



Installing the Cisco MDS 9148V-K9 Switch

This chapter describes how to install a Cisco MDS 9148V-K9 switch and its components.

Before you install, operate, or service the system, see the [Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family](#) document for important safety information.



Warning This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

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Preinstallation

Cisco MDS 9000 Series Telco and EIA Shelf Bracket

The optional Telco and EIA Shelf Bracket Kit (part number DS-SHELF=) can temporarily or permanently support the switch during installation. After the front rack-mount brackets are securely attached to the rack-mounting rails, the shelf bracket can be removed.

The Telco and EIA Shelf Bracket kit supports the following configurations:

- A two-post Telco rack
- A four-post EIA rack



Note Telco and EIA Shelf Bracket optional kit is not provided with the switch; to order the kit, contact your switch supplier.

This section describes the procedure for installing a switch in a rack or cabinet using the optional Telco and EIA Shelf Bracket Kit.

Shelf-Installation Guidelines



Caution

- If the rack is on wheels, ensure that the brakes are engaged or the rack is otherwise stabilized.
- If you are installing this kit in an EIA rack, attach the shelf to all four rack-mounting posts; the EIA posts may not be thick enough to prevent flexing of shelf brackets if only two posts are used.

Before Installing the Shelf Brackets

Before installing the shelf brackets, inspect the contents of your kit. The following table lists the contents of the shelf bracket kit:

Quantity	Part Description
2	Slider brackets
2	Shelf brackets
1	Crossbar
2	10-32 x 3/8-in. Phillips pan-head screws
16	12-24 x 3/4-in. Phillips screws
16	10-24 x 3/4-in. Phillips screws

Required Equipment

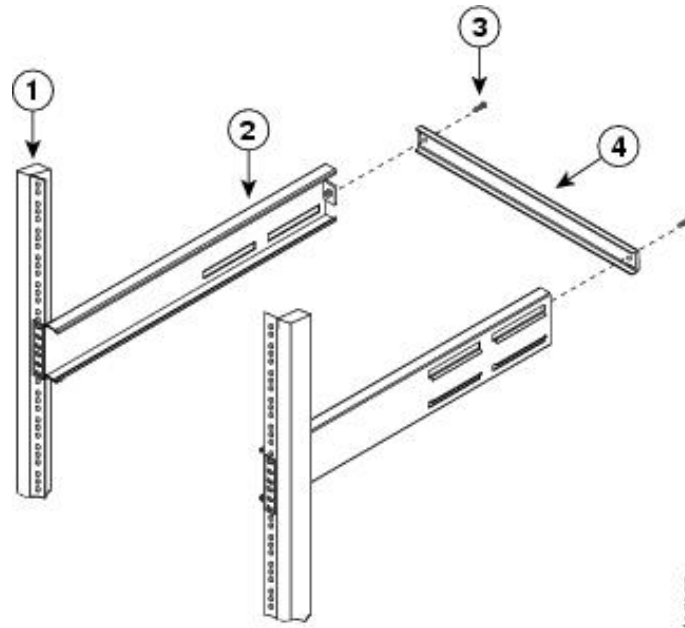
You need the following equipment for this installation:

- Number 2 Phillips screwdriver
- Tape measure and level (to ensure that shelf brackets are at level with each other)

Installing the Shelf Bracket Kit into a Four-Post EIA Rack

The following figure shows the installation of the shelf bracket kit into a four-post EIA rack:

Figure 1: Installing the Shelf Bracket Kit into an EIA Rack



1	Rack-mounting post	4	Crossbar
2	Shelf bracket	5	10-32 screws
3	Slider post		

To install the shelf brackets in an EIA rack, follow these steps:

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- Step 1** Position a shelf bracket inside the rack-mounting posts, as shown in [Installing the Shelf Bracket Kit into an EIA Rack](#). Align the screw holes at the front of the shelf bracket with the holes in the front rack-mounting post. Then, attach the shelf bracket to the front rack-mounting post using a minimum of four 12-24 or 10-24 screws.
- Note** The bottom hole of the shelf bracket should align with the bottom hole (the hole immediately above the 1/2 in. spacing) of a rack unit on the rack-mounting post.
- Step 2** Repeat Step 1 with the other shelf brackets.
- Step 3** Verify that the shelf brackets are at the same height (using the level or tape measure, as desired).
- Step 4** Attach the crossbar to the shelf brackets, as shown in [Installing the Shelf Bracket Kit into an EIA Rack](#), using the 10-32 screws.
- Step 5** Insert the slider posts into the shelf brackets, as shown in [Installing the Shelf Bracket Kit into an EIA Rack](#). Attach them to the rear rack-mounting posts, using a minimum of four 12-24 or 10-24 screws.
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Preinstallation Guidelines

Airflow Considerations

The switch comes with fan modules and power supply units that have either port-side intake or port-side exhaust airflow for cooling the switch. If you are orienting the switch with the FC ports facing a cold aisle, make sure that the switch has a port-side intake fan and power supply modules with red colorings. If you are orienting the switch with the fan and power supply modules facing a cold aisle, make sure that the switch has port-side exhaust fan and power supply units with blue colorings. All fan modules and power-supply modules must have the same direction of airflow.

