

# EX4300 Switch Hardware Guide

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*EX4300 Switch Hardware Guide*

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# About This Guide

Use this guide to install hardware and perform initial software configuration, routine maintenance, and troubleshooting for the EX4300 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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# EX4300 System Overview

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## EX4300 Switches Hardware Overview

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Juniper Networks EX4300 Ethernet Switches provide connectivity for high-density environments and scalability for growing networks. These switches can be deployed wherever you need high density of Gigabit Ethernet ports or redundancy. Typically, EX4300 switches are used in large branch offices, campus wiring closets, and data centers. In data centers, EX4300 switches can be positioned as top-of-rack switches; the top devices in a rack to provide connectivity for all the devices in the rack and provide options for optimized airflow (hot aisle/cold aisle).

Three variants of the EX4300 switches are available—24-port, 32-port, and 48-port switches, with or without PoE+, with AC or DC power supplies, and with different airflow directions. EX4300 switches also provide uplink ports and a slot for installing an optional uplink module.

You can manage EX4300 switches by using the CLI. You can manage EX4300 switches except the Multigigabit switches EX4300-48MP and EX4300-48MP-S by using the J-Web graphical interface, Junos Space, and Network Director. Starting in Junos OS Release 18.3R1, you can manage EX4300-48MP and EX4300-48MP-S switches by using Junos Space and Network Director also.

In addition to the device CLI, the EX4300 switch can be managed and monitored by using Juniper Routing Director (formerly Juniper Paragon Automation) or Juniper Paragon Automation.

This video provides a brief overview of the EX4300-48MP switch:



Video: [EX4300-48MP Switch Hardware Overview](#)

## Benefits of the EX4300 Switch

**Compact solution**—The EX4300 switch is a modular single rack unit device that is an apt solution for crowded wiring closets and access switch locations such as data center, campus, and branch office environments. It provides carrier-class reliability of modular systems with the economics and flexibility of stackable platforms.

**Support for Virtual Chassis**—EX4300 switches support Virtual Chassis technology. You can interconnect up to 10 EX4300 switches to form a Virtual Chassis.

**High availability**—EX4300 switches provide high availability through redundant power supplies and fans, graceful Routing Engine switchover (GRES), and nonstop bridging and routing when deployed in a Virtual Chassis configuration.

**Support for MACsec**—EX4300 switches support IEEE 802.1AE MACsec, providing support for link-layer data confidentiality, data integrity, and data origin authentication. The MACsec feature enables EX4300 to support 88 Gbps of near line-rate hardware-based traffic encryption on all Gigabit Ethernet and 10 Gigabit Ethernet ports.

## Software

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

## EX4300 Switches First View

EX4300 switches provide connectivity for high-density Gigabit Ethernet data center top-of-rack, enterprise, and campus aggregation/core deployments. EX4300 switches can be used in large branch offices, campus wiring closets, and data centers. In data centers, these switches can be positioned as the top devices in a rack to provide connectivity for all devices in the rack and provide options for optimized airflow (hot aisle/cold aisle).

To provide carrier-class reliability, EX4300 switches include:

- Dual redundant, load-sharing power supplies that are hot-insertable and hot-removable field-replaceable units (FRUs).
- Two fan modules that are field-replaceable units.
- Redundant Routing Engines in a Virtual Chassis or QFX5100 Virtual Chassis Fabric (VCF) configuration. This redundancy enables graceful Routing Engine switchover (GRES).
- Junos OS with its modular design that enables failed system processes to gracefully restart.

The following EX4300 switches are available:

### 24-Port EX4300 Switches

The 24-port EX4300 switches—EX4300-24T and EX4300-24P—provide 24 built-in 10/100/1000BASE-T Ethernet network ports and four built-in 40-Gigabit Ethernet quad small form-factor pluggable plus (QSFP+) ports that can house 40-Gigabit QSFP+ transceivers. All network ports in the EX4300-24P switch are equipped for Power over Ethernet (PoE+), whereas EX4300-24T has no PoE+ ports. 24-port EX4300 switches support AC power supply and fan module with front-to-back airflow direction and have a slot for installing an optional 4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP), which has four 10-Gigabit Ethernet small form-factor pluggable plus (SFP+) ports that can house four 10-gigabit small form-factor pluggable (SFP+) transceivers, four 1-gigabit small form-factor pluggable (SFP) transceivers, or a combination of SFP+ and SFP transceivers in the four ports on the uplink module.

[Figure 1 on page 5](#) shows the front panel of a 24-port EX4300 switch.

**Figure 1: Front Panel of a 24-Port EX4300 Switch**

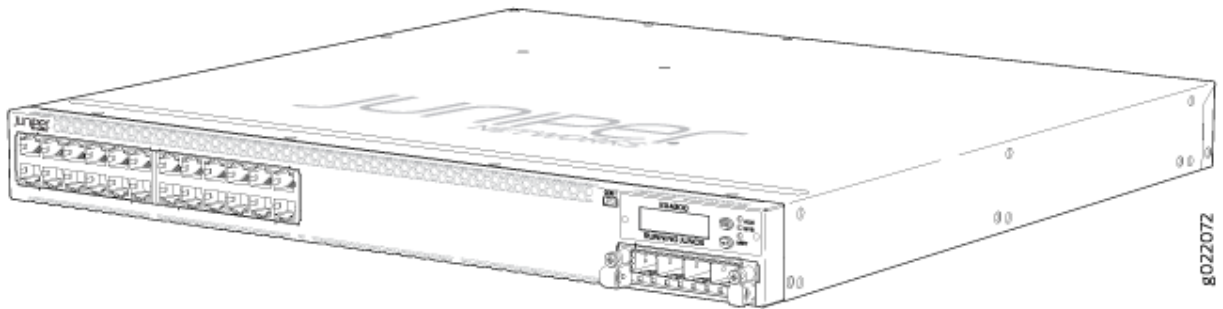


Figure 2 on page 5 shows the rear panel of a 24-port EX4300 switch with power supplies and fan modules installed.

**Figure 2: Rear Panel of a 24-Port EX4300 Switch**

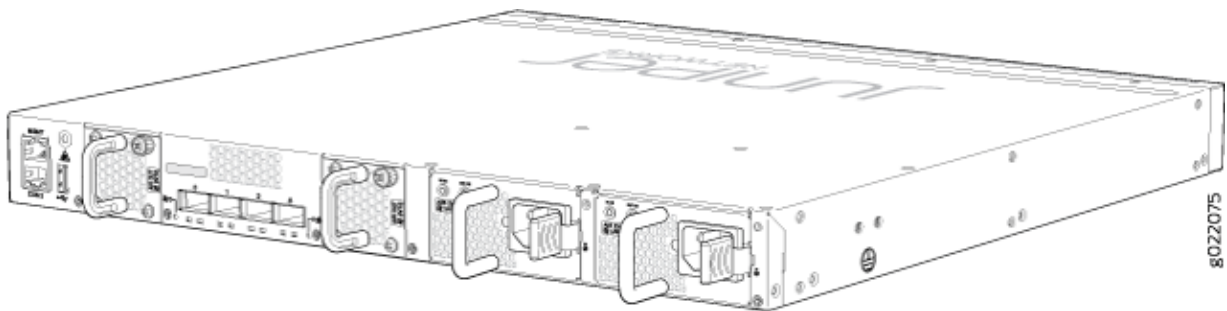


Table 1 on page 6 lists the 24-port EX4300 switch models and their components.

Table 1: Components in 24-Port EX4300 Switches

Switch Models	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules Shipped by Default	Power Supply Shipped by Default	Supported Uplink Module
EX4300-24T	24 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-24T-S	24 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labeled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-24P	24 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	24	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 715 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)

**Table 1: Components in 24-Port EX4300 Switches (Continued)**

Switch Models	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules Shipped by Default	Power Supply Shipped by Default	Supported Uplink Module
EX4300-24P-S	24 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	24	Fan modules for this model are not shipped by default; you must order two fan modules labeled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)

You can use the QSFP+ ports as network ports or as Virtual Chassis ports (VCPs) to connect the switch in a Virtual Chassis or a VCF. By default, the built-in QSFP+ ports are configured as VCPs. You can also use the uplink module ports to connect members of a Virtual Chassis or a VCF across multiple wiring closets by configuring the ports as VCPs. For more information about Virtual Chassis, see [Understanding EX Series Virtual Chassis](#). For more information about VCFs, see [Virtual Chassis Fabric Overview](#).

### 32-Port EX4300 Switches

The 32-port EX4300 switches—EX4300-32F and EX4300-32F-DC—provide 32 built-in 1-Gigabit Ethernet small form-factor pluggable (SFP) network ports that can house SFP transceivers, four built-in 10-Gigabit Ethernet small form-factor pluggable plus (SFP+) ports that can house SFP+ and SFP transceivers, and two built-in quad small form-factor pluggable plus (QSFP+) ports that can house 40-Gigabit QSFP+ transceivers. They support power supply and fan module with front-to-back airflow direction and have a slot for installing an optional uplink module—a 2-port 40-Gigabit Ethernet QSFP+ uplink module (model number: EX-UM-2QSFP) that can house two QSFP+ transceivers or an 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP) that can house eight SFP+ transceivers, eight SFP transceivers, or a combination of SFP and SFP+ transceivers in the eight ports on the uplink module.

[Figure 3 on page 8](#) shows the front panel of a 32-port EX4300 switch.

Figure 3: Front Panel of a 32-Port EX4300 Switch

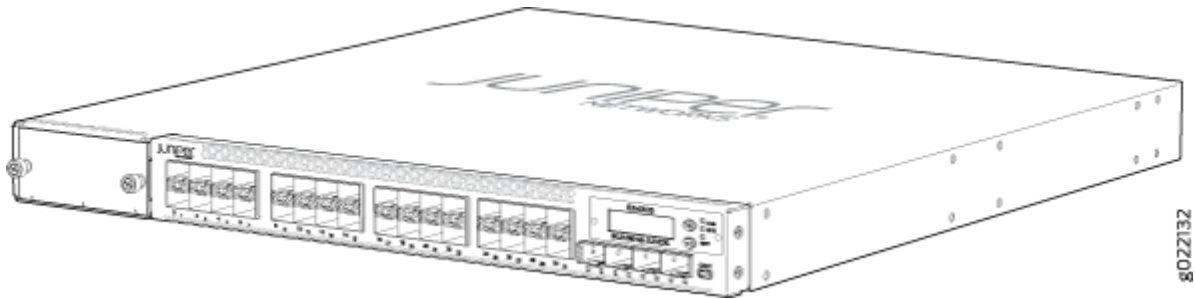


Figure 4 on page 8 shows the rear panel of a 32-port EX4300 switch.

Figure 4: Rear Panel of a 32-Port EX4300 Switch

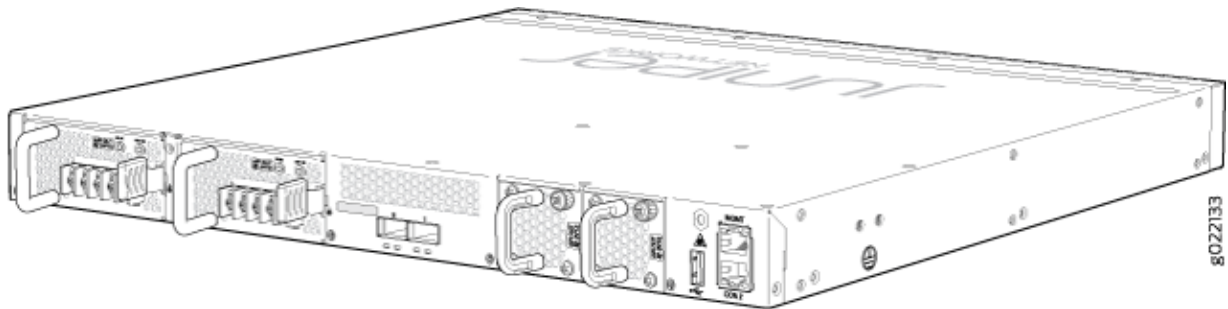


Table 2 on page 8 lists the 32-port EX4300 switch models and their components.

Table 2: Components in 32-Port EX4300 Switches

Switch Models	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-32F	32 SFP ports, four SFP+ ports, and two QSFP+ ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	2-port 40-Gigabit Ethernet QSFP+ uplink module (model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)

**Table 2: Components in 32-Port EX4300 Switches (Continued)**

Switch Models	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-32F-S	32 SFP ports, four SFP+ ports, and two QSFP+ ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labeled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	2-port 40-Gigabit Ethernet QSFP+ uplink module (model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)
EX4300-32F-DC	32 SFP ports, four SFP+ ports, and two QSFP+ ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 550 W DC power supply with the <b>AIR OUT (AFO)</b> label.	2-port 40-Gigabit Ethernet QSFP+ uplink module(model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)

You can use the built-in QSFP+ ports as network ports or as VCPs to connect the switch in a Virtual Chassis or a VCF. By default, the built-in QSFP+ ports are configured as VCPs. You can also use the uplink module ports to connect members of a Virtual Chassis or a VCF across multiple wiring closets by configuring these ports as VCPs. For more information about Virtual Chassis, see [Understanding EX Series Virtual Chassis](#). For more information about VCFs, see [Virtual Chassis Fabric Overview](#).

## 48-Port EX4300 Switches

The 48-port EX4300 switches EX4300-48T and EX4300-48P provide 48 built-in 10/100/1000BASE-T Ethernet network ports, with or without PoE+ depending on the switch model, and four built-in quad small form-factor pluggable plus (QSFP+) ports that can house 40-Gigabit QSFP+ transceivers. All network ports in the EX4300-48P switch are equipped for Power over Ethernet (PoE+), whereas EX4300-48T has no PoE+ ports. These switches support AC or DC power supply with different airflow directions. Each switch provides a slot for installing an optional 4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP), which has four SFP+ ports that can house four SFP+

transceivers, four SFP transceivers, or a combination of SFP and SFP+ transceivers in the four ports on the uplink module.

The 48-port EX4300 switches with multigigabit ports—EX4300-48MP and EX4300-48MP-S—provide 24 built-in 10/100/1000BASE-T Ethernet network ports, 24 built-in 100/1000/2500/5000/10000BASE-T Ethernet network ports, and four built-in Virtual Chassis Ports (VCPs) that house 40-Gbps quad small form-factor plus (QSFP+) transceivers. The 24 built-in 10/100/1000BASE-T Ethernet network ports support 10 Mbps, 100 Mbps, and 1 Gbps speeds. The 24 built-in 100/1000/2500/5000/10000BASE-T Ethernet network ports support 100 Mbps, 1 Gbps, 2.5 Gbps, 5 Gbps, and 10 Gbps speeds. All network ports are equipped for PoE+ and provide up to 95 watts of power. The four VCPs can be used to connect the switches to other devices in a Virtual Chassis configuration.

These switches support AC power supply with front-to-back airflow.

Each switch provides a slot for installing an optional 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) or a 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR). The 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module can house two QSFP+ transceivers, two QSFP28 transceivers, or a combination of one QSFP+ transceiver and one QSFP28 transceiver. The 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module can house four SFP transceivers, four SFP+ transceivers, or a combination of SFP and SFP+ transceivers in the four ports on the uplink module.

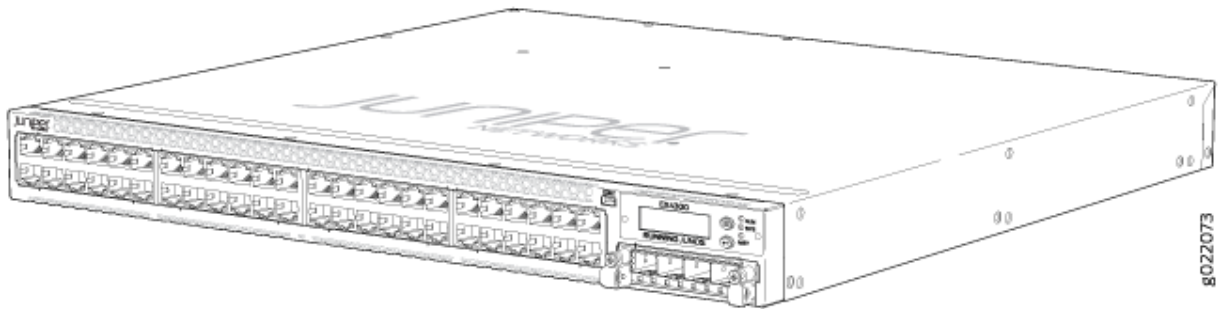


**NOTE:** The switch supports the 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) from Junos OS Release 18.4R1 onwards. Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the four QSFP+ ports on the switch are disabled.

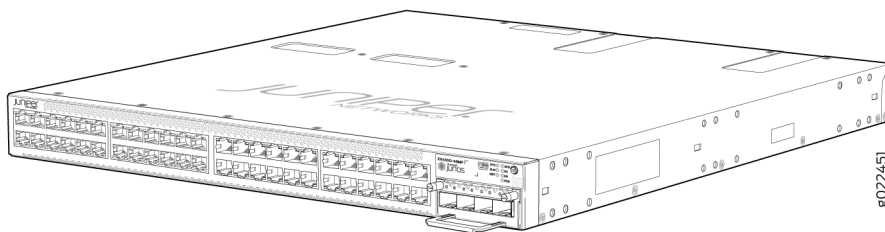
The switch supports the 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR) from Junos OS Release 18.2R1 onwards. Starting in Junos OS Release 19.1R1, you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release 18.4R1, the uplink module supported only SFP+ transceivers.

Figure 5 on page 11 shows the front panel of 48 port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. Figure 6 on page 11 shows the front panel of EX4300-48MP and EX4300-48MP-S switches.

**Figure 5: Front Panel of 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 6: Front Panel of EX4300-48MP and EX4300-48MP-S Switches**



[Figure 7 on page 11](#) shows the rear panel of 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, with power supplies and fan modules installed. [Figure 8 on page 12](#) shows the rear panel of EX4300-48MP and EX4300-48MP-S switches, with power supplies and fan modules installed.

**Figure 7: Rear Panel of 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

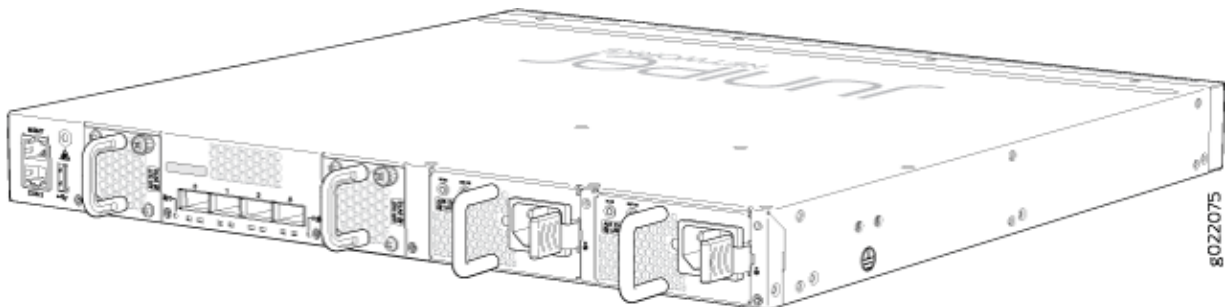


Figure 8: Rear Panel of EX4300-48MP and EX4300-48MP-S Switches

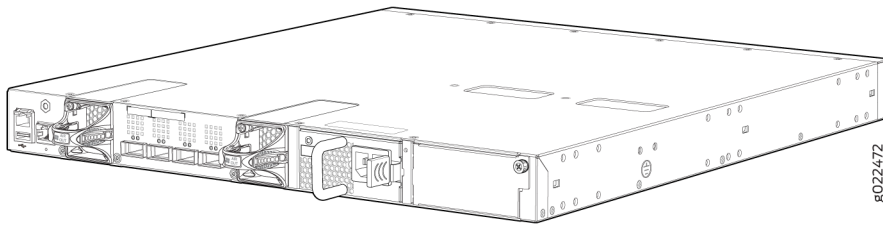


Table 3 on page 12 lists the 48-port EX4300 switch models and their components.

Table 3: Components in 48-Port EX4300 Switches

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-48T	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-48T-S	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labeled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-48T-AFI	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Two fan modules; each with an <b>AIR IN (AFI)</b> label.	A 350 W AC power supply with the <b>AIR IN (AFI)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-48T-DC	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 550 W DC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-48T-DC-AFI	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	0	Two fan modules; each with an <b>AIR IN (AFI)</b> label.	A 550 W DC power supply with the <b>AIR IN (AFI)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-48P	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	48	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 1100 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)
EX4300-48P-S	48 10/100/1000BASE-T Ethernet ports and four QSFP+ ports	48	Fan modules for this model are not shipped by default; you must order two fan modules labeled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-48MP	24 10/100/1000BASE-T Ethernet network ports, 24 100/1000/2500/5000/10000BASE-T Ethernet network ports, and four built-in QSFP+ ports that can house 40-Gigabit QSFP+ transceivers	48	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 1400 W AC power supply with the <b>AIR OUT (AFO)</b> label.	<p>2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) or 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR)</p> <p><b>NOTE:</b> The switch supports the 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) from Junos OS Release 18.4R1 onwards. Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in</p>

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
					<p>the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the four QSFP+ ports on the switch are disabled.</p> <p>The switch supports the 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR) from Junos OS Release 18.2R1 onwards. Starting in Junos OS Release 19.1R1,</p>

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
					you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release 18.4R1, the uplink module supported only SFP+ transceivers.

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
EX4300-48MP-S	24 10/100/1000BASE-T Ethernet network ports, 24 100/1000/2500/5000/10000BASE-T Ethernet network ports, and four built-in QSFP+ ports that can house 40-Gigabit QSFP+ transceivers	48	Fan modules for this model are not shipped by default; you must order two fan modules labeled <b>AIR OUT (AFO)</b> separately.	Power supplies for this model are not shipped by default; you must order AC power supplies separately.	<p>2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) or 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR)</p> <p><b>NOTE:</b> The switch supports the 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) from Junos OS Release 18.4R1 onwards. Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink</p>

Table 3: Components in 48-Port EX4300 Switches *(Continued)*

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
					<p>module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the four QSFP+ ports on the switch are disabled.</p> <p>The switch supports the 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR) from Junos OS Release 18.2R1 onwards. Starting in Junos OS Release 19.1R1, you can install</p>

**Table 3: Components in 48-Port EX4300 Switches (Continued)**

Switch Models	Built-In Ports	Number of PoE-enabled Ports	Fan Modules	Power Supply Shipped by Default	Supported Uplink Modules
					SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release 18.4R1, the uplink module supported only SFP+ transceivers.

By default, the built-in QSFP+ ports are dedicated VCPs. In 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, you can use the QSFP+ ports as network ports or as VCPs. You can also use the SFP+ uplink module ports to connect members of a Virtual Chassis or a VCF across multiple wiring closets by configuring these ports as VCPs.

In EX4300-48MP and EX4300-48MP-S switches, you can use only the built-in QSFP+ ports as VCPs to connect the switch in a Virtual Chassis. You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches to Virtual Chassis ports (VCPs). You cannot configure the built-in QSFP+ ports as network ports.




**NOTE:** EX4300-48MP switches can be a part of an EX4300 Virtual Chassis with other EX4300 switches only. If you want to create a Virtual Chassis comprising EX4300-48MP switch and other EX4300 switches, you must connect it to a 40-Gbps port on the other EX4300 switches in the Virtual Chassis configuration. In a Virtual Chassis configuration comprising EX4300-48MP switches, EX4300 switches can be configured only in the line card role.

For more information about Virtual Chassis, see [Understanding EX Series Virtual Chassis](#). For more information about VCFs, see [Virtual Chassis Fabric Overview](#).

## Uplink Modules

EX4300 switches provide one slot for installing an optional uplink module. You can use the uplink module ports to connect the switch to other devices. You can also configure these ports on EX4300 switches except EX4300-48MP and EX4300-48MP-S switches as VCPs and use them to interconnect EX4300 switches to form a Virtual Chassis or a VCF configuration by using SFP+ transceivers.



**NOTE:** You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches as Virtual Chassis ports (VCPs).

Table 4 on page 20 lists the uplink modules supported on 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. Table 5 on page 21 lists the uplink modules supported on 32-port EX4300 switch models. Table 6 on page 22 lists the uplink module supported on EX4300-48MP and EX4300-48MP-S switches.

**Table 4: Uplink Modules for 24-Port and 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

Uplink Module	Description	Supported EX4300 Switch Models	First Junos OS Release
4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	The 4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module can house up to four SFP transceivers, SFP+ transceivers, or a combination of SFP and SFP+ transceivers. You can also configure ports on this module as VCPs and use them to connect the switch in a Virtual Chassis or a VCF configuration by using SFP+ transceivers.	<ul style="list-style-type: none"><li>EX4300-24T</li><li>EX4300-24P</li><li>EX4300-48T</li><li>EX4300-48T-AFI</li><li>EX4300-48P</li><li>EX4300-48T-DC</li><li>EX4300-48T-DC-AFI</li></ul>	13.2X50-D10
		<ul style="list-style-type: none"><li>EX4300-24T-S</li><li>EX4300-24P-S</li><li>EX4300-48T-S</li><li>EX4300-48P-S</li></ul>	13.2X51-D26

**Table 5: Uplink Modules for 32-Port EX4300 Switches**

Uplink Module	Description	Supported EX4300 Switch Models	First Junos OS Release
2-port 40-Gigabit Ethernet QSFP+ uplink module (model number: EX-UM-2QSFP)	The 2-port 40-Gigabit Ethernet QSFP+ uplink module can house up to two QSFP+ transceivers. You can also configure the ports on this module as VCPs and use them to connect the switch in a Virtual Chassis or a VCF configuration.	<ul style="list-style-type: none"> <li>EX4300-32F</li> <li>EX4300-32F-DC</li> </ul>	13.2X51-D15
		<ul style="list-style-type: none"> <li>EX4300-32F-S</li> </ul>	13.2X51-D26
8-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)	The 8-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module can house up to eight SFP transceivers, SFP+ transceivers, or a combination of SFP and SFP+ transceivers. You can also configure the ports on this module as VCPs and use them to connect the switch in a Virtual Chassis or a VCF configuration by using SFP+ transceivers.	<ul style="list-style-type: none"> <li>EX4300-32F</li> <li>EX4300-32F-DC</li> </ul>	13.2X51-D15
		<ul style="list-style-type: none"> <li>EX4300-32F-S</li> </ul>	13.2X51-D26

Table 6: Uplink Modules for EX4300-48MP and EX4300-48MP-S Switches

Uplink Module	Description	Supported EX4300 Switch Models	First Junos OS Release
2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR)	<p>You can install two QSFP + transceivers, two QSFP28 transceivers, or a combination of one QSFP+ transceiver and one QSFP28 transceiver in this uplink module.</p> <p><b>NOTE:</b> You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches as Virtual Chassis ports (VCPs).</p>	<ul style="list-style-type: none"> <li>EX4300-48MP</li> <li>EX4300-48MP-S</li> </ul>	<p>18.4R1</p> <p><b>NOTE:</b> Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the four QSFP+ ports on the switch are disabled.</p>
4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR)	<p>You can install four SFP transceivers, four SFP+ transceivers, or a combination of SFP and SFP+ transceivers in the four ports of this uplink module.</p> <p><b>NOTE:</b> You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches as Virtual Chassis ports (VCPs).</p>	<ul style="list-style-type: none"> <li>EX4300-48MP</li> <li>EX4300-48MP-S</li> </ul>	<p>18.2R1</p> <p><b>NOTE:</b> Starting in Junos OS Release 19.1R1, you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release 18.4R1, the uplink module supported only SFP+ transceivers.</p>

For more information about uplink modules, see ["Uplink Modules in EX4300 Switches" on page 62](#).

## Virtual Chassis

You can interconnect a maximum of 10 EX4300 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 configure an EX4300 switch in a Virtual Chassis:

- For 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches:
  - QSFP+ ports configured as VCPs
  - SFP+ uplink module ports configured as VCPs
- For 32-port EX4300 switches:
  - QSFP+ ports (built-in) or QSFP+ uplink module ports configured as VCPs
  - SFP+ uplink module ports configured as VCPs



**NOTE:** The four built-in SFP+ ports on 32-port EX4300 switches cannot be configured as VCPs.

- For EX4300-48MP and EX4300-48MP-S switches:
  - QSFP+ ports

By default, the built-in QSFP+ ports are dedicated VCPs. In 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, you can use the QSFP+ ports as network ports or as VCPs. You can also use the SFP+ uplink module ports to connect members of a Virtual Chassis or a VCF across multiple wiring closets by configuring these ports as VCPs.

In EX4300-48MP and EX4300-48MP-S switches, you can use only the built-in QSFP+ ports as VCPs to connect the switch in a Virtual Chassis. You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches to Virtual Chassis ports (VCPs). You cannot configure the built-in QSFP+ ports as network ports.



**NOTE:** EX4300-48MP switches can be a part of an EX4300 Virtual Chassis with other EX4300 switches only. If you want to create a Virtual Chassis comprising EX4300-48MP switch and other EX4300 switches, you must connect it to a 40-Gbps port on the other EX4300 switches in the Virtual Chassis configuration. In a Virtual Chassis configuration comprising EX4300-48MP switches, EX4300 switches can be configured only in the line card role.

For more information about Virtual Chassis, see [Understanding EX Series Virtual Chassis](#). For more information about VCFs, see [Virtual Chassis Fabric Overview](#).

## Power Supplies

EX4300 switches except EX4300-48MP and EX4300-48MP-S switches support AC or DC power supplies with different airflow directions. EX4300-48MP and EX4300-48MP-S switches support only AC power supplies with front-to-back airflow. Power supplies for the EX4300 switch are fully redundant, load-sharing, and hot-removable and hot-insertable FRUs. All the EX4300 switch models except EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are shipped with one power supply preinstalled in the rear panel of the switches. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are not shipped with preinstalled power supplies; you must order the power supplies separately.

Each power supply has a label—**AIR IN (AFI)** or **AIR OUT (AFO)**—on the faceplate of the power supply that indicates the direction of airflow. **AIR IN (AFI)** labels indicate back-to-front airflow while **AIR OUT (AFO)** labels indicate front-to-back airflow.

[Table 7 on page 24](#) lists the AC and DC power supplies used in EX4300 switches and the direction of airflow in them.

**Table 7: Airflow Direction in Power Supplies for EX4300 Switches**

Power Supply Rating	Label on Power Supply	Direction of Airflow
350 W AC	<b>AIR IN (AFI)</b>	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.
350 W AC	<b>AIR OUT (AFO)</b>	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.

Table 7: Airflow Direction in Power Supplies for EX4300 Switches *(Continued)*

Power Supply Rating	Label on Power Supply	Direction of Airflow
550 W DC	<b>AIR IN (AFI)</b>	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.
550 W DC	<b>AIR OUT (AFO)</b>	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.
715 W AC	<b>AIR OUT (AFO)</b>	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.
1100 W AC	<b>AIR OUT (AFO)</b>	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.
1400 W AC  <b>NOTE:</b> Only EX4300-48MP and EX4300-48MP-S switches support 1400 W AC power supply.	<b>AIR OUT (AFO)</b>	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.

For more information, see ["Cooling System and Airflow in an EX4300 Switch" on page 85.](#)



**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis.
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

## Fan Modules

In the EX4300 switches the fan modules are hot-insertable and hot-removable field-replaceable units (FRUs).

All the EX4300 switch models, except EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are shipped with two fan modules preinstalled in the rear panel of the switch. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are not shipped with preinstalled fan modules; you must order the fan modules separately.

The fan modules are available in two models that have different airflow directions—back-to-front airflow, indicated by the label **AIR IN (AFI)** and front-to-back airflow, indicated by the label **AIR OUT (AFO)**. See ["Cooling System and Airflow in an EX4300 Switch" on page 85](#).



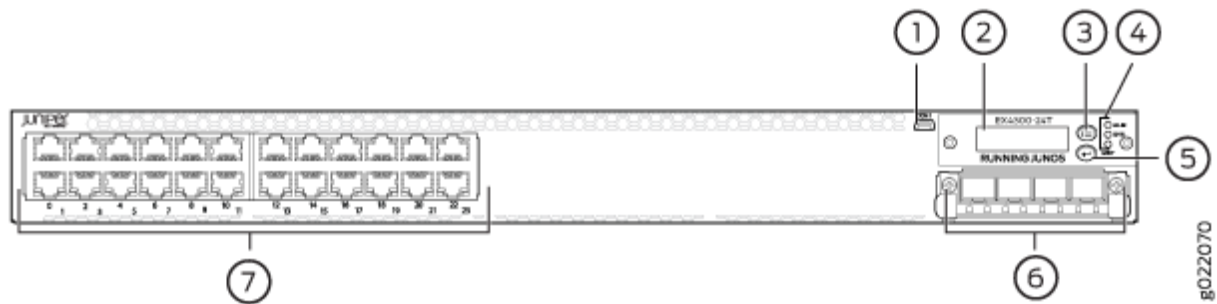
**CAUTION:** Do not mix:

- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules and power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- AC and DC power supplies in the same chassis.

## EX4300 Switch Components

Figure 9 on page 27 shows the components on the front panel of a 24-port EX4300 switch (with an SFP+ uplink module installed).

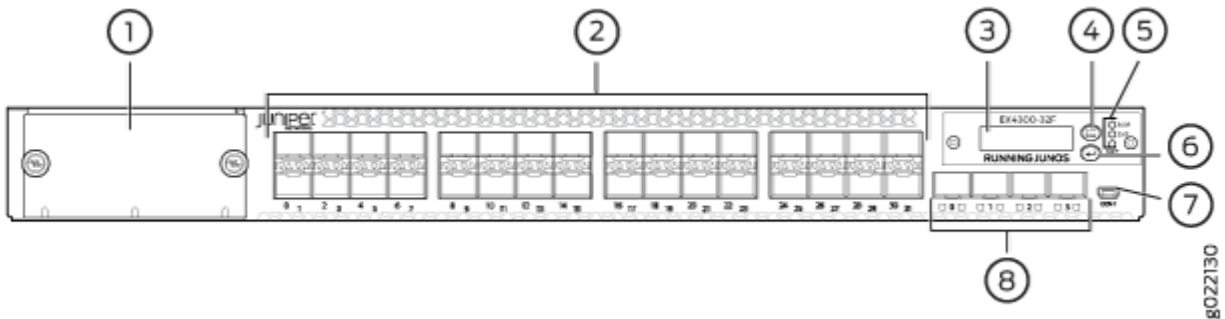
Figure 9: Components on the Front Panel of a 24-Port EX4300 Switch



1– Mini-USB console port	5– LCD panel Enter button
2– LCD panel	6– SFP+ uplink module (optional)
3– LCD panel Menu button	7– Network ports
4– Chassis status LEDs	

Figure 10 on page 27 shows the components on the front panel of a 32-port EX4300 switch.

Figure 10: Components on the Front Panel of a 32-Port EX4300 Switch



1– Cover panel for uplink module slot	5– Chassis status LEDs
2– SFP network ports	6– LCD panel Enter button
3– LCD panel	7– Mini-USB console port
4– LCD panel Menu button	8– SFP+ uplink ports

Figure 11 on page 28 shows the components on the front panel of a 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches (with an SFP+ uplink module installed).

Figure 11: Components on the Front Panel of 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches

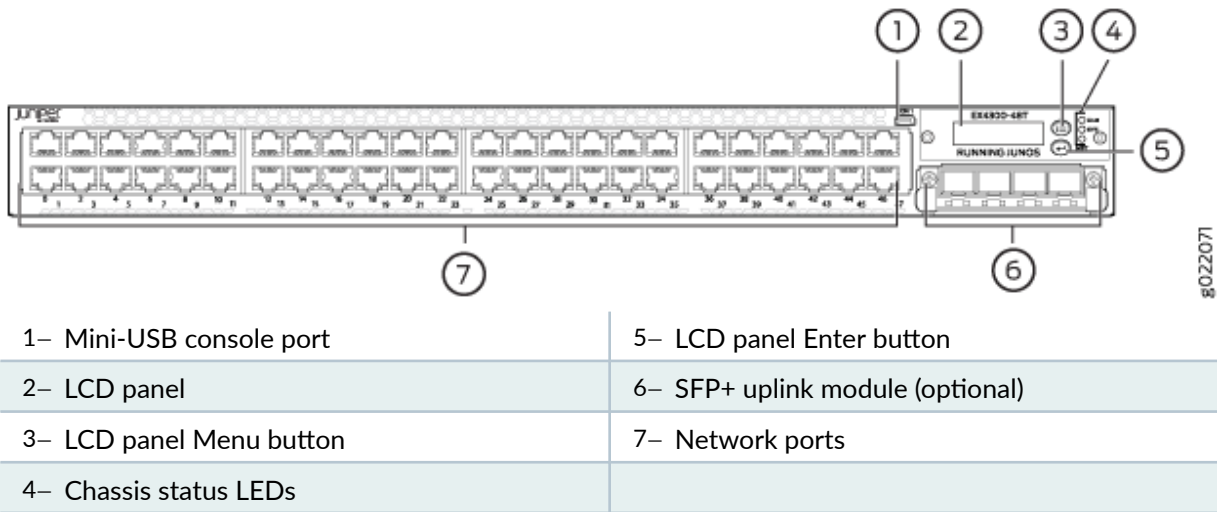


Figure 12 on page 28 shows the components on the front panel of EX4300-48MP and EX4300-48MP-S switches (with a 4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module installed).

Figure 12: Components on the Front Panel of EX4300-48MP and EX4300-48MP-S Switches

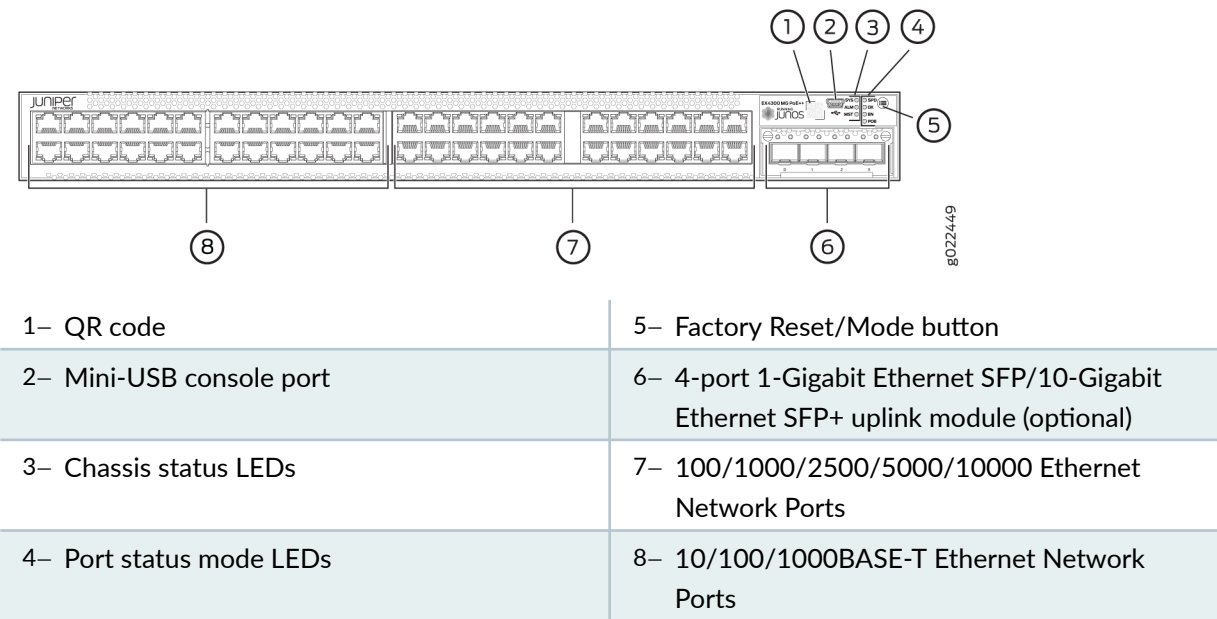
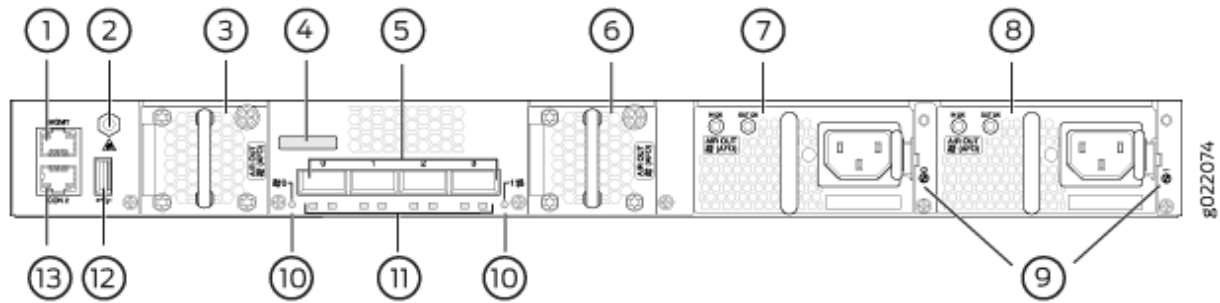


Figure 13 on page 29 shows the components on the rear panel of a 24-port and 48-port EX4300 switch except EX4300-48MP and EX4300-48MP-S switches (with two AC power supplies and two fan modules installed).

**Figure 13: Components on the Rear Panel of a 24-Port and 48-Port EX4300 Switch Except EX4300-48MP and EX4300-48MP-S Switches**



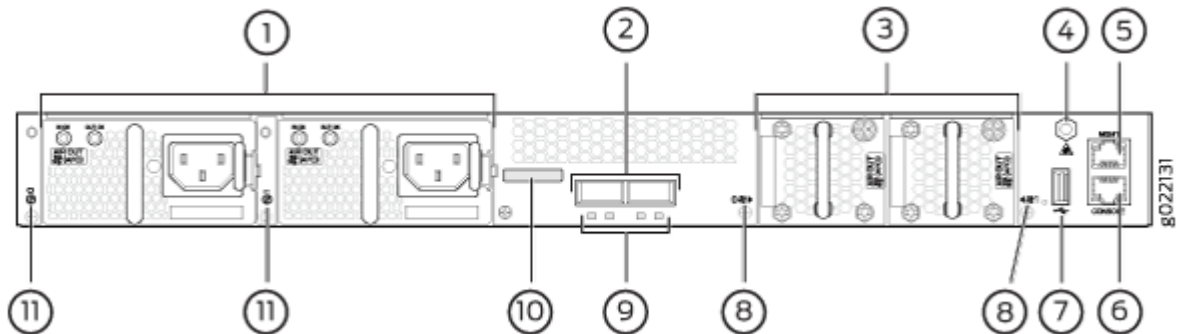
1– Management port	8– AC power supply in slot 1
2– ESD point	9– Power supply slot numbers
3– Fan module in slot 0	10– Fan module slot numbers and LEDs
4– Serial number label	11– QSFP+ port LEDs
5– QSFP+ ports	12– USB port
6– Fan module in slot 1	13– Console port
7– AC power supply in slot 0	



**NOTE:** DC power supplies are installed in the power supply slots in models that use DC power.


Figure 14 on page 29 shows the components on the rear panel of a 32-port EX4300 switch (with two AC power supplies and two fan modules installed).

**Figure 14: Components on the Rear Panel of a 32-Port EX4300 Switch**



1– AC power supplies in slot 0 and slot 1	7– USB port
2– QSFP+ ports	8– Fan module slot numbers and LEDs
3– Fan modules in slot 0 and slot 1	9– QSFP+ port LEDs

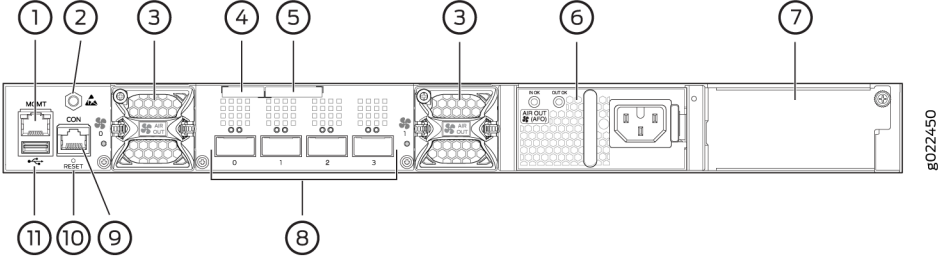
4– ESD point	10– Serial number label
5– Management port	11– Power supply slot numbers
6– Console port	




**NOTE:** DC power supplies are installed in the power supply slots in models that use DC power.

Figure 15 on page 30 shows the components on the rear panel of EX4300-48MP and EX4300-48MP-S switches (with one AC power supply and two fan modules installed).

