



Preparing for Installation



Warning

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



Warning

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



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

This chapter describes how to prepare your site for the installation of the switch and contains these sections:

- [Electrostatic Discharge, page 2-2](#)
- [Site Power Requirements and Heat Dissipation, page 2-3](#)
- [System Ground Connection Guidelines, page 2-4](#)
- [AC Power Connection Guidelines, page 2-9](#)
- [Site-Planning Checklist, page 2-12](#)

**Note**

See the [Site-Planning Checklist](#) at the end of this chapter to ensure that you complete all site-planning activities before you install the switch.

Electrostatic Discharge

Electrostatic discharge is common on Category 5E and Category 6 cabling systems.

Category 5E and Category 6 cables have higher capacitance than Category 5 cables. As a result, Category 5E and Category 6 cables can store higher voltages than Category 5 cables and are more prone to cause damage to networking equipment should a differential discharge event occur.

Unshielded twisted-pair cables can store high voltages. When these charged cables are connected to networking equipment, the energy is discharged into the networking equipment; this is known as electrostatic discharge (ESD).

Networking equipment is commonly designed and tested to withstand common mode ESD events of up to 2000 V. The design for the common mode event is based on the expectation that the discharge is delivered to all pins of a port at once. Sometimes voltage is discharged to some of the pins of the connector and not others, or to some pins on the connector before others. This is known as a differential discharge event, which can damage the networking equipment being connected.

Following are preventive measures against ESD cable damage:

- Ground the cable before connecting the networking equipment. You can create a grounding cable using an RJ-45 patch cable by doing the following:
 - Bare the wires on one end
 - Connect the wires to a suitable and safe earth ground
 - Connect the RJ-45 cable to a female RJ-45 connector
- Briefly connect all cables to the grounded cable prior to connecting to networking equipment.
- Leave cables connected from the networking equipment in the distribution closet to ports at user desktops. Once connections on either side of the cable are made to networking equipment, the cable will not build up charge.

Site Power Requirements and Heat Dissipation


Note

Catalyst 4003 switches have two slots that can be used for removable AC-input power supplies. Catalyst 4006 switches have three slots that can be used for removable AC-input power supplies. Each power supply requires a separate power circuit.

This section provides site power requirements and heat dissipation specifications for the Catalyst 4000 series switches. You should verify site power before you install the switch.

Knowing the power requirements is useful for planning the power distribution system necessary to support the switches. The heat dissipation specifications are an important consideration when estimating the air-conditioning requirements for an installation. [Table 2-1](#) provides the power requirement and heat dissipation specifications for the Catalyst 4003 and 4006 switches, supervisor engines, and switching modules.

Table 2-1 Power Requirements and Heat Dissipation Specifications

Model Number/ Module Type	AC-Input Power (W)	DC- Output Power (W)	Reset Mode (W)	Heat Dis- sipation (Btu/Hr)	Input Current at 90 VAC (A)	Input Current at 120 VAC (A)	Input Current at 180 VAC (A)	Input Current at 240 VAC (A)
Catalyst 4003 chassis (with fans)	12	9	N/A	41	0.13	0.10	0.07	0.05
Catalyst 4006 chassis (with fans)	38	28	N/A	130	0.41	0.32	0.22	0.16
Supervisor Engine I (WS-X4012)	93	70	110	318	1.04	0.78	0.52	0.39
Supervisor Engine II (WS-X4013)	147	110	110	500	1.63	1.22	0.81	0.61
Supervisor Engine III (WS-X4014)	111	83.2	110	379	1.23	0.92	0.62	0.47
Supervisor Engine IV (WS-X4515)	113	84.6	110	386	1.26	0.94	0.63	0.47

Table 2-1 Power Requirements and Heat Dissipation Specifications (continued)

