# JUNIPER NETWORKS EX4650 Engineeing Simplicity User Guide



Contents



## JUNIPER NETWORKS EX4650 Engineeing Simplicity

## Specifications

- **Speed options**: 10-Gbps, 25-Gbps, 40-Gbps, and 100-Gbps
- **Ports**: 8 quad small form-factor pluggable (QSFP28) ports
- **Power supply options**: AC or DC
- **Airflow options**: front-to-back or back-to-front

## Product Usage Instructions

### Part 1: Install a Power Supply

1. If the power supply slot has a cover panel on it, loosen the captive screws on the cover panel using your fingers or a screwdriver. Gently pull the cover panel outward to remove it and save it for later use.
2. Without touching the power supply pins, leads, or solder connections, remove the power supply from the bag.
3. 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.

### Part 2: Install a Fan Module

1. Remove the fan module from its bag.
2. Hold the handle of the fan module with one hand and support the weight of the module with the other hand.
3. Align the fan module with the fan module slot on the rear panel of the switch and slide it in until it is fully seated.

### FAQ:

**What are the speed options available for the EX4650 switch?**
The EX4650 switch offers speed options of 10 Gbps, 25 Gbps, 40 Gbps, and 100 Gbps.

**What types of ports does the EX4650 switch have?**
The EX4650 switch has 8 quad small form-factor pluggable (QSFP28) ports.

**What are the power supply options for the EX4650 switch?**
The EX4650 switch offers AC and DC power supply options.

**How should I connect the power supplies and fan modules?**
The power supplies and fan modules must have the same airflow direction. Ensure that the airflow direction on the power supplies matches the respective airflow direction on the fan modules.

## System Overview

The EX4650 line of Ethernet switches delivers high scale, high availability, and high performance for campus distribution deployments. Features 48 wire-speed 10-Gigabit Ethernet/25 Gigabit Ethernet small form-factor pluggable and pluggable plus transceiver (SFP/SFP+/SFP28) ports and 8 wire-speed 40 Gigabit Ethernet/100 Gigabit Ethernet quad SFP+ transceiver (QSFP+/QSP28) ports in a compact platform, the EX4650 provides the flexibility to support mixed environments. The EX4650 switches run the standard Junos operating system (OS). QFX5120-48Y switches also support virtual chassis technology. You can interconnect up to two EX4650-48Y switches in an EX4650-48Y virtual chassis.

- The EX4650-48Y switch offers 48 small-form-factor pluggable (SFP+) ports that operate at 1-Gbps, 10- Gbps, and 25-Gbps speeds along with 8 quad small form-factor pluggable (QSFP28) ports that operate at 40-Gbps (with QSFP+ transceivers) and 100-Gbps speeds (with QSFP28 transceivers).
    - **NOTE:** By default, the EX4650-48Y switch offers 10-Gbps speed. You need to configure to set 1-Gbps and 25-Gbps speeds.
- Eight 100-Gigabit Ethernet ports that can operate at 40-Gbps or 100-Gbps speed and support QSFP + or QSFP28 transceivers. When these ports operate at 40-Gbps speed, you can configure four 10-Gbps interfaces

and connect breakout cables, increasing the total number of supported 10-Gbps ports to 80. When these ports operate at 100-Gbps speed, you can configure four 25-Gbps interfaces and connect breakout cables, increasing the total number of supported 25-Gbps ports to 80.

A total of four models are available: two featuring AC power supplies and front-to-back or back-to-front airflow and two featuring DC power supplies and front-to-back or back-to-front airflow.