Figure 15: Components on the Rear Panel of EX4300-48MP and EX4300-48MP-S Switches



1– Management port	7– Empty slot for AC power supply
2– ESD point	8– QSFP+ ports (dedicated Virtual Chassis ports)
3– Fan module	9– Console port
4– Serial number label	10– Reset button
5– CLEI code label	11– USB port
6– AC power supply in slot 0	



**NOTE:** The protective earthing terminal is located on the left side of the chassis. See *Connect Earth Ground to an EX Series Switch*.

## EX4300 Switch Models

The EX4300 switch is available with 24, 32, or 48 ports and with or without Power over Ethernet (PoE+) capability. EX4300 switches support AC and DC power supplies depending on the switch model. EX4300-24P, EX4300-24P-S, EX4300-48P and EX4300-48P-S provide PoE+. EX4300-48MP, and

EX4300-48MP-S provide PoE++. [Table 8 on page 31](#) lists the components shipped with EX4300 switch models.

**Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release**

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-24T	24 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10
EX4300-24T-S	24 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labelled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X51 - D26

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-24P	24 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	24	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 715 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10
EX4300-24P-S	24 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	24	Fan modules for this model are not shipped by default; you must order two fan modules labelled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X51 - D26

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-32F	32 1-Gigabit Ethernet SFP network ports, four 10-Gigabit Ethernet SFP+ uplink ports, and two 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	2-port 40-Gigabit Ethernet QSFP + uplink module (model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)	13.2X51 - D15
EX4300-32F-S	32 1-Gigabit Ethernet SFP network ports, four 10-Gigabit Ethernet SFP+ uplink ports, and two 40-Gigabit Ethernet QSFP + ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labelled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	2-port 40-Gigabit Ethernet QSFP + uplink module (model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)	13.2X51 - D26

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-32F-DC	32 1-Gigabit Ethernet SFP network ports, four 10-Gigabit Ethernet SFP+ uplink ports, and two 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 550 W DC power supply with the <b>AIR OUT (AFO)</b> label.	2-port 40-Gigabit Ethernet QSFP + uplink module (model number: EX-UM-2QSFP) and 8-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP)	13.2X51 - D15
EX4300-48T	48 10/100/1000BASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 350 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-48T-S	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Fan modules for this model are not shipped by default; you must order two fan modules labelled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X51 - D26
EX4300-48T-AFI	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR IN (AFI)</b> label.	A 350 W AC power supply with the <b>AIR IN (AFI)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10
EX4300-48T-DC	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 550 W DC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-48T-DC-AFI	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	0	Two fan modules; each with an <b>AIR IN (AFI)</b> label.	A 550 W DC power supply with the <b>AIR IN (AFI)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10
EX4300-48P	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	48	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 1100 W AC power supply with the <b>AIR OUT (AFO)</b> label.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X50 - D10
EX4300-48P-S	48 10/100/1000B ASE-T Ethernet ports and four 40-Gigabit Ethernet QSFP + ports	48	Fan modules for this model are not shipped by default; you must order two fan modules labelled either <b>AIR OUT (AFO)</b> or <b>AIR IN (AFI)</b> separately.	Power supplies for this model are not shipped by default; you must order either AC power supplies or DC power supplies separately.	4-port 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP)	13.2X51 - D26

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-48MP	24 built-in 10/100/1000BASE-T Ethernet network ports, 24 built-in 100/1000/2500/5000/10000BASE-T Ethernet network ports, and four built-in QSFP+ ports that can house 40-Gigabit QSFP+ transceivers	48	Two fan modules; each with an <b>AIR OUT (AFO)</b> label.	A 1400 W AC power supply with the <b>AIR OUT (AFO)</b> label.	2-port 40-Gigabit Ethernet QSFP+/ 100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) or 4-port 1-Gigabit Ethernet SFP/ 10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR)  <b>NOTE:</b> The switch supports the 2-port 40-Gigabit Ethernet QSFP+/ 100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) from	18.2R1

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					<p>Junos OS Release 18.4R1 onwards. Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps</p>	

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					<p>speed, the four QSFP+ ports on the switch are disabled.</p> <p>The switch supports the 4-port 1-Gigabit Ethernet SFP/ 10-Gigabit Ethernet SFP + uplink module (model number: EX-UM-4SFPP-MR) from Junos OS Release 18.2R1 onwards. Starting in Junos OS Release 19.1R1, you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS</p>	

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					Release 18.4R1, the uplink module supported only SFP+ transceivers.	

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
EX4300-48MP-S	24 built-in 10/100/1000BASE-T Ethernet network ports, 24 built-in 100/1000/2500/5000/10000BASE-T Ethernet network ports, and four built-in QSFP+ ports that can house 40-Gigabit QSFP+ transceivers	48	Fan modules for this model are not shipped by default; you must order two fan modules labelled <b>AIR OUT (AFO)</b> separately.	Power supplies for this model are not shipped by default; you must order AC power supplies separately.	2-port 40-Gigabit Ethernet QSFP+/ 100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) or 4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR)  <b>NOTE:</b> The switch supports the 2-port 40-Gigabit Ethernet QSFP+/ 100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) from Junos OS	18.2R1

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					Release 18.4R1 onwards. Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the	

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					<p>four QSFP+ ports on the switch are disabled.</p> <p>The switch supports the 4-port 1-Gigabit Ethernet SFP/ 10-Gigabit Ethernet SFP + uplink module (model number: EX-UM-4SFPP-MR) from Junos OS Release 18.2R1 onwards. Starting in Junos OS Release 19.1R1, you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release</p>	

Table 8: EX4300 Switch Models, Shipped Components, and Supported Junos OS Release *(Continued)*

Model Number	Built-In Ports	Number of PoE-Enabled Ports	Fan Modules and Airflow	Power Supply Shipped by Default	Supported Uplink Modules	First Junos OS Release
					18.4R1, the uplink module supported only SFP+ transceivers.	



**NOTE:** Uplink modules and transceivers are not part of the shipping configuration. If you want to purchase any of these components, power supplies, or fan modules for your switch, you must order them separately.

## Identifying EX4300 Switch Models

### IN THIS SECTION

- Purpose | 44
- Action | 44
- Meaning | 45

### Purpose

Identify the model number of your EX4300 switch.

### Action

Check the value of the `FRU Model Number` field in the `Routing Engine` section in the output of the `show chassis hardware extensive` CLI command.

user@switch> show chassis hardware extensive

```

....
Routing Engine 1 REV D    650-044930    PD3113060024    EX4300-48P
Jedec Code:    0x7fb0          EEPROM Version:    0x02
P/N:           650-044930      S/N:              PD3113060024
Assembly ID:   0x0b5e          Assembly Version: 03.19
Date:          02-19-2013      Assembly Flags:   0x00
Version:       REV D           CLEI Code:
ID: EX4300-48P                FRU Model Number: EX4300-48P
....

```

The model number of your switch is one of the following:

- EX4300-24T
- EX4300-24P
- EX4300-32F
- EX4300-32F-DC
- EX4300-48T
- EX4300-48T-AFI
- EX4300-48T-DC
- EX4300-48T-DC-AFI
- EX4300-48P

In the sample output, the switch model is EX4300-48P.

## Meaning

In EX4300 switch model numbers:

- The 24T, 24P, 32F, 48T, and 48P in the model number indicate the type of network ports on the switch:
  - 24T—The switch has 24 10/100/1000BASE-T Ethernet network ports.
  - 24P—The switch has 24 10/100/1000BASE-T Ethernet network ports with all ports equipped for Power over Ethernet (PoE+).
  - 32F—The switch has 32 1-Gigabit SFP network ports.

- 48T—The switch has 48 10/100/1000BASE-T Ethernet network ports.
- 48P—The switch has 48 10/100/1000BASE-T Ethernet network ports with all ports equipped for PoE+.
- AFI indicates that the switch is shipped with two fan modules and a power supply, each bearing an **AIR IN (AFI)** label. Switches that do not have AFI in their model numbers ship with two fan modules and a power supply, each bearing an **AIR OUT (AFO)** label.

The labels on the fan modules and the power supplies indicate the direction of airflow they provide within the chassis when installed in the switch. **AIR IN (AFI)** labels indicate back-to-front airflow, and **AIR OUT (AFO)** labels indicate front-to-back airflow.

- The DC in the model number indicates that the switch model works on DC power supply. Switches that do not have DC in their model numbers work on AC power supply.

#### SEE ALSO

| [EX4300 Switch Models](#) | 30

## EX4300 Switch Hardware and CLI Terminology Mapping

This topic describes the hardware terms used in EX4300 switch documentation and the corresponding terms used in the Junos OS CLI. See [Table 9 on page 47](#).

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
Chassis	One of the following: <ul style="list-style-type: none"> <li>EX4300-24T</li> <li>EX4300-24P</li> <li>EX4300-32F</li> <li>EX4300-48T</li> <li>EX4300-48P</li> <li>EX4300-48MP</li> </ul>	–	Switch chassis	<a href="#">"Identifying EX4300 Switch Models" on page 44</a>
Routing Engine ( <i>n</i> )	One of the following: <ul style="list-style-type: none"> <li>EX4300-24T</li> <li>EX4300-24P</li> <li>EX4300-32F</li> <li>EX4300-48T</li> <li>EX4300-48P</li> <li>EX4300-48MP</li> </ul>	<i>n</i> is a value in the range 0 through 9. <ul style="list-style-type: none"> <li>On a standalone switch, the default value is 0.</li> <li>On a Virtual Chassis configuration, the values correspond to the member IDs of switches configured in the primary role and the backup role in the Virtual Chassis.</li> </ul>	Routing Engine	–
FPC ( <i>n</i> )	Abbreviated name of the Flexible PIC Concentrator (FPC)  One of the following:	<i>n</i> is a value in the range 0 through 9.		<a href="#">Understanding Interface Naming Conventions</a>

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches (*Continued*)

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
	<ul style="list-style-type: none"> <li>EX4300-24T</li> <li>EX4300-24P</li> <li>EX4300-32F</li> </ul>	On a standalone switch, the default value is 0.	In this case, FPC refers to the switch itself.	
	<ul style="list-style-type: none"> <li>EX4300-48T</li> <li>EX4300-48P</li> <li>EX4300-48MP</li> </ul>	In a Virtual Chassis configuration, the values correspond to the assigned member IDs of switches in the Virtual Chassis.	In this case, the FPC number refers to the member ID assigned to the switch.	
PIC ( <i>n</i> )	Abbreviated name of the Physical Interface Card (PIC)	<i>n</i> is a value in the range 0 through 2.		<a href="#">Understanding Interface Naming Conventions</a>

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• 24x 10/100/1000B ASE-T</li> <li>• 32x1G SFP</li> <li>• 48x 10/100/1000B ASE-T</li> <li>• 24x10M/100M/1G Base-T &amp; 24x 100M/1G/2.5G/5G/10G Base-T</li> </ul>	PIC 0	<ul style="list-style-type: none"> <li>• In 24-port and 48-port switches—PIC 0 stands for built-in network ports numbered <b>0</b> through <b>23</b> or <b>0</b> or through <b>47</b>.</li> <li>• In 32-port switches—PIC 0 stands for built-in network ports followed by SFP+ uplink ports. The network ports are labeled <b>0</b> through <b>31</b> and the SFP+ uplink ports are labeled <b>0</b> through <b>3</b>. In the CLI output, the network ports are numbered 0 through 31 and the SFP+ uplink ports are numbered 32 through 35.</li> </ul>	<a href="#">"EX4300 Switches Hardware Overview" on page 2</a>

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
	<ul style="list-style-type: none"> <li>For 24-port and 48-port switches except EX4300-48MP and EX4300-48MP-S switches: 4x40GE</li> <li>For 32-port switches: 2x40GE</li> <li>For EX4300-48MP and EX4300-48MP-S switches: 4x40G QSFP+</li> </ul>	PIC 1	Built-in QSFP+ ports	<a href="#">"EX4300 Switches Hardware Overview" on page 2</a>

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
	<ul style="list-style-type: none"> <li>For 24-port and 48-port switches except EX4300-48MP and EX4300-48MP-S switches: 4x 1G/10G SFP/SFP+</li> <li>For 32-port switches, one of the following:               <ul style="list-style-type: none"> <li>8x1G/10G SFP/SFP+</li> <li>2x40GE</li> </ul> </li> <li>For EX4300-48MP and EX4300-48MP-S switches: 4x10G SFP+</li> </ul>	PIC 2	Uplink module installed in the switch	<a href="#">"Uplink Modules in EX4300 Switches" on page 62</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 EX4300 Switches" on page 143</a>

Table 9: CLI Equivalents of Terms Used in the Documentation for EX4300 Switches *(Continued)*

Hardware Item (CLI)	Description (CLI)	Value	Item In Documentation	Additional Information
Power supply ( <i>n</i> )	One of the following: <ul style="list-style-type: none"> <li>JPSU-350-AC-AFO-A</li> <li>JPSU-350-AC-AFI-A</li> <li>JPSU-550-DC-AFO-A</li> <li>JPSU-550-DC-AFI-A</li> <li>JPSU-715-AC-AFO-A</li> <li>JPSU-1100-AC-AFO-A</li> <li>JPSU-1400W-AC-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	<ul style="list-style-type: none"> <li><a href="#">"AC Power Supply in EX4300 Switches" on page 93</a></li> <li><a href="#">"DC Power Supply in EX4300 Switches" on page 114</a></li> </ul>
		<b>CAUTION:</b> Do not mix: <ul style="list-style-type: none"> <li>AC and DC power supplies in the same chassis.</li> <li>Power supplies with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> <li>Fan modules with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> <li>Power supplies and fan modules with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> </ul>		
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 module	<a href="#">"Cooling System and Airflow in an EX4300 Switch" on page 85</a>
		<b>CAUTION:</b> Do not mix: <ul style="list-style-type: none"> <li>Fan modules with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> <li>Power supplies with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> <li>Power supplies and fan modules with different airflow labels (<b>AIR IN (AFI)</b> and <b>AIR OUT (AFO)</b>) in the same chassis.</li> <li>AC and DC power supplies in the same chassis.</li> </ul>		

## Chassis Physical Specifications for EX4300 Switches

The EX4300 switch chassis is a rigid sheet-metal structure that houses all components of the switch. [Table 10 on page 53](#) summarizes the physical specifications of the EX4300 switch chassis.

**Table 10: Physical Specifications of the EX4300 Switch Chassis**

Description	Value
Chassis height	1.72 in. (4.37 cm)
Chassis width	<ul style="list-style-type: none"> <li>17.36 in. (44.1 cm)</li> <li>The outer edges of the front-mounting brackets extend the width to 19 in. (48.2 cm)</li> </ul>
Chassis depth	<ul style="list-style-type: none"> <li>EX4300 switches except EX4300-32F and EX4300-48MP switches: <ul style="list-style-type: none"> <li>With no power supply or uplink module installed: 16.38 in. (41.6 cm)</li> <li>With power supply installed: 17.51 in. (44.47 cm)</li> <li>With power supply and uplink module installed: 18 in. (45.73 cm)</li> </ul> </li> <li>EX4300-32F switch: <ul style="list-style-type: none"> <li>With no power supply or uplink module installed: 17.87 in. (45.4 cm)</li> <li>With power supply installed: 19 in. (48.28 cm)</li> <li>With power supply and uplink module installed: 19.31 in. (49.07 cm)</li> </ul> </li> <li>EX4300-48MP switch: <ul style="list-style-type: none"> <li>With no power supply or uplink module installed: 18.39 in. (46.7 cm)</li> <li>With power supply installed: 19.64 in. (49.88 cm)</li> <li>With power supply and uplink module installed: 20.06 in. (50.96 cm)</li> </ul> </li> </ul>

**Table 10: Physical Specifications of the EX4300 Switch Chassis (*Continued*)**

Description	Value
Weight	<ul style="list-style-type: none"> <li>EX4300 switch except EX4300-48MP switch (with no power supply and no fan module installed): 13 lb (5.9 kg)</li> <li>EX4300-48MP switch (with no power supply and no fan module installed): 16.42 lb (7.45 kg)</li> <li>350 W AC power supply: 2.4 lb (1.1 kg)</li> <li>550 W DC power supply: 2.4 lb (1.1 kg)</li> <li>715 W AC power supply: 2.4 lb (1.1 kg)</li> <li>1100 W AC power supply: 2.4 lb (1.1 kg)</li> <li>1400 W AC power supply: 3.06 lb (1.39 kg)</li> <li>2-port 40-Gigabit Ethernet QSFP+ uplink module (model number: EX-UM-2QSFP) for 32-port EX4300 switches: 0.61 lb (0.28 kg)</li> <li>4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4X4SFP) for 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches: 0.44 lb (0.2 kg)</li> <li>2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) for EX4300-48MP and EX4300-48MP-S switches: 0.57 lb (0.26 kg)</li> <li>4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR) for EX4300-48MP and EX4300-48MP-S switches: 0.57 lb (0.26 kg)</li> <li>8-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-8X8SFP) for 32-port EX4300 switches: 0.74 lb (0.34 kg)</li> <li>Fan module: 0.33 lb (0.15 kg)</li> </ul>

You can mount an EX4300 switch on a standard 19-in. two-post or four-post rack. You can also mount the switch in a standard 19-in. enclosed cabinet.

**SEE ALSO**

| [Installing and Connecting an EX4300 Switch](#) | 172

## Field-Replaceable Units in EX4300 Switches

Field-replaceable units (FRUs) are components that you can replace at your site. The FRUs in EX4300 switches are hot-removable and hot-insertable: You can remove and replace them without powering off the switch. The FRUs in EX4300 switches are:

- Power supplies
- Fan modules
- Uplink module
- Transceivers



**NOTE:** The following switch models ship with one power supply (AC or DC) and two fan modules preinstalled:

- EX4300-24T
- EX4300-24P
- EX4300-32F
- EX4300-32F-DC
- EX4300-48T
- EX4300-48T-AFI
- EX4300-48P
- EX4300-48T-DC
- EX4300-48T-DC-AFI

The following switch models ship without any power supply or fan modules preinstalled:

- EX4300-24T-S
- EX4300-24P-S

- EX4300-48T-S
- EX4300-48P-S

Uplink modules and transceivers are not part of the shipping configuration. If you want to purchase any of these components, power supplies, or fan modules for your switch, you must order them separately.



**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

| [Installing and Removing EX4300 Switch Hardware Components](#)

## EX4300 Chassis

#### IN THIS SECTION

- [LCD Panel in EX4300 Switches | 57](#)
- [Uplink Modules in EX4300 Switches | 62](#)
- [Chassis Status LEDs on EX4300 Switches | 72](#)
- [Management Port LEDs on EX4300 Switches | 75](#)
- [Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches | 77](#)

## LCD Panel in EX4300 Switches

IN THIS SECTION

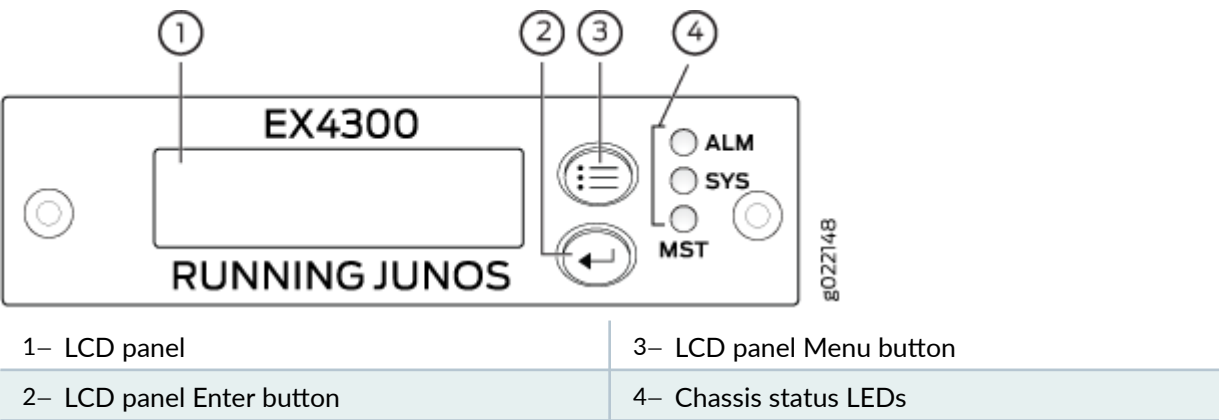
- LCD Panel Modes | 58
- LCD Panel Menus | 59

The LCD panel on the front panel of the EX4300 switch shows two lines of text, each with a maximum of 16 characters. The LCD panel displays a variety of information about the switch and also provides a menu to perform basic operations such as initial setup and reboot.

There are two navigation buttons—Menu and Enter—to the right of the LCD panel.

See [Figure 16 on page 57](#).

Figure 16: LCD Panel in EX4300 Switches



The first line of text on the LCD panel displays basic information about the switch and the second line of text displays information about the mode selected on the LCD panel. You can configure the second line of the text for the LCD panel to display a custom message. If the LCD panel is configured to display a custom message, the Menu button and the Enter button are disabled. See *Configuring the LCD Panel on EX Series Switches (CLI Procedure)*.

The LCD panel has a backlight. If the LCD panel is idle for 60 seconds, the backlight turns off. You can turn on the backlight by pressing the Menu or Enter button once. After turning on the backlight, you can toggle between the LCD panel menus by pressing the Menu button and navigate through the menu options by pressing the Enter button.



**NOTE:** The chassis viewer in the J-Web interface also displays the LCD panel. From the J-Web interface, you can view real-time status information in the LCD panel. See *Dashboard for EX Series Switches*.

This topic describes:

## LCD Panel Modes

The LCD panel operates in four modes: boot, idle, status, and maintenance.

The first line of text on the LCD panel displays the slot number, the role of the switch, and hostname in all the modes.

For a standalone EX4300 switch, by default the slot number is 00, and the role is RE.

In an EX4300 switch that is a member of a Virtual Chassis, the first line of the LCD panel always displays:

- The slot number (the member ID of the Virtual Chassis member)
- Role of the switch in the Virtual Chassis (RE for primary, BK for backup, and LC for line card member)
- Hostname

The LCD panel operates in boot mode during switch reboot. In the boot mode, the second line of the LCD panel displays the key milestones in the switch boot process. The boot mode does not have any menu options. After the boot process is complete, the LCD panel automatically reverts to the Idle (IDLE) menu.

In idle mode, the second line of text on the LCD panel displays the mode of the network ports' Status LED and the number of chassis alarms. The number of alarms is updated every second.

In status mode, the second line displays:

- Status of the Virtual Chassis port (VCP)
- Status of the power supplies
- Status of the fan modules and the chassis temperature
- Version of Junos OS for EX Series switches loaded on the switch

In maintenance mode, the second line displays one of the following options, which you can use to configure and troubleshoot the switch:

- System halt

- System reboot
- Load rescue
- Request VC port
- Factory default
- EZSetup

## LCD Panel Menus

The LCD panel has three menus: Idle, Status, and Maintenance. You can toggle between the LCD panel menus by pressing the Menu button and navigate through the menu options by pressing the Enter button.

[Table 11 on page 59](#) describes the LCD panel menu options.

**Table 11: LCD Panel Menu Options in EX4300 Switches**

Menu Label	Description
IDLE	<p>In the Idle menu:</p> <ul style="list-style-type: none"> <li>• Press Enter to cycle through the Status LED modes, which are port status indicators: <ul style="list-style-type: none"> <li>• ADM (administrative status)</li> <li>• DPX (duplex)</li> <li>• SPD (speed)</li> <li>• POE (Power over Ethernet) (only for EX4300-24P, EX4300-24P-S, EX4300-48P, and EX4300-48P-S models)</li> </ul> <p>See <a href="#">"Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches" on page 77</a> for information about the Status LED modes.</p> </li> <li>• Press Menu to exit the Idle menu and go to the Status menu.</li> </ul>

Table 11: LCD Panel Menu Options in EX4300 Switches *(Continued)*

Menu Label	Description
STATUS	<p>In the Status menu, press Menu to cycle through the following information:</p> <ul style="list-style-type: none"> <li>• VCPs status: Up or Down</li> </ul> <p>Display the status of VCPs on the switch. This option is supported only on EX4300 switches in a Virtual Chassis configuration. This option is not supported on standalone EX4300 switches.</p> <ul style="list-style-type: none"> <li>• Power supply status: OK, Failed, or Absent</li> <li>• Fan status and Temperature status. <ul style="list-style-type: none"> <li>• Fan status: OK, Failed, or Absent</li> <li>• Temp status: OK, High, or Shutdown</li> </ul> </li> <li>• Junos OS version for EX Series switches loaded on the switches.</li> <li>• EXIT STAT MENU?</li> </ul> <p>Choose one of the following:</p> <ul style="list-style-type: none"> <li>• Press Enter to exit the Status menu and go to the Maintenance menu.</li> <li>• Press Menu to display the VCPs status again.</li> </ul> <p>You can disable the Status menu or the options in the Status menu in the LCD panel. See <i>Configuring the LCD Panel on EX Series Switches (CLI Procedure)</i>.</p>

Table 11: LCD Panel Menu Options in EX4300 Switches *(Continued)*

Menu Label	Description
MAINT (Maintenance Menu)	<p>The Maintenance menu has the following options to configure and troubleshoot the switch:</p> <ul style="list-style-type: none"> <li>• SYSTEM HALT?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press Enter to halt the switch. Press Enter again to confirm the halt.</li> <li>• Press Menu to go to the next option in the Maintenance menu.</li> </ul> </li> <li>• SYSTEM REBOOT?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press Enter to reboot the switch. Press Enter again to confirm the reboot.</li> <li>• Press Menu to go to the next option in the Maintenance menu.</li> </ul> </li> <li>• LOAD RESCUE?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press Enter to roll back the switch to the previous valid configuration. Press Enter again to confirm the rollback.</li> <li>• Press Menu to go to the next option in the Maintenance menu.</li> </ul> </li> <li>• REQUEST VC PORT?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press the Enter button to configure an uplink module port or a built-in QSFP+ port to be a VCP or to delete a VCP from the switch configuration (when you delete the VCP, the port is reset to be an uplink module port or a network port).</li> <li>• Press the Menu button to go to the next option in the Maintenance menu.</li> </ul> </li> <li>• FACTORY DEFAULT?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press Enter to restore the switch to the factory default configuration. Press Enter again to confirm the restoration. The LCD panel flashes a success or failure message, after which it displays the Idle menu.</li> <li>• Press Menu to go to the next option in the Maintenance menu.</li> </ul> </li> <li>• ENTER EZSETUP?—Choose one of the following: <ul style="list-style-type: none"> <li>• Press Enter to launch EZSetup. Press Enter again to confirm the launch.</li> </ul> </li> </ul>

Table 11: LCD Panel Menu Options in EX4300 Switches *(Continued)*

Menu Label	Description
	<p>EZSetup configures DHCP and enables the J-Web user interface on the switch. The LCD panel flashes a success or failure message for approximately 10 seconds, after which it displays the Idle menu.</p> <p><b>NOTE:</b> You can use EZSetup only on a standalone switch that is in the factory default configuration.</p> <p>For information about EZSetup, see <i>Connecting and Configuring an EX Series Switch (J-Web Procedure)</i>.</p> <ul style="list-style-type: none"><li>• Press Menu to go to the next option in the Maintenance menu.</li><li>• EXIT MAINT MENU?—Choose one of the following:<ul style="list-style-type: none"><li>• Press Enter to exit the Maintenance menu.</li><li>• Press Menu to return to the SYSTEM HALT? option.</li></ul></li></ul> <p>You can disable the Maintenance menu or the options in the Maintenance menu in the LCD panel. See <i>Configuring the LCD Panel on EX Series Switches (CLI Procedure)</i>.</p>

SEE ALSO

<a href="#">EX4300 Switches Hardware Overview   2</a>
<a href="#">Connecting and Configuring an EX Series Switch (CLI Procedure)</a>

Uplink Modules in EX4300 Switches

EX4300 switches provide a slot to install an optional uplink module. Uplink modules are hot-insertable and hot-removable field-replaceable units (FRUs).

You can install an uplink module horizontally in the uplink module slot on the front panel of the switch. By installing an uplink module, you add more ports to your switch, thereby increasing the port density of the switch.

[Table 12 on page 63](#) shows the uplink modules supported on 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, their descriptions, and the Junos OS release in which the models were released. [Table 13 on page 63](#) shows the uplink modules supported on 32-port

EX4300 switches, their descriptions, and the Junos OS release in which the models were released. [Table 14 on page 65](#) shows the uplink modules supported on EX4300-48MP and EX4300-48MP-S switches, their descriptions, and the Junos OS release in which the models were released.

**Table 12: Uplink Modules in 24-Port and 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

Uplink Module Name	Model Number	Description	Supported EX4300 Switches	First Junos OS Release
4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module	EX-UM-4X4SFP	This uplink module can house up to four SFP+ transceivers, four SFP transceivers, or a combination of SFP and SFP+ transceivers in the four ports on the uplink module. You can also configure these ports as Virtual Chassis ports (VCPs) and use them to connect the switch in a Virtual Chassis or a VCF configuration by using SFP+ transceivers.	<ul style="list-style-type: none"> <li>EX4300-24T</li> <li>EX4300-24P</li> <li>EX4300-48T</li> <li>EX4300-48T-AFI</li> <li>EX4300-48P</li> <li>EX4300-48T-DC</li> <li>EX4300-48T-DC-AFI</li> </ul>	Junos OS Release 13.2X50-D10
			<ul style="list-style-type: none"> <li>EX4300-24T-S</li> <li>EX4300-24P-S</li> <li>EX4300-48T-S</li> </ul>	Junos OS Release 13.2X51-D26

**Table 13: Uplink Modules in 32-Port EX4300 Switches**

Uplink Module Name	Model Number	Description	Supported EX4300 Switches	First Junos OS Release
2-port 40-Gigabit Ethernet QSFP+ uplink module	EX-UM-2QSFP	This uplink module can house up to two QSFP+ transceivers. You can also configure these ports as VCPs and use them to connect the switch in a Virtual Chassis or a VCF configuration.	<ul style="list-style-type: none"> <li>EX4300-32F</li> <li>EX4300-32F-DC</li> </ul>	Junos OS Release 13.2X51-D15

**Table 13: Uplink Modules in 32-Port EX4300 Switches (Continued)**

Uplink Module Name	Model Number	Description	Supported EX4300 Switches	First Junos OS Release
			<ul style="list-style-type: none"> <li>EX4300-32F-S</li> </ul>	Junos OS Release 13.2X51-D26
8-port 10-Gigabit Ethernet SFP+ uplink module	EX-UM-8X8SFP	This uplink module can house up to eight SFP+ transceivers, eight SFP transceivers, or a combination of SFP+ and SFP transceivers in the eight ports on the uplink module. You can also configure these ports as VCPs and use them to connect the switch in a Virtual Chassis or a VCF configuration by using SFP+ transceivers.	<ul style="list-style-type: none"> <li>EX4300-32F</li> <li>EX4300-32F-DC</li> </ul>	Junos OS Release 13.2X51-D15
			<ul style="list-style-type: none"> <li>EX4300-32F-S</li> </ul>	Junos OS Release 13.2X51-D26

**Table 14: Uplink Modules in EX4300-48MP and EX4300-48MP-S Switches**

Uplink Module Name	Model Number	Description	Supported EX4300 Switches	First Junos OS Release
2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module	EX-UM-2QSFP-MR	<p>You can install two QSFP+ transceivers, two QSFP28 transceivers, or a combination of one QSFP+ transceiver and one QSFP28 transceiver in this uplink module.</p> <p><b>NOTE:</b> You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches as Virtual Chassis ports (VCPs).</p>	<ul style="list-style-type: none"> <li>EX4300-48MP</li> <li>EX4300-48MP-S</li> </ul>	<p>Junos OS Release 18.4R1</p> <p><b>NOTE:</b> Starting in Junos OS Release 19.3R1, you can install two 100-Gigabit Ethernet QSFP28 transceivers in the uplink module. In Junos OS Release 18.4R1 through Junos OS Release 19.2R1, the uplink module supported only one 100-Gigabit Ethernet transceiver. If you configure both the ports on the uplink module to operate at 100-Gbps speed, the four QSFP+ ports on the switch are disabled. See <a href="#">Setting the Operating Mode on a 2-Port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 Uplink Module</a>.</p>

Table 14: Uplink Modules in EX4300-48MP and EX4300-48MP-S Switches *(Continued)*

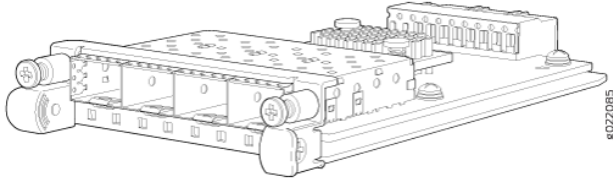
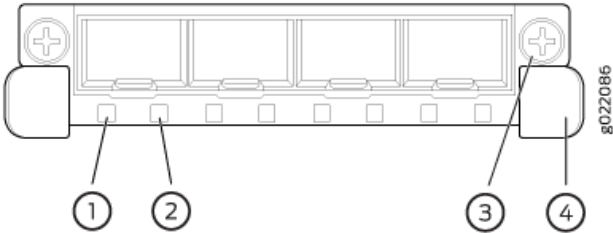
Uplink Module Name	Model Number	Description	Supported EX4300 Switches	First Junos OS Release
4-port 1-Gigabit Ethernet SFP/ 10-Gigabit Ethernet SFP+ uplink module	EX-UM-4SFPP-MR	<p>You can install four SFP transceivers, four SFP+ transceivers, or a combination of SFP and SFP+ transceivers in the four ports of this uplink module.</p> <p><b>NOTE:</b> You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches as Virtual Chassis ports (VCPs).</p>	<ul style="list-style-type: none"> <li>EX4300-48MP</li> <li>EX4300-48MP-S</li> </ul>	<p>Junos OS Release 18.2R1</p> <p><b>NOTE:</b> Starting in Junos OS Release 19.1R1, you can install SFP transceivers in the uplink module. In Junos OS Release 18.2R1 through Junos OS Release 18.4R1, the uplink module supported only SFP+ transceivers.</p>



**NOTE:** Uplink modules and transceivers are not part of the shipping configuration. You must order them separately.

Table 15 on page 67 shows the uplink modules used in 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. Table 16 on page 68 shows the uplink modules used in 32-port EX4300 switches. Table 17 on page 70 shows the uplink modules used in EX4300-48MP and EX4300-48MP-S switches.

**Table 15: Uplink Modules Used in 24-Port and 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

Uplink Module Name	Model Number	Figure
4-port 1-Gigabit Ethernet/ 10-Gigabit Ethernet SFP + uplink module	EX-UM-4X4SFP	<p data-bbox="802 468 1370 537"><b>Figure 17: 4-Port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ Uplink Module</b></p>  <p data-bbox="802 863 1403 932"><b>Figure 18: LEDs on the 4-Port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ Uplink Module</b></p>  <ol data-bbox="802 1255 1289 1472" style="list-style-type: none"> <li>1. Link activity LED of the uplink module port</li> <li>2. Status LED of the uplink module port</li> <li>3. Captive screws of the uplink module</li> <li>4. Handle of the uplink module</li> </ol>

**Table 16: Uplink Modules Used in 32-Port EX4300 Switches**

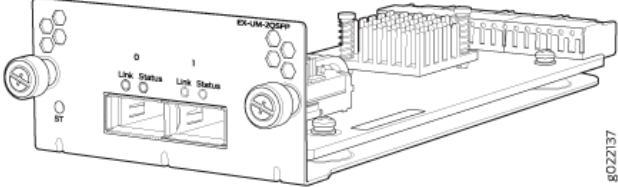
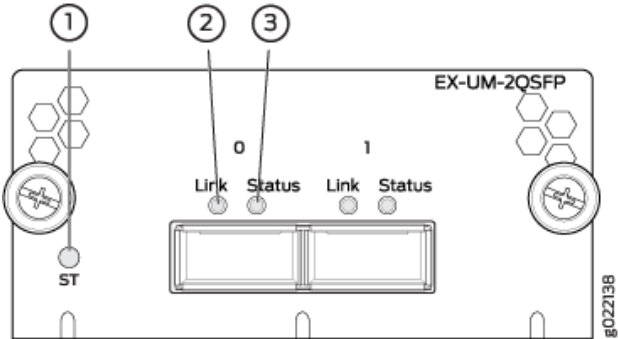
Uplink Module Name	Model Number	Figure
2-port 40-Gigabit Ethernet QSFP+ uplink module	EX-UM-2QSFP	<p data-bbox="805 436 1338 506"><b>Figure 19: 2-Port 40-Gigabit Ethernet QSFP+ Uplink Module</b></p>  <p data-bbox="805 840 1398 909"><b>Figure 20: LEDs on the 2-Port 40-Gigabit Ethernet QSFP+ Uplink Module</b></p>  <ol data-bbox="805 1331 1289 1486" style="list-style-type: none"> <li>1. Status LED of the uplink module</li> <li>2. Link activity LED of the uplink module port</li> <li>3. Status LED of the uplink module port</li> </ol>

Table 16: Uplink Modules Used in 32-Port EX4300 Switches *(Continued)*

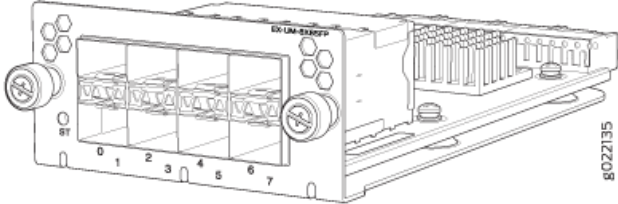
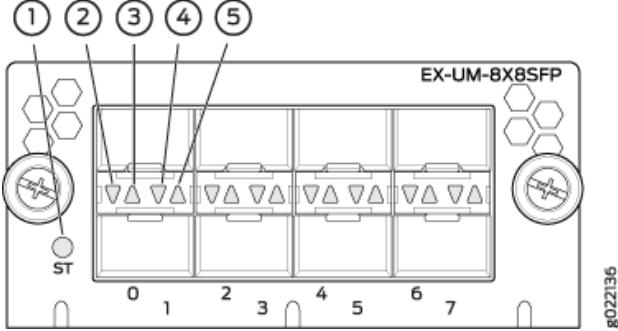
Uplink Module Name	Model Number	Figure
8-port 10-Gigabit Ethernet SFP+ uplink module	EX-UM-8X8SFP	<p data-bbox="805 428 1403 495"><b>Figure 21: 8-Port 10-Gigabit Ethernet SFP+ Uplink Module</b></p>  <p data-bbox="805 848 1403 915"><b>Figure 22: LEDs on the 8-Port 10-Gigabit Ethernet SFP+ Uplink Module</b></p>  <ol data-bbox="805 1331 1208 1604" style="list-style-type: none"> <li>1. Status LED of the uplink module</li> <li>2. Link activity LED of the lower port</li> <li>3. Link activity LED of the upper port</li> <li>4. Status LED the lower port</li> <li>5. Status LED the upper port</li> </ol>

Table 17: Uplink Modules Used in EX4300-48MP and EX4300-48MP-S Switches

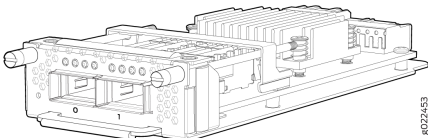
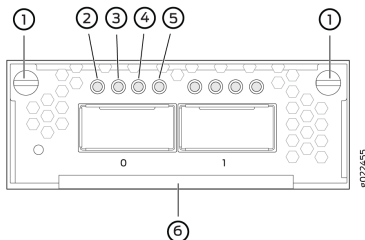
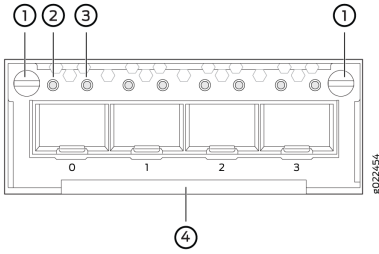
Uplink Module Name	Model Number	Figure						
2-port 40-Gigabit Ethernet QSFP+/ 100-Gigabit Ethernet QSFP28	EX-UM-2QSFP-MR	<p><b>Figure 23: 2-Port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 Uplink Module</b></p>  <p><b>Figure 24: LEDs on the 2-Port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 Uplink Module</b></p>  <table><tr><td>1– Captive screws of the uplink module</td><td>4– Link activity LED of the uplink module port</td></tr><tr><td>2– Link activity LED of the uplink module port</td><td>5– Link activity LED of the uplink module port</td></tr><tr><td>3– Link activity LED of the uplink module port</td><td>6– Handle of the uplink module</td></tr></table>	1– Captive screws of the uplink module	4– Link activity LED of the uplink module port	2– Link activity LED of the uplink module port	5– Link activity LED of the uplink module port	3– Link activity LED of the uplink module port	6– Handle of the uplink module
1– Captive screws of the uplink module	4– Link activity LED of the uplink module port							
2– Link activity LED of the uplink module port	5– Link activity LED of the uplink module port							
3– Link activity LED of the uplink module port	6– Handle of the uplink module							

Table 17: Uplink Modules Used in EX4300-48MP and EX4300-48MP-S Switches (*Continued*)

Uplink Module Name	Model Number	Figure
4-port 1-Gigabit Ethernet SFP/ 10-Gigabit Ethernet SFP + uplink module	EX-UM-4SFPP-MR	<p data-bbox="808 430 1388 499"><b>Figure 25: LEDs on the 4-Port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ Uplink Module</b></p>  <p data-bbox="808 835 1295 1054"> <b>1.</b> Captive screws of the uplink module  <b>2.</b> Link activity LED of the uplink module port  <b>3.</b> Status LED of the uplink module port  <b>4.</b> Handle of the uplink module </p>



**NOTE:** When you install an uplink module in the switch or replace an uplink module with another uplink module, the switch detects the ports on the uplink module. The switch creates the required interfaces when transceivers are installed in these ports.

The SFP+ uplink module ports in EX4300 switches can operate either in 10-gigabit or in 1-gigabit mode depending on the transceiver you install in them. The operating mode for an SFP+ uplink module is shown in the output of the `show chassis pic fpc-slot slot number pic-slot slot number` command.

Each port on the uplink modules has a pair of LEDs that indicate the link activity and status of the port. See ["Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches" on page 77](#) for details about the status and link activity LEDs.

SFP+ uplink modules are shipped with dust covers installed in the ports. QSFP+ uplink module is shipped with a dust cover installed in one of the ports.

## Chassis Status LEDs on EX4300 Switches

EX4300 switches except EX4300-48MP and EX4300-48MP-S switches have three chassis status LEDs (labeled **ALM**, **SYS**, and **MST**) on the right of the LCD panel, next to the Menu and Enter buttons (see [Figure 26 on page 72](#)). EX4300-48MP and EX4300-48MP-S switches have three chassis status LEDs (labeled **ALM**, **SYS**, and **MST**) on the right of the front panel (see [Figure 27 on page 72](#)).

Figure 26: Chassis Status LEDs in EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches

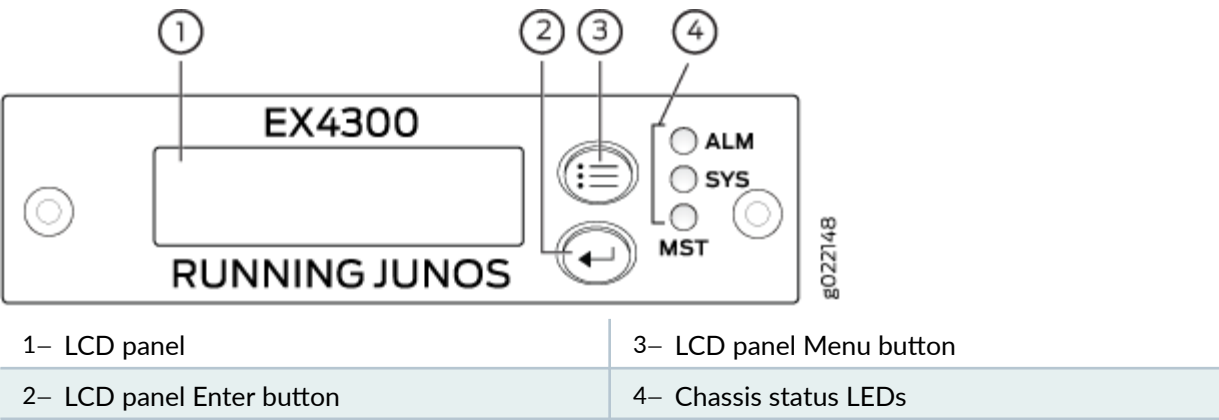
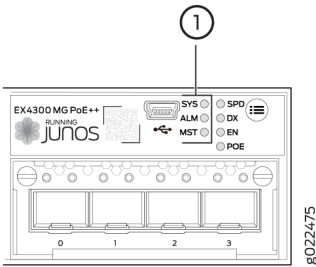


Figure 27: Chassis Status LEDs in EX4300-48MP and EX4300-48MP-S Switches



1– Chassis status LEDs	
------------------------	--

[Table 18 on page 73](#) describes the chassis status LEDs on an EX4300 switch, their colors and states, and the status they indicate. You can view the colors of the three LEDs remotely through the CLI by issuing the operational mode command `show chassis led`.

