



Switch Installation

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Preparing for Installation

This section provides information about these topics:

Warnings

These warnings are translated into several languages in the Regulatory Compliance and Safety Information for this switch.



Warning

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Statement 43



Warning

Exposure to some chemicals could degrade the sealing properties of materials used in the sealed relay device. Statement 381



Warning Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001



Warning Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



Warning Read the installation instructions before you connect the system to its power source. Statement 1004



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 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 This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



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



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Warning For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection. 10/100/1000 Ethernet Statement 1044



Warning To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:



Warning 158 F (70 C). For IE-4000-8GT8GP4G maximum recommend ambient is 131 F (55 C) at max POE budget of 240W. Statement 1047



Warning In switch installations in a hazardous location, the DC power source could be located away from the vicinity of the switch. Before performing any of the following procedures, locate the DC circuit to ensure that the power is removed and cannot be turned on accidentally, or verify that the area is nonhazardous before proceeding. Statement 1059



Warning This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool.



Warning The enclosure must meet IP 54 or NEMA type 4 minimum enclosure rating standards. Statement 1063



Warning When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method, for all power, input and output wiring, that complies with the governing electrical codes and in accordance with the authority having jurisdiction over Class I, Division 2 installations. Statement 1066



Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074



Warning Explosion Hazard—The area must be known to be nonhazardous before installing, servicing, or replacing the unit. Statement 1082



Warning Explosion Hazard—Substitution of components may impair suitability for Class I, Division 2/Zone 2. Statement 1083



Caution When installed in a Class I, Div/Zone 2 hazardous location environment, this equipment must be installed in a min. IP54, ATEX certified enclosure.



Caution Airflow around the switch must be unrestricted. To prevent the switch from overheating, there must be the following minimum clearances:

- Top and bottom: 2.0 in. (50.8 mm)
- Sides: 2.0 in. (50.8 mm)
- Front: 2.0 in. (50.8 mm)

Contact your Cisco Technical Assistance Centre (TAC) if tighter spacings are required.



Caution When installed in a Class I, Div/Zone 2 hazardous location environment, this equipment must be installed in a pollution degree 2 environment per IEC 60664-1)



Caution This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or only nonhazardous locations.



Caution Airflow around the switch must be unrestricted. To prevent the switch from overheating, there must be the following minimum clearances:

- Top and bottom: 2.0 in. (50.8 mm)
 - Sides: 2.0 in. (50.8 mm)
 - Front: 2.0 in. (50.8 mm)
-

Environment and Enclosure Guidelines

Review these environmental and enclosure guidelines before installation:

- This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 9842 ft (3 km) without derating.
- This equipment is considered Group 1, Class A industrial equipment, according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.
- This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame-spread rating of 5VA, V2, V1, V0 (or equivalent) if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication might contain additional information regarding specific enclosure-type ratings that are required to comply with certain product safety certifications.

General Guidelines

Before installation, observe these general guidelines:



Caution Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by using ground straps to eliminate the risk of ESD damage to the switch.

Do not touch connectors or pins on component boards. Do not touch circuit components inside the switch. When not in use, store the equipment in appropriate static-safe packaging.

- The switch only meets the requirements of IEC 61850-3 when powered by a redundant power supply configuration.
- If you are responsible for the application of safety-related programmable electronic systems (PES), you need to be aware of the safety requirements in the application of the system and be trained in using the system.



Caution The device is designed to mount on a DIN rail that conforms to Standard EN50022.

When determining where to place the switch, observe these guidelines:

- Before installing the switch, first verify that the switch is operational by powering it on and observing boot fast. Follow the procedures in the Verifying Switch Operation, page 39.
- For 10/100 ports and 10/100/1000 ports, the cable length from a switch to an attached device cannot exceed 328 feet (100 meters).
- For 100BASE-FX fiber-optic ports, the cable length from a switch to an attached device cannot exceed 6562 ft (2 km).
- Clearance to front and rear panels meets these conditions:
 - Front-panel LEDs can be easily read.
 - Access to ports is sufficient for unrestricted cabling.
 - Front-panel direct current (DC) power connectors and the alarm connector are within reach of the connection to the DC power source.
- Airflow around the switch must be unrestricted. To prevent the switch from overheating, you must have the following minimum clearances:
 - Top and bottom: 2.0 in. (50.8 mm)
 - Sides: 2.0 in. (50.8 mm)
 - Front: 2.0 in. (50.8 mm)



Caution When the switch is installed in an industrial enclosure, the temperature within the enclosure is greater than normal room temperature outside the enclosure.

Ensure temperatures inside the enclosure conform to device specifications detailed in Table 5 on page 67.

- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures.

Verifying Package Contents

If any item is missing or damaged, contact your Cisco representative or reseller for support.

Installing or Removing the Flash Memory Card (Optional)

The software/firmware is stored on the SD card memory from factory default. Optionally, you can execute the sync command to copy the software/firmware (including directory) to on-board memory (flash memory), then remove the SD card. It is strongly recommended that you use the SD card to boot or store the config for future easy replacement, in case of a hardware failure.

Warning: Do not insert or remove the flash card while power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Statement 379

To install or replace the flash memory card, follow these steps:

1. On the front of the switch, locate the door that protects the flash memory card slot. Loosen the captive screw at the top of the door using a Phillips screwdriver to open the door. See the following figure.

