



# **Cisco Nexus 9232E-B1 NX-OS Mode Switch Hardware Installation Guide**

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## Contents



## Overview

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## Overview

The Cisco Nexus 9232E-B1 switch (N9K-C9232E-B1) is a 1-rack unit (RU), fixed-port switch designed for deployment in data centers.

**This switch includes the following ports:**

- QSFP-DD800 ports (32)
- Control Plane Expansion port (10G)
- Management port (1G)
- Console port (RJ45)
- USB port

**Note** 800G copper is supported on ports 9-24.

**Note** Breakout support: 2x400G, 8x100G, and 4x100G. Additionally, 4x25G and 2x50G is supported on SFP+ links.

Only 2x400G breakout, 8x100G breakout, 4x100G breakout, Native 400G and Native 100G

**Note** Auto negotiation (AN) is not supported.

**This switch includes the following user-replaceable components:**

- Fan modules (6) with the following airflow choices:
  - Port-side intake fan module with burgundy coloring (NXA-SFAN-39CFM-PI)



Overview

Only Delta vendor NXA-SFAN-39CFM-PI fan modules are supported.

- Power supply modules (two—One for operations and one for redundancy [1+1]) with the following choices:
    - 2000-W port-side intake AC power supply with burgundy coloring (NXA-PAC-2KW-PI)
- Only NXA-PAC-2KW-PI power supply units are supported.

**Note** All fan modules and power supplies must use the same airflow direction.

**Note** Each fan module has two rotors. The switch can function normally if one rotor inside the any one fan module fails. In case of more than one rotor failure, the switch will issue a warning and power down in 2 minute.

**Note** Two minutes of delay is recommended between fan module online insertion and removal (OIR).

The following figure shows the switch features on the port side of the chassis.

1	USB port	2	Console port (RJ45)
3	Time of Day (ToD) port (RJ45)	4	400-Gigabit QSFP-DD ports (32)
5	Management port (1G RJ45)	6	Control Plane Expansion port (10G)
7	Synchronous Ethernet (SyncE) DIN connector (10 MHz)	8	Synchronous Ethernet (SyncE) DIN connector (1 PPS)

To determine which transceivers, adapters, and cables are support this switch, see the [Modules Compatibility Information](#) document.

The following figure shows the switch features on the power supply side of the chassis.





## Overview

- |   |  |   |  |
|---|--|---|--|
| 1 | Power supply modules (1 or 2) (AC power supplies shown) with slots numbered 1 (left) and 2 (right) | 2 | Fan modules (6) with slots numbered from 1 (left) to 6 (right) |
|---|--|---|--|

The following figure shows the side of the chassis.

### 1 Grounding pad

The fan and power supply modules are field replaceable. You can replace one fan module or one power supply module during operations so long as the other modules are installed and operating. If you have only one power supply installed, you can install the replacement power supply in the open slot before removing the existing power supply.

**Caution** If the switch has port-side intake airflow (burgundy coloring for fan modules), you must locate the switch in the cold aisle. If the switch has port-side exhaust airflow (blue coloring for fan modules), you must locate the switch in the hot aisle. If you locate the air intake in a hot aisle, the switch can overheat and shut down.



## Overview



## Preparing the Site

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- [Humidity Requirements, on page 5](#)
- [Altitude Requirements, on page 5](#)
- [Dust and Particulate Requirements, on page 6](#)
- [Minimizing Electromagnetic and Radio Frequency Interference, on page 6](#)
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## Temperature Requirements

The switch requires an operating temperature of 32 to 104 degrees Fahrenheit (0 to 40 degrees Celsius). When the switch is not operating, the temperature must be between –40 to 158 degrees Fahrenheit (–40 to 70 degrees Celsius).

## Humidity Requirements

High humidity can cause moisture to enter the switch. Moisture can cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and mechanical reliability. The switch is rated to withstand from 5- to 95-percent (nonoperating) and 5- to 90-percent (operating) humidity.

Buildings in which the climate is controlled by air-conditioning in the warmer months and by heating in the colder months usually maintain an acceptable level of humidity for the switch equipment. However, if the switch is located in an unusually humid location, use a dehumidifier to maintain the humidity within the acceptable range.

## Altitude Requirements

Altitude rating is 10,000 ft (3048 m). For China, it is 6,562 ft (2000 m).



## Dust and Particulate Requirements

Exhaust fans cool power supplies and system fans cool switches by drawing in air and exhausting it through various openings in the chassis. However, fans also ingest dust and other particles, causing contamination and buildup in the switch and increased internal chassis temperature. Dust and particles can act as insulators, interfere with the mechanical components in the switch. A clean operating environment can greatly reduce the negative effects of dust and other particles.

In addition to keeping your environment free of dust and particles, follow these precautions to avoid contamination of your switch:

- Do not permit smoking near the switch.
- Do not permit food or drink near the switch.

## Minimizing Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from the switch can adversely affect other devices, such as radio and television (TV) receivers. Radio frequencies that emanate from the switch can also interfere with cordless and low-power telephones. Conversely, RFI from high-power devices can cause spurious characters to appear on the switch monitor.