Connection Guidelines for AC-Powered Systems

To connect to the switch AC power supply units to the site power source, follow these guidelines:

- For power redundancy, each power supply should be connected to a separate power feed (at a minimum, separate branch circuits).
- Circuits should be sized according to local and national codes.
- The AC power receptacles that are used to power the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground in the service equipment.

Installation Guidelines

Follow these guidelines when installing the switch:

- Each new switch requires a license. See the [Cisco MDS 9000 Family NX-OS Licensing Guide](#) for instructions on installing a license.
- Plan your site configuration and prepare the site before installing the switch.
- Ensure that there is adequate space around the switch to allow for servicing the switch and for adequate airflow. The airflow requirements are listed the [Technical Specifications](#) section.
- Ensure that you are positioning the switch in a rack so that it takes in cold air from the cold aisle and exhausts air to the hot aisle. For more information, see the [Airflow Considerations](#) section.
- Ensure that the air-conditioning meets the heat dissipation requirements listed in the [Technical Specifications](#) section.
- Ensure that the cabinet or rack meets the requirements listed in the [Cabinet and Rack Installation](#) section.
- Ensure that the chassis is adequately grounded. If the switch is not mounted in a grounded rack, we recommend that you connect both the system ground on the chassis and the site power ground to an earth ground.
- Ensure that the site power meets the power requirements listed in the [Technical Specifications](#) section. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.



Caution Avoid UPS types that use ferro-resonant technology. These UPS types can become unstable with systems such as the Cisco MDS 9000 Series, triggered by substantial current draw fluctuations due to fluctuating data traffic patterns.

- Ensure that electrical circuits are sized according to local and national codes.

If you are using a 200 or 240 VAC power source in North America, the circuit must be protected by a two-pole circuit breaker.



Caution To prevent loss of input power, ensure that the total maximum loads on the circuits supplying power to the switch are within the electrical current ratings for circuit for wiring and breakers.

Unpacking and Inspecting the Switch



Caution When handling switch components, wear an ESD strap and handle modules using only the carrier edges.



Tip Retain the shipping container in case the chassis has to be shipped in the future.



Note The switch is thoroughly inspected before shipment. If any damage occurs during transportation, or if any item is missing, contact your customer representative immediately. If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact [Cisco Technical Support](#).

To inspect the shipment, follow these steps:

1. Compare the shipment to the equipment list provided by your customer service representative and verify that you have received all items, including the following:
 - Grounding lug kit
 - Rack-mount kit
 - ESD wrist strap
 - Cables and connectors
 - Optional items, if any, ordered
2. Check for damage and report any discrepancies or damage, to your customer service representative. Have the following information ready:
 - Invoice number of shipper (see packing slip)

- Model and serial number of the damaged unit
 - Description of damage
 - Effect of damage on the installation
3. Check if all the power supplies and the fan trays have the expected direction of airflow. Port-side intake airflow modules have a red coloring, and port-side exhaust airflow modules have blue coloring. For more information, see the [Power Supplies](#) and [Fan Modules](#) sections.

Installing the Switch

This section describes how to use the rack mount kit to install the switch into a cabinet or rack that meets the requirements described in the [Cabinet and Rack Requirements](#) section.

Installing the Switch in a 4-Post Rack

To install the switch, you must attach the front and rear mounting guides to the switch, install the slider rails on the rear of the rack, slide the switch into the slider rails, and secure the switch to the front of the rack. Typically, the front of the rack is the side that is easiest to access for maintenance.