Figure 1: Installing the Flash Memory Card in the Switch



1	Flash Memory Card Slot
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2. Install or remove the card:
 - To install a card, slide it into the slot, and press it in until it clicks in place. The card is keyed so that you cannot insert it the wrong way.
 - To remove the card, push it in until it releases for it to pop out. Place it in an antistatic bag to protect it from static discharge.
3. After the card is installed, close the guard door and fasten the captive screw using a Phillips screwdriver to keep the door in place.

Connecting to a Console Port (Optional)

You can also enter CLI commands through the console port. For more information about this process see [Accessing the CLI Through the Console Port](#).

**Warning**

If you connect or disconnect the console cable with power applied to the switch or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Statement 1080

Connecting to Power

This section contains the following:

Tools and Equipment

Obtain these necessary tools and equipment:

- Ratcheting torque flathead screwdriver that exerts up to 18 in-lb (2.03 N-m) of pressure.
- For the protective ground connector, obtain a single or pair of stu size 6 ring terminals (such as Hollingsworth part number R3456B or equivalent).
- Crimping tool (such as Thomas & Bett part number WT4000, ERG-2001, or equivalent).
- 10-gauge copper ground wire.
- For DC power connections, use UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire.
- Wire-stripping tools for stripping 10- and 18-gauge wires.
- A number-2 Phillips screwdriver.
- A flat-blade screwdriver.

Supported Power Supplies

The supported power supplies are listed in the following table:

Table 1: Supported Power Supplies

	PWR-IE50WPC-DC	PWR-IE50WPC-AC	PWR-IE70WPC-DC	PWR-IE70WPC-AC	PWR-IE50WAC-IEC	PWR-IE50WAC
Current	DC-DC	AC-DC	DC-DC	AC-DC	AC-DC	AC-DC
Input	18-60 VDC/4.3 Amp	110/220 VAC and 88-300 VDC	10.8-60 VDC/23 Amp	110/220 VAC and 88-300 VDC/2.1 Amp	110/220 VAC	110/220VAC and 88-300 VDC
Output	54VDC/1.2 Amp	54VDC/1.2 Amp	54VDC/3.15 Amp	54VDC/3.15 Amp	24VDC/2.1Amp	24 VDC / 2.1Amp

	PWR-IE50WPCDC	PWR-IE50WPCAC	PWR-IE70WPCDC	PWR-IE70WPCAC	PWR-IE30WAC-IEC	PWR-IE50WAC
Dimensions	5.9 in. H x 2.1 in. W x 4.9 in. D	5.9 in. H x 2.1 in. W x 4.9 in. D	5.93 in. (149.8 mm) H x 4.47 in. (113.5 mm) W x 5.7 in. (144.7 mm) D	5.93 in. (150.6 mm) H x 3.72 in. (94.5 mm) W x 5.6 in. (142.2 mm) D	5.8 in. H x 2 in. W x 4.4 in. D	5.8 in. H x 2 in. W x 4.4 in. D
Usage	Designed for up to 25W of POE load	Designed for up to 25W of POE load	Designed for up to 8 POE ports or 123W of POE power.	Designed for up to 8 POE ports or 123W of POE power.	No POE support	No POE support

Installing the Power Converter on a DIN Rail, Wall, or Rack Adapter

You install the power converter on a DIN rail, wall, or rack as you would a switch module.



Warning This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool.

The enclosure must meet IP 54 or NEMA type 4 minimum enclosure rating standards. Statement 1063



Caution To prevent the switch assemble from overheating, there must be sufficient spacings as explained under Installation Guidelines, page 15, between any other switch assembly.

Grounding the Switch

Make sure to follow any grounding requirements at your site.



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 This equipment is intended to be grounded to comply with emission and immunity requirements. Ensure that the switch functional ground lug is connected to earth ground during normal use. Statement 1064



Caution To make sure that the equipment is reliably connected to earth ground, follow the grounding procedure instructions, and use a UL-listed ring terminal lug suitable for number 10-to-12 AWG wire, such as Hollingsworth part number R3456B or equivalent)



Caution Use at least a 4 mm² conductor to connect to the external grounding screw. The ground lug is not supplied with the switch. You can use one of the these options:

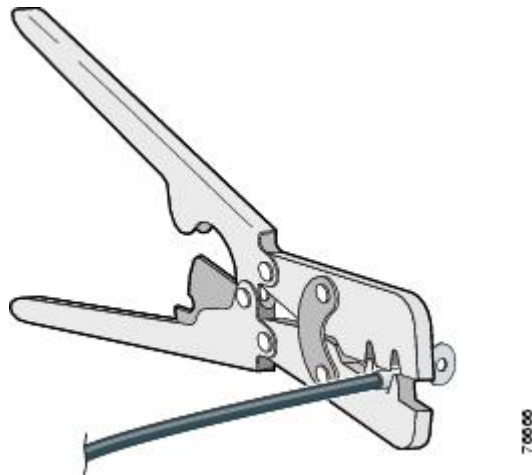
The ground lug is not supplied with the switch. You can use one of the these options:

- Single ring terminal
- Two single ring terminals

To ground the switch to earth ground by using the ground screw, follow these steps:

1. Use a standard Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head to remove the ground screw from the front panel of the switch. Store the ground screw for later use.
2. Use the manufacturer’s guidelines to determine the wire length to be stripped.
3. Insert the ground wire into the ring terminal lug, and using a crimping tool, crimp the terminal to the wire. See the following figure. If two ring terminals are being used, repeat this action for a second ring terminal.

