



Switch Installation

This section describes how to install your switch, verify boot fast, and connect the switch to other devices. It also includes information specifically for installations in hazardous environments.

Read these topics, and perform the procedures in this order:

- [Preparing for Installation, page 29](#)
- [Installing or Removing the Flash Memory Card, page 33](#)
- [Verifying Switch Operation, page 35](#)
- [Connecting Alarm Circuits, page 58](#)
- [Connecting the Protective Ground and DC Power, page 37](#)
- [Connecting Alarm Circuits, page 58](#)
- [Connecting Destination Ports, page 62](#)
- [Where to Go Next, page 71](#)

Preparing for Installation

This section provides information about these topics:

- [Warnings, page 29](#)
- [Additional Information for Installation in a Hazardous Environment, page 30](#)
- [Installation Guidelines, page 32](#)

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: 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:
140°F (60°C) Statement 1047

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

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 inches (50.8 mm)
- Sides: 2.0 inches (50.8 mm)
- Front: 2.0 inches (50.8 mm)

Additional Information for Installation in a Hazardous Environment

- Hazardous Area Installation Warnings, page 30
- North American Hazardous Location Approval, page 31
- EMC Environmental Conditions for Products Installed in the European Union, page 32

Hazardous Area Installation Warnings

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

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

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

Preparing for Installation

only by the use of a tool.

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

Warning: Use twisted-pair supply wires suitable for 86° F (30° C) above surrounding ambient temperature outside the enclosure. Statement 1067

Warning: 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), and at altitudes up to 2000 meters without derating. Statement 1068

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

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

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

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

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

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

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations:

English: Products marked "Class I, Div 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

Français: Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués "Class I, Div 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

Preparing for Installation

EMC Environmental Conditions for Products Installed in the European Union

This section applies to products to be installed in the European Union.

The equipment is intended to operate under the following environmental conditions with respect to EMC:

- A separate defined location under the user's control.
- Earthing and bonding shall meet the requirements of ETS 300 253 or ITU-T K.27.
- AC-power distribution shall be one of the following types, where applicable: TN-S and TN-C as defined in IEC 60364-3.

In addition, if equipment is operated in a domestic environment, interference could occur.

Installation Guidelines

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

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 6562 feet (2 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.

- 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.
- This product is grounded through the DIN rail to chassis ground. Use zinc-plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (such as aluminum, plastic, and so on) that can corrode, oxidize, or are poor conductors can result in improper or intermittent grounding. Secure the DIN rail to the mounting surface approximately every 7.8 inches (200 mm), and use end-anchors appropriately.

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 35](#).

Installing or Removing the Flash Memory Card

- 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 feet (2 km).
- Operating environment is within the ranges listed in [Technical Specifications, page 79](#)
- 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, there must be the following minimum clearances:
 - Top and bottom: 2.0 inches (50.8 mm)
 - Exposed side (not connected to the module): 2.0 inches (50.8 mm)
 - Front: 2.0 inches (50.8 mm)Contact your Cisco TAC if tighter spacings are required.
- Temperature surrounding the unit does not exceed 140° F (60° C).

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

The temperature inside the enclosure cannot exceed 140° F (60° C), which is the maximum ambient enclosure temperature of the switch.

- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures.
- Connect the unit only to a Class 2 DC power source.

Installing or Removing the Flash Memory Card

The switches store Cisco IOS software images and switch configurations on a removable flash memory card, which is an SD memory type card. You can replace the switch without reconfiguring it. The SD memory card is orderable. You can order it (SD-IE-1GB=) when you order the switch or by calling Cisco TAC.

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

Verify that the card is in place behind the hinged cover on the front of the switch.

To install or replace the flash memory card:

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 [Figure 14 on page 34](#).

Installing or Removing the Flash Memory Card

Figure 14 Installing the Flash Memory Card in the Switch

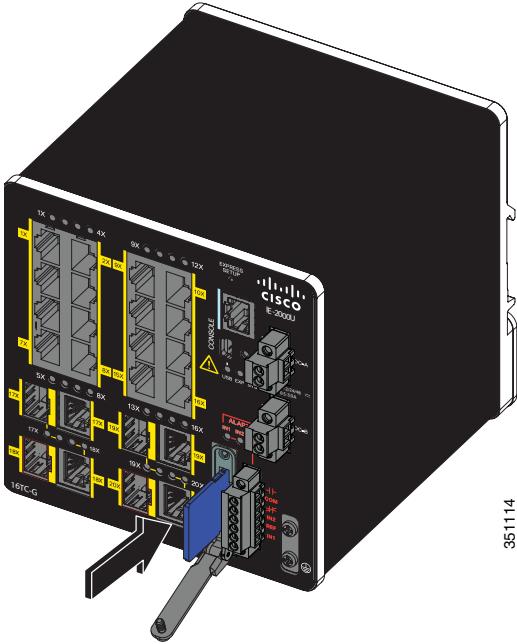
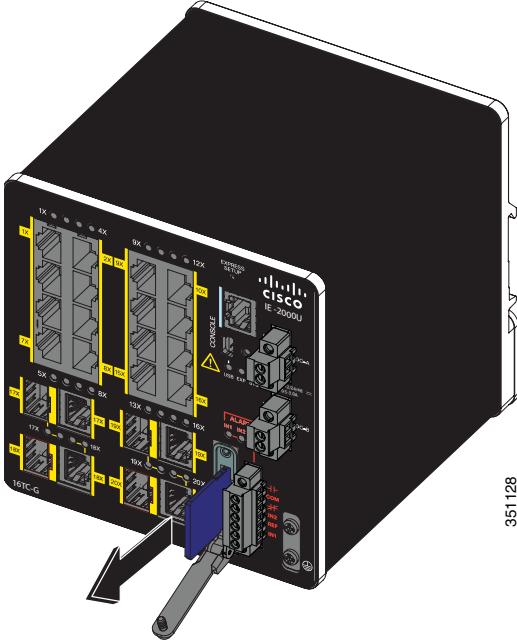


Figure 15 Removing the Flash Memory Card from the Switch



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.

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 mode. The boot fast sequence allows the switch to boot up in less than 60 seconds.

Installing the Switch

This section describes how to install the switch:

- [Installing the Switch on a DIN Rail, page 35](#)
- [Removing the Switch from a DIN Rail, page 36](#)

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 from overheating, ensure these minimum clearances:

- **Top and bottom: 2.0 inches (50.8 mm)**
- **Exposed side (not connected to the module): 2.0 inches (50.8 mm)**
- **Front: 2.0 inches (50.8 mm)**

Contact your Cisco TAC if tighter spacings are required.

Installing the Switch on a DIN Rail

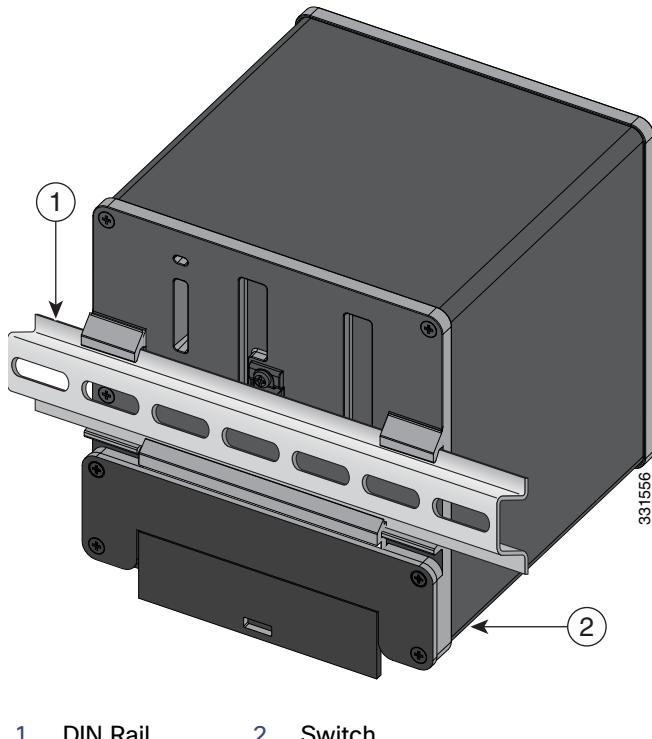
The switch ships with a spring-loaded latch on the rear panel for a mounting on a DIN rail.

To attach the switch to a DIN rail:

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.
2. Hold the bottom of the switch away from the DIN rail, and place the two hooks on the back of the switch over the top of the DIN rail. See [Figure 16 on page 36](#).

Caution: Do not stack any equipment on the switch.

Installing the Switch

Figure 16 Position the Hooks Over the DIN Rail

1 DIN Rail

2 Switch

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 the [Connecting Alarm Circuits, page 58](#).