Model Number/ Module Type	AC-Input Power (W)	DC- Output Power (W)	Reset Mode (W)	Heat Dis- sipation (Btu/Hr)	Input Current at 90 VAC (A)	Input Current at 120 VAC (A)	Input Current at 180 VAC (A)	Input Current at 240 VAC (A)
WS-X4019	13	10	10	45	0.15	0.11	0.07	0.06
WS-X4124-FX-MT	120	90	75	409	1.33	1.00	0.67	0.50
WS-X4148-FX-MT	160	120	10	546	1.78	1.33	0.89	0.67
WS-X4148-RJ	87	65	40	296	0.96	0.72	0.48	0.36
WS-X4148-RJ21	87	65	40	296	0.96	0.72	0.48	0.36
WS-X4148-RJ45V	80	60	50	273	0.89	0.67	0.44	0.33
WS-X4232-L3	160	120	70	546	1.78	1.33	0.89	0.67
WS-X4232-GB-RJ	73	55	35	250	0.81	0.61	0.41	0.31
WS-X4232-RJ-XX	67	50	35	227	0.74	0.56	0.37	0.28
WS-X4306-GB	47	35	30	159	0.52	0.39	0.26	0.19
WS-X4412-2GB-T	147	110	70	500	1.63	1.22	0.81	0.61
WS-X4418-GB	107	80	50	364	1.19	0.89	0.59	0.44
WS-X4424-GB-RJ45	120	90	50	409	1.33	1.00	0.67	0.50
WS-X4448-GB-LX	100	85	50	344	1.11	0.83	0.56	0.42
WS-X4448-GB-RJ45	160	120	72	546	1.78	1.33	0.89	0.67
WS-X4604-GWY	160	120	35	546	1.78	1.33	0.89	0.67

System Ground Connection Guidelines

A grounding pad with two system (earth) grounding holes is provided in an enclosure on the right front panel of the Catalyst 4003 switch and near the power supplies on the Catalyst 4006 switch. See [Figure 2-1](#) for the location of the grounding holes on the Catalyst 4003 switch and [Figure 2-2](#) for the location on the Catalyst 4006 switch.

Figure 2-1 Catalyst 4003 Grounding Holes

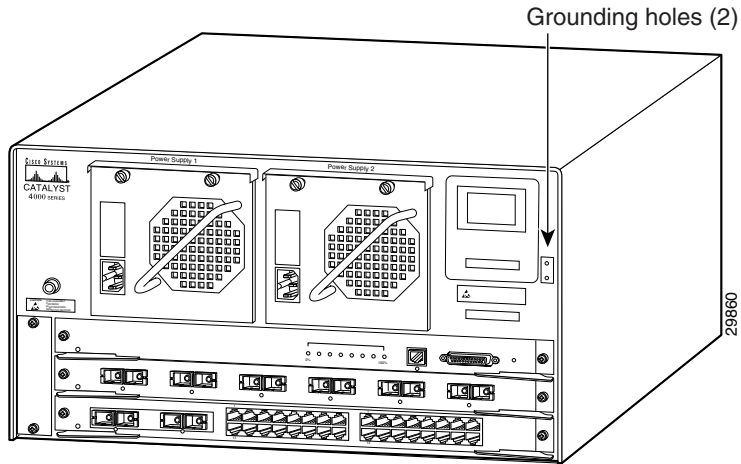
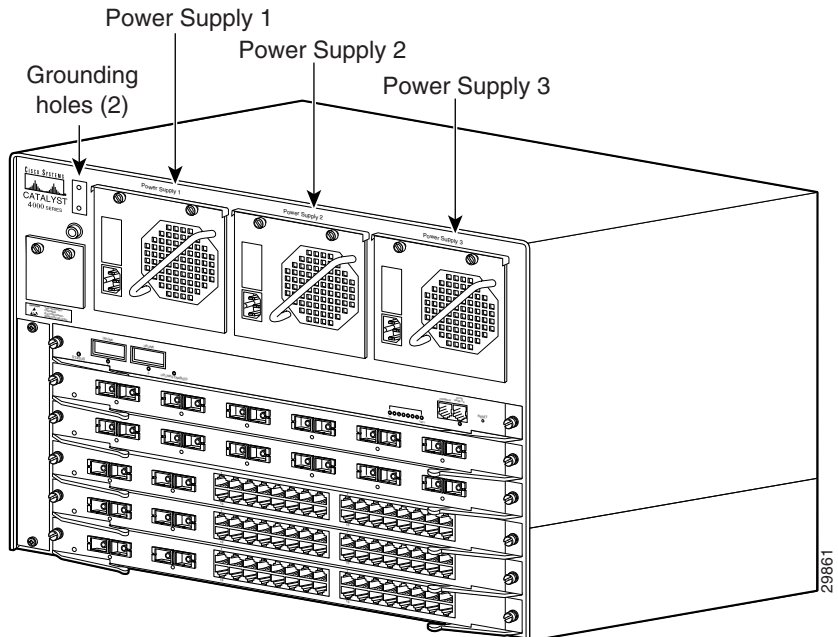


Figure 2-2 Catalyst 4006 Grounding Holes



Parts and Required Tools

**Note**

The parts and required tools described in this section are not available from Cisco Systems.

