



Site Preparation and Safety Guide

Read this guide before installing or servicing the system.

Note Only trained and qualified service personnel (as defined in IEC 60950 and AS/NZS3260) should install, replace, or service the equipment.



Warning The instructions in this guide warn you about situations that could cause bodily injury. Before working on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Preparing Your Site for Installation

To ensure normal system operation, plan your site configuration and prepare your site before installation.

Choosing a Site for Installation

- Install the system in a restricted access area, where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security.
- Choose a site with a dry, clean, well-ventilated and air-conditioned area.
- Choose a site that maintains an ambient temperature of 32 to 104° F (0 to 40° C).

Ensuring Overcurrent Protection

The system relies on the protective devices in the building installation for protection against short-circuit, overcurrent, and earth (grounding) fault. Ensure that the protective devices in the building installation are properly rated to protect the system, and that they comply with national and local codes.

Grounding the System

- Do not defeat the ground conductor on an AC plug.
- Connect AC-powered systems to grounded power outlets.
- Connect the system to earth (ground).

Creating a Safe Environment

- Keep tools and chassis components off the floor and away from foot traffic.
- Clear the area of possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Keep the area around the chassis free from dust and foreign conductive material (such as metal flakes from nearby construction activity).

Rack-Mounting the System

A rack-mount kit and cable guides come with the system. The kit is not suitable for racks with obstructions (such as a power strip) that could impair access to system components. Allow sufficient clearance around the rack for system maintenance.

Ensuring Proper Airflow

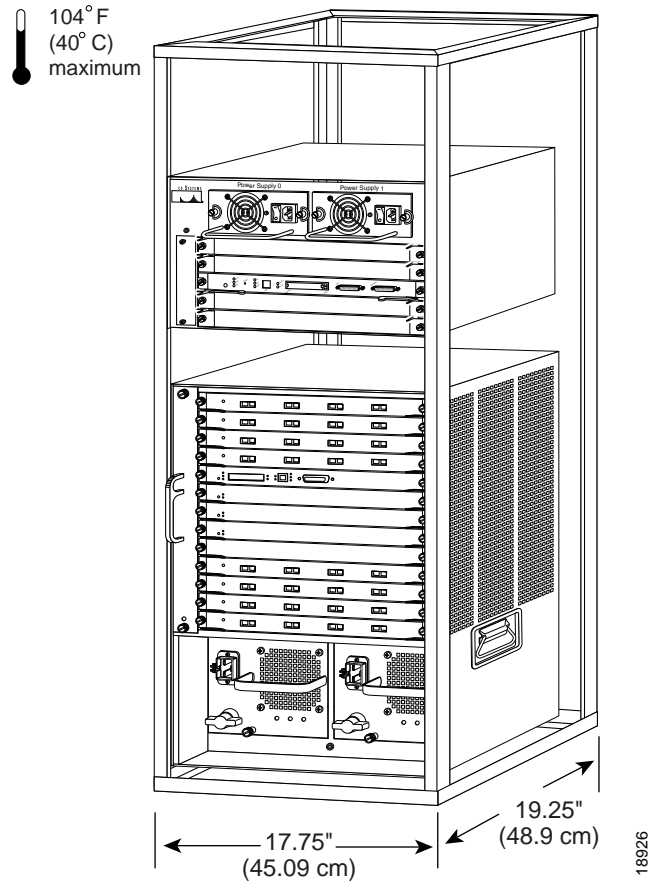
- Install the system in an open rack whenever possible. If installation in an enclosed rack is unavoidable, ensure that the rack has adequate ventilation.
- Maintain ambient airflow to ensure normal operation. If the airflow is blocked or restricted, or if the intake air is too warm, an overtemperature condition can occur.
- Allow at least 6 inches (15.24 cm) of clearance around the ventilation openings of the chassis.
- Avoid placing the system in an overly congested rack or directly next to another equipment rack. Heat exhaust from other equipment can enter the inlet air vents and cause an overtemperature condition.
- Equipment near the bottom of a rack might generate excessive heat that is drawn upward and into the intake ports of the equipment above. The warm air can cause an overtemperature condition in the equipment above.
- Ensure that cables from other equipment do not obstruct the airflow through the chassis or impair access to the power supplies or cards. Route cables away from field-replaceable components to avoid disconnecting cables unnecessarily for equipment maintenance or upgrades.