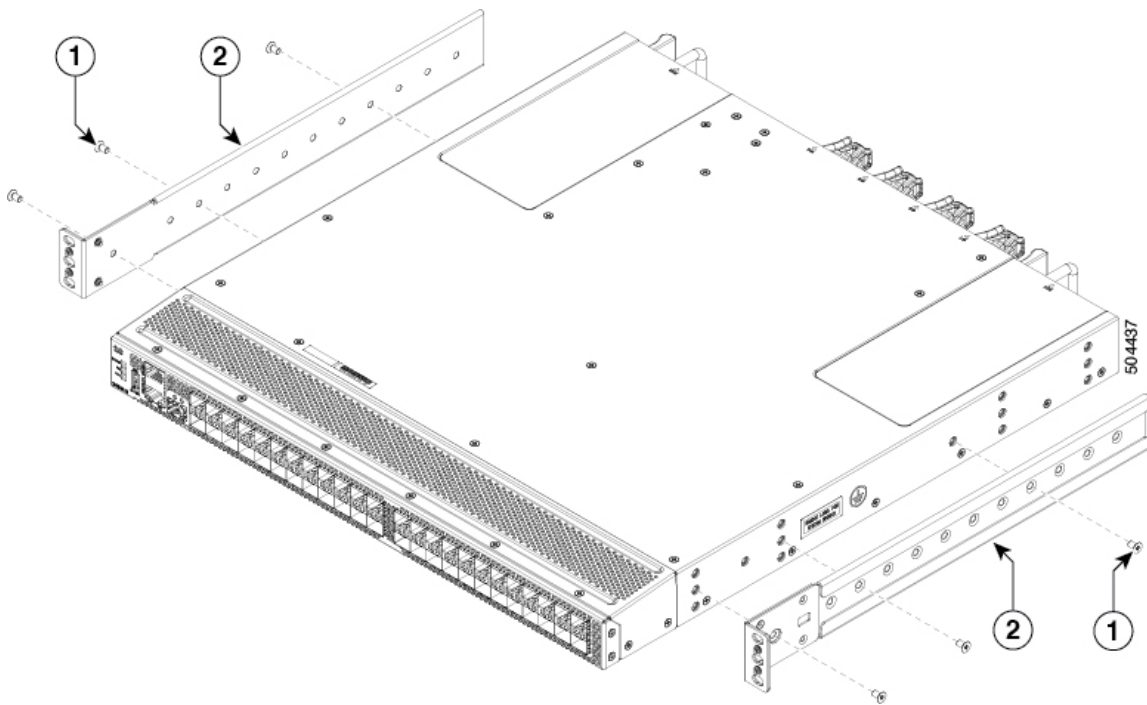
Before you begin

- Inspect the switch shipment to ensure that you have everything you ordered.
- Make sure that the switch rack-mount kit includes the following parts:
 - Rack-mount brackets (2)
 - Rack-mount guides (2)
 - Slider rails (2)
 - M4 x 0.7 x 8-mm Phillips countersink screws (12)
- The rack is installed and secured to its location.
- Determine how you want to set up your switch:
 1. Determine which end of the chassis is to be located in the cold aisle as follows:
 - a. If the switch has port-side intake modules (fan modules and power supply units with red coloring), position the switch so that its ports are in the cold aisle.
 - b. If the switch has port-side exhaust modules (fan modules and power supply units with blue coloring), position the switch so that its fan modules and power supply units are in the cold aisle.
 2. Determine which way the chassis should slide in and out of the rack—port-side entry first or rear-side entry first. You might consider whether the front or back of the rack provides better clearance for maneuvering the chassis in and out during installation and servicing. The end that needs to enter the rack first requires the guides and the other end the brackets.

Step 1 Install two rack-mount brackets to the switch as follows:

- a. Position a rack-mount bracket so that three of its screw holes are aligned to the screw holes on the side of the chassis. You can align any three of the holes in the rack-mount bracket to three of the screw holes on the side of the chassis. The holes that you use depend on the requirements of your rack and the amount of clearance. For more information on clearance, see the [General Requirements for Cabinets and Racks](#).
- b. You can install the rack-mount bracket either at the front or rear of the chassis. The choice is determined by which end of the chassis will be inserted into the rack first. If the rear end of the chassis is to be inserted first, then mount the brackets on the front of the chassis, and vice versa.

Figure 2: Installing Rack-Mount Brackets on the Front Side of the Chassis



1.	M4 screws	2.	Rack-mount
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- c. Secure the rack-mount bracket to the chassis using the three M4 screws and tighten each screw to 12 in-lb (1.36 N·m) of torque.
- d. Repeat [Step 1](#) for the other rack-mount bracket on the other side of the switch, and be sure to position it in the same distance from the front of the switch.

Step 2 If you are installing the chassis into an ungrounded rack, you must attach a customer-supplied grounding wire to the chassis. However, if you are installing the chassis into a grounded rack, you can skip this step.

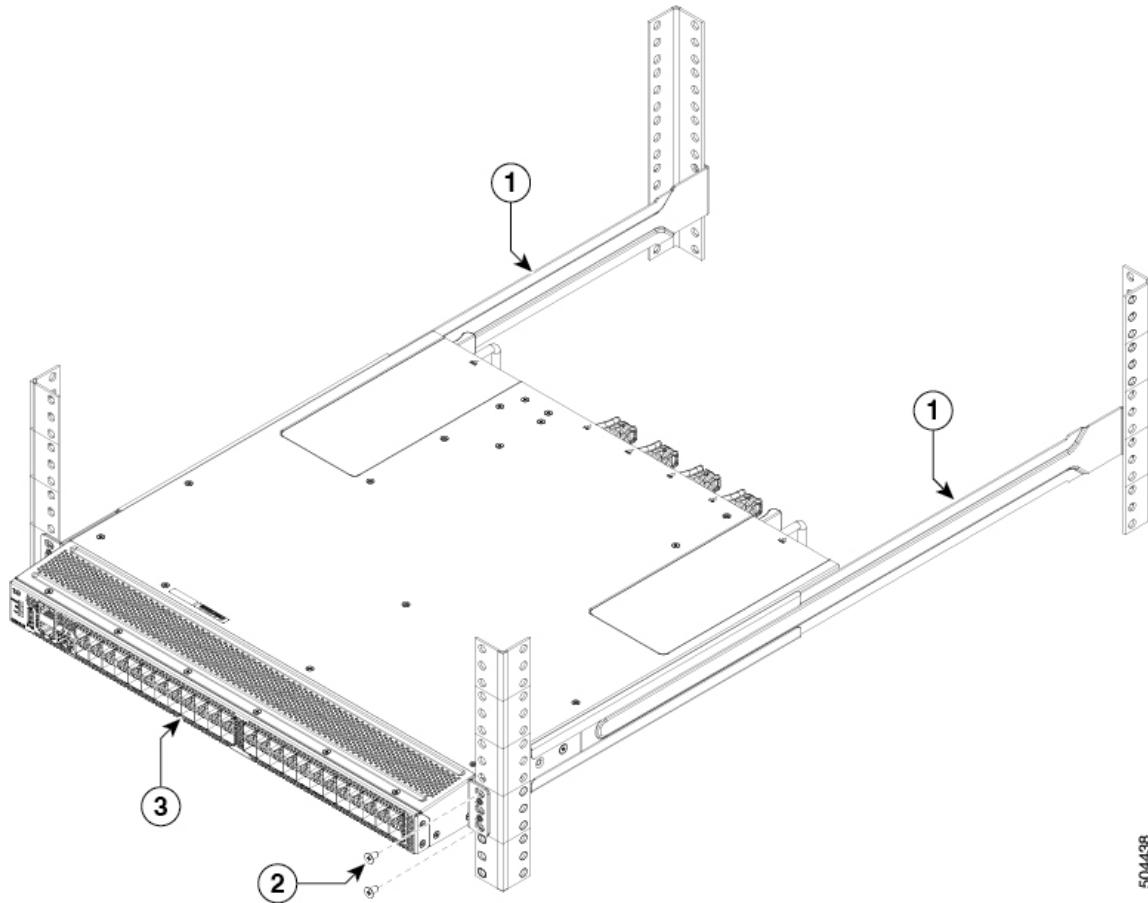
Step 3 Install the slider rails into the rack or cabinet, as follows:

