearance Requirements for Airflow and Hardware Maintenance for EX3400 Switches | 57](#)

## Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet

Before mounting the switch on two posts in a rack:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX3400 Switches" on page 41](#).
- 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*.

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)
- 2 mounting brackets and 8 mounting screws (provided)
- Screws to secure the chassis to the rack (not provided)
- 2-in.-recess front-mounting brackets (from the separately orderable four-post rack-mount kit) if you will mount the switch in a recessed position

You can mount an EX3400 switch on two posts of a 19-in. rack or cabinet by using the mounting brackets provided with the switch. (The remainder of this topic uses *rack* to mean *rack or cabinet*.)

You can mount the switch on four posts of a four-post rack by using the mounting brackets provided with the separately orderable four-post rack-mount kit. See ["Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet" on page 102](#).



**NOTE:** If you need to mount the switch in a recessed position on either a two-post rack or a four-post rack, you can use the 2-in.-recess front-mounting brackets provided in the separately orderable four-post rack-mount kit.



**NOTE:** One person must be available to lift the switch while another secures the switch to the rack.

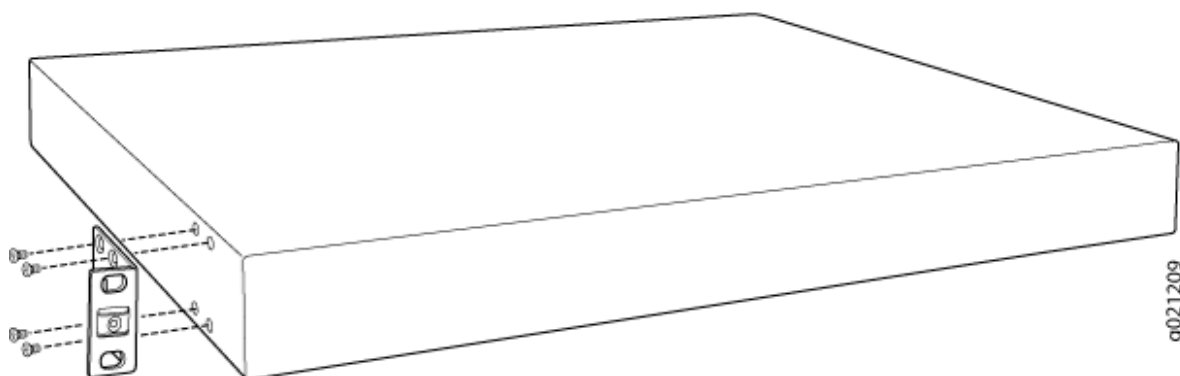


**CAUTION:** If you are mounting multiple units on a rack, mount the heaviest unit at the bottom of the rack and mount the other units from the bottom of the rack to the top in decreasing order of the weight of the units.

To mount the switch on two posts in a rack:

1. Remove the switch from the shipping carton (see ["Unpacking an EX3400 Switch" on page 93](#)).
2. Place the switch on a flat, stable surface.
3. Align the mounting brackets along the front or rear of the side panels of the switch chassis depending on how you want to mount the switch. For example, if you want to front-mount the switch, align the brackets along the front of the chassis. See [Figure 27 on page 100](#).

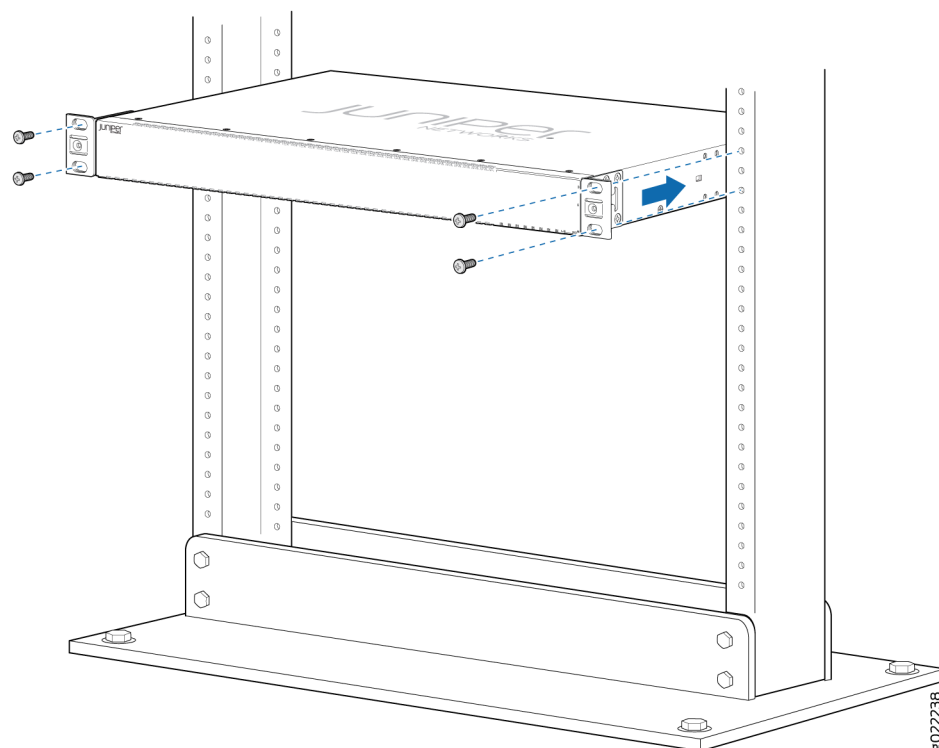
Figure 27: Attaching the Mounting Bracket Along the Front of the Switch



**NOTE:** If you need to mount the switch in a recessed position, use the 2-in.-recess front-mounting brackets from the separately orderable four-post rack-mount kit.

4. Align the bottom holes in the mounting brackets with the holes on the side panels of the switch chassis.
5. Insert the mounting screws into the aligned holes.
6. Ensure that the other holes in the mounting brackets are aligned with the holes in the side panels. Insert a screw in each hole and tighten the screws.
7. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the mounting bracket holes with the threaded holes in the rack or cabinet rail. Align the bottom hole in each mounting bracket with a hole in each rack rail, making sure the chassis is level. See [Figure 28 on page 101](#).

**Figure 28: Mounting the Switch on Two Posts in a Rack**



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

## SEE ALSO

[Connect Earth Ground to an EX Series Switch | 110](#)

[Connecting AC Power to an EX3400 Switch | 120](#)

[Connecting DC Power to an EX3400 Switch | 122](#)

[Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)

[Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet | 105](#)

[Rack-Mounting and Cabinet-Mounting Warnings | 265](#)

## Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet

Before mounting the switch on four posts in a rack:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX3400 Switches" on page 41.](#)
- 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*.

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- 6 flat-head 4-40 mounting screws (provided with the four-post rack-mount kit)
- 8 flat-head 4x6-mm Phillips mounting screws (provided with the four-post rack-mount kit)
- One pair each of flush or 2-in.-recess front-mounting brackets (provided with the four-post rack-mount kit)
- One pair of side mounting-rails (provided with the four-post rack-mount kit)
- One pair of rear-mounting blades (provided with the four-post rack-mount kit)
- Screws to secure the chassis and the rear-mounting blades to the rack (not provided)

You can mount an EX3400 switch on four posts of a 19-in. rack or cabinet by using the separately orderable four-post rack-mount kit. (The remainder of this topic uses *rack* to mean *rack or cabinet*.)

You can mount the switch on two posts in either a two-post rack or a four-post rack by using the mounting brackets provided with the switch. See ["Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet" on page 98.](#)



**NOTE:** If you need to mount the switch in a recessed position on either a two-post rack or a four-post rack, you can use the 2-in.-recess front-mounting brackets provided in the separately orderable four-post rack-mount kit.



**NOTE:** One person must be available to lift the switch while another secures the switch to the rack.

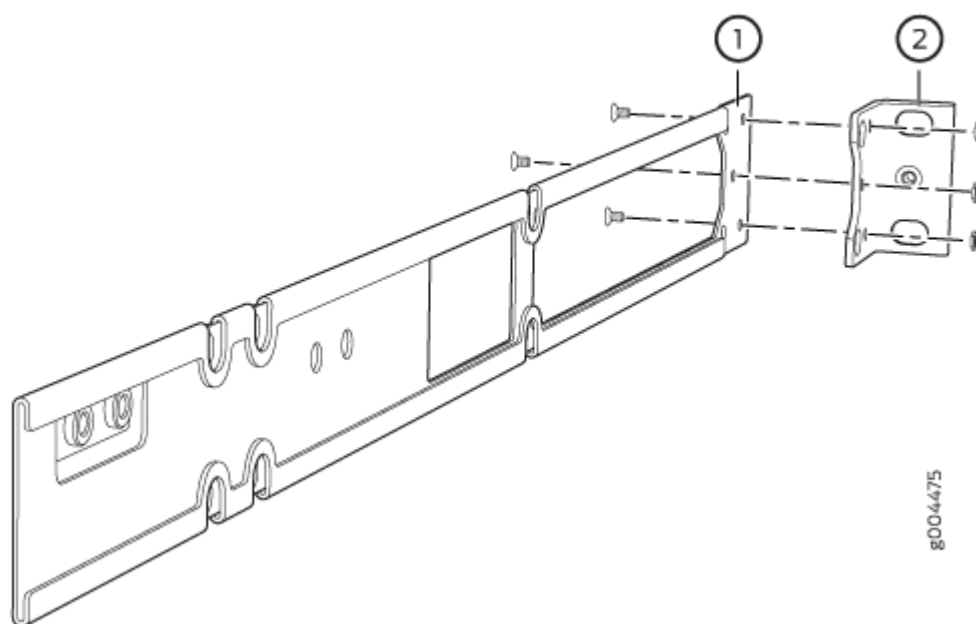


**CAUTION:** If you are mounting multiple units on a rack, mount the heaviest unit at the bottom of the rack and mount the other units from the bottom of the rack to the top in decreasing order of the weight of the units.

To mount the switch on four posts in a rack:

1. Remove the switch from the shipping carton (see ["Unpacking an EX3400 Switch" on page 93](#)).
2. Place the switch on a flat, stable surface.
3. Attach the front-mounting brackets (either the flush or the 2-in.-recess front-mounting brackets) to the side mounting-rails by using the 6 4-40 flat-head Phillips mounting screws. See [Figure 29 on page 103](#).

**Figure 29: Attaching the Front-Mounting Bracket to the Side Mounting-Rail**



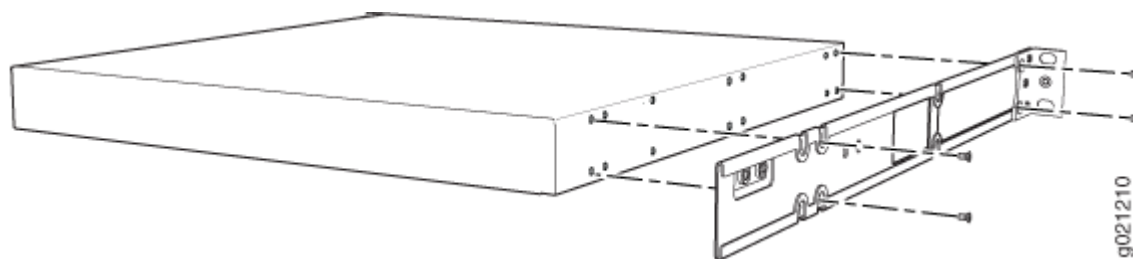
1– Side mounting-rail

2– Front-mounting bracket

4. Align the side mounting-rails along the side panels of the switch chassis. Align the two holes in the rear of the side mounting-rails with the two holes on the rear of the side panel.
5. Insert 4x6-mm Phillips flat-head mounting screws into the two aligned holes and tighten the screws. Ensure that the two holes in the rear of the side mounting-rails are aligned with the remaining two holes in the side panel. See [Figure 30 on page 104](#).

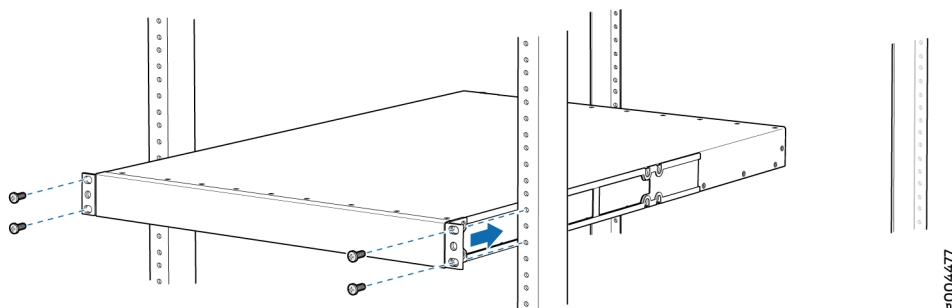


**Figure 30: Attaching the Side Mounting-Rail to the Switch Chassis**



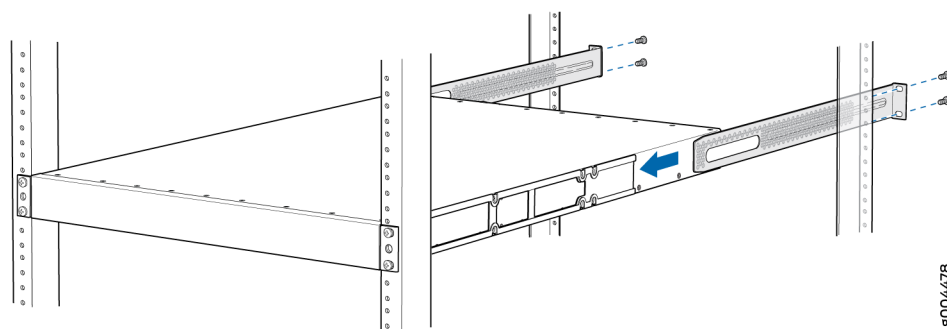
6. Insert the 4x6-mm Phillips flat-head mounting screws into the remaining two holes in the side mounting-rails and tighten the screws.
7. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the side mounting-rail holes with the threaded holes in the front post of the rack. Align the bottom hole in both the front-mounting brackets with a hole in each rack rail, making sure the chassis is level. See [Figure 31 on page 104](#).

**Figure 31: Mounting the Switch to the Front Posts in a Rack**



8. Have a second person secure the front of the switch to the rack by using the appropriate screws for your rack.
9. Slide the rear-mounting blades into the side mounting-rails. See [Figure 32 on page 105](#).

**Figure 32: Sliding the Rear-Mounting Blades into the Side Mounting-Rails**



10. Attach the rear-mounting blades to the rear post by using the appropriate screws for your rack. Tighten the screws.
11. Ensure that the switch chassis is level by verifying that all the screws on the front of the rack are aligned with the screws at the back of the rack.

#### SEE ALSO

[Connect Earth Ground to an EX Series Switch | 110](#)

[Connecting AC Power to an EX3400 Switch | 120](#)

[Connecting DC Power to an EX3400 Switch | 122](#)

[Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)

[Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet | 105](#)

[Rack-Mounting and Cabinet-Mounting Warnings | 265](#)

## Mounting an EX3400 Switch in a Recessed Position in a Rack or Cabinet

You can mount an EX3400 switch in a rack or cabinet such that the switch is recessed inside the rack from the front of the rack by 2 inches. You can use the 2-in.-recess front-mounting brackets provided in the separately orderable four-post rack-mount kit to mount the switch in a recessed position.

Reasons that you might want to mount the switch in a recessed position include:

- You are mounting the switch in a cabinet and the cabinet doors do not close completely unless the switch is recessed.
- The switch you are mounting has transceivers installed in the uplink ports and the transceivers in the uplink ports protrude from the front of the switch.

To mount the switch in a recessed position on four posts, follow the instructions in ["Mounting an EX3400 Switch on Four Posts in a Rack or Cabinet" on page 102](#). To mount the switch in a recessed position on two posts, follow the instructions in ["Mounting an EX3400 Switch on Two Posts in a Rack or Cabinet" on page 98](#).

## SEE ALSO

[Connect Earth Ground to an EX Series Switch | 110](#)

[Rack-Mounting and Cabinet-Mounting Warnings | 265](#)

## Mounting an EX3400 Switch on a Wall

Before mounting the switch on a wall:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX3400 Switches" on page 41](#).
- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.

Ensure that you have the following parts and tools available:

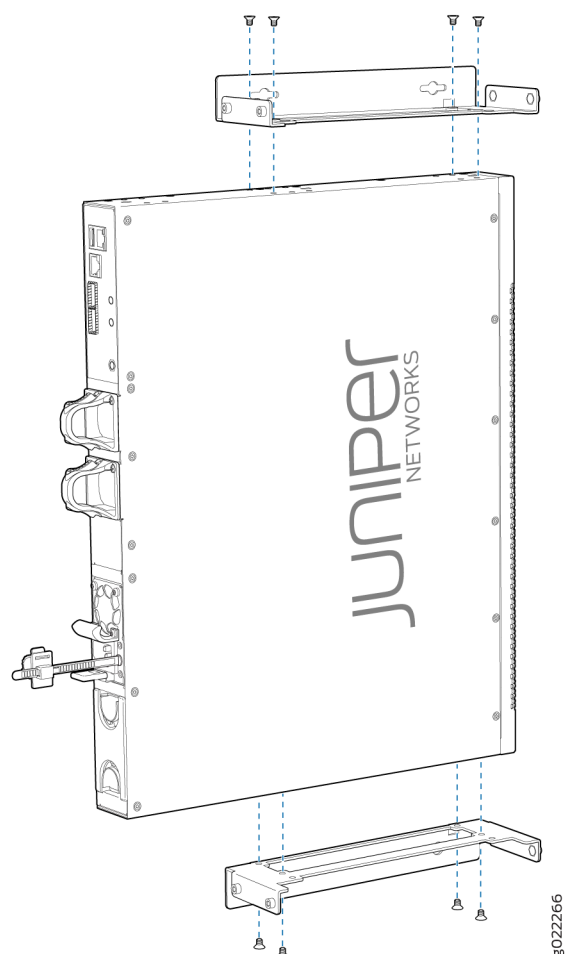
- 2 wall-mounting brackets (provided in the wall-mount kit)
- 12 wall-mounting bracket screws (provided in the wall-mount kit)
- 6 mounting screws (8-32 x 1.25 in. or M4 x 30 mm) (not provided)
- Hollow wall anchors rated to support up to 75 lb (34 kg) if you are not screwing the screws directly into wall studs (not provided)
- Phillips (+) screwdriver, number 2

You can mount an EX3400 switch on a wall by using the separately orderable wall-mount kit.

To mount one or two switches on a wall:

1. Remove the switch from the shipping carton (see ["Unpacking an EX3400 Switch" on page 93](#)).
2. Attach the wall-mounting brackets to the sides of the chassis using four wall-mounting bracket screws on each side, as shown in [Figure 33 on page 107](#).

Figure 33: Attaching Wall-Mounting Brackets to a Switch Chassis



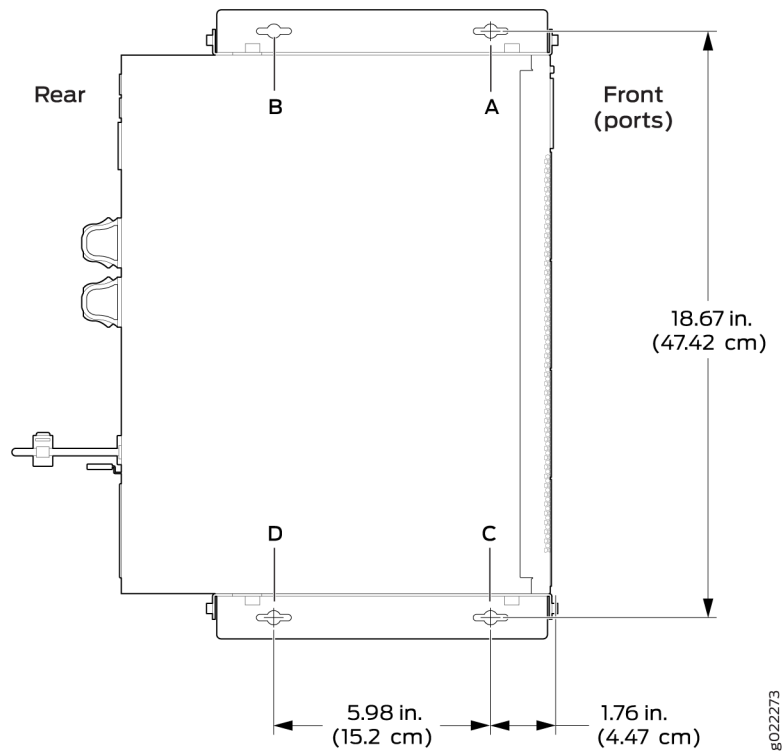
3. Install six mounting screws in the wall for the wall-mounting brackets at the location shown in [Figure 34](#) on page 108:



**NOTE:** Tighten the screws only part way in, leaving about 1/4 in. (6 mm) distance between the head of the screw and the wall.