Stabilizing the System

- Install any stabilizers that came with your equipment rack before mounting or servicing the system in the rack.
- Load the rack from the bottom to the top, with the heaviest system at the bottom.
- Do not stack the system on top of any other equipment. If the system falls, it can cause severe bodily injury and damage the equipment.
- If you are using an equipment shelf, ensure that the shelf is constructed to support the weight and dimensions of the chassis.
- If you are using a telco rack, ensure that the weight of the chassis does not make the rack unstable. Secure the telco rack with ceiling brackets if the rack is populated with heavy equipment.
- Bolt the rack to the floor for stability.

Rack-Mounting the System

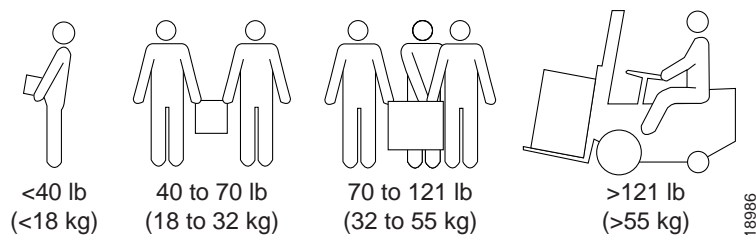
Figure 1 Standard Equipment Rack Dimensions



Lifting the System

- Disconnect all power and external cables before lifting the system.
- Ensure that your footing is solid and the weight of the system is evenly distributed between your feet.
- Lift the system slowly, keeping your back straight. Lift with your legs, not with your back. Bend at the knees, not at the waist.
- Do not attempt to lift the system with the handles on the power supplies or on any of the cards. These handles are not designed to support the weight of the system.
- Depending on the weight of the system, more than one person might be required to lift it.

Figure 2 **Safely Lifting the System**



Power Considerations

AC and DC power supplies, and an optional redundant (second) power supply, are available for most systems.

Note Refer to your hardware installation guide for AC and DC power specifications and for redundant power supply availability.

- Be careful when connecting systems to the supply circuit so that wiring is not overloaded.

AC Power

- The system is designed for connection to TN power systems. A TN power system is a power distribution system with one point connected directly to earth (ground). The exposed conductive parts of the installation are connected to that point by protective earth conductors.
- Ensure that the plug-socket combination is accessible at all times, because it serves as the main disconnecting device.

DC Power

- Connect DC-input power supplies only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in the UL 1950, CSA 950, EN 60950, and IEC 60950 standards.
- Incorporate a readily accessible two-poled disconnect device in the fixed wiring.
- Ensure that power is removed from the DC circuit before installing or removing power supplies. Tape the switch handle of the DC circuit breaker in the off position.
- Use only copper conductors to connect to a DC terminal block.
- Use approved wiring terminations, such as closed-loop or spade-type with upturned lugs, when stranded wiring is required. These terminations should be the appropriate size for the wires and should clamp both the insulation and the conductor.
- Ensure that no exposed portion of the DC-input power source wire extends from the terminal block plug. An exposed wire can conduct a harmful level of electricity.

Redundant Power

If your system includes an optional redundant (second) power supply, connect each of the two power supplies to different input power sources. Failure to do so makes the system susceptible to total power failure in the event that one of the power supplies fails.