Figure 2: Crimping the Ring Terminal



4. Slide the ground screw through the terminal.
5. Insert the ground screw into the functional ground screw opening on the front panel.
6. Use a ratcheting torque screwdriver to tighten the ground screws and ring terminal to the switch front panel. The torque should not exceed 4.5 in-lb (0.51 N-m).

1	Ground-Lug Screw
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Figure 3: Ground-Lug Screw



7. Attach the other end of the ground wire to a grounded bare metal surface, such as a ground bus, a grounded DIN rail, or a grounded bare rack.

Connecting the Power Converter to an AC Power Source

These sections describe the steps required to connect the power converter to an AC power source:

Preparing the AC Power Connection

To connect the power converter to an AC power source, you need an AC power cord. Power cord connector types and standards vary by country. Power-cord wiring color codes also vary by country. You must have a qualified electrician select, prepare, and install the appropriate power cord to the power supply.

Note: Use copper conductors only, rated at a minimum temperature of 167°F (75°C).

Note: This section does not apply to PWR-IE50W-AC-IEC, which has pluggable IEC connector.

Connecting the AC Power Source to the Power Converter



Caution AC power sources must be dedicated AC branch circuits. Each branch circuit must be protected by a dedicated two-pole circuit breaker.



Caution Do not turn on AC power until the wiring is secured.

1. Remove the plastic cover from the input power terminals and set it aside.
2. Insert the exposed ground wire lead (10-to-12 AWG cable) into the power converter ground wire connection. Ensure that only wire with insulation extends from the connector. Note that the position of the power converter may vary on different switch models.

3. Tighten the ground wire terminal block screw.

Note: Torque to 10 in-lb (1.13Nm).

4. Insert the line and neutral wire leads into the terminal block line and neutral connections. Make sure that you cannot see any wire lead. Ensure that only wire with insulation extends from the connectors.

5. Tighten the line and neutral terminal block screws.

Note: Torque to 10 in-lb (1.13Nm).

6. Replace the plastic cover over the terminal block.
7. Connect the other end of the wiring to your AC power source.

Connecting the Power Converter to a DC Power Source



Caution AC power sources must be dedicated AC branch circuits. Each branch circuit must be protected by a dedicated two-pole circuit breaker.



Caution Do not turn on AC power until the wiring is secured.

1. Remove the plastic cover from the input power terminals and set it aside.
2. Insert the exposed ground wire lead (10-to-12 AWG cable) into the power converter ground wire connection. Ensure that only wire with insulation extends from the connector. Note that the position of the power converter may vary on different switch models.

3. Tighten the ground wire terminal block screw.

Note: Torque to 10 in-lb (1.13Nm).

4. Insert the line and neutral wire leads into the terminal block line and neutral connections. Make sure that you cannot see any wire lead. Ensure that only wire with insulation extends from the connectors.

5. Tighten the line and neutral terminal block screws.
Note: Torque to 10 in-lb (1.13Nm).
6. Replace the plastic cover over the terminal block.
7. Connect the other end of the wiring to your AC power source.

Wiring the DC Power Source

Read these cautions and warnings before wiring the switch the DC power source.



Warning A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022



Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 3A. Statement 1005



Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074



Warning Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



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



Caution For wire connections to the power and alarm connectors, you must use UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire (such as Belden part number 9318).



Caution On switches that support PoE, do not connect the negative (return) terminal of the DC power source to earth ground

To wire the switch to a DC power source, follow these steps:

- Step 1** Locate the two power connectors on the switch front panel labeled DC-A and DC-B.
- Step 2** Identify the connector positive and return DC power connections. The labels for power connectors DC-A and DC-B are on the switch panel as displayed below.

Label	Connection
+	Positive DC power connection
-	Return DC power connection

Step 3 Measure two strands of twisted-pair copper wire (16-to-18 AWG) long enough to connect to the DC power source.

Step 4 Using an 18-gauge wire-stripping tool, strip each of the two twisted pair wires coming from each DC-input power source to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the power connector after installation.



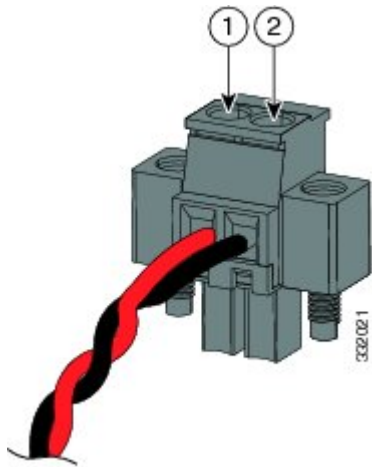
Step 5 Remove the two captive screws that attach the power connector to the switch, and remove the power connector. Remove both connectors if you are connecting to two power sources.



1	Power Connectors
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Step 6 On the power connector, insert the exposed part of the positive wire into the connection labeled “+” and the exposed part of the return wire into the connection labeled “-”. See the following figure. Make sure that you cannot see any wire lead. Only wire with insulation should extend from the connector.