Table 18: Chassis Status LEDs on an EX4300 Switch

LED Label	Color	State and Description
<b>ALM</b> (Alarm)	Unlit	There is no alarm or the switch is halted.
	Red	<p>There is a major alarm. A major alarm indicates a critical error condition that requires immediate attention.</p> <p><b>NOTE:</b> When you connect power to the switch, the Alarm (<b>ALM</b>) LED glows red. This behavior is normal. Plugging an active Ethernet cable into the management (<b>MGMT</b>) port 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 (on EX4300 switches except EX4300-48MP and EX4300-48MP-S switches) or amber (on EX4300-48MP and EX4300-48MP-S switches)	<p>There is a minor alarm. A minor alarm indicates a noncritical condition that requires monitoring or maintenance. A minor alarm that is left unchecked might cause interruption in service or performance degradation.</p> <p><b>NOTE:</b> The Alarm (<b>ALM</b>) LED glows yellow on EX4300 switches except EX4300-48MP and EX4300-48MP-S switches or amber on EX4300-48MP and EX4300-48MP-S switches if you commit a configuration to make it active on the switch and do not also create 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>
<b>SYS</b> (System)	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 (not applicable for EX4300-48MP and EX4300-48MP-S switches)—The switch is booting.</li> </ul>

Table 18: Chassis Status LEDs on an EX4300 Switch *(Continued)*

LED Label	Color	State and Description
	Unlit	<ul style="list-style-type: none"> <li>EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—The switch is powered off or is halted.</li> <li>EX4300-48MP and EX4300-48MP-S switches—The switch is booting or the switch is powered off or is halted.</li> </ul>
<b>MST (Primary)</b>	Green	<p>In a standalone EX4300 switch:</p> <ul style="list-style-type: none"> <li>On steadily—The switch is functioning normally.</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 the primary in the Virtual Chassis configuration.</li> <li>Blinking—The switch is the backup in the Virtual Chassis configuration.</li> <li>Off—The switch is a line card 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 or amber) 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.

## SEE ALSO

[show chassis lcd](#)

[Chassis Component Alarm Conditions on EX4300 Switches | 322](#)

*Check Active Alarms with the J-Web Interface*

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

## Management Port LEDs on EX4300 Switches

The management port, labeled **MGMT**, on the rear panel of an EX4300 switch, has two LEDs that indicate link activity and status of the management port. [Figure 28 on page 75](#) shows the location of Management port on a 24-port EX4300 switch. The location of the LEDs and their behavior are similar for all EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. [Figure 29 on page 75](#) shows the location of Management port on EX4300-48MP and EX4300-48MP-S Switches.

Figure 28: LEDs on the Management Port on a 24-Port EX4300 Switch

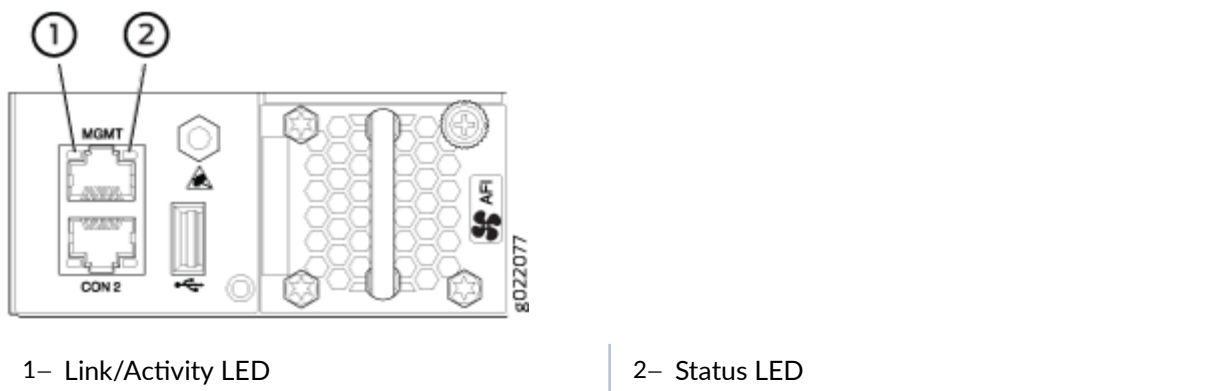
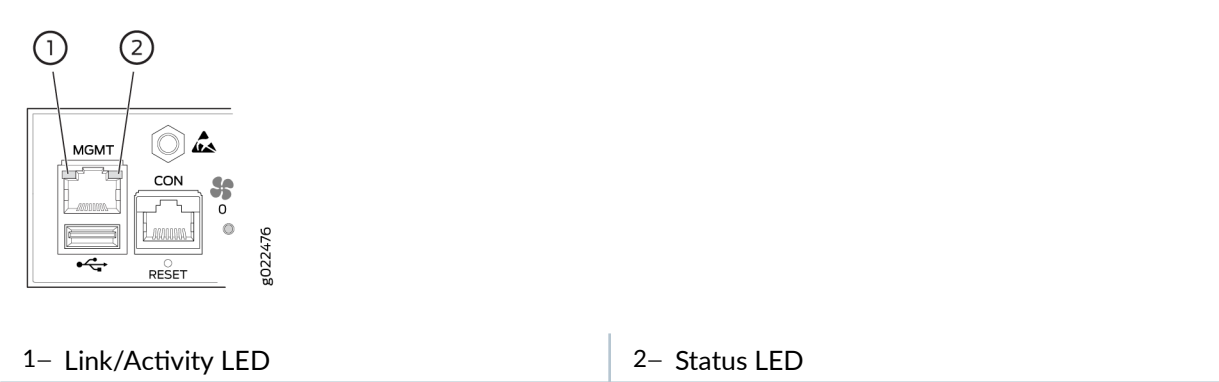


Figure 29: LEDs on the Management Port on EX4300-48MP and EX4300-48MP-S Switches



[Table 19 on page 76](#) describes the Link/Activity LED.

**Table 19: Link/Activity LED on the Management Port on an EX4300 Switch**

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.</li> <li>• On steadily—The port and the link are active, but there is no link activity.</li> <li>• Off—The port is not active.</li> </ul>

[Table 20 on page 76](#) describes the Status LED.

**Table 20: Status LED on the Management Port on an EX4300 Switch**

LED	Color	State and Description
Status	Green	<p>Indicates the speed. The speed indicators are:</p> <ul style="list-style-type: none"> <li>• EX4300 switches except EX4300-48MP and EX4300-48MP-S switches: <ul style="list-style-type: none"> <li>• Off—Link speed is 10 Mbps.</li> <li>• Blinking—Link speed is 100 Mbps.</li> <li>• On steadily—Link speed is 1000 Mbps.</li> </ul> </li> <li>• EX4300-48MP and EX4300-48MP-S switches: <ul style="list-style-type: none"> <li>• Off—Link speed is 10 Mbps or 1000 Mbps.</li> <li>• On steadily—Link speed is 100 Mbps.</li> </ul> </li> </ul>

**SEE ALSO**

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

## Network Port, Built-In QSFP+ Port, Uplink Port, and Uplink Module Port LEDs on EX4300 Switches

Each 10/100/1000BASE-T network port, SFP network port, SFP+ uplink port, SFP+ uplink module port, built-in QSFP+ port, and QSFP+ uplink module port on an EX4300 switch has two LEDs that show the link activity and status of the port.

The following figures in this topic shows the location of those LEDs:

- [Figure 30 on page 77](#) shows the LEDs on the 10/100/1000BASE-T and 100/1000/2500/5000/10000BASE-T Ethernet network ports.
- [Figure 31 on page 78](#) shows the LEDs on the SFP network ports on EX4300-32F switches.
- [Figure 32 on page 78](#) shows the LEDs on the built-in QSFP+ ports.
- [Figure 33 on page 78](#) shows the LEDs on the SFP+ uplink ports and on the uplink module ports on the 4-port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ uplink module for EX4300 switches except EX4300-48MP and EX4300-48MP-S switches.
- [Figure 34 on page 79](#) shows the LEDs on the ports on the 2-port 40-Gigabit Ethernet QSFP+ uplink module for EX4300-32F switches.
- [Figure 35 on page 79](#) shows the LEDs on the ports on the 8-port 10-Gigabit Ethernet SFP+ uplink module for EX4300-32F switches.
- [Figure 36 on page 80](#) shows the LEDs on the ports on the 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module for EX4300-48MP and EX4300-48MP-S switches.
- [Figure 37 on page 80](#) shows the LEDs on the ports on the 4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module for EX4300-48MP and EX4300-48MP-S switches.

**Figure 30: LEDs on 10/100/1000BASE-T Network Ports and 100/1000/2500/5000/10000BASE-T Ethernet Network Ports**

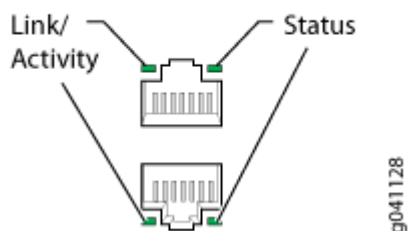


Figure 31: LEDs on the SFP Network Ports on EX4300-32F Switches

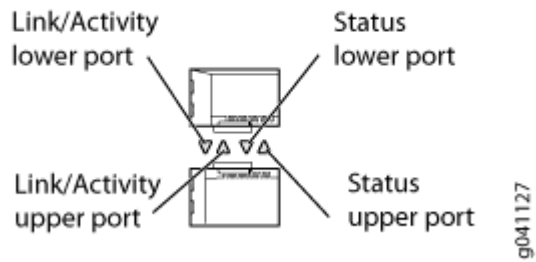
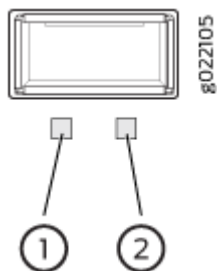


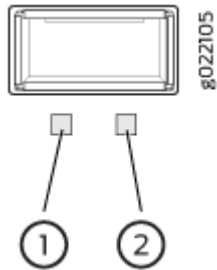
Figure 32: LEDs on the Built-In QSFP+ Ports



1– Link activity LED

2– Status LED

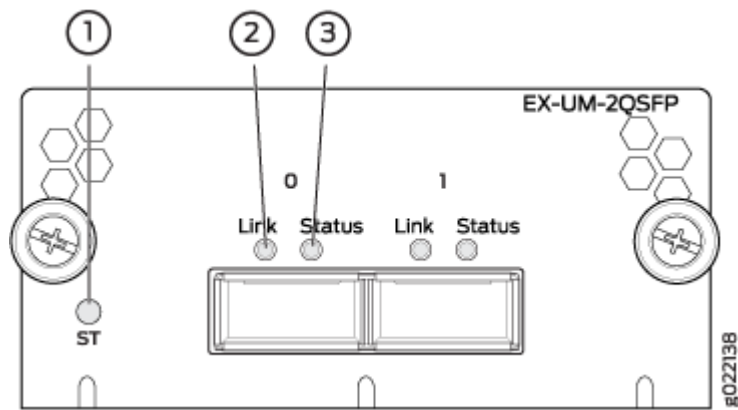
Figure 33: LEDs on the SFP+ Uplink Ports and on the 4-Port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ Uplink Module for EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches



1– Link activity LED

2– Status LED

**Figure 34: LEDs on the on the Ports on the 2-Port 40-Gigabit Ethernet QSFP+ Uplink Module for EX4300-32F Switches**

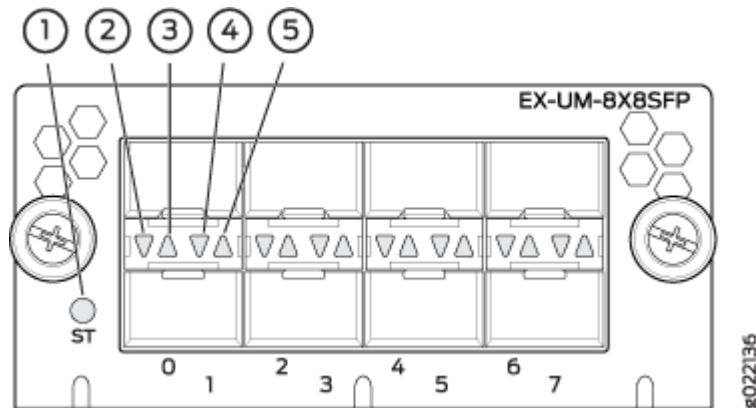


1– Status LED of the uplink module

3– Status LED of the uplink module port

2– Link activity LED of the uplink module port

**Figure 35: LEDs on the 8-Port 10-Gigabit Ethernet SFP+ Uplink Module for EX4300-32F Switches**



1– Status LED of the uplink module

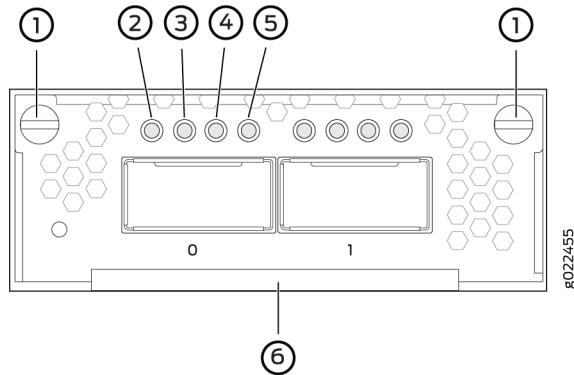
4– Status LED the lower port

2– Link activity LED of the lower port

5– Status LED the upper port

3– Link activity LED of the upper port

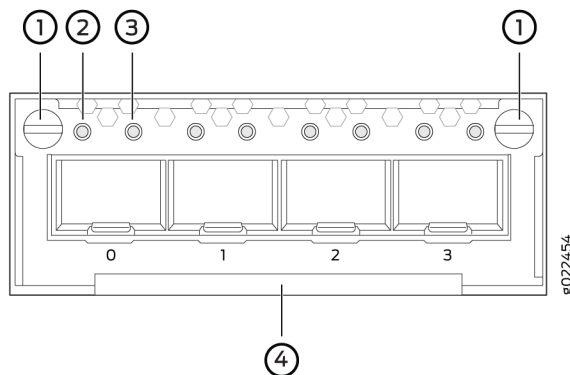
**Figure 36: LEDs on the Ports on the 2-Port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 Uplink Module for EX4300-48MP and EX4300-48MP-S Switches**



1– Captive screws of the uplink module	4– Link activity LED of the uplink module port
2– Link activity LED of the uplink module port	5– Link activity LED of the uplink module port
3– Link activity LED of the uplink module port	6– Handle of the uplink module

There are four LEDs for each port (labeled 2, 3, 4, and 5 in [Figure 36 on page 80](#)). If a port is configured to operate at 10-Gbps speed by using breakout cables, four 10-Gbps interfaces are created and the four LEDs for that port becomes operational. Each of these LEDs indicates the link activity on the corresponding interface. If a port is configured to operate at 40-Gbps or 100-Gbps speed, the LED labeled 2 for that port in [Figure 36 on page 80](#) becomes operational and indicates the link activity on the corresponding port.

**Figure 37: LEDs on the Ports on the 4-Port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ Uplink Module for EX4300-48MP and EX4300-48MP-S Switches**



1– Captive screws of the uplink module	3– Status LED of the uplink module port
2– Link activity LED of the uplink module port	4– Handle of the uplink module

The [Table 21 on page 81](#) describes the link activity LED on 10/100/1000BASE-T network ports, SFP network ports, SFP+ uplink ports, SFP+ uplink module ports, built-in QSFP+ ports, QSFP+ uplink module ports, and QSFP+/QSFP28 uplink module ports.

**Table 21: Link/Activity LED**

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.</li> <li>On steadily—The port and the link are active, but there is no link activity.</li> <li>Off—The port is not active.</li> </ul>

On EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, from the Idle menu of the LCD panel, use the Enter button on the LCD panel to toggle between the ADM, DPX, SPD, and PoE+ indicators.

[Table 22 on page 81](#) describes the Status LED on 10/100/1000BASE-T Ethernet network ports and SFP network ports on EX4300 switches except EX4300-48MP and EX4300-48MP-S switches.

**Table 22: Status LED on 10/100/1000BASE-T Ethernet Network Ports and SFP Network Ports on EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

LED	LCD Indicator/ Status Mode LED	State and Description
Status	LED: ADM/EN	Indicates the administrative status (enabled or disabled). The status indicators are: <ul style="list-style-type: none"> <li>Green—Port is administratively enabled.</li> <li>Unlit—Port is administratively disabled.</li> </ul>
	LED: DPX/DX	Indicates the duplex mode. The status indicators are: <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> <p><b>NOTE:</b> In EX4300 switches, the ports operate in full-duplex mode only.</p>

**Table 22: Status LED on 10/100/1000BASE-T Ethernet Network Ports and SFP Network Ports on EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches (Continued)**

LED	LCD Indicator/ Status Mode LED	State and Description
	LED: SPD	<p>Indicates the speed. The speed indicators are:</p> <ul style="list-style-type: none"> <li>• Unlit—10 Mbps</li> <li>• Blinking green—100 Mbps</li> <li>• Steadily green—1000 Mbps</li> </ul> <p><b>NOTE:</b> In 32-port EX4300 switches, when an EX-SFP-1GE-T transceiver is installed in the port, the LED is unlit when the speed is 100 Mbps.</p>
	LED: PoE/POE	<p>Indicates the PoE mode. The status indicators are:</p> <ul style="list-style-type: none"> <li>• Steadily green—PoE is enabled on the port and a device is drawing power.</li> <li>• Blinking green—PoE is enabled on the port, but no power is drawn from the port.</li> <li>• Unlit—PoE is not enabled on the port.</li> </ul>

**Table 23: Status LED on SFP+ Uplink Ports and SFP+ Uplink Module Ports Except on EX4300-48MP and EX4300-48MP-S switches**

LED	LCD Indicator	State and Description
Status	Green	<p>Indicates the speed. The speed indicators are:</p> <ul style="list-style-type: none"> <li>• Blinking green—1000 Mbps</li> <li>• Steadily green—10 Gbps</li> </ul>

Table 24 on page 83 describes the Status LED on QSFP+ ports and QSFP+ uplink module ports in EX4300 switches.

**Table 24: Status LED on QSFP+ Ports and QSFP+ Uplink Module Ports**

LED	LCD Indicator	State and Description
Status	Green	<p>Indicates the status. The status indicators are:</p> <ul style="list-style-type: none"> <li>• Unlit—40-Gigabit port is down.</li> <li>• Steadily green—40-Gigabit port is up.</li> </ul>

[Table 25 on page 83](#) describes the Status LED on 100/1000/2500/5000/10000BASE-T Ethernet network ports on EX4300-48MP and EX4300-48MP-S switches. 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 the 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.

**Table 25: Status LED on 100/1000/2500/5000/10000BASE-T Ethernet Network Ports on EX4300-48MP and EX4300-48MP-S Switches**

LED	Status Mode LED	State and Description
Status	EN	<p>Indicates the administrative status (enabled or disabled). 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>
	DX	<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> <p><b>NOTE:</b> In EX4300 switches, the ports operate in full-duplex mode only.</p>

**Table 25: Status LED on 100/1000/2500/5000/10000BASE-T Ethernet Network Ports on EX4300-48MP and EX4300-48MP-S Switches (Continued)**

LED	Status Mode LED	State and Description
	SPD	<p>Indicates the speed. The speed indicators are:</p> <ul style="list-style-type: none"> <li>• Unlit—10 Mbps</li> <li>• Blinking green—100 Mbps</li> <li>• Steadily green—1000 Mbps</li> <li>• Blinking amber—5000 Mbps</li> <li>• Steadily blue—10000 Mbps</li> </ul>
	POE	<p>Indicates the PoE mode. The status indicators are:</p> <ul style="list-style-type: none"> <li>• Steadily green—PoE is enabled on the port and a device is drawing power.</li> <li>• Blinking green—PoE is enabled on the port, but no power is drawn from the port.</li> <li>• Unlit—PoE is not enabled on the port.</li> </ul>

Starting in Junos OS Release 20.1R1, you can use the [request chassis beacon](#) command on EX4300-48MP 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](#)).

[Table 26 on page 84](#) describes the Status LED on the ports on the 4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module for EX4300-48MP and EX4300-48MP-S switches.

**Table 26: Status LED on the Ports on the 4-Port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ Uplink Module for EX4300-48MP and EX4300-48MP-S Switches**

LED	LCD Indicator	State and Description
Status	Green	<p>Indicates the speed. The speed indicator is:</p> <ul style="list-style-type: none"> <li>• Steadily green—1 or 10 Gbps</li> </ul>

# Cooling System and Airflow in an EX4300 Switch

## IN THIS SECTION

- [Fan Modules | 85](#)
- [Airflow Direction in EX4300 Switch Models | 86](#)
- [Front-to-Back Airflow | 88](#)
- [Back-to-Front Airflow | 89](#)
- [Do Not Mix AIR IN \(AFI\) and AIR OUT \(AFO\) Components in the Switch | 90](#)
- [Positioning the Switch | 91](#)
- [Fan Module Status | 91](#)

The cooling system in an EX4300 switch consists of two fan modules and a single fan in each power supply. EX4300 switches provide back-to-front airflow (air enters through the back of the switch), indicated by the label **AIR IN (AFI)**, or front-to-back (air exhausts through the back of the switch), indicated by the label **AIR OUT (AFO)**—depending on the fan modules and power supplies installed in the switch.

This topic describes:

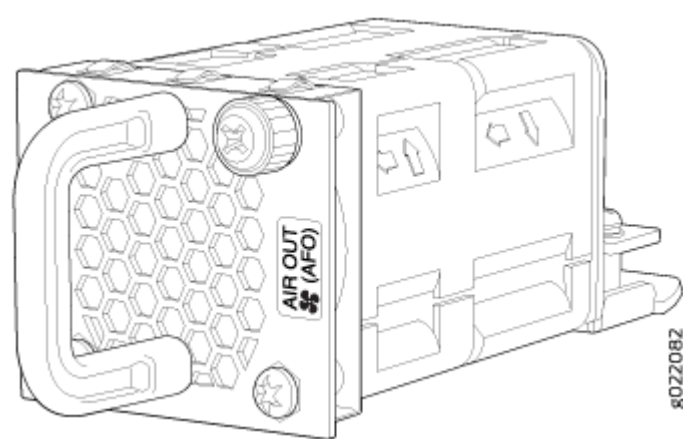
## Fan Modules

In the EX4300 switches the fan modules are hot-insertable and hot-removable field-replaceable units (FRUs).

All the EX4300 switches, except EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, and EX4300-48P-S switches are shipped with two fan modules pre-installed in the rear panel of the switch. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, and EX4300-48P-S switches are not shipped with pre-installed fan modules; you must order them separately. Each switch can accommodate two fan modules in the fan module slots on the rear panel of the switch. The fan module slots are numbered 0 and 1 and each slot has a fan icon next to it.

[Figure 38 on page 86](#) shows the fan module used in an EX4300 switch:

Figure 38: Fan Module Used in an EX4300 Switch



You must remove only one fan module at a time for replacement from the rear panel of the chassis. The switch continues to operate for a limited period of time (30 seconds) during the replacement of the fan module without thermal shutdown.

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

The fan modules are available in two models that have different airflow directions—back-to-front (air enters through the back of the switch), indicated by label **AIR IN (AFI)**, and front-to-back (air exhausts through the back of the switch), indicated by label **AIR OUT (AFO)**. [Table 27 on page 86](#) lists the available fan module models and the direction of airflow in them.

Table 27: Fan Modules in EX4300 Switches

Fan Module	Label on the Fan Module
EX4300-FAN	AIR OUT (AFO)
EX4300-FAN-AFI	AIR IN (AFI)

## Airflow Direction in EX4300 Switch Models

[Table 28 on page 87](#) shows the direction of airflow in EX4300 switch models as shipped.

Table 28: Airflow Direction in EX4300 Switch Models

Model Number	Fan Modules and Power Supply	Direction of Airflow
<ul style="list-style-type: none"> <li>EX4300-24T</li> <li>EX4300-24P</li> <li>EX4300-32F</li> <li>EX4300-48T</li> <li>EX4300-48P</li> </ul>	The switch ships with two fan modules and an AC power supply, each with a label <b>AIR OUT (AFO)</b> .	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.
<ul style="list-style-type: none"> <li>EX4300-32F-DC</li> <li>EX4300-48T-DC</li> </ul>	The switch ships with two fan modules and a DC power supply, each with a label <b>AIR OUT (AFO)</b> .	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.
EX4300-48T-AFI	The switch ships with two fan modules and an AC power supply, each with a label <b>AIR IN (AFI)</b> .	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.
EX4300-48T-DC-AFI	The switch ships with two fan modules and a DC power supply, each with a label <b>AIR IN (AFI)</b> .	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.

**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis

- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

## Front-to-Back Airflow

In the EX4300 switch models that have front-to-back airflow, the air intake to cool the chassis is through the vents on the front panel of the switch and hot air exhausts through the vents on the rear panel. See [Figure 39 on page 88](#) and [Figure 40 on page 89](#).

Figure 39: Front-to-Back Airflow Through 24-Port and 48-Port EX4300 Switch Chassis

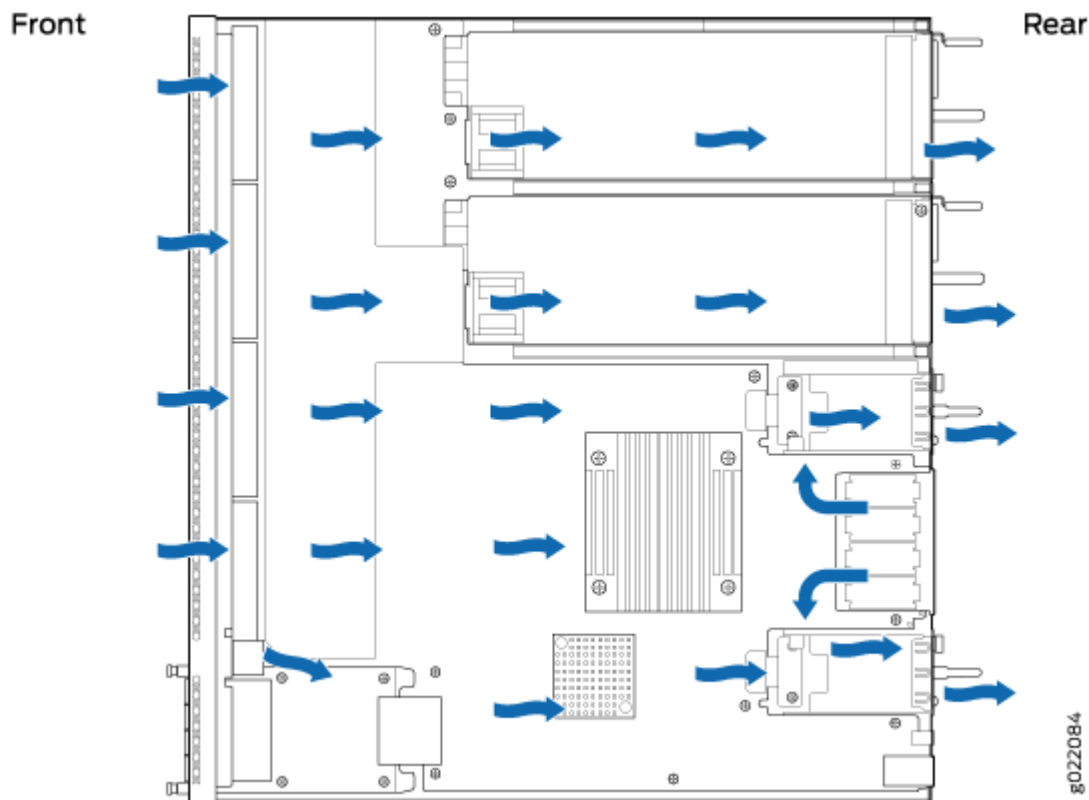
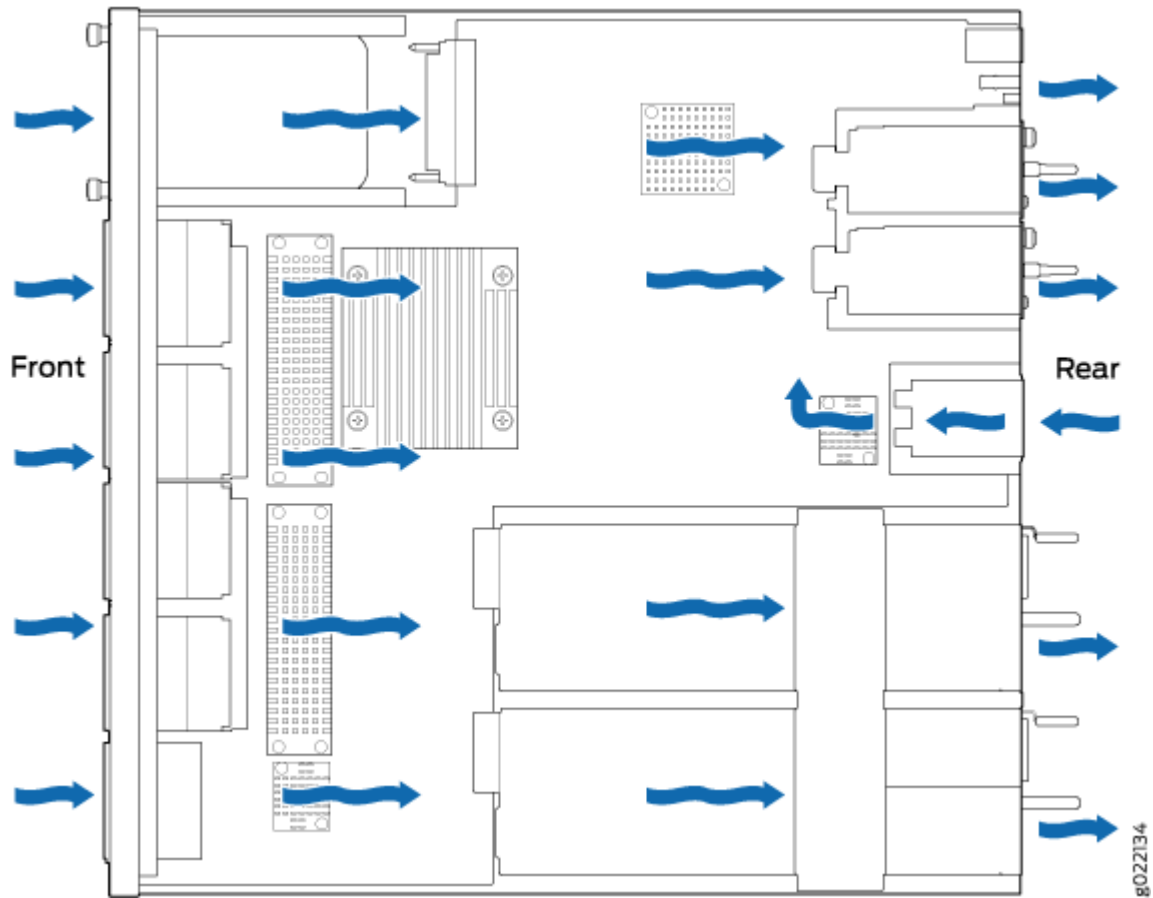


Figure 40: Front-to-Back Airflow Through 32-Port EX4300 Switch Chassis

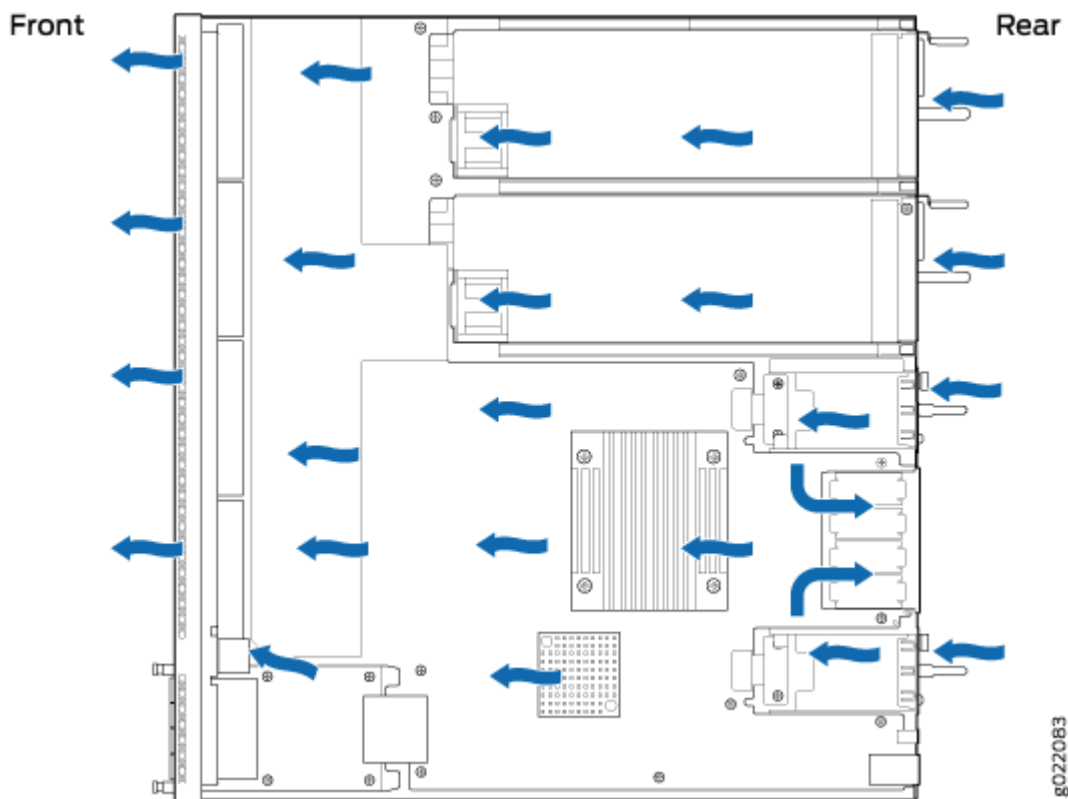


You must install only power supplies that have **AIR OUT (AFO)** labels in switches in which the fan modules have **AIR OUT (AFO)** labels.

## Back-to-Front Airflow

In the EX4300 switch models that have back-to-front airflow, the air intake to cool the chassis is through the vents on the rear panel and hot air exhausts through the vents on the front panel of the switch. See [Figure 41 on page 90](#).

Figure 41: Back-to-Front Airflow Through the 24-Port and 48-Port EX4300 Switch Chassis



You must install only power supplies that have **AIR IN (AFI)** labels in switches in which the fan modules have **AIR IN (AFI)** labels.

## Do Not Mix AIR IN (AFI) and AIR OUT (AFO) Components in the Switch

Do not mix power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis. If the fan modules have **AIR IN (AFI)** labels, the power supplies must also have **AIR IN (AFI)** labels; if the fan modules have **AIR OUT (AFO)** labels, the power supplies must also have **AIR OUT (AFO)** labels.

The labels on the power supplies and fan modules should match the labels on the switch chassis.

Mixing components with **AIR IN (AFI)** and **AIR OUT (AFO)** labels in the same chassis hampers the performance of the cooling system of the switch and leads to overheating of the chassis.



**CAUTION:** The system raises an alarm if a fan module fails or if the ambient temperature inside the chassis rises above the acceptable range. If the temperature inside the chassis rises above the threshold temperature, the system shuts down automatically.

## Positioning the Switch

In front-to-back airflow, indicated by the label **AIR OUT (AFO)** on the fan modules and power supplies, hot air exhausts through the vents on the rear panel of the switch. In back-to-front airflow, indicated by the label **AIR IN (AFI)** on the fan modules and power supplies, hot air exhausts through the vents on the front panel of the switch.

In data center deployments, position the switch in such a manner that the **AIR IN (AFI)** labels on switch components are next to the cold aisle, and **AIR OUT (AFO)** labels on switch components are next to the hot aisle.

## Fan Module Status

Each switch has a status LED for each fan module next to the fan module slot on the rear panel of the chassis. The Status LED indicates the status of the fan module. [Table 29 on page 91](#) describes the Status LED on the fan module in an EX4300 switch.

**Table 29: Fan Module Status LED**

LED	State	Description
Status	Green	The fan module is functioning normally.
	Unlit	Indicates one of the following: <ul style="list-style-type: none"> <li>• The fan module is not installed.</li> <li>• The fan module is not functioning normally.</li> <li>• The airflow direction of the fan module does not match with the airflow direction of other components.</li> </ul>

Under normal operating conditions, the fan modules operate at a moderate speed. Temperature sensors in the chassis monitor the temperature within the chassis.

The system raises an alarm if a fan module fails or if the ambient temperature inside the chassis rises above the acceptable range. If the temperature inside the chassis rises above the threshold temperature, the system shuts down automatically.

You can check the status of fans and the chassis temperature from the Environment Status option in the Status menu on the LCD panel. See "[LCD Panel in EX4300 Switches](#)" on page 57.

## RELATED DOCUMENTATION

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[Field-Replaceable Units in EX4300 Switches](#) | 55

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[EX4300 Switches Hardware Overview](#) | 2

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*Prevention of Electrostatic Discharge Damage*

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[Installing a Fan Module in an EX4300 Switch](#) | 294

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[Removing a Fan Module from an EX4300 Switch](#) | 293

# EX4300 Power System

## IN THIS SECTION

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- [AC Power Supply Specifications for EX4300 Switches](#) | 105
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## AC Power Supply in EX4300 Switches

### IN THIS SECTION

- [Characteristics of an AC Power Supply | 94](#)
- [AC Power Supply Airflow | 96](#)
- [N+0 Redundancy Configuration of AC Power Supplies | 97](#)
- [N+N Redundancy Configuration of AC Power Supplies | 101](#)

The AC power supply in EX4300 switches is a hot-insertable and hot-removable field-replaceable unit (FRU): You can install it without powering off the switch or disrupting the switching function.

All the EX4300 switches that are powered by AC power supplies, except EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are shipped with one AC power supply installed in the rear panel of the switches. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches are not shipped with power supplies; you must order the power supplies separately.



**NOTE:** EX4300 switches except EX4300-48MP and EX4300-48MP-S switches support 350 W, 715 W, and 1100 W AC power supplies. EX4300-48MP and EX4300-48MP-S switches support 715 W, 1100 W, and 1400 W AC power supplies.

This topic describes the AC power supplies.



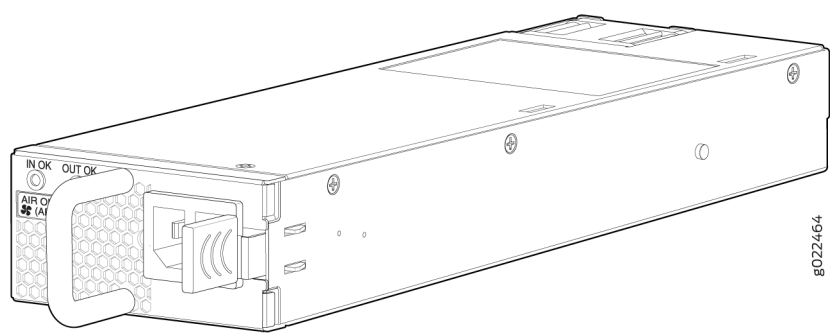
**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

Characteristics of an AC Power Supply

The AC power supplies for EX4300 switches are available in 350 W, 715 W, 1100 W, and 1400 W models. [Figure 42 on page 94](#) shows an AC power supply for EX4300 switches. The AC power supplies support Power over Ethernet (PoE+) in EX4300-24P, EX4300-24P-S, EX4300-48P, EX4300-48P-S, EX4300-48MP, and EX4300-48MP-S models.

Figure 42: AC Power Supply for EX4300 Switches



[Table 30 on page 94](#) lists the details of the 350 W, 715 W, 1100 W, and 1400 W AC power supplies used in EX4300 switches.

Table 30: Details of the AC Power Supplies in EX4300 Switches

Details	350 W AC Power Supply	715 W AC Power Supply	1100 W AC Power Supply	1400 W AC Power Supply
Model number	<ul style="list-style-type: none"><li>JPSU-350-AC-AFO-A</li><li>JPSU-350-AC-AFI-A</li></ul>	JPSU-715-AC-AFO-A	JPSU-1100-AC-AFO-A	JPSU-1400W-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	2.43 lb (1.1 kg)	2.43 lb (1.1 kg)	2.43 lb (1.1 kg)	3.06 lb (1.39 kg)

Table 30: Details of the AC Power Supplies in EX4300 Switches (Continued)

Details		350 W AC Power Supply	715 W AC Power Supply	1100 W AC Power Supply	1400 W AC Power Supply
Minimum installed in chassis		1	1	1	1
Maximum installed in chassis		2	2	2	2
Power supply slots		Install in power supply slots labeled <b>PSU 0</b> and <b>PSU 1</b> in the rear panel of the chassis.	Install in power supply slots labeled <b>PSU 0</b> and <b>PSU 1</b> in the rear panel of the chassis.	Install in power supply slots labeled <b>PSU 0</b> and <b>PSU 1</b> in the rear panel of the chassis.	Install in power supply slots labeled <b>PSU 0</b> and <b>PSU 1</b> in the rear panel of the chassis.
AC appliance Inlet  <b>NOTE:</b> Each AC appliance inlet requires a dedicated AC power feed.	Number	1	1	1	1
	Type	IEC-320-C13	IEC-320-C13	IEC-320-C15	IEC-320-C15
	Rating	2 A  <b>NOTE:</b> EX4300-48MP and EX4300-48MP-S switches do not support this power supply.	<ul style="list-style-type: none"> <li>EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—11–5 A</li> <li>EX4300-48MP and EX4300-48MP-S switches—10 A</li> </ul>	<ul style="list-style-type: none"> <li>EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—12–6 A</li> <li>EX4300-48MP and EX4300-48MP-S switches—15 A</li> </ul>	12–8 A
Fans		Internal	Internal	Internal	Internal

Table 30: Details of the AC Power Supplies in EX4300 Switches *(Continued)*

Details	350 W AC Power Supply	715 W AC Power Supply	1100 W AC Power Supply	1400 W AC Power Supply
Airflow	<ul style="list-style-type: none"> <li>• Front-to-back, indicated by label <b>AIR OUT (AFO)</b></li> <li>• Back-to-front, indicated by label <b>AIR IN (AFI)</b></li> </ul>	Front-to-back, indicated by label <b>AIR OUT (AFO)</b>	Front-to-back, indicated by label <b>AIR OUT (AFO)</b>	Front-to-back, indicated by label <b>AIR OUT (AFO)</b>
AC power cord retainer	1	1	1	1
Power supply status LEDs	<b>IN OK</b> and <b>OUT OK</b>	<b>IN OK</b> and <b>OUT OK</b>	<b>IN OK</b> and <b>OUT OK</b>	<b>IN OK</b> and <b>OUT OK</b>
Operating range	<ul style="list-style-type: none"> <li>• Low line: 100–120 VAC</li> <li>• High line: 200–240 VAC</li> </ul>	<ul style="list-style-type: none"> <li>• Low line: 100–120 VAC</li> <li>• High line: 200–240 VAC</li> </ul>	<ul style="list-style-type: none"> <li>• Low line: 115–120 VAC</li> <li>• High line: 200–240 VAC</li> </ul>	<ul style="list-style-type: none"> <li>• Low line: 100–140 VAC</li> <li>• High line: 200–240 VAC</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.

To prevent electrical injury while installing or removing AC power supplies, carefully follow instructions in ["Installing an AC Power Supply in an EX4300 Switch" on page 298](#) and ["Removing an AC Power Supply from an EX4300 Switch" on page 297](#).

## AC 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 (AFO)** or **AIR IN (AFI)** on the faceplate of the power supply that indicates the direction of airflow in the power supply.