### Tools and Parts Required for Installation

**NOTE**: See the complete documentation at **https://www.juniper.net/documentation/product/en_US/ex4650**.

To mount a Juniper Networks EX4650 Ethernet switch on a rack, you need:

- Two front-mounting brackets and twelve screws to secure the brackets to the chassis—provided
- Two rear-mounting brackets—provided
- Screws to secure the chassis to the rack—not provided
- Phillips (+) screwdriver, number 2—not provided
- Electrostatic discharge (ESD) grounding strap—not provided
- Fan module—preinstalled

To connect the switch to earth ground, you need:

- A grounding cable (minimum 12 AWG (2.5 $mm^2$), minimum 90° C wire, or as permitted by the local code), a grounding lug (Panduit LCD10-10A-L or equivalent), a pair of 10-32 x .25-in. screws with #10 split-lock washers, and a pair of #10 flat washers—none provided

To connect power to the switch, you need:

- For models that are powered by AC power—An AC power cord with a plug appropriate for your geographical location, and a power cord retainer
- For models that are powered by DC power—DC power source cables (12 AWG—not provided) with ring lugs (Molex 190700069 or equivalent—not provided) attached

To perform the initial configuration of the switch, you need:

- An Ethernet cable with an RJ-45 connector attached—not provided
- An RJ-45 to DB-9 serial port adapter—not provided
- A management host, such as a PC, with an Ethernet port—not provided

**NOTE**: We no longer include a DB-9 to RJ-45 cable or a DB-9 to RJ-45 adapter with a CAT5E copper cable as part of the device package. If you require a console cable, you can order it separately with the part number JNP-CBL-RJ45-DB9 (DB-9 to RJ-45 adapter with a CAT5E copper cable).

Register product serial numbers on the Juniper Networks website and update the installation base data if there is any addition or change to the installation base or if the installation base is moved. Juniper Networks will not be held accountable for not meeting the hardware replacement service-level agreement for products that do not have registered serial numbers or accurate installation base data.

Register your product at **https://tools.juniper.net/svcreg/SRegSerialNum.jsp**.
Update your install base at **https://www.juniper.net/customers/csc/management/updateinstallbase.jsp**.

The fan modules and the power supplies in the EX4650 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:**

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

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

**NOTE**: Power supplies and fan modules must have the same airflow direction. The airflow direction on the power supplies must match the respective airflow direction on the fan modules.

## Install a Power Supply

**NOTE**: Each power supply must be connected to a dedicated power source outlet. The power supply slots are on the rear panel.

To install a power supply:

**Figure 1: Installing an AC Power Supply in the EX4650 Switch**

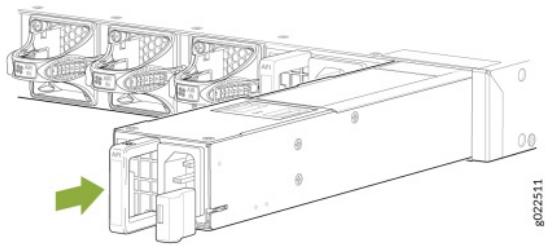
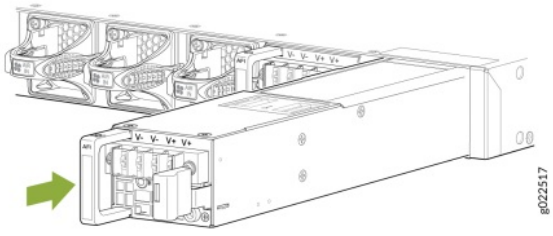



**Figure 2: Installing a DC Power Supply in the EX4650 Switch**



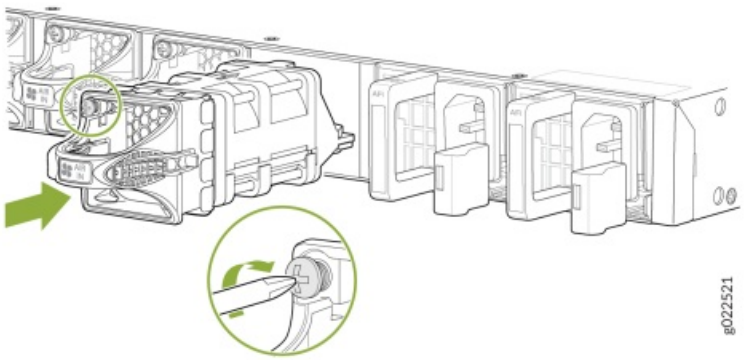

1. If the power supply slot has a cover panel on it, loosen the captive screws on the cover panel by using your fingers or the screwdriver. Hold the screws and gently pull the cover panel outward to remove the cover panel. Save the cover panel for later use.
2. Without touching the power supply pins, leads, or solder connections, remove the power supply from the bag.
3. 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.