To make an adequate grounding connection, you will need the following parts and tools:

- Grounding lug—The grounding lug must have two grounding holes. See [Figure 2-1](#) for the location of the grounding holes on the Catalyst 4003 switch and [Figure 2-2](#) for the Catalyst 4006 switch.
- Two M4 (metric) hex-head screws with locking washers.
- One grounding wire (6 AWG recommended)—The length of the grounding wires depends on the location of your switch within the site and its proximity to proper grounding facilities.
- Number 2 Phillips screwdriver.
- Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug.
- Wire-stripping tool.

Connecting System Ground

This section describes how to connect the Catalyst 4003 and Catalyst 4006 switches to earth ground. You must complete this procedure before connecting system power or turning on your switch.

Follow these steps to attach the grounding lug and cable to the grounding pad on the Catalyst 4003 and Catalyst 4006 switches:

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- Step 1** Using a wire-stripping tool, remove approximately 0.75 inches (19 mm) of the covering from the end of the grounding wire.
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug ([Figure 2-3](#)).
- Step 3** Using a crimping tool, secure the grounding wire in place in the grounding lug.

Step 4 Locate the grounding pad on the switch.

See [Figure 2-3](#) for the location of the grounding pad on the Catalyst 4003 switch and [Figure 2-4](#) for the Catalyst 4006 switch.