For configuration instructions about the CLI setup program, see [Configuring the Switch with the CLI-Based Setup Program, page 93](#)

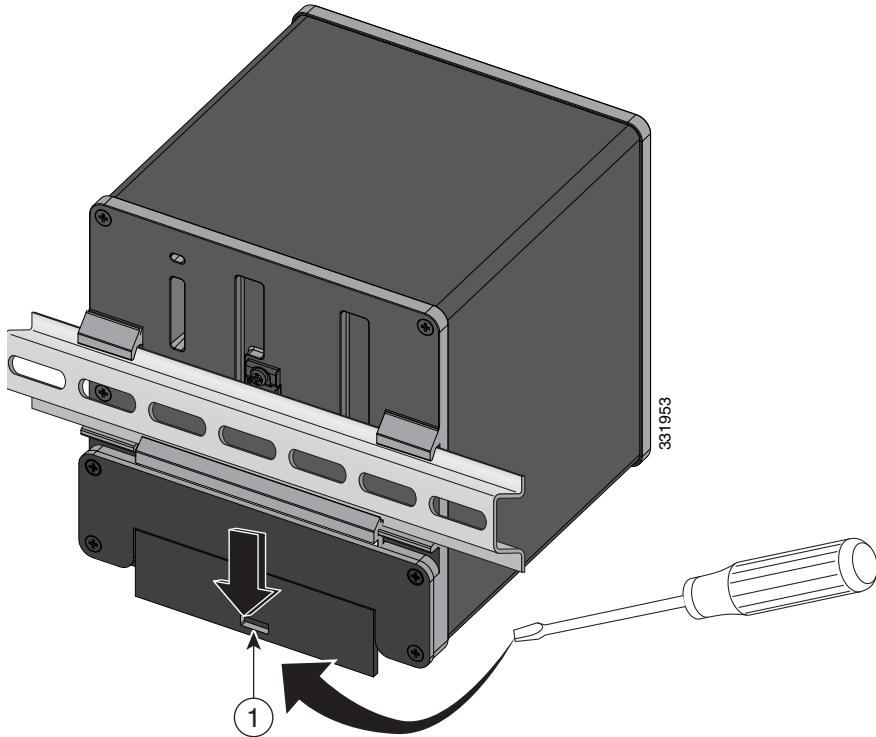
Note: For instructions on how to remove the switch from a DIN rail, see the [Removing the Switch from a DIN Rail, page 36](#).

Removing the Switch from a DIN Rail

To remove the switch from a DIN rail:

1. Ensure that power is removed from the switch, and disconnect all cables and connectors from the front panel of the switch.
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 [Figure 17 on page 37](#).
3. Pull the bottom of the switch away from the DIN rail, and lift the hooks off the top of the DIN rail. See [Figure 17 on page 37](#).

Connecting the Protective Ground and DC Power

Figure 17 Releasing the Spring-Loaded Latch from the DIN Rail

1 Push latch down

4. Remove the switch from the DIN rail.

Connecting the Protective Ground and DC Power

These sections describe the steps required to connect a protective ground and DC power to the switch:

- [Grounding the Switch, page 38](#)
- [Selecting a DC Power Source, page 41](#)
- [Installing the DC Power Supply Module \(Optional\), page 42](#)
- [Wiring the DC Power Source, page 45](#)
- [Attaching the Power Connectors to the Switch, page 50](#)

Obtain these necessary tools and equipment:

- Ratcheting torque flathead screwdriver that exerts up to 15 in-lb (1.69 N-m) of pressure.
- For the protective ground connector, obtain a single or pair of stud size 6 ring terminals (such as Hollingsworth part number R3456B or equivalent).
- Crimping tool (such as Thomas & Bett part number WT2000, ERG-2001, or equivalent).
- 10- to 12-AWG size copper ground wire (such as Belden part number 9912 or equivalent).

Connecting the Protective Ground and DC Power

- For DC power connections, use 16- to 18-AWG, UL- and CSA-rated, twisted-pair copper appliance wire.
- Wire-stripping tools for stripping 10- to 18-AWG size wire.
- A number-2 Phillips screwdriver.
- A flat-blade screwdriver.

Grounding the Switch

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.

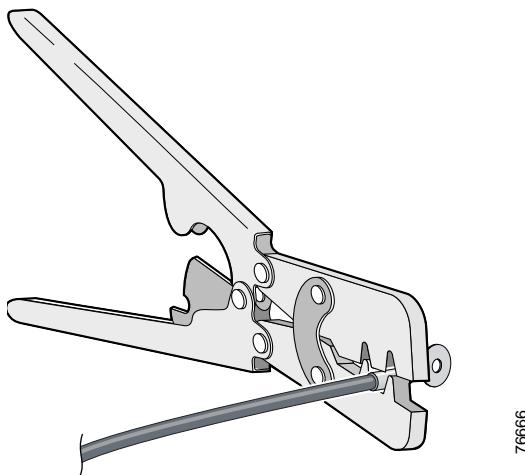
The ground lug is not supplied with the switch. You can use one of the these options:

- Single ring terminal
- Two single ring terminals

To ground the switch to earth ground by using the ground screw:

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 [Figure 18 on page 39](#). If two ring terminals are being used, repeat this action for a second ring terminal.

Connecting the Protective Ground and DC Power

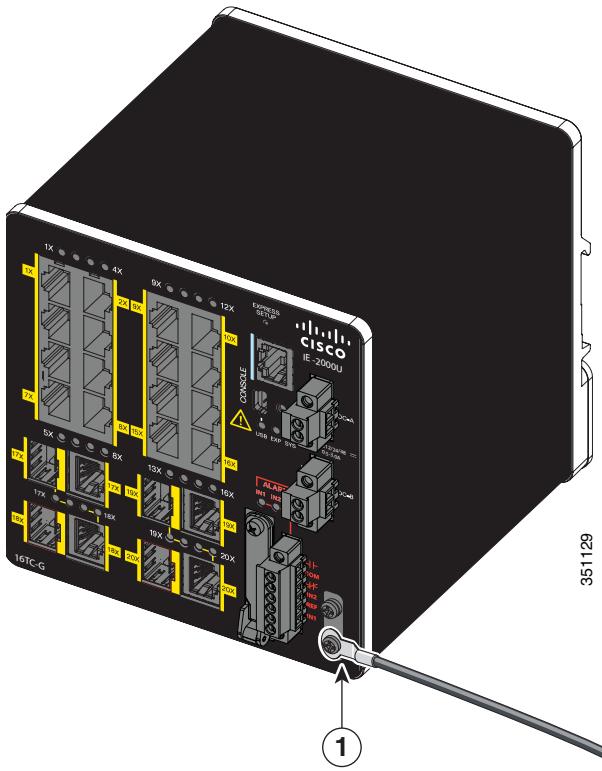
Figure 18 Crimping the Ring Terminal

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 to 3.5 in-lb (0.4 N-m). See [Figure 19 on page 40](#) or [Figure 20 on page 41](#).

Note: Do not exceed 3.5 in-lb (0.4 N-m) torque.

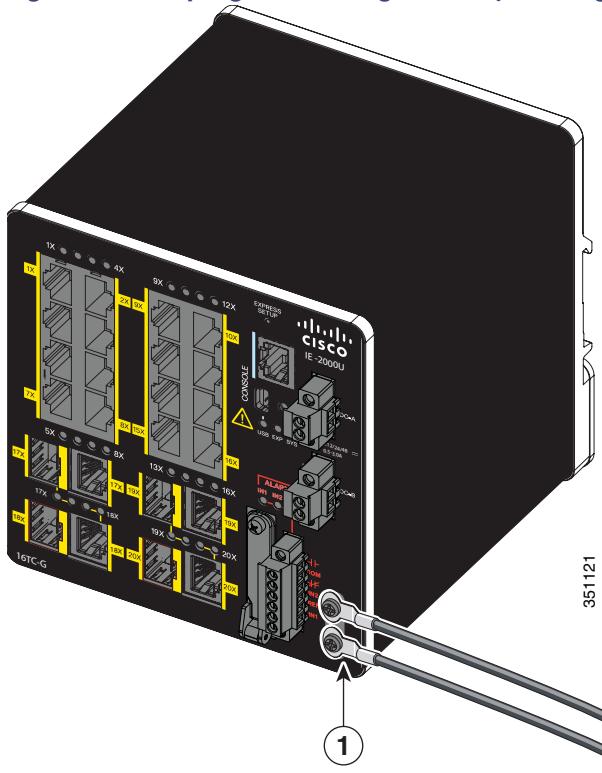
Connecting the Protective Ground and DC Power

Figure 19 Torquing Ground-Lug Screws (Single Ring Terminal)



1 Ground cable

Connecting the Protective Ground and DC Power

Figure 20 Torquing Ground-Lug Screws (Two Single Ring Terminals)

1 Ground cable

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.

Selecting a DC Power Source

There are two options for supplying DC power to the switch:

- [Site Source DC, page 41](#)
- [DC Power Supply Module, page 41](#)

Site Source DC

Site source DC can be used to power the switch. You must have a qualified electrician select, prepare, and install the appropriate power cord to the DC source. For more information on the power requirements of the IE 2000U switch, see [Table 16 on page 79](#) of the [Technical Specifications, page 79](#) chapter.

To wire a site source DC, proceed to the [Wiring the DC Power Source, page 45](#).

DC Power Supply Module

A 50-W DC- or AC-input power supply module (PWR-IE50W-AC=) can be used to power the IE 2000U switch. The input terminal block connector of the power supply can accept either a DC or AC source.

Connecting the Protective Ground and DC Power

[Table 10 on page 42](#) describes the supported DC power supply module.

Table 10 Supported DC Power Supply Module

| Power Supply Module | Input | Output | Dimensions (H x W x D) | Insulation Class |
|---------------------|---------------------------|----------------|---|------------------|
| PWR-IE50W-AC= | 88-300 VDC or 110/220 VAC | 24 VDC / 2.1 A | 5.8 x 2 x 4.4 in. (14.73 x 5.08 x 11.18 cm) | Class I |

Note: You can order the IE 2000U DC power supply module from your Cisco sales representative:

- PWR-IE50W-AC=

Installing the DC Power Supply Module (Optional)

This section describes how to install the DC power supply module:

- [Installing the DC Power Supply Module on a DIN Rail, page 42](#)
- [Connecting the AC Power Cord to the DC Power Supply Module, page 43](#)

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

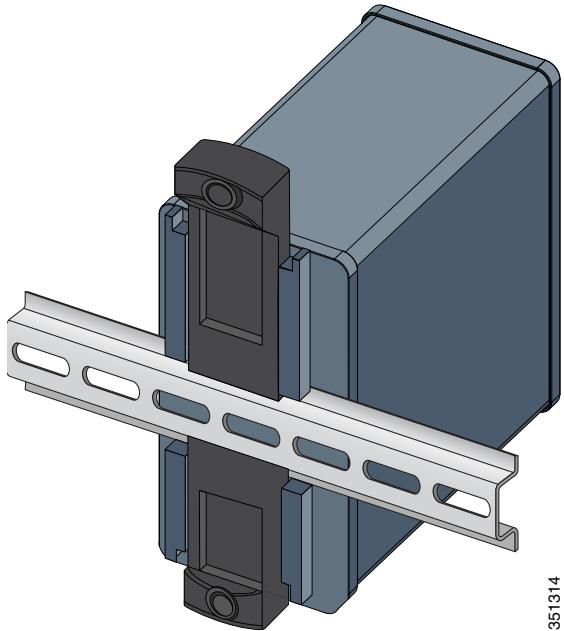
Caution: To prevent the switch assembly from overheating, there must be a minimum of 3 inches (76.19 mm) between any other device and the top, bottom, or sides of the switch assembly.