Preventing ESD

Electrostatic discharge (ESD) damage occurs when electronic cards or components are mishandled and can result in complete or intermittent failures. Note the following guidelines before you install or service the system:

- Always wear an ESD-preventive wrist or ankle strap when handling electronic components. Connect one end of the strap to an ESD jack or an unpainted metal component on the system (such as a captive installation screw).
- Handle cards by the faceplates and edges only; avoid touching the printed circuit board and connector pins.
- Place any removed component on an antistatic surface or in a static shielding bag.
- Avoid contact between the cards and clothing. The wrist strap only protects the card from ESD voltages on the body; ESD voltages on clothing can still cause damage.

Note For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

Installing and Servicing the System

- Disconnect all power and external cables before installing the system.
- Install the system in compliance with your local and national electrical codes:
 - United States: National Fire Protection Association (NFPA) 70; United States National Electrical Code.
 - Canada: Canadian Electrical Code, Part I, CSA C22.1.
 - Other countries: If local and national electrical codes are not available, refer to IEC 364, Part 1 through Part 7.
- Do not work alone under potentially hazardous conditions.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

- Do not touch the backplane or midplane with your hand or metal tools.
- Remove all jewelry (including rings and chains) or other items that could get caught in the system or heat up and cause serious burns.

Disconnecting Power

- Locate the emergency power-off switch for the room before working with the system.
- Turn off the power and disconnect the power from the circuit when working with components that are not hot-swappable or when working near the system backplane or midplane. If the system does not have an on/off switch, unplug the power cord.
- To completely de-energize the system, disconnect the power connection to all power supplies.
- For DC power supplies, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the off position, and tape the switch handle of the circuit breaker in the off position.
- Do not touch the power supply when the power cord is connected. Line voltages are present within the power supply even when the power switch is off and the power cord is connected.

Working with WAN Interfaces

- Use caution when installing or modifying telephone lines to prevent electric shock.
- Do not work on the system or connect or disconnect cables during periods of lightning activity.
- Do not touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Hazardous network voltages are present in WAN ports regardless of whether power to the system is off or on. When detaching cables, detach the end away from the system first.
- Do not use a telephone (unless it is the cordless type) during an electrical storm.

- Do not use a telephone to report a gas leak in the vicinity of the leak.
- Do not install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

Working with Lasers

- Fiber-optic ports (for example, FDDI, OC-3, OC-12, OC-48, ATM, GBIC, and 100BaseFX) are considered Class 1 laser or Class 1 LED ports.
- These products have been tested and found to comply with Class 1 limits of IEC 60825-1, IEC 60825-2, EN 60825-1, EN 60825-2, and 21CFR1040.
- To avoid exposure to radiation, do not stare into the aperture of a fiber-optic port. Invisible radiation might be emitted from the aperture of the port when no fiber cable is connected.

Figure 3, Figure 4, and Figure 5 show examples of Class 1 laser and LED labels. The smaller labels shown in Figure 3 and Figure 4 usually appear on field-replaceable cards. Or the larger label shown in Figure 5 appears on the chassis.

Figure 3 Class 1 Laser Label for a Single-Mode Fiber Port

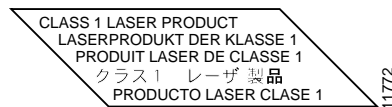


Figure 4 Class 1 LED Label for a Multimode Fiber Port



Figure 5 Class 1 Laser Label for a Chassis



Preventing EMI

When you run wires for any significant distance in an electromagnetic field, electromagnetic interference (EMI) can occur between the field and the signals on the wires.

Note that:

- Bad plant wiring can result in radio frequency interference (RFI).
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in the system, and can even create an electrical hazard by conducting power surges through lines and into the system.

To predict and remedy strong EMI, consult RFI experts.

Covering Empty Slots

Ensure that all cards, faceplates, and covers are in place. Blank faceplates and cover panels are used to:

- Prevent exposure to hazardous voltages and currents inside the chassis
- Help contain electromagnetic interference (EMI) that might disrupt other equipment
- Direct the flow of cooling air through the chassis

Disposing of the System

Dispose of the system and its components (including batteries) as specified by all national laws and regulations.

Disposing of the System