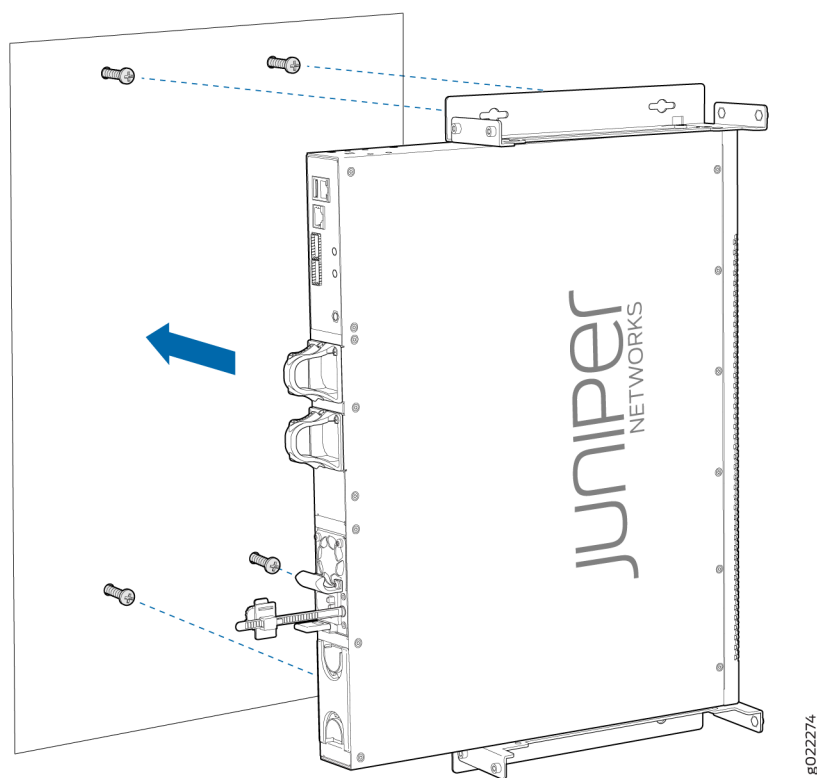
- a. Drill a hole A and install a mounting screw.
- b. Drill a hole B at a distance of 5.98 in. (15.2 cm) from screw A on a level line to the right and install a mounting screw.
- c. Drill a hole C at a distance of 18.67 in. (47.43 cm) on a plumb line down from screw A and install a mounting screw.
- d. Drill a hole D at a distance of 18.67 in. (47.43 cm) on a plumb line down from screw B and install a mounting screw.

**Figure 34: Measurements for Installing Mounting Screws**



4. Place the switch against the wall such that the front panel of the switch faces to the right side and the holes in the mounting brackets heads align with the mounting screw heads.
5. Slide the switch chassis to the left or right a bit so that the mounting screws are pushed into the channels of the holes in the mounting brackets until the switch rests firmly in place as shown in [Figure 35 on page 109](#).
6. Tighten all mounting screws.

Figure 35: Mounting the Switch on a Wall



#### SEE ALSO

[Connecting AC Power to an EX3400 Switch | 120](#)

[Connecting DC Power to an EX3400 Switch | 122](#)

[Mounting an EX3400 Switch on a Wall | 106](#)

## Connecting the EX3400 to Power

#### IN THIS SECTION

● [Connect Earth Ground to an EX Series Switch | 110](#)

- [Ground the ORv3 Compliant Switch with Tray | 120](#)
- [Connecting AC Power to an EX3400 Switch | 120](#)
- [Connecting DC Power to an EX3400 Switch | 122](#)

## Connect Earth Ground to an EX Series Switch

### IN THIS SECTION

- [Parts and Tools Required for Connecting an EX Series Switch to Earth Ground | 110](#)
- [Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch | 117](#)
- [Connecting Earth Ground to an EX Series Switch | 119](#)

To ensure proper operation and to meet 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 119](#)).

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 37 on page 111](#) 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 37 on page 111](#) lists the earthing terminal location, grounding cable and lug specifications, and parts needed for connecting an EX Series switch to earth ground.

Table 37: 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 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	
EX2300-C	Rear panel of the chassis	14 AWG (2 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14AW-L or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	



Table 37: 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	<ul style="list-style-type: none"> <li>EX2300 switches except EX2300-24 MP and EX2300-48 MP models—14 AWG (2 mm<sup>2</sup>), minimum 90°C wire, or as permitted by the local code</li> <li>EX2300-24 MP and EX2300-48 MP models—14-10 AWG STR (2.5-6 mm<sup>2</sup>), 12-10 AWG SOL (4-6 mm<sup>2</sup>) minimum 90°C wire, or as permitted by the local code—not provided</li> </ul>	<ul style="list-style-type: none"> <li>EX2300 switches except EX2300-24MP and EX2300-48MP models—Panduit LCC10-14AW-L or equivalent—not provided</li> <li>EX2300-24MP and EX2300-48MP models—Panduit LCA10-10L or equivalent—not provided</li> </ul>	<ul style="list-style-type: none"> <li>EX2300 switches except EX2300-24 MP and EX2300-48 MP models <ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul> </li> <li>EX2300-24 MP and EX2300-48 MP models <ul style="list-style-type: none"> <li>One Pan Phillips M 4 x 6 mm Nickel plated screw—provided</li> </ul> </li> </ul>	

Table 37: 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 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	For EX3200 Switches, see <a href="#">"Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch"</a> on page 117.
EX3400	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-10A-L or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	
EX4200	Left side of the chassis	14 AWG (2 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer—not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	See <a href="#">"Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch"</a> on page 117.

Table 37: 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 EX4300-4 8MP and EX4300-4 8MP-S switches	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-10A-L or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer — not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	
EX4300-4 8MP and EX4300-4 8MP-S switches	Rear panel of the chassis	14-10 AWG STR (2.5-6 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCD10-14B-L, LCC10-BW-L, or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer — not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	
EX4500 and EX4550	Left side of the chassis	14 AWG (2 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCC10-14BWL or equivalent—not provided	<ul style="list-style-type: none"> <li>Two 10-32 x .25 in. screws with #10 split-lock washer — not provided</li> <li>Two #10 flat washers—not provided</li> </ul>	See <a href="#">"Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch"</a> on page 117.

Table 37: 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	<ul style="list-style-type: none"> <li>Two ¼ -20 x 0.5 in. screws with #¼" split-washer —provided</li> <li>Two #¼" flat washers—provided</li> </ul>	
EX8208	Left side of the chassis	6 AWG (13.3 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent —provided	<ul style="list-style-type: none"> <li>Two ¼ -20 x 0.5 in. screws with #¼" split-washer —provided</li> <li>Two #¼" flat washers—provided</li> </ul>	

Table 37: 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	<p>Two earthing terminals:</p> <ul style="list-style-type: none"> <li>Left side of the chassis</li> <li>Rear panel of the chassis</li> </ul> <p><b>NOTE:</b> You must use only one of the two protective earthing terminals.</p>	2 AWG (33.6 mm <sup>2</sup> ), minimum 90° C wire, or as permitted by the local code	Panduit LCD2-14A-Q or equivalent—provided	<ul style="list-style-type: none"> <li>Two ¼ -20 x 0.5 in. screws with #¼" split-washer—provided</li> <li>Two #¼" flat washers—provided</li> </ul>	
EX9204, EX9208, and EX9214	Rear panel of the chassis	One 6 AWG (13.3 mm <sup>2</sup> ), minimum 90° C wire, or one that complies with the local code	Thomas& Betts LCN6-14 or equivalent—provided	<ul style="list-style-type: none"> <li>Two ¼ -20 x 0.5 in. screws with #¼" split-washer—provided</li> <li>Two #¼" flat washers—provided</li> </ul>	See <a href="#">Grounding Cable and Lug Specifications for EX9200 Switches</a> .

**Table 37: 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 mm <sup>2</sup> ), 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 <a href="#">Grounding Cable and Lug Specifications for EX9200 Switches</a> .
EX9253	Right side of the chassis	14-10 AWG (2-5.3 mm <sup>2</sup> ), 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:

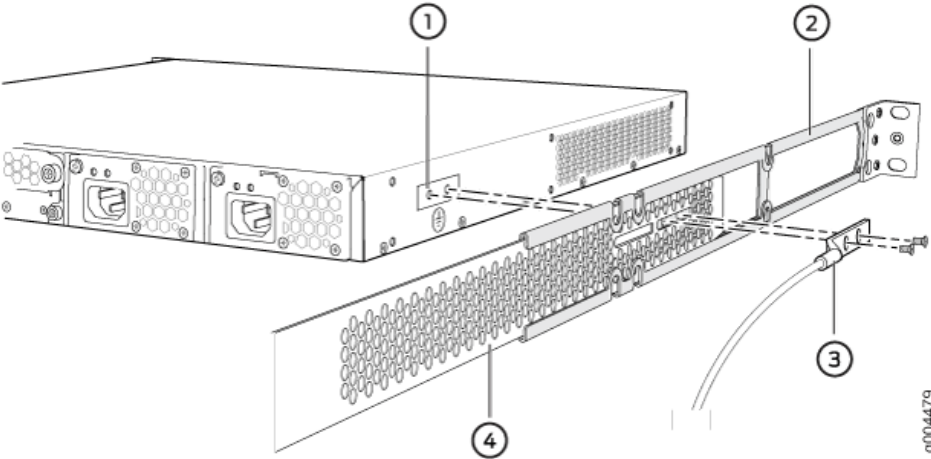
- An electrostatic discharge grounding strap (provided)
- A Phillips (+) number 2 screwdriver to tighten the screws.

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 38 on page 118](#) lists the special instructions that you might need to follow before connecting earth ground to a switch.

Table 38: Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch

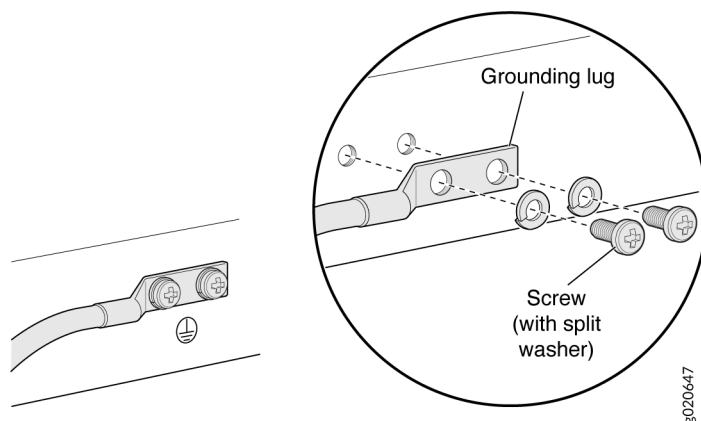
Switch	Special Instructions
EX3200 and EX4200	Some early variants of EX3200 and EX4200 switches for which the Juniper Networks model number on the label next to the protective earthing terminal is from 750-021xxx through 750-030xxx require 10-24x.25 in. screws.
EX4200, EX4500, and EX4550	<p>If you plan 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.</p> <p><b>NOTE:</b> 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 <a href="#">Figure 36 on page 118</a>.</p> <p><b>Figure 36: Connecting the Grounding Lug to a Switch Mounted on Four Posts of a Rack</b></p>  <p>1– Protective earthing terminal      3– Grounding lug</p> <p>2– Side mounting-rail      4– Rear mounting-blade</p> <p><b>NOTE:</b> 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.)</p>

## 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 on page 119](#).

**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*



## Ground the ORv3 Compliant Switch with Tray



**NOTE:** To meet electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the ORv3 rack to the earth ground.

You do not need to make any external connections to ground the ORv3 Compliant Switch with Tray. The ORv3 Compliant Switch with Tray is connected to earth ground when you slide in the tray.

To ground the device:

1. In the ORv3 Compliant Switch with Tray, the protective earthing terminal of the switch is connected to the tray using a grounding cable terminated with two-hole protective grounding lugs.
2. When the ORv3 Compliant Switch with Tray is completely inserted into the ORv3 rack, the IT Gear input connector ground contacts provide electrically conductive path to the busbar and the rack frame.
3. There are dedicated grounding points on the rack frame, typically located at the top of the rack, which are used for grounding the complete loaded ORv3 Rack.

## Connecting AC Power to an EX3400 Switch

Ensure that you have the following parts and tools available:

- A power cord appropriate for your geographical location
- A power cord retainer clip (provided with the switch)

Ensure that you have connected the device chassis to earth ground. The AC power cords provide additional grounding when you connect the power supply in the switch to a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see ["AC Power Cord Specifications for EX3400 Switches" on page 32](#)).



**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*.

The power supply is installed in the power supply slot on the rear panel of the switch.

To connect AC power to the switch:

1. Push the end of the power cord retainer strip into the slot above the power cord inlet until the strip snaps into place. Ensure that the loop in the retainer strip faces the power cord (see [Figure 38 on page 121](#)).

The power cord retainer clip extends out of the chassis by 3 in. (7.62 cm)

2. Press the small tab on the retainer strip to loosen the loop. Slide the loop until there is enough space to insert the power cord coupler into the power cord inlet.
3. Locate the power cord or cords shipped with the switch; the cords have plugs appropriate for your geographical location. See "[AC Power Cord Specifications for EX3400 Switches](#)" on page 32.



**WARNING:** Ensure that the power cord does not drape where people can trip on it or block access to switch components.

4. Insert the power cord coupler firmly into the power cord inlet (see [Figure 39 on page 122](#)).
5. Slide the loop toward the power supply until it is snug against the base of the coupler.
6. Press the tab on the loop and draw out the loop into a tight circle.
7. If the AC power source outlet has a power switch, set it to the OFF (O) position.
8. Insert the power cord plug into an AC power source outlet.
9. If the AC power source outlet has a power switch, set it to the ON (I) position.

**Figure 38: Connecting an AC Power Cord Retainer Clip to the AC Power Cord Inlet**

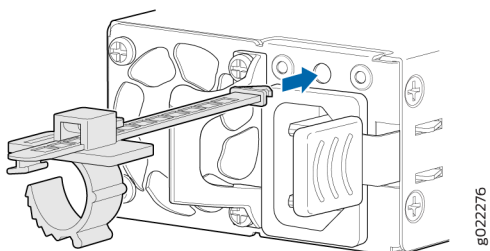
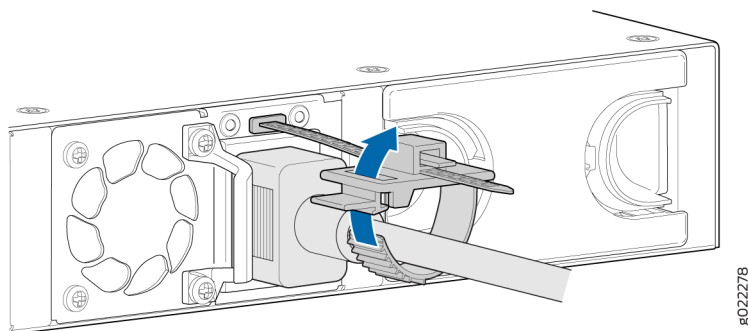


Figure 39: Connecting an AC Power Cord to the AC Power Cord Inlet



## SEE ALSO

[Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)

[AC Power Supply in EX3400 Switches | 28](#)

## Connecting DC Power to an EX3400 Switch

Before you begin connecting DC power to the switch, ensure that you have connected earth ground to the switch chassis.



**CAUTION:** To meet electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the switch 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 the earth ground. For instructions on connecting earth ground, see *Connect Earth Ground to an EX Series Switch*.



**NOTE:** Grounding is required for DC systems and recommended for AC systems.

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

Install the power supply in the chassis. For instructions on installing a DC power supply in an EX3400 switch, see ["Installing a DC Power Supply in an EX3400 Switch" on page 213](#).

Ensure that you have the following parts and tools available:

- DC power source cables (14–16 AWG) (not provided)
- Wire pins (Molex 192120005) (not provided)
- Terminal connector (provided)
- Phillips (+) screwdriver, number 2
- Slotted (-) screwdriver

The power supply is installed in the power supply slot in the rear panel.



**WARNING:** DC-powered switches are intended for installation only in a restricted-access location.

To connect DC power to the switch:

1. Ensure that the input circuit breaker is open so that the cable leads do not become active while you are connecting DC power.



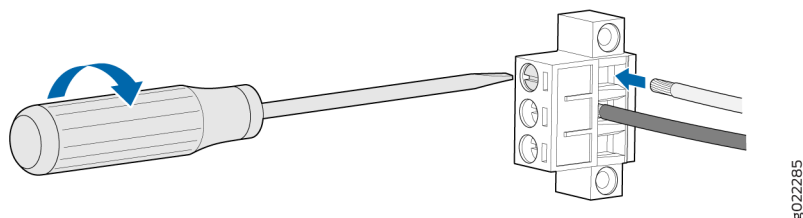
**NOTE:** The DC power inlet in the switch has two terminals labeled + and – and has a terminal to connect to earth ground. The DC power inlet has a clear plastic cover.



**NOTE:** The + terminal is referred to as +RTN and – terminal is referred to as –48 V in *DC Power Wiring Sequence Warning* and *DC Power Electrical Safety Guidelines*.

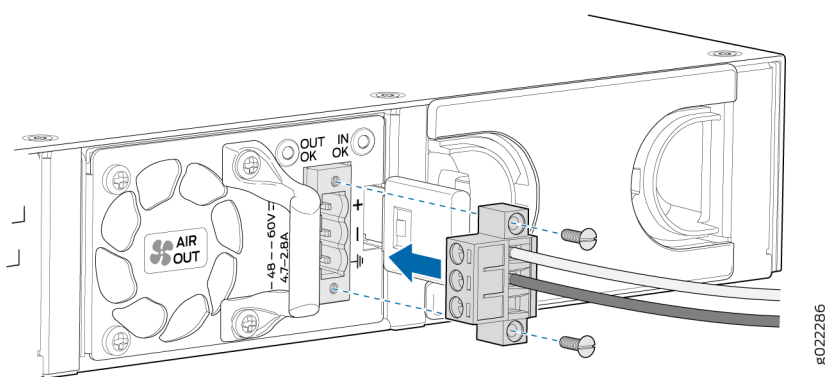
2. Grasp the plastic cover in the middle, gently bend it outward, and pull it out. Save the cover.
3. Loosen the screws on the terminal connector by using the screwdriver.
4. Strip 0.25 inch (6.35 mm) of the insulator from one end of the power cable. Attach the two wires to the wire pins.
5. Secure the wire pins to the appropriate terminals on the terminal connector by using the screws from the terminal connector (see [Figure 40 on page 124](#)).

Figure 40: Securing Wire Pins to the Terminals on the Terminal Connector



- To connect the wire pins to the appropriate terminals on the terminal connector:
  - a. Connect the positive (+) wire pin to the + terminal on the terminal connector.
  - b. Connect the negative (-) wire pin to the - terminal on the terminal connector.
  - c. Ensure that the pins are fully inserted into the terminal connector.
  - d. Tighten each screw on the terminal connector until snug by using the screwdriver. Do not overtighten—apply 4.5 lb-in. (0.51 Nm) of torque to the screws.
- 6. Insert the terminal connector (with the power cable attached) into the power supply socket on the switch and secure it by tightening the two screws on either side of the terminal connector (see [Figure 41 on page 124](#)).

Figure 41: Securing the Terminal Connector to the DC Power Inlet



**NOTE:** To supply sufficient power, terminate the DC input wiring on a facility DC source that is capable of supplying a minimum of 7.5 A at -48 VDC.

7. Connect the other end of the power cable to the power source.
8. Close the input circuit breaker.
9. Verify that the **IN OK** and the **OUT OK** LEDs are lit green and on steadily.

**SEE ALSO**[Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)[DC Power Supply in EX3400 Switches | 35](#)

## Connecting the EX3400 to External Devices

**IN THIS SECTION**

- [Connect a Device to a Network for Out-of-Band Management | 125](#)
- [Connect a Device to a Management Console Using an RJ-45 Connector | 126](#)
- [Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port | 128](#)

### 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.

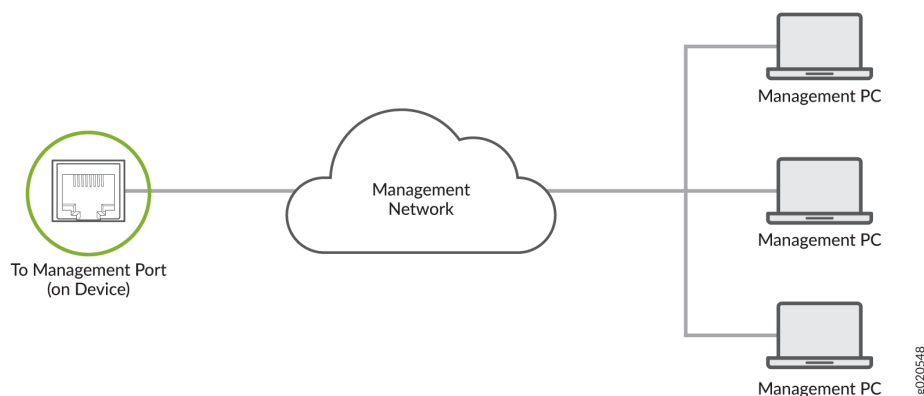
**Figure 42: RJ-45 Connector on an Ethernet Cable**



You can monitor and manage a network device, such as a router or a switch, 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:

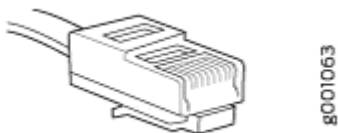
1. Connect one end of the Ethernet cable to the management port on the device.
2. Connect the other end of the Ethernet cable to the management device.



## 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 and an RJ-45-to-DB-9 serial port adapter.

Figure 43: RJ-45 Connector on an Ethernet Cable



**NOTE:** We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:

- RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter, you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See <https://ftdichip.com/drivers/vcp-drivers/> to download the driver.



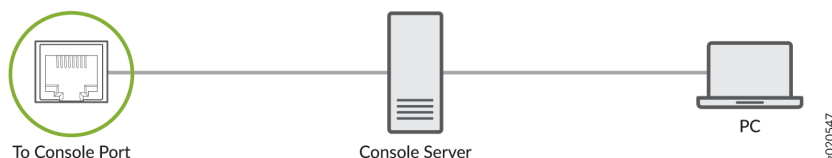
**NOTE:** If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC directly to the device, use a combination of the RJ-45-to-DB-9 socket adapter and a USB-to-DB-9 plug adapter. You must provide the USB-to-DB-9 plug adapter.

You can configure and manage your network 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.

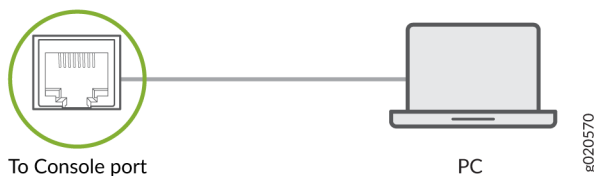
To connect the device to a management console:

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 [Figure 44 on page 127](#)) or management console (see [Figure 45 on page 127](#)).