## Install a Fan Module

**NOTE**: The fan module slots are on the rear panel of the switches.

To install a fan module:

**Figure 3: Installing a Fan Module in the EX4650 Switch**




1. Remove the fan module from its bag.
2. 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.
3. Tighten the screws on the faceplate of the fan module by using a screwdriver.

## Mount the Switch on Four Posts of a Rack

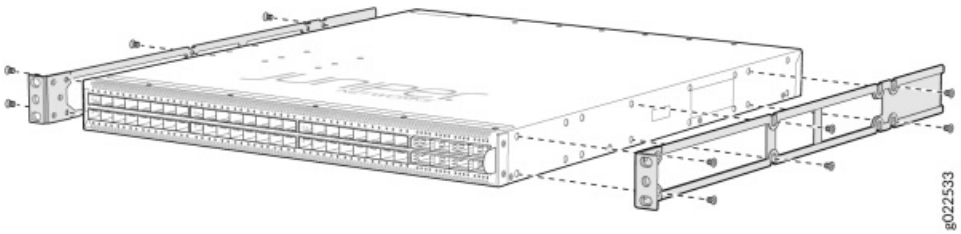
You can mount an EX4650 switch on four posts of a 19-in. rack or an ETSI rack. This guide describes the procedure to mount the switch on a 19-in. rack. Mounting an EX4650 switch requires one person to lift the switch and a second person to install the mounting screws to secure the switch to the rack.

**NOTE**: The EX4650-48Y switch with two power supplies and fans installed in it weighs approximately 23.7 lb (10.75 kg).

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

   **NOTE:** While mounting multiple units on a rack, mount the heaviest unit at the bottom and mount the other units from the bottom to the top in decreasing order of weight.
2. Place the switch on a flat, stable surface.
3. Position the front-mounting brackets along the side panels of the chassis, aligning them with the front panel.
4. Attach the brackets to the chassis by using the mounting screws. Tighten the screws (see Figure 4).

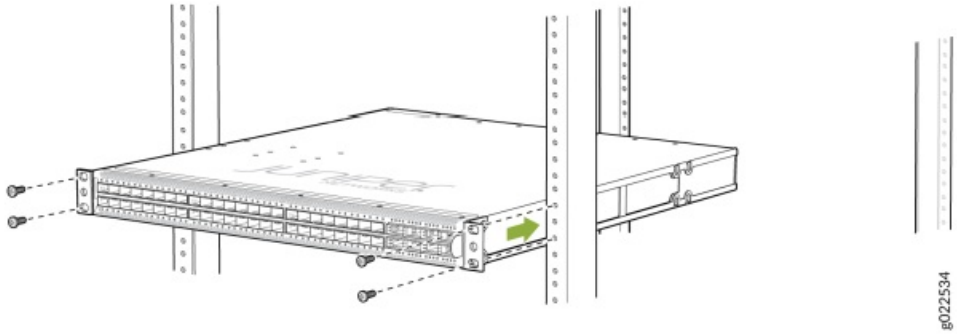
**Figure 4: Attaching Front-Mounting Brackets to the EX4650-48Y Chassis**