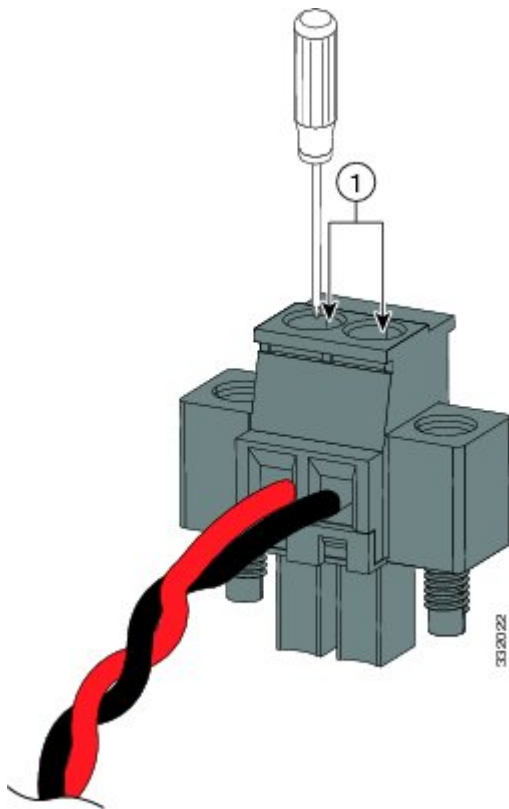
Warning An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the connector(s) or terminal block(s). Statement 122



1	Power source positive connection	2	Power source return connection
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Step 7 Use a ratcheting torque flathead screwdriver to torque the power connector captive screws (above the installed wire leads) to 5in-lb (0.565 Nm). See the following figure:

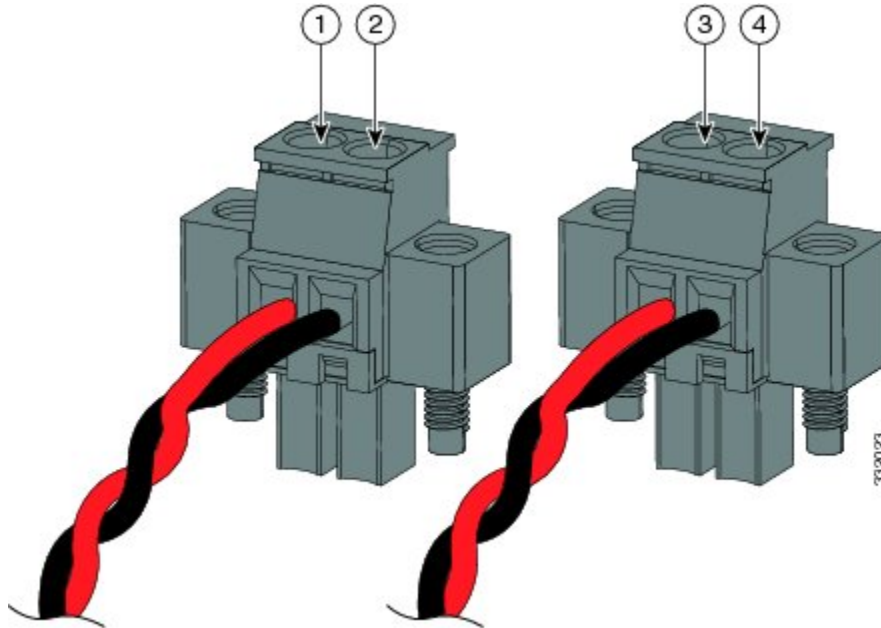
Caution Do not over-torque the power connector’s captive screws. The torque should not exceed 5in-lb (0.565 Nm).



1	Power Connectors
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Step 8 Connect the other end of the positive wire to the positive terminal on the DC power source, and connect the other end of the return wire to the return terminal on the DC power source.

The following figure shows the completed DC-input wiring on a power connector for a primary power source and an optional secondary power source.



1	Power source A positive connection	3	Power source B positive connection
2	Power source A return connection	4	Power source B return connection

If your power source is -48 VDC, this table describes the your wiring connections

1	Power source A ground connection	3	Power source B ground connection
2	Power source A -48 VDC connection	4	Power source B -48 VDC connection

Attaching the Power Connectors to the Switch

To attach the power connectors to the front panel of the switch, follow these steps:

1. Insert one power connector into the DC-A receptacle on the switch front panel, and the other into the DC-B receptacle.



Warning Failure to securely tighten the captive screws can result in an electrical arc if the connector is accidentally removed. Statement 397



Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 7.5A. Statement 1005



Warning When you connect or disconnect the power and/or alarm connector with power applied, an electrical arc can occur. This could cause an explosion in hazardous area installations. Be sure that all power is removed from the switch and any other circuits. Be sure that power cannot be accidentally turned on or verify that the area is nonhazardous before proceeding. Statement 1058



Warning Use twisted-pair supply wires suitable for 86°F (30°C) above surrounding ambient temperature outside the enclosure. Statement 106



Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074

- Use a ratcheting torque flathead screwdriver to tighten the captive screws on the sides of the power connectors.

When you are testing the switch, one power source is sufficient. If you are installing the switch and are using a second power source, repeat this procedure for the second power connector (DC-B), which installs just below the primary power connector (DC-A).

When you are installing the switch, secure the wires coming from the power connector so that they cannot be disturbed by casual contact. For example, use tie wraps to secure the wires to the rack.

Applying Power to the Power Converter

Move the circuit breaker for the AC outlet or the DC control circuit to the on position.

The LED on the power converter front panel is green when the unit is operating normally. The LED is off when the unit is not powered or is not operating normally. After the power is connected, the switch automatically begins the power-on self- test (POST), a series of tests that verifies that the switch functions properly.

Running Boot Fast

This section contains the following:

Powering On the Switch

To apply power to a switch that is directly connected to a DC power source, locate the circuit breaker on the panel board that services the DC circuit, and switch the circuit breaker to the ON position.

Verifying Boot Fast

When you power on the switch, it automatically begins a boot fast sequence. The System LED blinks green as the Cisco IOS software image loads. If the boot fast sequence fails, the System LED turns red.