**Figure 44: Connect a Device to a Management Console Through a Console Server**



**Figure 45: Connect a Device Directly to a Management Console**





## Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port

### Before You Begin

Before you connect the switch using the Mini-USB Type-B console port:

- Ensure that the USB to Serial driver is installed on the host machine.
- Ensure that the HyperTerminal properties of the console server or laptop are set as follows:
  - Baud rate—9600
  - Flow control—None
  - Data—8
  - Parity—None
  - Stop bits—1
  - DCD state—Disregard

You will need the following parts and tools:

- One mini-USB cable with Standard-A and Mini-USB Type-B (5-pin) connectors (not provided)

EX2200-C, EX2300, EX2300-C, EX3400, EX4300, and EX4550 switches, except EX2300-24MP and EX2300-48MP models, have two console ports: an RJ-45 console port that accepts a cable with an RJ-45 connector and a Mini-USB Type-B console port that accepts a cable with a Mini-USB Type-B plug (5-pin) connector. You can configure and manage the switch using the RJ-45 console port or the Mini-USB Type-B console port. On EX2200-C and EX4550 switches, only one console port is active at a time and the console input is active only on that port. On EX2300, EX2300-C, EX3400, and EX4300 switches, both the RJ-45 console port and the Mini-USB Type-B console port can be active at the same time.



**NOTE:** EX2300-24MP and EX2300-48MP models only have an RJ-45 console port.

By default, the RJ-45 console port is the active port. If your laptop or PC does not have a DB-9 plug connector pin or RJ-45 connector pin, you can connect your laptop or PC directly to the switch using a mini-USB cable that has a Standard-A USB connector on one end and a Mini-USB Type-B (5-pin) connector on the other end. You must first configure the Mini-USB Type-B console port as the active port before you can use it to connect to the switch.

This topic describes the procedure to connect EX2200-C, EX2300, EX2300-C, EX3400, EX4300, and EX4550 switches to the management console using the Mini-USB Type-B console port.

For information about configuring and managing an EX Series switch using the RJ-45 console port, see *Connect a Device to a Management Console Using an RJ-45 Connector*.

To connect the switch to the console using the Mini-USB Type-B console port:

1. Connect the host machine to the device directly using the active console port or remotely using the management interface. To connect using the active console port, which is the RJ-45 console port by default, see *Connect a Device to a Management Console Using an RJ-45 Connector*.
2. Connect the Standard-A connector of the mini-USB cable to the host machine (PC or laptop).
3. Connect the Mini-USB Type-B (5-pin) connector of the mini-USB cable to the Mini-USB Type-B console port (labeled **CON**) on the switch.
4. By default, the RJ-45 port is set as an active console port and the Mini-USB Type-B port is the passive console port. Set the Mini-USB Type-B console port as the active console port using the `port-type` command. See [Configuring the Console Port Type \(CLI Procedure\)](#).
5. Reboot the switch. The boot log appears on the activated console.

After the connection is established, the Mini-USB Type-B becomes the active console port. The host machine connected to the Mini-USB Type-B console port displays log messages and you can control switch functionality through it. On EX2300, EX2300-C, EX3400, and EX4300 switches, both the Mini-USB Type-B and RJ-45 console ports are now active. On EX2200-C and EX4550 switches, the Mini-USB Type-B console port is active and the RJ-45 console port is passive.

## Register Products—Mandatory to Validate SLAs

Juniper Networks auto registers newly purchased products based on the end customer information provided at the point of sale. Registering products and changes to products activates your hardware replacement service-level agreements (SLAs).



**CAUTION:** Update the installation base data if any installation base data is added or changed or if the installation base is moved. Juniper Networks is not responsible for customers not meeting the hardware replacement service-level agreement (SLA) for products that do not have registered serial numbers or accurate installation base data. To know more about how to register your product and update your installation base, see [Juniper Networks Product Registration and Install Base Management](#).

# Connecting the EX3400 to the Network

## IN THIS SECTION

- [Install a Transceiver | 130](#)
- [Connect a Fiber-Optic Cable | 133](#)

## 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 the transceivers 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 46 on page 133 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers.

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 a site ESD point or to the ESD point on the device.
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, use your fingers to 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 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.



**NOTE:** When you install SFP-DD transceivers, push it hard until you hear a click sound. Use a long nose plier to pull the SFP-DD transceiver connected on the top and bottom rows of the chassis where the pull tabs face each other.

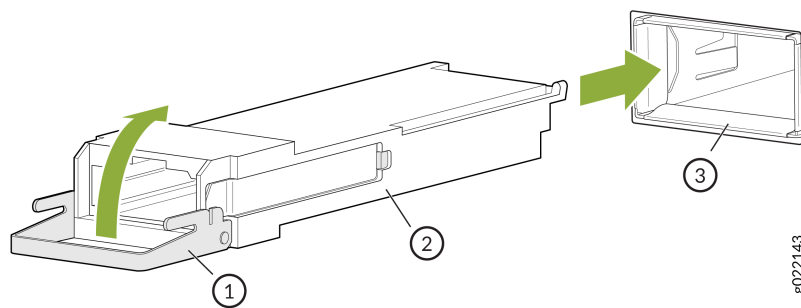


**NOTE:** Make sure to use a dust cap to cover ports that are unused.



**NOTE:** While using Finisar AOC SFP+ optical module with the QFX5130-48C switch, you may need to pull the module upwards to pull out the module smoothly from the cage.

Figure 46: Install a Transceiver



1– Ejector lever

3– Port

2– Transceiver

## Connect a Fiber-Optic Cable

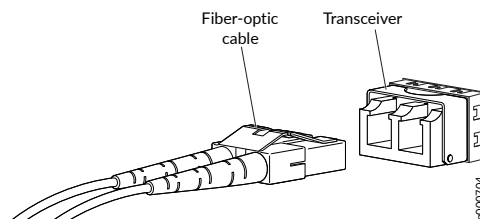
Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see [Laser and LED Safety Guidelines and Warnings](#)).

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.



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 EX3400

### IN THIS SECTION

- [EX3400 Switch Default Configuration | 134](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 155](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) | 158](#)
- [Reverting to the Default Factory Configuration for the EX Series Switch | 161](#)

### EX3400 Switch Default Configuration

Each EX Series switch is programmed with a factory-default configuration that contains the values set for each configuration parameter when a switch is shipped.

The EX3400 switch default configuration:

- Sets Ethernet switching and storm control on all interfaces
- Sets Power over Ethernet (PoE) on all RJ-45 ports of models that provide PoE
- Enables the following protocols:
  - Internet Group Management Protocol (IGMP) snooping
  - Rapid Spanning Tree Protocol (RSTP)
  - Link Layer Discovery Protocol (LLDP)
  - Link Layer Discovery Protocol Media Endpoint Discovery (LLDP-MED)

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*.



**NOTE:** The factory-default configuration file is different for different EX3400 switch models.

The number of interfaces in the default configuration file depends on the number of ports in the EX3400 switch.

The `poe` statement does not appear for models without PoE.

The four uplink ports on the front panel of EX3400 switches are listed as `ge-0/2/0` through `ge-0/2/3` and `xe-0/2/0` through `xe-0/2/3`.

The following is the factory-default configuration file for an EX3400 switch with 24 ports with PoE capability that runs Junos OS Release 18.2R3 or later.

```
system {
  auto-snapshot;
  phone-home {
    server https://redirect.juniper.net;
    rfc-compliant;
  }
  services {
    ssh;
    netconf {
      ssh;
      rfc-compliant;
      yang-compliant;
    }
  }
}
protocols {
  lldp {
    interface all;
  }
  lldp-med {
    interface all;
  }
  igmp-snooping {
    vlan default;
  }
}
```



```

rstp {
    interface ge-0/0/0;
    interface ge-0/0/1;
    interface ge-0/0/2;
    interface ge-0/0/3;
    interface ge-0/0/4;
    interface ge-0/0/5;
    interface ge-0/0/6;
    interface ge-0/0/7;
    interface ge-0/0/8;
    interface ge-0/0/9;
    interface ge-0/0/10;
    interface ge-0/0/11;
    interface ge-0/0/12;
    interface ge-0/0/13;
    interface ge-0/0/14;
    interface ge-0/0/15;
    interface ge-0/0/16;
    interface ge-0/0/17;
    interface ge-0/0/18;
    interface ge-0/0/19;
    interface ge-0/0/20;
    interface ge-0/0/21;
    interface ge-0/0/22;
    interface ge-0/0/23;
    interface xe-0/2/0;
    interface xe-0/2/1;
    interface xe-0/2/2;
    interface xe-0/2/3;
    interface ge-0/2/0;
    interface ge-0/2/1;
    interface ge-0/2/2;
    interface ge-0/2/3;
}
}
forwarding-options {
    storm-control-profiles default {
        all;
    }
}
poe {
    interface all;
}

```

```
interfaces {
  ## For phone-home connectivity to PHS enable dhcp on vme and irb.
  vme {
    unit 0 {
      family inet {
        dhcp;
      }
    }
  }
  irb {
    unit 0 {
      family inet {
        dhcp;
      }
    }
  }
  ge-0/0/0 {
    unit 0 {
      family ethernet-switching {
        storm-control default;
      }
    }
  }
  ge-0/0/1 {
    unit 0 {
      family ethernet-switching {
        storm-control default;
      }
    }
  }
  ge-0/0/2 {
    unit 0 {
      family ethernet-switching {
        storm-control default;
      }
    }
  }
  ge-0/0/3 {
    unit 0 {
      family ethernet-switching {
        storm-control default;
      }
    }
  }
}
```

```
}
ge-0/0/4 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/5 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/6 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/7 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/8 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/9 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
```

```
ge-0/0/10 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/11 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/12 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/13 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/14 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/15 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/16 {
```

```
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/17 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/18 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/19 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/20 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/21 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/22 {
    unit 0 {
```

```
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/23 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/0 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/1 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/2 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/3 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/0 {
    unit 0 {
        family ethernet-switching {
```

```

        storm-control default;
    }
}
ge-0/2/1 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/2 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/3 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
}
groups {
    junos-defaults {
        protocols {
            igmp {
                interface me0.0 {
                    disable;
                }
                interface vme.0 {
                    disable;
                }
            }
        }
    }
}
system {
    commit {
        factory-settings {

```

```

        reset-chassis-lcd-menu;
        reset-virtual-chassis-configuration;
    }
}
chassis {
    redundancy {
        graceful-switchover;
    }
}
vlans {
    default {
        vlan-id 1;
        l3-interface irb.0;
    }
}

```

The following is the factory-default configuration file for an EX3400 switch with 48 ports with PoE capability that runs a version of Junos OS release earlier than 18.2R3.

```

system {
    auto-snapshot;
    syslog {
        user * {
            any emergency;
        }
        file messages {
            any notice;
            authorization info;
        }
        file interactive-commands {
            interactive-commands any;
        }
    }
    commit {
        factory-settings {
            reset-virtual-chassis-configuration;
            reset-chassis-lcd-menu;
        }
    }
}
interfaces {

```



```
ge-0/0/0 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/1 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/2 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/3 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/4 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/5 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/6 {
```

```
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/7 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/8 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/9 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/10 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/11 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/12 {
    unit 0 {
```

```
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/13 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/14 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/15 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/16 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/17 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/18 {
    unit 0 {
        family ethernet-switching {
```

```
        storm-control default;
    }
}
ge-0/0/19 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/20 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/21 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/22 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/23 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/0/24 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
```

```
    }  
  }  
}  
ge-0/0/25 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}  
ge-0/0/26 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}  
ge-0/0/27 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}  
ge-0/0/28 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}  
ge-0/0/29 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}  
ge-0/0/30 {  
  unit 0 {  
    family ethernet-switching {  
      storm-control default;  
    }  
  }  
}
```

```
    }  
  }  
  ge-0/0/31 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }  
  ge-0/0/32 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }  
  ge-0/0/33 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }  
  ge-0/0/34 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }  
  ge-0/0/35 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }  
  ge-0/0/36 {  
    unit 0 {  
      family ethernet-switching {  
        storm-control default;  
      }  
    }  
  }
```

```
}  
ge-0/0/37 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/38 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/39 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/40 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/41 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/42 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}
```

```
ge-0/0/43 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/44 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/45 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/46 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/0/47 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
ge-0/2/0 {  
    unit 0 {  
        family ethernet-switching {  
            storm-control default;  
        }  
    }  
}  
xe-0/2/0 {
```



```
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/1 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/1 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/2 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/2 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
ge-0/2/3 {
    unit 0 {
        family ethernet-switching {
            storm-control default;
        }
    }
}
xe-0/2/3 {
    unit 0 {
```

```

        family ethernet-switching {
            storm-control default;
        }
    }
}
forwarding-options {
    storm-control-profiles default {
        all;
    }
}
protocols {
    lldp {
        interface all;
    }
    lldp-med {
        interface all;
    }
    igmp-snooping {
        vlan default;
    }
    rstp {
        interface ge-0/0/0;
        interface ge-0/0/1;
        interface ge-0/0/2;
        interface ge-0/0/3;
        interface ge-0/0/4;
        interface ge-0/0/5;
        interface ge-0/0/6;
        interface ge-0/0/7;
        interface ge-0/0/8;
        interface ge-0/0/9;
        interface ge-0/0/10;
        interface ge-0/0/11;
        interface ge-0/0/12;
        interface ge-0/0/13;
        interface ge-0/0/14;
        interface ge-0/0/15;
        interface ge-0/0/16;
        interface ge-0/0/17;
        interface ge-0/0/18;
        interface ge-0/0/19;
        interface ge-0/0/20;
    }
}

```

```
    interface ge-0/0/21;
    interface ge-0/0/22;
    interface ge-0/0/23;
    interface ge-0/0/24;
    interface ge-0/0/25;
    interface ge-0/0/26;
    interface ge-0/0/27;
    interface ge-0/0/28;
    interface ge-0/0/29;
    interface ge-0/0/30;
    interface ge-0/0/31;
    interface ge-0/0/32;
    interface ge-0/0/33;
    interface ge-0/0/34;
    interface ge-0/0/35;
    interface ge-0/0/36;
    interface ge-0/0/37;
    interface ge-0/0/38;
    interface ge-0/0/39;
    interface ge-0/0/40;
    interface ge-0/0/41;
    interface ge-0/0/42;
    interface ge-0/0/43;
    interface ge-0/0/44;
    interface ge-0/0/45;
    interface ge-0/0/46;
    interface ge-0/0/47;
    interface ge-0/2/0;
    interface xe-0/2/0;
    interface ge-0/2/1;
    interface xe-0/2/1;
    interface ge-0/2/2;
    interface xe-0/2/2;
    interface ge-0/2/3;
    interface xe-0/2/3;
  }
}
poe {
  interface all;
}
```

## SEE ALSO

[Configuration Files Terms](#)

[Connecting and Configuring an EX Series Switch \(CLI Procedure\)](#)

[EX3400 Switches Hardware Overview](#) | [2](#)

## Connecting and Configuring an EX Series Switch (CLI Procedure)

Using the CLI, set the following parameter values in the console server or PC:

- Baud rate—9600
- Flow control—None
- Data—8
- Parity—None
- Stop bits—1
- DCD state—Disregard

There are two ways to connect and configure an EX Series switch: one method is through the console by using the CLI and the other is by using the J-Web interface.



**NOTE:** EX2200-24T-4G-DC switches do not support switch connection and configuration through the J-Web interface.

This topic describes the CLI procedure.



**NOTE:** To run the `ezsetup` script, the switch must have the factory-default configuration as the active configuration. If you have configured anything on the switch and want to run `ezsetup`, revert to the factory-default configuration. See *Reverting to the Default Factory Configuration for the EX Series Switch*.

To connect and configure the switch from the console by using the CLI:

1. Connect the console port to a laptop or PC by using the RJ-45 to DB-9 serial port adapter. An Ethernet cable that has an RJ-45 connector at either end and an RJ-45 to DB-9 serial port adapter. If your laptop doesn't have a serial port, use a serial to USB adapter.



**NOTE:** We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:

- RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, <https://ftdichip.com/drivers/vcp-drivers/> to download the driver.

For the location of the console port on different EX Series switches:

- See [EX2200 Switches Hardware Overview](#).
- See *EX2300 Switches Hardware Overview*.
- See [Rear Panel of an EX3200 Switch](#).
- See [Rear Panel of an EX3300 Switch](#).
- See ["Rear Panel of an EX3400 Switch" on page 14](#).
- See *Rear Panel of an EX4200 Switch*.
- See *EX4300 Switches Hardware Overview*
- See [Front Panel of an EX4500 Switch](#).
- See [EX4550 Switches Hardware Overview](#)
- See [Switch Fabric and Routing Engine \(SRE\) Module in an EX6200 Switch](#).
- See [Switch Fabric and Routing Engine \(SRE\) Module in an EX8208 Switch](#).
- See [Routing Engine \(RE\) Module in an EX8216 Switch](#).



**NOTE:** In EX2200-C, EX2300, EX3400, EX4300, and EX4550 switches, you can also use the Mini-USB Type-B console port to connect to a laptop or PC. See *Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port*.

2. At the Junos OS shell prompt `root%`, type **ezsetup**.
3. Enter the hostname. This is optional.
4. Enter the root password you want to use for the device. Reenter the root password when prompted.
5. Enable services such as SSH and Telnet.



**NOTE:** You will not be able to log in to the switch as the root user through Telnet. Root login is allowed only through SSH.

- The default option for SSH is `yes`. Select this to enable SSH.
  - The default option for Telnet is `no`. Change this to `yes` to enable Telnet.
6. Use the Management Options page to select the management scenario:



**NOTE:** On EX2300 and EX3400 switches, you cannot create a new VLAN for management.

On EX4500, EX6200, and EX8200 switches, only the out-of-band management option is available.

- *Configure in-band management.* In in-band management, you configure a network interface or an uplink module (expansion module) interface as the management interface and connect it to the management device.  
In this scenario, you have the following two options:
    - Use the automatically created VLAN *default* for management—Select this option to configure all data interfaces as members of the default VLAN. Specify the management IP address and the default gateway.
    - Create a new VLAN for management—Select this option to create a management VLAN. Specify the VLAN name, VLAN ID, management IP address, and default gateway. Select the ports that must be part of this VLAN.
  - *Configure out-of-band management*—Configure the management port. In out-of-band management, you use a dedicated management channel (**MGMT** port) to connect to the management device. Specify the IP address and gateway of the management interface. Use this IP address to connect to the switch.
7. Specify the SNMP read community, location, and contact to configure SNMP parameters. These parameters are optional.
  8. Specify the system date and time. Select the time zone from the list. These options are optional.

9. The configured parameters are displayed. Enter **yes** to commit the configuration. The configuration is committed as the active configuration for the switch.
10. (For EX4500 switches only) Enter the operational mode command **request chassis pic-mode intraconnect** to set the PIC mode to intraconnect.

You can now log in with the CLI or the J-Web interface to continue configuring the switch. If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

## SEE ALSO

*Connecting and Configuring an EX Series Switch (J-Web Procedure)*

[Installing and Connecting an EX2200 Switch](#)

*Installing and Connecting an EX2300 Switch*

[Installing and Connecting an EX3200 Switch](#)

[Installing and Connecting an EX3300 Switch](#)

[Installing and Connecting an EX3400 Switch | 95](#)

*Installing and Connecting an EX4200 Switch*

*Installing and Connecting an EX4300 Switch*

[Installing and Connecting an EX4550 Switch](#)

[Installing and Connecting an EX4500 Switch](#)

[Installing and Connecting an EX6210 Switch](#)

[Installing and Connecting an EX8208 Switch](#)

[Installing and Connecting an EX8216 Switch](#)

## Connecting and Configuring an EX Series Switch (J-Web Procedure)

There are two ways to connect and configure an EX Series switch: one method is through the console by using the CLI and the other is by using the J-Web interface.

Starting in Junos OS Release 19.2R1, J-Web supports EX4650 switches.



### NOTE:

This topic describes the J-Web procedure.



**NOTE:** Before you begin the configuration, enable a DHCP client on the management PC that you will connect to the switch so that the PC can obtain an IP address dynamically.



**NOTE:**

To connect and configure the switch by using the J-Web interface:

1. Connect the Ethernet cable from the Ethernet port on the PC to the switch.
  - EX2200, EX3200, or EX4200 switch—Connect the cable to port 0 (ge-0/0/0) on the front panel of the switch.
  - EX3300 switch—Connect the cable to the port labeled **MGMT** on the rear panel of the switch.
  - EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—Connect the cable to the port labeled **MGMT** on the rear panel of the switch.
  - EX4500 or EX4550 switch—Connect the cable to the port labeled **MGMT** on the front panel (LCD panel side) of the switch.
  - EX4650 switches—Connect the cable to the port labeled **CON** on the rear panel of the switch.
  - EX6200 switch—Connect the cable to one of the ports labeled **MGMT** on the Switch Fabric and Routing Engine (SRE) module in slot 4 or 5 in an EX6210 switch.
  - EX8200 switch—Connect the cable to the port labeled **MGMT** on the Switch Fabric and Routing Engine (SRE) module in slot SRE0 in an EX8208 switch or on the Routing Engine (RE) module in slot RE0 in an EX8216 switch.

These ports are configured as the DHCP server with the default IP address, 192.168.1.1. The switch can assign an IP address to the management PC in the IP address range 192.168.1.2 through 192.168.1.253.

2. From the PC, open a Web browser, type **http://192.168.1.1** in the address field, and press **Enter**.
3. On the J-Web login page, type **root** as the username, leave the password field blank, and click **Login**.
4. On the Introduction page, click **Next**.
5. On the Basic Settings page, modify the hostname, the root password, and date and time settings:
  - Enter the hostname. This is optional.
  - Enter a password and reenter the password.
  - Specify the time zone.



- Synchronize the date and time settings of the switch with the management PC or set them manually by selecting the appropriate option button. This is optional.

Click **Next**.

6. Use the Management Options page to select the management scenario:



**NOTE:** On EX2300 and EX3400 switches, you cannot create a new VLAN for management.

On EX4500, EX6210, and EX8200 switches, only the out-of-band management option is available.

- *Configure in-band management.* In in-band management, you configure a network interface or an uplink module (expansion module) interface as the management interface and connect it to the management device.  
In this scenario, you have the following two options:
  - Use the automatically created VLAN *default* for management—Select this option to configure all data interfaces as members of the default VLAN. Specify the management IP address and the default gateway.
  - Create a new VLAN for management—Select this option to create a management VLAN. Specify the VLAN name, VLAN ID, management IP address, and default gateway. Select the ports that must be part of this VLAN.
- *Configure out-of-band management*—Configure the management port. In out-of-band management, you use a dedicated management channel (**MGMT** port) to connect to the management device. Specify the IP address and gateway of the management interface. Use this IP address to connect to the switch.