Installing the DC Power Supply Module on a DIN Rail

To mount the DC-input power supply on a DIN rail:

1. Remove the power supply from the shipping packaging.
2. Position the rear panel of the power supply 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 power supply and the spring-loaded latch near the bottom of the power supply chassis.
3. Hold the bottom of the power supply chassis away from the DIN rail, and place the two hooks on the back of the power supply over the top of the DIN rail (see [Figure 21 on page 43](#)).

Connecting the Protective Ground and DC Power

Figure 21 Installing the Power Supply Module on a DIN rail

4. Pivot the power supply toward the DIN rail so that the spring-loaded latch snaps into place on the underside of the DIN rail.

Connecting the AC Power Cord to the DC Power Supply Module

This procedure is provided for a qualified electrician to follow when installing an AC power cord to the AC-input connections of the DC power supply module. DC also can be used and both the AC-input and DC-input connections are shown in [Figure 23 on page 45](#).

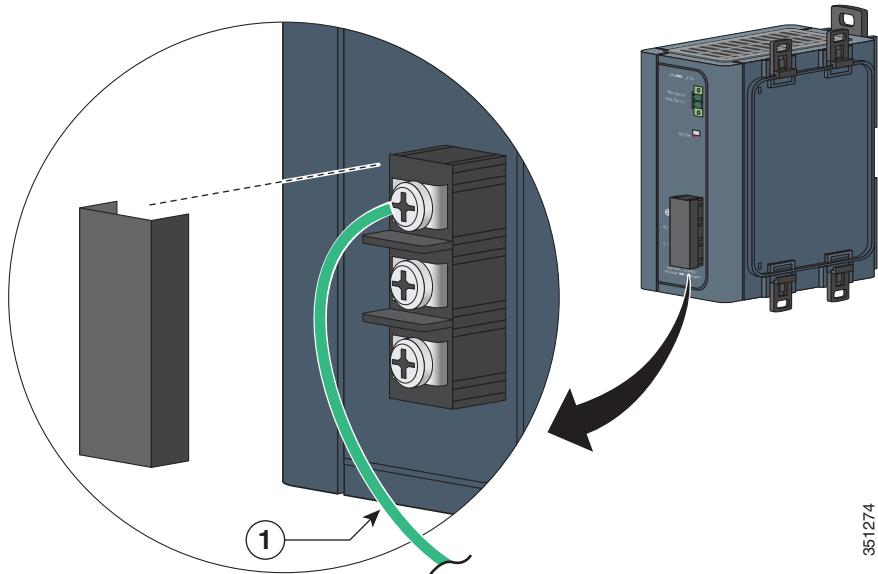
Caution: AC power sources must be on dedicated AC branch circuits. Each branch circuit must be protected by a dedicated two-pole circuit breaker.

Caution: Do not insert the power cord plug into the AC outlet until you have completed wiring the line, neutral, and ground connections.

To connect the AC power cord wires to the power supply terminal block:

1. Remove the plastic cover from the input power terminals and set it aside.

Connecting the Protective Ground and DC Power

Figure 22 AC Power Input Terminal Block

351274

1. Ground wire

2. Loosen the three Phillips-head terminal screws on the terminal block.
3. Insert the exposed ground wire lead into the power supply ground wire connection on the terminal block.

Ensure that only wire *with insulation* extends from the connector.

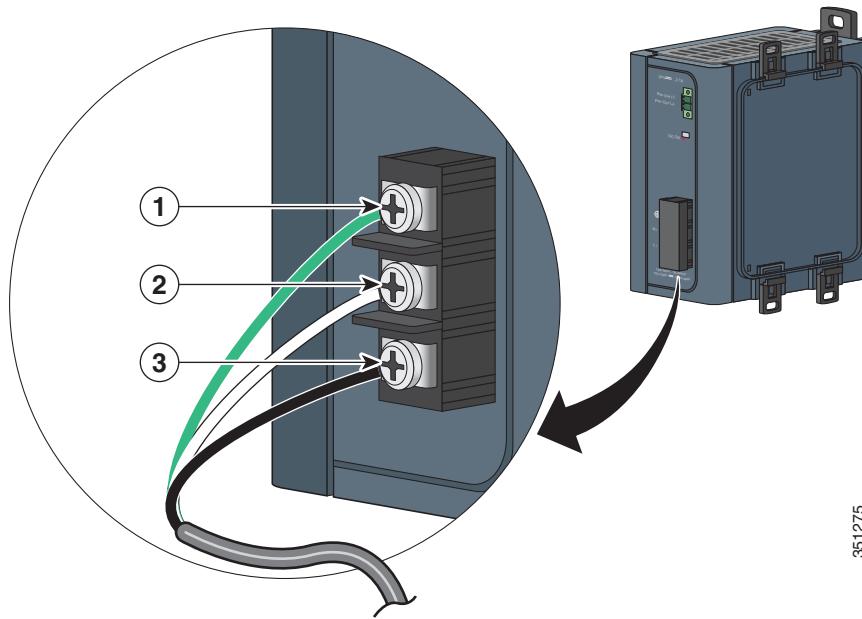
4. Tighten the ground wire terminal block screw.

Note: Do not exceed 2.2 in-lb (0.25 Nm) torque.

5. Insert the line and neutral wire leads into the terminal block line and neutral connections.

Ensure that you cannot see any wire lead, and that only wire *with insulation* extends from the connectors.

Connecting the Protective Ground and DC Power

Figure 23 Connecting AC Power to the Power Converter

351275

- | | | | |
|---|------------------|---|---------------|
| 1 | Ground | 3 | AC line (DC+) |
| 2 | AC neutral (DC-) | | |

6. Tighten the line and neutral terminal block screws.
Note: Do not exceed 2.2 in-lb (0.25 Nm) torque.
7. Replace the plastic cover over the terminal block.
8. Connect the plug end of the AC power cord into the source AC outlet.

Wiring the DC Power Source

Read these warnings before wiring the DC power source:

Caution: This product is intended to be supplied by a Class 2 power source marked with Class 2 and rated from 12, 24, or 48 VDC, 2.5 A.

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

Connecting the Protective Ground and DC Power

Caution: You must connect the switch only to a DC-input power source that has an input supply voltage of 12, 24, or 48 VDC. If the supply voltage is not in this range, the switch might not operate properly or might be damaged.

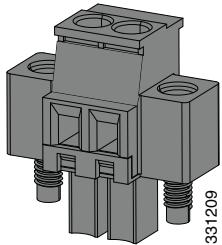
Caution: For wire connections to the power and alarm connectors, you must use UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire.

To wire the switch to a DC-input power source:

1. Locate the two power connectors on the switch front panel labeled DC-A and DC-B. (See [Figure 24 on page 46](#).)

Note: On the PoE-capable models of the switch, there is a third DC-input power connector on the switch front panel labeled PoE. For more information about the PoE power connector, see the [Connecting Power to the Switch PoE DC-Input \(Optional\)](#), page 53.

Figure 24 Power Connector



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 in [Table 11 on page 46](#).

Table 11 DC-A and DC-B Power Connector Labels

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

You can view the switch panel labels in [Figure 1 on page 12](#), [Figure 2 on page 13](#), or [Figure 3 on page 14](#).

3. Measure two strands of twisted-pair copper wire (16 to 18 AWG) long enough to connect to the DC power source.
4. Using a 16- to 18-AWG size 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) \pm 0.02 inch (0.5 mm).

Note: 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.

Figure 25 Stripping the Power Connection Wire

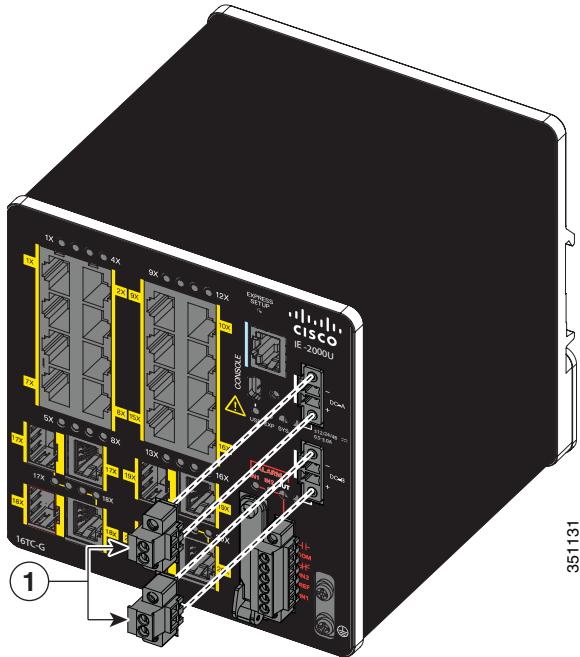


1 0.25 in. (6.3 mm) \pm 0.02 in. (0.5 mm)

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. See [Figure 26 on page 47](#).