Note: Boot fast failures are usually fatal. Call Cisco TAC immediately if your switch does not complete boot fast successfully.

Note: You can disable the boot fast and run POST by using the Cisco IOS CLI. See the Cisco IE 4000 Switch Software Configuration Guide for more information.

Disconnecting Power

To disconnect power after successfully running boot fast, follow these steps:

1. Turn off power to the switch.
2. Disconnect the cables.

Installing the Switch

This section contains the following:

Installing the Switch on a DIN Rail

The switch ships with a spring-loaded latch on the rear panel for a mounting on a DIN rail.

You can install the switch as a standalone device on the DIN rail or with the expansion modules already connected. You must connect expansion modules to the switch before installing the switch on the DIN rail.

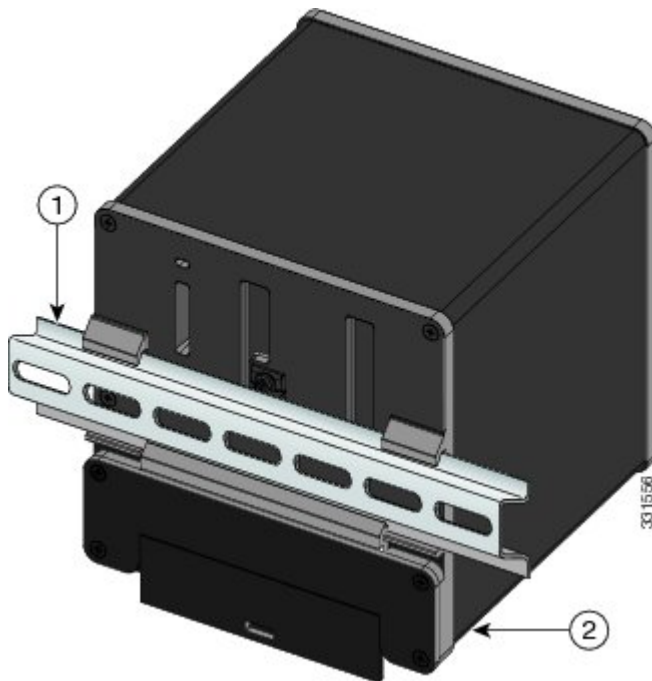
To attach the switch to a DIN rail, follow these steps:

Step 1 Position the rear panel of the switch directly in front of the DIN rail, making sure that the DIN rail fits in the space between the two hooks near the top of the switch and the spring-loaded latch near the bottom.

Step 2 Holding the bottom of the switch away from the DIN rail, place the two hooks on the back of the switch over the top of the DIN rail

Caution Do not stack any equipment on the switch.

Figure 4: Position the Hooks Over the DIN Rail



1	DIN Rail	2	Switch
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Step 3 Push the switch toward the DIN rail to cause the spring-loaded latch at the bottom rear of the switch to move down, and snap into place.

After the switch is mounted on the DIN rail, connect the power and alarm wires, as described in [Connecting Alarm Circuits, on page 20](#).

For configuration instructions about the CLI setup program, see .

Note For instructions on how to remove the switch from a DIN rail, see [Removing the Switch from a DIN Rail, on page 19](#).

Removing the Switch from a DIN Rail

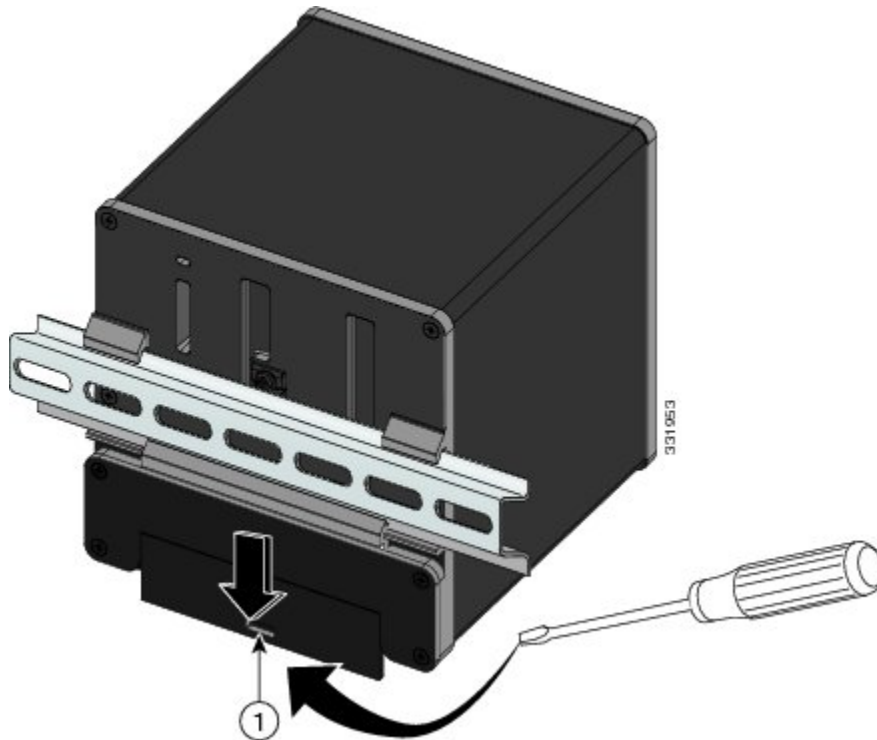
To remove the switch from a DIN rail, follow these steps:

Step 1 Ensure that power is removed from the switch, and disconnect all cables and connectors from the front panel of the switch.