7. Click **Next**.
8. On the Manage Access page, you can select options to enable Telnet, SSH, and SNMP services. For SNMP, you can configure the read community, location, and contact.
9. Click **Next**. The Summary screen displays the configured settings.
10. Click **Finish**. The configuration is committed as the active switch configuration.



**NOTE:** After the configuration is committed, the connectivity between the PC and the switch might be lost. To renew the connection, release and renew the IP address by executing the appropriate commands on the management PC or by removing and reinserting the Ethernet cable.

11. (For EX4500 switches only) In the CLI, enter the **request chassis pic-mode intraconnect** operational mode command to set the PIC mode to intraconnect.

You can now log in by using the CLI or the J-Web interface to continue configuring the switch.

If you use the J-Web interface to continue configuring the switch, the Web session is redirected to the new management IP address. If the connection cannot be made, the J-Web interface displays instructions for starting a J-Web session.

## Reverting to the Default Factory Configuration for the EX Series Switch

### IN THIS SECTION

- [Reverting to the EX Series Switch Factory-Default Configuration Using the request system zeroize Command | 162](#)
- [Reverting to the EX Series Switch Factory-Default Configuration Using the load factory-default Command | 163](#)
- [Reverting to the Factory-Default Configuration Using the EX Series Switch LCD Panel | 164](#)
- [Reverting to the Factory-Default Configuration Using the Factory Reset/Mode button on EX2300, EX3400, and EX4300-48MP Switches | 164](#)

With EX Series switches, if for any reason the current active configuration fails, you can revert to the factory-default configuration.

You can also roll back to a previous configuration, as described in [Rolling Back Junos OS Configuration Changes](#), or revert to the rescue configuration, as described in [Reverting to the Rescue Configuration for the EX Series Switch](#).



**TIP:** If you have lost the root password, it is not necessary to revert to the factory-default configuration to reset it. See [Recovering the Root Password on Switches](#).

The factory-default configuration contains the basic configuration settings for the switch. This is the first configuration of the switch and it is loaded when the switch is first powered on. For the factory-default configuration file for your switch, see the hardware documentation for your switch.



**TIP:** You can run the EZsetup script to complete the initial configuration of the switch *after* reverting to the factory-default configuration. (The EZsetup script is available only on fixed configuration switches, it is not available on modular switches.) For information

on completing the initial configuration using either the CLI or the J-Web interface, see *Connecting and Configuring an EX Series Switch (CLI Procedure)* or *Connecting and Configuring an EX Series Switch (J-Web Procedure)*.

You can revert to the factory-default configuration by using the **Menu** button to the right of the LCD panel on switches with LCD panel or by using the `request system zeroize` operational command or the `load factory-default` configuration command. (If your switch model does not have an LCD panel, use these commands.) You can also use the `load factory-default` command to revert to the factory-default configuration file that contains all default settings *except* the root password setting, which is retained.

These procedures are described in the following sections:



**NOTE:** After resetting the factory default configuration either through the CLI or Factory Reset/Port mode button, the previous host name of the device is not reset. The host name can only be changed by configuring a new hostname or rebooting the device.

## Reverting to the EX Series Switch Factory-Default Configuration Using the `request system zeroize` Command

The `request system zeroize` command is a standard Junos OS operational mode command that removes all configuration information and resets all key values. The operation unlinks all user-created data files, including customized configuration and log files, from their directories. The switch then reboots and reverts to the factory-default configuration.

To completely erase user-created data so that it is unrecoverable, use the `request system zeroize media` command.



**CAUTION:** Before issuing `request system zeroize`, use the `request system snapshot` command to back up the files currently used to run the switch to a secondary device. Using the zeroize command will destroy Junos and OAM partitions and the switch may not boot. To recover from a failed software installation, see [Recovering from a Failed Software Installation](#).

To revert to the factory-default configuration by using the `request system zeroize` command:

1.

```
user@switch> request system zeroize
warning: System will be rebooted and may not boot without
configuration
Erase all data, including configuration and log files? [yes,no]
(yes)
```

2. Type `yes` to remove configuration and log files and revert to the factory-default configuration.



**NOTE:** The `auto-image-upgrade` statement is added under the `[edit chassis]` hierarchy level when you use this procedure, and thus the automatic image upgrade feature is made available on the switch.

## Reverting to the EX Series Switch Factory-Default Configuration Using the `load factory-default` Command

The `load factory-default` command is a standard Junos OS configuration command that replaces the current active configuration with the factory-default configuration (except the root password setting, which by default is not set but which you must set in order to commit the new configuration in this procedure).

If you want to run the EZsetup script to complete the initial configuration of the switch after you revert to the factory-default configuration, do not use the `load factory-default` command. Instead do the reversion using either the LCD panel or the `request system zeroize` command. If you use the `load factory-default` command to revert to the factory-default configuration, the configuration for the root password is retained and the EZsetup script will not run. (The EZsetup script is available only on fixed configuration switches, it is not available on modular switches.)



**NOTE:** The `load factory-default` command by itself is not supported on EX3300, EX4200, EX4500, and EX4550 switches configured in a Virtual Chassis.

To revert to the factory-default configuration by using the `load factory-default` command:



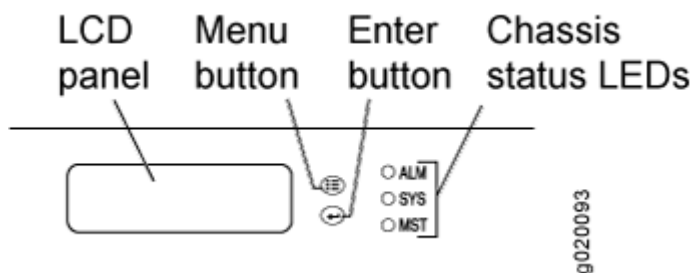
**NOTE:** If you use this procedure, you must delete the system commit factory settings, set the root password, and commit the configuration. These steps are not required when you revert to the factory-default configuration by using `request system zeroize`. Also, the `auto-image-upgrade` statement is not added to the configuration when you use this procedure; it *is* added to the configuration when you use `request system zeroize`.

1. `[edit] user@switch# load factory-default`
2. `[edit] user@switch# delete system commit factory-settings`
3. `[edit] user@switch# set system root-authentication plain-text-password`
4. `[edit] user@switch# commit`
5. Check the member ID and primary-role priority with the `show virtual-chassis` command and check to see whether there are remaining settings for uplink VCPs by using the `show virtual-chassis vc-port` command.

## Reverting to the Factory-Default Configuration Using the EX Series Switch LCD Panel

To set the switch to the factory-default configuration, for EX Series switches, you can use the LCD panel and buttons on the front panel of the switch. If the EX Series switch model does not have an LCD panel, use one of the procedures described in the following sections.

Figure 47: EX Series Switch LCD Panel



**NOTE:** To revert a member switch of a Virtual Chassis to the factory-default configuration, first disconnect the cables connected to the Virtual Chassis ports (VCPs) to avoid affecting Virtual Chassis configuration parameters (member ID, primary-role priority, and setting of VCP uplinks) on other members. See *Disconnect a Fiber-Optic Cable, Disconnecting a Virtual Chassis Cable from an EX4200 Switch*, or [Disconnecting a Virtual Chassis Cable from an EX4500 Switch](#).

To revert to the factory-default configuration by using the LCD panel:

1. Press the **Menu** button until you see MAINTENANCE MENU on the panel.
2. Press the **Enter** button.
3. Press **Menu** until you see FACTORY DEFAULT.
4. Press **Enter**. The display says RESTORE DEFAULT?
5. Press **Enter**. The screen flashes **FACTORY DEFAULT IN PROGRESS** and returns to the idle menu.
6. Complete the initial configuration of the switch. See *Connecting and Configuring an EX Series Switch (CLI Procedure)* or *Connecting and Configuring an EX Series Switch (J-Web Procedure)*.

## Reverting to the Factory-Default Configuration Using the Factory Reset/Mode button on EX2300, EX3400, and EX4300-48MP Switches

To set the EX2300 switches except the EX2300-24MP and EX2300-48MP switches, EX2300-C switches, EX3400 switches, and EX4300-48MP switches to the factory-default configuration, use the Factory Reset/Mode button located on the far right side of the front panel.



**NOTE:** To revert a member switch of a Virtual Chassis to the factory-default configuration, disconnect the cables connected to the VCPs to avoid affecting Virtual Chassis configuration parameters (member ID, primary-role priority, and setting of VCP uplinks) on other members (see *Disconnect a Fiber-Optic Cable*).

To revert to the factory-default configuration by using the Factory Reset/Mode button:

1. Press the Factory Reset/Mode button for 10 seconds. The switch transitions into factory-default configuration, the console displays **committing factory default configuration**, and the Link/Activity LED on the RJ-45 network ports and the uplink ports is lit steadily in green color.
2. Press the Factory Reset/Mode button for 10 more seconds. The switch transitions into initial setup mode, the console displays **committing ezsetup config**, and the Link/Activity LED on the RJ-45 network ports and the uplink ports blink in green color.

The Factory Reset/Mode button is enabled by default. You can disable the button using the CLI.

To disable the Factory Reset/Mode button, run the commands:

1. [edit]  
user@switch# set chassis config-button no-clear
2. [edit]  
user@switch# commit

To enable the Factory Reset/Mode button, run the commands:

1. [edit]  
user@switch# delete chassis config-button no-clear
2. [edit]  
user@switch# commit

## RELATED DOCUMENTATION

*Connecting and Configuring an EX Series Switch (CLI Procedure)*

*Connecting and Configuring an EX Series Switch (J-Web Procedure)*

[Understanding Configuration Files](#)

## Change History Table

Feature support is determined by the platform and release you are using. Use [Feature Explorer](#) to determine if a feature is supported on your platform.

Release	Description
19.2R1	Starting in Junos OS Release 19.2R1, J-Web supports EX4650 switches.

## Dashboard for EX Series Switches

### IN THIS SECTION

- [Graphical Chassis Viewer | 167](#)
- [System Information Panel | 170](#)
- [Health Status Panel | 173](#)
- [Capacity Utilization Panel | 177](#)
- [Alarms Panel | 178](#)
- [File System Usage | 179](#)
- [Chassis Viewer | 179](#)



**NOTE:** This topic applies only to the J-Web Application package.

When you log in to the J-Web UI, the dashboard for the Juniper Networks EX Series Ethernet Switches appears. Use the dashboard to view system information.

The Update Available window appears when a new update of the J-Web Application package is available on the Juniper Networks server. This window is enabled by the auto update feature of J-Web.



**NOTE:**

- The Update Available window will *not* appear when you log in, if you have not selected the **Check for updates automatically on every login** in the *Update Preference*

section in the **Maintain > Update J-Web** side pane. By default, the *Check for update automatically on every login* is selected.

- If you choose *Update Later*, you can update to the latest J-Web Application package by clicking the orange icon next to *Update Available* on the top pane of the J-Web interface or through **Maintain > Update J-Web**.
- Starting in Junos OS Release 22.3R1 which aligns with the J-Web Application package release 22.3A1, J-Web supports EX4400 switches.
- Starting in Junos OS Release 22.4R1 which aligns with the J-Web Application package release 22.4A1, J-Web supports EX4100 and EX4100-F switches.
- Starting in Junos OS Release 23.1R1 which aligns with the J-Web Application package release 23.1A1, J-Web supports EX4400-24X switches.
- Starting in Junos OS Release 23.2R1 which aligns with the J-Web Application package release 23.2A1, J-Web supports EX4400-EM-1C uplink module for EX4400 and EX4400-24X switches.
- Starting in Junos OS Release 24.4R1 which aligns with the J-Web Application package release 24.4A1, J-Web supports EX4100-H-12MP, EX4100-H-24MP, EX4100-H-24F, EX4400-48XP, and EX4400-48MXP switches.

The dashboard comprises a graphical chassis viewer and four panels.

## Graphical Chassis Viewer

The Dashboard panel displays a graphical view of the chassis of a switch. In a Virtual Chassis, it displays a graphical view of each member switch.

In a Virtual Chassis, the default values are shown on the Dashboard panel when no chassis image is clicked. The panel displays the value for a switch if you click its image.



### NOTE:

- If the member switch is not present, inactive, or not provisioned, you cannot expand the member switch image.



- Starting in J-Web Application Package Release 19.2A1, J-Web supports EX4650 switches.



**NOTE:** For EX4650 switches, chassis viewer supports only the standalone view and does not support the Virtual Chassis configuration.

- Starting in Junos OS Release 22.3R1 which aligns with the J-Web Application package release 22.3A1, J-Web supports EX4400 switches. For EX4400 switches, chassis viewer supports both the standalone view and Virtual Chassis configuration.
- Starting in Junos OS Release 22.4R1 which aligns with the J-Web Application package release 22.4A1, J-Web supports EX4100 and EX4100-F switches. For EX4100 and EX4100-F switches, chassis viewer supports both the standalone view and Virtual Chassis configuration.
- Starting in Junos OS Release 23.1R1 which aligns with the J-Web Application package release 23.1A1, J-Web supports EX4400-24X switches. For EX4400-24X switches, chassis viewer supports both the standalone view and Virtual Chassis configuration.
- Starting in Junos OS Release 23.2R1 which aligns with the J-Web Application package release 23.2A1, J-Web supports EX4400-EM-1C uplink module for EX4400 and EX4400-24X switches.
- Starting in Junos OS Release 24.4R1 which aligns with the J-Web Application package release 24.4A1, J-Web supports EX4100-H-12MP, EX4100-H-24MP, EX4100-H-24F, EX4400-48XP, and EX4400-48MXP switches.

Table 39 on page 168 lists the details that are displayed on each member switch.

**Table 39: Details of a Virtual Chassis Member Switch**

Details	Example
Model number of the member switch	<b>EX3300</b>
Assigned ID that applies to the entire Virtual Chassis configuration	<b>ID 2</b>  <b>NOTE:</b> If the member switch is not provisioned, the serial number of the switch is displayed instead of its ID.

**Table 39: Details of a Virtual Chassis Member Switch (Continued)**

Details	Example
Role of the member switch	<b>Master</b> Possible roles are: <b>Master</b> , <b>Backup</b> , or <b>Linecard</b>
Status of the member switch	<b>Prsnt</b> Possible statuses are: <b>Prsnt</b> , <b>NotPrsnt</b> , <b>Inactive</b> , or <b>Unprvsnd</b>

The status of the member switch is displayed on the image of the switch. If the member switch appears dimmed, it means the switch is not present, is inactive, or is not provisioned in the Virtual Chassis. If the member switch does not appear dimmed, it means the switch is present and is active.

[Table 40 on page 169](#) describes the possible status of a member switch.

**Table 40: Status of a Member Switch in a Virtual Chassis**

If the member switch is	It appears as	It means the member switch
Present	<b>Prsnt</b>	Has established physical and logical connections with Virtual Chassis member switches.
Not present	dimmed and <b>NotPrsnt</b>	Has been disconnected from the existing Virtual Chassis.
Inactive	dimmed and <b>Inactive</b>	Has established physical connections, but is unable to establish logical connections.
Not provisioned	dimmed and <b>Unprvsnd</b>	Cannot synchronize with the existing preprovisioned Virtual Chassis.

Click **Rear View** to see a graphical view of the switch's rear panel.

Click **Preferences** to choose which panels must be displayed and set the refresh interval for chassis viewer information. Click **OK** to save your changes and return to the dashboard or click **Cancel** to return to the dashboard without saving changes.



**NOTE:** You can drag the various panels to different locations in the J-Web window.

## System Information Panel

Table 41: System Information

Field	Description
System name	<p>Indicates the local name of the EX Series switch. The local name of the EX Series switches changes when an individual image is clicked.</p> <p>For EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches:</p> <ul style="list-style-type: none"><li>• Indicates the switch's hostname.</li><li>• Displays the switch's specific hostname when you click on the individual line card.</li></ul>
Device model	<p>Indicates the model of the EX Series switch. In a Virtual Chassis configuration, to indicate the model of a switch, click the image of that switch.</p> <p><b>NOTE:</b> In a Virtual Chassis setup for an EX6210, EX8208, or EX8216 switch, the Device model field displays details of the primary Routing Engine. To view details of a member, select it.</p> <p>By default, the EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches show the model of the primary switch. When you click on the image, the model of the switch is displayed.</p>

Table 41: System Information (*Continued*)

Field	Description
Inventory details	<p>Indicates the following:</p> <ul style="list-style-type: none"> <li>For EX3200, EX2200, EX2200-C, EX3300, EX4200, EX4300-48MP, EX4500, and EX4550 switches that are not configured as Virtual Chassis, the value displayed in Inventory details field is always 1 FPC. FPC is a legacy term for a slot in a large Juniper Networks chassis; which simply refers to the standalone switch.</li> <li>For EX2200 and EX2200-C switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–4 FPC, with the number corresponding to the number of member switches.</li> <li>For EX3300 switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–6 FPC, with the number corresponding to the number of member switches.</li> </ul> <p><b>NOTE:</b> For Junos OS Release 14.1X53-D10 and later, EX3300 switches configured as a Virtual Chassis display the value 1–10 FPC in the Inventory details field.</p> <ul style="list-style-type: none"> <li>For EX4200, EX4500, and EX4550 switches configured as a Virtual Chassis, the value displayed in the Inventory details field is 1–10 FPC, with the number corresponding to the number of member switches.</li> <li>For EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches, the value displayed in Inventory details field is equal to the number of FPCs.</li> <li>For EX6210 switches, the values displayed in the Inventory details field are 1–2 CB and 1–9 FPC. CB, or Control Board, refers to the SRE module. FPC refers to line cards and the FPC within the CB.</li> </ul>

Table 41: System Information (*Continued*)

Field	Description
	<ul style="list-style-type: none"> <li>For an EX8208 switch, the values displayed in Inventory details field are 1–3 CB and 0–8 FPC. CB, or Control Board, refers to SRE and SF modules. FPC refers to line cards.</li> <li>For EX8216 switches, the values displayed in Inventory details field are 1–2 CB and 0–16 FPC. CB, or Control Board, refers to RE module and FPC refers to line cards.</li> <li>For an XRE200 External Routing Engine in an EX8200 Virtual Chassis, the value displayed in Inventory details is 1 XRE. XRE refers to Routing Engine modules. For XRE200 External Routing Engines configured as a Virtual Chassis, the values displayed in Inventory details are 1–2 XRE and 0–4 LCC, where LCC refers to the EX8200 line card chassis.</li> </ul>
Junos image	<p>Indicates the version of the Junos OS image. In a Virtual Chassis configuration, the Junos OS image of the primary switch is displayed by default. To display the Junos OS image of a specific switch, click the image of that switch.</p> <p><b>NOTE:</b> For EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches, the Junos OS image of the primary switch is displayed by default. To display the Junos OS image of a specific switch, click the image of that switch.</p>

Table 41: System Information (*Continued*)

Field	Description
Boot image	<p>Indicates the version of the boot image that is used. In a Virtual Chassis configuration, the boot image of the primary switch is displayed by default. To display the boot image of a specific switch, click the image of that switch.</p> <p><b>NOTE:</b> For EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches, the boot image of the primary switch is displayed by default. To display the boot image of a specific switch, click the image of that switch.</p>
Device uptime	<p>Indicates the time since the last reboot. In a Virtual Chassis configuration, click the specific switch's image to view its uptime.</p> <p><b>NOTE:</b> For EX4650, EX4400, EX4100, EX4100-H, and EX4100-F switches, click the image of the switch to display the uptime.</p>
Last configured time	<p>Indicates the time when the switch was last configured.</p> <p>For EX4400, EX4100, EX4100-H, and EX4100-F switches in Virtual Chassis configuration, indicates the last configured time of the primary by default. To display the last configured time of a specific switch, click the image of that switch.</p>

## Health Status Panel

Table 42: Health Status

Field	Description
EX2200, EX2200-C, EX3200, EX3300, EX4200, and EX4300-48MP Switches	

Table 42: Health Status *(Continued)*

Field	Description
Memory util.	<p>Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the primary Routing Engine is displayed.</p> <p><b>NOTE:</b> In EX4300-48MP switches, you can use only the built-in QSFP+ ports as VCPs to connect the switch in a Virtual Chassis. You cannot connect the ports on the uplink module in EX4300-48MP switches to Virtual Chassis ports (VCPs).</p>
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Temp.	<p>Indicates the chassis temperature status. Temperatures are listed in Celsius and the corresponding Fahrenheit values.</p> <p><b>NOTE:</b> The <b>Temp</b> field is unavailable for a standalone EX2200-C switch.</p> <p>The <b>Temp</b> field is dynamically available for an EX2200 Virtual Chassis switch based on the model of the member clicked.</p>
CPU load	Indicates the average CPU usage over 15 minutes. In a Virtual Chassis configuration, on loading the primary or backup switch, the CPU load for that switch's Routing Engine is displayed by default. To display the CPU load for a specific switch's Routing Engine, click the image of that switch.
Fan status	<p>Indicates the status of the fans in the fan tray. The possible values are <b>OK</b>, <b>Failed</b>, and <b>Absent</b>. In a Virtual Chassis configuration, the fan status of the primary switch is displayed by default. To display the fan status for any switch, click the image of that switch.</p> <p><b>NOTE:</b> The <b>Fan status</b> field is unavailable for a standalone EX2200-C switch.</p> <p>The <b>Fan status</b> field is dynamically available for an EX2200 Virtual Chassis switch based on the model of the member clicked.</p>

**EX4500 and EX4550 Switches**

Memory util.	Indicates the memory used in the Routing Engine. In a Virtual Chassis configuration, the memory utilization value of the primary Routing Engine is displayed.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.