5. Position the mounting brackets along the side panels of the chassis aligning them with the front panel side.

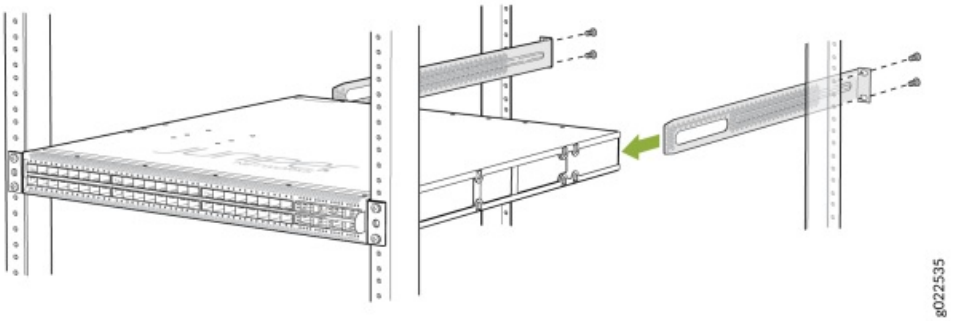
6. Have one person grasp both sides of the switch, lift the switch, and position it in the rack, aligning the mounting bracket holes with the threaded holes in the rack rail. Align the bottom hole in each mounting bracket with a hole in each rail, making sure that the chassis is level. See Figure 5
7. Have a second person secure the switch to the rack by inserting the screws appropriate for your rack through the bracket and the threaded holes on the rack.

**Figure 5: Securing the EX4650-48Y Switch to the Rack**




8. On the rear of the switch chassis, slide the rear-mounting brackets into the front-mounting brackets on either side of the chassis until the rear-mounting brackets contact the rack rails (see Figure 6,7).

**Figure 6: Connecting the Rear-Mounting Brackets to the EX4650 Switch**




9. Secure the rear-mounting brackets to the rear posts by using the screws appropriate for your rack.
10. Ensure that the chassis is level by verifying that all the screws on the front posts of the rack are aligned with the screws on the rear posts of the rack.

## Connect Power to the Switch

Depending on the model, you can use either AC or DC power supplies. The power supplies install in the slots on the rear panel.

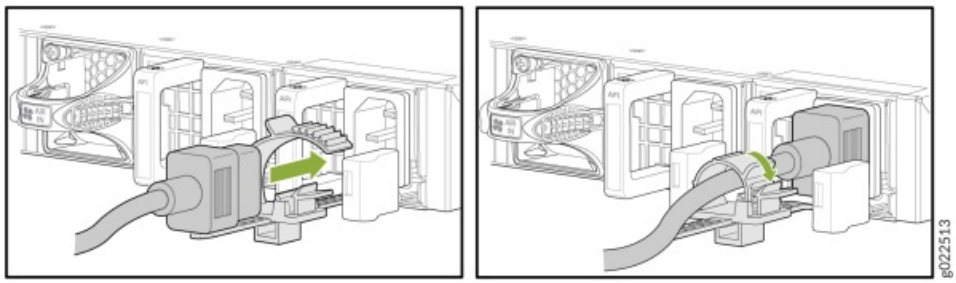
**CAUTION**: Do not mix AC and DC power supplies in the same switch.

**NOTE**: Grounding is required for models that use DC power supplies and recommended for models that use AC power supplies. An AC-powered switch gets additional grounding when you connect the power supply in the switch to a grounded AC power source outlet by using the power cord. Before you connect power to the switch, 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.

To connect earth ground to a switch:
Before you connect power to the switch, 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.