Connecting the Protective Ground and DC Power

Figure 26 Removing the Power Connectors from the Switch

1 Power connectors

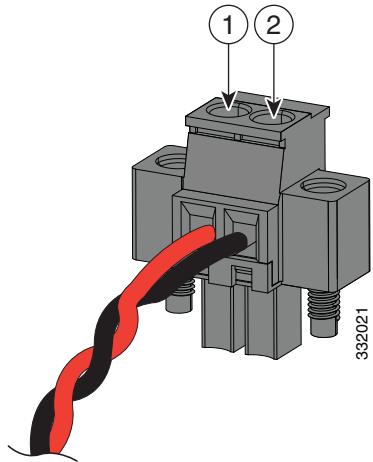
6. On the power connector, insert the exposed part of the positive wire into the connection labeled “+” and the exposed part of the return wire into the connection labeled “-”. See [Figure 27 on page 48](#).

Ensure 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

Connecting the Protective Ground and DC Power

Figure 27 Inserting Wires in the Power Connector

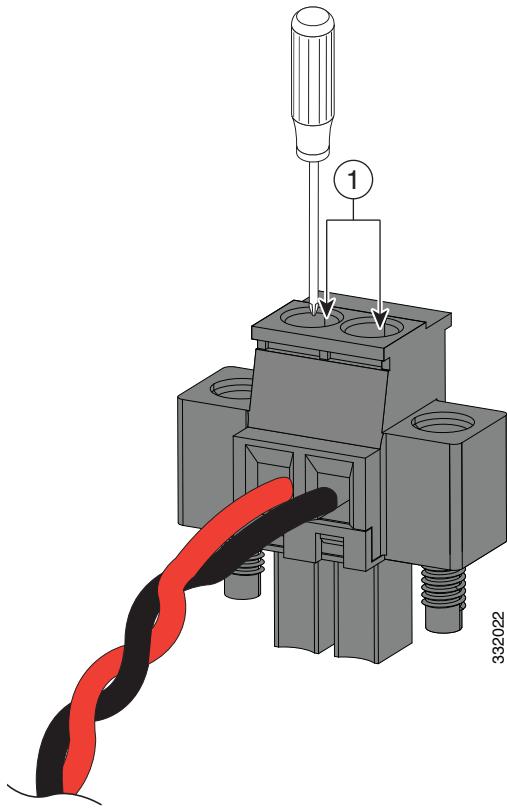


1 Power source positive connection 2 Power source return connection

7. Use a ratcheting torque flathead screwdriver to torque the power connector captive screws (above the installed wire leads) to 2 in-lb (0.23 N-m) torque. See [Figure 28 on page 49](#).

Note: Do not over-torque the captive screws on the power connector. Do not exceed 2 in-lb (0.23 N-m) torque.

Connecting the Protective Ground and DC Power

Figure 28 Torquing the Power Connector Captive Screws

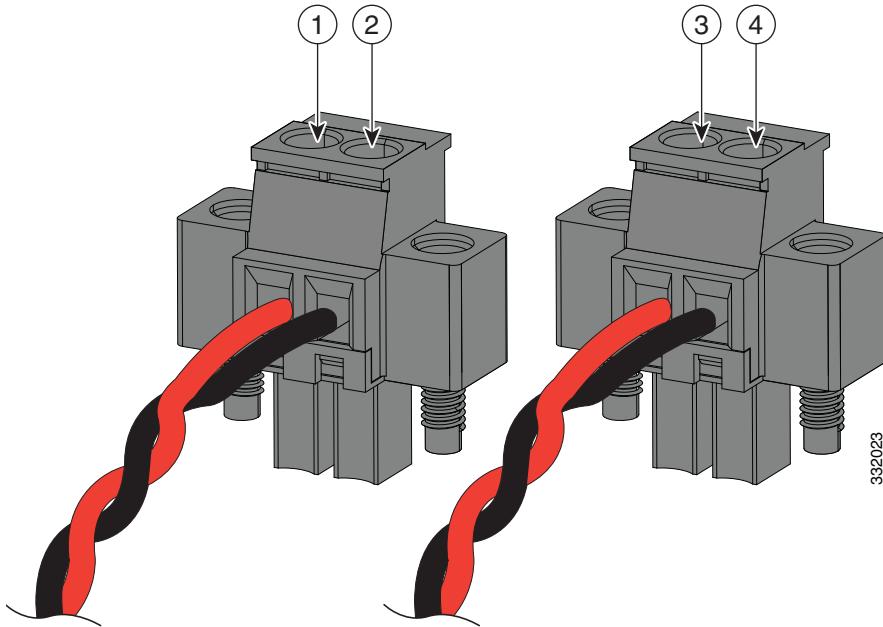
1 Power connector captive screws

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.

When you are testing the switch, one power connection is sufficient. If you are installing the switch and are using a second power source, repeat the above steps using the second power connector.

[Figure 29 on page 50](#) shows the completed DC-input wiring on a power connector for a primary power source and an optional secondary power source.

Connecting the Protective Ground and DC Power

Figure 29 Completed DC Power Connections on the Power Connectors

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

For a -48 VDC power source, this table describes the wiring connections for [Figure 29 on page 50](#).

- | | |
|-------------------------------------|-------------------------------------|
| 1 Power source A return connection | 3 Power source B return 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:

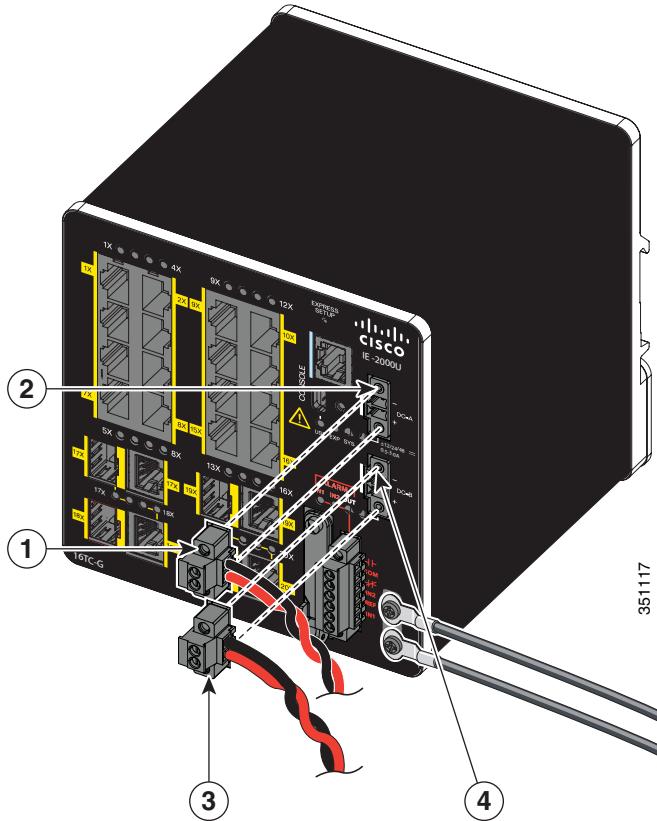
1. Insert one power connector into the DC-A receptacle on the switch front panel, and the other into the DC-B receptacle. See [Figure 30 on page 51](#).

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

Connecting the Protective Ground and DC Power

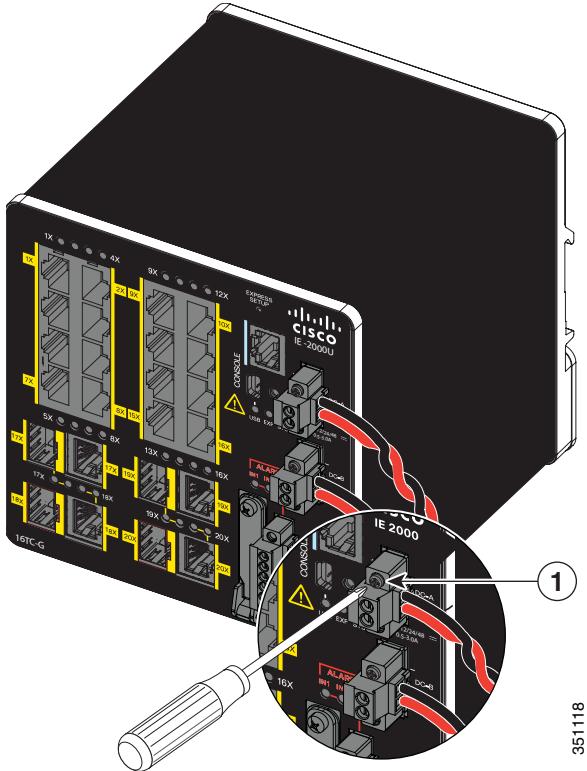
Figure 30 Attaching the Power Connectors to the Switch