- a. Determine which two posts of the rack or cabinet you should use for the slider rails. Of the four vertical posts in the rack or cabinet, two will be used for the rack-mount brackets, and the other two posts will have the slider rails.

- b. Position a slider rail at the desired level side of the rack and use two 12-24 screws or two 10-32 screws, depending on the rack thread type, to attach the slider rail to the rack. Tighten the 12-24 screws to 30 in-lb (3.39 N·m) of torque, or tighten the 10-32 screws to 20 in-lb (2.26 N·m) of torque.
- c. Repeat [Step 2](#) to attach the other slider rail to the other side of the rack.

To make sure that the slider rails are at the same level, you should use a level tool or tape measure, or carefully count the screw holes in the vertical mounting posts.

Step 4 Insert the switch into the rack and attach it as follows:



1.	Slider rails	3.	Chassis
2.	rack-mount screws		

- a. Holding the switch with both hands, position the two rack-mount guides on the switch between the rack or cabinet posts that do not have slider rails attached to them.
- b. Align the two rack-mount guides on either side of the switch with the slider rails installed in the rack. Slide the guides onto the slider rails, and then gently slide the switch all the way into the rack until the brackets come in contact with two rack or cabinet posts.

Note If you attached a grounding cable to the chassis, you will need to flex one of the rack-mount posts slightly to allow the grounding lug to go behind the post.

- c. Holding the chassis level, insert two screws (12-24 or 10-32, depending on the rack type) into each of the two brackets (using a total of four screws), and into the cage nuts or threaded holes in the rack or cabinet posts.
- d. Tighten the 10-32 screws to 20 in-lb (2.26 N·m), or tighten the 12-24 screws to 30 in-lb (3.39 N·m).

Step 5 If you have attached a grounding wire to the chassis grounding pad, connect the other end of the wire to the facility ground.

Installing the Switch into a 2-Post Rack

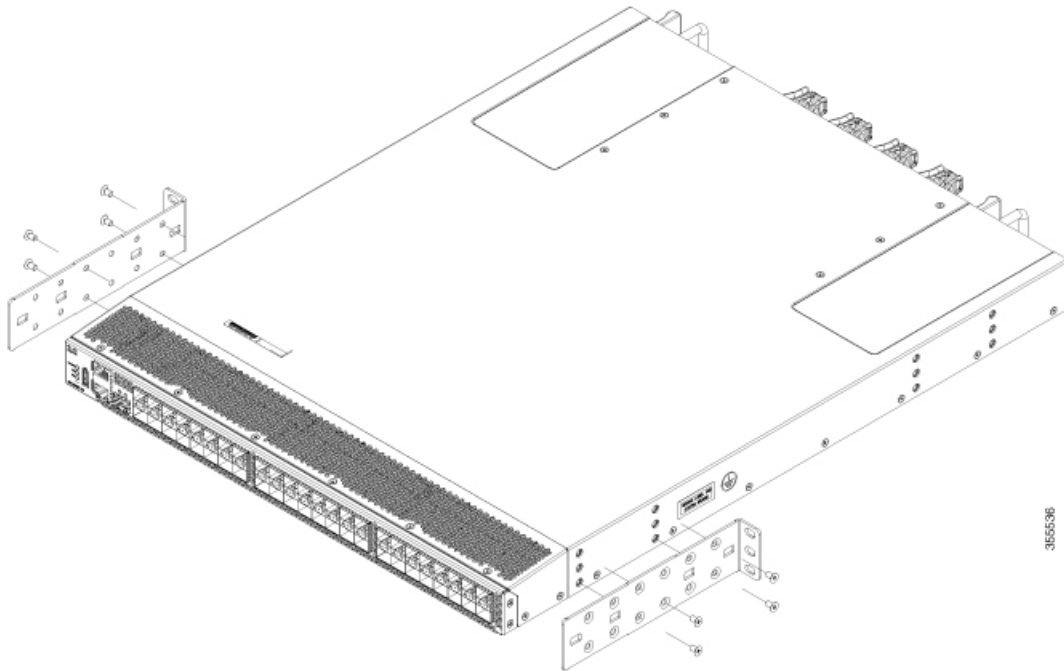
Before you begin

- Determine how you want to set up your switch:
 - Determine which end of the chassis is to be located in the cold aisle as follows:
 1. If the switch has port-side intake modules (fan modules and power supply units with red coloring), position the switch so that its ports are in the cold aisle.
 2. If the switch has port-side exhaust modules (fan modules and power supply units with blue coloring), position the switch so that its fan modules and power supply units are in the cold aisle.
 - Determine which way the chassis should slide in and out of the rack—port side entry first or rear-side entry first. You might consider whether the front or back of the rack provides better clearance for maneuvering the chassis in and out during installation and servicing. The end that needs to enter the rack first requires the guides and the other end the brackets.