Table 42: Health Status *(Continued)*

Field	Description
Temp.	<p>Indicates the chassis temperature status. Temperatures in the dashboard are listed in Celsius and the corresponding Fahrenheit values.</p> <p><b>NOTE:</b> The <b>Temp</b> field is unavailable for an EX4500 switch.</p>
CPU load	Indicates the average CPU usage over 15 minutes.
Fan status	<p>Indicates the status of the fans in the fan tray. The possible values are <b>OK</b>, <b>Failed</b>, and <b>Absent</b>. This field also shows the fan tray's airflow direction. The possible values are <b>Front to back</b> and <b>Back to front</b>.</p>

**EX4650, EX4400, EX4100, EX4100-H, and EX4100-F Switches**

Fan status	<p>Indicates the status of the fans in the fan tray. The possible values are <b>OK</b>, <b>Failed</b>, and <b>Absent</b>.</p> <p><b>NOTE:</b> The fans are located on the side panel of the chassis.</p> <p>For EX4400, EX4100, and EX4100-F switches in Virtual Chassis, displays the primary member's fan status.</p> <p><b>NOTE:</b> EX4100-F-12T, EX4100-F-12P, and EX4100-H-12MP, EX4100-H-24MP, and EX4100-H-24F are fanless switches that have natural convection cooling.</p>
Temp.	<p>Indicates temperature of the sensor near to Routing Engine.</p> <p>In EX4400, EX4100, EX4100-H, and EX4100-F Virtual Chassis, the primary FPCs Routing Engine temperature is displayed by default. To display the temperature of the FPC Routing Engine of the specific switch, click the image of that switch.</p>
Memory util.	<p>Indicates the memory used in the Routing Engine.</p> <p>To display the Routing Engine memory utilization of the EX4400, EX4100, EX4100-H, and EX4100-F switches, click primary or line card for primary. Click backup for backup.</p>
CPU load	<p>Indicates the average CPU usage over 15 minutes.</p> <p>In EX4400, EX4100, EX4100-H, and EX4100-F Virtual Chassis, the primary Routing Engine CPU load is displayed by default. To display the chassis Routing Engine CPU load of the specific switch, click the image of that switch.</p>



Table 42: Health Status *(Continued)*

Field	Description
<b>EX6210 Switches</b>	
Memory util.	Indicates the memory used in the primary Routing Engine. Click the <b>backup Routing Engine</b> to view the memory used in the backup Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Fan status	Indicates the status of the fans in the fan tray. The possible values are <b>OK</b> , <b>Failed</b> , and <b>Absent</b> .
<b>EX8208 Switches</b>	
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the primary role is displayed. Click the <b>XRE200 External Routing Engine</b> in the backup role to view the memory used in the backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
<b>EX8216 Switches</b>	
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the primary role is displayed. Click the XRE200 External Routing Engine in the backup role to view the memory used in the backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
<b>XRE200 External Routing Engines</b>	

Table 42: Health Status *(Continued)*

Field	Description
Memory util.	Indicates the memory used in the external Routing Engine. In an EX8200 Virtual Chassis, the memory utilization value of the XRE200 External Routing Engine in the primary role is displayed. Click the backup XRE200 External Routing Engine to view the memory used in backup external Routing Engine.
CPU load	Indicates the average CPU usage over 15 minutes.
Flash	Indicates the usage and capacity of internal flash memory and any external USB flash drive.
Fan Status	Indicates the status of the fans in the fan tray. The possible values are <b>OK</b> , <b>Failed</b> , and <b>Absent</b> .

## Capacity Utilization Panel

Table 43: Capacity Utilization

Field	Description
Number of active ports	Indicates the number of active ports in the switch. Configured Virtual Chassis ports (VCPs) are considered as active ports.
Total number of ports	<p>Indicates the number of ports in the switch.</p> <p>In an EX3300 Virtual Chassis, the total number of ports of all of the switches is displayed.</p> <p>For EX4650 switches, on loading the switch, the consolidated values for all the FPCs are displayed by default.</p> <p>For EX4400, EX4100, and EX4100-F switches, on loading the switch, the consolidated values for all the FPCs are displayed by default and dedicated VCP ports are not considered.</p>

**Table 43: Capacity Utilization (Continued)**

Field	Description
Used-up MAC-Table entries	Indicates the number of MAC table entries.
Supported MAC-Table entries	<p>Indicates the maximum number of MAC table entries permitted.</p> <p>For EX4650 switches, the supported maximum number of MAC table entries are 288000.</p> <p>For EX4400, EX4100, and EX4100-F switches, the supported maximum number of MAC table entries are 64000.</p>
Number of VLANs configured	<p>Indicates the number of VLANs configured.</p> <p><b>NOTE:</b> Only tagged VLANs are counted.</p>
Number of VLANs supported	<p>Indicates the maximum number of VLANs supported.</p> <p>For EX switches, the supported maximum number of VLANs are 4094.</p>

## Alarms Panel

Displays information about the last five alarms raised in the system. For example, if there are 5 major alarms, then details of all 5 major alarms are displayed. If there are 4 major alarms and 3 minor alarms, then details of the 4 major alarms and 1 minor alarm are displayed. Major alarms are displayed in red and minor alarms are displayed in yellow.

In an EX8200 Virtual Chassis, the top 5 alarms for the primary external Routing Engine are displayed by default. If you select an EX8200 member switch of the Virtual Chassis, the top 5 alarms for that member switch are displayed.

## File System Usage

To display the file system storage details of a switch in the backup or line card role, click the image of that switch.

For EX4650, EX4400, EX4100, and EX4100-F switches, the directory, space used, and the file type details are displayed. By default, primary switch file system storage details are displayed. When you click the image, line card switch file system storage details are displayed.

## Chassis Viewer

Click the **Rear View** button to see the back of the chassis image. Click the **Front View** button to see the front of the chassis image. In a Virtual Chassis configuration, the **Rear View** button is disabled if the switch is not selected.



**NOTE:** For EX4650 switches, chassis viewer supports only the standalone view and does not support Virtual Chassis configuration.

Starting in Junos OS Release 22.3R1 which aligns with the J-Web Application package release 22.3A1, J-Web supports EX4400 switches.

Starting in Junos OS Release 22.4R1 which aligns with the J-Web Application package release 22.4A1, J-Web supports EX4100 and EX4100-F switches.

Starting in Junos OS Release 23.1R1 which aligns with the J-Web Application package release 23.1A1, J-Web supports EX4400-24X switches.

Starting in Junos OS Release 23.2R1 which aligns with the J-Web Application package release 23.2A1, J-Web supports EX4400-EM-1C uplink module for EX4400 and EX4400-24X switches.

Starting in Junos OS Release 24.4R1 which aligns with the J-Web Application package release 24.4A1, J-Web supports EX4100-H-12MP, EX4100-H-24MP, EX4100-H-24F, EX4400-48XP, and EX4400-48MXP switches.

- [Table 44 on page 180](#)—Describes the chassis viewer for EX2200 switches.
- [Table 45 on page 181](#)—Describes the chassis viewer for EX2200-C switches.
- [Table 46 on page 182](#)—Describes the chassis viewer for EX3200, EX3300, and EX4200 switches.
- [Table 47 on page 184](#)—Describes the chassis viewer for EX4100 and EX4100-F switches.
- [Table 48 on page 186](#)—Describes the chassis viewer for EX4100-H switches.

- [Table 49 on page 188](#)—Describes the chassis viewer for EX4400 switches.
- [Table 50 on page 191](#)—Describes the chassis viewer for EX4500 switches.
- [Table 51 on page 193](#)—Describes the chassis viewer for EX4550 switches.
- [Table 52 on page 195](#)—Describes the chassis viewer for EX4650 switches.
- [Table 53 on page 196](#)—Describes the chassis viewer for EX6210 switches.
- [Table 54 on page 198](#)—Describes the chassis viewer for EX8208 switches.
- [Table 55 on page 199](#)—Describes the chassis viewer for EX8216 switches.
- [Table 56 on page 201](#)—Describes the chassis viewer for the XRE200 External Routing Engines.

**Table 44: Chassis Viewer for EX2200 Switches**

Field	Description
<b>Front View</b>	
Interface status	<p>In the image, the following colors denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p>
<b>Rear View</b>	
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</p>

Table 44: Chassis Viewer for EX2200 Switches *(Continued)*

Field	Description
Fan tray	Hover over the fan tray icon to display name, status, and description information.
Power supply	Hover over the power outlet icon to display name, status, and description information.

Table 45: Chassis Viewer for EX2200-C Switches

Field	Description
<b>Front View</b>	
Interface status	<p>In the image, the following colors denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p>
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series Switches.</p>
<b>Rear View</b>	
Power supply	Hover over the power outlet icon to display name, status, and description information.

Table 46: Chassis Viewer for EX3200, EX3300, and EX4200 Switches

Field	Description
<b>Front View</b>	
Interface status	<p>In the image, the following colors denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>For a Virtual Chassis configuration, select the switch to view the interface status.</p> <p>If an SFP+ uplink module is installed in the switch, hover over the port icon to display whether the module is configured to operate in 1-gigabit mode or in 10-gigabit mode. If the module is configured to operate in 1-gigabit mode, the tool tip information is displayed for all 4 ports. If the module is configured to operate in 10-gigabit mode, the tool tip information is displayed only for 2 ports.</p> <p>On an EX3300 switch with the 4x GE/XE SFP+ module, hover over the port icon to display whether the module is configured to operate in 1-gigabit mode or 10-gigabit mode.</p> <p>For SFP, SFP+, and XFP ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you hover over the port icon.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
<b>Rear View of the EX3200 Switch</b>	
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)

Table 46: Chassis Viewer for EX3200, EX3300, and EX4200 Switches (*Continued*)

Field	Description
USB port	Indicates the USB port for the switch.  <b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan tray	Hover over the fan tray icon to display name, status, and description information.
Power supply	Hover over the power supply icon to display name, status, and description information.

**Rear View of the EX3300 and EX4200 Switch**

Fan tray	Hover over the fan tray icon to display name, status, and description information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	Displayed only when EX4200 switches are configured as a Virtual Chassis. The following colors denote the Virtual Chassis port (VCP) status: <ul style="list-style-type: none"> <li>• Green—VCP is up and operational.</li> <li>• Yellow—VCP is up but is nonoperational.</li> <li>• Gray—VCP is down and nonoperational.</li> </ul>
USB port	Indicates the USB port for the switch.  <b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management.
Console port	The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)
Power supplies	Hover over the power supply icons to display name, status, and description information.



Table 47: Chassis Viewer for EX4100 and EX4100-F Switches

Field	Description
<b>Front View</b>	
RJ-45 ports	<p>Hover over the interface (port) to view more information.</p> <p>EX4100 Switches:</p> <ul style="list-style-type: none"> <li>EX4100-24P switch supports 24 RJ-45 ports (10/100/1000BASE-T) that support PoE+.</li> <li>EX4100-24T switch supports 24 RJ-45 ports (10/100/1000BASE-T).</li> <li>EX4100-48P switch supports 48 RJ-45 ports (10/100/1000BASE-T) that support PoE+.</li> <li>EX4100-48T switch supports 48 RJ-45 ports (10/100/1000BASE-T).</li> </ul> <p>EX4100-F Switches:</p> <ul style="list-style-type: none"> <li>EX4100-F-12T switch supports 12 RJ-45 ports (10/100/1000BASE-T).</li> <li>EX4100-F-12P switch supports 12 RJ-45 ports (10/100/1000BASE-T) that support PoE+.</li> <li>EX4100-F-24P switch supports 24 RJ-45 ports (10/100/1000BASE-T) that support PoE+.</li> <li>EX4100-F-24T switch supports 24 RJ-45 ports (10/100/1000BASE-T).</li> <li>EX4100-F-48P switch supports 48 RJ-45 ports (10/100/1000BASE-T) that support PoE+.</li> <li>EX4100-F-48T switch supports 48 RJ-45 ports (10/100/1000BASE-T).</li> </ul>
SFP ports	<p>Hover over the interface (10 GbE SFP+ Uplink ports) to view more information.</p>

Table 47: Chassis Viewer for EX4100 and EX4100-F Switches *(Continued)*

Field	Description
USB type C port	Displays USB Type C console port.
Chassis status LEDs	Displays status LEDs labeled <b>SYS</b> , <b>ALM</b> , <b>MST</b> , and <b>CLD</b> .
Port mode LEDs	Displays port mode LEDs labeled <b>SPD</b> , <b>DX</b> , <b>EN</b> , and <b>PoE</b> .
Factory Reset/Mode button	Displays the Factory Reset/Mode button, which is used to reset the switches to the factory-default configuration.
Virtual Chassis ports	EX4100 and EX4100-F switches have dedicated Virtual Chassis ports (VCPs) that you can use to interconnect member switches of a Virtual Chassis. You can interconnect a maximum of 10 switches to form a Virtual Chassis.
<b>Rear View</b>	
Management port	The management port (MGMT) is used to connect the switch to a management device for out-of-band management.
Console port	The Console port (RJ-45) labeled as <b>CON</b> is used to connect the switch to a management console or to a console server.
USB port	Indicates the USB port for the switch.  <b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.

Table 47: Chassis Viewer for EX4100 and EX4100-F Switches *(Continued)*

Field	Description
Power supply	<p>Hover over the power supply icon to display name, status, and description information.</p> <p><b>NOTE:</b> EX4100-F-12T and EX4100-F-12P switches use external power adapters.</p>
Fan tray	<p>Hover over the fan tray icon to display fan's status information.</p> <p><b>NOTE:</b> EX4100-F-12T and EX4100-F-12P are fanless switches that have natural convection cooling.</p>

Table 48: Chassis Viewer for EX4100-H Switches

Field	Description
<b>Front View</b>	
RJ-45 ports	<p>Hover over the interface (port) to view more information.</p> <p>EX4100-H Switches:</p> <ul style="list-style-type: none"> <li>EX4100-H-12MP switch supports 12 RJ-45 ports (8 10/100/1000BASE-T RJ-45 ports and 4 100/1000/2500-Base-T RJ-45 ports).</li> <li>EX4100-H-24MP switch supports 24 RJ-45 ports (16 10/100/1000BASE-T RJ-45 ports and 8 100/1000/2500-Base-T RJ-45 ports).</li> </ul> <p><b>NOTE:</b> This port is not available on the EX4100-H-24F switch.</p>

Table 48: Chassis Viewer for EX4100-H Switches *(Continued)*

Field	Description
SFP ports	<p>Hover over the interface (10 GbE SFP+ Uplink ports) to view more information.</p> <p>EX4100-H-12MP switch supports four 10GbE SFP+ ports.</p> <p>EX4100-H-24MP switch supports eight 10GbE SFP+ ports.</p> <p>EX4100-H-24F switch supports 24 1GbE SFP ports and 8 10GbE SFP+ ports.</p>
USB type C port	Displays USB Type C console port.
Chassis status LEDs	Displays status LEDs labeled <b>SYS</b> , <b>ALM</b> , <b>MST</b> , and <b>CLD</b> .
Port mode LEDs	<p>Displays port mode LEDs labeled <b>SPD</b>, <b>DX</b>, <b>EN</b>, and <b>PoE</b>.</p> <p><b>NOTE:</b> <b>PoE</b> LED is not available on the EX4100-H-24F switch.</p>
Factory Reset/Mode button	Displays the Factory Reset/Mode button, which is used to reset the switches to the factory-default configuration.
Virtual Chassis ports	EX4100-H switches have dedicated Virtual Chassis ports (VCPs) that you can use to interconnect member switches of a Virtual Chassis. You can interconnect a maximum of 10 switches to form a Virtual Chassis.
Management port	The management port (MGMT) is used to connect the switch to a management device for out-of-band management.

Table 48: Chassis Viewer for EX4100-H Switches *(Continued)*

Field	Description
Console port	The Console port (RJ-45) labeled as <b>CON</b> is used to connect the switch to a management console or to a console server.
USB type A port	<p>Indicates the USB type A port for the switch.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</li> </ul>
Power supply	<p>Hover over the power supply icon to display name, status, and description information.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>EX4100-H-12MP switch uses external power adapter.</li> <li>The EX4100-H-12MP switch has two hot swappable power supply units (AC or DC).</li> <li>For EX4100-H-24MP and EX4100-H-24F, the power supply unit is available on the rear panel of the switch.</li> </ul>

Table 49: Chassis Viewer for EX4400 Switches

Field	Description
<b>Front View</b>	

Table 49: Chassis Viewer for EX4400 Switches *(Continued)*

Field	Description
RJ-45 ports	<p>Hover over the interface (port) to view more information.</p> <ul style="list-style-type: none"> <li>EX4400-24T switch supports 24 RJ-45 ports (10/100/1000BASE-T).</li> <li>EX4400-24P switch supports 24 RJ-45 ports (10/100/1000BASE-T) that support PoE-bt.</li> <li>EX4400-24MP switch supports 24 RJ-45 ports (100-Mbps/1-Gbps/2.5-Gbps/5-Gbps/10-Gbps) that support PoE-bt.</li> <li>EX4400-48T switch supports 48 RJ-45 ports (10/100/1000BASE-T).</li> <li>EX4400-48P and EX4400-48XP switches support 48 RJ-45 ports (10/100/1000BASE-T) that support PoE-bt.</li> <li>EX4400-48MP switch supports 36 RJ-45 ports (100-Mbps/1-Gbps/2.5-Gbps) and 12 RJ-45 ports (100-Mbps/1-Gbps/2.5-Gbps/5-Gbps/10-Gbps) that support PoE-bt.</li> <li>EX4400-48MXP switch supports 36 RJ-45 ports (1-Gbps/2.5-Gbps) and 12 RJ-45 ports (1-Gbps/2.5-Gbps/5-Gbps/10-Gbps) that support PoE-bt.</li> </ul>
SFP ports	<p>Hover over the interface (port) to view more information.</p> <p>EX4400-48F switch supports 36 small form-factor pluggable (SFP) ports and 12 small form-factor pluggable plus (SFP+) ports.</p> <p>EX4400-24X switch supports 24 1GbE/10GbE SFP/SFP+ ports and two 100GbE QSFP28 ports.</p> <p><b>NOTE:</b> SFP port is not available for EX4400-48XP and EX4400-48-MXP switches.</p>

Table 49: Chassis Viewer for EX4400 Switches *(Continued)*

Field	Description
USB port	Displays USB Type C console port.
Chassis status LEDs	Displays status LEDs labeled <b>SYS</b> , <b>ALM</b> , <b>MST</b> , and <b>CLD</b> .
Port mode LEDs	Displays port mode LEDs labeled <b>SPD</b> , <b>DX</b> , and <b>EN</b> .
Factory Reset/Mode button	Displays the Factory Reset/Mode button, which is used to reset the switches to the factory-default configuration.
Extension module slot	<p>Displays a slot for installing an optional extension module. Extension modules are hot-insertable and hot-removable field replaceable units (FRUs).</p> <p>The 1x100GbE QSFP28 extension module (EX4400-EM-1C) supports Media Access Control Security (MACsec) with AES-256 encryption. You can install one 40GbE QSFP+ transceiver or one 100GbE QSFP28 transceiver in the extension module.</p>
<b>Rear View</b>	
Management port	<p>The management port (me0) is used to connect the switch to a management device for out-of-band management.</p> <p><b>NOTE:</b> For EX4400-24X, the MGMT port is available on the front panel.</p>
Virtual Chassis ports	The QSFP28 ports are configured as Virtual Chassis ports (VCPs) by default. You can configure them as network ports and operate them as 100 GbE network ports by using QSFP28 transceivers.

Table 49: Chassis Viewer for EX4400 Switches *(Continued)*

Field	Description
Console port	<p>The Console port (RJ-45) labeled as <b>CON</b> is used to connect the switch to a management console or to a console server.</p> <p><b>NOTE:</b> For EX4400-24X, the CON port is available on the front panel.</p>
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</li> <li>• For EX4400-24X, the USB port is available only on the front panel.</li> </ul>
Mini USB port	<p>Indicates the mini USB port for the switch.</p> <p><b>NOTE:</b> Mini USB port is not available for EX4400-24X, EX4400-48XP, and EX4400-48MXP switches.</p>
Power supply	<p>Hover over the power supply icon to display name, status, and description information.</p> <p><b>NOTE:</b> The EX4400 switch has two hot swappable power supply units (AC or DC).</p>
Fan tray	<p>Hover over the fan tray icon to display status of the fans and airflow direction information.</p>

Table 50: Chassis Viewer for EX4500 Switches

Field	Description
<b>Front View</b>	



Table 50: Chassis Viewer for EX4500 Switches *(Continued)*

Field	Description
Interface status	<p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>For a Virtual Chassis configuration, select the switch to view the interface status.</p> <p>If an SFP+ uplink module is installed in the switch, hover over the interface (ports) on the module for more information.</p> <p>For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you hover over the port icon.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
Console port	The console port is used to connect the switch to a management console or to a console server.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</p>
<b>Rear View of the EX4500 Switch</b>	
Fan tray	Hover over the fan tray icon to display status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.

Table 50: Chassis Viewer for EX4500 Switches *(Continued)*

Field	Description
Virtual Chassis port	Displayed only when switches are configured as a Virtual Chassis. The colors listed below denote the Virtual Chassis port (VCP) status: <ul style="list-style-type: none"><li>• Green—VCP is up and operational.</li><li>• Yellow—VCP is up but is nonoperational.</li><li>• Gray—VCP is down and nonoperational.</li></ul>
Power supplies	Hover over the power supply icons to display name, status, and description information.
Intraconnect module	Hover over the module to display details of the intraconnect module. The intraconnect module helps the switch achieve line rate on all its ports.
Virtual Chassis module	Hover over to display details of the switches in the Virtual Chassis configuration.