- 1 DC-A power connector
2 DC-A power connection

- 3 DC-B power connector
4 DC-B power connection

Connecting the Protective Ground and DC Power

Figure 31 Connecting the Power Connectors to the Switch

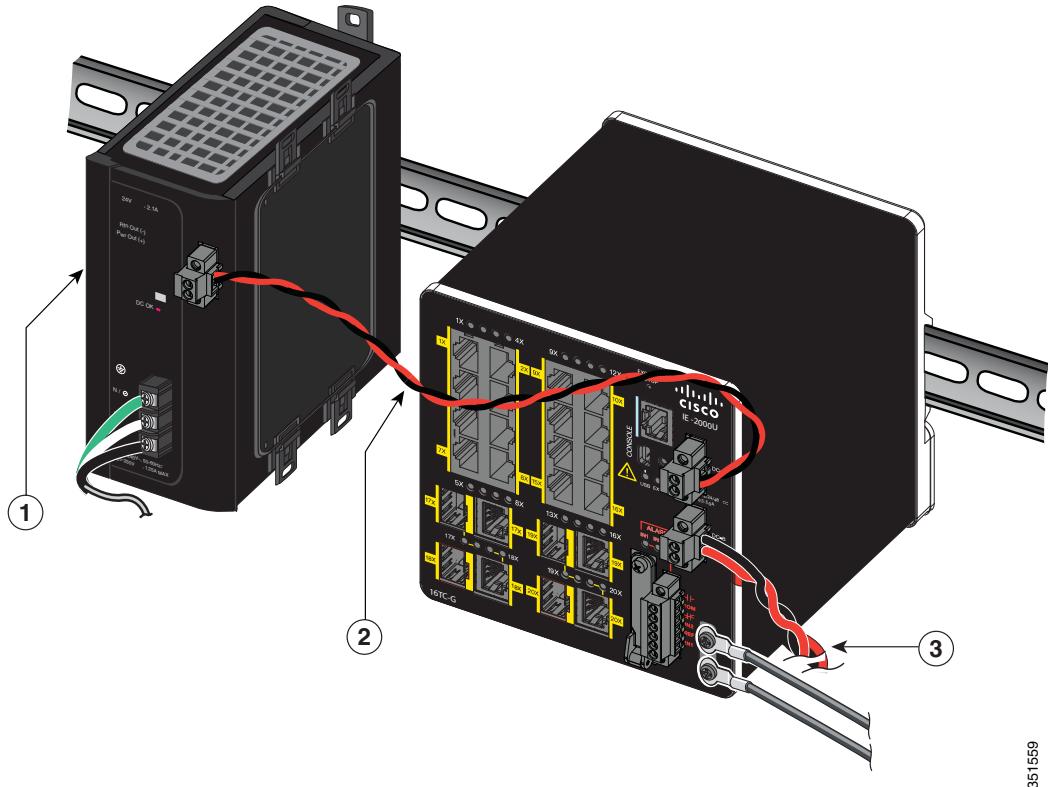
1 DC-A power connector upper captive screw

2. 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). [Figure 32 on page 53](#) shows a 50 W AC-input DC power supply module wired as the primary power source.

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.

Connecting the Protective Ground and DC Power

Figure 32 **Wired DC Power Supply Module**

351559

- 1 DC power supply module (PWR-IE50W-AC=) 3 DC-B power connector cable (Optional)
 2 DC-A power connector cable

Connecting Power to the Switch PoE DC-Input (Optional)

This procedure is applicable only to the IE 2000U switch models that are PoE-capable. If you have a PoE-capable IE 2000U switch and do not plan on using PoE, you do not need to attach power to the PoE DC-input connector; the switch can operate without the connection being made.

The DC-input accepts 48 V DC or 54 V DC at 2.5A. For more information about the PoE power requirements of the IE 2000U switch, see [Table 16 on page 79](#).

There are two PoE power source options:

- Site source DC
- PoE power supply module

Caution: For a site source DC, you must have a qualified electrician select, prepare, and install the appropriate power cord to the DC source.

Connecting the Protective Ground and DC Power

For a PoE power supply module source, you can select a 65 W DC-input, 65 W DC- or AC-input, 170 W DC-input, or 170 W DC- or AC-input PoE power supply module to power the PoE circuit. [Table 12 on page 54](#) describes the PoE supported power supply modules.

Table 12 PoE Supported Power Supply Modules

| PoE Power Supply Module | Input | Output | Dimensions (H x W x D) | Insulation Class |
|-------------------------|---------------------------|---------------|--|------------------|
| PWR-IE65W-PC-DC= | 18-60 VDC/4.3 A | 54 VDC/1.2 A | 5.9 x 2.1 x 4.9 in. (14.97 x 5.33 x 12.45 cm) | Class III |
| PWR-IE65W-PC-AC= | 88-300 VDC or 110/220 VAC | 54 VDC/1.2 A | 5.9 x 2.1 x 4.9 in. (14.97 x 5.33 x 12.45 cm) | Class I |
| PWR-IE170W-PC-DC= | 10.8-60 VDC | 54 VDC/3.15 A | 5.93 x 4.47 x 5.75 in. (150.6 x 113.5 x 145.8mm) | Class III |
| PWR-IE170W-PC-AC= | 90-264 VAC or 106-300 VDC | 54 VDC/3.15 A | 5.93 x 3.72 x 5.60 in. (150.6 x 94.5 x 142.2mm) | Class I |

Note: If you use site source DC to power the PoE ports, you can operate all four ports either as PoE or as PoE+. Make sure that the site power has 2.5A at 54 VDC to power four PoE+ port. When using PWR-IE170W modules, PoE port can power either 4 PoE or PoE+ ports. When using PWR-IE65W modules, PoE port can power 4 PoE or two PoE+ ports.

To install the PoE power supply module, complete the steps in the [Installing the DC Power Supply Module on a DIN Rail, page 42](#).

Note: You can order these IE 2000U PoE power supply modules from your Cisco sales representative:

- PWR-IE65W-PC-DC=, PoE 65-W DC-input power supply module
- PWR-IE65W-PC-AC=, PoE 65-W DC- or AC-input power supply module
- PWR-IE170W-PC-DC=, PoE 170-W DC-input power supply module
- PWR-IE170W-PC-AC=, PoE 170-W DC- or AC-input power supply module

Note: The input rating is 48/54VDC 2.5A.

Caution: To prevent the switch from overheating, ensure these minimum clearances:

- **Top and bottom: 2.0 inches (50.8 mm)**
- **Exposed side (not connected to the module): 2.0 inches (50.8 mm)**
- **Front: 2.0 inches (50.8 mm)**

Contact your Cisco TAC if tighter spacings are required.

To attach source DC to the PoE DC-input connector:

1. Verify that power is off to the DC circuit that you are going to attach to the switch PoE DC-input connector.

This can be either of the two power supplies (AC-input or DC-input) or site source DC.

As an added precaution, place the appropriate safety flag and lockout devices at the source power circuit breaker, or place a piece of adhesive tape over the circuit breaker handle to prevent accidental power restoration while you are working on the circuit.

2. Locate the PoE DC-input power connector, which is labeled PoE, on the switch front panel.
3. Loosen the power connector's two screws and remove the plug portion of the connector from the switch.
4. Measure two strands of twisted-pair copper wire (16- to 18-AWG size stranded copper wire that is an appropriate type, wire size, and color-code for your country) long enough to connect the switch to the DC power source.

Connecting the Protective Ground and DC Power

5. Using a 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) \pm 0.02 inch (0.5 mm).

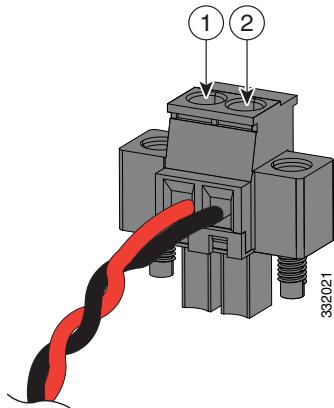
Note: Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the power connector after installation.

6. Loosen the two captive screws on the PoE power plug and 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 [Figure 33 on page 55](#) below.

Ensure that you cannot see any wire lead. Ensure that only wire *with insulation* extends 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

Figure 33 Inserting Wires into the PoE Power Connector

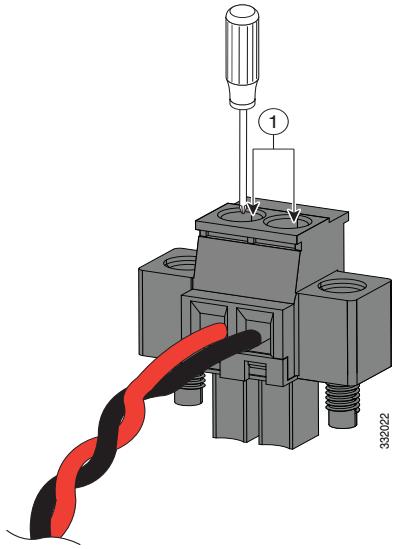


1 Power source positive connection 2 Power source return connection

7. Use a ratcheting torque flathead screwdriver to tighten the power connector captive screws (above the installed wire leads) to 2 in-lb (0.23 N-m) torque, as shown in [Figure 34 on page 56](#).

Note: Do not over-torque the captive screws of the PoE power connector. Do not exceed 2 in-lb (0.23 N-m) torque.