RFI is defined as any EMI with a frequency above 10 kHz. This type of interference can travel from the switch to other devices through the power cable and power source or through the air as transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI that are emitted by computing equipment. Each switch meets these FCC regulations.

To reduce the possibility of EMI and RFI, follow these guidelines:

- Cover all open expansion slots with a blank filler plate.
- Always use shielded cables with metal connector shells for attaching peripherals to the switch.

When wires are run for any significant distance in an electromagnetic field, interference can occur to signals on the wires with the following implications:

- Bad wiring can result in radio interference emanating from the plant wiring.
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signals and receivers in the chassis and even create an electrical hazard by conducting power surges from power lines into equipment.

**Note** To predict and prevent strong EMI, you need to consult experts in radio frequency interference.

The wiring is unlikely to emit radio interference if you use a twisted-pair cable with a good distribution of grounding conductors. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable.





**Caution** If the wires exceed the recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse that is caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to damage sensitive switches. You will want to consult experts in electrical surge suppression and shielding if you have had problems in the past.

## Shock and Vibration Requirements

The switch has been shock- and vibration-tested for operating ranges, handling, and earthquakes.

## Grounding Requirements

The switch is sensitive to variations in voltage that is supplied by the power sources. Overvoltage, under-voltage, and transients (or spikes) can erase data from memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the switch. You can connect the ground pad on the switch either directly to the earth-ground connection or to a fully bonded and grounded metal rack.

When you properly install the chassis in a grounded rack, the switch is grounded because it has a metal-to-metal connection to the rack. Alternatively, you can ground the chassis by using a customer-supplied grounding cable that meets your local and national installation requirements. For U.S. installations, we recommend 6-AWG wire. Connect your grounding cable to the chassis with a grounding lug (provided in the optional accessory kit) and to the facility ground.

**Note** You automatically ground AC power supplies when you connect them to AC power sources.

**Note** An electrical conducting path shall exist between the product chassis and the metal surface of the rack or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by the thread-forming type mounting screws that remove any paint or non-conductive coatings and provide metal-to-metal contact. Any paint or other non-conductive coatings shall be removed on the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an anti-oxidant applied before installation.

## Planning for Power Requirements

The switch includes two power supplies (1-to-1 redundancy with current sharing) in one of the following combinations:

- Two 2000-W AC power supplies



## Airflow Requirements

**Note** For 1+1 redundancy, you must use two power sources and connect each power supply to a separate power source.

**Note** Some of the power supply modules have rating capabilities that exceed the switch requirements. When calculating your power requirements, use the switch requirements to determine the amount of power required for the power supplies.

To minimize the possibility of circuit failure, make sure that each power-source circuit that is used by the switch is dedicated to the switch.

# Airflow Requirements

The switch is positioned with its ports in either the front or the rear of the rack depending on your configuration and maintenance requirements.

To identify the airflow options for your switch, see the user-replaceable components in the Overview section of this document.

You must have fan and power supply modules that move the coolant air from the cold aisle to the hot aisle in one of the following ways:

- Port-side exhaust airflow—Cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle.
- Port-side intake airflow—Cool air enters the chassis through the port end in the cold aisle and exhausts through the fan and power supply modules in the hot aisle.

You can identify the airflow direction of each fan and power supply module by its coloring as follows:

- Blue coloring indicates port-side exhaust airflow.
- Burgundy coloring indicates port-side intake airflow.

**Note** To prevent the switch from overheating and shutting down, you must position the air intake for the switch in a cold aisle. The fan and power supply modules must have the same direction of airflow. If you change the airflow direction for the switch, you must shutdown the switch before changing the modules.

## Rack and Cabinet Requirements

You can install the following types of racks or cabinets for your switch:

- Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom-to-top cooling)



## Preparing the Site

- Standard open four-post Telco racks

Work with your cabinet vendors to determine which of their cabinets meet the following requirements. Contact the Cisco Technical Assistance Center (TAC) for recommendations:

- Use a standard 19-inch (48.3-cm), four-post Electronic Industries Alliance (EIA) cabinet or mounting rails that conform to English universal hole spacing per section 1 of the ANSI/EIA standard.
- The depth of a four-post rack must be 24 to 32 inches (61.0 to 81.3 cm) between the front and rear mounting rails (for proper mounting of the bottom-support brackets or other mounting hardware).

Also, you must have power receptacles that are located within reach of the power cords that are used with the switch.

### **Warning** Statement 1048 Rack Stabilization

The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before installation, moving, or servicing. Failure to stabilize the rack can cause bodily injury.

## Clearance Requirements

Provide the chassis with adequate clearance between the chassis and any other rack, device, or component that you can properly install the chassis. Provide the chassis with adequate clearance to route cables, maintain airflow, and maintain the switch. For the clearances required for an installation of this chassis in a rack, see the following figure.



#### Clearance Requirements

2	Vertical rack-mount posts and rails	6	Maximum extension of the bottom 36.0 in (91.0 cm)
3	Chassis width 17.3 in (43.9 cm)	7	Depth of the front clearance area depth of the chassis).
4	Width of the front clearance area (equal to the width of the chassis with two rack-mount brackets that are attached to it). 19.0 in (48.3 cm)		

**Note** Both the front and rear of the chassis must be open to both aisles for airflow.