To connect power to an AC-powered switch (see Figure 7,8):

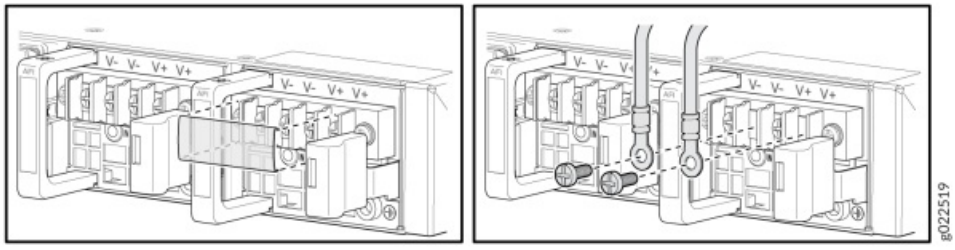
**Figure 7: Connecting Power to a EX4650 Switch Powered by AC Power Supply**




1. Push the end of the retainer strip into the hole next to the inlet on the power supply faceplate until it snaps into place.
2. Press the 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.
3. Insert the power cord coupler firmly into the inlet.
4. Slide the loop toward the power supply until it is snug against the base of the coupler.
5. Press the tab on the loop and draw out the loop into a tight circle.
6. If the AC power source outlet has a power switch, set it to the OFF (O) position.
    - **NOTE**: The switch powers on as soon as power is provided to the power supply. There is no power switch on the switch.
7. Insert the power cord plug into the power source outlet.
8. Verify that the AC and DC LEDs on the power supply are lit green. If the fault LED is lit, remove power from the power supply, and replace the power supply.

To connect power to a DC-powered EX4650-48Y switch (see Figure 8,9):

**Figure 8: Connecting Power to a EX4650 Switch Powered by DC Power Supply**




The DC power supply has terminals labeled V-, V–, V+, and V+ for connecting DC power source cables labeled positive (+) and negative (–).

**WARNING**: Ensure that the input circuit breaker is open so that the cable leads will not become active while you are connecting DC power.

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

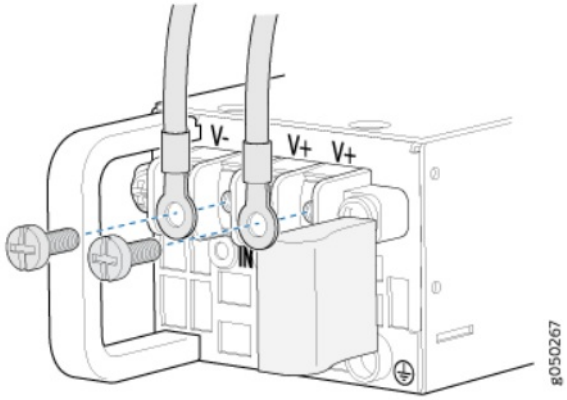
1. Remove the terminal block cover. The terminal block cover is a piece of clear plastic that snaps into place over the terminal block.
2. Remove the screws on the terminals by using the screwdriver. Save the screws.
3. Connect each power supply to a power source. Secure power source cables to the power supplies by screwing

the ring lugs attached to the cables to the appropriate terminals by using the screws from the terminals.

- Secure the ring lug of the positive (+) DC power source cable to the V+ terminal on the DC power supply.
- Secure the ring lug of the negative (–) DC power source cable to the V– terminal on the DC power supply.
- Tighten the screws on the power supply terminals by using an appropriate screwdriver. Do not overtighten —apply between 5 lb-in. (0.56 Nm) and 6 lb-in. (0.68 Nm) of torque to the screws.

4. Replace the terminal block cover.
5. Close the input circuit breaker.
6. Verify that the IN OK and the OUT OK LEDs on the power supply are lit green and on steadily. See Figure 9,10

**Figure 9: Connecting Power to a DC-Powered QFX5120-48Y Switch**




## Perform Initial Configuration

1. Before you begin, 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
2. Connect the console port on the rear panel of the switch to a laptop or PC by using the RJ-45 to DB-9 serial port adapter (not provided). The console (CON) port is located on the management panel of the switch.
3. Log in as root. There is no password. If the software booted before you connected to the console port, you might need to press the Enter key for the prompt to appear. login root
4. Start the CLI. root@% cli
5. Add a password to the root administration user account.
   [edit] root@# set system root-authentication plain-text-password
   New password: password
   Retype new password: password
6. (Optional) Configure the name of the switch. If the name includes spaces, enclose the name in quotation marks (“ ”).
   [edit] root@# set system host-name host-name
7. Configure the default gateway.
   [edit] root@# set routing-options static route default next-hop address
8. Configure the IP address and prefix length for the switch management interface.
   [edit] root@# set interfaces em0 unit 0 family inet address address/prefix-length

NOTE: The management ports em0 (C0) and em1 (C1) are located on the rear panel of the EX4650-48Y switch.