[Table 31 on page 97](#) lists the AC power supply models and the direction of airflow in them.

**Table 31: Airflow Direction in AC Power Supply Models for EX4300 Switches**

Model	Label on Power Supply	Direction of Airflow
JPSU-350-AC-AFO-A	<b>AIR OUT (AFO)</b>	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.
JPSU-350-AC-AFI-A	<b>AIR IN (AFI)</b>	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.
JPSU-715-AC-AFO-A	<b>AIR OUT (AFO)</b>	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.
JPSU-1100-AC-AFO-A	<b>AIR OUT (AFO)</b>	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.
JPSU-1400W-AC-AFO	<b>AIR OUT (AFO)</b>	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.

## N+0 Redundancy Configuration of AC Power Supplies

In an N+0 redundancy configuration, lower priority PoE ports may be impacted if a power supply fails.

[Table 32 on page 98](#) lists the N+0 power calculation for 24-port EX4300 switches that use 350 W, 715 W, and 1100 W power supplies.

**Table 32: N+0 AC Power Calculations for 24-Port EX4300 Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports Enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>	PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)					
350 W AC	–	350	350	0	150	200	6
350 W AC	350 W AC	700	665	0	150	515	17
350 W AC	715 W AC	1065	993.5	0	150	720	24
715 W AC	–	715	715	0	150	565	18
715 W AC	715 W AC	1430	1358.5	0	150	720	24
715 W AC	1100 W AC	1815	1705	0	150	720	24
1100 W AC	–	1100	1100	0	150	720	24
1100 W AC	1100 W AC	2200	2090	0	150	720	24
1100 W AC	350 W AC	1450	1340	0	150	720	24

Table 33 on page 99 lists the N+0 power calculation for 32-port EX4300 switches that use the 350 W power supply.



**NOTE:** 32-port EX4300 switches does not support Power over Ethernet (PoE).

**Table 33: N+0 AC Power Calculations for 32-Port EX4300 Switches**

Power Supply Rating		Total Power (in watts) PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)
PSU <sub>0</sub>	PSU <sub>1</sub>				
350 W AC	–	350	350	0	164
350 W AC	350 W AC	700	665	0	164

[Table 34 on page 99](#) lists the N+0 power calculation for 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches that use 350 W, 715 W, and 1100 W power supplies.

**Table 34: N+0 AC Power Calculations for 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports Enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>	PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)					
350 W AC	–	350	350	0	175	175	5
350 W AC	350 W AC	700	665	0	175	490	16
350 W AC	715 W AC	1065	993.5	0	175	818	27
715 W AC	–	715	715	0	175	540	18
715 W AC	715 W AC	1430	1358.5	0	175	1183	39
715 W AC	1100 W AC	1815	1705	0	175	1440	48
1100 W AC	–	1100	1100	0	175	925	30
1100 W AC	1100 W AC	2200	2090	0	175	1440	48

**Table 34: N+0 AC Power Calculations for 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches (Continued)**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports Enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>	PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)					
1100 W AC	350 W AC	1450	1340	0	175	1165	38

Table 35 on page 100 lists the N+0 power calculation for EX4300-48MP and EX4300-48MP-S switches that use 715 W, 1100 W, and 1400 W power supplies.



**NOTE:** When operating at low line configuration, the 1400 W power supply operates as 1100 W power supply.

**Table 35: N+0 AC Power Calculations for EX4300-48MP and EX4300-48MP-S Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports Enabled for PoE+	Ports Enabled for PoE++
PSU <sub>0</sub>	PSU <sub>1</sub>	PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)						
715 W AC	–	715	679	0	300	379	12	3
715 W AC	715 W AC	1430	1358	0	300	1058	35	11
715 W AC	1100 W AC	1815	1615	0	300	1315	43	13
715 W AC	1400 W AC	2115	1615	0	300	1315	43	13
1100 W AC	–	1100	1045	0	300	745	24	7

**Table 35: N+0 AC Power Calculations for EX4300-48MP and EX4300-48MP-S Switches (Continued)**

Power Supply Rating		Total Power (in watts) PSU <sub>0</sub> (W) + PSU <sub>1</sub> (W)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports Enabled for PoE+	Ports Enabled for PoE++
PSU <sub>0</sub>	PSU <sub>1</sub>							
1100 W AC	1100 W AC	2200	1670	0	300	1370	45	14
1100 W AC	1400 W AC	2500	1670	0	300	1370	45	14
1400 W AC	–	1400 W AC	1330	0	300	1030	34	10
1400 W AC	1400 W AC	2800	2000	0	300	1700	48	17

## N+N Redundancy Configuration of AC Power Supplies

You can configure your switch for  $N+N$  redundancy, in which  $N$  power supplies can be removed or fail and the remaining  $N$  power supplies continue to supply power to the switch without interruption.

[Table 36 on page 101](#) lists the  $N+N$  power calculation for 24-port EX4300 switches that use 350 W, 715 W, and 1100 W power supplies.

**Table 36: N+N AC Power Calculations for 24-Port EX4300 Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>						
350 W AC	–	350	350	0	150	200	6

Table 36: N+N AC Power Calculations for 24-Port EX4300 Switches *(Continued)*

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>						
350 W AC	350 W AC	700	350	350	150	200	6
350 W AC	715 W AC	1065	350	350	150	200	6
715 W AC	–	715	715	0	150	565	18
715 W AC	715 W AC	1430	715	715	150	565	18
715 W AC	1100 W AC	1815	715	715	150	565	18
1100 W AC	–	1100	1100	0	150	720	24
1100 W AC	1100 W AC	2200	1100	1100	150	720	24
1100 W AC	350 W AC	1450	350	350	150	200	6

Table 37 on page 103 lists the N+N power calculation for 32-port EX4300 switches that use 350 W power supplies.



**NOTE:** 32-port EX4300 switches does not support Power over Ethernet (PoE).

**Table 37: N+N AC Power Calculations for 32-Port EX4300 Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)
PSU <sub>0</sub>	PSU <sub>1</sub>				
350 W AC	–	350	350	0	177
350 W AC	350 W AC	700	350	350	177

Table 38 on page 103 lists the *N+N* power calculation for 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches that use 350 W, 715 W, and 1100 W power supplies.

**Table 38: N+N AC Power Calculations for 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>						
350 W AC	–	350	350	0	175	175	5
350 W AC	350 W AC	700	350	350	175	175	5
350 W AC	715 W AC	1065	350	350	175	175	5
715 W AC	–	715	715	0	175	540	18
715 W AC	715 W AC	1430	715	715	175	540	18
715 W AC	1100 W AC	1815	715	715	175	540	18
1100 W AC	–	1100	1100	0	175	925	30

**Table 38: N+N AC Power Calculations for 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches (Continued)**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+
PSU <sub>0</sub>	PSU <sub>1</sub>						
1100 W AC	1100 W AC	2200	1100	1100	175	925	30
1100 W AC	350 W AC	1450	350	350	175	175	5

Table 39 on page 104 lists the *N+N* power calculation for EX4300-48MP and EX4300-48MP-S switches that use 715 W, 1100 W, and 1400 W power supplies.



**NOTE:** When operating at low line configuration, the 1400 W power supply operates as 1100 W power supply.

**Table 39: N+N AC Power Calculations for EX4300-48MP and EX4300-48MP-S Switches**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+	Ports enabled for PoE++
PSU <sub>0</sub>	PSU <sub>1</sub>							
715 W AC	–	715	679	0	300	379	12	3
715 W AC	715 W AC	1430	679	679	300	379	12	3
715 W AC	1100 W AC	1815	679	679	300	379	12	3
715 W AC	1400 W AC	2115	679	679	300	379	12	3

**Table 39: N+N AC Power Calculations for EX4300-48MP and EX4300-48MP-S Switches (Continued)**

Power Supply Rating		Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)	Available PoE Power (in watts)	Ports enabled for PoE+	Ports enabled for PoE++
PSU <sub>0</sub>	PSU <sub>1</sub>							
1100 W AC	–	1100	1045	0	300	745	24	7
1100 W AC	1100 W AC	2200	1045	1045	300	745	24	7
1100 W AC	1400 W AC	2500	1045	1045	300	745	24	7
1400 W AC	–	1400	1330	0	300	1030	34	10
1400 W AC	1400 W AC	2800	1330	1330	300	1030	34	10

## AC Power Supply Specifications for EX4300 Switches

EX4300 switches support 350 W, 715 W, and 1100 W AC power supplies.

The tables in this topic provides power supply specification of AC power supplies used in an EX4300 switch:

- [Table 40 on page 106](#): 350 W AC power supply specifications
- [Table 41 on page 106](#): 715 W AC power supply specifications
- [Table 42 on page 107](#): 1100 W AC power supply specifications

**Table 40: 350 W AC Power Supply Specifications for an EX4300 Switch**

Item	Specification
AC input voltage	<ul style="list-style-type: none"> <li>• Low-voltage line: 100–120 VAC</li> <li>• High-voltage line: 200–240 VAC</li> </ul>
AC input line frequency	50–60 Hz
AC input current rating	<ul style="list-style-type: none"> <li>• Low-voltage line: 4 A</li> <li>• High-voltage line: 2 A</li> </ul>
Output power	350 W



**NOTE:** The 32-port EX4300 switches support only 350 W AC power supplies with front-to-back airflow direction.

**Table 41: 715 W AC Power Supply Specifications for an EX4300 Switch**

Item	Specification
AC input voltage	<ul style="list-style-type: none"> <li>• Low-voltage line: 100–120 VAC</li> <li>• High-voltage line: 200–240 VAC</li> </ul>
AC input line frequency	50–60 Hz
AC input current rating	<ul style="list-style-type: none"> <li>• Low-voltage line: 11 A</li> <li>• High-voltage line: 5 A</li> </ul>
Output power	715 W

**Table 42: 1100 W AC Power Supply Specifications for an EX4300 Switch**

Item	Specification
AC input voltage	<ul style="list-style-type: none"> <li>• Low-voltage line: 115–120 VAC</li> <li>• High-voltage line: 200–240 VAC</li> </ul>
AC input line frequency	50–60 Hz
AC input current rating	<ul style="list-style-type: none"> <li>• Low-voltage line: 12 A</li> <li>• High-voltage line: 6 A</li> </ul>
Output power	1100 W

**SEE ALSO**

[AC Power Supply in EX4300 Switches | 93](#)

[AC Power Supply LEDs in EX4300 Switches | 112](#)

## AC Power Cord Specifications for an EX4300 Switch

Each AC power supply has a single AC appliance inlet that requires a dedicated AC power feed. A detachable AC power cord is supplied with each AC power supply. The 350 W AC and the 715 W AC power supplies are shipped with AC power cords with the C13 coupler type and the 1100 W AC power supplies and 1400 W AC power supplies are shipped with AC power cord with the C15 coupler type 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.

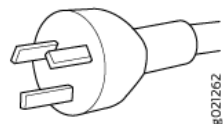
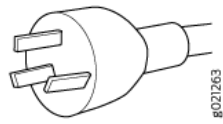
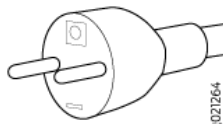


**NOTE:** In North America, AC power cords must not exceed 14.75 ft (4.5 m) in length, to comply with National Electrical Code (NEC) Section 400-8 (NFPA 75, 5-2.2) and Canadian Electrical Code (CEC) Section 4-010(3).

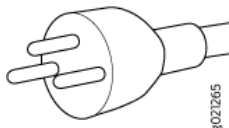
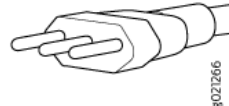
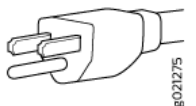
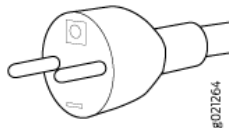
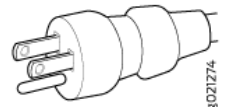
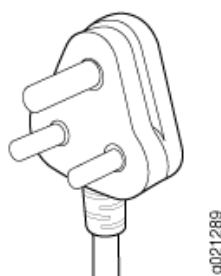
The tables in this topic list the AC power cords specifications provided for different power supplies for each country or region.

- [Table 43 on page 108](#)—Power cords for 350 W AC for EX4300 switches except EX4300-48MP and EX4300-48MP-S switches and 715 W AC power supplies for EX4300 switches
- [Table 44 on page 110](#)—Specifications of power cords used to connect EX4300 switches to C13 power
- [Table 45 on page 110](#)—Power cords for 1100 W AC power supplies for EX4300 switches and 1400 W AC power supplies for EX4300-48MP and EX4300-48MP-S Switches

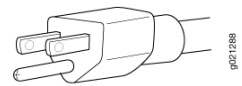

**Table 43: AC Power Cord Specifications for 350 W Power Supplies for EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches and 715 W AC Power Supplies for EX4300 Switches**

Country/ Region	Electrical Specifications	Plug Standards	Juniper Model Number	Graphic
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	CBL-EX-PWR-C13-AR	No graphic available
Australia	250 VAC, 10 A, 50 Hz	AS/NZS 3112 Type SAA/3	CBL-EX-PWR-C13-AU	 g021262
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	CBL-EX-PWR-C13-BR	No graphic available
China	250 VAC, 10 A, 50 Hz	GB 1002-1996 Type PRC/3	CBL-EX-PWR-C13-CH	 g021263
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CBL-EX-PWR-C13-EU	 g021264
India	250 VAC, 10 A, 50 Hz	IS 1293 Type IND/3	CBL-EX-PWR-C13-IN	No graphic available

**Table 43: AC Power Cord Specifications for 350 W Power Supplies for EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches and 715 W AC Power Supplies for EX4300 Switches**  
**(Continued)**

Country/ Region	Electrical Specifications	Plug Standards	Juniper Model Number	Graphic
Israel	250 VAC, 10 A, 50 Hz	SI 32/1971 Type IL/3G	CBL-EX-PWR-C13-IL	
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CBL-EX-PWR-C13-IT	
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	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	
South Africa	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/3	CBL-EX-PWR-C13- SA	

**Table 43: AC Power Cord Specifications for 350 W Power Supplies for EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches and 715 W AC Power Supplies for EX4300 Switches (Continued)**

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Graphic
Switzerland	250 VAC, 10 A, 50 Hz	SEV 6534-2 Type 12G	CBL-EX-PWR-C13-SZ	No graphic available
Taiwan	125 VAC, 10 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	

**Table 44: Specifications of Power Cords Used to Connect EX4300 Switches to C13 Power Strips**

Country/Region	Electrical Specifications	Juniper Model Number
Europe	250 VAC, 10 A, 50 Hz	CBL-PWR-C15-C14-EU
North America	125 VAC, 15 A, 60 Hz	CBL-PWR-C15-C14-US

**Table 45: AC Power Cord Specifications for 1100 W AC Power Supplies for EX4300 Switches and 1400 W AC Power Supplies for EX4300-48MP and EX4300-48MP-S Switches**


Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	CBL-PWR-C15M-HITEMP-AR
Australia	250 VAC, 10 A, 50 Hz	AS/NZS 3112-2000 Type SAA/3	CBL-PWR-C15M-HITEMP-AU


**Table 45: AC Power Cord Specifications for 1100 W AC Power Supplies for EX4300 Switches and 1400 W AC Power Supplies for EX4300-48MP and EX4300-48MP-S Switches (Continued)**

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	CBL-PWR-C15M-HITEMP-BR
China	250 VAC, 10 A, 50 Hz	GB2099, GB1002 Type PRC/3	CBL-PWR-C15M-HITEMP-CH
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CBL-PWR-C15M-HITEMP-EU
Israel	250 VAC, 10 A, 50 Hz	SI 32 Type IL/3G	CBL-PWR-C15M-HITEMP-IL
India	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/3	CBL-PWR-C15M-HITEMP-IN
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CBL-PWR-C15M-HITEMP-IT
Japan	125 VAC, 15 A, 50 Hz or 60 Hz	JIS 8303 Type 498GJ	CBL-PWR-C15M-HITEMP-JP
Korea	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CBL-PWR-C15M-HITEMP-KR
South Africa	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/3	CBL-PWR-C15M-HITEMP-SA
North America	125 VAC, 15 A, 60 Hz	NEMA 5-15 Type N5/15	CBL-PWR-C15M-HITEMP-US
Switzerland	250 VAC, 10 A, 50 Hz	SEV 1011 / 6534-2 Type 12G	CBL-PWR-C15M-HITEMP-SZ

Table 45: AC Power Cord Specifications for 1100 W AC Power Supplies for EX4300 Switches and 1400 W AC Power Supplies for EX4300-48MP and EX4300-48MP-S Switches *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A Type BS89/13	CBL-PWR-C15M-HITEMP-UK

 **CAUTION:** The AC power cord for the EX4300 switch is intended for use with this switch only. Do not use the cord with any other product.

 **CAUTION:** Power cords must not block access to switch components.

SEE ALSO

| [Connecting AC Power to an EX4300 Switch](#) | 197

AC Power Supply LEDs in EX4300 Switches

Figure 43 on page 112 shows the location of the LEDs on an AC power supply for EX4300 switches except EX4300-48MP and EX4300-48MP-S switches.

Figure 43: LEDs on AC Power Supply for EX4300 Switches

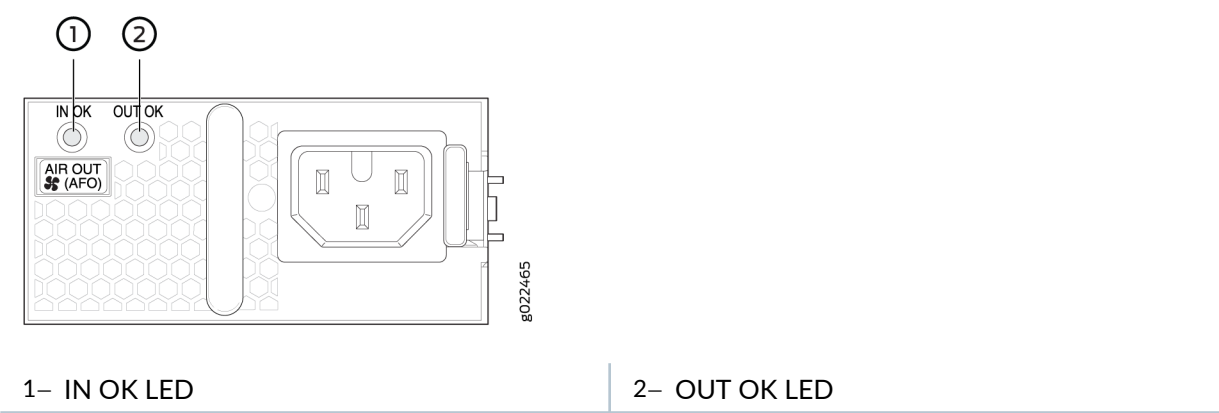


Table 46 on page 113 describes the AC power supply LEDs.

**Table 46: AC Power Supply LEDs in EX4300 Switches**

LED	Color	Description
<b>IN OK</b>	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 and is functioning normally.
<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 delivering power and is functioning correctly.
	Red	The power supply has failed and must be replaced.



**NOTE:** If the **IN OK** LED and the **OUT 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 **IN OK** LED is lit green and the **OUT OK** LED is unlit or lit red, the AC power supply is installed properly, but the power supply has an internal failure.

## DC Power Supply in EX4300 Switches

### IN THIS SECTION

- [Characteristics of a DC Power Supply | 115](#)
- [DC Power Supply Airflow | 116](#)
- [N+0 Redundancy Configuration of DC Power Supplies | 117](#)
- [N+N Redundancy Configuration of DC Power Supplies | 118](#)

The DC power supply in EX4300 switches is a hot-insertable and hot-removable field-replaceable unit (FRU): You can install it without powering off the switch or disrupting the switching function.



**NOTE:** EX4300-24T, EX4300-24P, EX4300-32F, EX4300-48T, EX4300-48T-AFI, EX4300-48P, EX4300-48MP, and EX4300-48MP-S models do not support DC power. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-32F-DC, EX4300-48T-S, EX4300-48T-DC, EX4300-48T-DC-AFI, and EX4300-48P-S models support DC power.

All the EX4300 switches that are powered by DC power supplies except EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, and EX4300-48P-S switches are shipped with one DC power supply installed in the rear panel of the switches. EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, and EX4300-48P-S switches are not shipped with power supplies; you must order the power supplies separately.

This topic describes the DC power supplies.



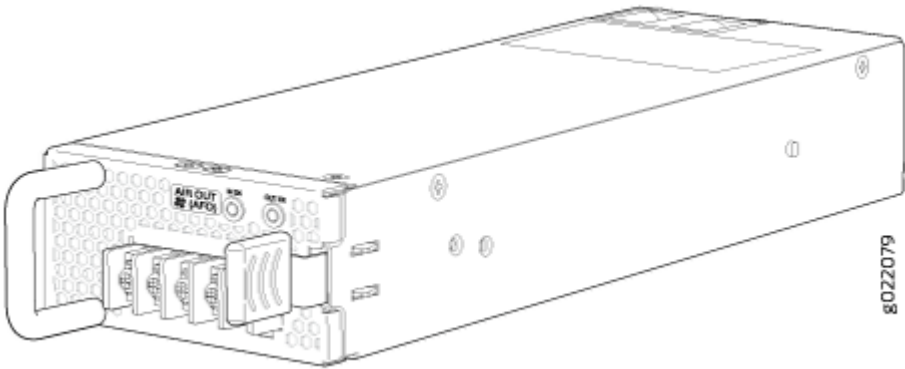
**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

Characteristics of a DC Power Supply

EX4300 switches support 550 W DC power supply (see [Figure 44 on page 115](#)).

Figure 44: DC Power Supply for an EX4300 Switch



You can install up to two DC power supplies in an EX4300 switch. Power supplies are installed in the power supply slots labeled **PSU 0** and **PSU 1** in the rear panel of the chassis.

[Table 47 on page 115](#) lists the details of the 550 W DC power supplies used in EX4300 switches.

Table 47: Details of the DC Power Supplies in EX4300 Switches

Details	550 W DC Power Supply
Model number	<ul style="list-style-type: none"><li>JPSU-550-DC-AFO-A</li><li>JPSU-550-DC-AFI-A</li></ul>
Field-replaceable unit (FRU) type	Hot-insertable and hot-removable
Power supply weight	2.43 lb (1.1 kg)
Minimum installed in chassis	1
Maximum installed in chassis	2

**Table 47: Details of the DC Power Supplies in EX4300 Switches (Continued)**

Details	550 W DC Power Supply
Power supply slots	Install in power supply slots labeled <b>PSU 0</b> and <b>PSU 1</b> in the rear panel of the chassis.
Fans	Internal
Airflow	<ul style="list-style-type: none"> <li>• Front-to-back, indicated by label <b>AIR OUT (AFO)</b></li> <li>• Back-to-front, indicated by label <b>AIR IN (AFI)</b></li> </ul>
Power supply status LEDs	<b>IN OK</b> and <b>OUT OK</b>
DC input current rating	14.2 A
Operating range	-40.8 through -60 VDC  <b>NOTE:</b> The minimum input power required to power on the switch is -43.5 +/- 0.5 VDC. After the switch is powered on, the operating range is -40.8 through -60 VDC.

To prevent electrical injury while installing or removing DC power supplies, carefully follow instructions in ["Installing a DC Power Supply in an EX4300 Switch" on page 302](#) and ["Removing an AC Power Supply from an EX4300 Switch" on page 297](#).

## 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 (AFO)** or **AIR IN (AFI)** on the faceplate of the power supply that indicates the direction of airflow in the power supply.

[Table 48 on page 117](#) lists the DC power supply models and the direction of airflow in them.

**Table 48: Airflow Direction in DC Power Supply Models for EX4300 Switches**

Model	Label on Power Supply	Direction of Airflow
JPSU-550-DC-AFO-A	<b>AIR OUT (AFO)</b>	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.
JPSU-550-DC-AFI-A	<b>AIR IN (AFI)</b>	Back-to-front—that is, air intake to cool the chassis is through the vents on the rear panel of the chassis and hot air exhausts through the vents on the front panel of the chassis.

## N+0 Redundancy Configuration of DC Power Supplies

In an *N+0* redundancy configuration, no power is reserved for resiliency regardless of number of power supplies installed in the switch.

Depending on the power supplies installed in the switch, you can determine the system power budget.

- If one power supply is installed in the switch:

System power budget = Output wattage of the installed power supply (PSU(W))

- If two power supplies are installed in the switch:

System power budget = (Sum of the output wattage of the two power supplies) – (10% of the output wattage of the installed power supply)

System power budget =  $PSU_0(W) + PSU_1(W) - (0.10 \times (PSU(W)))$

[Table 49 on page 118](#) lists the *N+0* power calculation for EX4300 switches that use 550 W DC power supplies.



**NOTE:** The DC power supply in the switch does not support Power over Ethernet (PoE); you can use either an external power injector or an AC power supply to supply power to PoE devices that you connect to the switch. 32-port EX4300 switches does not support Power over Ethernet (PoE).

**Table 49: N+0 DC Power Calculations for EX4300 Switch Configurations**

Switch Configuration	Number of Power Supplies	Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)
24-port EX4300 switch	1	550	550	0	150
	2	1100	1045	550	150
32-port EX4300 switch	1	550	550	0	149
	2	1100	550	550	160
48-port EX4300 switch	1	550	550	0	175
	2	1100	1045	550	175

## N+N Redundancy Configuration of DC Power Supplies

You can configure your switch for  $N+N$  redundancy, in which  $N$  power supplies can be removed or fail and the remaining  $N$  power supplies continue to supply power for the switch without interruption.

You can configure the power management software to manage switch power for  $N+N$  redundancy. When you configure power management for  $N+N$  redundancy, half of the total power available ( $M$ ) is held as reserve power while the other half ( $M$ ) is available for immediate consumption. If the switch configuration changes and requires additional power, then additional power is drawn from the reserve power, and the switch no longer has  $N+N$  power supply redundancy. This condition raises a minor alarm. If the condition is not corrected within 5 minutes, then a major alarm is issued.

For more information about how power management allocates power to chassis components when power is insufficient, see [Understanding Power Management on EX Series Switches](#).

Depending on the power supplies installed in the switch, you can determine the system power budget.

- If one power supply is installed in the switch:
  - System power budget = Output wattage of the installed power supply (PSU(W))
  - Backup power available = 0 W

A minor alarm is raised as switch has no *N+N* power supply redundancy.

- If two power supplies are installed in the switch:
    - System power budget = (Output wattage of one power supply) – (5% of the output wattage of one power supply)
$$\text{System power budget} = \text{PSU(W)} - (0.05 \times \text{PSU(W)})$$
  - Backup power available = (Output wattage of one power supply) – (5% of the output wattage of one power supply)
- $$\text{System power budget} = \text{PSU(W)} - (0.05 \times \text{PSU(W)})$$

Table 50 on page 119 lists the *N+N* power calculation for EX4300 switches that use 550 W DC power supplies.



**NOTE:** The DC power supply in the switch does not support Power over Ethernet (PoE); you can use either an external power injector or an AC power supply to supply power to PoE devices that you connect to the switch. 32-port EX4300 switches does not support Power over Ethernet (PoE).

**Table 50: N+N DC Power Calculations for EX4300 Switch Configurations**

Switch Configuration	Number of Power Supplies	Total Power (in watts)	Usable System Power (in watts)	Backup Power (in watts)	Base Power (in watts)
24-port EX4300 switch	1	550	550	0	150
	2	1100	550	550	150
32-port EX4300 switch	1	550	550	0	149
	2	1100	550	550	160
48-port EX4300 switch	1	550	550	0	175
	2	1100	550	550	175

SEE ALSO

| [Installing a DC Power Supply in an EX4300 Switch](#) | 302

**DC Power Supply Specifications for EX4300 Switches**

Table 51 on page 120 lists the power supply specifications for a DC power supply used in an EX4300 switch.

**Table 51: DC Power Supply Specifications for an EX4300 Switch**

Item	Specifications
DC input voltage	<ul style="list-style-type: none"><li>Nominal operating voltage: -48 VDC</li><li>Operating voltage range: -40.8 VDC through -60 VDC</li></ul>
DC input current rating	4 A maximum at nominal operating voltage (-48 VDC)
Output power	550 W

SEE ALSO

| [DC Power Supply in EX4300 Switches](#) | 114

| [DC Power Supply LEDs in EX4300 Switches](#) | 120

**DC Power Supply LEDs in EX4300 Switches**

Figure 45 on page 121 shows the location of the LEDs on a DC power supply for an EX4300 switch.

Figure 45: DC Power Supply Faceplate on an EX4300 Switch

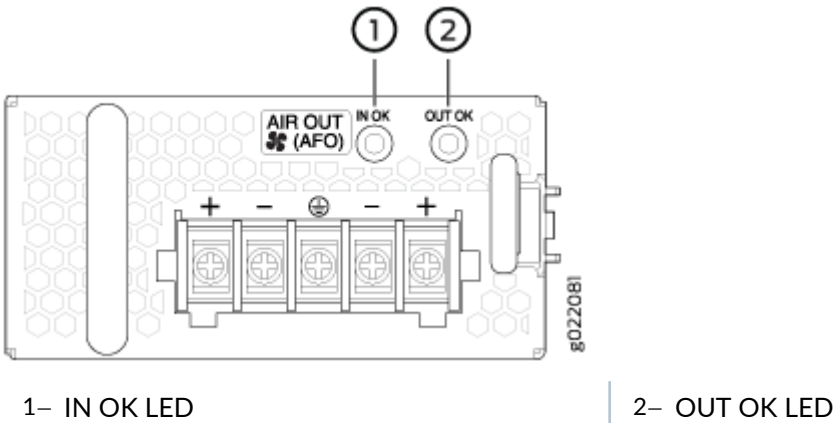


Table 52 on page 121 describes the LEDs on the DC power supplies.

Table 52: DC Power Supply LEDs on an EX4300 Switch

Name	Color	Description
IN OK	Unlit	Indicates one of the following: <ul style="list-style-type: none"><li>• Power supply is disconnected from DC power feed.</li><li>• DC power input voltage is not within normal operating range.</li><li>• No DC power input.</li></ul>
	Green	The power supply is receiving power.
OUT OK	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.

# 2

CHAPTER

## Site Planning, Preparation, and Specifications

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### IN THIS CHAPTER

- Site Preparation Checklist for EX4300 Switches | 123
  - EX4300 Site Guidelines and Requirements | 125
  - EX4300 Network Cable and Transceiver Planning | 142
  - EX4300 Management Cable Specifications and Pinouts | 153
-

# Site Preparation Checklist for EX4300 Switches

The checklist in [Table 53 on page 123](#) summarizes the tasks you need to perform when preparing a site for EX4300 switch installation.

**Table 53: 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 125</a>		
<b>Power</b>			
Measure the distance between external power sources and the switch installation site.			
Locate sites for connection of system grounding.			
Calculate the power consumption and requirements.	<ul style="list-style-type: none"> <li>• <a href="#">"AC Power Supply Specifications for EX4300 Switches" on page 105</a></li> <li>• <a href="#">"DC Power Supply Specifications for EX4300 Switches" on page 120</a></li> </ul>		
<b>Hardware Configuration</b>			
Choose the number and types of switches you want to install.	<a href="#">"EX4300 Switches Hardware Overview" on page 2</a>		
<b>Rack or Cabinet</b>			

**Table 53: Site Preparation Checklist (Continued)**

Item or Task	For More Information	Performed by	Date
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 134</a></li> <li>• <a href="#">"Cabinet Requirements" on page 136</a></li> </ul>		
Plan rack or cabinet location, including required space clearances.	<a href="#">"Clearance Requirements for Airflow and Hardware Maintenance for EX4300 Switches" on page 137</a>		
Secure the rack or cabinet to the floor and building structure.			
<b>Cables</b>			
Acquire cables and connectors: <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**

| *General Safety Guidelines and Warnings*

# EX4300 Site Guidelines and Requirements

## IN THIS SECTION

- [Environmental Requirements and Specifications for EX Series Switches | 125](#)
- [General Site Guidelines | 132](#)
- [Site Electrical Wiring Guidelines | 133](#)
- [Rack Requirements | 134](#)
- [Cabinet Requirements | 136](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for EX4300 Switches | 137](#)

## 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 54 on page 126](#) provides the required environmental conditions for normal switch operation.

Table 54: 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 54: 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 54: 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 54: 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 54: 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 54: 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 54: 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 55 on page 133 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 55: 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 55: 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	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.

*(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 56: 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 56: 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 EX4300 Switches

When planning the site for installing an EX4300 switch, you must ensure sufficient clearance around the switch.

Follow these clearance requirements:

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See [Figure 46 on page 138](#), [Figure 47 on page 139](#), and [Figure 48 on page 140](#) for reference.

Figure 46: Front-to-Back Airflow on 24-Port and 48-Port EX4300 Switches

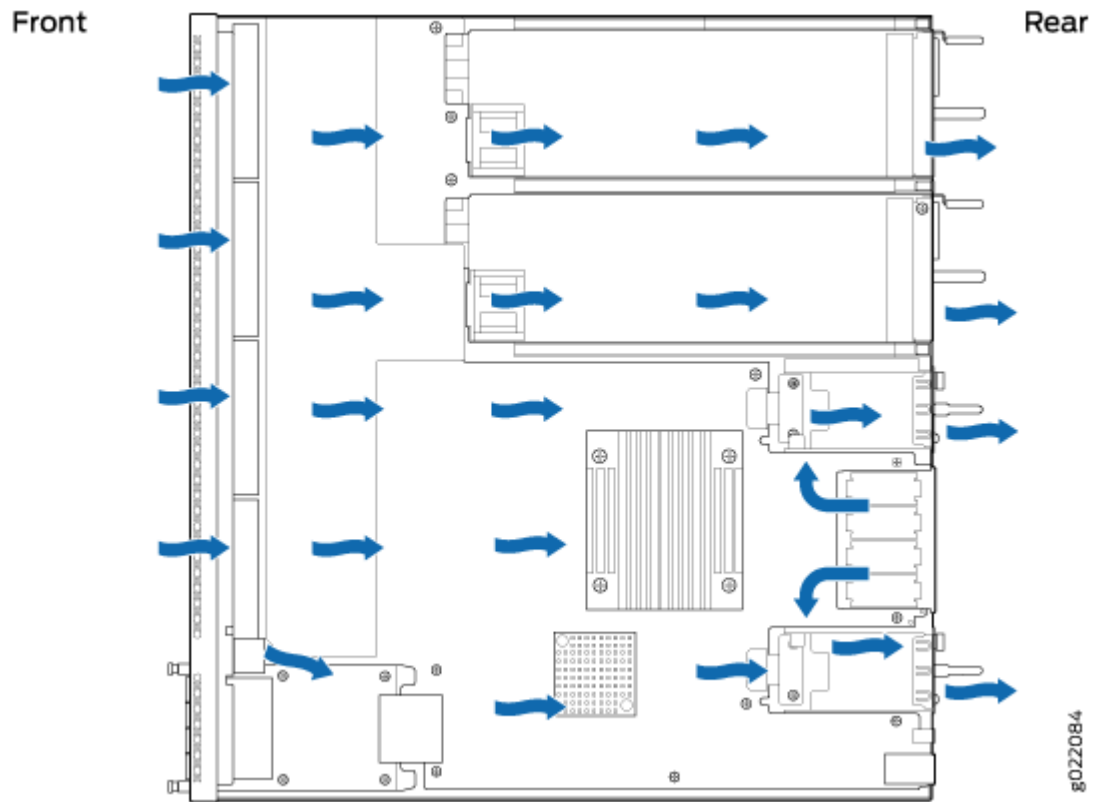


Figure 47: Front-to-Back Airflow on 32-Port EX4300 Switches

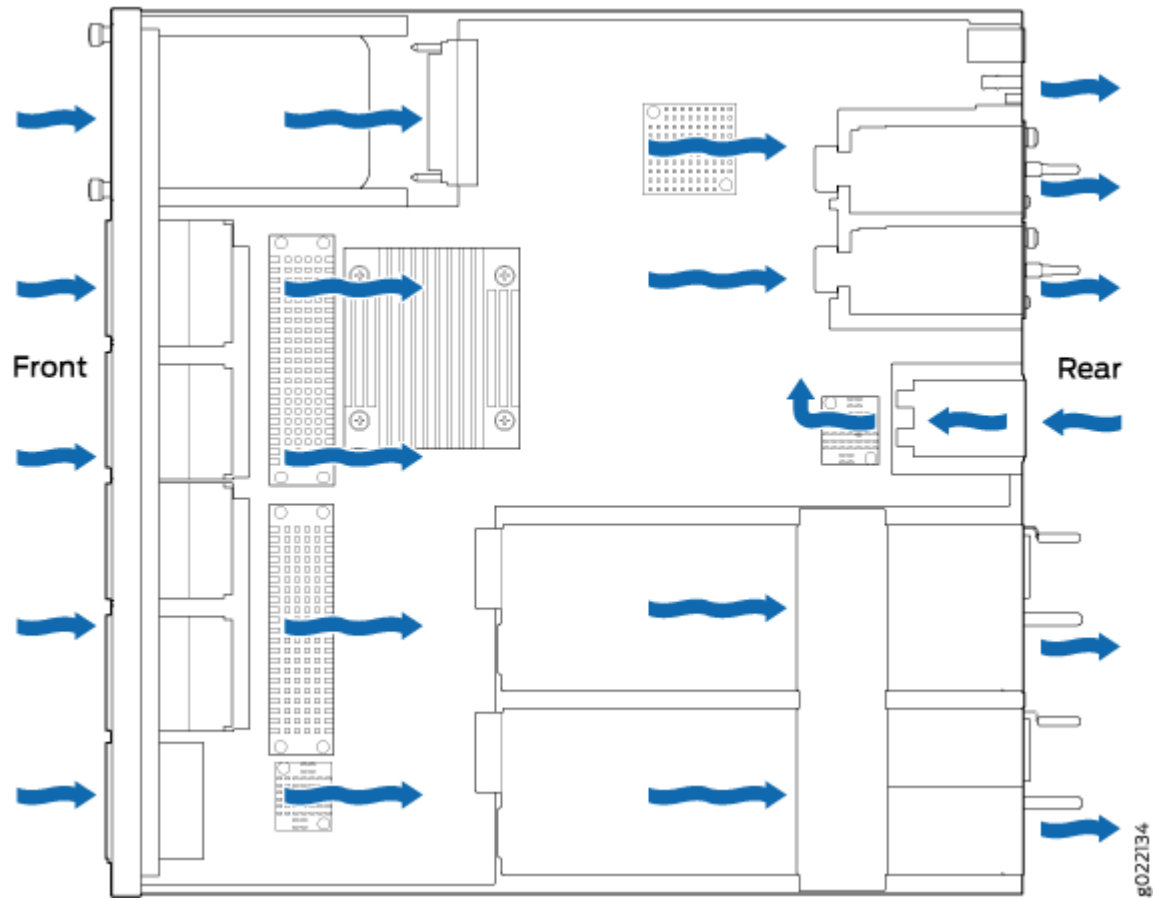
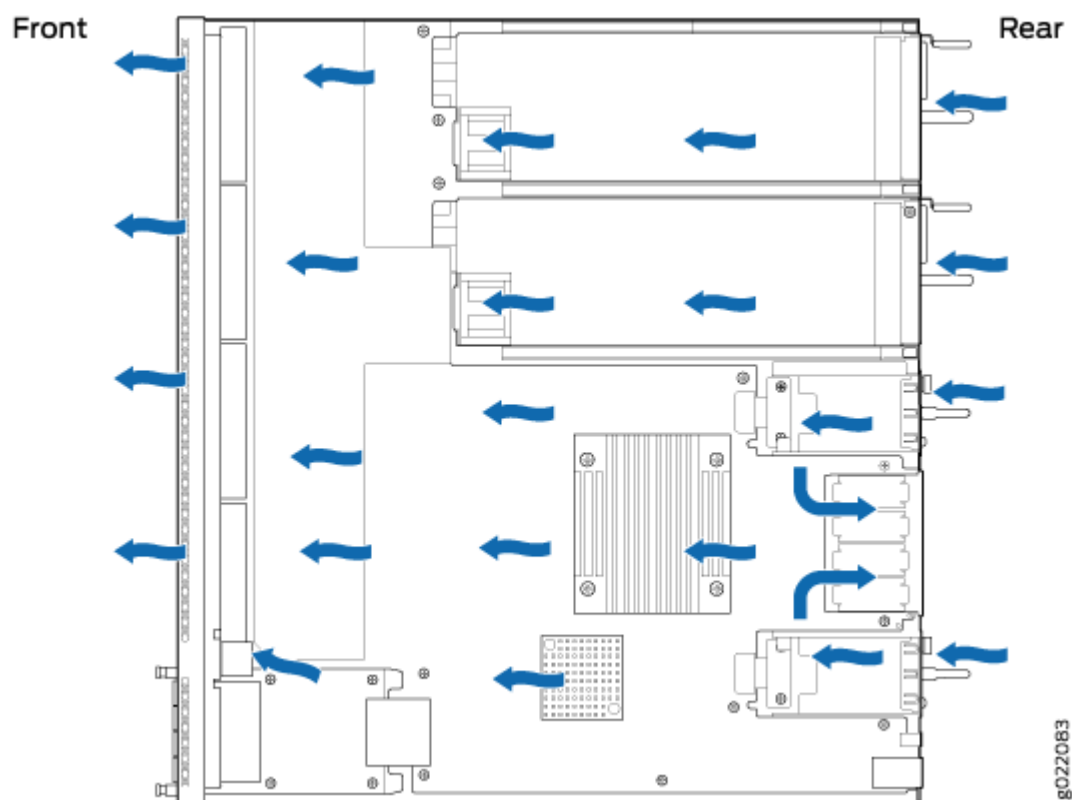
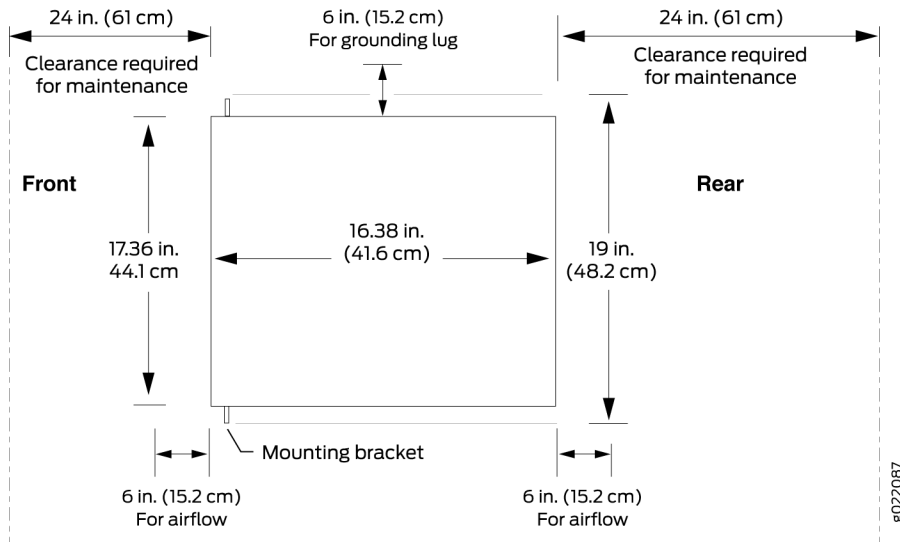


Figure 48: Back-to-Front Airflow on 24-Port and 48-Port EX4300 Switches

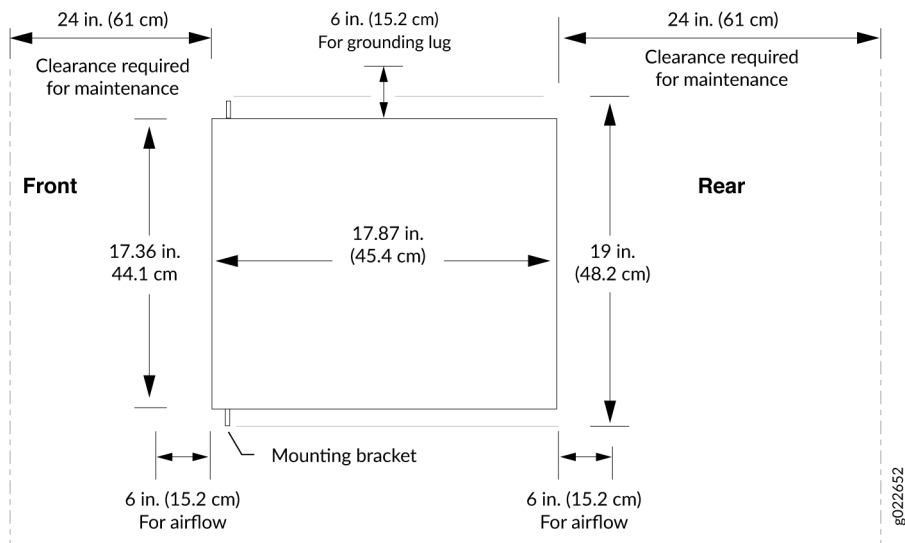


- If you are mounting the switch on a rack or cabinet along with other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.
- Leave at least 6 in. (15.2 cm) clearance in front of and behind the chassis for airflow.
- Leave at least 6 in. (15.2 cm) clearance on the left of the chassis for installing the grounding lug.
- Leave at least 24 in. (61 cm) clearance in front of and behind the switch for service personnel to remove and install hardware components. See [Figure 49 on page 141](#), [Figure 50 on page 141](#), and [Figure 51 on page 142](#).