Table 51: Chassis Viewer for EX4550 Switches

Field	Description
<b>Front View</b>	

Table 51: Chassis Viewer for EX4550 Switches *(Continued)*

Field	Description
Interface status	<p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>For a Virtual Chassis configuration, select the switch to view the interface status.</p> <p>If an expansion module or a Virtual Chassis module is installed in the switch, hover over the interface (ports) on the module for more information.</p> <p>On an EX4550-32F switch, for SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver (1G/10G) not plugged in when you hover over the port icon.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
Console port	The console port is used to connect the switch to a management console or to a console server.
Mini Console port	The mini console port is used to connect the switch to the management console.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.
PIC1 slot	You can insert an uplink module or a Virtual Chassis module in the PIC1 slot. Hover over to display the details of the module inserted (uplink or Virtual Chassis).
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</p>

#### Rear View of the EX4550 Switch

**Table 51: Chassis Viewer for EX4550 Switches (Continued)**

Field	Description
Fan tray	Hover over the fan tray icon to display the status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Virtual Chassis port	<p>Displayed only when switches are configured as a Virtual Chassis. In the image, the colors listed below denote the Virtual Chassis port (VCP) status:</p> <ul style="list-style-type: none"> <li>• Green—VCP is up and operational.</li> <li>• Yellow—VCP is up but is nonoperational.</li> <li>• Gray—VCP is down and nonoperational.</li> </ul>
Power supplies	Hover over the power supply icons to display name, status, and description information.
PIC2 slot	You can insert an uplink module or a Virtual Chassis module into the PIC2 slot. Hover over to display the details of the module inserted (uplink or Virtual Chassis).

**Table 52: Chassis Viewer for EX4650 Switches**

Field	Description
<b>Front View</b>	
SFP28 and QSFP28 Ports	<p>Displays 48 small form-factor pluggable (SFP28) ports and eight 100-Gbps quad small form-factor pluggable (QSFP28) ports.</p> <p>Hover over the interface (port) to view more information.</p>
<b>Rear View</b>	
Management port	The management port (em0) is used to connect the switch to a management device for out-of-band management.
Virtual Chassis ports	Not supported.

Table 52: Chassis Viewer for EX4650 Switches *(Continued)*

Field	Description
Console port	The Console port (RJ-45) is used to connect the switch to a management console or to a console server.
USB port	Indicates the USB port for the switch.  <b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.
Fan Tray	Hover over the fan tray icons to display name, status, and description information.
Power supply	Hover over the power supply icon to display name, status, and description information.

Table 53: Chassis Viewer for EX6210 Switches

Field	Description
<b>Front View</b>	
Temperature	Hover over the temperature icon to display the temperature of the CB or line card.

Table 53: Chassis Viewer for EX6210 Switches *(Continued)*

Field	Description
Interface status	<p>Select the CB or line card.</p> <p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>You can view status for the following ports on the SRE module:</p> <ul style="list-style-type: none"> <li>• USB port—Indicates the USB port for the switch.</li> </ul> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series Switches switch.</p> <ul style="list-style-type: none"> <li>• Management (<b>me0</b>) port—The management port is used to connect the switch to a management device for out-of-band management. There are 2 management ports: fiber and copper. The same status is displayed for both the <b>me0</b> ports.</li> <li>• Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)</li> </ul> <p>CBs support 4 SFP+ uplink ports. Hover over the interface on the CB for more information.</p> <p>For SFP and SFP+ ports, the interfaces appear dimmed if no transceiver is inserted. The chassis viewer displays Transceiver not plugged-in when you hover over the port icon.</p>
Power supplies	Hover over the power supply icons to display name, status, and description information.
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display of the primary Routing Engine. The EX6210 switch has 2 LCD panels, one for each Routing Engine. The backup Routing Engine LCD displays <b>Backup</b> .
<b>Rear View of the EX6210 Switch</b>	
Fan tray	Hover over the fan tray icon to display information regarding the cooling fans.

Table 54: Chassis Viewer for EX8208 Switches

Field	Description
<b>Front View</b>	
Interface status	<p>In the image, click any line card, SRE module, or SF module to view the front view of the selected component. In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>You can view status for the following ports on the SRE module:</p> <ul style="list-style-type: none"> <li>• USB port—Indicates the USB port for the switch.</li> </ul> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series Switches.</p> <ul style="list-style-type: none"> <li>• Auxiliary port—This port is unavailable.</li> <li>• Management (<b>me0</b>) port—The management port is used to connect the switch to a management device for out-of-band management.</li> <li>• Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)</li> </ul> <p>Because the SF module has no ports, no status information is displayed.</p>
Slot numbers	<p>Slots on the switch are labeled, from the top of the switch down:</p> <ul style="list-style-type: none"> <li>• 0–3 (line cards)</li> <li>• SRE0, SF, SRE1 (SRE and SF modules)</li> <li>• 4–7 (line cards)</li> </ul>
Temperature	<p>The active slots contain a gray temperature icon. Hover over the icon to display temperature information for the slot.</p>

Table 54: Chassis Viewer for EX8208 Switches *(Continued)*

Field	Description
Fan status	Hover over the fan tray icon to display name, status, and description information.
Power supplies	Hover over the power supply icons to display name, status, and description information.
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
<b>Rear View</b>	The EX8208 switch does not have any components on the rear of the chassis.

Table 55: Chassis Viewer for EX8216 Switches

Field	Description
<b>Front View</b>	



Table 55: Chassis Viewer for EX8216 Switches *(Continued)*

Field	Description
Interface status	<p>In the image, click any line card or RE module to display the front view of the selected component. In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>You can view status for the following ports on the RE module:</p> <ul style="list-style-type: none"> <li>• USB port—Indicates the USB port for the switch.</li> </ul> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series Switches.</p> <ul style="list-style-type: none"> <li>• Auxiliary port—This port is unavailable.</li> <li>• Management (<b>me0</b>) port—The management port is used to connect the switch to a management device for out-of-band management.</li> <li>• Console port—The console port is used to connect the switch to a management console or to a console server. (You might do this for initial switch configuration.)</li> </ul>
Slot numbers	<p>Slots on the switch are labeled, from the top of the switch down:</p> <ul style="list-style-type: none"> <li>• RE0 (RE module)</li> <li>• RE1 (RE module)</li> <li>• 0–15 (line cards)</li> </ul>
Temperature	<p>The active slots contain a gray temperature icon. Hover over the icon to display temperature information for the slot.</p>
Fan status	<p>Hover over the fan tray icon to display consolidated information about the fans.</p>
Power supplies	<p>Hover over the power supply icons to display name, status, and description information.</p>

Table 55: Chassis Viewer for EX8216 Switches *(Continued)*

Field	Description
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
<b>Rear View</b>	
SF modules	Hover over the SF module icons in their respective slots to display information. Slots are numbered SF7–SF0, from left to right.

Table 56: Chassis Viewer for XRE200 External Routing Engines

Field	Description
<b>Front View</b>	
Interface status	<p>In the image, the colors listed below denote the interface status:</p> <ul style="list-style-type: none"> <li>• Green—Interface is up and operational.</li> <li>• Yellow—Interface is up but is nonoperational.</li> <li>• Gray—Interface is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p> <p>For a Virtual Chassis configuration, select the switch to view the interface status.</p>
Console port	The console port is used to connect the switch to a management console or to a console server.
Management (me0) port	The management port is used to connect the switch to a management device for out-of-band management. Use this port for initial switch configuration.

Table 56: Chassis Viewer for XRE200 External Routing Engines *(Continued)*

Field	Description
Virtual Chassis port	<p>In the image, the colors listed below denote the Virtual Chassis port (VCP) status:</p> <ul style="list-style-type: none"> <li>• Green—VCP is up and operational.</li> <li>• Yellow—VCP is up but is nonoperational.</li> <li>• Gray—VCP is down and nonoperational.</li> </ul> <p>Hover over the interface (port) to view more information.</p>
LCD panel	LCD panel configured for the LEDs on the ports. Hover over the icon to view the current character display.
Temperature	The active slots contain a gray temperature icon. Hover over the icon to display temperature information for the slot.
USB port	<p>Indicates the USB port for the switch.</p> <p><b>NOTE:</b> We recommend that you use USB flash drives purchased from Juniper Networks for your EX Series switch.</p>
PIC1 slot	You can install a Virtual Chassis module in the PIC1 slot. Hover over the Virtual Chassis ports to display the port status details.
PIC2 slot	You can install a Virtual Chassis module in the PIC2 slot. Hover over the Virtual Chassis ports to display the port status details.
<b>Rear View of the XRE200 External Routing Engine</b>	
Fan modules	Hover over the fan modules to display status of the fans and airflow direction information. For a Virtual Chassis, the status of the fans of the selected member switch is displayed.
Power supplies	Hover over the power supply icons to display name, status, and description information.

## Change History Table

Feature support is determined by the platform and release you are using. Use [Feature Explorer](#) to determine if a feature is supported on your platform.

Release	Description
22.4A1	Starting in Junos OS Release 22.4R1 which aligns with the J-Web Application package release 22.4A1, J-Web supports EX4100 and EX4100-F switches.

RELATED DOCUMENTATION

<a href="#">J-Web User Interface for EX Series Switches Overview</a>
<a href="#">EX2200 Switches Hardware Overview</a>
<a href="#">EX2300 Switches Hardware Overview</a>
<a href="#">EX3200 Switches Hardware Overview</a>
<a href="#">EX3300 Switches Hardware Overview</a>
<a href="#">EX4200 Switches Hardware Overview</a>
<a href="#">EX4500 Switches Hardware Overview</a>
<a href="#">EX6210 Switch Hardware Overview</a>
<a href="#">EX8208 Switch Hardware Overview</a>
<a href="#">EX8216 Switch Hardware Overview</a>
<a href="#">Check Active Alarms with the J-Web Interface</a>
<a href="#">XRE200 External Routing Engine Hardware Guide</a>

# 4

CHAPTER

## Maintaining Components

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### IN THIS CHAPTER

- Maintaining the EX3400 Switch Cooling System | 205
  - Maintaining the EX3400 Power System | 208
  - Maintaining a Transceiver | 214
  - Maintaining Fiber-Optic Cables | 220
-

# Maintaining the EX3400 Switch Cooling System

## IN THIS SECTION

- [Removing a Fan Module from an EX3400 Switch | 205](#)
- [Installing a Fan Module in an EX3400 Switch | 206](#)

## Removing a Fan Module from an EX3400 Switch

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2
- An antistatic bag or an antistatic mat
- A replacement fan module

Each fan module in EX3400 switches is a hot-removable and hot-insertable field-replaceable unit (FRU) installed in the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.



**NOTE:** If you remove both the fan modules, you must replace at least one fan module within four minutes for the switch to operate without disrupting its functions.

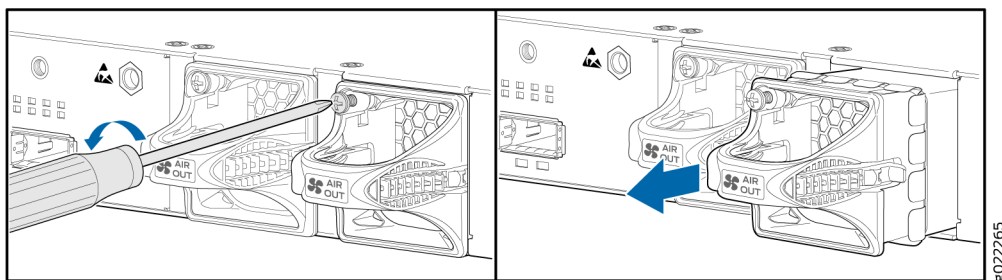
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Loosen the captive screws on the front faceplate of the fan module by using your fingers. If you are unable to loosen the captive screws by using your fingers, use the screwdriver.



**WARNING:** To prevent injury, do not touch the fan with your hands or any tools as you slide the fan module out of the chassis—the fan might still be running.

3. Grasp the handle on the fan module and pull it firmly to slide the fan module out of the chassis.
4. Place the fan module in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
5. Install the replacement fan.
6. Tighten the captive screws on the faceplate of the fan module by using your fingers. If you are unable to tighten the captive screws by using your fingers, use the screwdriver.

Figure 48: Removing a Fan Module from an EX3400 Switch



**NOTE:** Both the fan modules must be installed and operational for optimal functioning of the switch.

## Installing a Fan Module in an EX3400 Switch

Before you install a fan module 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 to install a fan module in the switch chassis:

- ESD grounding strap
- Phillips (+) screwdriver, number 2

Each fan module is a hot-removable and hot-insertable field-replaceable unit (FRU) installed in the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.



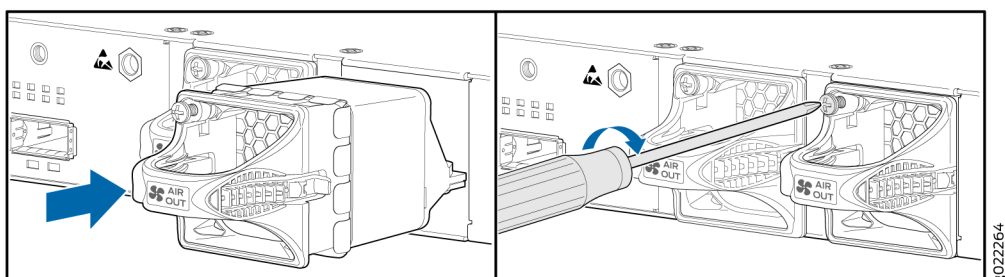
**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis.
- Fan modules with different directions for the airflow in the same chassis.
- Power supplies with different directions for the airflow in the same chassis.

- Power supplies and fan modules with different directions for the airflow in the same chassis.

1. Ensure that you have the correct fan module. The direction of the airflow in the fan module must match the direction of the airflow in the installed power supply.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. Remove the fan module from its bag.
4. Hold the handle of the fan module with one hand and support the weight of the module with the other hand. Place the fan module in the fan module slot on the rear panel of the switch and slide it in until it is fully seated.
5. Tighten the captive screws on the faceplate of the fan module by using your fingers. If you are unable to tighten the captive screws by using your fingers, use the screwdriver.

**Figure 49: Installing a Fan Module in an EX3400 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.

## SEE ALSO

| [EX3400 Cooling System](#) | 24



# Maintaining the EX3400 Power System

## IN THIS SECTION

- [Removing an AC Power Supply from an EX3400 Switch | 208](#)
- [Installing an AC Power Supply in an EX3400 Switch | 209](#)
- [Removing a DC Power Supply from an EX3400 Switch | 211](#)
- [Installing a DC Power Supply in an EX3400 Switch | 213](#)

## Removing an AC Power Supply from an EX3400 Switch

Before you remove a power supply from an EX3400 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 remove a power supply from an EX3400 switch:

- ESD grounding strap
- Phillips (+) screwdriver, number 2 (not provided)
- Antistatic bag or an antistatic mat
- Replacement power supply or a cover panel for the power supply slot

The power supplies in EX3400 switches are hot-removable and hot-insertable field-replaceable units (FRUs) installed in the rear panel of the switch: You can remove and replace them without powering off the switch or disrupting switch functions.



**NOTE:** If only one power supply is installed in the switch, you must power off the switch before removing the power supply.

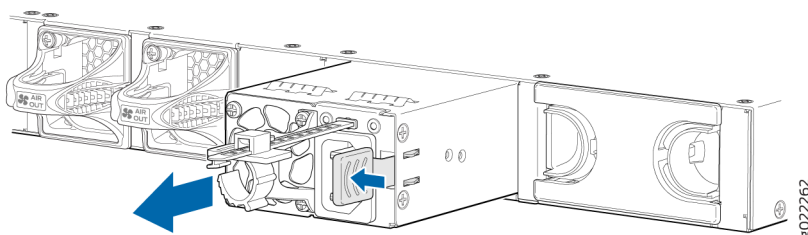


**CAUTION:** We recommend that you install either a replacement power supply or a cover panel in the empty power supply slot to prevent chassis overheating and dust accumulation.

To remove an AC power supply from the switch (see [Figure 50 on page 209](#)):

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. If the AC power source outlet has a power switch, set it to the OFF (O) position.
4. Gently pull out the plug end of the power cord connected to the power source outlet.
5. Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.
6. Slide the ejector lever toward the left until the power supply is unseated.
7. Grasp the power supply handle and pull firmly to slide the power supply halfway out of the chassis.
8. Place one hand under the power supply to support it and slide it completely out of the chassis. Take care not to touch power supply components, pins, leads, or solder connections.
9. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
10. If you are not replacing the power supply, install the cover panel over the slot.

**Figure 50: Removing an AC Power Supply from an EX3400 Switch**



## Installing an AC Power Supply in an EX3400 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 to install the power supply:

- ESD grounding strap
- Phillips (+) screwdriver, number 2

Each AC power supply in EX3400 switches is a hot-removable and hot-insertable field-replaceable unit (FRU) installed in the rear panel of the switch: You can remove and replace it without powering off the switch or disrupting switch functions.



**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis.
- 150 W, 600 W, and 920 W power supplies in the same chassis.
- Power supplies with different directions for the airflow in the same chassis.
- Fan modules with different directions for the airflow in the same chassis.
- Power supplies and fan modules with different directions for the airflow in the same chassis.

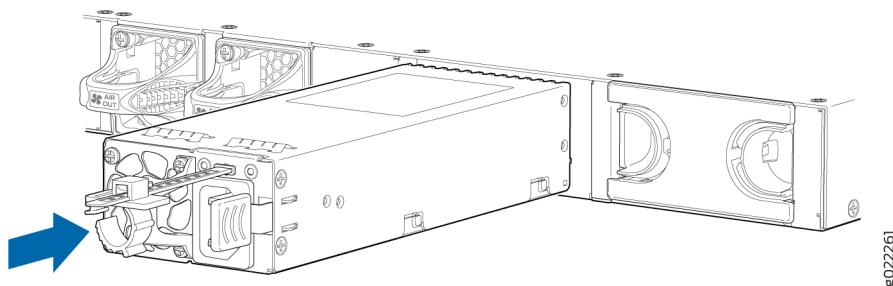


**NOTE:** Each power supply must be connected to a dedicated power source outlet. The switch is shipped with one power supply preinstalled. Additional power supplies are separately orderable. You can install up to two power supplies in the switch. The power supplies provided by default for each model are documented in [EX3400 Switch Models](#).

To install an AC power supply in the switch (see [Figure 51 on page 211](#)):

1. Ensure that you have the correct power supply. The direction of the airflow in the power supply must match the direction of the airflow in the installed fan module.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. If the power supply slot has a cover panel on it, loosen the captive screws on the cover panel by using your fingers or the screwdriver. Hold the captive screw and gently pull it outward to remove the cover panel. Save the cover panel for later use.
4. Taking care not to touch power supply pins, leads, or solder connections, remove the power supply from the bag.
5. Using both hands, place the power supply in the power supply slot on the rear panel of the switch and slide it in until it is fully seated and the ejector lever fits into place.

**Figure 51: Installing an AC Power Supply in an EX3400 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.

## SEE ALSO

[AC Power Supply in EX3400 Switches](#) | 28

## Removing a DC Power Supply from an EX3400 Switch

Before you remove a power supply from an EX3400 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 remove the power supply from the switch chassis:

- ESD grounding strap
- Phillips (+) screwdriver, number 2 (not provided)
- Slotted (-) screwdriver
- Antistatic bag or an antistatic mat
- Replacement power supply or a cover panel for the power supply slot

The power supplies in EX3400 switches is a hot-removable and hot-insertable field-replaceable units (FRUs) installed in the rear panel of the switch: You can remove and replace them without powering off the switch or disrupting switch functions.



**NOTE:** If only one power supply is installed in the switch, you must power off the switch before removing the power supply.

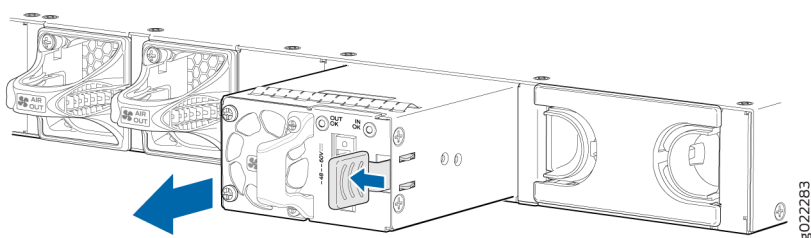


**CAUTION:** We recommend that you install either a replacement power supply or a cover panel in the empty power supply slot to prevent chassis overheating and dust accumulation.

To remove a DC power supply from the switch (see [Figure 52 on page 212](#)):

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. Make sure that the voltage across the DC power source cables leads is 0 V and that there is no chance that the cables might become active during the removal process.
4. Remove the two screws that attach the terminal connector to the power supply socket.
5. Remove the terminal connector from the power supply unit.
6. Slide the ejector lever toward the left until the power supply is unseated.
7. Grasp the power supply handle and pull firmly to slide the power supply halfway out of the chassis.
8. Taking care not to touch power supply pins, leads, or solder connections, place one hand under the power supply to support it. Grasp the power supply handle with your other hand and pull the power supply completely out of the chassis.
9. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
10. If you are not replacing the power supply, install the cover panel over the slot.

**Figure 52: Removing a DC Power Supply from an EX3400 Switch**



## Installing a DC Power Supply in an EX3400 Switch

Before you install an DC 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 to install the power supply:

- ESD grounding strap
- Phillips (+) screwdriver, number 2

Each DC power supply in EX3400 switches is a hot-removable and hot-insertable field-replaceable unit (FRU) installed in the rear panel of the switch: You can remove and replace the power supplies without powering off the switch or disrupting switch functions.



**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis.
- Power supplies with different directions for the airflow in the same chassis.
- Fan modules with different directions for the airflow in the same chassis.
- Power supplies and fan modules with different directions for the airflow in the same chassis.

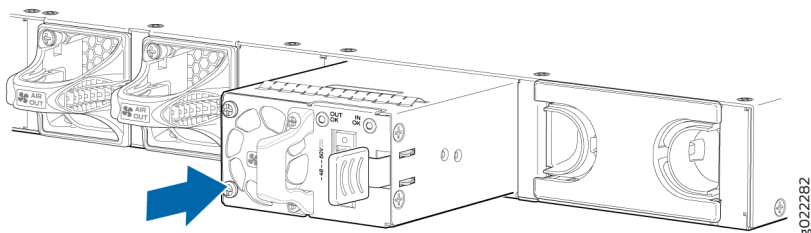


**NOTE:** Each power supply must be connected to a dedicated power source. The switch is shipped with one power supply preinstalled. Additional power supplies are separately orderable. You can install up to two power supplies in the switch.