Step 1 Install two rack-mount brackets onto the switch as follows:

- a. Position a rack-mount bracket so that four of its screw holes are aligned to the screw holes on the side of the chassis. You can align any four of the holes in the rack-mount bracket to four of the six screw holes on the side of the chassis. The holes that you use depend on the requirements of your rack and the amount of clearance. For more information on clearance, see the [General Requirements for Cabinets and Racks](#).
- b. You can install the rack-mount bracket either at the front or rear of the chassis. The choice is determined by which end of the chassis will be inserted into the rack first. If the rear end of the chassis is to be inserted first, then mount the brackets on the front of the chassis, and vice versa.

Figure 3: Installing Rack-Mount Brackets on the Front Side of the Chassis



Step 2 If you are installing the chassis into an ungrounded rack, you must attach a customer-supplied grounding wire to the chassis. However, if you are installing the chassis into a grounded rack, you can skip this step.

Step 3 Install the switch onto the 2-post rack:

- a. Holding the switch with both hands, position the back of the switch between the two posts of the rack. Then gently move the switch until the rack-mount brackets come in contact with two rack posts.
- b. Holding the chassis level, insert three screws (12-24 or 10-32, depending on the rack type) into each of the two rack-mount brackets (using a total of six screws) and into the cage nuts or threaded holes in the rack or cabinet posts.

Figure 4: Installing the Switch onto the 2-Post Rack From the Front Side of the Chassis

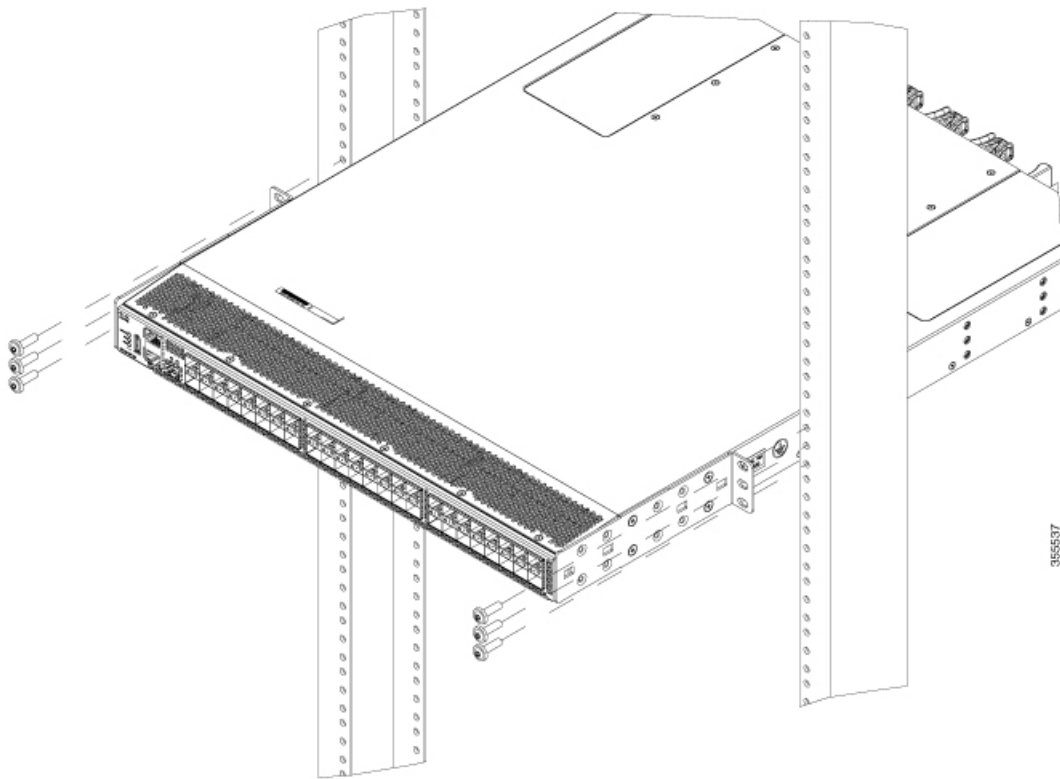
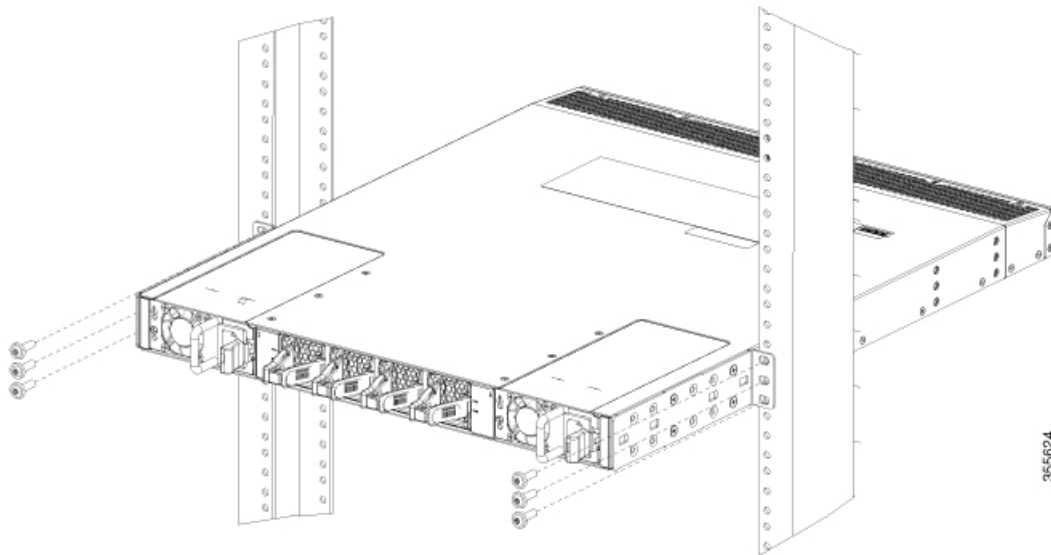