Step 2 Insert a tool such as a flathead screwdriver in the slot at the bottom of the spring-loaded latch and use it to release the latch from the DIN rail. See the following figure:

Step 3 Pull the bottom of the switch away from the DIN rail, and lift the hooks off the top of the DIN rail. See the following figure:

Figure 5: Releasing the Spring-Loaded Latch from the DIN Rail



1	Push Latch Down
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Step 4 Remove the switch from the DIN rail.

Connecting Alarm Circuits

After the switch is installed, you are ready to connect the DC power and alarm connections.

- Wiring the Protective Ground and DC Power for Alarm Circuits, page 31
- Wiring the External Alarms, page 31

Wiring the Protective Ground and DC Power for Alarm Circuits

For instructions on grounding the switch and connecting the DC power, see [Grounding the Switch](#), on page 9.

Wiring the External Alarms

The switch has two alarm input and one alarm output relay circuits for external alarms. The alarm input circuits are designed to sense if the alarm input is open or closed relative to the alarm input reference pin. Each alarm

input can be configured as an open or closed contact. The alarm output relay circuit has a normally open and a normally closed contact.

Alarm signals are connected to the switch through the six-pin alarm connector. Three connections are dedicated to the two alarm input circuits: alarm input 1, alarm input 2, and a reference ground. An alarm input and the reference ground wiring connection are required to complete a single alarm input circuit. The three remaining connections are for the alarm output circuit: a normally open output, a normally closed output, and a common signal. An alarm output and the common wiring connection are required to complete a single alarm output circuit.

The labels for the alarm connector are on the switch panel and are displayed below.

Label	Connection
NO	Alarm Output Normally Open (NO) connection
COM	Alarm Output Common connection
NC	Alarm Output Normally Closed (NC) connection
IN2	Alarm Input 2
REF	Alarm Input Reference Ground connection
IN1	Alarm Input 1



Warning Explosion Hazard—Do not connect or disconnect wiring while the field-side power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or that the area is nonhazardous before proceeding. Statement 1081



Caution The input voltage source of the alarm output relay circuit must be an isolated source and limited to less than or equal to 24 VDC, 1.0 A or 48 VDC, 0.5 A.



Note Wire connections to the power and alarm connectors must be UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire (such as Belden part number 9318).

To wire the switch to an external alarm device, follow these steps

Step 1

Remove the captive screws that hold the alarm connector on the switch, and remove the connector from the switch chassis. See the following figure:

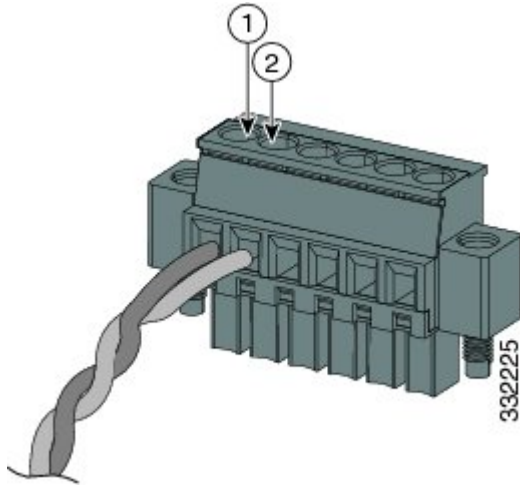
Figure 6: Alarm Connector



1	Alarm Connector
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- Step 2** Measure two strands of twisted-pair wire (16-to-18 AWG) long enough to connect to the external alarm device. Choose between setting up an external alarm input or output circuit.
- Step 3** Use a wire stripper to remove the casing from both ends of each wire to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wires. Stripping more than the recommended amount of wire can leave exposed wire from the alarm connector after installation.
- Step 4** Insert the exposed wires for the external alarm device into the connections based on an alarm input or output circuit setup. For example, to wire an alarm input circuit, complete the IN1 and REF connections.

Figure 7: Alarm Connector



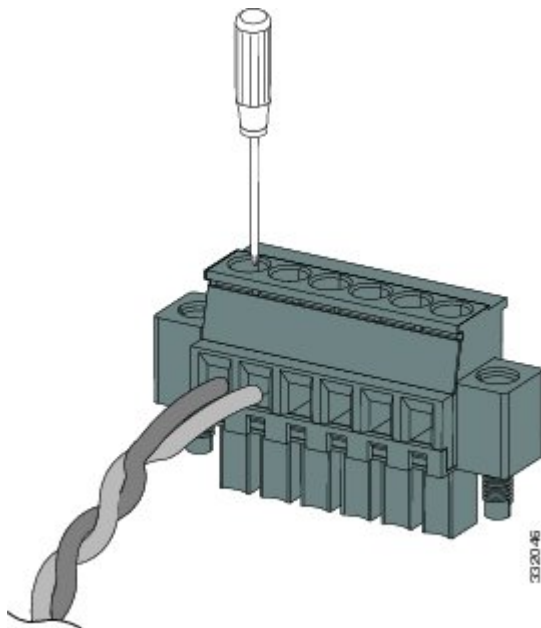
1	IN1 - External device connection 1	2	REF - External device connection 2
---	------------------------------------	---	------------------------------------

Step 5

Use a ratcheting torque flathead screwdriver to tighten the alarm connector captive screw (above the installed wire leads) to 2 in-lb (0.23 N-m). See the following figure:

Caution Do not over-torque the power and alarm connectors' captive screws. The torque should not exceed 2 in-lb (0.23 N-m).