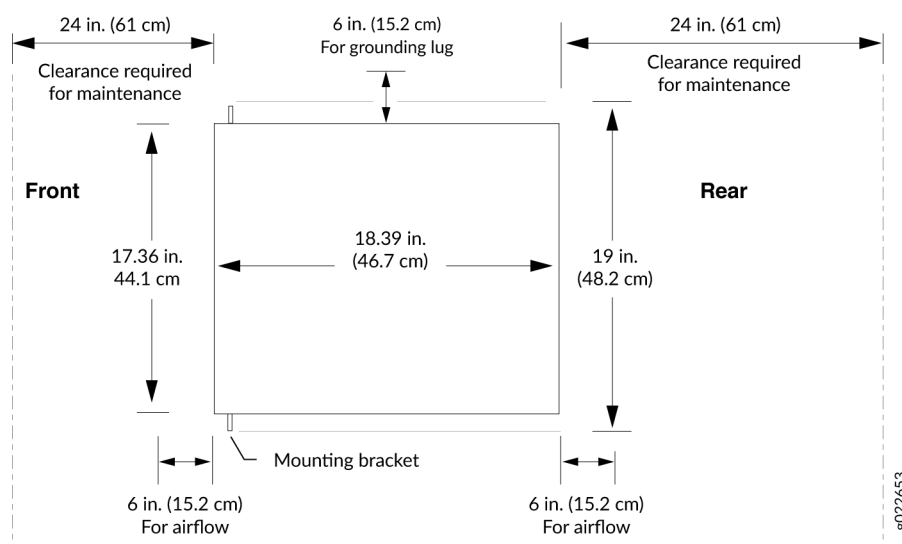
**Figure 49: Clearance Requirements for Airflow and Hardware Maintenance for an EX4300 Switches Except EX4300-32F and EX4300-48MP Switches**



**Figure 50: Clearance Requirements for Airflow and Hardware Maintenance for EX4300-32F Switches**



**Figure 51: Clearance Requirements for Airflow and Hardware Maintenance for EX4300-48MP Switches**



## SEE ALSO

[Chassis Physical Specifications for EX4300 Switches | 53](#)

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

[General Site Guidelines](#)

[Cooling System and Airflow in an EX4300 Switch | 85](#)

# EX4300 Network Cable and Transceiver Planning

## IN THIS SECTION

- [Pluggable Transceivers Supported on EX4300 Switches | 143](#)
- [SFP+ Direct Attach Copper Cables for EX Series Switches | 144](#)
- [QSFP+ Direct Attach Copper Cables for EX Series Switches | 147](#)
- [Overview of EX Series Switches: Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 148](#)

- [Calculate the Fiber-Optic Cable Power Budget for EX Series Devices | 150](#)
- [Calculating the Fiber-Optic Cable Power Margin for EX Series Devices | 151](#)

## Pluggable Transceivers Supported on EX4300 Switches

You can find the list of transceivers supported on EX4300 switches except EX4300-48MP and EX4300-48MP-S switches and information about those transceivers at the [Hardware Compatibility Tool page for EX4300](#).

You can find the list of transceivers supported on EX4300-48MP and EX4300-48MP-S switches and information about those transceivers at the [Hardware Compatibility Tool page for EX4300 Multigigabit](#).



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



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

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

The Gigabit Ethernet transceivers installed in EX4300 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 ports configured as Virtual Chassis ports (VCPs).

## SEE ALSO

*Remove a Transceiver*

*Install a Transceiver*

*Remove a QSFP28 Transceiver*

*Install a QSFP28 Transceiver*

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

### IN THIS SECTION

- [Cable Specifications | 145](#)
- [List of DAC Cables Supported on EX Series Switches | 145](#)
- [Standards Supported by These Cables | 146](#)

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

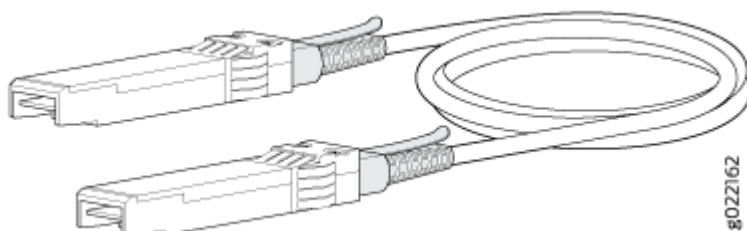
third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, 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 52 on page 145](#).

**Figure 52: 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 | 147](#)
- [DAC Cables Supported on EX3400, EX4300, EX4550, EX4600, EX9251, and EX9253 Switches | 148](#)

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.

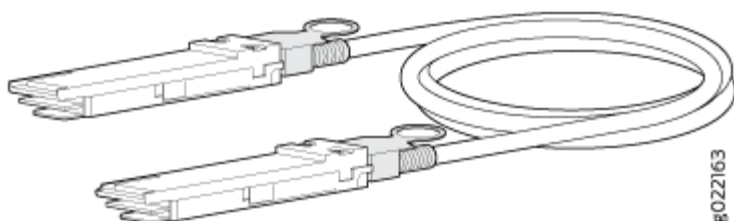
Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. 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 53 on page 148](#).

**Figure 53: 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 | 149](#)
- [Attenuation and Dispersion in Fiber-Optic Cable | 149](#)

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 ( $P_T$ ):  

$$-15 \text{ dBm} - (-28 \text{ dBm}) = 13 \text{ dBm}$$

## 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 57 on page 151](#) (here, the link is 2 km long and multimode, and the ( $P_B$ ) is 13 dBm):

**Table 57: 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>
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	<p>This example assumes 5 connectors. Loss for 5 connectors:</p> <p>(5) * (0.5 dBm) = 2.5 dBm</p>

Table 57: Estimated Values for Factors Causing Link Loss (*Continued*)

Link-Loss Factor	Estimated Link-Loss Value	Sample (LL) Calculation Values
Splice	0.5 dBm	This example assumes 2 splices. Loss for two splices:  (2) * (0.5 dBm) = 1 dBm
Fiber attenuation	<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>• (2 km) * (1.0 dBm/km) = 2 dBm</li> <li>• (2 km) * (0.5 dBm/km) = 1 dBm</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.

# EX4300 Management Cable Specifications and Pinouts

IN THIS SECTION

- [Management Cable Specifications | 153](#)
- [Console Port Connector Pinout Information | 154](#)
- [Mini-USB Port Pinout Specifications | 155](#)
- [USB Port Specifications for an EX Series Switch | 156](#)
- [RJ-45 Management Port Connector Pinout Information | 157](#)
- [EX4300 RJ-45 Port, SFP Port, SFP+ Port, QSFP+ Port, and QSFP28 Port Connector Pinout Information | 157](#)
- [RJ-45 to DB-9 Serial Port Adapter Pinout Information | 165](#)

## Management Cable Specifications

Table 58 on page 153 lists the specifications for the cables that connect the console and management ports to management devices.

Table 58: Specifications of Cables to Connect to Management Devices

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console port	Rollover cable	RJ-45	Connect a Device to a Management Console Using an RJ-45 Connector
Management Ethernet port	Ethernet cable with an RJ-45 connector	RJ-45	Connect a Device to a Network for Out-of-Band Management

Table 58: Specifications of Cables to Connect to Management Devices *(Continued)*

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

## 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 59 on page 155 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 59: 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

## Mini-USB Port Pinout Specifications

If your management host (laptop or PC) does not have a DB-9 plug connector pin or an RJ-45 connector pin but has a USB port, you can connect your management host to the Mini-USB Type-B console port by using a cable that has a standard Type-A USB connector on one end and a Mini-USB Type-B (5-pin) connector on the other end.

The Mini-USB Type-B console port uses a Mini-USB Type-B connector to connect to a console management device. The default baud rate for the console port is 9600 baud.

[Table 60 on page 156](#) provides the pinout information of the Mini-USB Type-B console port.

**Table 60: Mini-USB Type-B Console Port Pinout Information**

Pin	Signal	Description
1	VCC	+5 VDC
2	D-	Data -
3	D+	Data +
X	N/C	Could be not connected (N/C), connected to ground (GND), or used as an attached device presence indicator
4	GND	Ground

## 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 Management Port Connector Pinout Information

[Table 61 on page 157](#) provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

**Table 61: RJ-45 Management Port Connector Pinout Information**

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

## EX4300 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 62 on page 158](#)—10/100/1000BASE-T Ethernet network port connector pinout information except for EX4300-48MP and EX4300-48MP-S switches
- [Table 63 on page 159](#)—10/100/1000BASE-T Ethernet network port and 100/1000/2500/5000/10000BASE-T Ethernet network port connector pinout information for EX4300-48MP and EX4300-48MP-S switches
- [Table 64 on page 160](#)—SFP network port connector pinout information
- [Table 65 on page 161](#)—SFP+ network port connector pinout information
- [Table 66 on page 163](#)—QSFP+ and QSFP28 network module ports connector pinout information

**Table 62: 10/100/1000BASE-T Ethernet Network Port Connector Pinout Information Except for EX4300-48MP and EX4300-48MP-S Switches**

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
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 63: 10/100/1000BASE-T Ethernet Network Port and 100/1000/2500/5000/10000BASE-T Ethernet Network Port Connector Pinout Information for EX4300-48MP and EX4300-48MP-S Switches**

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



**NOTE:** The Ethernet cables that you use to connect to the RJ-45 network ports on EX4300-48MP and EX4300-48MP-S switches and provide 95-W power over 4-pair wire

must meet the following specifications related to deployment, temperature rise, category, IEEE, UL, NEC, and local electric codes to ensure proper performance and to not exceed rated temperature and ampacity of cables:

- The cables must be shielded RJ-45 cables.
- The cables must be rated for IEEE 802.3 BT, TIA standards, and UL-LP.
- The cables must follow NEC 725.144 article and local electric code.
- The operating temperature of the cable must be rated at 15° C more than the ambient temperature.

**Table 64: 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
10	VeeR	Module receiver ground

**Table 64: SFP Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
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 65: 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

**Table 65: SFP+ Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
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
19	TD-	Transmitter inverted data input

**Table 65: SFP+ Network Port Connector Pinout Information (Continued)**

Pin	Signal	Description
20	VeeT	Module transmitter ground

**Table 66: 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
13	GND

Table 66: QSFP+ and QSFP28 Network Port Connector Pinout Information *(Continued)*

Pin	Signal
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
28	IntL

**Table 66: QSFP+ and QSFP28 Network Port Connector Pinout Information** *(Continued)*

Pin	Signal
29	VccTx
30	Vcc1
31	Reserved
32	GND
33	TX3p
34	TX3n
35	GND
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 67 on page 166](#) provides the pinout information for the RJ-45 to DB-9 serial port adapter.

**Table 67: 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
8	NC	7	RTS

# 3

CHAPTER

## Initial Installation and Configuration

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  - Connecting the EX4300 to Power | **186**
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-

# Unpacking and Mounting the EX4300 Switch

## IN THIS SECTION

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- [Update Base Installation Data | 171](#)
- [Installing and Connecting an EX4300 Switch | 172](#)
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- [Mounting an EX4300 Switch on a Wall | 181](#)

## Unpacking an EX4300 Switch

EX4300 switches are shipped in a cardboard carton, secured with foam packing material. The carton has an accessory compartment.



**CAUTION:** EX4300 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. Pull out the packing material holding the switch in place.
5. Verify the parts received against the inventory on the label attached to the carton. See ["Parts Inventory \(Packing List\) for an EX4300 Switch" on page 169](#).
6. Save the shipping carton and packing materials in case you need to move or ship the switch later.

## Parts Inventory (Packing List) for an EX4300 Switch

The switch shipment includes a packing list. Check the parts you receive with the switch against the items on the packing list. The packing list specifies the part number and provides a description of each part in your order. The parts shipped depend on the switch model you order. See ["EX4300 Switch Models" on page 30](#) for more information.

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

[Table 68 on page 169](#) lists the parts and their quantities as in the standard packing list for an EX4300 switch.

**Table 68: Inventory of Components Provided with an EX4300 Switch**

Component		Quantity
Switch		1
Fan modules	EX4300-24T, EX4300-24P, EX4300-32F, EX4300-48T, EX4300-48T-AFI, EX4300-48P, EX4300-48MP, EX4300-48T-DC, and EX4300-48T-DC-AFI switches	2 preinstalled
	EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches	Fan modules for this model are not shipped by default; you must order two fan modules separately.
Power supplies	EX4300-24T, EX4300-24P, EX4300-32F, EX4300-48T, EX4300-48T-AFI, EX4300-48P, EX4300-48MP, EX4300-48T-DC, and EX4300-48T-DC-AFI switches	1 (AC or DC) preinstalled

**Table 68: Inventory of Components Provided with an EX4300 Switch (Continued)**

Component		Quantity
	EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches	Power supplies for this model are not shipped by default; you must order power supplies separately.
AC power cord appropriate for your geographical location	EX4300-24T, EX4300-24P, EX4300-32F, EX4300-48T, EX4300-48T-AFI, EX4300-48P, and EX4300-48MP switches	1
	EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches	AC power cord for these models is not shipped by default; you must order it separately.
AC power cord retainer	EX4300-24T, EX4300-24P, EX4300-32F, EX4300-48T, EX4300-48T-AFI, EX4300-48P, and EX4300-48MP switches	1
	EX4300-24T-S, EX4300-24P-S, EX4300-32F-S, EX4300-48T-S, EX4300-48P-S, and EX4300-48MP-S switches	AC power cord retainer for these models is not shipped by default; a retainer is shipped if you order an AC power supply.
Cover panels for slots without preinstalled components		<ul style="list-style-type: none"> <li>• Uplink module slot cover panel: 1</li> <li>• Power supply cover panel: 1</li> </ul>
Mounting brackets		2
Mounting screws		8
Rubber feet		4

Table 68: Inventory of Components Provided with an EX4300 Switch (*Continued*)

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

**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.



**NOTE:** You must provide the appropriate mounting screws for mounting the switch 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 EX4300 Switch

To install and connect an EX4300 switch:

1. Follow instructions in ["Unpacking an EX4300 Switch" on page 168](#).
2. Install a power supply if it is not preinstalled:
  - ["Installing an AC Power Supply in an EX4300 Switch" on page 298](#)
  - ["Installing a DC Power Supply in an EX4300 Switch" on page 302](#)
3. Install a fan module if it is not preinstalled; see ["Installing a Fan Module in an EX4300 Switch" on page 294](#).
4. Mount the switch by following instructions appropriate for your site:
  - ["Mounting an EX4300 Switch on Two Posts of a Rack or Cabinet" on page 173](#) (by using the mounting brackets provided)
  - ["Mounting an EX4300 Switch in a Recessed Position in a Rack or Cabinet" on page 181](#) (by using the 2-in.-recess front brackets from the separately orderable four-post rack-mount kit)
  - ["Mounting an EX4300 Switch on Four Posts of a Rack or Cabinet" on page 177](#) (by using the separately orderable four-post rack-mount kit)
  - ["Mounting an EX4300 Switch on a Wall" on page 181](#) (by using the separately orderable wall-mount kit)
5. Follow instructions in *Connect Earth Ground to an EX Series Switch*.
6. Follow instructions for connecting power as appropriate for your site:
  - ["Connecting AC Power to an EX4300 Switch" on page 197](#)
  - ["Connecting DC Power to an EX4300 Switch" on page 200](#)
7. Register your product by following instructions in *Register Products—Mandatory for Validating SLAs*.
8. Perform initial configuration of the switch by following the instructions in *Connecting and Configuring an EX Series Switch (CLI Procedure)* or *Connecting and Configuring an EX Series Switch (J-Web Procedure)*.
9. Set the switch's management options by following the instructions in:
  - *Connect a Device to a Network for Out-of-Band Management*
  - *Connect a Device to a Management Console Using an RJ-45 Connector*
  - *Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port*

**SEE ALSO**


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[\*Rack Requirements\*](#)


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[\*Cabinet Requirements\*](#)


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[Clearance Requirements for Airflow and Hardware Maintenance for EX4300 Switches | 137](#)


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## Mounting an EX4300 Switch

You can mount an EX4300 switch:

- On two posts of a 19-in. rack or a 19-in. cabinet by using the mounting brackets provided with the switch.
- On four posts of a 19-in. rack or a 19-in. cabinet by using the separately orderable four-post rack-mount kit.
- In a position recessed 2 in. from the front of a 19-in. rack or a 19-in. cabinet by using the 2-in.-recess front brackets in the separately orderable four-post rack-mount kit. You can mount the switch in this recessed position on two-post or four-post racks and cabinets.
- On a wall by using the separately orderable wall-mount kit.

The holes in the mounting brackets are placed at 1 U (1.75 in. or 4.45 cm) apart so that the switch can be mounted in any rack or cabinet that provides holes spaced at that distance.

See the Related Documentation for detailed descriptions of the various rack or cabinet mounting options.

**SEE ALSO**


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[Mounting an EX4300 Switch on Two Posts of a Rack or Cabinet | 173](#)


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[Mounting an EX4300 Switch in a Recessed Position in a Rack or Cabinet | 181](#)


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[Mounting an EX4300 Switch on Four Posts of a Rack or Cabinet | 177](#)


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[Mounting an EX4300 Switch on a Wall | 181](#)


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[\*Connect Earth Ground to an EX Series Switch\*](#)


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## Mounting an EX4300 Switch on Two Posts of a Rack or Cabinet

Before mounting the switch on two posts of a rack:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX4300 Switches" on page 123](#).
- Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.
- Remove the switch from the shipping carton (see ["Unpacking an EX4300 Switch" on page 168](#)).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)
- 2 mounting brackets and 8 mounting screws (provided in the accessory box shipped with the switch)
- Screws to secure the chassis to the rack (not provided)
- 2-in.-recess front-mounting brackets if you will mount the switch in a recessed position (part of the separately orderable four-post rack-mount kit)
- Cover panels for uplink module and power supply slots (provided)

You can mount an EX4300 switch on two posts of a 19-in. rack (either a two-post or a four-post rack) or a 19-in. 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 EX4300 Switch on Four Posts of a Rack or Cabinet" on page 177](#).



**NOTE:** If you need to mount the switch in a recessed position on two posts of 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.

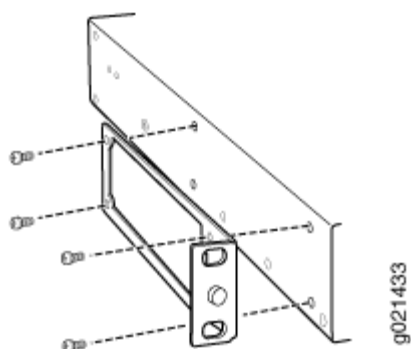


**CAUTION:** If you are mounting multiple switches on a rack, mount a switch in the bottom of the rack first and proceed to mount the rest of the switches from bottom to top.

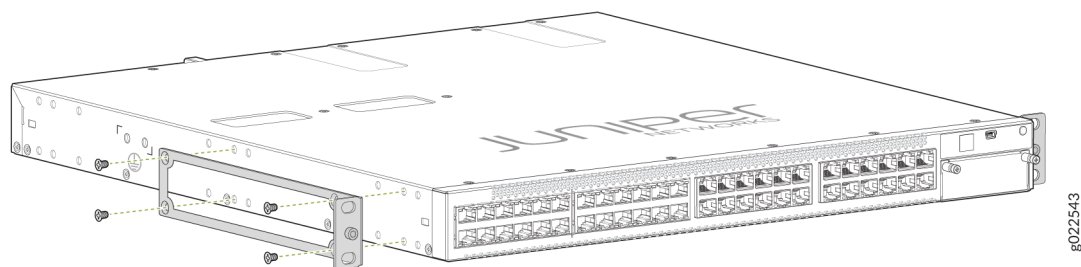
To mount the switch on two posts of a rack:

1. Place the switch on a flat, stable surface.
2. Align the mounting brackets along the front, rear, or center 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 EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, align the brackets along the front of the side panel (see [Figure 54 on page 175](#)). If you want to front-mount an EX4300-48MP or EX4300-48MP-S switch, align the brackets 17.5 mm offset from the front panel (see [Figure 55 on page 175](#) and [Figure 56 on page 176](#)).

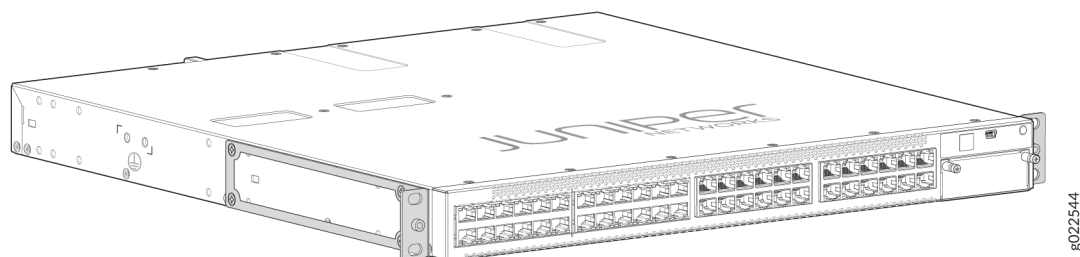
**Figure 54: Attaching the Mounting Bracket to the Side Panel of EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 55: Attaching the Mounting Bracket to the Side Panel of EX4300-48MP and EX4300-48MP-S Switches**

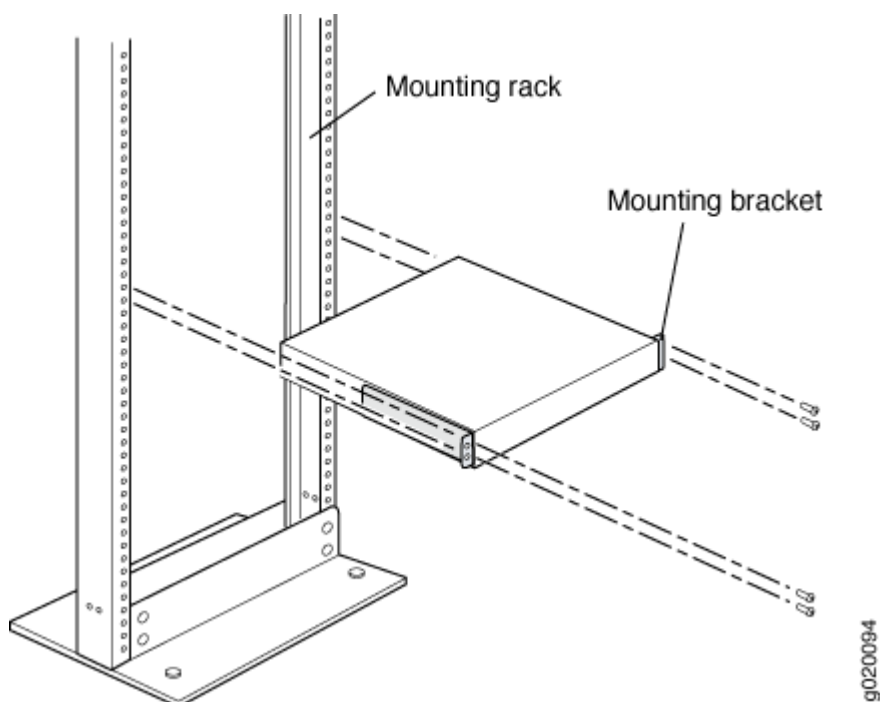


**Figure 56: Mounting Bracket Attached to the Side Panel of EX4300-48MP and EX4300-48MP-S Switches**



3. Align the bottom holes in the mounting brackets with the holes on the side panels of the switch chassis.
4. Insert mounting screws into the aligned holes. Tighten the screws by using the Phillips (+) screwdriver.
5. 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 by using the Phillips (+) screwdriver.
6. 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 both the mounting brackets with a hole in each rack rail, making sure the chassis is level. See [Figure 57 on page 177](#).

Figure 57: Mounting the Switch on Two Posts of a Rack



7. Have a second person secure the switch to the rack by using the appropriate screws. Tighten the screws.
8. Ensure that the switch chassis is level by verifying that all screws on one side of the rack are aligned with the screws on the other side.



**NOTE:** We recommend that you install cover panels in the unused uplink module and power supply slots.

## SEE ALSO

*Rack-Mounting and Cabinet-Mounting Warnings*

## Mounting an EX4300 Switch on Four Posts of a Rack or Cabinet

Before mounting the switch on four posts of a rack:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX4300 Switches"](#) on page 123.

- Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.
- Remove the switch from the shipping carton (see ["Unpacking an EX4300 Switch" on page 168](#)).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)
- 6 flat-head 4-40 Phillips mounting screws (provided with the four-post rack-mount kit)
- 12 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)
- Cover panels for uplink module and power supply slots (provided)

You can mount an EX4300 switch on four posts of a 19-in. rack or a 19-in. 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 of either a two-post rack or a four-post rack by using the mounting brackets provided with the switch. See ["Mounting an EX4300 Switch on Two Posts of a Rack or Cabinet" on page 173](#).



**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:** To ensure that the protective earthing terminal is accessible through the opening in the rear mounting-blade:

- Ensure that the rack is 27.5 in. (70 cm) through 30.5 in. (77.5 cm) deep if you are mounting the switch flush with the rack front on four posts of a rack.

- Ensure that the rack is 29.5 in. (75 cm) through 32.5 in. (82.5 cm) deep if you will mount the switch 2 in. recessed from the rack front.



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

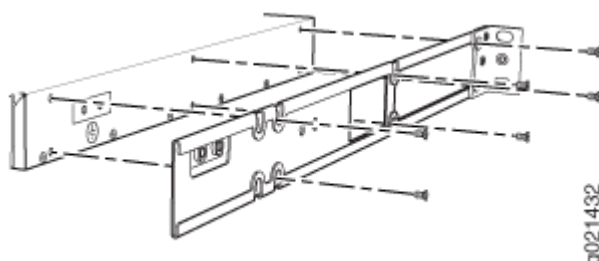
1. Place the switch on a flat, stable surface.



**NOTE:** The four-post rack-mount kit ships with the short front-mounting brackets attached to the side mounting-rails. If you want to recess the switch in the rack, you must unscrew the short front-mounting brackets from the side mounting-rails by using the Phillips (+) screwdriver and attach the long front-mounting brackets to the side mounting-rails.

2. 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 panels.
3. Insert 4x6-mm Phillips flat-head mounting screws into the two aligned holes and tighten the screws by using the screwdriver. Ensure that the remaining four holes in the side mounting-rails are aligned with the four holes in the side panel. See [Figure 58 on page 179](#).

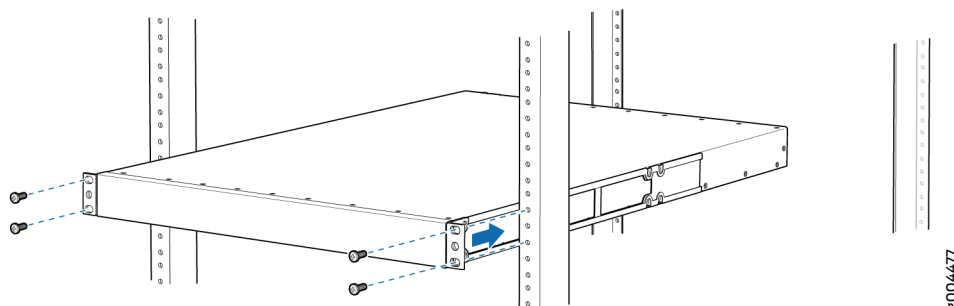
**Figure 58: Attaching the Side Mounting-Rail to the Switch Chassis**



4. Insert the 4x6-mm Phillips flat-head mounting screws into the remaining four holes in the side mounting-rails and tighten the screws by using the screwdriver.

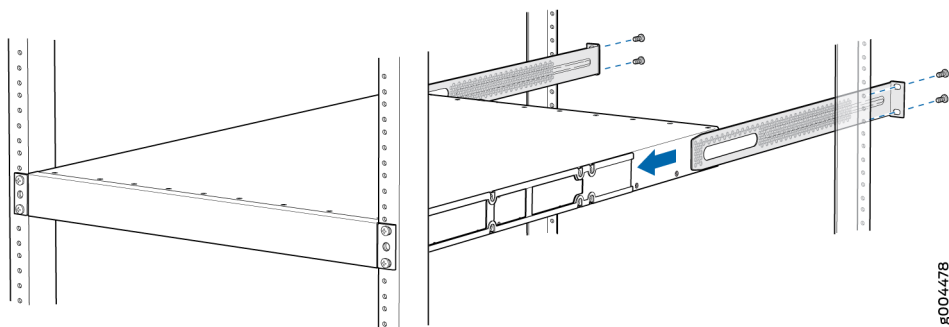
5. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the side mounting-rail holes with the threaded holes in the front post of the rack. Align the bottom hole in both the front-mounting brackets with a hole in each rack rail, making sure the chassis is level. See [Figure 59 on page 180](#).

**Figure 59: Mounting the Switch on Front Posts of a Rack**



6. Have a second person secure the front of the switch to the rack by using the appropriate screws for your rack.
7. Slide the rear mounting-blades into the side mounting-rails. See [Figure 60 on page 180](#).

**Figure 60: Sliding the Rear Mounting-Blades into the Side Mounting-Rails**



8. Attach the rear mounting-blades to the rear post by using the appropriate screws for your rack. Tighten the screws.
9. 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.



**NOTE:** We recommend that you install cover panels in the unused uplink module and power supply slots.

**SEE ALSO**

*Rack-Mounting and Cabinet-Mounting Warnings*

## Mounting an EX4300 Switch in a Recessed Position in a Rack or Cabinet

You can mount an EX4300 switch in a recessed position on two posts of either a two-post rack or a four-post rack such that the switch is recessed inside the rack from the rack front by 2 inches. To mount the switch in a recessed position, use the front-mounting brackets provided in the separately orderable four-post rack-mount kit.

Reasons 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 an uplink module with transceivers installed in it—the transceivers in the uplink module ports protrude from the front of the switch.

To mount the switch in a recessed position, on two-posts or on four-posts, follow the instructions in ["Mounting an EX4300 Switch on Two Posts of a Rack or Cabinet" on page 173](#) or ["Mounting an EX4300 Switch on Four Posts of a Rack or Cabinet" on page 177](#).

**SEE ALSO**

*Connect Earth Ground to an EX Series Switch*  
*Rack-Mounting and Cabinet-Mounting Warnings*

## Mounting an EX4300 Switch on a Wall

Before mounting the switch on a wall:

- Verify that the site meets the requirements described in ["Site Preparation Checklist for EX4300 Switches" on page 123](#).
- Read *General Safety Guidelines and Warnings*, with particular attention to *Chassis and Component Lifting Guidelines*.
- Remove the switch from the shipping carton (see ["Unpacking an EX4300 Switch" on page 168](#)).

Ensure that you have the following parts and tools available:

- Phillips (+) screwdriver, number 2 (not provided)
- 2 wall-mount brackets (provided with the wall-mount kit)
- 12 wall-mount bracket screws (provided with the wall-mount kit)
- 4 mounting screws (8-32 x 1.25 in. or M4 x 30 mm) (not provided)
- Cover panels for uplink module and power supply slots (provided)
- Hollow wall anchors capable of supporting the combined weight of two fully loaded switches, up to 33 lb (15 kg) (not included)—if you are mounting the switch in sheetrock (wall board with a gypsum plaster core) or in wall board not backed by wall studs.



**WARNING:** When mounting EX4300 switches except EX4300-48MP and EX4300-48MP-S switches on a wall, orient the front panel of the chassis downward to ensure proper airflow and meet safety requirements in the event of a fire. When mounting EX4300-48MP and EX4300-48MP-S switches on a wall, orient the front panel of the chassis pointing to the right side or to the left side to ensure proper airflow and meet safety requirements in the event of a fire.



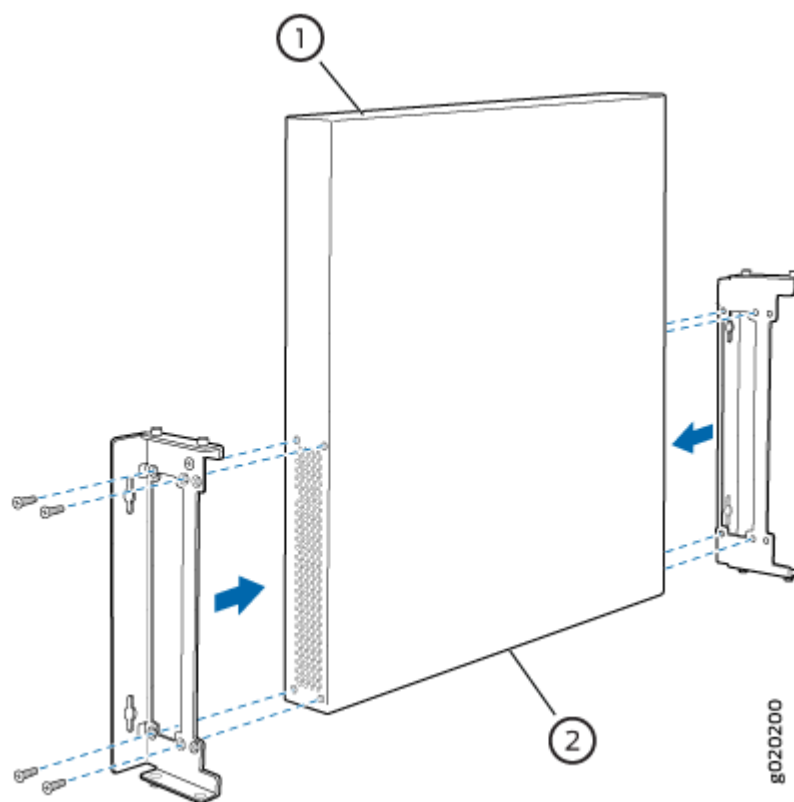
**NOTE:** For easier lifting, install any additional power supplies only after you mount the switch on the wall.

You can mount an EX4300 switch on a wall by using the separately orderable wall-mount kit.

To mount the switch on a wall:

1. Attach the wall-mount brackets to the sides of the chassis by using four of the wall-mount bracket screws on each side (see the representation in [Figure 61 on page 183](#)). Use the screwdriver to tighten the screws.

Figure 61: Attaching Wall-Mount Brackets to the Switch Chassis



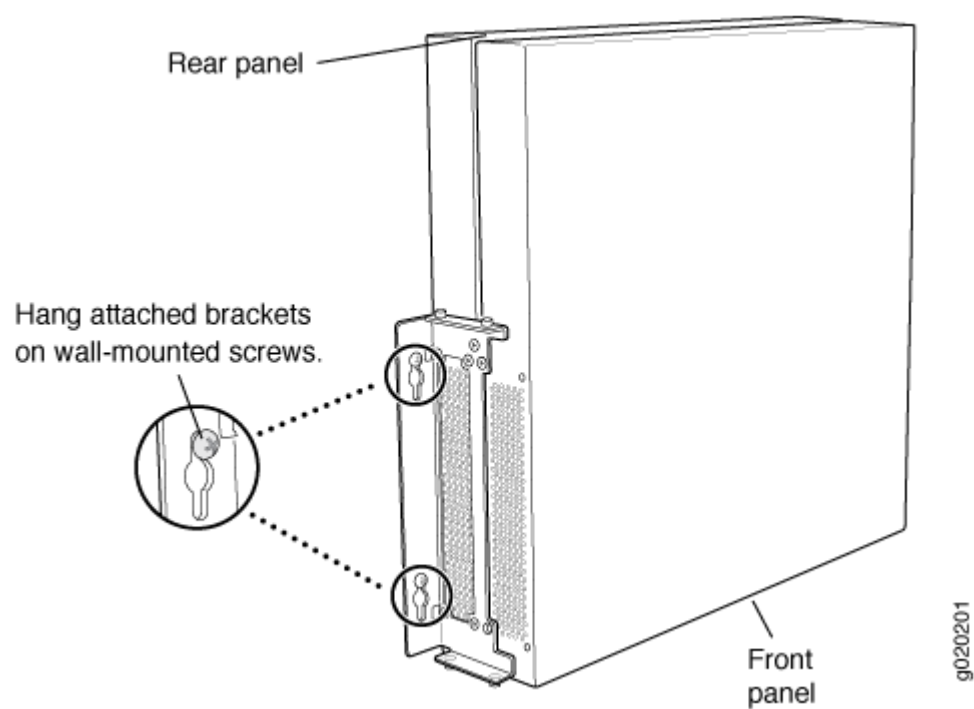
2. If you are mounting two switches together, line the second switch on top of the first and attach it to the mounting brackets by using two wall-mount bracket screws on each side (see the representation in [Figure 62 on page 184](#)).
3. Insert the mounting screws in the wall. If you are mounting EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, insert the top pair of mounting screws 474.35 mm apart, and insert the second pair of mounting screws 151.81 mm directly below the first set. If you are mounting EX4300-48MP and EX4300-48MP-S switches, insert the top pair of mounting screws 474.2 mm apart, and insert the second pair of mounting screws 152 mm directly below the first set (see [Figure 63 on page 185](#) and [Figure 64 on page 186](#)).

If the mounting screws are inserted in a wall board with no stud behind it, you must use dry wall anchors rated to support 75 lb (34 kg). Insert the screws into wall studs wherever possible to provide added support for the chassis.

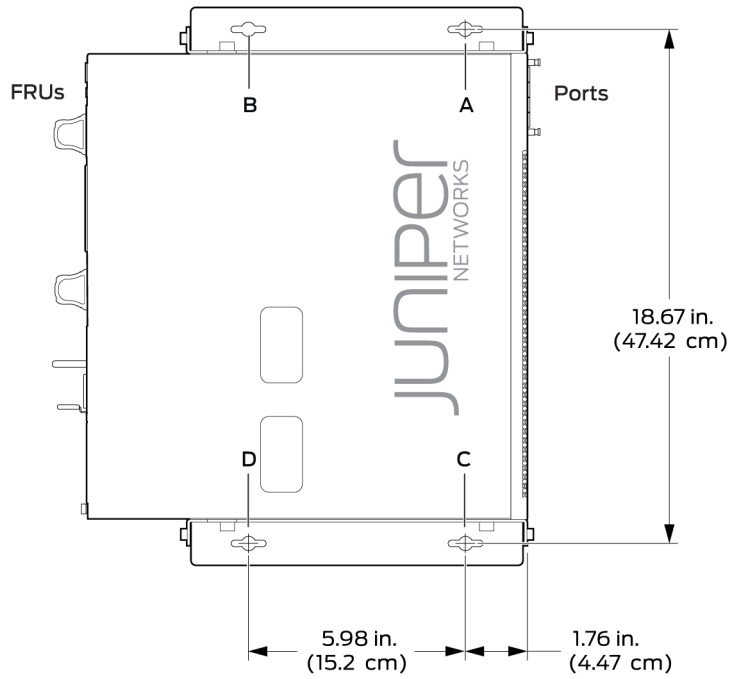
Drive the screws only part way in, leaving about 1/4 in. (6 mm) distance between the head of the screw and the wall. Use the screwdriver to drive the screws in.

4. Grasp each side of the switch or switches, lift the switch or switches, and hang the brackets from the mounting screws (see the representation in [Figure 62 on page 184](#)).

Figure 62: Mounting the Switch on a Wall

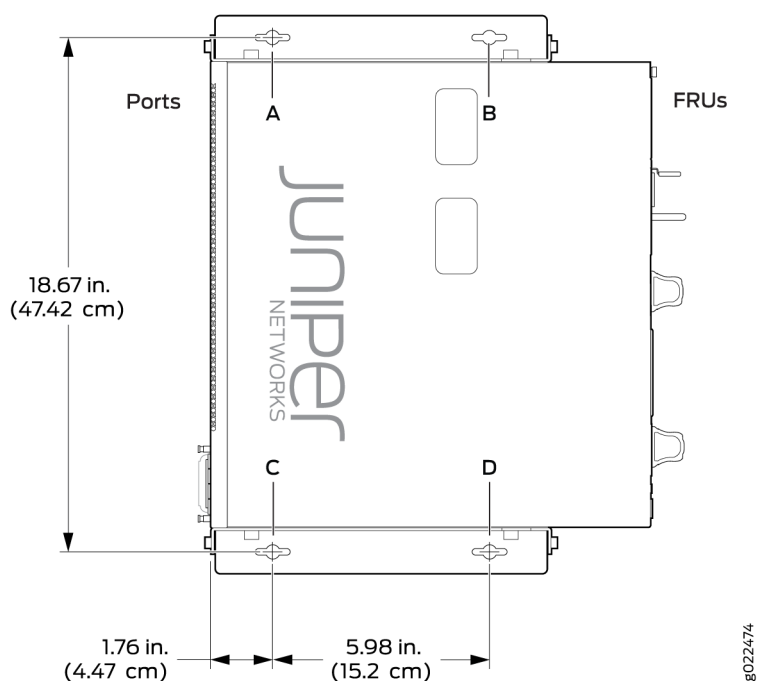


**Figure 63: Measurements for Mounting EX4300-48MP and EX4300-48MP-S Switches on a Wall with the Front Panel Pointing to the Right Side**



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**Figure 64: Mounting EX4300-48MP and EX4300-48MP-S Switches on a Wall with the Front Panel Pointing to the Left Side**



5. Tighten the mounting screws by using the screwdriver.

#### SEE ALSO

[Wall-Mounting Warning for EX4300 Switches | 370](#)

## Connecting the EX4300 to Power

#### IN THIS SECTION

- [Connect Earth Ground to an EX Series Switch | 187](#)
- [Connecting AC Power to an EX4300 Switch | 197](#)
- [Connecting DC Power to an EX4300 Switch | 200](#)

## Connect Earth Ground to an EX Series Switch

### IN THIS SECTION

- [Parts and Tools Required for Connecting an EX Series Switch to Earth Ground | 187](#)
- [Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch | 194](#)
- [Connecting Earth Ground to an EX Series Switch | 196](#)

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 66 on page 196](#)).

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 69 on page 188](#) 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 69 on page 188](#) lists the earthing terminal location, grounding cable and lug specifications, and parts needed for connecting an EX Series switch to earth ground.

Table 69: 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 69: 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 69: 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 194.
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 194.

Table 69: 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 194.

Table 69: 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 69: 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 69: 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:

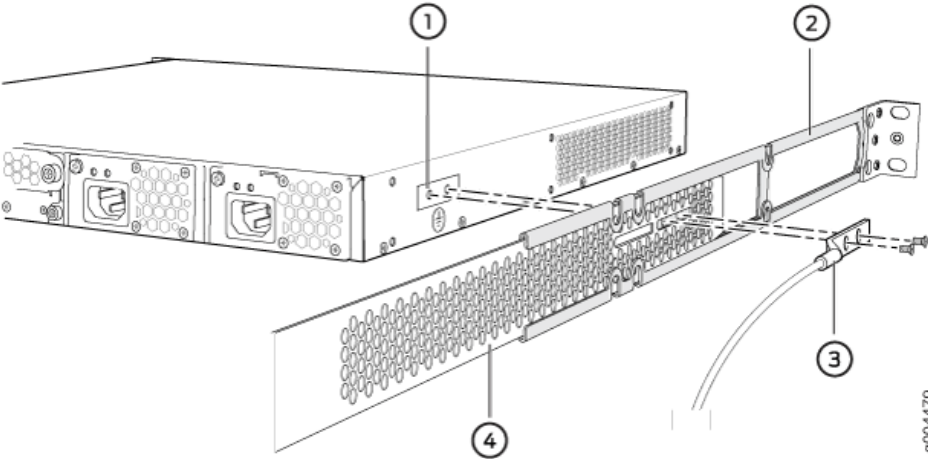
- An electrostatic discharge grounding strap (provided)
- A Phillips (+) number 2 screwdriver to tighten the screws.