Figure 5: Installing the Switch onto the 2-Post Rack From the Rear Side of the Chassis



- c. Tighten the 10-32 screws to 20 in-lb (2.26 N.m) or tighten the 12-24 screws to 30 in-lb (3.39 N.m).

- Step 4** If you have attached a grounding wire to the chassis grounding pad, connect the other end of the wire to the facility ground.

Grounding the Switch

The switch chassis is automatically grounded when you install the switch properly in a grounded rack with metal-to-metal connections between the switch and rack.

Alternatively, you can ground the chassis (this is required if the rack is not grounded) by attaching a customer-supplied grounding cable to the chassis grounding pad and the facility ground. We recommend using 6-AWG wire.



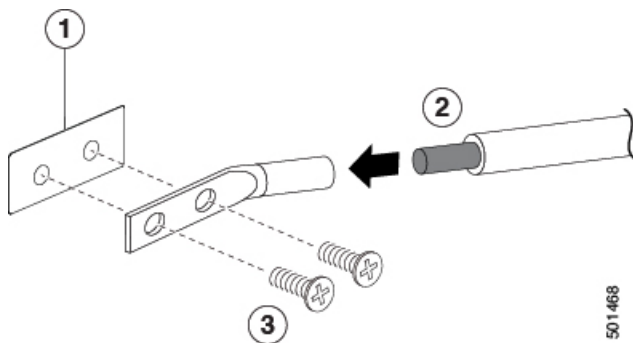
Warning This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. **Statement 1024**



Warning When installing or replacing the unit, the ground connection must always be made first and disconnected last. **Statement 1046**

- Step 1** Use a wire-stripping tool to remove approximately 0.75 in. (1.9 cm) of the covering from the end of the grounding wire.
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug, and use a crimping tool to crimp the lug to the wire. Verify that the ground wire is securely attached to the grounding lug by attempting to pull the wire out of the crimped lug.
- Step 3** Remove the label covering the grounding pad on the chassis. Secure the grounding lug to the chassis grounding pad with two M4 screws, and tighten each screw to 11.5 to 15 in-lb (1.3 to 1.7 N·m) of torque.

Figure 6: Grounding the Switch



Chassis grounding pad

Two M4 screws are used to secure the grounding lug to the chassis

Grounding cable, with 0.75 in. (19 mm) of insulation that is stripped from one end, which is inserted into the grounding lug and crimped in place.	
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- Step 4** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure an adequate earth ground for the switch. If the rack is fully bonded and grounded, connect the grounding wire, as explained in the documentation provided by the vendor from whom you bought the rack.
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Installing and Removing Components



Warning Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Statement 1034



Caution During this procedure, wear grounding wrist straps to avoid ESD damage to the switch.

Installing the ESD Grounding Strap

This section illustrates how to prepare yourself before removing the chassis from the sealed antistatic bag.

The figures show how to cuff the ESD strap around the wrist and the ground cord that connects the cuff to the ground. ESD wrist straps are the primary means of controlling static charge on personnel.



Note These images are for only representation purposes. The chassis' actual appearance and size may vary.