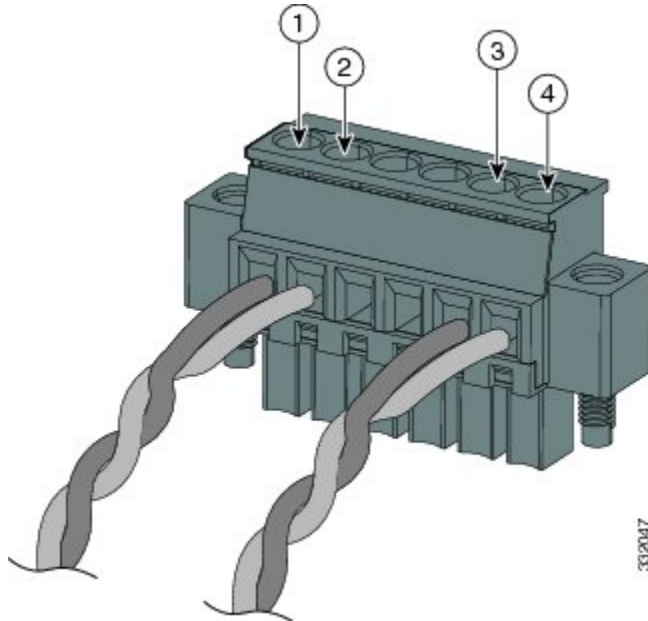
Figure 8: Securing the Alarm Connector Captive Screws

**Step 6**

Repeat Step 2 through Step 5 to insert the input and output wires of one additional external alarm device into the alarm connector.

The following figure shows the completed wiring for two external alarm devices. The first alarm device circuit is wired as an alarm input circuit; the IN1 and REF connections complete the circuit. The second alarm device circuit is wired as an alarm output circuit that works on a normally open contact basis; the NO and COM connections complete the circuit.

Figure 9: Completed Connections for Three External Alarm Devices on the Alarm Connector



1	IN1 wired connection	3	COM wired connection
2	REF wired connection	4	NO wired connection

Attaching the Alarm Connector to the Switch



Warning Failure to securely tighten the captive screws can result in an electrical arc if the connector is accidentally removed. Statement 397



Warning When you connect or disconnect the power and/or alarm connector with power applied, an electrical arc can occur. This could cause an explosion in hazardous area installations. Be sure that all power is removed from the switch and any other circuits. Be sure that power cannot be accidentally turned on or verify that the area is nonhazardous before proceeding. Statement 1058

To attach the alarm connector to the front panel of the switch, follow these steps:

1. Insert the alarm connector into the receptacle on the switch front panel.
2. Use a ratcheting torque flathead screwdriver to tighten the captive screws on the sides of the alarm connector.

Connecting Destination Ports

These section provide more information about connecting to the destination ports:

Connecting to 10/100 and 10/100/1000 Ports

The switch 10/100/1000 ports automatically configure themselves to operate at the speed of attached devices. If the attached ports do not support autonegotiation, you can explicitly set the speed and duplex parameters. Connecting devices that do not autonegotiate or that have their speed and duplex parameters manually set can reduce performance or result in no linkage.



Warning Do not connect or disconnect cables to the ports while power is applied to the switch or any device on the network because an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed from the switch and cannot be accidentally be turned on, or verify that the area is nonhazardous before proceeding. Statement 1070

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the port speed and duplex parameters on both ends of the connection.

The models that support PoE provide up to four ports of either PoE (15.4 W per port; IEEE 802.3af) or PoE+ (30 W per port; IEEE 802.3at), depending on the power source used.



Caution To prevent electrostatic-discharge (ESD) damage, follow your normal board and component handling procedures.

To connect to 10BASE-T, 100BASE-TX or 1000BASE-T devices, follow these steps:

Step 1

When connecting to workstations, servers, routers, and Cisco IP phones, connect a straight-through cable to an RJ-45 connector on the front panel.

When connecting to 1000BASE-T-compatible devices, use a twisted four-pair, Category 5 or higher cable.

The auto-MDIX feature is enabled by default. For configuration information for this feature, see the Cisco IE 4000 Switch Software Configuration Guide.

Step 2

Connect the other end of the cable to an RJ-45 connector on the other device. The port LED turns on when both the switch and the connected device have established a link.

The port LED is amber while Spanning Tree Protocol (STP) discovers the topology and searches for loops. This can take up to 30 seconds, and then the port LED turns green. If the port LED does not turn on:

- The device at the other end might not be turned on.
- There might be a cable problem or a problem with the adapter installed in the attached device. See [Troubleshooting](#) for solutions to cabling problems.

Step 3 Reconfigure and reboot the connected device if necessary.

Step 4 Repeat Steps 1 through 3 to connect each device.

Installing and Removing SFP Modules

These sections describe how to install and remove SFP modules. SFP modules are inserted into SFP module slots on the front of the switch. These field-replaceable modules provide the uplink optical interfaces, send (TX) and receive (RX).

You can use any combination of rugged SFP modules. See the release notes on Cisco.com for the list of supported modules. Each SFP module must be of the same type as the SFP module on the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communications.



Caution When you use commercial SFP modules such as CWDM and 1000BX-U/D, reduce the maximum operating temperature by 59°F (15°C). The minimum operating temperature is 32°F (0°C).