Figure 2-3 Connecting System Ground on the Catalyst 4003 Switch

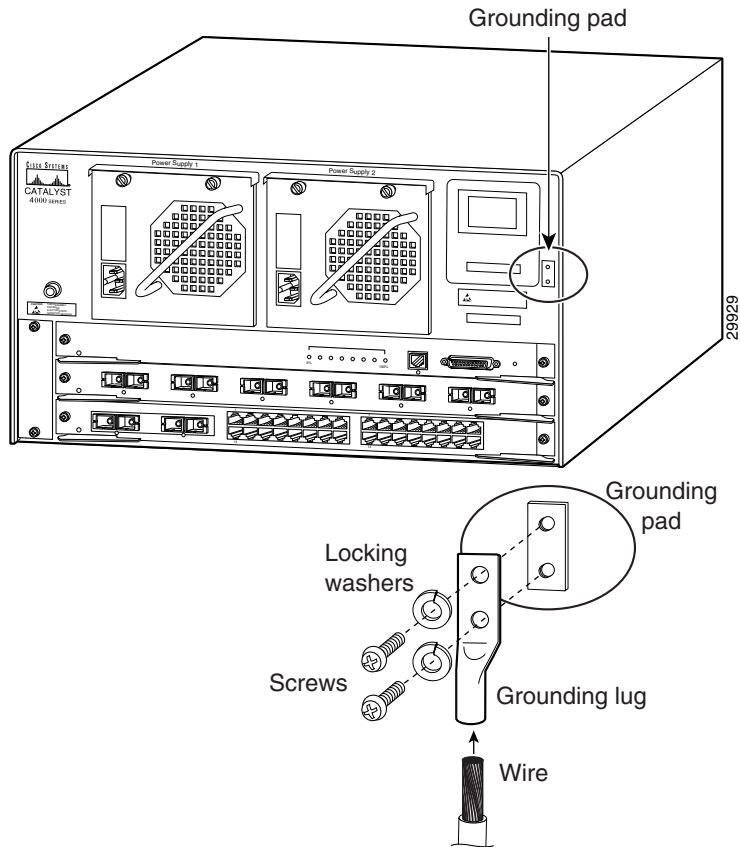
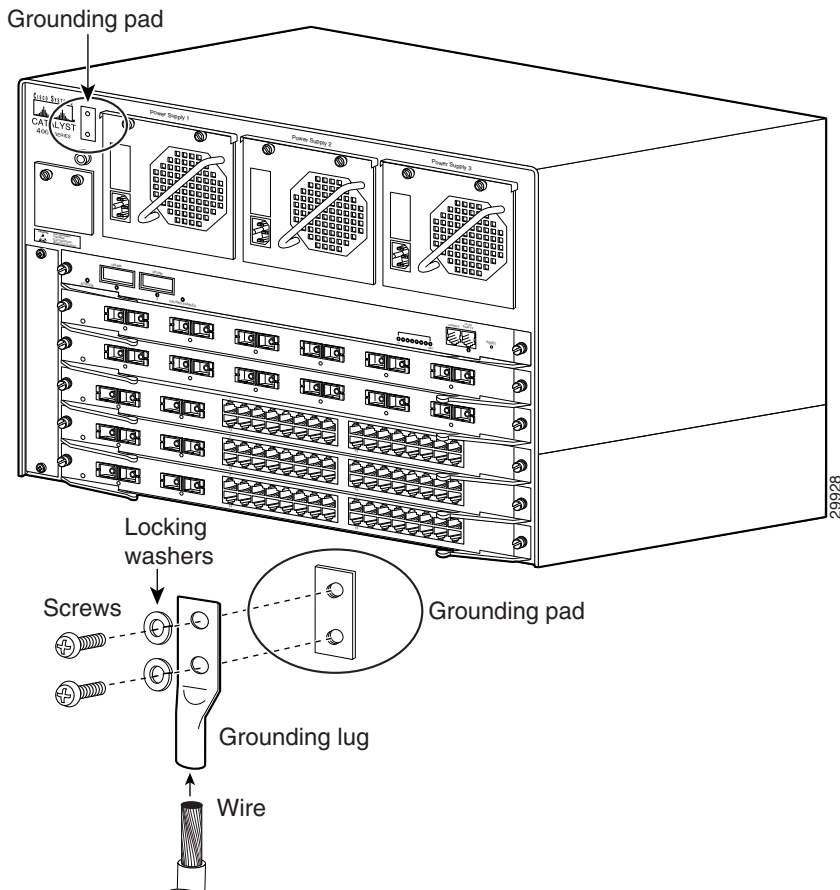


Figure 2-4 Connecting System Ground on the Catalyst 4006 Switch

- Step 5** Remove the label that covers the grounding pad.
- Step 6** Place the grounding lug against the grounding pad, aligning the holes. Insert the two M4 screws through the locking washers and then through the holes in the grounding lug and grounding pad (Figure 2-3 and Figure 2-4).

Ensure that the grounding lug and the attached wire will not interfere with other switch hardware or rack equipment.

- Step 7** Tighten the screws to secure the locking washers and grounding lug to the grounding pad.
- Step 8** Repeat Steps 1 through 3 to prepare the other end of the grounding wire and connect it to an appropriate grounding point at your site to ensure adequate earth ground for the switch.
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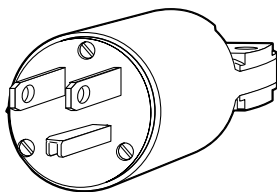
AC Power Connection Guidelines

This section provides guidelines for connecting Catalyst 4000 series AC power supplies to the site power source.

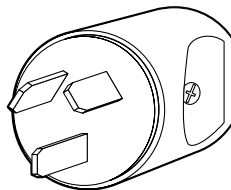
For a list of the nominal and acceptable voltage ranges for source AC power, see [Appendix A, “Specifications.”](#)

[Figure 2-5](#) shows the different styles of AC-input power plugs that are available for various international locales.

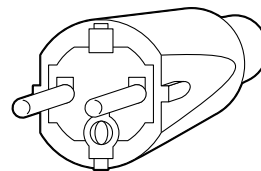
[Table 2-2](#) lists the AC-input power cord options and Cisco product numbers. Make sure that you have the correct power cord for your site.