To install a DC power supply in the switch (see [Figure 53 on page 214](#)):

1. Ensure that the fan modules installed in the switch have the **AIR OUT** label on them.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. If the power supply slot has a cover panel on it, loosen the captive screws on the cover panel by using your fingers or the screwdriver. Hold the captive screw and gently pull it outward to remove the cover panel. Save the cover panel for later use.
4. Taking care not to touch power supply pins, leads, or solder connections, remove the power supply from the bag.
5. Using both hands, place the power supply in the power supply slot on the rear panel of the switch and slide it in until it is fully seated and the ejector lever fits into place.

Figure 53: Installing a DC Power Supply in an EX3400 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.

#### SEE ALSO

DC Power Supply in EX3400 Switches | 35

## Maintaining a Transceiver

#### IN THIS SECTION

- Install a Transceiver | 214
- Remove a Transceiver | 217

### 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 the transceivers 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 54 on page 217 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers.

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 a site ESD point or to the ESD point on the device.
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, use your fingers to 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.

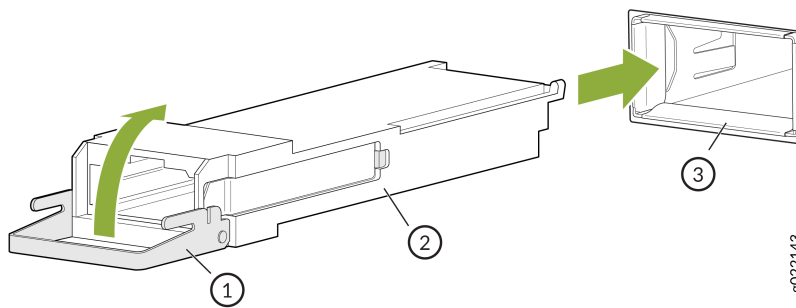
**CAUTION:** Avoid bending the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

**NOTE:** When you install SFP-DD transceivers, push it hard until you hear a click sound. Use a long nose plier to pull the SFP-DD transceiver connected on the top and bottom rows of the chassis where the pull tabs face each other.

**NOTE:** Make sure to use a dust cap to cover ports that are unused.

**NOTE:** While using Finisar AOC SFP+ optical module with the QFX5130-48C switch, you may need to pull the module upwards to pull out the module smoothly from the cage.

Figure 54: Install a Transceiver



1– Ejector lever

2– Transceiver

3– Port

## 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 the transceivers 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.

Figure 55 on page 219 shows how to remove a quad small form-factor pluggable plus (QSFP+) transceiver. The procedure is the same for all types of transceivers except the QSFP28 and C form-factor pluggable (CFP) transceivers.

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 rack.
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.
6. To remove an SFP56-DD, SFP, SFP+, XFP, a QSFP+, or QSFP56-DD transceiver:
  - a. Using your fingers, pull open the ejector lever on the transceiver to unlock the transceiver.  
Note that QSFP-DD and SFP-DD transceivers don't have ejector levers, instead they have a pull tab which can be used to unlock and remove the transceiver.



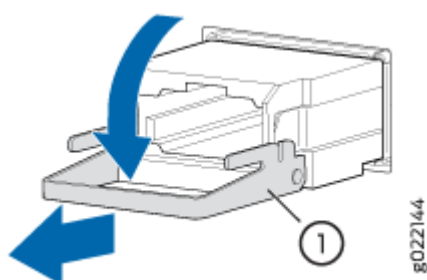
**CAUTION:** Before removing the transceiver, make sure that you open the ejector lever completely until you hear it click. This precaution prevents damage to the transceiver.

- 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 55: 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.

## Maintaining Fiber-Optic Cables

### IN THIS SECTION

- [Connect a Fiber-Optic Cable | 220](#)
- [Disconnect a Fiber-Optic Cable | 221](#)
- [How to Handle Fiber-Optic Cables | 222](#)

### Connect a Fiber-Optic Cable

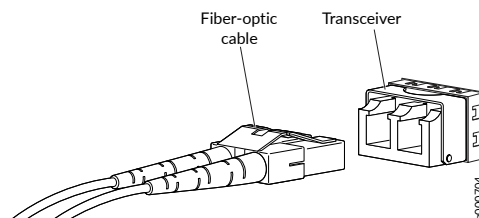
Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see [Laser and LED Safety Guidelines and Warnings](#)).

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.



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 the 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. Replacing the short fiber extension is easier and cost efficient compared with replacing 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

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### IN THIS CHAPTER

- [Troubleshooting EX3400 Components | 224](#)
-



# Troubleshooting EX3400 Components

## IN THIS SECTION

- Understand Alarm Types and Severity Levels on EX Series Switches | 224
- Chassis Component Alarm Conditions on EX3400 Switches | 226
- Check Active Alarms with the J-Web Interface | 229
- Monitor System Log Messages | 230
- Troubleshooting PoE Voltage Injection Failure in EX2300, EX3400, EX4300, or EX4400 Switch Models with PoE Capability | 237
- Troubleshooting Storage Issues While Upgrading Junos OS in EX2300 and EX3400 Switches | 238
- Troubleshoot Temperature Alarms in EX Series Switches | 240

## Understand Alarm Types and Severity Levels on EX Series Switches



**NOTE:** This topic applies only to the J-Web Application package.

Alarms alert you to conditions that might prevent normal operation of the switch. Before monitoring alarms on a Juniper Networks EX Series Ethernet switch, become familiar with the terms defined in [Table 57 on page 224](#).

**Table 57: Alarm Terms**

Term	Definition
<b>alarm</b>	Signal alerting you to conditions that might prevent normal operation. On a switch, the alarm signal is the <b>ALM</b> LED lit on the front of the chassis.
<b>alarm condition</b>	Failure event that triggers an alarm.

Table 57: Alarm Terms (*Continued*)

Term	Definition
<b>alarm severity</b>	Seriousness of the alarm. If the Alarm ( <b>ALM</b> ) LED is red, this indicates a major alarm. If the Alarm LED is yellow or amber, this indicates a minor alarm. If the Alarm LED is unlit, there is no alarm or the switch is halted.
<b>chassis alarm</b>	Preset alarm triggered by a physical condition on the switch such as a power supply failure, excessive component temperature, or media failure.
<b>system alarm</b>	Preset alarm triggered by a missing rescue configuration or failure to install a license for a licensed software feature.  <b>NOTE:</b> On EX6200 switches, a system alarm can be triggered by an internal link error.

### Alarm Types

The switch supports these alarms:

- Chassis alarms indicate a failure on the switch or one of its components. Chassis alarms are preset and cannot be modified.
- System alarms indicate a missing rescue configuration. System alarms are preset and cannot be modified, although you can configure them to appear automatically in the J-Web interface display or the CLI display.

### Alarm Severity Levels

Alarms on switches have two severity levels:

- Major (red)—Indicates a critical situation on the switch that has resulted from one of the following conditions. A red alarm condition requires immediate action.
  - One or more hardware components have failed.
  - One or more hardware components have exceeded temperature thresholds.
  - An alarm condition configured on an interface has triggered a critical warning.
- Minor (yellow or amber)—Indicates a noncritical condition on the switch that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow or amber alarm condition requires monitoring or maintenance.

A missing rescue configuration generates a yellow or amber system alarm.

SEE ALSO

| *Dashboard for EX Series Switches*

# Chassis Component Alarm Conditions on EX3400 Switches

This topic describes the chassis component alarm conditions on EX3400 switches.

[Table 58 on page 226](#) lists the alarm conditions on EX3400 switches, their severity levels, and the actions you can take to respond to them.

**Table 58: Alarm Conditions on EX3400 Switches**

Chassis Component	Alarm Condition	Alarm Severity	Remedy
<b>Fan modules</b>	Fan module is not installed.	Major (red)	Install the fan module.
	Mix of fan modules with different airflow directions.	Major (red)	Do not mix fan modules with different directions for the airflow in the same chassis.
	Mix of fan modules and power supplies with different airflow directions.	Major (red)	Do not mix fan modules and power supplies with different directions for the airflow in the same chassis.
<b>Power supplies</b>	A power supply has been removed from the chassis.	Minor (yellow)	Install a power supply in the empty slot.
	The power supply is not switched on.	Minor (yellow)	Check the input connection to the power supply.
	An unknown power supply is installed.	Major (red)	Install a power supply recommended by Juniper Networks.

Table 58: Alarm Conditions on EX3400 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
	Mix of power supplies with different airflow directions.	Major (red)	Do not mix power supplies with different directions for the airflow in the same chassis.
	Mix of fan modules and power supplies with different airflow directions.	Major (red)	Do not mix fan modules and power supplies with different directions for the airflow in the same chassis.
<b>Temperature</b>	The temperature inside the chassis reaches the yellow alarm limit.	Minor (yellow)	<ul style="list-style-type: none"> <li>• Check the fan.</li> <li>• Open a support case using the Case Manager link at <a href="https://www.juniper.net/support/">https://www.juniper.net/support/</a> or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).</li> </ul>
	The temperature inside the chassis reaches the red alarm limit.	Major (red)	<ul style="list-style-type: none"> <li>• Check the fan.</li> <li>• Open a support case using the Case Manager link at <a href="https://www.juniper.net/support/">https://www.juniper.net/support/</a> or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).</li> </ul>
	The temperature sensor has failed.	Major (red)	Open a support case using the Case Manager link at <a href="https://www.juniper.net/support/">https://www.juniper.net/support/</a> or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).

Table 58: Alarm Conditions on EX3400 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
<b>Management Ethernet interface</b>	Management Ethernet link is down.	Major (red)	<ul style="list-style-type: none"> <li>Check whether a cable is connected to the management Ethernet interface, or whether the cable is defective. Replace the cable if required.</li> <li>If you are unable to resolve the problem, open a support case using the Case Manager link at <a href="https://www.juniper.net/support/">https://www.juniper.net/support/</a> or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).</li> </ul>
<b>Routing Engine</b>	/var partition usage is high.	Minor (yellow)	Clean up the system file storage space on the switch. For more information, see <a href="#">Freeing Up System Storage Space</a> .
	/var partition is full.	Major (red)	Clean up the system file storage space on the switch. For more information, see <a href="#">Freeing Up System Storage Space</a> .
	Rescue configuration is not set.	Minor (yellow)	Use the request system configuration rescue save command to set the rescue configuration.
	Feature usage requires a license or the license for the feature usage has expired.	Minor (yellow)	Install the required license for the feature specified in the alarm. For more information, see <a href="#">Understanding Software Licenses for EX Series Switches</a> .

**SEE ALSO**


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[Field-Replaceable Units in EX3400 Switches | 12](#)


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[Chassis Status LEDs in EX3400 Switches | 16](#)


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[Understand Alarm Types and Severity Levels on EX Series Switches | 224](#)

# Check Active Alarms with the J-Web Interface

IN THIS SECTION

- Purpose | 229
- Action | 229
- Meaning | 229

## Purpose



**NOTE:** This topic applies only to the J-Web Application package.

Use the monitoring functionality to view alarm information for the EX Series switches including alarm type, alarm severity, and a brief description for each active alarm on the switching platform.

## Action

To view the active alarms:

1. Select **Monitor > Events and Alarms > View Alarms** in the J-Web interface.
2. Select an alarm filter based on alarm type, severity, description, and date range.
3. Click **Go**.

All the alarms matching the filter are displayed.



**NOTE:** When the switch is reset, the active alarms are displayed.

## Meaning

Table 59 on page 230 lists the alarm output fields.

Table 59: Summary of Key Alarm Output Fields

Field	Values
Type	<div>Category of the alarm:</div> <ul style="list-style-type: none"><li>• Chassis—Indicates an alarm condition on the chassis (typically an environmental alarm such as one related to temperature).</li><li>• System—Indicates an alarm condition in the system.</li></ul>
Severity	Alarm severity—either major (red) or minor (yellow or amber).
Description	Brief synopsis of the alarm.
Time	Date and time when the failure was detected.

SEE ALSO

*Monitor System Log Messages*

*Dashboard for EX Series Switches*

[Understand Alarm Types and Severity Levels on EX Series Switches](#) | 224

## Monitor System Log Messages

IN THIS SECTION

- Purpose | 231
- Action | 231
- Meaning | 234

Purpose

 **NOTE:** This topic applies only to the J-Web Application package.

Use the monitoring functionality to filter and view system log messages for EX Series switches.

Action

To view events in the J-Web interface, select **Monitor > Events and Alarms > View Events**.

Apply a filter or a combination of filters to view messages. You can use filters to display relevant events. [Table 60 on page 231](#) describes the different filters, their functions, and the associated actions.

To view events in the CLI, enter the following command:

```
show log
```

**Table 60: Filtering System Log Messages**

Field	Function	Your Action
System Log File	Specifies the name of a system log file for which you want to display the recorded events.	To specify events recorded in a particular file, select the system log filename from the list— for example, <b>messages</b> .
	Lists the names of all the system log files that you configure.	Select <b>Include archived files</b> to include archived files in the search.
	By default, a log file, <code>messages</code> , is included in the <code>/var/log/</code> directory.	
Process	Specifies the name of the process generating the events you want to display.	To specify events generated by a process, type the name of the process.
	To view all the processes running on your system, enter the CLI command <code>show system processes</code> .	For example, type <code>mgd</code> to list all messages generated by the management process.
	For more information about processes, see the <a href="#">Junos OS Installation and Upgrade Guide</a> .	



Table 60: Filtering System Log Messages (*Continued*)

Field	Function	Your Action
Date From To	<p>Specifies the time period in which the events you want displayed are generated.</p> <p>Displays a calendar that allows you to select the year, month, day, and time. It also allows you to select the local time.</p> <p>By default, the messages generated during the last one hour are displayed. End Time shows the current time and Start Time shows the time one hour before End Time.</p>	<p>To specify the time period:</p> <ul style="list-style-type: none"> <li>Click the <b>Calendar</b> icon and select the year, month, and date— for example, <b>02/10/2007</b>.</li> <li>Click the <b>Calendar</b> icon and select the year, month, and date— for example, <b>02/10/2007</b>.</li> <li>Click to select the time in hours, minutes, and seconds.</li> </ul>
Event ID	<p>Specifies the event ID for which you want to display the messages.</p> <p>Allows you to type part of the ID and completes the remainder automatically.</p> <p>An event ID, also known as a system log message code, uniquely identifies a system log message. It begins with a prefix that indicates the generating software process or library.</p>	<p>To specify events with a specific ID, type the partial or complete ID— for example, <b>TFTPD_AF_ERR</b>.</p>
Description	<p>Specifies text from the description of events that you want to display.</p> <p>Allows you to use regular expressions to match text from the event description.</p> <p><b>NOTE:</b> Regular expression matching is case-sensitive.</p>	<p>To specify events with a specific description, type a text string from the description with regular expression.</p> <p>For example, type <b>^Initial*</b> to display all messages with lines beginning with the term <i>Initial</i>.</p>
Search	<p>Applies the specified filter and displays the matching messages.</p>	<p>To apply the filter and display messages, click <b>Search</b>.</p>
Reset	<p>Resets all the fields in the Events Filter box.</p>	<p>To reset the field values that are listed in the Events Filter box, click <b>Reset</b>.</p>

Table 60: Filtering System Log Messages (Continued)

Field	Function	Your Action
Generate Raw Report	Generates a list of event log messages in nontabular format.	To generate a raw report:
<b>NOTE:</b> <ul style="list-style-type: none"><li>Starting in Junos OS Release 14.1X53, a Raw Report can be generated from the log messages being loaded in the Events Detail table. The Generate Raw Report button is enabled after the event log messages start loading in the Events Detail table.</li><li>After the log messages are completely loaded in the Events Detail table, Generate Raw Report changes to Generate Report.</li></ul>		<ol style="list-style-type: none"><li>Click <b>Generate Raw Report</b>.  The <i>Opening filteredEvents.html</i> window appears.</li><li>Select <b>Open with</b> to open the HTML file or select <b>Save File</b> to save the file.</li><li>Click <b>OK</b>.</li></ol>

**Table 60: Filtering System Log Messages (Continued)**

Field	Function	Your Action
<p>Generate Report</p> <p><b>NOTE:</b> Starting in Junos OS Release 14.1X53, a Formatted Report can be generated from event log messages being loaded in an Events Detail table. The Generate Report button appears only after event log messages are completely loaded in the Events Detail table. The Generate Raw Report button is displayed while event log messages are being loaded.</p>	<p>Generates a list of event log messages in tabular format, which shows system details, events filter criteria, and event details.</p>	<p>To generate a formatted report:</p> <ol style="list-style-type: none"> <li>1. Click <b>Generate Report</b>.</li> </ol> <p>The <i>Opening Report.html</i> window appears.</p> <ol style="list-style-type: none"> <li>2. Select <b>Open with</b> to open the HTML file or select <b>Save File</b> to save the file.</li> <li>3. Click <b>OK</b>.</li> </ol>

## Meaning

Table 61 on page 235 describes the Event Summary fields.



**NOTE:** By default, the View Events page in the J-Web interface displays the most recent 25 events, with severity levels highlighted in different colors. After you specify the filters, Event Summary displays the events matching the specified filters. Click the **First**, **Next**, **Prev**, and **Last** links to navigate through messages.

Table 61: Viewing System Log Messages

Field	Function	Additional Information
Process	Displays the name and ID of the process that generated the system log message.	The information displayed in this field is different for messages generated on the local Routing Engine than for messages generated on another Routing Engine (on a system with two Routing Engines installed and operational). Messages from the other Routing Engine also include the identifiers <b>re0</b> and <b>re1</b> that identify the Routing Engine.
Severity	<p>Severity level of a message is indicated by different colors.</p> <ul style="list-style-type: none"> <li>• <b>Unknown</b>—Gray—Indicates no severity level is specified.</li> <li>• <b>Debug/Info/Notice</b>—Green—Indicates conditions that are not errors but are of interest or might warrant special handling.</li> <li>• <b>Warning</b>—Yellow or Amber—Indicates conditions that warrant monitoring.</li> <li>• <b>Error</b>—Blue—Indicates standard error conditions that generally have less serious consequences than errors in the emergency, alert, and critical levels.</li> <li>• <b>Critical</b>—Pink—Indicates critical conditions, such as hard-drive errors.</li> <li>• <b>Alert</b>—Orange—Indicates conditions that require immediate correction, such as a corrupted system database.</li> <li>• <b>Emergency</b>—Red—Indicates system panic or other conditions that cause the switch to stop functioning.</li> </ul>	<p>A severity level indicates how seriously the triggering event affects switch functions. When you configure a location for logging a facility, you also specify a severity level for the facility. Only messages from the facility that are rated at that level or higher are logged to the specified file.</p>

Table 61: Viewing System Log Messages (*Continued*)

Field	Function	Additional Information
Event ID	<p>Displays a code that uniquely identifies the message.</p> <p>The prefix on each code identifies the message source, and the rest of the code indicates the specific event or error.</p>	<p>The event ID begins with a prefix that indicates the generating software process.</p> <p>Some processes on a switch do not use codes. This field might be blank in a message generated from such a process.</p> <p>An event can belong to one of the following type categories:</p> <ul style="list-style-type: none"> <li>• <b>Error</b>—Indicates an error or failure condition that might require corrective action.</li> <li>• <b>Event</b>—Indicates a condition or occurrence that does not generally require corrective action.</li> </ul>
Event Description	Displays a more detailed explanation of the message.	
Time	Displays the time at which the message was logged.	

## SEE ALSO

*Check Active Alarms with the J-Web Interface*

*Understand Alarm Types and Severity Levels on EX Series Switches*

## Troubleshooting PoE Voltage Injection Failure in EX2300, EX3400, EX4300, or EX4400 Switch Models with PoE Capability

### IN THIS SECTION

● Problem | 237

● Solution | 238

### Problem

#### Description

Devices that draw power from EX2300, EX3400, EX4300 or EX4400 switch models with Power over Ethernet (PoE) capability do not get power from those switches. The problem persists after rebooting the switches or upgrading to the latest version of Junos OS. PoE stops working on Juniper EX3400, EX2300, EX4300, or EX4400 devices during initial installation. It is noticed that the new PDs connected to the POE devices do not power up.

- When the PoE ports of the Switches - EX2200, EX3200, EX4200, and EX4400 are connected to the PoE ports of EX3400, EX4300, EX2300, EX4400, the PoE functionality would be affected on EX4300, EX3400, EX2300, EX4400 switches. This is an expected behavior.
- When an EX3400 is connected to another EX3400 or an EX4300 is connected to an EX3400 the PoE operates in a normal manner - This is an expected behavior.

#### Debugging and confirming voltage injection by analyzing the PoE port status on Juniper switches

Voltage injection on PoE port scan can be identified by enabling syslog any any on EX3400, EX2300, EX4300, and EX4400.

In show log messages, any POE voltage injection port with status 36 indicates this problem. This is caused due to PoE power injected to the ports on EX3400, EX4300, EX2300, and EX4400.

Port status 36 is due to the mutual powering of switches. This is because Juniper switches support legacy device detection. Switches that supports legacy detection will detect other switches as a legacy device, and power each other.

## Solution

When connecting uplink devices to EX3400, EX4300, EX2300, EX4400, ensure PoE is disabled on the interface (uplink device). PoE must be enabled only on interfaces where Access Points/VOIP Phones or any other PoE powered devices are connected.

Use the following command

```
set poe interface <interface name>
```

When connecting EX4200, EX3200, EX2200 to EX4400, EX4300, EX3400, and EX2300, disable PoE on legacy switches (EX4200, EX3200, EX2200) as below:

```
set poe interface ge-0/0/0 disable
```

## SEE ALSO

[Understanding PoE on EX Series Switches](#)

## Troubleshooting Storage Issues While Upgrading Junos OS in EX2300 and EX3400 Switches

### IN THIS SECTION

- [Problem | 238](#)
- [Cause | 239](#)
- [Solution | 239](#)

## Problem

### Description

Upgrading Junos OS in EX2300 and EX3400 switches fails.

## Symptoms

When you upgrade Junos OS in EX2300 and EX3400 switches, you get the error not enough space to unpack *installation-pack-name*.

## Cause

There is not enough memory in the switch to install the upgrade installation package.