Figure 7: Wearing the ESD Strap

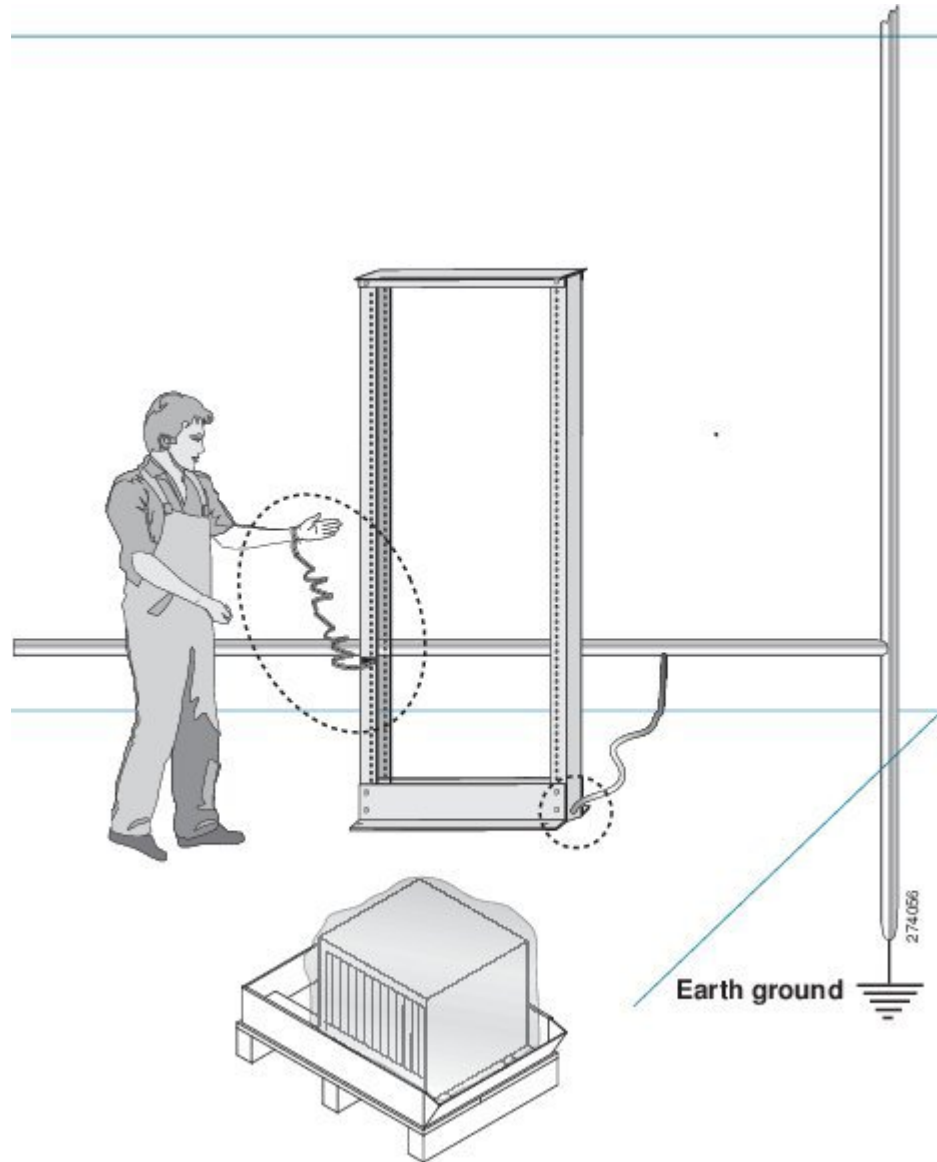
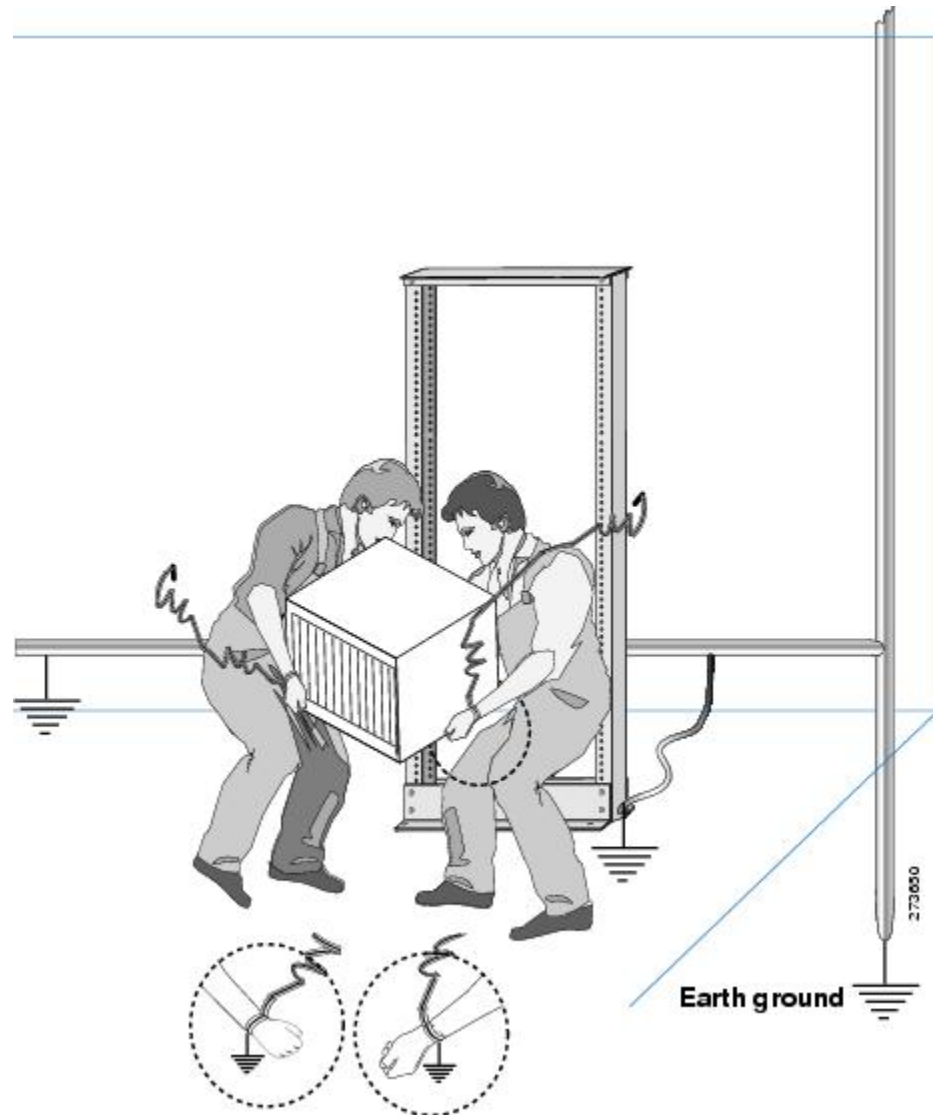