Figure 2-5 AC Power Cord Plugs

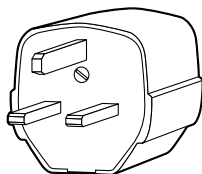
North America
NEMA 5-15P plug (13A)



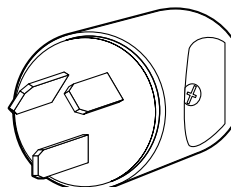
Australia, New Zealand
SAA/3 plug (10A)



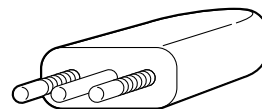
Continental Europe
(excluding Italy)
CEE (7) (10A)



United Kingdom
BS589/13
(10A; replaceable fuse)



Argentina
IRAM 2073 plug (10A)



Italy
1/3/16 plug
CEI 23-16-3 (10A)

32329

Table 2-2 AC-Input Power Cord Options

Locale	Description	Product Number
North America	125 V@ 13 A	CAB-7KAC=
Australia, New Zealand	250 V@ 10 A	CAB-7KACA=
Continental Europe (excluding Italy)	250 V@ 10 A	CAB-7KACE=
United Kingdom	250 V@ 10 A	CAB-KACU=
Argentina	250 V@ 10 A	CAB-KACR=
Italy	250 V@ 10 A	CAB-7KACI=

Ventilation

Planning a proper location for the switch and the layout of your equipment rack or wiring closet is essential for successful system operation. You should install the switch in an enclosed, secure area, ensuring that only qualified personnel have

access to the switch and control of the environment. Equipment placed too close together or inadequately ventilated can cause system overtemperature conditions. In addition, poor equipment placement can make chassis panels inaccessible and difficult to maintain.

The switch operates as a standalone system mounted in a rack in a secure wiring closet. It requires a dry, clean, well-ventilated, and air-conditioned environment. To ensure normal operation, maintain ambient airflow. If the airflow is blocked or restricted, or if the intake air is too warm, an overtemperature condition can occur. The switch environmental monitor can then shut down the system to protect the system components.

To ensure normal operation and avoid unnecessary maintenance, plan your site configuration and prepare your site before installation. After installation, make sure that the site maintains an ambient temperature of 0 to 40°C (32 to 104°F). It is essential to keep the area around the chassis as free from dust and foreign conductive material (such as metal flakes from nearby construction activity) as is possible.

Multiple switches can be rack-mounted with little or no clearance above and below the chassis. However, when mounting a switch in a rack with other equipment, or when placing it on the floor near other equipment, ensure that the exhaust from other equipment does not blow into the intake vent of the chassis.

Cooling air is drawn in through the right side of the chassis. Keep the right side clear of obstructions, including dust and foreign conductive material, and away from the exhaust ports of other equipment.

[Appendix A, “Specifications,”](#) lists the operating and nonoperating environmental site requirements for the switches. To maintain normal operation and ensure high system availability, maintain an ambient temperature and clean power at your site. The environmental ranges listed in [Appendix A, “Specifications,”](#) are those within which the switch will continue to operate; however, a measurement that approaches the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental anomalies before they exceed the maximum operating range.

Site-Planning Checklist

Table 2-3 lists the site-planning activities that you should complete before you install a Catalyst 4000 series switch. Completing each activity helps to ensure a successful switch installation.

Table 2-3 Site-Planning Checklist

Task No.	Planning Activity	Verified by	Time	Date
1	Space evaluation: <ul style="list-style-type: none"> • Space and layout • Floor covering • Impact and vibration • Lighting • Maintenance access 			
2	Environmental evaluation: <ul style="list-style-type: none"> • Ambient temperature • Humidity • Altitude • Atmospheric contamination • Airflow 			
3	Power evaluation: <ul style="list-style-type: none"> • Input power type • Receptacle proximity to the equipment • Dedicated (separate) circuits for redundant power supplies • UPS for power failures 			
4	Grounding evaluation: <ul style="list-style-type: none"> • Circuit breaker size 			

Table 2-3 Site-Planning Checklist (continued)

Task No.	Planning Activity	Verified by	Time	Date
5	Cable and interface equipment evaluation: <ul style="list-style-type: none">• Cable type• Connector type• Cable distance limitations• Interface equipment (transceivers)			
6	EMI evaluation: <ul style="list-style-type: none">• Distance limitations for signaling• Site wiring• RFI levels			