## Solution

If upgrading Junos OS in EX2300 and EX3400 switches fails due to the lack of memory in the switch:

1. Perform a system storage cleanup and delete unwanted files in the system storage by using the command:

```
user@switch> request system storage cleanup
```



**NOTE:** You can get the list of files that this command deletes by using the command:

```
user@switch> request system  
storage cleanup dry-run
```

This command does not delete files in the *root* folder; it deletes files in the folders *jail*, *log*, and *tmp* only.

2. If any directory is taking up a lot of memory, delete unwanted files in that directory. Check the memory utilization by using the command:

```
user@switch> show system storage
```

3. Delete non-recovery snapshots.

- If Junos OS 15.1X53D56 or later is installed in your switch:
  - a. Delete non-recovery snapshots by using the command:

```
user@switch> request system  
software add software-image-name force
```



- If a version of Junos OS released earlier than Junos OS 15.1X53D56 is installed in your switch:
  - a. Check for non-recovery snapshots by using the command:

```
user@switch> show system snapshot
```

b.



**NOTE:** Snapshot names are not completed automatically in the CLI; you must enter the snapshot name.

Delete non-recovery snapshots by using the command:

```
user@switch> request system  
snapshot delete snapshot-name
```

4. After upgrading Junos OS, delete the upgrade installation package by using the command:

```
user@switch> request system software  
add software-image-name force unlink
```

## SEE ALSO

[Understanding Software Installation on EX Series Switches](#)

## Troubleshoot Temperature Alarms in EX Series Switches

### IN THIS SECTION

- [Problem | 241](#)
- [Cause | 241](#)
- [Solution | 241](#)



**NOTE:** This topic is a generic one and applies to all EX Series Switches. There could be variations in output depending on the switch. For example, in a fan less switch such as EX4100-H-12MP, any fan related information does not apply.

## 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. For EX4100-H-12MP switches, refer *Environmental Guidelines* in [EX4100-H Site Guidelines and Requirements](#).

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. Note that for fan less switches such as EX4100-H-12MP, fan output will not display in the output.

### 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

Table 62 on page 243 lists the output fields for the show chassis environment command. The table lists output fields in the approximate order in which they appear.

Table 62: show chassis environment Output Fields

Field Name	Field Description
Class	Information about the category or class of chassis component: <ul style="list-style-type: none"><li>• Temp: Temperature of air flowing through the chassis in degrees Celsius (°C) and degrees Fahrenheit (°F)</li><li>• Fans: Information about the status of fans and blowers</li></ul>
Item	Information about the chassis components: <ul style="list-style-type: none"><li>• Flexible PIC Concentrators (FPCs)—that is, the line cards</li><li>• Control Boards (CBs)</li><li>• Routing Engines</li><li>• Power entry modules (PEMs)—that is, the power supplies</li></ul>

**Table 62: show chassis environment Output Fields (Continued)**

Field Name	Field Description
Status	<p>Status of the specified chassis component. For example, if Class is Fans, the fan status can be:</p> <ul style="list-style-type: none"> <li>• OK: The fans are operational.</li> <li>• Testing: The fans are being tested during initial power-on.</li> <li>• Failed: The fans have failed or the fans are not spinning.</li> <li>• Absent: The fan tray is not installed.</li> </ul>
Measurement	<p>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.</p>

2. Issue the command `show chassis temperature-thresholds`. This command displays the chassis temperature threshold settings. The 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 (degrees C)		Yellow alarm (degrees C)		Red alarm (degrees C)		Fire Shutdown (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 63 on page 245 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 63: show chassis temperature-thresholds Output Fields

Field Name	Field Description
<b>Item</b>	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.
<b>Fan speed</b>	<p>Temperature thresholds, in degrees Celsius, for the fans to operate at normal and at high speed.</p> <ul style="list-style-type: none"> <li>• <b>Normal</b>—The temperature threshold at which the fans operate at normal speed and when all the fans are present and functioning normally.</li> <li>• <b>High</b>—The temperature threshold at which the fans operate at high speed or when a fan has failed or is missing.</li> </ul> <p><b>NOTE:</b> An alarm is triggered when the temperature exceeds the threshold settings for a yellow, amber, or red alarm.</p>
<b>Yellow or amber alarm</b>	<p>Temperature threshold, in degrees Celsius, that triggers a yellow or amber alarm.</p> <ul style="list-style-type: none"> <li>• <b>Normal</b>—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.</li> <li>• <b>Bad fan</b>—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.</li> </ul>
<b>Red alarm</b>	<p>Temperature threshold, in degrees Celsius, that triggers a red alarm.</p> <ul style="list-style-type: none"> <li>• <b>Normal</b>—The temperature threshold that must be exceeded on the device to trigger a red alarm when the fans are running at full speed.</li> <li>• <b>Bad fan</b>—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.</li> </ul>

**Table 63: show chassis temperature-thresholds Output Fields (Continued)**

Field Name	Field Description
<b>Fire shutdown</b>	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 64 on page 246](#) lists the possible causes for the switch to generate a temperature alarm. It also lists the respective remedies.

**Table 64: 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 <i>Environmental Requirements and Specifications for EX Series Switches</i> .

**Table 64: Causes and Remedies for Temperature Alarms (Continued)**

Cause	Remedy
Fan module or fan tray has failed.	<p><b>NOTE:</b> This step is not applicable for fan less switches such as EX4100-H-12MP</p> <p>Perform the following steps:</p> <ol style="list-style-type: none"> <li>1. Check the fan.</li> <li>2. Replace the faulty fan module or fan tray.</li> <li>3. If the above two checks show no problems, open a support case using the Case Manager link at <a href="https://www.juniper.net/support/">https://www.juniper.net/support/</a> or call 1-888-314-5822 (toll-free within the United States and Canada) or 1-408-745-9500 (from outside the United States).</li> </ol>
Restricted airflow through the switch due to insufficient clearance around the installed switch.	Ensure that there is sufficient clearance around the installed switch.

**Change History Table**

Feature support is determined by the platform and release you are using. Use [Feature Explorer](#) to determine if a feature is supported on your platform.

Release	Description
14.1X53	Starting in Junos OS Release 14.1X53, a Raw Report can be generated from the log messages being loaded in the Events Detail table.
14.1X53	Starting in Junos OS Release 14.1X53, a Formatted Report can be generated from event log messages being loaded in an Events Detail table.



# 6

CHAPTER

## Contacting Customer Support and Returning the Chassis or Components

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### IN THIS CHAPTER

- [Returning an EX3400 Chassis or Components | 249](#)
-

# Returning an EX3400 Chassis or Components

## IN THIS SECTION

- [Returning an EX3400 Switch or Component for Repair or Replacement | 249](#)
- [Locating the Serial Number on an EX3400 Switch or Component | 250](#)
- [Contact Customer Support to Obtain a Return Material Authorization | 252](#)
- [Packing an EX3400 Switch or Component for Shipping | 253](#)

## Returning an EX3400 Switch or Component for Repair or Replacement

If you need to return an EX3400 switch or hardware component to Juniper Networks for repair or replacement, follow this procedure:

1. Determine the serial number of the component. For instructions, see "[Locating the Serial Number on an EX3400 Switch or Component](#)" on page 250.
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 EX3400 Switch or Component for Shipping](#)" on page 253.

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 EX3400 Switch or Component

## IN THIS SECTION

- [Listing the Switch and Components Details with the CLI | 250](#)
- [Locating the Chassis Serial Number ID Label on an EX3400 Switch | 251](#)

If you are returning an EX3400 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 Material Authorization (RMA).

If the switch is operational and you can access the 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 (see [Figure 56 on page 251](#) and [Figure 57 on page 251](#)) 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.

## Listing the Switch and Components Details with the CLI

To list the switch and switch components and their serial numbers, enter the following CLI command:

```
user@switch> show
chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               NY0215350046
Routing Engine 1      BUILTIN    BUILTIN       RE-EX3400-48P
FPC 0              REV 05     650-059857    NY0215350046    EX3400-48P
  CPU              BUILTIN    BUILTIN       FPC CPU
  PIC 0            REV 05     BUILTIN       BUILTIN         48x10/100/1000 Base-T
  PIC 1            REV 05     650-059857    NY0215350046    2x40G QSFP
    Xcvr 0          REV       740-044512    APF14500007NFC  QSFP+-40G-CU50CM
  PIC 2            REV 05     650-059857    NY0215350046    4x10G SFP/SFP+
    Xcvr 0          REV 01     740-021308    1YT511104293    SFP+-10G-SR
```

Power Supply 0 REV 02	640-060601	1EDS5250082	JPSU-920W-AC-AF0
Fan Tray 0			Fan Module, Airflow Out (AF0)
Fan Tray 1			Fan Module, Airflow Out (AF0)

Locating the Chassis Serial Number ID Label on an EX3400 Switch

EX3400 switches shipped after 2 February, 2017 have serial number ID label on the side panel of the chassis (see [Figure 56 on page 251](#)) and on the rear panel of the chassis (see [Figure 57 on page 251](#)). EX3400 switches shipped before 2 February, 2017 have the serial number ID label only on the side panel of the chassis.

Figure 56: Location of the Serial Number ID Label on the Side Panel of an EX3400 Switch

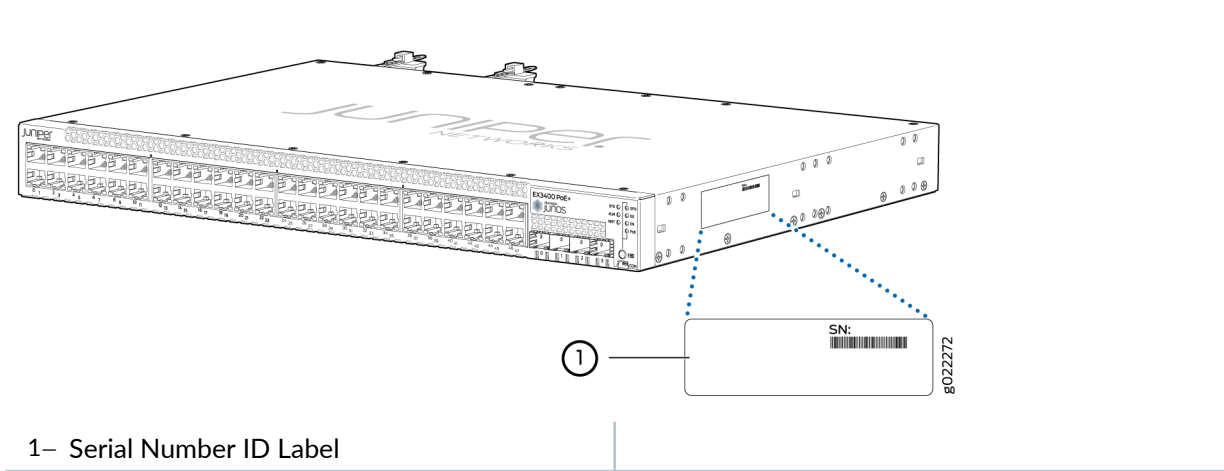
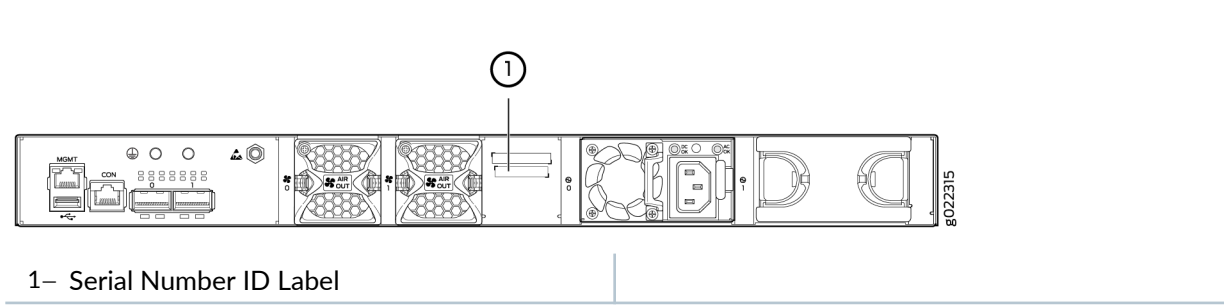


Figure 57: Location of the Serial Number ID Label on the Rear Panel of an EX3400 Switch



## 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 an RMA number from 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 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 EX3400 Switch or Component for Shipping

### IN THIS SECTION

- [Packing a Switch for Shipping | 253](#)
- [Packing Switch Components for Shipping | 254](#)

If you are returning an EX3400 switch or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you begin, ensure that you have 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 that you have the following parts and tools available:

- Antistatic bag, one for each switch or component
- Phillips (+) screwdriver, number 2

### Packing a Switch for Shipping

To pack a switch for shipping:

1. On the console or other management device connected to the switch, enter the 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.

2. Disconnect power from the switch by performing one of the following:
  - If the power source outlet has a power switch, set it to the OFF (0) position.
  - If the power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.
3. Remove the cables that connect the switch to all external devices. See *Disconnect a Fiber-Optic Cable*.
4. Remove all optical transceivers installed in the switch. See *Remove a Transceiver*.

5. If the switch is mounted on a wall or on two posts, have one person support the weight of the switch while another person unscrews and removes the mounting screws. Use the Phillips (+) screwdriver to remove the screws.
6. Remove the switch from the wall, rack, cabinet, or desk and place the switch in an antistatic bag.
7. Slip on the end caps of the packaging foam on both sides of the switch.
8. Place the switch in the shipping carton.
9. Place the packing foam on top of and around the switch.
10. If you are returning accessories or FRUs with the switch, pack them as instructed in ["Packing Switch Components for Shipping" on page 254](#).
11. Close the top of the cardboard carton and seal it with packing tape.
12. Write the RMA number on the exterior of the carton to ensure proper tracking.

## **Packing Switch Components for Shipping**

To pack and ship switch components:

- Place individual components in antistatic bags.
- Ensure that the components are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Close the top of the cardboard shipping carton and seal it with packing tape.
- Write the RMA number on the exterior of the carton to ensure proper tracking.

# 7

CHAPTER

## Safety and Compliance Information

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### IN THIS CHAPTER

- General Safety Guidelines and Warnings | 257
- Definitions of Safety Warning Levels | 258
- Qualified Personnel Warning | 260
- Warning Statement for Norway and Sweden | 260
- Fire Safety Requirements | 261
- Installation Instructions Warning | 262
- Chassis and Component Lifting Guidelines | 263
- Restricted Access Warning | 263
- Ramp Warning | 265
- Rack-Mounting and Cabinet-Mounting Warnings | 265
- Grounded Equipment Warning | 269
- Laser and LED Safety Guidelines and Warnings | 270
- Radiation from Open Port Apertures Warning | 273
- Maintenance and Operational Safety Guidelines and Warnings | 274
- General Electrical Safety Guidelines and Warnings | 280
- Action to Take After an Electrical Accident | 281
- Prevention of Electrostatic Discharge Damage | 282
- AC Power Electrical Safety Guidelines | 283
- AC Power Disconnection Warning | 284
- DC Power Electrical Safety Guidelines | 285
- DC Power Disconnection Warning | 286
- DC Power Grounding Requirements and Warning | 287



- DC Power Wiring Sequence Warning | **288**
  - DC Power Wiring Terminations Warning | **290**
  - Multiple Power Supplies Disconnection Warning | **291**
  - TN Power Warning | **292**
  - Agency Approvals for EX Series Switches | **293**
  - Compliance Statements for EMC Requirements for EX Series Switches | **294**
  - Compliance Statements for Acoustic Noise for EX Series Switches | **298**
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# 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 være 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 THIS SECTION

- [Fire Suppression | 261](#)
- [Fire Suppression Equipment | 261](#)

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.

**Varoituis** Lue asennusohjeet ennen järjestelmän yhdistämistä virtälähteeseen.

**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 käyttää 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 vältetään loukkaantumisia. 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 edifício.
- 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, oerientemente 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.

**Warning!** 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.

## Laser and LED Safety Guidelines and Warnings

### IN THIS SECTION

- [General Laser Safety Guidelines | 271](#)
- [Class 1 Laser Product Warning | 271](#)
- [Class 1 LED Product Warning | 272](#)
- [Laser Beam Warning | 272](#)

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.

**Warning!** Rikta inte blicken in mot strålen och titta inte direkt på den genom optiska instrument.

## 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 kytkettyä, 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 emitteres 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.

## Maintenance and Operational Safety Guidelines and Warnings

### IN THIS SECTION

- [Battery Handling Warning | 274](#)
- [Jewelry Removal Warning | 276](#)
- [Lightning Activity Warning | 277](#)
- [Operating Temperature Warning | 278](#)
- [Product Disposal Warning | 279](#)

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 batería 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.

**Warning!** 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.

**Warning!** 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 ylikuumentuusi, 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.

**Warning!** 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

**Warning!** 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 metalically 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 metalically 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 [Figure 58 on page 283](#)) 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.

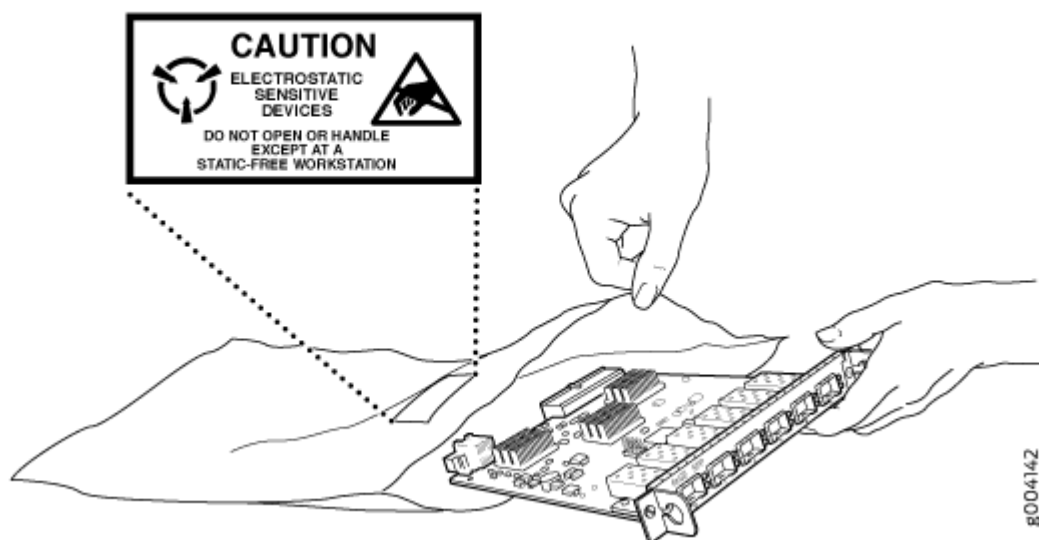
**Avertissement** Par mesure de sécurité, vérifiez régulièrement la résistance du bracelet antistatique. Cette valeur doit être comprise entre 1 et 10 mégohms (Mohms).

- 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 58 on page 283](#)). If you are returning a component, place it in an antistatic bag before packing it.

Figure 58: 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。

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## 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 yhdistettävä kytkentäjäjestys on maajohto maajohtoon, +RTN varten +RTN, -48 V varten - 48 V. Oikea irrotettava kytkentäjäjestys on -48 V varten - 48 V, +RTN varten +RTN, maajohto maajohtoon.

**Avertissement** Câblez l'alimentation 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 sequência apropriada da fiação é moída para moer, +RTN a +RTN, então -48 V a -48 V. Ao desconectar a potência, a sequência

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.

**Warning!** 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 aansluitpunten, 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 forcilla 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 ledaren.

**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 slutet 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.

**Warning!** 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.

**Warning!** Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

# Agency Approvals for EX Series Switches

## IN THIS SECTION

- [Compliance Statement for Argentina | 294](#)

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.

These hardware devices comply with the following standards:

- Safety
  - CAN/CSA-C22.2 No. 60950-1 Information Technology Equipment
  - CAN/CSA-C22.2 No. 62368-1 Information Technology Equipment
  - UL 60950-1 Information Technology Equipment
  - UL 62368-1 Second Edition
  - EN 60950-1 Information Technology Equipment
  - EN 62368-1 Second Edition
  - IEC 60950-1 Information Technology Equipment
  - IEC 62368-1 Second Edition
  - EN 60825-1 Safety of Laser Products - Part 1: Equipment classification and requirements
- EMC
  - FCC 47CFR Part 15 Class A (USA)
  - EN 55022 Class A Emissions (Europe)
  - ICES-003 Class A
  - VCCI Class A (Japan)
  - AS/NZS CISPR 22 Class A (Australia/New Zealand)
  - CISPR 22 Class A

- EN 55024
- EN 300386
- 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.

# Compliance Statements for EMC Requirements for EX Series Switches

### IN THIS SECTION

- [Canada | 295](#)
- [Taiwan | 296](#)
- [European Community | 296](#)
- [Israel | 296](#)
- [Japan | 296](#)
- [Korea | 297](#)
- [United States | 297](#)

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。

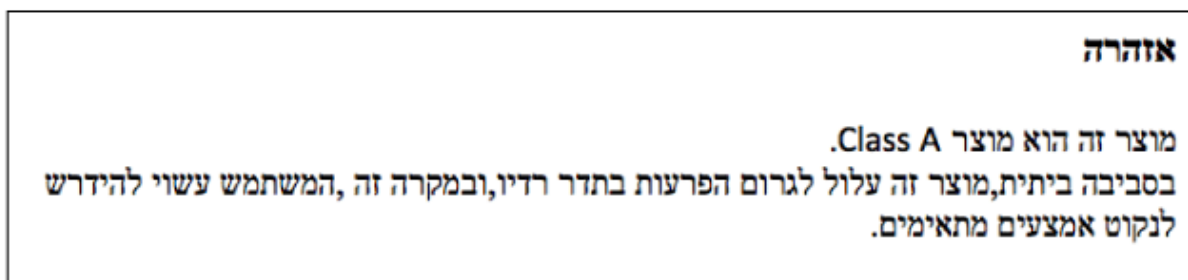
The preceding translates as follows:

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.

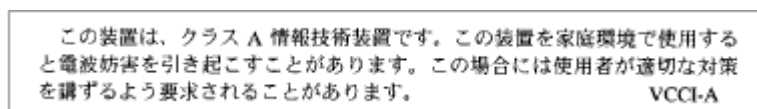
## Israel



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



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.