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 70 on page 195](#) lists the special instructions that you might need to follow before connecting earth ground to a switch.

Table 70: Special Instructions to Follow Before Connecting Earth Ground to an EX Series Switch

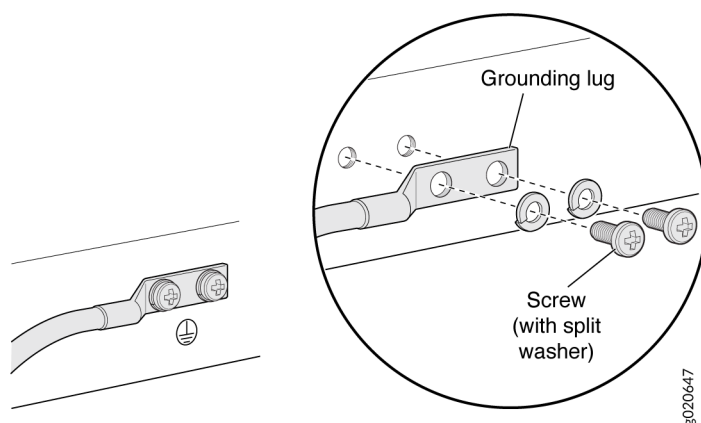
Switch	Special Instructions
EX3200 and EX4200	Some early variants of EX3200 and EX4200 switches for which the Juniper Networks model number on the label next to the protective earthing terminal is from 750-021xxx through 750-030xxx require 10-24x.25 in. screws.
EX4200, EX4500, and EX4550	<p>If you plan 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 65 on page 195</a>.</p> <p><b>Figure 65: 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 66 on page 196](#).

**Figure 66: Connecting a Grounding Cable to an EX Series Switch**



5. Secure the grounding lug to the protective earthing terminal with the washers and screws.
6. Dress the grounding cable and ensure that it does not touch or block access to other switch components and that it does not drape where people could trip over it.

### SEE ALSO

*General Safety Guidelines and Warnings*

*Grounded Equipment Warning*

## Connecting AC Power to an EX4300 Switch

Before you begin connecting AC power to an EX4300 switch:

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



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

To meet electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the EX4300 switch to earth ground before you connect it 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*. An EX4300 switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see ["AC Power Cord Specifications for an EX4300 Switch" on page 107](#)).

- Install the power supply in the chassis. For instructions on installing a power supply in an EX4300 switch, see ["Installing an AC Power Supply in an EX4300 Switch" on page 298](#).

EX4300 switches support 350 W, 715 W, or 1100 W AC power supplies depending on the switch model. After you install at least one power supply, you can connect power to the switch.



**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

Ensure that you have the following parts and tools available:

- A power cord appropriate for your geographical location (provided)



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

To connect AC power to an EX4300 switch:

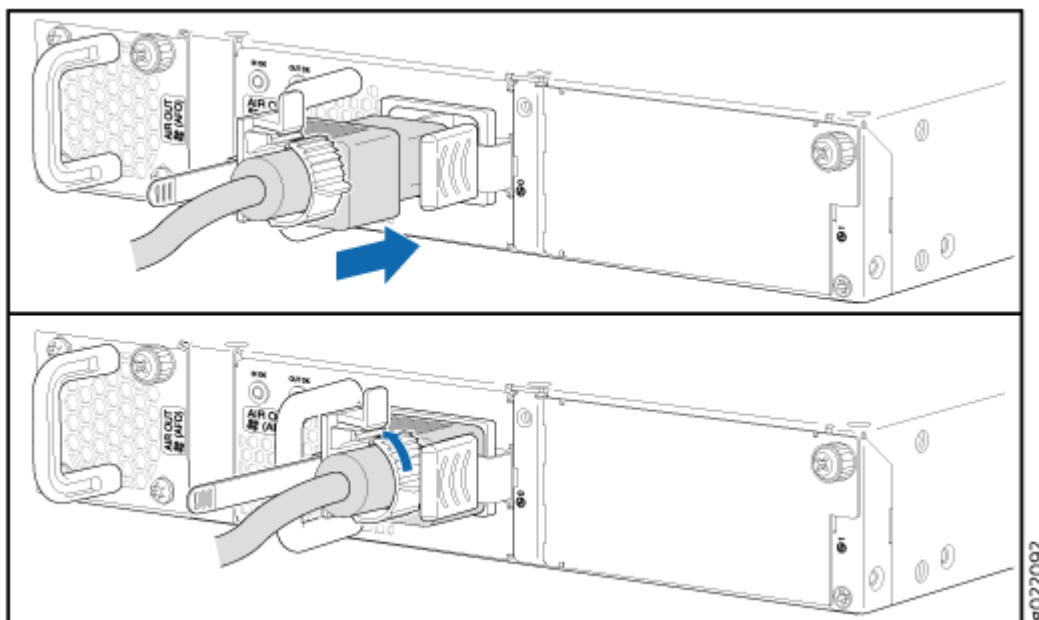
1. Attach the grounding strap to your bare wrist and to a site ESD point.



**NOTE:** The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 67 on page 199](#) shows how to connect an AC power cord to an AC power supply installed on 24-port or 48-port EX4300 switches. The procedure is the same for 32-port EX4300 switches.

2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure. If only one power supply is installed, ensure that a cover panel is installed over the second power supply slot.
3. Locate the power cord and power cord retainer shipped with the switch; the cords have plugs appropriate for your geographical location. See "[AC Power Cord Specifications for an EX4300 Switch](#)" on page 107.
4. Push the end of the retainer strip into the hole next to the inlet on the power supply face plate until it snaps into place. Ensure that the loop in the retainer strip faces toward the power cord.
5. Press the small tab on the retainer strip to loosen the loop. Slide the loop until you have enough space to insert the power cord coupler into the inlet.
6. Insert the power cord coupler firmly into the inlet.
7. Slide the loop toward the power supply until it is snug against the base of the coupler.
8. Press the tab on the loop and draw out the loop into a tight circle (see [Figure 67 on page 199](#)).

Figure 67: Connecting an AC Power Cord to an AC Power Supply in an EX4300 Switch



9. If the AC power source outlet has a power switch, set it to the OFF (O) position.
10. Insert the power cord plug into an AC power source outlet.
11. If the AC power source outlet has a power switch, set it to the ON (I) position.
12. Verify that the **IN OK** and **OUT OK** LEDs on each power supply are lit green.

If the **OUT OK** LED is lit amber, remove power from the power supply, and replace the power supply (see ["Removing an AC Power Supply from an EX4300 Switch" on page 297](#)). Do not remove the power supply until you have a replacement power supply ready: the power supplies or a cover panel must be installed in the switch to ensure proper airflow.



**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.

#### SEE ALSO

[AC Power Supply in EX4300 Switches | 93](#)

[AC Power Supply LEDs in EX4300 Switches | 112](#)

## Connecting DC Power to an EX4300 Switch

Before you begin connecting DC power to an EX4300 switch:

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



**CAUTION:** Ensure that you install the power supply module first and then install the DC input wire, before closing input breaker ON.



**CAUTION:** Before you connect power to the device, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the device (for example, by causing a short circuit). To meet electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it 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*.

- Install the power supply in the chassis. For instructions on installing a DC power supply in an EX4300 switch, see ["Installing a DC Power Supply in an EX4300 Switch" on page 302](#).

Ensure that you have the following parts and tools available:

- DC power source cables (14–16 AWG) with ring lug (Molex 190700067 or equivalent) (not provided)
- Phillips (+) screwdriver, number 2 (not provided)
- Multimeter (not provided)
- A 14-10 AWG STR (2.5-6 mm<sup>2</sup>), minimum 90°C wire grounding cable, or one permitted by the local code, with a Panduit LCD10-10A-L or equivalent grounding lug attached (not provided)
- Two 10-32 x .25 in. screws with #10 split-lock washer (not provided)
- Two #10 flat washers (not provided)

EX4300 switches can be configured with up to two DC power supplies. After you install at least one power supply, you can connect power to the switch.



**CAUTION:** Do not mix:

- AC and DC power supplies in the same chassis
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.

To connect DC power to an EX4300 switch:

1. Attach the grounding strap to your bare wrist and to a site ESD point.



**NOTE:** The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 69 on page 204](#) shows how to secure ring lugs to the terminals on the DC power supply installed on 24-port or 48-port EX4300 switches. The procedure is the same for 32-port EX4300 switches.

2. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the -48V and RTN DC cables to chassis ground:
  - The cable with very low resistance (indicating a closed circuit) to chassis ground is positive (+) and will be installed on the V+ (return) DC power input terminal.
  - The cable with very high resistance (indicating an open circuit) to chassis ground is negative (-) and will be installed on the V- (input) DC power input terminal.



**CAUTION:** You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (-) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the DC power input terminals on each power supply.

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

To install heat-shrink tubing:

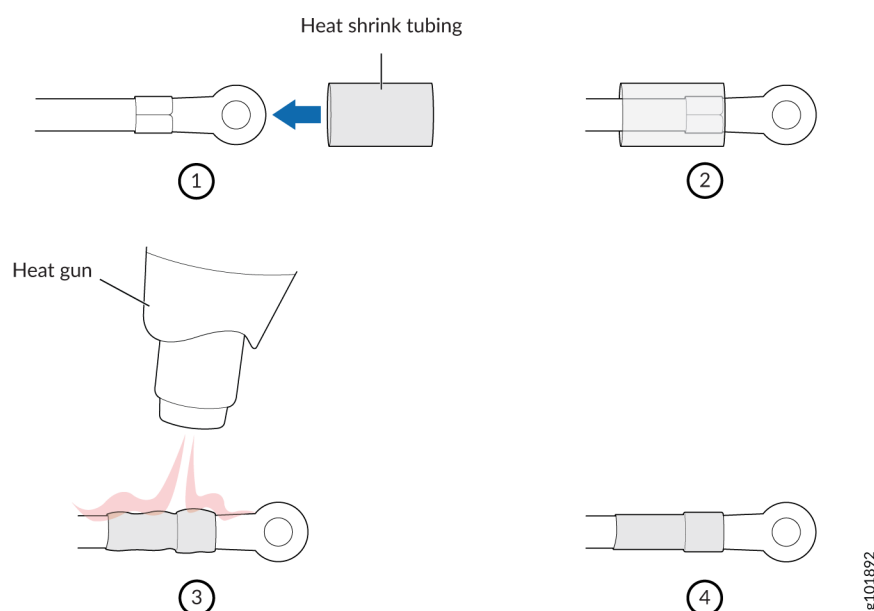
- a. Slide the tubing over the portion of the cable where it is attached to the lug barrel. Ensure that tubing covers the end of the wire and the barrel of the lug attached to it.
- b. Shrink the tubing with a heat gun. Ensure that you heat all sides of the tubing evenly so that it shrinks around the cable tightly.

Figure 68 on page 202 shows the steps to install heat-shrink tubing.



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

**Figure 68: How to Install Heat-Shrink Tubing**



4. Ensure that the input circuit breaker is open so that the voltage across the DC power source cable leads is 0 V and that the cable leads will not become active while you are connecting DC power.



**NOTE:** The V+ terminals are referred to as +RTN and V- terminals are referred to as -48 V in *DC Power Wiring Sequence Warning* and *DC Power Electrical Safety Guidelines*.

5. Ensure that the power supplies are fully inserted in the chassis.
6. Remove the terminal block cover. The terminal block cover is a piece of clear plastic that snaps into place over the terminal block.
7. Remove the screws on the terminals by using the screwdriver. Save the screws.



**WARNING:** Ensure that the power cables do not block access to switch components or drape where people can trip on them.



**NOTE:** The DC power supply has five terminals, two positive terminals labeled V+ and two negative terminals labeled V–, for connecting the power supply to a dedicated DC power source by using the DC power source cables labeled positive (+) and negative (–), and one terminal for connecting the power supply to earth ground (see [Figure 69 on page 204](#)). The V+ terminals are shunted internally together, as are the V– terminals to provide parallel current path.

8. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
9. Place the grounding lug attached to the grounding cable over the earth ground terminal. The protective earth ground terminal on an EX4300 switch, mounted on four posts of a rack, is accessible through the slot on the mounting bracket on the left side only. If you are unable to access protective earthing terminal, you can connect the grounding cable to the earth ground terminal on the DC power supply.
10. Secure the grounding lug to the protective earthing terminal with the washers and screws.
11. Dress the grounding cable and ensure that it does not touch or block access to other switch components.



**WARNING:** Ensure that the cable does not drape where people could trip over it.

12. Connect each power supply to the power source. Secure power source cables to the power supplies by screwing the ring lugs attached to the cables to the appropriate terminals by using the screw from the terminals (see [Figure 69 on page 204](#)).
  - To connect a power supply to a power source:
    - a. Secure the ring lug of the positive (+) DC power source cable to one of the + terminals on the DC power supply.
    - b. Secure the ring lug of the negative (–) DC power source cable to the – terminal adjacent to the + terminal that you connected to on the DC power supply.
    - c. Connect the ground wire to earth ground if the switch is not in a grounded rack. The protective earth ground terminal on an EX4300 switch, mounted on four posts of a rack, is accessible through the slot on the mounting bracket on the left side only. If you are unable to access protective earthing terminal, you can connect the grounding cable to the earth ground terminal on the DC power supply.

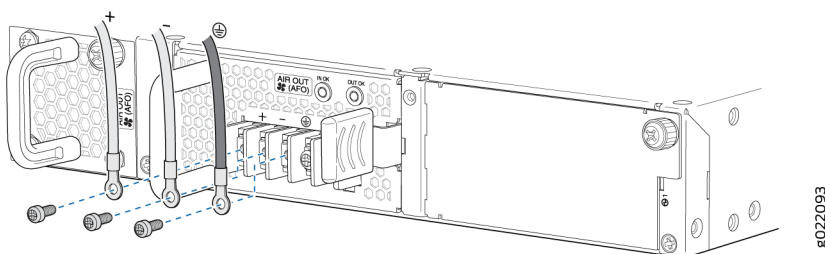
- d. Tighten the screws on the power supply terminals until they are snug by using the screwdriver. Do not overtighten—apply between 5 lb-in (0.56 Nm) and 6 lb-in (0.68 Nm) of torque to the screws.

If you have a second installed power supply, connect it in the same way you did the first.

- To connect one power supply to two power sources:
  - a. Secure the ring lug of the positive (+) DC power source cable from the first DC power source to a + terminal on the power supply.
  - b. Secure the ring lug of the negative (-) DC power source cable from the first DC power source to the - terminal adjacent to the + terminal on the DC power supply to which you connected the ring lug of the positive (+) DC power source cable from the first DC power source.
  - c. Secure the ring lug of the positive (+) DC power source cable from the second DC power source to the other + terminal on the power supply.
  - d. Secure the ring lug of the negative (-) DC power source cable from the second DC power source to the - terminal adjacent to the + terminal on the DC power supply to which you connected the ring lug of the positive (+) DC power source cable from the second DC power source.
  - e. Connect the ground wire to earth ground if the switch is not in a grounded rack. The protective earth ground terminal on an EX4300 switch, mounted on four posts of a rack, is accessible through the slot on the mounting bracket on the left side only. If you are unable to access protective earthing terminal, you can connect the grounding cable to the earth ground terminal on the DC power supply.
  - f. Tighten the screws on the power supply terminals on both the power supplies until snug using the screwdriver. Do not overtighten—apply between 8 lb-in. (0.9 Nm) and 9 lb-in. (1.02 Nm) of torque to the screws.

If you have a second installed power supply, connect it in the same way you did the first.

**Figure 69: Securing Ring Lugs to the Terminals on the DC Power Supply**



13. Replace the terminal block cover.
14. Close the input circuit breaker.
15. Verify that the **IN OK** and **OUT OK** LEDs on the power supply are lit green and are on steadily.

#### SEE ALSO

[DC Power Supply in EX4300 Switches | 114](#)

[DC Power Supply LEDs in EX4300 Switches | 120](#)

## Connecting the EX4300 to External Devices

#### IN THIS SECTION

- [Connect a Device to a Network for Out-of-Band Management | 205](#)
- [Connect a Device to a Management Console Using an RJ-45 Connector | 206](#)
- [Connect an EX Series Switch to a Management Console Using the Mini-USB Type-B Console Port | 208](#)

### 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.

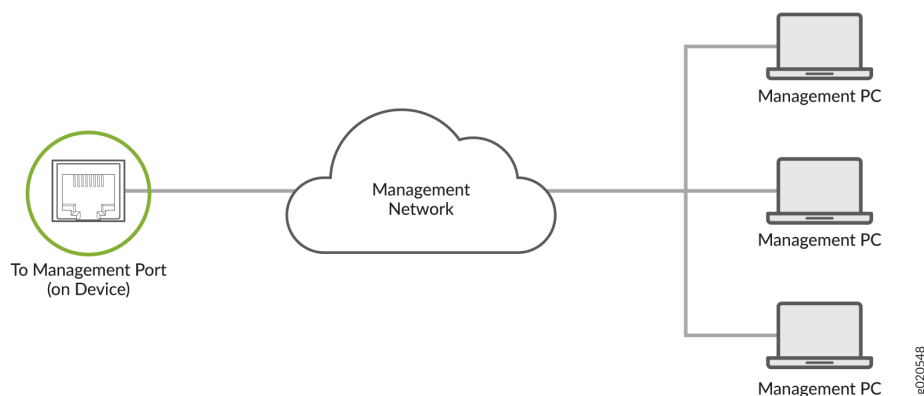
**Figure 70: RJ-45 Connector on an Ethernet Cable**



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:

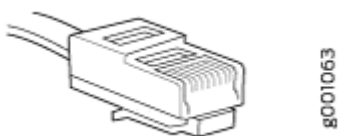
1. Connect one end of the Ethernet cable to the management port on the device.
2. Connect the other end of the Ethernet cable to the management device.



## 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 71: 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.



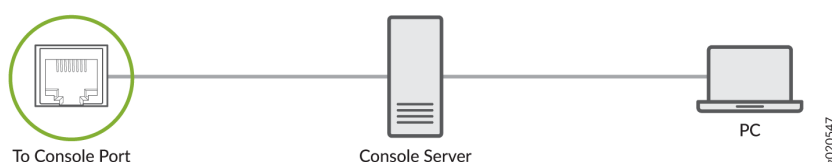
**NOTE:** If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC directly to the device, use a combination of the RJ-45-to-DB-9 socket adapter and a USB-to-DB-9 plug adapter. You must provide the USB-to-DB-9 plug adapter.

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.

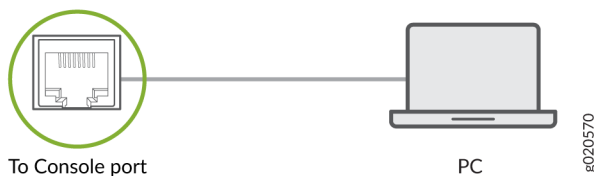
To connect the device to a management console:

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 72 on page 207](#)) or management console (see [Figure 73 on page 207](#)).

**Figure 72: Connect a Device to a Management Console Through a Console Server**



**Figure 73: 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 EX4300 to the Network

## IN THIS SECTION

- [Install a Transceiver | 210](#)
- [Connect a Fiber-Optic Cable | 213](#)

## 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 74 on page 213 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.

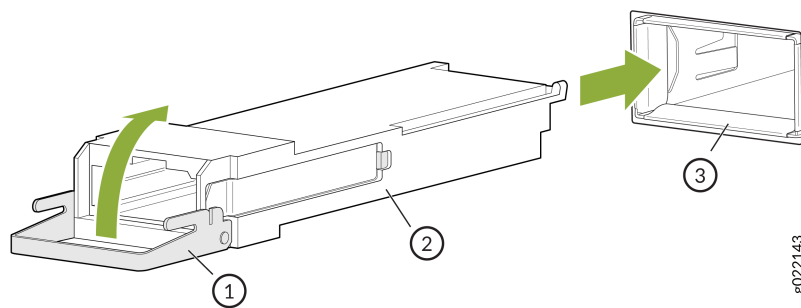


**NOTE:** Make sure to use a dust cap to cover ports that are unused.



**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 74: Install a Transceiver



1– Ejector lever

3– Port

2– Transceiver

## Connect a Fiber-Optic Cable

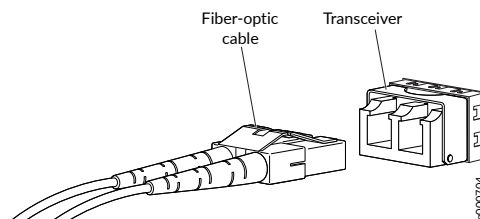
Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see [Laser and LED Safety Guidelines and Warnings](#)).

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.

## Connecting QFX Series and EX Series Switches in a QFX Virtual Chassis

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## Connecting QFX Series and EX Series Switches in a QFX Virtual Chassis

### IN THIS SECTION

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In a QFX Virtual Chassis, you can connect up to 10 standalone QFX5100, QFX3600, QFX3500, and EX4300 switches except EX4300-48MP and EX4300-48MP-S switches into a QFX Series Virtual Chassis and manage the interconnected switches as a single chassis. Unlike a Virtual Chassis Fabric (VCF), which is cabled in a spine and leaf topology, the QFX Virtual Chassis is cabled in a ring topology.

For Virtual Chassis Fabric cabling examples, see [Connecting a QFX5100 Device in a Virtual Chassis Fabric](#).

As of Junos Release 17.3R1, you can also connect select models of the QFX5100 in the line card role in a QFX5110 Virtual Chassis. See [Connecting QFX5110 and QFX5100 Members in a QFX5110 Virtual Chassis](#).

This topic describes how to cable QFX Series switches and EX4300 switches into a QFX Virtual Chassis.

## Before You Start

You configure a QFX Series Virtual Chassis by configuring the switch interfaces into Virtual Chassis ports (VCPs). VCPs connect switches together to form a Virtual Chassis, and are responsible for passing all data and control traffic between member switches in the Virtual Chassis. All non-channelized QSFP+ uplink interfaces on standalone QFX5100 switches can be configured into VCPs. All fixed SFP+ interfaces on QFX5100-96S switches can also be configured into VCPs.

Use the following interfaces to create VCPs:

- On QFX5100, non-channelized QSFP+ uplink interfaces. All fixed SFP+ interfaces on the QFX5100-96S switches are also available.
- On EX4300 switches, the built-in QSFP+ ports are dedicated VCPs by default. In 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, you can use the QSFP+ ports as network ports or as VCPs. You can also use the SFP+ uplink module ports as VCPs by configuring these ports as VCPs.

In EX4300-48MP and EX4300-48MP-S switches, you can use only the built-in QSFP+ ports as VCPs. You cannot configure the ports on the uplink module in EX4300-48MP and EX4300-48MP-S switches to Virtual Chassis ports (VCPs).

- On QFX3500 and QFX3600, all non-channelized QSFP+ and fixed SFP+ interfaces.



**BEST PRACTICE:** Use the 40-Gigabit QSFP+ interfaces for the VCPs.

The advantages of connecting multiple switches into a Virtual Chassis include better-managed bandwidth at a network layer, simplified configuration and maintenance because multiple devices can be managed as a single device, increased fault tolerance and high availability (HA) because a Virtual Chassis can remain active and network traffic can be redirected to other member switches when a single member switch fails, and a flatter, simplified Layer 2 network topology that minimizes or eliminates the need for loop prevention protocols such as Spanning Tree Protocol (STP).

You can increase VCP bandwidth between member switches by configuring multiple interfaces between the same two switches into VCPs. When multiple VCPs are interconnecting the same two member switches, a Link Aggregation Group (LAG) bundle is automatically formed when the VCPs are on

interfaces supporting identical speeds. For instance, if you have two 40-Gigabit QSFP+ interfaces configured as VCPs between member switches, a LAG with two member links with 80 Gbps of total bandwidth is formed. 10-Gigabit SFP+ and 40-Gigabit QSFP+ interfaces configured as VCPs cannot be members of the same LAG, however. The Virtual Chassis feature is not applicable to QFX devices in a QFabric.

Virtual Chassis can be installed in a single rack, multiple racks, or in wire closets.

## Valid Configurations

Valid configurations are:

- All QFX5100 members—in a ring topology this is Virtual Chassis; in a spine and leaf topology this is a Virtual Chassis Fabric (VCF). For a cabling example of spine and leaf, see [Connecting a QFX5100 Device in a Virtual Chassis Fabric](#).
- All QFX3600 members
- All QFX3500 members
- A mixture of QFX3600 and QFX3500 members
- A mixture of QFX5100, QFX3600, and QFX3500 members—use the QFX5100 switches as primary and backup whenever possible.
- A mixture of QFX5100, QFX3600, QFX3500, and EX4300 members except EX4300-48MP and EX4300-48MP-S switches. EX4300 switches as the primary or backup is not supported; use QFX5100 switches in these roles whenever possible.

An all EX4300 member is simply considered an EX4300 Virtual Chassis (see [Understanding EX Series Virtual Chassis](#)).

If the QSFP+ interfaces are not available for VCP, 10-Gigabit interfaces can be used.

All members of the Virtual Chassis are required to run the same Junos OS Release. You can check the version and release by issuing the `show chassis version` CLI command.

## Cabling QFX3500 Switches in a QFX5100 Virtual Chassis

[Figure 75 on page 217](#) is the preferred cabling method using the 40-Gigabit QSFP ports. See [Figure 76 on page 218](#) for an alternative method using the 10-Gigabit SFP+ ports.

Figure 75: QFX3500 Using the 40G Ports as the VCPs

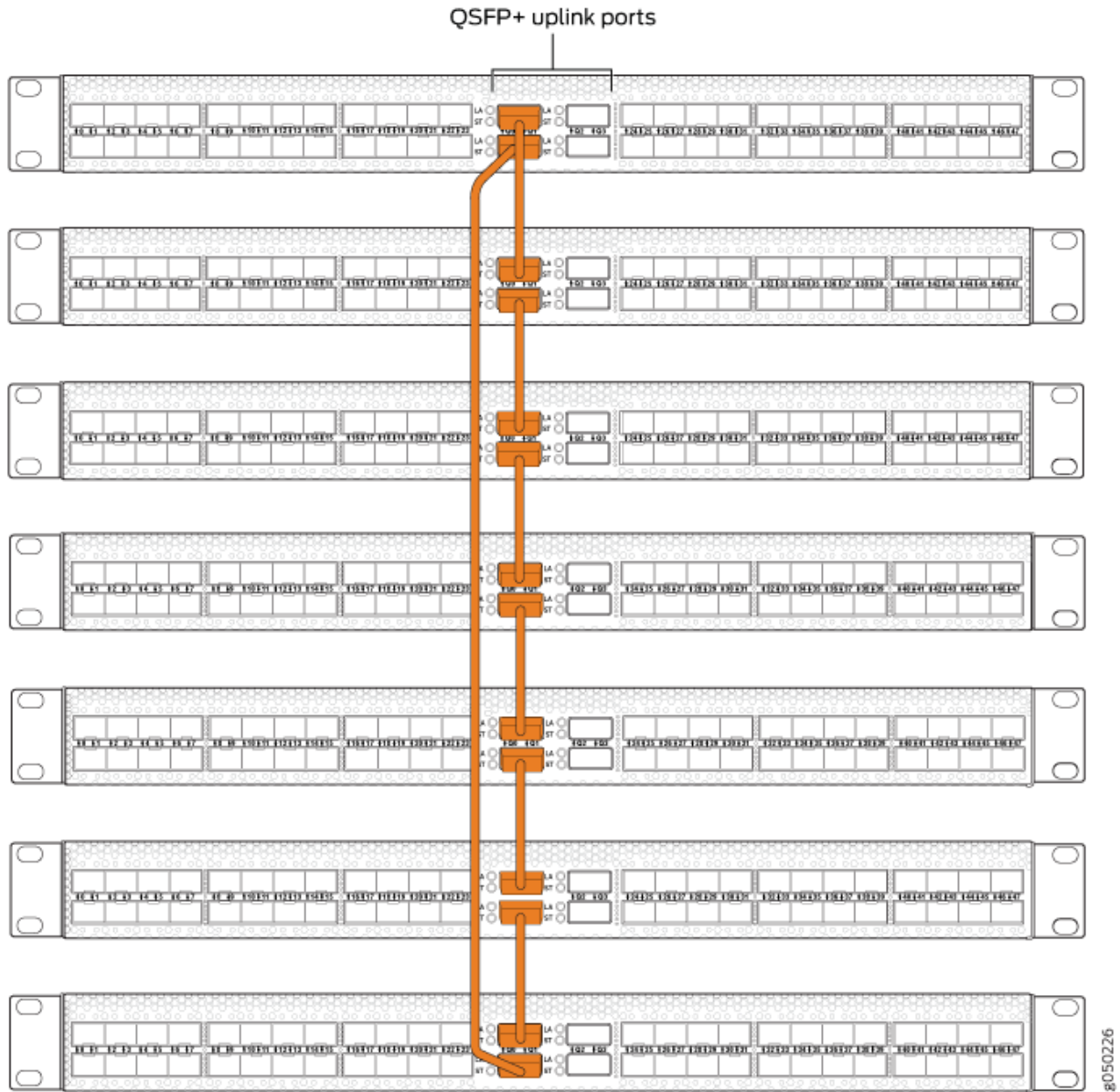
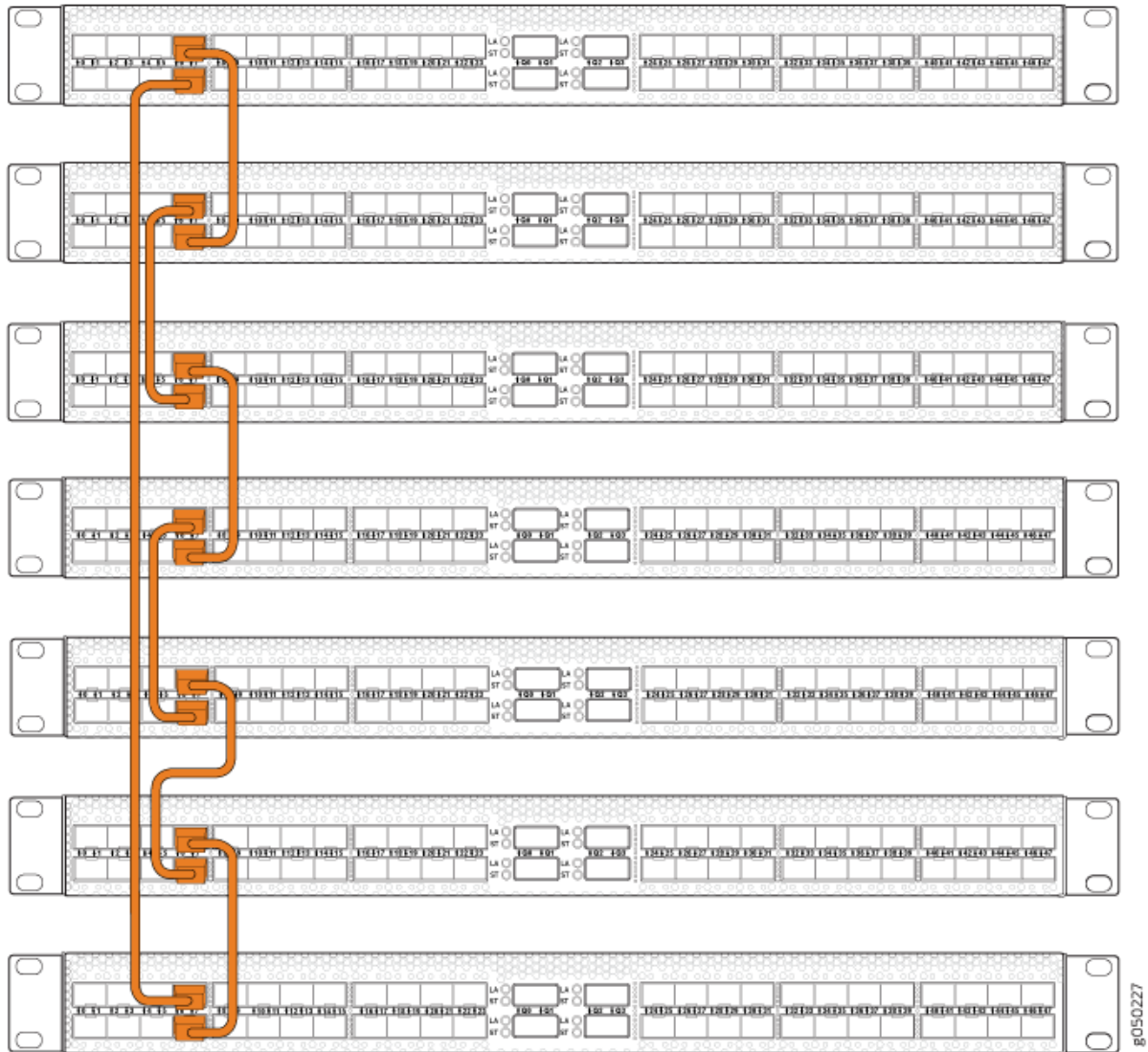


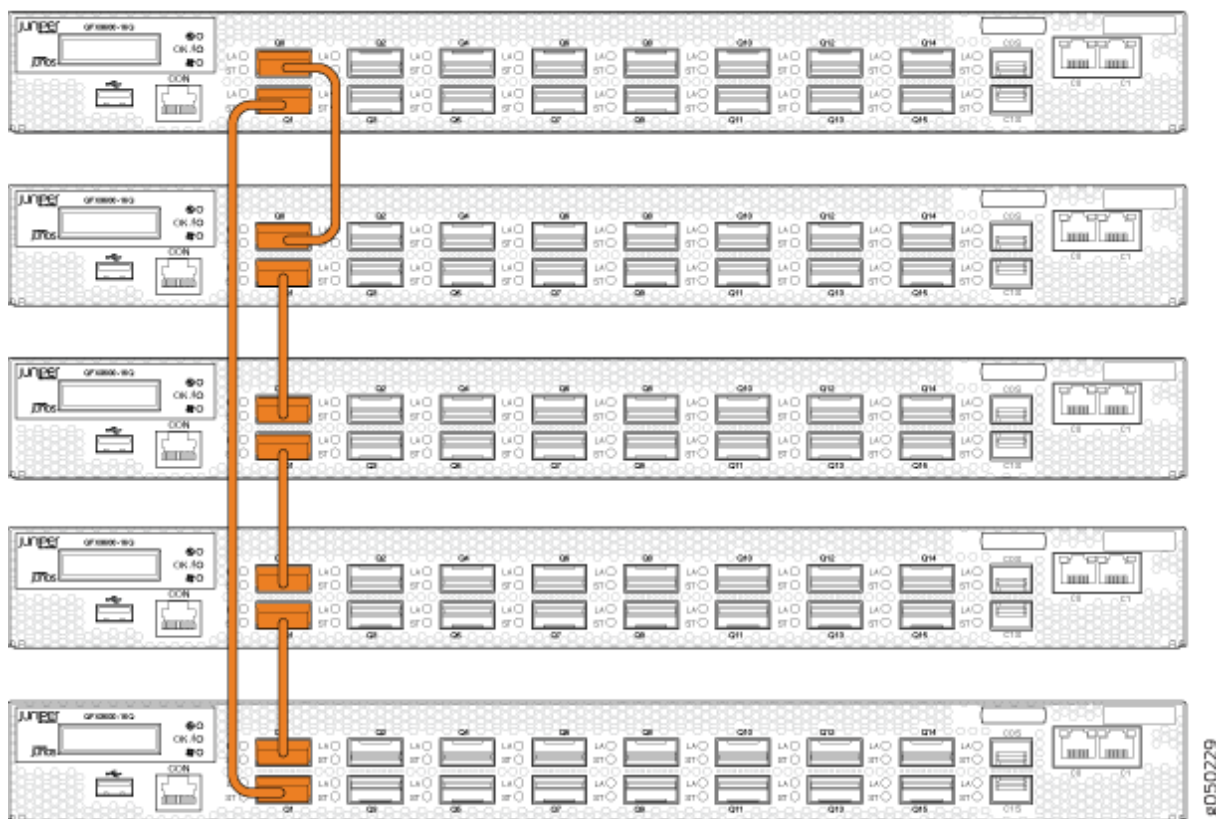
Figure 76: QFX3500 Using the 10G Ports as the VCPs



### Cabling QFX3600 Switches in a QFX Virtual Chassis

See [Figure 77 on page 219](#) for a diagram of configuring an exclusive QFX3600 Virtual Chassis.

Figure 77: QFX3600 Using the 40G Ports as the VCPs



### Cabling a Mixed QFX Virtual Chassis

A mixed QFX Virtual Chassis is a mixture of QFX5100, QFX3500, QFX3600, or EX4300 switches except EX4300-48MP and EX4300-48MP-S switches in a ring topology. Always configure a QFX5100 as the primary and backup devices when they are available. See [Figure 78 on page 220](#) for an example using the 40-Gigabit QSFP+ ports and [Figure 79 on page 220](#) for an example using both 40-Gigabit and 10-Gigabit SFP+ ports. [Figure 80 on page 221](#) shows QFX5100-24Q switches as the primary and backup cabled in a ring to QFX3500 and QFX3600 switches.

Figure 78: QFX3500 and QFX3600 Mixed Using the 40G Ports as the VCPs

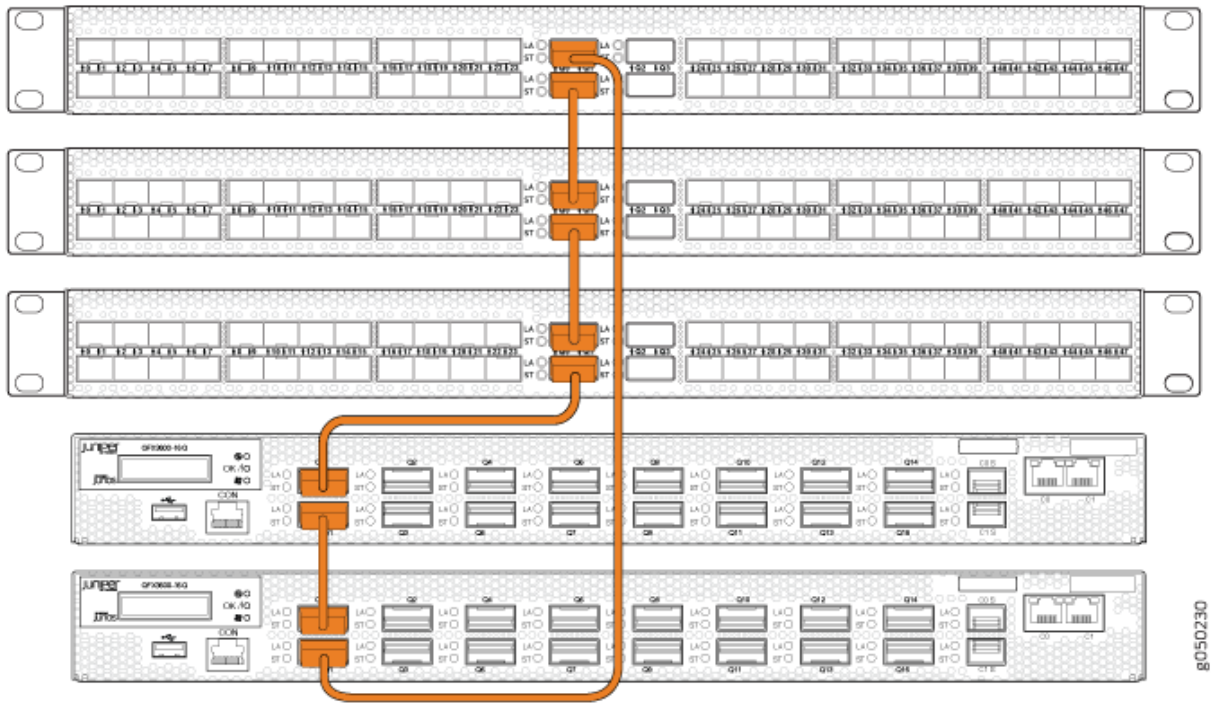


Figure 79: QFX3500 and QFX3600 Mixed Using Both 40G Ports and 10G Ports as the VCPs

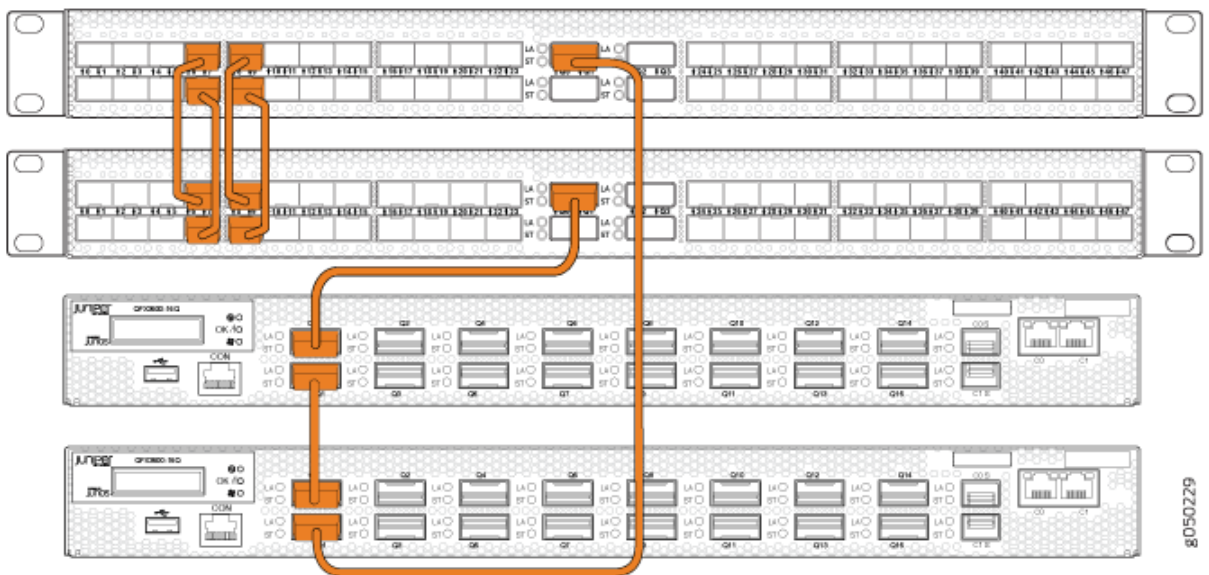
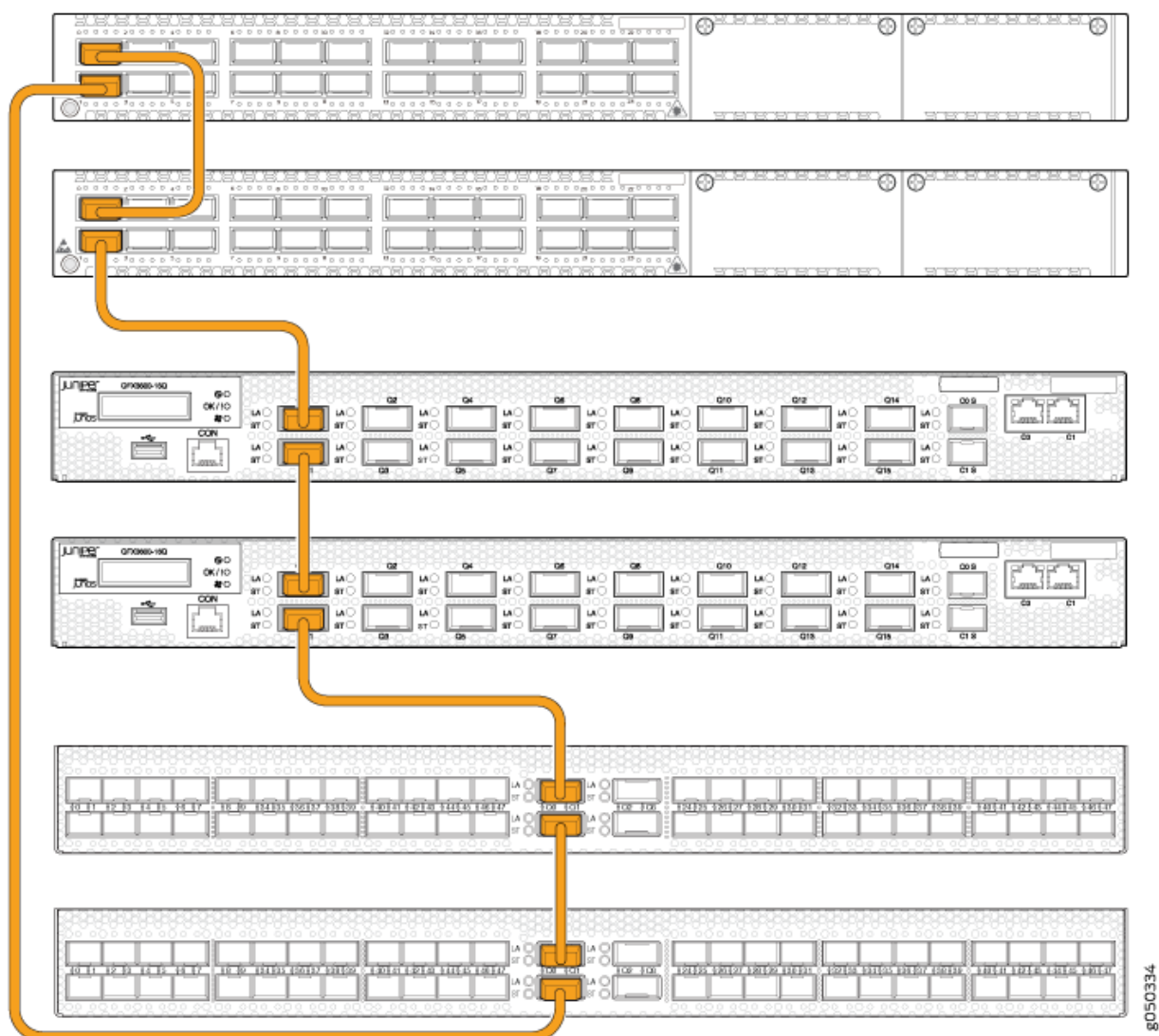


Figure 80: QFX5100 Primary Connecting QFX3600 and QFX3500 Using 40G Ports as VCPs



## RELATED DOCUMENTATION

[Understanding QFX Series Virtual Chassis](#)

[Connecting QFX5110 and QFX5100 Members in a QFX5110 Virtual Chassis](#)

[Adding a New Switch to an Existing EX4650 or QFX Series Virtual Chassis](#)

[Connecting a QFX5100 Device in a Virtual Chassis Fabric](#)

# Configuring Junos OS on the EX4300

## IN THIS SECTION

- [EX4300 Default Configuration | 222](#)
- [Connecting and Configuring an EX Series Switch \(CLI Procedure\) | 240](#)
- [Connecting and Configuring an EX Series Switch \(J-Web Procedure\) | 244](#)
- [Configure LCD Panel on EX Series Switches \(CLI Procedure\) | 247](#)
- [Reverting to the Default Factory Configuration for the EX Series Switch | 249](#)

## EX4300 Default Configuration

Each EX Series switch is programmed with a factory default configuration that contains the values set for each configuration parameter when the switch is shipped. The default configuration file sets values for system parameters such as `syslog` and `commit`, configures Ethernet switching on all interfaces, enables IGMP snooping, and enables the LLDP and RSTP protocols.