Figure 8: Handling the Chassis

Installing and Removing Power Supply Units

This section provides instructions for installing and removing the power supply units in the switch.

Installing Power Supply Units

You can replace one power supply unit (PSU) while the other one provides power to the switch.

Before you begin

- To implement n+n redundancy, each PSU must be connected to a separate power feed. Otherwise, only one power feed is required.

- There must be an earth ground connection to the chassis to which you are installing the replacement module. Typically, the chassis is grounded by its metal-to-metal connection with a grounded rack. If you need to ground the chassis, see [Grounding the Switch](#).

Step 1 Holding the PSU with one hand underneath it and the other hand holding the handle, turn the PSU so that its release latch is on the right side, and align the back end (the end with the electrical connections) to the open power supply slot. Carefully slide the PSU all the way into the slot until it clicks into place.

Note If the PSU does not fit into the slot opening, turn the unit over and try again.

Step 2 Test the installation by trying to pull the PSU out of the slot without using the release latch.

If the PSU does not move out of place, it is secured in the slot. If the PSU moves, carefully press it all the way into the slot until it clicks in place.

Step 3 Attach the power cable to the power socket on the front of the PSU.

Step 4 Make sure that the other end of the power cable is attached to the appropriate power feed for the PSU. If the power feed has a switch, slide it to the On position.

Note Depending on the outlet socket on your power distribution unit, you might need the optional jumper cable to connect the switch to the outlet socket.

Step 5 Verify that the PSU is operational by making sure that the PSU LEDs are both green. For information on what the PSU LEDs indicate, see the [Switch LEDs](#) section.

Removing Power Supply Units

You can remove one faulty PSU, and the other one will provide enough power to operate the switch.

Step 1 Holding the plug for the power cable, pull the plug out from the power socket on the PSU, and wait until both the PSU LEDs are off.

Step 2 Grasp the PSU handle while pressing the release latch towards the handle.

Step 3 Place your other hand under the PSU to support it while you slide it out of the chassis.

Caution Do not touch the electrical connectors on the back side of the unit and prevent anything else from coming into contact with and damaging the connectors.

Installing and Removing Fan Modules

This section provides instructions for installing and removing the fan modules for the switch.

You can replace one of the four fan modules even when the switch is operating so long as you perform the replacement within one minute of removing the old fan module. If you cannot perform the replacement within one minute, leave the original fan module in the chassis to maintain the designed airflow until you have the replacement fan module on hand and can perform the replacement.

**Caution**

If you are replacing a module during operation, be sure that the replacement fan module has the correct direction of airflow, which means that it has the same airflow direction as the other modules in the chassis. Also, be sure that the airflow direction takes in air from a cold aisle and sends it out to a hot aisle. Otherwise, the switch can overheat and shut down.

If you are changing the airflow direction of all the modules in the chassis, you must shut down the switch before replacing all the fan and power supply modules with modules using the other airflow direction. During operation, all the modules must have the same direction of airflow.

Installing a Fan Module

To install a new fan module, follow these steps:

Before you begin

- You must have a new fan module on hand and ready to install within one minute of removing the original fan module if the switch is operating.
- The new fan module must have the same airflow direction as the other fan and power supply modules installed in the switch. All of these modules must have either red coloring (port-side intake airflow) or blue coloring (port-side exhaust airflow).
- Remove any blank plate or existing fan module from the fan slot.

Step 1

Holding the fan module by its handle, align the back of the fan module (the side with the electrical connectors) to the open fan slot in the chassis.

Step 2

Slide the fan module into the fan module bay until it clicks into place.

Step 3

Verify that the Status LED turns on and becomes green. For more information on what the LEDs indicate, see the [LEDs section](#).

Removing a Fan Module

The fan module is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damaging the system.

**Caution**

The Cisco MDS 9000 Series Switches have internal temperature sensors that can shut down the system if the temperature within the chassis exceed certain safety thresholds. To accurately monitor the system temperature, the temperature sensors require sufficient airflow through the chassis. In the event that a fan module is removed from the chassis and the airflow is reduced, the system will bypass the temperature sensor information and shut down after five minutes to prevent undetected overheating. However, the switches will shut down sooner if the major temperature threshold is exceeded.



Warning While removing the fan module, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan module. Statement 258

To remove an existing fan module, follow these steps:

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- Step 1** On the fan module that you are removing, press the two sides of the fan module handle next to where it connects to the fan module and pull on the handles enough to unseat it from its connectors.
- Step 2** Holding the handle, pull the module out of the chassis.
- Caution** Do not touch the electrical connectors on the back side of the module and prevent anything else from coming into contact with and damaging the connectors.
-