Connecting the Protective Ground and DC Power

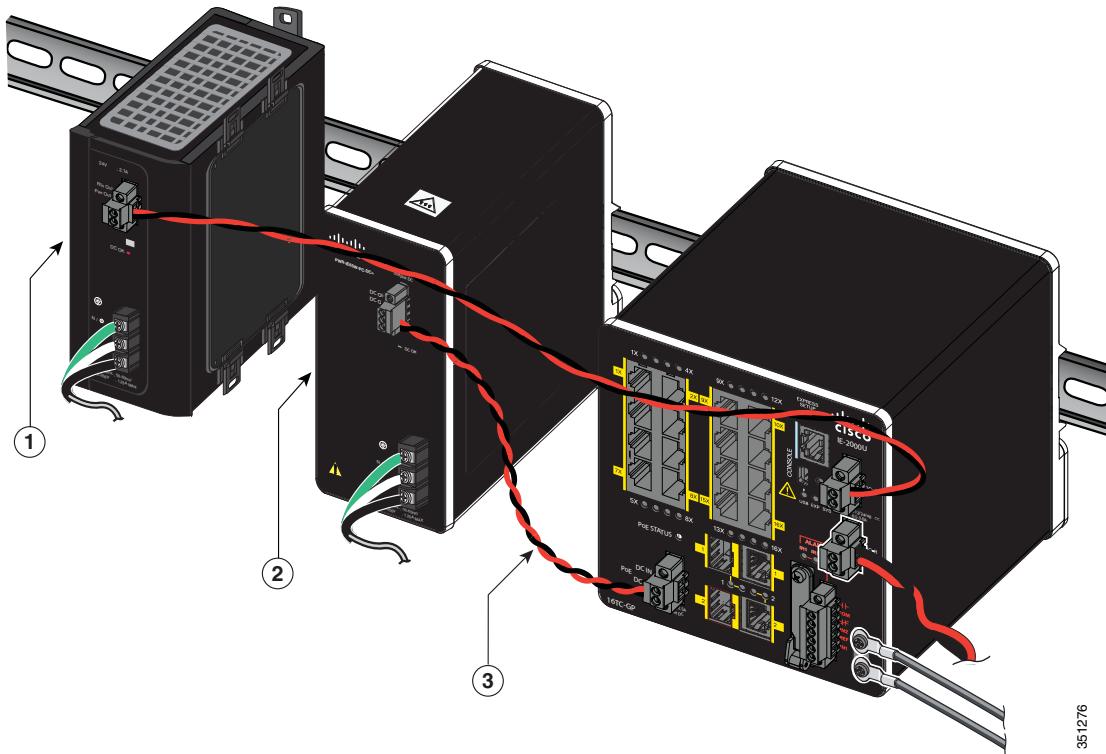
Figure 34 Securing the Power Connector Captive Screws

1 Power connector captive screws

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.
9. Insert the wired power plug into the switch PoE power connector and tighten the two screws to secure the plug.

[Figure 35 on page 57](#) shows a PoE-capable switch with a PoE power supply module connected to the PoE DC-input connector. A DC power supply module is connected to the primary power connector (DC-A) also.

Connecting the Protective Ground and DC Power

Figure 35 PoE-capable Switch with PoE Power Supply Module Connected

- 1 DC power supply module (PWR-IE50W-AC=)
- 2 PoE power supply module (PWR-IE65W-PC-AC=)
- 3 PoE power connector cable

Running Boot Fast

When the switch powers on, it automatically initiates a boot fast sequence. The boot fast sequence allows the switch to boot up in less than 60 seconds. To test the switch, follow the steps in these sections:

- [Powering On the Switch, page 57](#)
- [Verifying Boot Fast, page 57](#)
- [Disconnecting Power, page 58](#)

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.

Connecting Alarm Circuits

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

Note: You can disable boot fast and run POST by using the Cisco IOS CLI. See the *Cisco Connected Grid Switches System Management Software Configuration Guide* and the *Cisco IOS Master Command List, All Releases* for more information.

Disconnecting Power

To disconnect power after successfully running boot fast:

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

Connecting Alarm Circuits

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

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 in [Table 13 on page 58](#).

Table 13 Alarm Connector Labels (Top to Bottom)

| 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.**

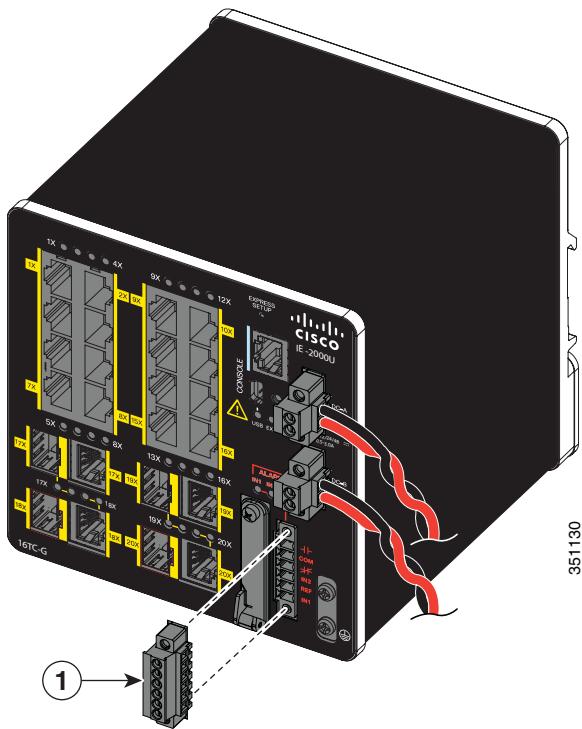
Note: Wire connections to the alarm connector must be 16- to 20-AWG, UL- and CSA-rated, style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire.

Connecting Alarm Circuits

To wire the switch to an external alarm device:

1. Remove the captive screws that hold the alarm connector on the switch, and remove the connector from the switch chassis. See [Figure 36 on page 59](#).

Figure 36 Removing the Alarm Connector



1 Alarm connector

2. Measure two strands of twisted-pair wire (16-to-20 AWG) long enough to connect to the external alarm device.

Choose between setting up an external alarm input or output circuit.

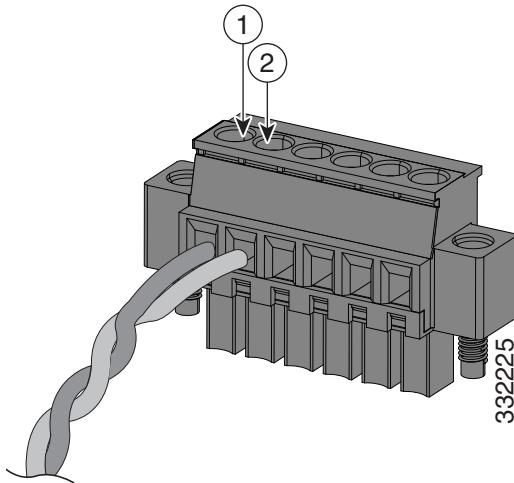
3. Use a wire stripper to remove the casing from both ends of each wire to 0.25 inch (6.3 mm) \pm 0.02 inch (0.5 mm).

Note: 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.

4. Insert the exposed wires for the external alarm device into the connections based on an alarm input or output circuit setup (see [Table 13 on page 58](#)).

For example, to wire an alarm input circuit, complete the IN1 and REF connections (see [Figure 37 on page 60](#)).

Connecting Alarm Circuits

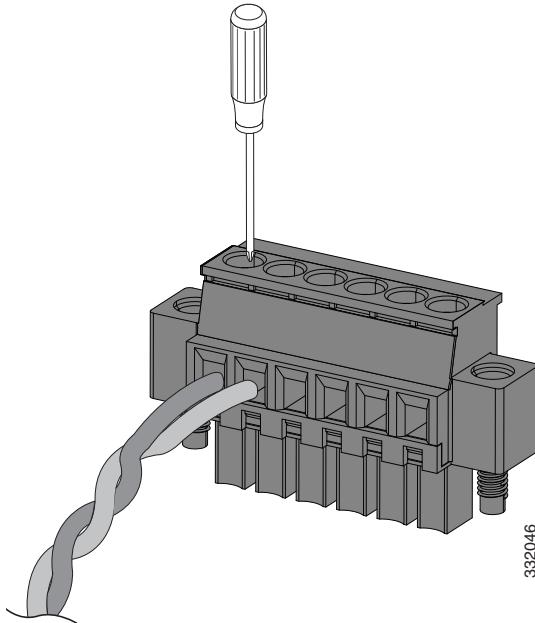
Figure 37 Inserting Wires into the Alarm Connector (Alarm Input Circuit)

1 IN1 - External device connection 1

2 REF - External device connection 2

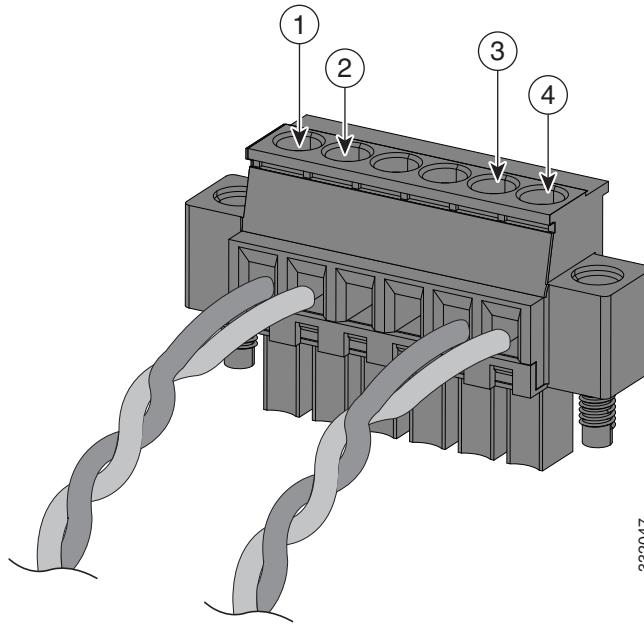
5. Use a ratcheting torque flathead screwdriver to tighten the alarm connector captive screw (above the installed wire leads) to 2 in-lb (0.23 N-m) torque. See [Figure 38 on page 60](#) for details.

Note: Do not over-torque the captive screws of the alarm connectors. Do not exceed 2 in-lb (0.23 N-m) torque.

Figure 38 Torquing the Alarm Connector Captive Screws

6. Repeat the above steps to insert the input and output wires of one additional external alarm device into the alarm connector.