For detailed instructions on installing, removing, and cabling the SFP module, see your SFP module documentation.



Warning Do not insert and remove SFP modules while power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Statement 1087

Installing SFP Modules into SFP Module Slots

The following figure shows an SFP module that has a bale-clasp latch.

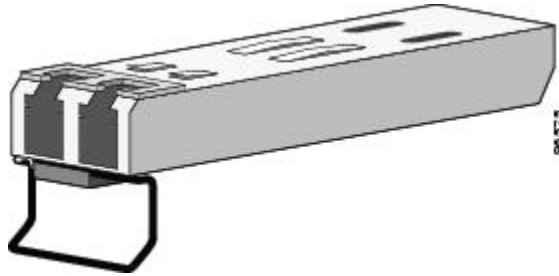


Caution We strongly recommend that you do not install or remove the SFP module with fiber-optic cables attached to it because of the potential damage to the cables, the cable connector, or the optical interfaces in the SFP module.

Disconnect all cables before removing or installing an SFP module.

Removing and installing an SFP module can shorten its useful life. Do not remove and insert SFP modules more often than is absolutely necessary.

Figure 10: SFP Module with a Bale-Clasp Latch



To insert an SFP module into the SFP module slot:

1. Attach an ESD-preventive wrist strap to your wrist and to a grounded bare metal surface.
2. Find the send (TX) and receive (RX) markings that identify the correct side of the SFP module.
On some SFP modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send or receive (TX or RX).
3. Align the SFP module sideways in front of the slot opening.
4. Insert the SFP module into the slot until you feel the connector on the module snap into place in the rear of the slot.
5. Remove the dust plugs from the SFP module optical ports and store them for later use.



Caution Do not remove the dust plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

6. Insert the LC cable connector into the SFP module.

Removing SFP Modules from SFP Module Slots

To remove an SFP module from a module receptacle:

1. Attach an ESD-preventive wrist strap to your wrist and to a grounded bare metal surface.
2. Disconnect the LC from the SFP module.
3. Insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.
4. Unlock and remove the SFP module.

If the module has a bale-clasp latch, pull the bale out and down to eject the module. If the bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale-clasp latch.

5. Grasp the SFP module between your thumb and index finger, and carefully remove it from the module slot.
6. Place the removed SFP module in an antistatic bag or other protective environment.

Connecting to SFP Modules

This section describes how to connect to a fiber-optic SFP port. To connect to an RJ-45 Gigabit Ethernet port instead of a fiber-optic port, see [Connecting to a Dual-Purpose Port, on page 28](#). For instructions on how to install or remove an SFP module, see [Installing and Removing SFP Modules, on page 26](#).



Warning Class 1 laser product. Statement 1008



Warning Do not connect or disconnect cables to the ports while power is applied to the switch or any device on the network because an electrical arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed from the switch and cannot be accidentally be turned on, or verify that the area is nonhazardous before proceeding. Statement 1070



Caution Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, be sure that you understand the port and cabling guidelines in the [Preparing for Installation, on page 1](#).

To connect a fiber-optic cable to an SFP module, follow these steps:

1. Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.
2. Insert one end of the fiber-optic cable into the SFP module port.
3. Insert the other cable end into a fiber-optic receptacle on a target device.
4. Observe the port status LED:
 - The LED turns green when the switch and the target device have an established link.
 - The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.
 - If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be a problem with the adapter installed in the target device. See [Troubleshooting](#) for solutions to cabling problems.
5. If necessary, reconfigure and restart the switch or the target device.

Connecting to a Dual-Purpose Port

The dual-purpose port is a single port with two interfaces, one for an RJ-45 cable and another for an SFP module. Only one interface can be active at a time. If both interfaces are connected, the SFP module has priority.



Warning Class 1 laser product. Statement 1008



Caution Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, be sure that you understand the port and cabling stipulations in [Preparing for Installation, on page 1](#).

To connect to a dual-purpose port, follow these steps:

1. Connect an RJ-45 connector to the 10/100/1000 port, or install an SFP module into the SFP module slot, and connect a cable to the SFP module port.

For more information about RJ-45 connections, SFP modules, and optical connections, see topics preceding this.

2. Connect the other end of the cable to the other device.

By default, the switch detects whether an RJ-45 connector or SFP module is connected to a dual-purpose port and configures the port accordingly. You can change this setting and configure the port to recognize only an RJ-45 connector or only an SFP module by using the media type interface configuration command. For more information, see the Cisco IE 4000 Switch Command Reference.

Verifying Switch Operation

Before installing the switch in its final location, power on the switch, and verify that the switch powers up in boot fast style. The boot fast sequence allows the switch to boot up in less than 60 seconds.

Where to Go Next

If the default configuration is satisfactory, the switch does not need further configuration. You can use any of these management options to change the default configuration:

- Start Device Manager, which is in the switch memory, to manage individual and standalone switches. This is an easy-to-use web interface that offers quick configuration and monitoring. You can access Device Manager from anywhere in your network through a web browser. For more information, see the Software Configuration Guide and the Device Manager online help.
- Start the Cisco Network Assistant application, which is described in the Getting Started with Cisco Network Assistant guide. Using the GUI, you can configure and monitor a switch cluster or an individual switch.
- Use the CLI to configure the switch as an individual switch from the console. See the Command Reference on Cisco.com for information about using the CLI.
- Start an SNMP application such as the CiscoView application.

- Start the Common Industrial Protocol (CIP) management tool. You can manage an entire industrial automation system with the CIP-based tools.