### NOTE:

- The factory default configuration file has more interfaces for models that have more ports.
- The `poe` statement does not appear for models without PoE+ ports.

Interfaces `ge-0/0/0` through `ge-0/0/23` are network port interfaces. Interfaces `ge-0/2/0` through `ge-0/2/3` and `xe-0/2/0` through `xe-0/2/3` are SFP/SFP+ uplink module port interfaces.

When you commit changes to the configuration, a new configuration file is created, which 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*.

The following is the factory-default configuration file for an EX4300-48P switch with 48 ports with PoE capability that runs Junos OS Release 18.3R3 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 all;
  }
}
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;

```

```

    }
  }
}
vpls {
  default {
    vlan-id 1;
    l3-interface irb.0;
  }
}
}

```

The following is the factory-default configuration file for an EX4300-48T switch with 48 ports without PoE capability that runs a version of Junos OS release earlier than 18.3R3.

```

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;
      vlan {
        members default;
      }
      storm-control default;
    }
  }
}

```

```

    }
  }
}
ge-0/0/1 {
  unit 0 {
    family ethernet-switching;
    vlan {
      members default;
    }
    storm-control default;
  }
}
ge-0/0/2 {
  unit 0 {
    family ethernet-switching;
    vlan {
      members default;
    }
    storm-control default;
  }
}
ge-0/0/3 {
  unit 0 {
    family ethernet-switching;
    vlan {
      members default;
    }
    storm-control default;
  }
}
ge-0/0/4 {
  unit 0 {
    family ethernet-switching;
    vlan {
      members default;
    }
    storm-control default;
  }
}
}

```

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

```

        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/10 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/11 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/12 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/13 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
    }
}

```

```

        storm-control default;
    }
}
ge-0/0/14 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/15 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/16 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}
ge-0/0/17 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        storm-control default;
    }
}

```

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

```

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

```

```

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

```

```

    }
}
xe-0/2/3 {
    unit 0 {
        family ethernet-switching;
        vlan {
            members default;
        }
        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;  
}
```

```

}
vllans {
    default {
        vllan-id 1;
    }
}
poe {
    interface-all;
}

```

The following is the factory-default configuration file for an EX4300-48MP switch that runs Junos OS Release 19.1R2 or later.

```

protocols {
    lldp {
        interface all;
    }
    lldp-med {
        interface all;
    }
    igmp-snooping {
        vllan default;
    }
    rstp {
        interface all;
    }
}

```

## SEE ALSO

[Reverting to the Default Factory Configuration for the EX Series Switch | 249](#)

Connecting and Configuring an EX Series Switch (CLI Procedure)

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

## 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*.
- See *Rear Panel of an EX4200 Switch*.
- See ["EX4300 Switches Hardware Overview" on page 2](#)
- 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*

*Installing and Connecting an EX4200 Switch*

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[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.

## Configure LCD Panel on EX Series Switches (CLI Procedure)

### IN THIS SECTION

- [Disable or Enable Menus and Menu Options on the LCD Panel | 247](#)
- [Configure a Custom Display Message | 248](#)

This topic applies to hardware devices in the EX Series product family, which includes switches and the XRE200 External Routing Engine, that support the LCD panel interface.

The LCD panel on the front panel of EX Series switches displays a variety of information about the switch in the Status menu and provides the Maintenance menu to enable you to perform basic operations such as initial setup and reboot. You can disable these menus or individual menu options if you do not want switch users to use them. You can also set a custom message that will be displayed on the panel.

### Disable or Enable Menus and Menu Options on the LCD Panel

By default, the Maintenance menu, the Status menu, and the options in those menus in the LCD panel are enabled. Users can configure and troubleshoot the switch by using the Maintenance menu and view certain details about the switch by using the Status menu.

If you do not want users to be able to use those menus or some of the menu options, you can disable the menus or individual menu options. You can reenable the menus or menu options.

Issue the `show chassis lcd menu operational mode` command to see the menus or menu options that are currently enabled.



**NOTE:** On some platforms, you must specify an FPC slot number in these commands. See the [lcd-menu](#) statement for details.

To disable a menu:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-name disable
```

To enable a menu:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-name disable
```

To disable a menu option:

```
[edit]
user@switch# set chassis lcd-menu menu-item menu-option disable
```

To enable a menu option:

```
[edit]
user@switch# delete chassis lcd-menu menu-item menu-option disable
```

## Configure a Custom Display Message

You can configure the second line of the LCD to display a custom message temporarily for 5 minutes or permanently.

To display a custom message temporarily:

- On an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, a standalone EX4300 switch except EX4300-48MP and EX4300-48MP-S switches, a standalone EX4500 switch, a standalone EX4550 switch, an EX6200 switch, an EX8200 switch, or an XRE200 External Routing Engine:

```
user@switch> set chassis display message message
```

- On an EX3300, EX4200, EX4300, EX4500, or EX4550 switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number
```

To display a custom message permanently:

- On an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, a standalone EX4300 switch except EX4300-48MP and EX4300-48MP-S switches, a standalone EX4500 switch,

a standalone EX4550 switch, an EX6200 switch, an EX8200 switch, or an XRE200 External Routing Engine:

```
user@switch> set chassis display message message permanent
```

- On an EX3300, EX4200, EX4300 except EX4300-48MP and EX4300-48MP-S, EX4500, or EX4550 switch in a Virtual Chassis configuration:

```
user@switch> set chassis display message message fpc-slot slot-number permanent
```



**NOTE:** The buttons on the LCD panel are disabled when the LCD is configured to display a custom message.

To disable the display of the custom message:

```
user@switch> clear
chassis display message
```

You can view the custom message by issuing the `show chassis lcd` command.

## 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 | 250
- Reverting to the EX Series Switch Factory-Default Configuration Using the `load factory-default` Command | 251
- Reverting to the Factory-Default Configuration Using the EX Series Switch LCD Panel | 252
- Reverting to the Factory-Default Configuration Using the Factory Reset/Mode button on EX2300, EX3400, and EX4300-48MP Switches | 253

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:



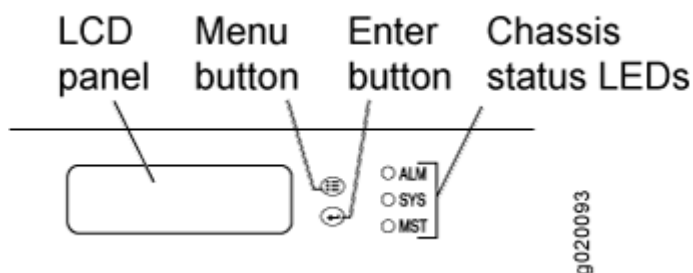
**NOTE:** If you use this procedure, you must delete the system commit factory settings, set the root password, and commit the configuration. These steps are not required when you revert to the factory-default configuration by using `request system zeroize`. Also, the `auto-image-upgrade` statement is 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 81: 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 | 255](#)
- [System Information Panel | 258](#)
- [Health Status Panel | 261](#)
- [Capacity Utilization Panel | 265](#)
- [Alarms Panel | 266](#)
- [File System Usage | 267](#)
- [Chassis Viewer | 267](#)

 **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 71 on page 256 lists the details that are displayed on each member switch.

**Table 71: Details of a Virtual Chassis Member Switch**

Details	Example
Model number of the member switch	EX3300

**Table 71: Details of a Virtual Chassis Member Switch (Continued)**

Details	Example
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.
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 72 on page 257](#) describes the possible status of a member switch.

**Table 72: 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 73: 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 73: System Information (*Continued*)

Field	Description
Inventory details	<p data-bbox="841 363 1084 390">Indicates the following:</p> <ul data-bbox="841 426 1421 1730" style="list-style-type: none"> <li data-bbox="841 426 1421 667">• 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 data-bbox="841 703 1421 842">• 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 data-bbox="841 877 1421 1016">• 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 data-bbox="906 1045 1404 1184"><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 data-bbox="841 1220 1421 1730" style="list-style-type: none"> <li data-bbox="841 1220 1421 1388">• 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 data-bbox="841 1423 1421 1562">• 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 data-bbox="841 1598 1421 1730">• 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 73: 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 73: 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 74: Health Status

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

Table 74: 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 74: 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 74: 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 74: 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 75: 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 75: 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 76 on page 268](#)—Describes the chassis viewer for EX2200 switches.
- [Table 77 on page 269](#)—Describes the chassis viewer for EX2200-C switches.
- [Table 78 on page 270](#)—Describes the chassis viewer for EX3200, EX3300, and EX4200 switches.
- [Table 79 on page 272](#)—Describes the chassis viewer for EX4100 and EX4100-F switches.
- [Table 80 on page 274](#)—Describes the chassis viewer for EX4100-H switches.

- [Table 81 on page 276](#)—Describes the chassis viewer for EX4400 switches.
- [Table 82 on page 279](#)—Describes the chassis viewer for EX4500 switches.
- [Table 83 on page 281](#)—Describes the chassis viewer for EX4550 switches.
- [Table 84 on page 283](#)—Describes the chassis viewer for EX4650 switches.
- [Table 85 on page 284](#)—Describes the chassis viewer for EX6210 switches.
- [Table 86 on page 286](#)—Describes the chassis viewer for EX8208 switches.
- [Table 87 on page 287](#)—Describes the chassis viewer for EX8216 switches.
- [Table 88 on page 289](#)—Describes the chassis viewer for the XRE200 External Routing Engines.

**Table 76: 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 76: 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 77: 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 78: 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 78: 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 79: 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 79: 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 79: 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 80: 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 80: 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 eight 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 80: 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 81: Chassis Viewer for EX4400 Switches

Field	Description
<b>Front View</b>	

Table 81: 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 81: 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 81: 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 82: Chassis Viewer for EX4500 Switches

Field	Description
<b>Front View</b>	

Table 82: 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 82: Chassis Viewer for EX4500 Switches *(Continued)***

Field	Description
Virtual Chassis port	<p>Displayed only when switches are configured as a Virtual Chassis. 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.
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 83: Chassis Viewer for EX4550 Switches**

Field	Description
<b>Front View</b>	

Table 83: 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 83: 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 84: 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 84: 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 85: 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 85: 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 86: 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 86: 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 87: Chassis Viewer for EX8216 Switches**

Field	Description
<b>Front View</b>	

Table 87: 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 87: 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 88: 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 88: 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.

**Rear View of the XRE200 External Routing Engine**

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 EX4300 Cooling System | **293**
  - Maintaining the EX4300 Power System | **296**
  - Maintaining an Uplink Module in an EX4300 Switch | **304**
  - Maintain Transceivers | **309**
  - Maintain Fiber-Optic Cables | **315**
-

# Maintaining the EX4300 Cooling System

## IN THIS SECTION

- [Removing a Fan Module from an EX4300 Switch | 293](#)
- [Installing a Fan Module in an EX4300 Switch | 294](#)

## Removing a Fan Module from an EX4300 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

The fan module in EX4300 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:** The fan module slots are at the left end of the rear panel on 24-port and 48-port switches, and at the right end on 32-port switches. [Figure 82 on page 294](#) shows how to remove a fan module from 24- port or 48-port switches. The procedure is the same for 32-port switches.

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.

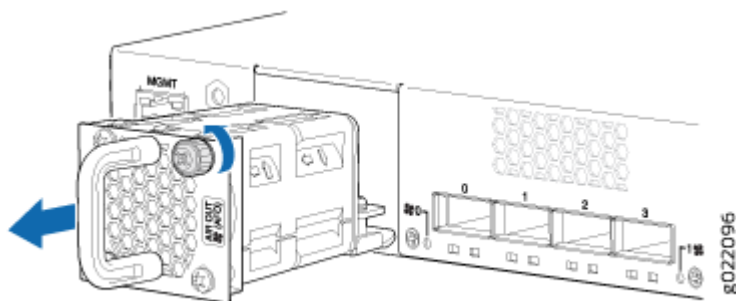


**WARNING:** To prevent injury, do not touch the fan with your hands or any tools as you slide the fan module out of the chassis—the fan might still be running.

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 82: Removing a Fan Module from an EX4300 Switch**



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

## SEE ALSO

[Installing a Fan Module in an EX4300 Switch | 294](#)

[Installing and Removing EX4300 Switch Hardware Components](#)

[Cooling System and Airflow in an EX4300 Switch | 85](#)

[Field-Replaceable Units in EX4300 Switches | 55](#)

[EX4300 Switches Hardware Overview | 2](#)

## Installing a Fan Module in an EX4300 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:

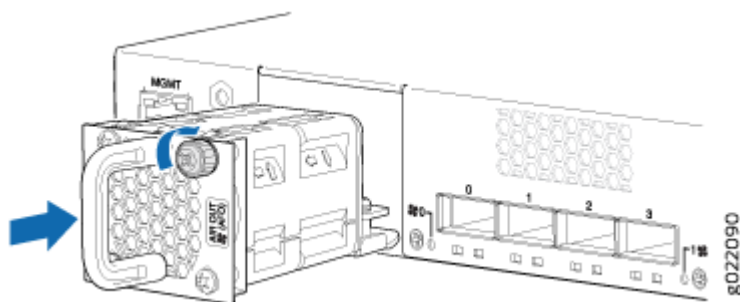
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- AC and DC power supplies in the same chassis.



**NOTE:** The fan module slots are at the left end of the rear panel on 24-port and 48-port switches, and at the right end on 32-port switches. [Figure 83 on page 296](#) shows how to install a fan module in 24- port or 48-port switches. The procedure is the same for 32-port switches.

1. Ensure that you have the correct fan module. The label **AIR IN (AFI)** or **AIR OUT (AFO)** on the fan module must match the label **AIR IN (AFI)** or **AIR OUT (AFO)** on 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 83: Installing a Fan Module in a 24-Port EX4300 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

[Removing a Fan Module from an EX4300 Switch | 293](#)

[Cooling System and Airflow in an EX4300 Switch | 85](#)

[Field-Replaceable Units in EX4300 Switches | 55](#)

[EX4300 Switches Hardware Overview | 2](#)

## Maintaining the EX4300 Power System

#### IN THIS SECTION

- [Removing an AC Power Supply from an EX4300 Switch | 297](#)
- [Installing an AC Power Supply in an EX4300 Switch | 298](#)
- [Removing a DC Power Supply from an EX4300 Switch | 300](#)
- [Installing a DC Power Supply in an EX4300 Switch | 302](#)

## Removing an AC Power Supply from an EX4300 Switch

Before you remove a power supply from an EX4300 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 EX4300 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 EX4300 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.



**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.



**NOTE:** The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 84 on page 298](#) shows how to remove an AC power supply from 24-port or 48-port switches. The procedure is the same for 32-port switches.

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.

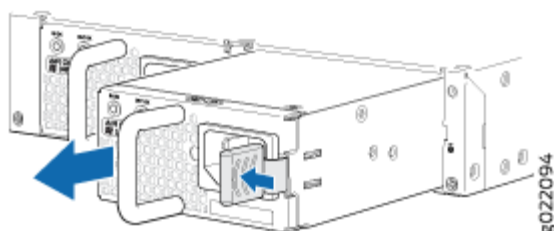


**NOTE:** If only one power supply is installed in your EX4300 switch, you need to power off the switch before removing the power supply.

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 84: Removing an AC Power Supply from an EX4300 Switch**



#### SEE ALSO

[Installing an AC Power Supply in an EX4300 Switch | 298](#)

[Installing and Removing EX4300 Switch Hardware Components](#)

[AC Power Supply Specifications for EX4300 Switches | 105](#)

[Field-Replaceable Units in EX4300 Switches | 55](#)

[AC Power Cord Specifications for an EX4300 Switch | 107](#)

[EX4300 Switches Hardware Overview | 2](#)

## Installing an AC Power Supply in an EX4300 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

The AC power supply in EX4300 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
- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.



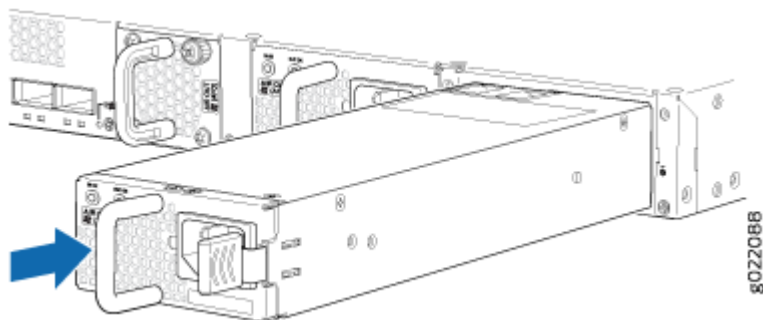
**NOTE:** Each power supply must be connected to a dedicated power source outlet.

The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 85 on page 300](#) shows how to install an AC power supply in 24-port or 48-port switches. The procedure is the same for 32-port switches.

To install an AC power supply in the switch:

1. Ensure that you have the correct power supply. The label **AIR IN (AFI)** or **AIR OUT (AFO)** on the power supply must match the label **AIR IN (AFI)** or **AIR OUT (AFO)** on 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 85: Installing an AC Power Supply in an EX4300 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

[Removing an AC Power Supply from an EX4300 Switch | 297](#)

[Connecting AC Power to an EX4300 Switch | 197](#)

[AC Power Supply in EX4300 Switches | 93](#)

[AC Power Cord Specifications for an EX4300 Switch | 107](#)

[EX4300 Switches Hardware Overview | 2](#)

## Removing a DC Power Supply from an EX4300 Switch

Before you begin removing a power supply from 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 remove the power supply from the switch chassis:

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

- An antistatic bag or an antistatic mat
- Replacement power supply or a cover panel for the power supply slot

The power supply in EX4300 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.



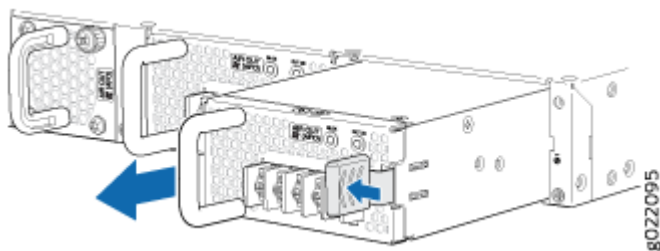
**CAUTION:** We recommend that you install either a replacement power supply or a cover panel in the empty power supply slot to prevent chassis overheating and dust accumulation.



**NOTE:** The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 86 on page 302](#) shows how to remove a DC power supply from 24-port or 48-port switches. The procedure is the same for 32-port switches.

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 plastic cover from the input terminals by sliding the cover either to the left or right.
5. Unscrew the locking screws counterclockwise by using the screwdriver.
6. Remove the cable lugs from the input DC terminals.
7. Slide the ejector lever toward the left until the power supply is unseated.
8. Grasp the power supply handle and pull firmly to slide the power supply halfway out of the chassis.
9. 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.
10. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
11. If you are not replacing the power supply, install the cover panel over the slot.

Figure 86: Removing a DC Power Supply from an EX4300 Switch



#### SEE ALSO

[Installing a DC Power Supply in an EX4300 Switch | 302](#)

[DC Power Supply in EX4300 Switches | 114](#)

[EX4300 Switches Hardware Overview | 2](#)

## Installing a DC Power Supply in an EX4300 Switch

Before you install a DC power supply in the switch:

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

Ensure that you have the following parts and tools available to install a DC power supply in the switch chassis:

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

The DC power supply in EX4300 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

- Power supplies with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.
- Power supplies and fan modules with different airflow labels (**AIR IN (AFI)** and **AIR OUT (AFO)**) in the same chassis.



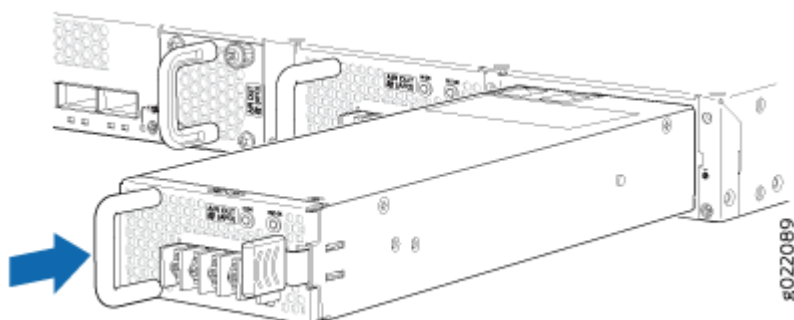
**NOTE:** We recommend that you connect each power supply to a dedicated power source outlet.

The power supply slots are at the right end of the rear panel on 24-port and 48-port switches, and at the left end on 32-port switches. [Figure 87 on page 303](#) shows how to install a DC power supply in 24-port or 48-port switches. The procedure is the same for 32-port switches.

To install a DC power supply in the switch:

1. Ensure that you have the correct power supply. The label **AIR IN (AFI)** or **AIR OUT (AFO)** on the power supply must match the label **AIR IN (AFI)** or **AIR OUT (AFO)** on 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 87: Installing a DC Power Supply in an EX4300 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

[Removing a DC Power Supply from an EX4300 Switch | 300](#)

[Connecting DC Power to an EX4300 Switch | 200](#)

[DC Power Supply in EX4300 Switches | 114](#)

[EX4300 Switches Hardware Overview | 2](#)

# Maintaining an Uplink Module in an EX4300 Switch

## IN THIS SECTION

- [Removing an Uplink Module from an EX4300 Switch | 304](#)
- [Installing an Uplink Module in an EX4300 Switch | 307](#)

## Removing an Uplink Module from an EX4300 Switch

Before you begin removing an uplink module from the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).
- If there are any transceivers installed in the uplink module, remove them before you remove the uplink module. For instructions on removing transceivers, see *Remove a Transceiver*.

Ensure that you have the following parts and tools available:

- ESD grounding strap

- Phillips (+) screwdriver, number 2
- A replacement uplink module or cover panel
- An antistatic bag or antistatic mat

The uplink module in EX4300 switches is hot-removable and hot-insertable field-replaceable unit (FRU): You can remove and replace it without powering off the switch or disrupting switch functions.



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

To remove an uplink module from the switch (see [Figure 88 on page 306](#), [Figure 89 on page 306](#), and [Figure 90 on page 307](#)):

1. Take the uplink module offline by issuing the following CLI command:

```
user@switch> request
chassis pic offline fpc-slot slot-number pic-slot slot-number
```

2. Wrap and fasten one end of an ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the switch.
3. Loosen both captive screws on the faceplate of the uplink module by using your fingers. If you are unable to unscrew the captive screws by using your fingers, use the screwdriver.



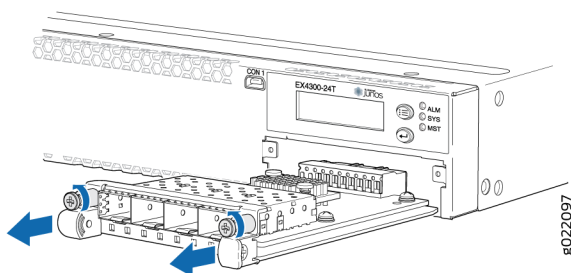
**CAUTION:** Do not pull the uplink module out of the module slot by holding the faceplate of the uplink module.

4.
  - a. 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—Hold both the ejector handles or the captive screws on the uplink module and gently pull the uplink module toward you and out of the module slot.
  - b. EX4300-48MP and EX4300-48MP-S switches—Hold the ejector handle on the uplink module and gently pull the uplink module toward you and out of the module slot.
5. Place the uplink module in an antistatic bag or on an antistatic mat placed on a flat, stable surface.
6. If you are not replacing the uplink module, install the cover panel over the slot.



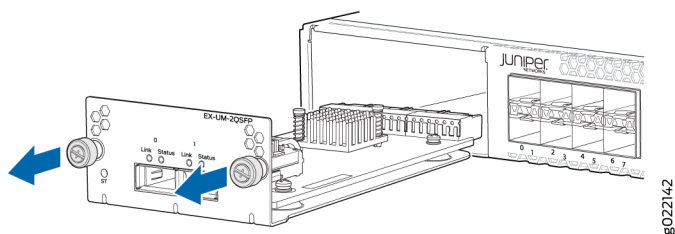
**NOTE:** After you have removed an uplink module, wait for at least 5 seconds before you install an uplink module. If you do not wait for at least 5 seconds, the interfaces on the uplink module might not come up.

**Figure 88: Removing a 4-Port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ Uplink Module from a 24-Port or 48-Port EX4300 Switch Except EX4300-48MP and EX4300-48MP-S Switches**

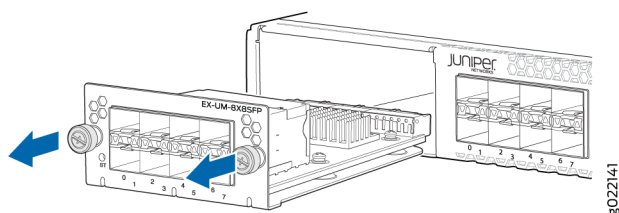


**NOTE:** The procedure is the same for EX4300-48MP and EX4300-48MP-S switches.

**Figure 89: Removing a 2-Port 40-Gigabit Ethernet QSFP+ Uplink Module from a 32-Port EX4300 Switch**



**Figure 90: Removing an 8-Port 10-Gigabit Ethernet SFP+ Uplink Module from a 32-Port EX4300 Switch**



## Installing an Uplink Module in an EX4300 Switch

Before you begin installing an uplink module in the switch:

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

Ensure that you have the following parts and tools available:

- Electrostatic discharge (ESD) grounding strap (If a grounding strap is not available, follow the alternative grounding method described in Step 1 of the following procedure.)
- Phillips (+) screwdriver, number 2

You can install an uplink module in the front panel of an EX4300 switch. The uplink module in EX4300 switches is a hot-removable and hot-insertable unit (FRU): You can remove and replace it without powering off the switch.



**NOTE:** If you have set an uplink module port as a Virtual Chassis port (VCP), removing the uplink module breaks the setting. You must reset the port as a VCP after you replace the module. See [Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port](#).

To install an uplink module in the switch (see [Figure 91 on page 308](#), [Figure 92 on page 309](#), and [Figure 93 on page 309](#)):

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

If a grounding strap is not available, hold the uplink module in its antistatic bag in one hand and touch the exposed, bare metal of the switch with the other hand to ground yourself and the component.

2. If the uplink module slot has a cover panel on it, loosen both captive screws on the faceplate of the uplink module by using your fingers. If you are unable to unscrew the captive screws by using your fingers, use the screwdriver. Hold both the captive screws and gently pull it outward to remove the cover panel, and save it for later use.



**NOTE:** If you are removing an uplink module and installing another uplink module, wait for at least 10 seconds after removing the uplink module before installing the new or the same uplink module. If you do not wait for at least 10 seconds, the interfaces on the uplink module might not come up.

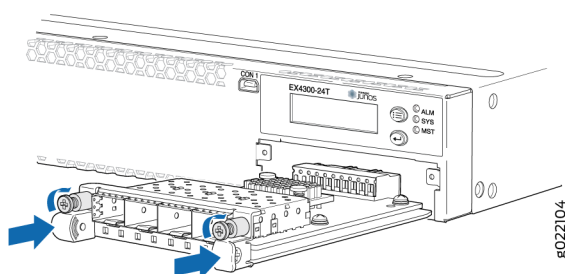
3. Taking care not to touch module components, pins, leads, or solder connections, remove the uplink module from its bag.



**CAUTION:** Before you slide the uplink module into the slot on the switch chassis, ensure the uplink module is aligned correctly. Misalignment might cause the pins to bend, making the uplink module unusable.

4. Using both hands, place the module in the empty slot and slide it in gently until it is fully seated.
5. Tighten both the captive screws by using your fingers or the screwdriver.

**Figure 91: Installing a 4-Port 1-Gigabit Ethernet/10-Gigabit Ethernet SFP+ Uplink Module in a 24-Port or 48-Port EX4300 Switch Except EX4300-48MP and EX4300-48MP-S Switches**



**NOTE:** The procedure is the same for EX4300-48MP and EX4300-48MP-S switches.

Figure 92: Installing a 2-Port 40-Gigabit Ethernet QSFP+ Uplink Module in a 32-Port EX4300 Switch

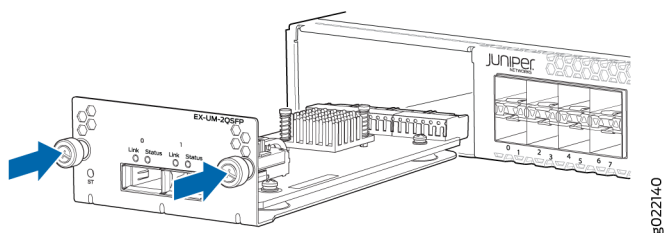
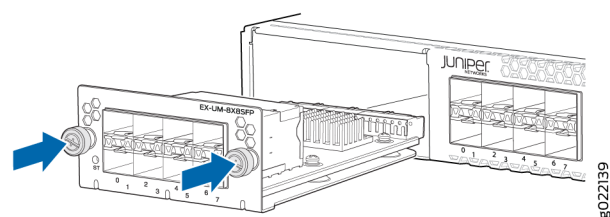


Figure 93: Installing an 8-Port 10-Gigabit Ethernet SFP+ Uplink Module in a 32-Port EX4300 Switch



**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

[Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)

# Maintain Transceivers

## IN THIS SECTION

● [Remove a Transceiver | 310](#)

## 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 94 on page 312 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.



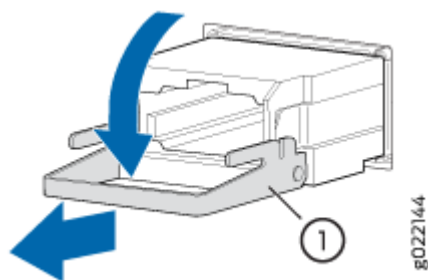
**CAUTION:** Before removing the transceiver, make sure that you open the ejector lever completely until you hear it click. This precaution prevents damage to the transceiver.

- 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 94: Remove a QSFP+ Transceiver



1– Ejector lever

To remove a CFP transceiver:

- a. Using your fingers, loosen the screws on the transceiver.
- b. Grasp the screws on the transceiver and gently slide the transceiver approximately 0.5 in. (1.3 cm) straight out of the port.



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

7. Using your fingers, grasp the body of the transceiver and pull it straight out of the port.
8. Place the transceiver in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
9. Place the dust cover over the empty port, or install the replacement transceiver.

## Install a Transceiver

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

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

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace 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 95 on page 315 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.



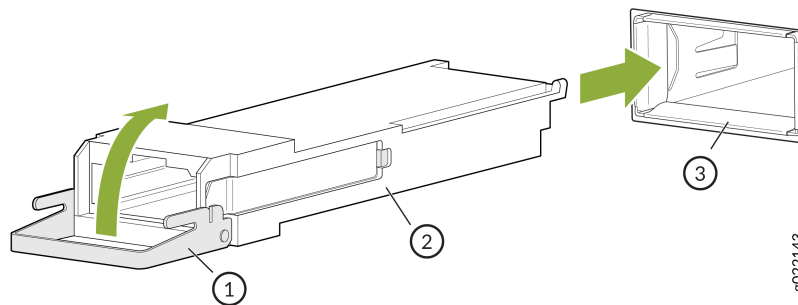
**CAUTION:** Avoid bending the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

**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 95: Install a Transceiver



1– Ejector lever

3– Port

2– Transceiver

## Maintain Fiber-Optic Cables

### IN THIS SECTION

- [Connect a Fiber-Optic Cable | 316](#)
- [Disconnect a Fiber-Optic Cable | 316](#)
- [How to Handle Fiber-Optic Cables | 317](#)

## Connect a Fiber-Optic Cable

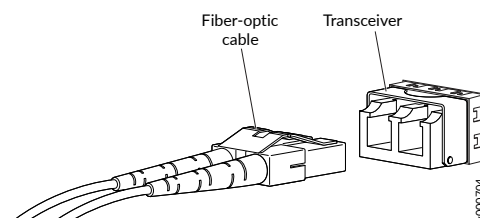
Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see [Laser and LED Safety Guidelines and Warnings](#)).

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 the EX4300 Components | 320](#)
-

# Troubleshooting the EX4300 Components

IN THIS SECTION

- Understand Alarm Types and Severity Levels on EX Series Switches | 320
- Chassis Component Alarm Conditions on EX4300 Switches | 322
- Check Active Alarms with the J-Web Interface | 325
- Monitor System Log Messages | 326
- Troubleshooting PoE Voltage Injection Failure in EX2300, EX3400, EX4300, or EX4400 Switch Models with PoE Capability | 333
- Troubleshoot Temperature Alarms in EX Series Switches | 334

## 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 89 on page 320](#).

Table 89: Alarm Terms

Term	Definition
alarm	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.
alarm condition	Failure event that triggers an alarm.
alarm severity	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.

Table 89: Alarm Terms (*Continued*)

Term	Definition
<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 EX4300 Switches

This topic describes the chassis component alarm conditions on EX4300 switches.

[Table 90 on page 322](#) lists the alarms that the chassis components can generate on EX4300 switches, their severity levels, and the actions you can take to respond to them.

**Table 90: Chassis Component Alarm Conditions on EX4300 Switches**

Chassis Component	Alarm Condition	Alarm Severity	Remedy
<b>Power supplies</b>	A power supply has been removed from the chassis.	Minor (yellow or amber)	Install a power supply in the empty slot.
	A power supply output has failed.	Major (red)	Check power supply output connection.
	A power supply has failed.	Major (red)	Replace the failed power supply.
	An unknown power supply is installed.	Major (red)	Install a power supply recommended by Juniper Networks.
	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>Fan modules</b>	Fan module is not installed.	Major (red)	Install the fan module.
	A fan module has failed.	Major (red)	Replace the fan module.

Table 90: Chassis Component Alarm Conditions on EX4300 Switches *(Continued)*

Chassis Component	Alarm Condition	Alarm Severity	Remedy
	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>Temperature</b>	The temperature inside the chassis reaches the yellow or amber alarm limit.	Minor (yellow or amber)	<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>

Table 90: Chassis Component Alarm Conditions on EX4300 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 or amber)	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 or amber)	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 or amber)	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 EX4300 Switches | 55](#)


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[Chassis Status LEDs on EX4300 Switches | 72](#)


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[Understand Alarm Types and Severity Levels on EX Series Switches | 320](#)

# Check Active Alarms with the J-Web Interface

IN THIS SECTION

- Purpose | 325
- Action | 325
- Meaning | 325

## 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 91 on page 326](#) lists the alarm output fields.

Table 91: 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*

Monitor System Log Messages

IN THIS SECTION

- Purpose | 327
- Action | 327
- Meaning | 330

## 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 92 on page 327](#) describes the different filters, their functions, and the associated actions.

To view events in the CLI, enter the following command:

```
show log
```

**Table 92: 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 92: 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 92: Filtering System Log Messages (Continued)**

Field	Function	Your Action
<p>Generate Raw Report</p> <p><b>NOTE:</b></p> <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>	<p>Generates a list of event log messages in nontabular format.</p>	<p>To generate a raw report:</p> <ol style="list-style-type: none"> <li>Click <b>Generate Raw Report</b>.</li> </ol> <p>The <i>Opening filteredEvents.html</i> window appears.</p> <ol style="list-style-type: none"> <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 92: 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 93 on page 331 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 93: 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 93: 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 | 333

● Solution | 334

### 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](#)

## Troubleshoot Temperature Alarms in EX Series Switches

### IN THIS SECTION

- [Problem | 334](#)
- [Cause | 335](#)
- [Solution | 335](#)



**NOTE:** This topic is a generic one and applies to all EX Series Switches. There could be variations in output depending on the switch.

## Problem

## Description

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

## Cause

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

## Solution

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



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

1. Connect to the switch by using Telnet, and issue the [show chassis environment](#) command. This command displays environmental information about the switch chassis, including the temperature. The command also displays information about the fans, power supplies, and Routing Engines. Following is a sample output on an EX9208 switch. The output is similar on other EX Series switches. 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 94 on page 337 lists the output fields for the `show chassis environment` command. The table lists output fields in the approximate order in which they appear.

**Table 94: `show chassis environment` Output Fields**

Field Name	Field Description
Class	<p>Information about the category or class of chassis component:</p> <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	<p>Information about the chassis components:</p> <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>
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>

- Issue the command `show chassis temperature-thresholds`. This command displays the chassis temperature threshold settings. The following is the output on a EX4300 switch.

## show chassis temperature-thresholds

```
user@switch> show chassis temperature-thresholds
```

Shutdown  (degrees C) Item	Fan speed		Yellow alarm		Red alarm		Fire
	(degrees C)		(degrees C)		(degrees C)		
	Normal	High	Normal	Bad fan	Normal	Bad fan	
Normal							
FPC 0 CPU	35	85	77	77	85		
85 95							
FPC 0 NW-PFE	35	60	59	59	67		
67 70							
FPC 0 SE-PFE	35	71	70	70	78		
78 81							
FPC 0 PHY-2/3	35	65	64	64	72		
72 75							
FPC 0 MGMT PHY	35	73	72	72	80		
80 84							
FPC 0 PHY-4/5	35	70	69	69	77		
77 80							
FPC 1 CPU	35	85	77	77	85		
85 95							
FPC 1 NW-PFE	35	60	59	59	67		
67 70							
FPC 1 SE-PFE	35	71	70	70	78		
78 81							
FPC 1 PHY-2/3	35	65	64	64	72		
72 75							
FPC 1 MGMT PHY	35	73	72	72	80		
80 84							
FPC 1 PHY-4/5	35	70	69	69	77		
77 80							
FPC 2 CPU	35	85	77	77	85		
85 95							
FPC 2 NW-PFE	35	60	59	59	67		
67 70							
FPC 2 SE-PFE	35	71	70	70	78		
78 81							
FPC 2 PHY-2/3	35	65	64	64	72		

72	75					
FPC 2	MGMT PHY	35	73	72	72	80
80	84					
FPC 2	PHY-4/5	35	70	69	69	77
77	80					

Table 95 on page 339 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 95: show chassis temperature-thresholds Output Fields**

Field Name	Field Description
Item	Chassis component. You can configure the threshold information for components such as the chassis, the Routing Engines, and FPC for each slot in each FRU to display in the output. By default, information is displayed only for the chassis and the Routing Engines.
Fan speed	<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>
Yellow or amber alarm	<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>

**Table 95: show chassis temperature-thresholds Output Fields (Continued)**

Field Name	Field Description
<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>
<b>Fire shutdown</b>	<p>Temperature threshold, in degrees Celsius, at which the switch shuts down in case of fire.</p>

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 96 on page 341](#) lists the possible causes for the switch to generate a temperature alarm. It also lists the respective remedies.

**Table 96: 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> .
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 EX4300 Chassis or Components | 343](#)
-

# Returning an EX4300 Chassis or Components

## IN THIS SECTION

- [Returning an EX4300 Switch or Component for Repair or Replacement | 343](#)
- [Locating the Serial Number on an EX4300 Switch or Component | 344](#)
- [Contact Customer Support to Obtain a Return Material Authorization | 352](#)
- [Packing an EX4300 Switch or Component for Shipping | 353](#)

## Returning an EX4300 Switch or Component for Repair or Replacement

If you need to return an EX4300 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 EX4300 Switch or Component](#)" on page 344.
2. Obtain an Return Materials Authorization (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 EX4300 Switch or Component for Shipping](#)" on page 353.

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



PIC 0	REV D	BUILTIN	BUILTIN	48x 10/100/1000 Base-T
PIC 1	REV D	BUILTIN	BUILTIN	4x 40GE
PIC 2	REV A0	611-044925	MY3112490109	4x 1G/10G SFP/SFP+
Xcvr 0	REV 01	740-030658	AD0946A02ZT	SFP+-10G-USR
Xcvr 1	REV 01	740-030658	AA1212ALZ5E	SFP+-10G-USR
Power Supply 0	REV 01	740-046871	1EDA2490663	JPSU-1100-AC-AFO-A
Power Supply 1	REV 01	740-046873	1EDE2430149	JPSU-350-AC-AFO-A
Fan Tray 0				Fan Module, Airflow Out (AFO)
Fan Tray 1				Fan Module, Airflow Out (AFO)

The following output lists the switch components and serial numbers for an EX4300-48MP switch:

```

user@switch> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number  Description
Chassis                               XR3617480018  EX4300-48MP
Pseudo CB 0
Routing Engine 0          BUILTIN      BUILTIN        RE-EX4300MP
FPC 0          REV 02      650-078100     XR3617480018  EX4300-48MP
  CPU          BUILTIN      BUILTIN        FPC CPU
  PIC 0        REV 02      BUILTIN      BUILTIN        24x10M/100M/1G Base-T & 24x 100M/1G/
2.5G/5G/10G Base-T
  PIC 1        REV 02      650-078100     XR3617480018  4x40G QSFP+
  PIC 2        REV          650-080740     XS3617480045  4x10G SFP+
    Xcvr 0     REV 02      740-011613     NT33F2C       SFP-SX
    Xcvr 1     REV 01      740-021308     09T511103777  SFP+-10G-SR
    Xcvr 3     REV 01      740-030658     AA1229AZXZG   SFP+-10G-USR
Power Supply 0  REV 01      740-074873     1F197410083   JPSU-1400W-AC-AFO
Fan Tray 0          Fan Module, Airflow Out (AFO)
Fan Tray 1          Fan Module, Airflow Out (AFO)

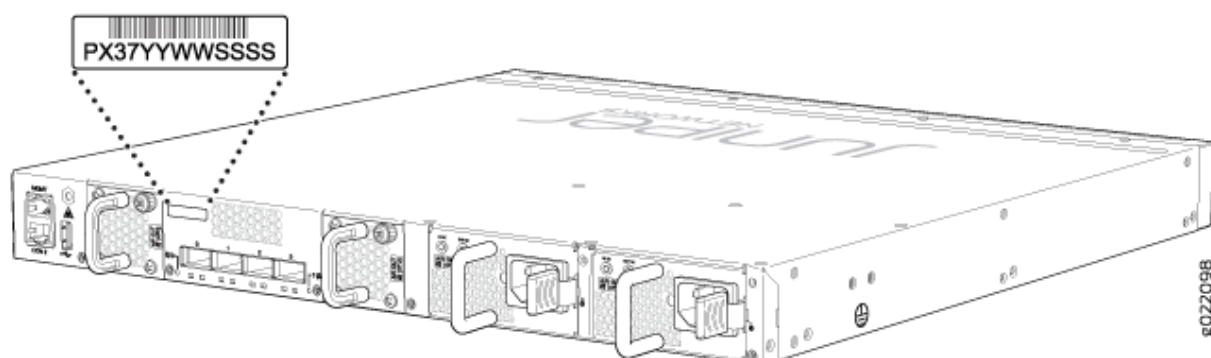
```

For information about the `show chassis hardware` command, see [show chassis hardware](#).