[Figure 39 on page 61](#) 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 39 Alarm Connector Wired for Two External Alarm Devices

1 IN1 wired connection

2 REF wired connection

3 COM wired connection

4 NO wired connection

Attaching the Alarm Connector to the Switch

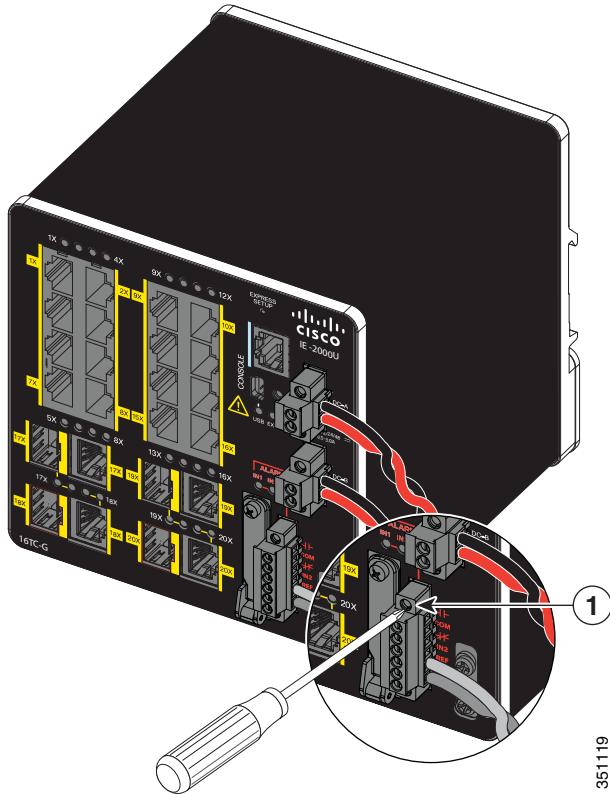
Warning: Failure to securely tighten the captive screws can result in an electrical arc if the connector is accidentally removed. Statement 397

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:

1. Insert the alarm connector into the receptacle on the switch front panel. See [Figure 40 on page 62](#).

Connecting Destination Ports

Figure 40 Connecting the Alarm Connector to the Switch

- 1 Alarm connector upper captive screw
2. 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) torque. See [Figure 38 on page 60](#) for details.

Note: Do not over-torque the captive screws of the alarm connectors. Do not exceed 2 in-lb (0.23 N-m) torque.

Connecting Destination Ports

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

- [Connecting to 10/100 and 10/100/1000 Ports, page 63](#)
- [Installing and Removing SFP Modules, page 64](#)
- [Connecting to SFP Modules, page 69](#)
- [Connecting to a Dual-Purpose Port, page 70](#)
- [Where to Go Next, page 71](#)

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.

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 PoE-capable IE 2000U-16TC-GP model provides up to four ports of either PoE (15.4 W per port; IEEE 802.3af) or PoE+ (30 W per port; IEEE 802.3at). In order to utilize the PoE capability, you must attach a site source DC or power supply module to the PoE power connector on the switch faceplate. For more information about the PoE power connector, see [Connecting Power to the Switch PoE DC-Input \(Optional\)](#), page 53.

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

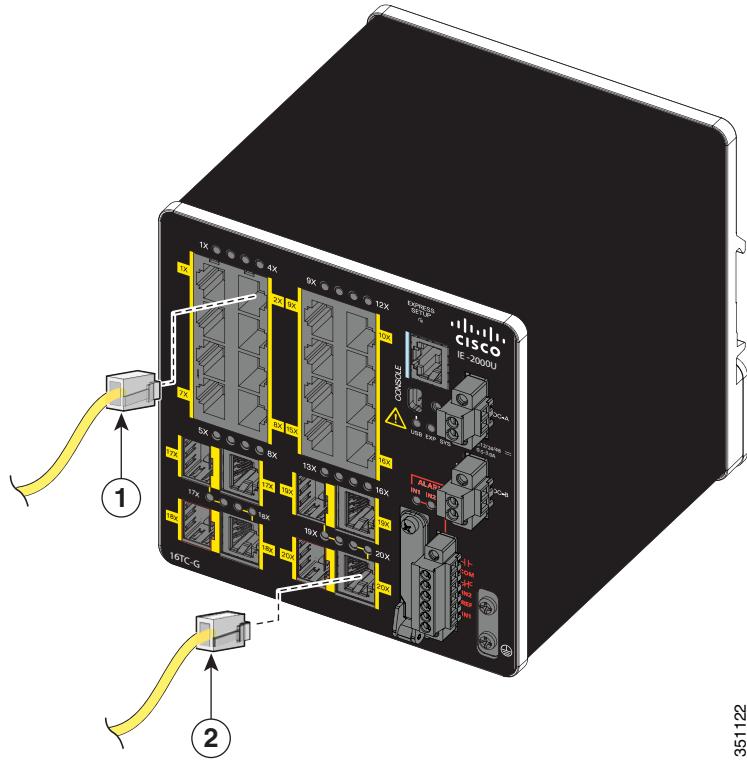
To connect to 10BASE-T, 100BASE-TX or 1000BASE-T devices:

1. When connecting to workstations, servers, and routers, connect a straight-through cable to an RJ-45 connector on the front panel. See [Figure 41 on page 64](#).

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

The auto-MDIX feature is enabled by default. For configuration information for this feature, see the *Cisco Connected Grid Switches Interfaces Software Configuration Guide* or go to the Cisco IOS 15.2M&T command references, at: http://www.cisco.com/en/US/products/ps11746/prod_command_reference_list.html

Connecting Destination Ports

Figure 41 Connecting to an Ethernet Port

351122

- 1 10/100 port
- 2 10/100/100 port

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 establish 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:

- Check that the device at the other end is turned on.
- Check the cable and adapter. There might be a cable problem or a problem with the adapter installed on the attached device. See [Troubleshooting, page 73](#) for solutions to cabling problems.

3. Reconfigure and reboot the connected device if necessary.

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 optical interfaces, send (TX) and receive (RX).

Connecting Destination Ports

You can use any combination of rugged SFP modules. See the *Release Notes for the Cisco IE 2000U Switches* at www.cisco.com/go/ie2000u-docs 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. See [Table 19 on page 86](#) for cable stipulations for SFP module connections.

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).

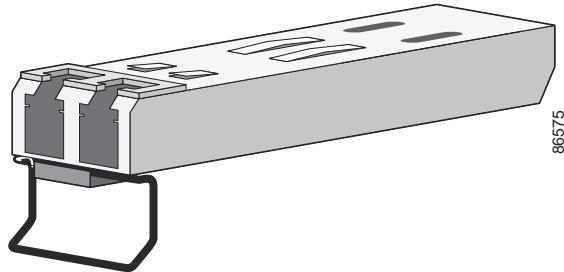
Warning: Do not insert and remove SFP modules while power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Statement 1087

Installing SFP Modules into SFP Module Slots

[Figure 42 on page 65](#) shows an SFP module that has a bale-clasp latch.

Caution: 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 42 SFP Module with a Bale-Clasp Latch



Installing Fiber-Optic SFP Modules

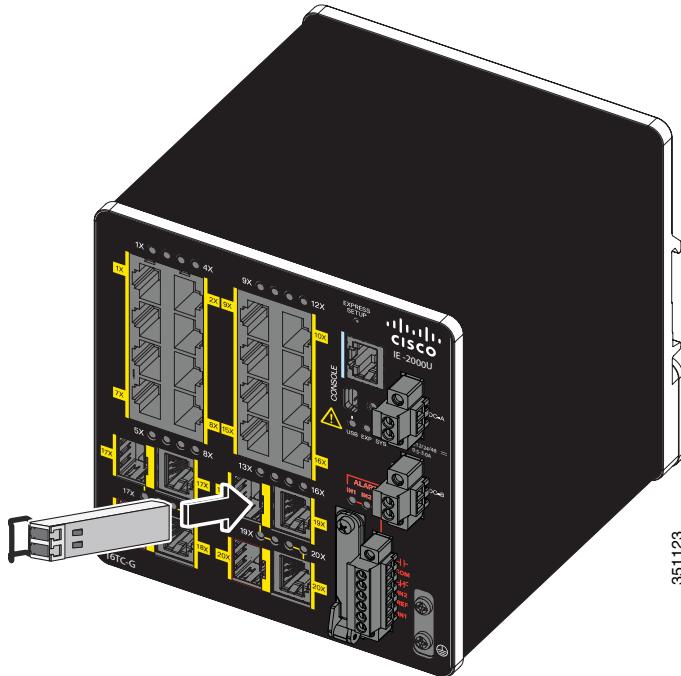
To insert a fiber-optic SFP module into the SFP module slot:

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 ([Figure 43 on page 66](#)).

Figure 43 Installing an SFP Module into an SFP Module Slot



5. Remove the dust plugs from the SFP module optical ports and store them for later use.

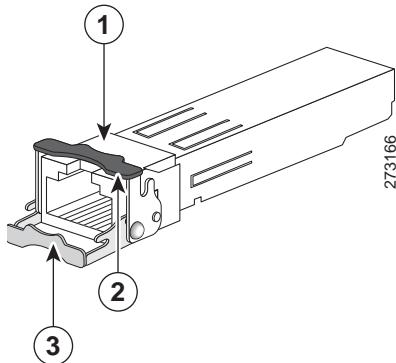
Caution: Do not remove the dust plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

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

Installing 1000BASE-T SFP Modules

The 1000BASE-T (copper) SFP transceiver, see [Figure 44 on page 67](#), has a bale-clasp locking mechanism that secures the transceiver in the module socket. An RJ-45 connector provides the transceiver's interface point to the network.

Connecting Destination Ports

Figure 44 1000BASE-T SFP Transceiver

1 RJ-45 connector

3 Bale-clasp latching mechanism in the open (unlocked) position.

2 Bale-clasp latching mechanism in the closed (locked) position.

Caution: To comply with GR-1089 intrabuilding lightning immunity requirements, you must use grounded, shielded, twisted-pair, CAT5 cabling.

Note: When connecting to a 1000BASE-T-compatible server, workstation, or router, use four twisted-pair, straight-through CAT5 cabling for the SFP transceiver port. When connecting to a 1000BASE-T-compatible switch or repeater, use four twisted-pair, crossover CAT5 cabling.