9. (Optional) Configure the static routes to remote prefixes with access to the management port.
   [edit] root@# set routing-options static route remote-prefix next-hop destination-ip retain no-readvertise
10. Enable Telnet service.
    [edit] root@# set system services telnet
11. Enable SSH service.
    [edit] root@# set system services SSH
12. Commit the configuration to activate it on the switch.
    [edit] root@# commit
13. Configure in-band management or out-of-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, can do either of the following:
    - Use the automatically created VLAN named default for management of all data interfaces as members of the default VLAN. Specify the management IP address and the default gateway.
    - Create a new management VLAN. Specify the VLAN name, VLAN ID, management IP address, and default gateway. Select the ports that must be part of this VLAN.
    - 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.
14. (Optional) Specify the SNMP read community, location, and contact to configure SNMP parameters.
15. (Optional) Specify the system date and time. Select the time zone from the list. The configured parameters are displayed.
16. Enter yes to commit the configuration. The configuration is committed as the active configuration for the switch.

You can now log in by using the CLI and continue configuring the switch.

**Guidelines for Using EX4650 RMA Replacement Chassis**
The RMA replacement chassis for EX4650 is a universal chassis that comes installed with QFX5120 personality and preloaded with Junos OS for EX Series software image in the /var/tmp directory. You must change the personality of the device to EX4650 beore performing the initial configuration. Use the console port to connect to the switch to change the personality of the switch.

- Log in as root. There is no password.
  login: root
- Install the EX4650 software package.
  root# request system software add /var/tmp/jinstall-host-ex-4e-flex-x86-64-18.3R1.11-secure-signed.tgz force-host reboot
- Verify if the device is changed to EX4650 personality.
  root> show version
- Delete the EX Series software image from the /var/tmp directory if required.

**Safety Warnings Summary**
This is a summary of safety warnings. For a complete list of warnings, including translations, see the EX4650 documentation at **https://www.juniper.net/documentation/product/en_US/ex4650**.

**WARNING**: Failure to observe these safety warnings can result in personal injury or death.

- Permit only trained and qualified personnel to install or replace switch components.
- Perform only the procedures described in this quick start and the EX Series documentation. Other services must be performed only by authorized service personnel.
- Before installing the switch, read the planning instructions in the EX Series documentation to make sure that the site meets power, environmental, and clearance requirements for the switch.
- Before connecting the switch to a power source, read the installation instructions in the EX Series documentation.
- Installing the switch requires one person to lift the switch and a second person to install the mounting screws.
- If the rack has stabilizing devices, install them in the rack before mounting or servicing the switch in the rack.
- Before installing or after removing an electrical component, always place it component-side up on an antistatic mat placed on a flat, stable surface or in an antistatic bag.
- Do not work on the switch or connect or disconnect cables during electrical storms.
- 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 become welded to the terminals.

**Power Cable Warning (Japanese)**
The attached power cable is only for this product. Do not use this cable for another product.

**Contacting Juniper Networks**
For technical support, see **http://www.juniper.net/support/requesting-support.html**.



## Documents / Resources

| | |
|---|---|
|  | **JUNIPER NETWORKS EX4650 Engineeing Simplicity** [pdf] User Guide<br>EX4650 Engineeing Simplicity, EX4650, Engineeing Simplicity, Simplicity |

## References

- **Contact - Support - Juniper Networks**

- Juniper Networks Inc. - Sign In
- EX4650 Documentation | Juniper Networks
- User Manual