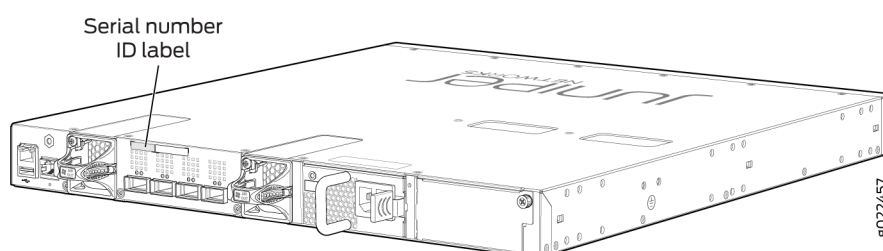
## Locating the Chassis Serial Number ID Label on an EX4300 Switch

The serial number ID label is located on the rear panel of the chassis on EX4300 switches. [Figure 96 on page 346](#) shows the location of the serial number ID label on 24-port and 48-port EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. [Figure 97 on page 346](#) shows the location of the serial number ID label on EX4300-48MP and EX4300-48MP-S switches. [Figure 98 on page 346](#) shows the location of the serial number ID label on 32-port EX4300 switches.

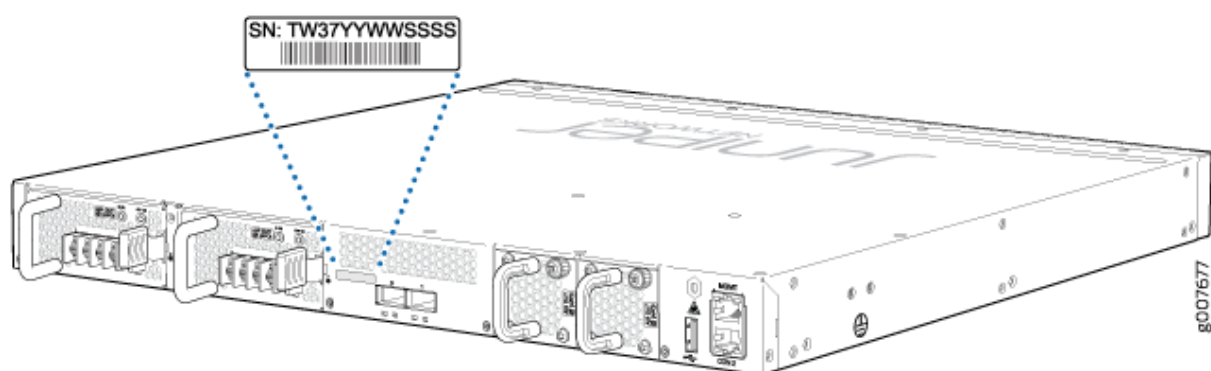
**Figure 96: Location of the Serial Number ID Label on 24-Port and 48-Port EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 97: Location of the Serial Number ID Label on EX4300-48MP and EX4300-48MP-S Switches**



**Figure 98: Location of the Serial Number ID Label on 32-Port EX4300 Switches**



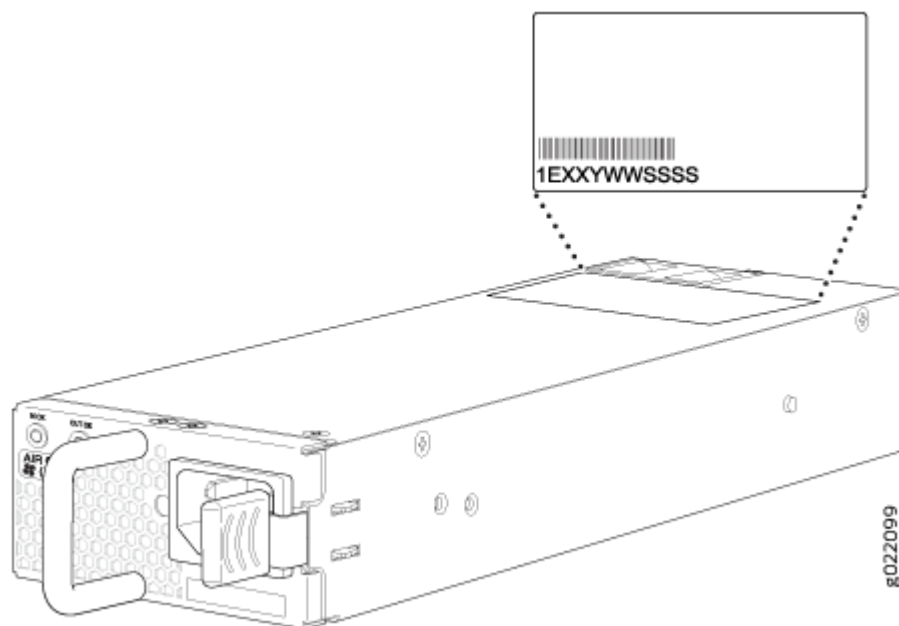
## Locating the Serial Number ID Labels on FRUs in an EX4300 Switch

The power supplies, fan modules, and uplink modules, installed in EX4300 switches are field-replaceable units (FRUs).

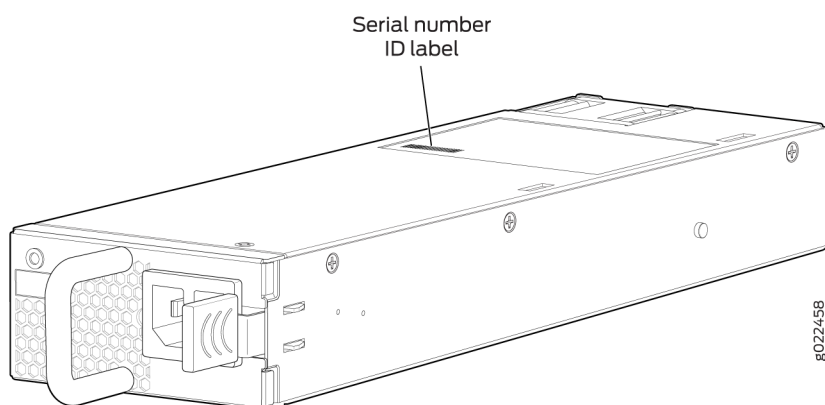
For each of these FRUs, you must remove the FRU from the switch chassis to see the FRU's serial number ID label.

- *Power Supply*—The serial number ID label is on the top of the power supply. [Figure 99 on page 347](#) shows the location of the serial number ID label on an AC power supply used in EX4300 switches except EX4300-48MP and EX4300-48MP-S switches, [Figure 100 on page 348](#) shows the location of the serial number ID label on an AC power supply used in EX4300-48MP and EX4300-48MP-S switches, and [Figure 101 on page 348](#) shows the location of the serial number ID label on a DC power supply. EX4300-48MP and EX4300-48MP-S switches do not support DC power supply. See "[Removing an AC Power Supply from an EX4300 Switch](#)" on page 297 and "[Removing an AC Power Supply from an EX4300 Switch](#)" on page 297.

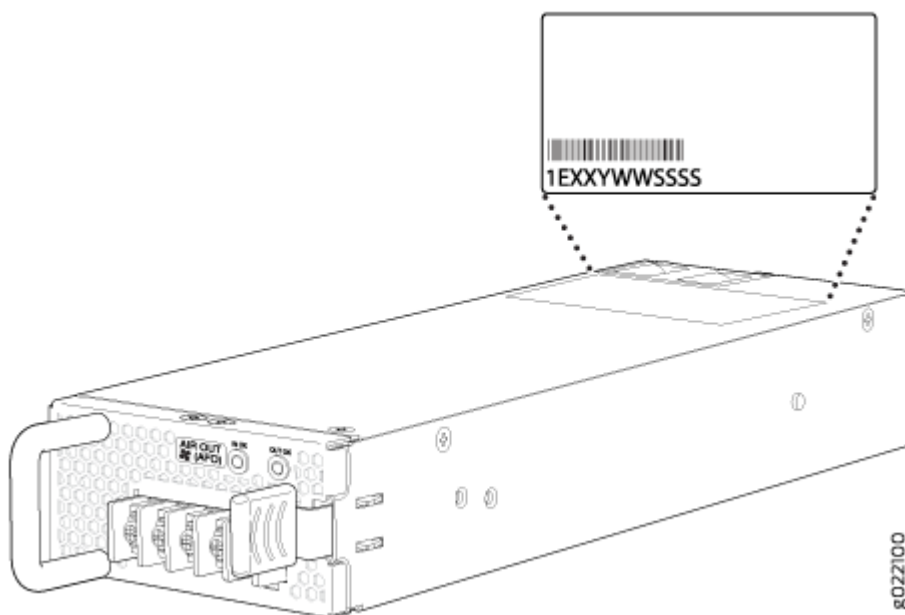
**Figure 99: Location of the Serial Number ID Label on an AC Power Supply Used in EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 100: Location of the Serial Number ID Label on an AC Power Supply Used in EX4300-48MP and EX4300-48MP-S Switches**

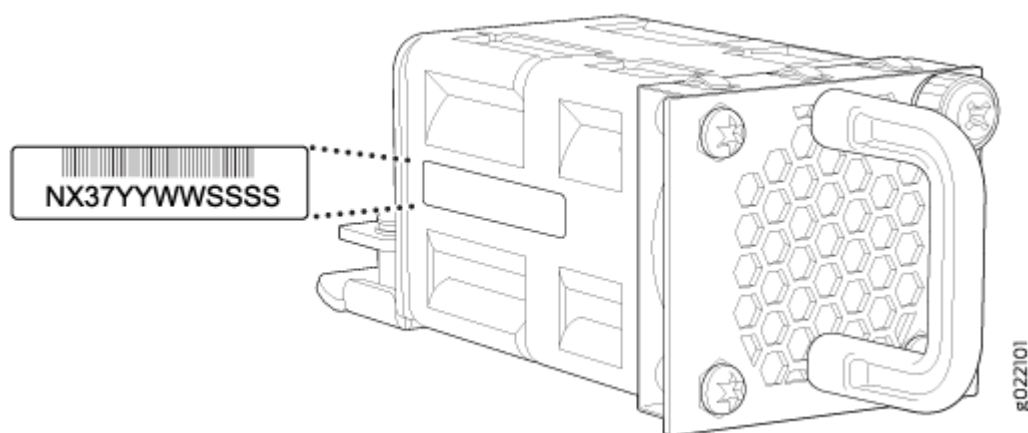


**Figure 101: Location of the Serial Number ID Label on a DC Power Supply Used in EX4300 Switches**

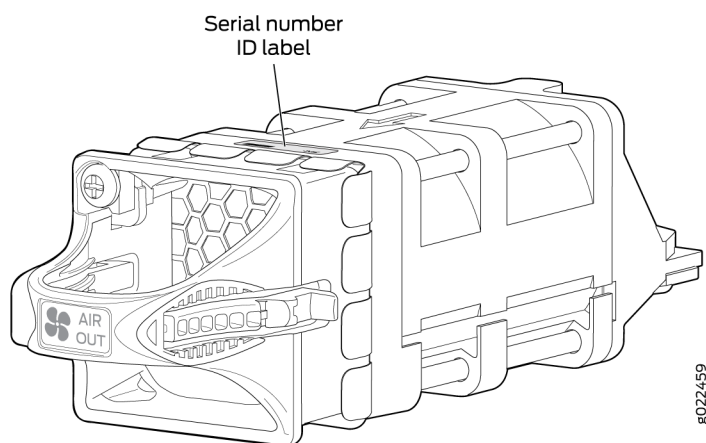


- *Fan module*—[Figure 102 on page 349](#) shows the location of the serial number ID label on the fan module for EX4300 switches except EX4300-48MP and EX4300-48MP-S switches. [Figure 103 on page 349](#) shows the location of the serial number ID label on the fan module for EX4300-48MP and EX4300-48MP-S switches. See "[Removing a Fan Module from an EX4300 Switch](#)" on page 293.

**Figure 102: Location of the Serial Number ID Label on the Fan Module Used in an EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 103: Location of the Serial Number ID Label on the Fan Module Used in an EX4300-48MP and EX4300-48MP-S Switches**

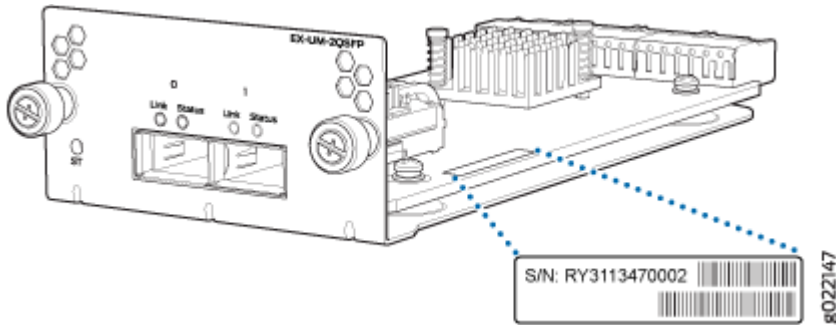


- *Uplink modules*
  - EX4300 switches except EX4300-48MP and EX4300-48MP-S switches—[Figure 104 on page 350](#) shows the location of the serial number ID label on the QSFP+ uplink module, [Figure 106 on page 351](#) shows the location of the serial number ID label on the 4-port SFP+ uplink module, and [Figure 107 on page 351](#) shows the location of the serial number ID label on the 8-port SFP+ uplink module.
  - EX4300-48MP and EX4300-48MP-S switches—[Figure 105 on page 350](#) shows the location of the serial number ID label on the 2-port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 uplink module (model number: EX-UM-2QSFP-MR) and [Figure 108 on page 352](#) shows

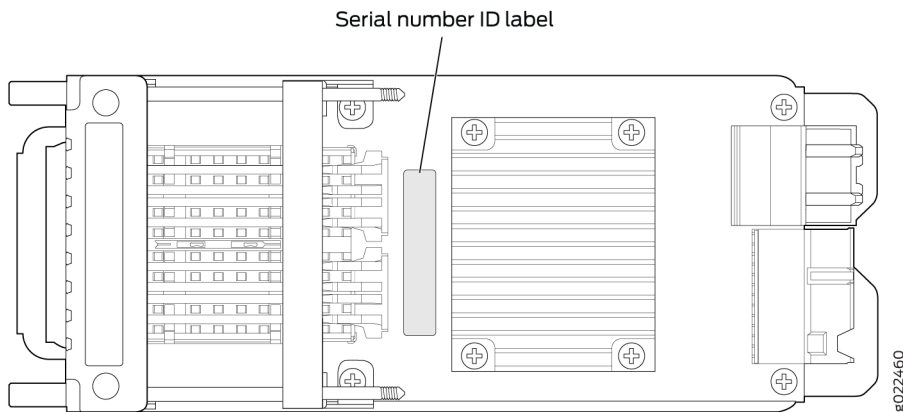
the location of the serial number ID label on the 4-port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ uplink module (model number: EX-UM-4SFPP-MR) for EX4300-48MP and EX4300-48MP-S switches.

See ["Removing an Uplink Module from an EX4300 Switch" on page 304.](#)

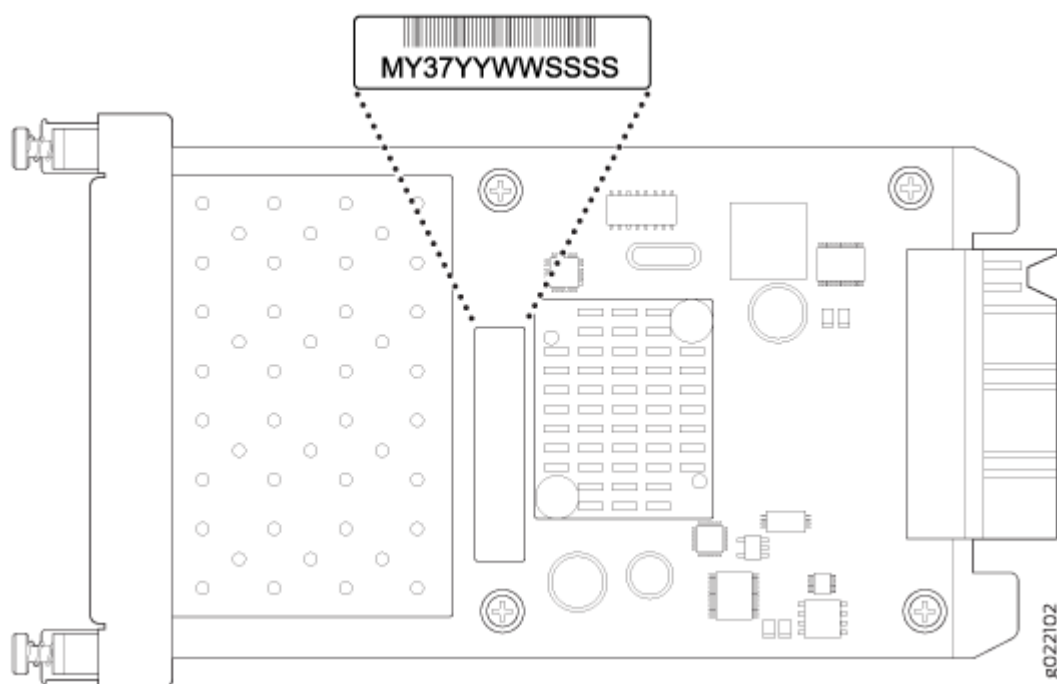
**Figure 104: Location of the Serial Number ID Label on the QSFP+ Uplink Module**



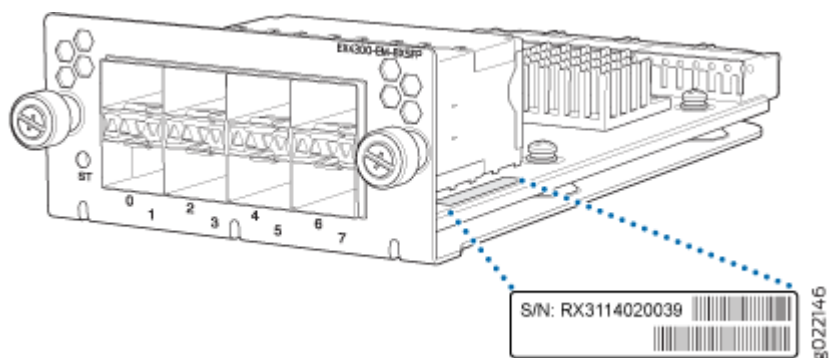
**Figure 105: Location of the Serial Number ID label on the 2-Port 40-Gigabit Ethernet QSFP+/100-Gigabit Ethernet QSFP28 Uplink Module for EX4300-48MP Switches**



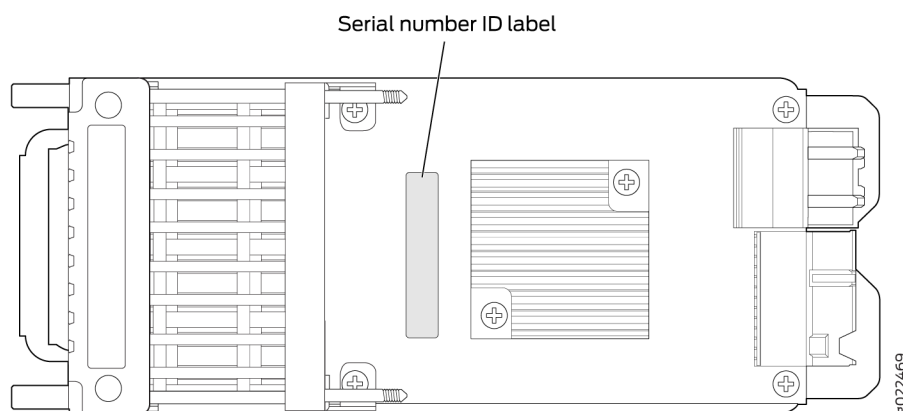
**Figure 106: Location of the Serial Number ID Label on the 4-Port SFP+ Uplink Module for EX4300 Switches Except EX4300-48MP and EX4300-48MP-S Switches**



**Figure 107: Location of the Serial Number ID Label on the 8-Port SFP+ Uplink Module**



**Figure 108: Location of the Serial Number ID Label on the 4-Port 1-Gigabit Ethernet SFP/10-Gigabit Ethernet SFP+ Uplink Module for EX4300-48MP Switches**



## 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 EX4300 Switch or Component for Shipping

### IN THIS SECTION

- [Packing an EX4300 Switch for Shipping | 353](#)
- [Packing EX4300 Switch Components for Shipping | 355](#)

If you are returning an EX4300 switch or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you begin packing the switch or component, ensure you have:

- Followed all the steps listed in *Contact Customer Support to Obtain Return Material Authorization*.
- Retrieved the original shipping carton and packing materials. Contact your JTAC representative if you do not have these materials, to learn about approved packing materials. See *Contact Customer Support to Obtain Return Material Authorization*.
- Ensure you understand how to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.

This topic describes:

### Packing an EX4300 Switch for Shipping

Before you pack the switch:

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 (O) 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*.

If you need to transport the switch to another location or return the switch to Juniper Networks, you need to pack the switch securely in its original packaging to prevent damage during transportation.

Ensure that you have the following parts and tools available to pack the switch:

- Phillips (+) screwdriver, number 2
- The original switch packing material (cardboard box, accessory box and its contents, and foam padding)
- ESD grounding strap
- Antistatic bag



**CAUTION:** Do not pack the switch in anything except its original container or the switch might be damaged in transit.

To pack the switch:

1. If the switch is installed in a rack or cabinet, have one person support the weight of the switch while another person unscrews and removes the mounting screws.
2. Remove the switch from the rack or cabinet and place the switch on a flat, stable surface.
3. Use the screwdriver to remove the rack-mounting brackets from the switch chassis.
4. Place the switch in an antistatic bag.
5. Place the bottom portion of the packaging foam in the shipping carton.
6. Place the switch inside the cavity in the bottom packaging foam.

7. Place the top portion of the packaging foam on top of the switch.
8. If you are returning accessories or field-replaceable units (FRUs) with the switch, pack them as instructed in ["Packing EX4300 Switch Components for Shipping" on page 355](#).
9. Place the accessory box vertically by the rear end of the chassis in the shipping carton.
10. Close the top of the cardboard shipping box and seal it with packing tape.
11. Write the RMA number on the exterior of the box to ensure proper tracking.

## Packing EX4300 Switch Components for Shipping

Ensure that you have the following parts and tools available:

- Antistatic bag, one for each component
- ESD grounding strap

To pack the switch components, follow the instructions here.



**CAUTION:** Do not stack switch components. Return individual components in separate boxes if they do not fit together on one level in the shipping box.

To pack the switch components:

- Place individual components in antistatic bags.
- Use the original packing materials if they are available. If the original packing materials are not available, ensure the component is adequately packed to prevent damage during transit. The packing material you use must be able to support the weight of the component.
- Ensure that the components are adequately protected by wrapping them well with packing materials. Pack the component in an oversized box (if the original box is not available) with extra packing material around the unit so that the component is prevented from moving around inside the box.
- Securely tape the box closed.
- Write the RMA number on the exterior of the box to ensure proper tracking.

## RELATED DOCUMENTATION

[Returning an EX4300 Switch or Component for Repair or Replacement](#) | 343

[Unpacking an EX4300 Switch](#) | 168

# 7

CHAPTER

## Safety and Compliance Information

---

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  - [Multiple Power Supplies Disconnection Warning | 393](#)
  - [TN Power Warning | 394](#)
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  - [Compliance Statements for EMC Requirements for EX Series Switches | 396](#)
  - [Compliance Statements for Acoustic Noise for EX Series Switches | 400](#)
  - [Statements of Volatility for Juniper Network Devices | 400](#)
-

# 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 | 362](#)
- [Fire Suppression Equipment | 362](#)

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.

## Wall-Mounting Warning for EX4300 Switches



**WARNING:** When mounting EX4300 switches except EX4300-48MP and EX4300-48MP-S switches on a wall, orient the front panel of the chassis downward to ensure proper airflow and meet safety requirements in the event of a fire. When mounting EX4300-48MP and EX4300-48MP-S switches on a wall, orient the front panel of the chassis pointing to the right side or to the left side to ensure proper airflow and meet safety requirements in the event of a fire.

### RELATED DOCUMENTATION

| [Mounting an EX4300 Switch on a Wall](#) | 181

## Grounded Equipment Warning



**WARNING:** This device must be properly grounded at all times. Follow the instructions in this guide to properly ground the device to earth.

**Waarschuwing** Dit apparaat moet altijd goed geaard zijn. Volg de instructies in deze gids om het apparaat goed te aarden.

**Varoitus** Laitteen on oltava pysyvästi maadoitettu. Maadoita laite asianmukaisesti noudattamalla tämän oppaan ohjeita.

**Avertissement** L'appareil doit être correctement mis à la terre à tout moment. Suivez les instructions de ce guide pour correctement mettre l'appareil à la terre.

**Warnung** Das Gerät muss immer ordnungsgemäß geerdet sein. Befolgen Sie die Anweisungen in dieser Anleitung, um das Gerät ordnungsgemäß zu erden.

**Avvertenza** Questo dispositivo deve sempre disporre di una connessione a massa. Seguire le istruzioni indicate in questa guida per connettere correttamente il dispositivo a massa.

**Advarsel** Denne enheten på jordes skikkelig hele tiden. Følg instruksjonene i denne veiledningen for å jorde enheten.

**Aviso** Este equipamento deverá estar ligado à terra. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

**¡Atención!** Este dispositivo debe estar correctamente conectado a tierra en todo momento. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

**Varning!** Den här enheten måste vara ordentligt jordad. Följ instruktionerna i den här guiden för att jorda enheten ordentligt.

## Radiation from Open Port Apertures Warning



**LASER WARNING:** Because invisible radiation might be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures.

**Waarschuwing** Aangezien onzichtbare straling vanuit de opening van de poort kan komen als er geen fiberkabel aangesloten is, dient blootstelling aan straling en het kijken in open openingen vermeden te worden.

**Varoitus** Koska portin aukosta voi emittoitua näkymätöntä säteilyä, kun kuitukaapelia ei ole 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 a exposição à radiação e não deverá olhar fixamente para orifícios que se encontrarem a descoberto.

**¡Atención!** Debido a que la apertura del puerto puede emitir radiación invisible cuando no existe un cable de fibra conectado, evite mirar directamente a las aperturas para no exponerse a la radiación.

**Varning!** Osynlig strålning kan avges från en portöppning utan ansluten fiberkabel och du bör därför undvika att bli utsatt för strålning genom att inte stirra in i oskyddade öppningar.

## Laser and LED Safety Guidelines and Warnings

### IN THIS SECTION

● General Laser Safety Guidelines | 373

- [Class 1 Laser Product Warning | 373](#)
- [Class 1 LED Product Warning | 374](#)
- [Laser Beam Warning | 375](#)

Juniper Networks devices are equipped with laser transmitters, which are considered a Class 1 Laser Product by the U.S. Food and Drug Administration and are evaluated as a Class 1 Laser Product per IEC/EN 60825-1 requirements.

Observe the following guidelines and warnings:

## General Laser Safety Guidelines

When working around ports that support optical transceivers, observe the following safety guidelines to prevent eye injury:

- Do not look into unterminated ports or at fibers that connect to unknown sources.
- Do not examine unterminated optical ports with optical instruments.
- Avoid direct exposure to the beam.



**LASER WARNING:** Unterminated optical connectors can emit invisible laser radiation. The lens in the human eye focuses all the laser power on the retina, so focusing the eye directly on a laser source—even a low-power laser—could permanently damage the eye.

**Avertissement** Les connecteurs à fibre optique sans terminaison peuvent émettre un rayonnement laser invisible. Le cristallin de l'œil humain faisant converger toute la puissance du laser sur la rétine, toute focalisation directe de l'œil sur une source laser, — même de faible puissance—, peut entraîner des lésions oculaires irréversibles.

## Class 1 Laser Product Warning



**LASER WARNING:** Class 1 laser product.

**Waarschuwing** Klasse-1 laser produkt.

**Varoitus** Luokan 1 lasertuote.

**Avertissement** Produit laser de classe I.

**Warnung** Laserprodukt der Klasse 1.

**Avvertenza** Prodotto laser di Classe 1.

**Advarsel** Laserprodukt av klasse 1.

**Aviso** Produto laser de classe 1.

**¡Atención!** Producto láser Clase I.

**Varning!** Laserprodukt av klass 1.

## Class 1 LED Product Warning



**LASER WARNING:** Class 1 LED product.

**Waarschuwing** Klasse 1 LED-product.

**Varoitus** Luokan 1 valodiodituote.

**Avertissement** Alarme de produit LED Class I.

**Warnung** Class 1 LED-Produktwarnung.

**Avvertenza** Avvertenza prodotto LED di Classe 1.

**Advarsel** LED-produkt i klasse 1.

**Aviso** Produto de classe 1 com LED.

**¡Atención!** Aviso sobre producto LED de Clase 1.

**Varning!** Lysdiodprodukt av klass 1.

## Laser Beam Warning



**LASER WARNING:** Do not stare into the laser beam or view it directly with optical instruments.

**Waarschuwing** Niet in de straal staren of hem rechtstreeks bekijken met optische instrumenten.

**Varoitus** Älä katso säteeseen äläkä tarkastele sitä suoraan optisen laitteen avulla.

**Avertissement** Ne pas fixer le faisceau des yeux, ni l'observer directement à l'aide d'instruments optiques.

**Warnung** Nicht direkt in den Strahl blicken und ihn nicht direkt mit optischen Geräten prüfen.

**Avvertenza** Non fissare il raggio con gli occhi né usare strumenti ottici per osservarlo direttamente.

**Advarsel** Stirr eller se ikke direkte p strlen med optiske instrumenter.

**Aviso** Não olhe fixamente para o raio, nem olhe para ele directamente com instrumentos ópticos.

**¡Atención!** No mirar fijamente el haz ni observarlo directamente con instrumentos ópticos.

**Varning!** Rikta inte blicken in mot strålen och titta inte direkt på den genom optiska instrument.

## Maintenance and Operational Safety Guidelines and Warnings

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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 weggegooid 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.

**Warning!** 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 liitännänpoihin.

**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.

**Varning!** Vid åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

## Operating Temperature Warning



**WARNING:** To prevent the device from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature. To prevent airflow restriction, allow at least 6 in. (15.2 cm) of clearance around the ventilation openings.

**Waarschuwing** Om te voorkomen dat welke switch van de Juniper Networks router dan ook oververhit raakt, dient u deze niet te bedienen op een plaats waar de maximale aanbevolen omgevingstemperatuur van 40° C wordt overschreden. Om te voorkomen dat de luchtstroom wordt beperkt, dient er minstens 15,2 cm speling rond de ventilatie-openingen te zijn.

**Varoitus** Ettei Juniper Networks switch-sarjan reititin ylikuumentuisi, sitä ei saa käyttää tilassa, jonka lämpötila ylittää korkeimman suositellun ympäristölämpötilan 40° C. Ettei ilmanvaihto estyisi, tuuletusaukkojen ympärille on jätettävä ainakin 15,2 cm tilaa.

**Avertissement** Pour éviter toute surchauffe des routeurs de la gamme Juniper Networks switch, ne l'utilisez pas dans une zone où la température ambiante est supérieure à 40° C. Pour permettre un flot d'air constant, dégagez un espace d'au moins 15,2 cm autour des ouvertures de ventilations.

**Warnung** Um einen Router der switch vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene

Maximum von 40° C überschreitet. Um Lüftungsverschluß zu verhindern, achten Sie darauf, daß mindestens 15,2 cm lichter Raum um die Lüftungsöffnungen herum frei bleibt.

**Avvertenza** Per evitare il surriscaldamento dei switch, non adoperateli in un locale che ecceda la temperatura ambientale massima di 40° C. Per evitare che la circolazione dell'aria sia impedita, lasciate uno spazio di almeno 15.2 cm di fronte alle aperture delle ventole.

**Advarsel** Unngå overoppheting av eventuelle rutere i Juniper Networks switch Disse skal ikke brukes på steder der den anbefalte maksimale omgivelsestemperaturen overstiger 40° C (104° F). Sørg for at klaringen rundt lufteåpningene er minst 15,2 cm (6 tommer) for å forhindre nedsatt luftsirkulasjon.

**Aviso** Para evitar o sobreaquecimento do encaminhador Juniper Networks switch, não utilize este equipamento numa área que exceda a temperatura máxima recomendada de 40° C. Para evitar a restrição à circulação de ar, deixe pelo menos um espaço de 15,2 cm à volta das aberturas de ventilação.

**¡Atención!** Para impedir que un encaminador de la serie Juniper Networks switch se recaliente, no lo haga funcionar en un área en la que se supere la temperatura ambiente máxima recomendada de 40° C. Para impedir la restricción de la entrada de aire, deje un espacio mínimo de 15,2 cm alrededor de las aperturas para ventilación.

**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

**Varning!** Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

## General Electrical Safety Guidelines and Warnings



**WARNING:** Certain ports on the device are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in *GR-1089-CORE*) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS (Network Equipment-Building System) requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be 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 109 on page 384](#)) 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.

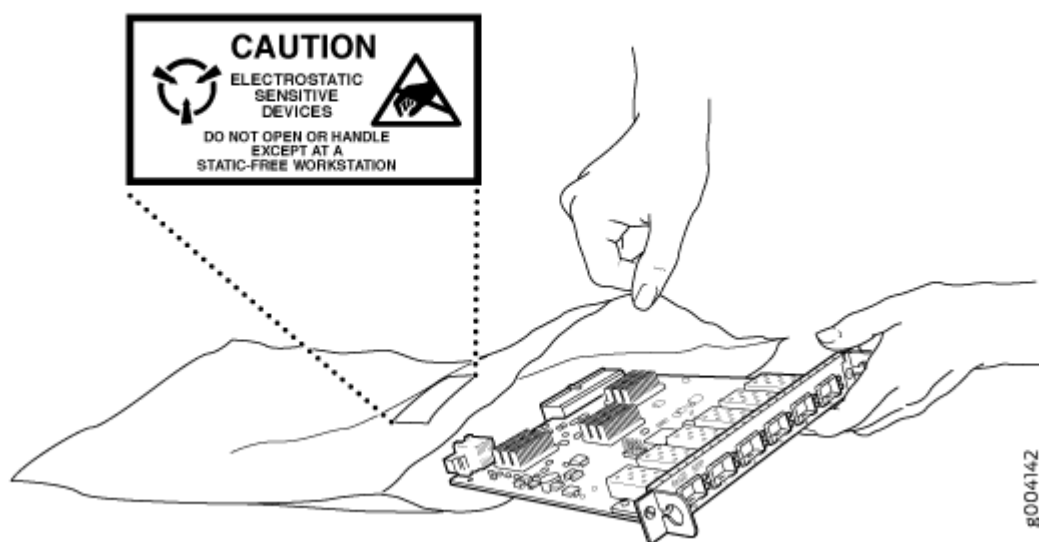
**Avertissement** Par mesure de sécurité, vérifiez régulièrement la résistance du bracelet antistatique. Cette valeur doit être comprise entre 1 et 10 mégohms (Mohms).

- 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 109 on page 384](#)). If you are returning a component, place it in an antistatic bag before packing it.

**Figure 109: Placing a Component into an Antistatic Bag**



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**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 virtälähteiden 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 for EX4300 Switches

- 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.



**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).

**Warning!** 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 maaajohto maaajohtoon, +RTN varten +RTN, -48 V varten -48 V. Oikea irrotettava kytkentäjäjestys on -48 V varten -48 V, +RTN varten +RTN, maaajohto maaajohtoon.

**Avertissement** Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis -48 V à -48 V. En débranchant la puissance, l'ordre approprié de câblage est -48 V à -48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché

pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

**Warnung** Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

**Avvertenza** Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

**Advarsel** Riktig tilkoples tilkopplingssekvens er jord til jord, +RTN til +RTN, -48 V til -48 V. Riktig frakoples tilkopplingssekvens 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 na EXTremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então -48 V a -48 V. Ao desconectar a potência, a seqüência apropriada da fiação é -48 V a -48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

**Varning!** Korrekt kopplingssekvens är jord till jord, +RTN till +RTN, -48 V till -48 V. Korrekt kopplas kopplingssekvens är -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 johdinliitintä, esimerkiksi suljettua silmukkaa tai kourumaista liitintä, jossa on ylöspäin käännetty kiinnityskorvat. Tällaisten liitintöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

**Avertissement** Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

**Warnung** Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsabschlüsse, z.B. für einen geschlossenen Regelkreis oder gabelförmig, mit nach oben gerichteten Kabelschuhen zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

**Avvertenza** Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

**Advarsel** Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

**Aviso** Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

**¡Atención!** Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

**Varning!** När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

## Multiple Power Supplies Disconnection Warning



**WARNING:** The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

**Waarschuwing** Deze eenheid heeft meer dan één stroomtoevoerverbinding; alle verbindingen moeten volledig worden verwijderd om de stroom van deze eenheid volledig te verwijderen.

**Varoitus** Tässä laitteessa on useampia virtalähdekytkentöjä. Kaikki kytkennät on irrotettava kokonaan, jotta virta poistettaisiin täysin laitteesta.

**Avertissement** Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

**Warnung** Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

**Avvertenza** Questa unità ha più di una connessione per alimentatore elettrico; tutte le connessioni devono essere completamente rimosse per togliere l'elettricità dall'unità.

**Advarsel** Denne enheten har mer enn én strømtilkobling. Alle tilkoblinger må kobles helt fra for å eliminere strøm fra enheten.

**Aviso** Este dispositivo possui mais do que uma conexão de fonte de alimentação de energia; para poder remover a fonte de alimentação de energia, deverão ser desconectadas todas as conexões existentes.

**¡Atención!** Esta unidad tiene más de una conexión de suministros de alimentación; para eliminar la alimentación por completo, deben desconectarse completamente todas las conexiones.

**Varning!** Denna enhet har mer än en strömförsörjningsanslutning; alla anslutningar måste vara helt avlägsnade innan strömtillförseln till enheten är fullständigt bruten.

## TN Power Warning



**WARNING:** The device is designed to work with a TN power system.

**Waarschuwing** Het apparaat is ontworpen om te functioneren met TN energiesystemen.

**Varoitus** Koje on suunniteltu toimimaan TN-sähkövoimajärjestelmien yhteydessä.

**Avertissement** Ce dispositif a été conçu pour fonctionner avec des systèmes d'alimentation TN.

**Warnung** Das Gerät ist für die Verwendung mit TN-Stromsystemen ausgelegt.

**Avvertenza** Il dispositivo è stato progettato per l'uso con sistemi di alimentazione TN.

**Advarsel** Utstyret er utfomet til bruk med TN-strømsystemer.

**Aviso** O dispositivo foi criado para operar com sistemas de corrente TN.

**¡Atención!** El equipo está diseñado para trabajar con sistemas de alimentación tipo TN.

**Varning!** Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

## Agency Approvals for EX Series Switches

### IN THIS SECTION

- [Compliance Statement for Argentina | 396](#)

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

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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，用者請採取相應措施。

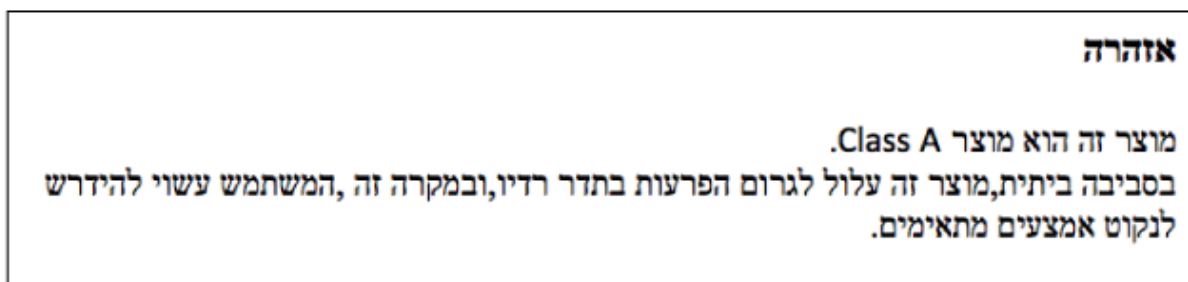
The preceding translates as follows:

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.

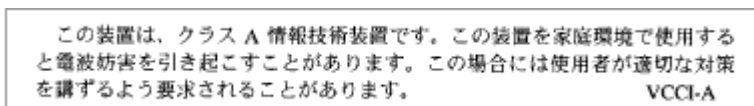
## Israel



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.

## Statements of Volatility for Juniper Network Devices

A *statement of volatility (SoV)*—sometimes known as *letter of volatility (LoV)*—identifies the volatile and non-volatile storage components in Juniper Networks devices, and describes how to remove non-volatile storage components from the device.



**NOTE:** Individual FRUs do not have separate SoV or LoV documents. They are covered in the SoV or LoV of the Juniper Networks device in which they are installed.



**NOTE:** Statements of volatility are not available for all Juniper Networks devices.

CTP Series:

- [CTP150](#)
- [CTP2000](#)

EX Series:

- [EX2200 and EX2200-C](#)
- [EX2300-24P, EX2300-24T, and EX2300-24T-DC](#)
- [EX2300-48P and EX2300-48T](#)
- [EX2300-C](#)
- [EX3300](#)
- [EX3400-24P, EX3400-24T, EX3400-24T-DC](#)
- [EX3400-48P, EX3400-48T, EX3400-48T-AFI](#)
- [EX4200](#)
- [EX4300](#)
- [EX4300-48MP](#)
- [EX4400](#)
  1. [EX4400-24T](#)
  2. [EX4400-24P](#)
  3. [EX4400-24MP](#)
  4. [EX4400-48T](#)
  5. [EX4400-48P](#)
  6. [EX4400-48MP](#)
  7. [EX4400-48F](#)
- [EX4500](#)
- [EX4550](#)

- [EX4600](#)
- [EX8200](#)
- [EX9251](#)
- [EX9253](#)
- [XRE200 External Routing Engine](#)

LN Series:

- [LN1000-CC](#)

MX Series:

- [M7i](#)
- [M7i Compact Forwarding Engine Board \(CFEB\)](#)
- [M40e and M10i](#)
- [M320](#)
- [MX5, MX10, MX40, and MX80](#)
- [MX104](#)
- [MX204](#)
- [MX304](#)
- [MX240, MX480, and MX960](#)
- [MX10003](#)
- [RE-A-2000 Route Engine](#)
- [RE-S-X6-64G Routing Engine](#)

NFX Series:

- [NFX250](#)

QFX Series:

- [QFX3008-I](#)
- [QFX3100](#)
- [QFX3500](#)

- [QFX3600](#)
- [QFX5100-24Q](#)
- [QFX5100-48S](#)
- [QFX5100-48T](#)
- [QFX5110-32Q](#)
- [QFX5110-48S](#)
- [QFX5120](#)
  1. [QFX5120-32C](#)
  2. [QFX5120-48T](#)
  3. [QFX5120-48Y](#)
  4. [QFX5120-48YM](#)
- [QFX5200](#)
- [QFX5200-32C](#)
- [QFX10008 and QFX10016](#)

SRX Series:

- [SRX100](#)
- [SRX110](#)
- [SRX210B](#)
- [SRX210H-POE](#)
- [SRX210H-P-MGW](#)
- [SRX220](#)
- [SRX240H](#)
- [SRX240H-POE](#)
- [SRX300](#)
- [SRX320](#)
- [SRX340 and SRX345](#)

- [SRX380](#)
- [SRX550](#)
- [SRX650](#)
- [SRX1400](#)
- [SRX1500](#)
- [SRX3400 and SRX3600](#)
- [SRX4200](#)
- [SRX4600](#)
- [SRX5400, SRX5600, and SRX5800](#)
- [SRX-MP-1SERIAL](#)
- [SSG-520M](#)

T Series:

- [RE-A-2000 Route Engine](#)