To install a 1000BASE-T SFP transceiver:

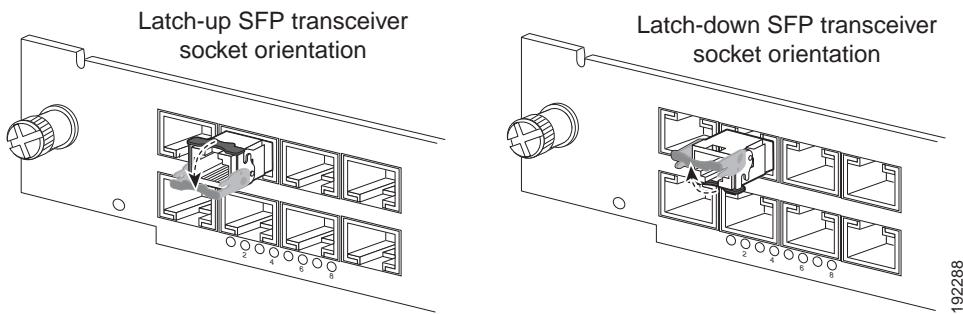
- 1.** Attach an ESD-preventive wrist strap to your wrist and to the ESD ground connector on the chassis or to a properly grounded bare metal surface.

Caution: To avoid ESD damage, handle the SFP by its sides; do not touch the connector pins.

- 2.** Remove the new 1000BASE-T SFP module from its protective packaging.
- 3.** Check the markings on the SFP transceiver to verify that you have the correct model for your network.
- 4.** Position the SFP transceiver in front of the port socket opening.

Note: Different Cisco devices have different SFP transceiver socket configurations. Your Cisco device might require that the SFP transceiver be installed with the bale-clasp either in a latch-up or a latch-down orientation. [Figure 45 on page 68](#), left view, shows the SFP installed in a latch-up orientation where the bale-clasp latching mechanism pivots up to the closed (locked) position. [Figure 45 on page 68](#), right view shows the SFP installed in a latch-down orientation where the bale-clasp latching mechanism pivots down to the closed (locked) position. Verify that you have the SFP transceiver oriented correctly when you position it in front of the port socket.

Connecting Destination Ports

Figure 45 SFP Transceiver Socket Orientation

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5. With the bale-clasp closed (locked), slide the SFP transceiver into the socket until you feel it snap in place in the socket.

You may hear an audible click as the SFP transceiver latch engages in the socket ([Figure 43 on page 66](#)).

6. Connect the network interface cable RJ-45 plug to the SFP RJ-45 connector.

7. Observe the port status LED:

- Green indicates that the SFP transceiver and the target device established a link.
- Amber indicates that the port is discovering the network topology and searching for loops. This process takes about 30 seconds, and then the LED turns green.
- Off indicates that 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. Refer to [Troubleshooting, page 73](#) for solutions to cabling problems.

Removing SFP Modules from SFP Module Slots

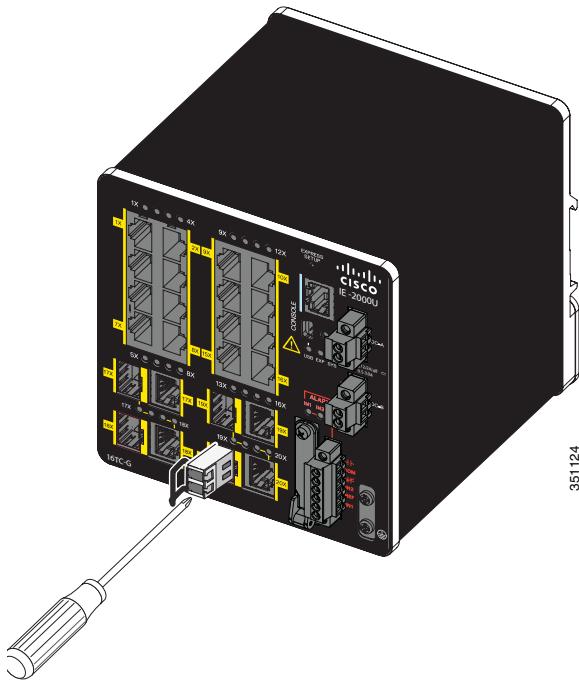
To remove an SFP module from a module receptacle:

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. See [Figure 46 on page 69](#).

Connecting Destination Ports

Figure 46 Opening a Bale-Clasp Latch on an SFP Module Using a Flat-Blade Screwdriver



1 Bale clasp

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 the [Connecting to a Dual-Purpose Port](#), page 70.

For instructions on how to install or remove an SFP module, see the [Installing and Removing SFP Modules](#), page 64.

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](#), page 29. See [Cable and Connectors](#), page 83 for information about the LC on the SFP module.

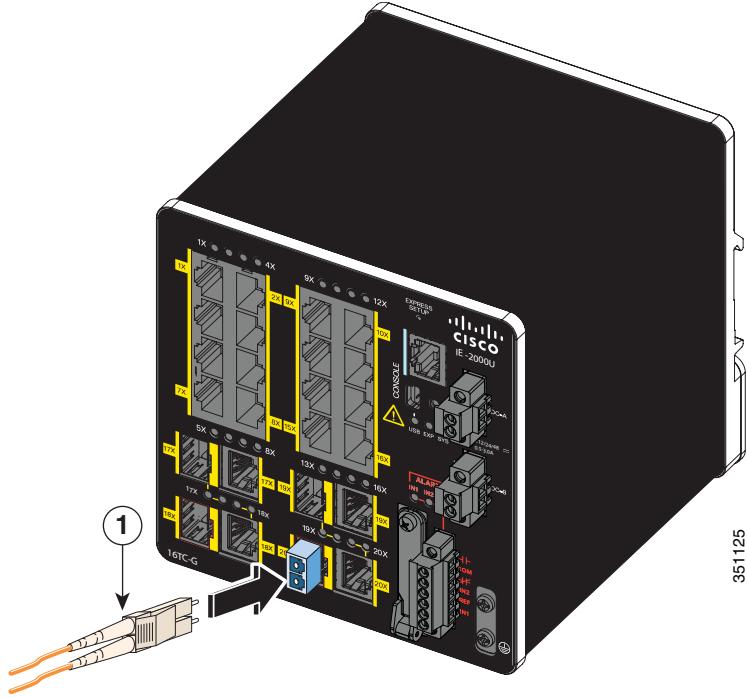
To connect a fiber-optic cable to an SFP module:

1. Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.

Connecting Destination Ports

2. Insert one end of the fiber-optic cable into the SFP module port. See [Figure 47 on page 70](#).

Figure 47 Connecting to a Fiber-Optic SFP Module Port



1 LC connector

3. Insert the other cable end into a fiber-optic receptacle on a target device.

4. Observe the port status LED:

- Green indicates that the switch and the target device established a link.
- Amber indicates that the STP is discovering the network topology and is searching for loops. This process takes about 30 seconds, and then the port LED turns green.
- Off indicates that 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, page 73](#) 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. For more information about dual-purpose ports, see the [Power Connectors, page 20](#).

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 guidelines in the [Preparing for Installation, page 29](#). See [Cable and Connectors, page 83](#) for information

about the LC on the SFP module.

To connect to a dual-purpose port:

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. See [Figure 48 on page 71](#).

For more information about RJ-45 connections, SFP modules, and optical connections, see the [Connecting to 10/100 and 10/100/1000 Ports, page 63](#), the [Installing and Removing SFP Modules, page 64](#), and the [Connecting to SFP Modules, page 69](#).

Figure 48 Connecting to a Dual-Purpose Port

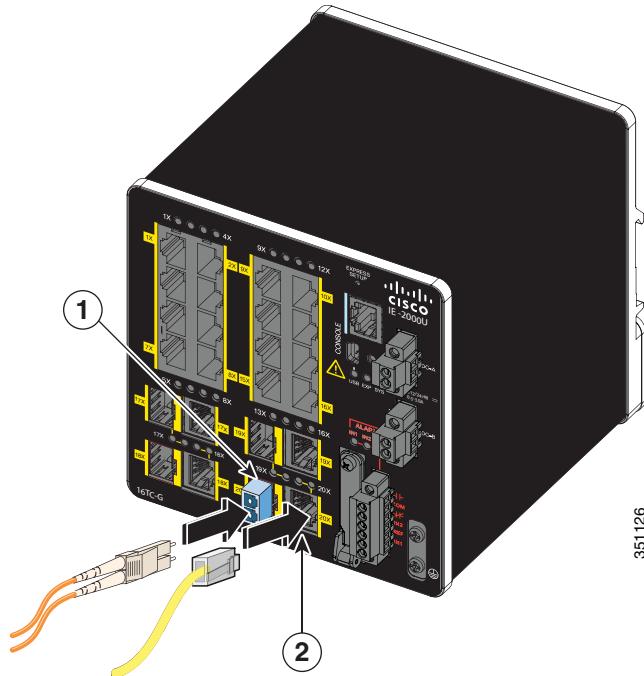


Table 4-14

| | | | |
|---|--------------|---|-----------------|
| 1 | LC connector | 2 | RJ-45 connector |
|---|--------------|---|-----------------|

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 IOS 15.2M&T command references, at:

http://www.cisco.com/en/US/products/ps11746/prod_command_reference_list.html

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 Cisco Configuration Professional, which is a PC-based application that provides device management for switches and routers. It simplifies configuration of features through easy-to-use wizards.

Where to Go Next

- Use the CLI to configure the switch as an individual switch from the console. See the *Cisco IOS Master Command List, All Releases* on Cisco.com for information about using the CLI at:
http://www.cisco.com/en/US/products/ps11746/products_product_indices_list.html
- Start an SNMP application such as the CiscoView application.