

# Preparing for Installation

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# Cisco UCS Fabric Interconnect 6664 and Cisco UCS Fabric Interconnect 6652 Preparation

The Cisco UCS 6600 Series Fabric Interconnect product family consists of the following different models.

| Model | Cisco PID | Notes |
|---|---|---|
| Cisco UCS 6664 Fabric Interconnect | UCS-FI-6664 | 2 rack-unit (2U) chassis supporting Ethernet, FCoE, and FC ports. MACsec enabled. |
| Cisco UCS 6652 Fabric Interconnect | UCS-FI-6652 | 1 rack-unit (1U) chassis supporting Ethernet, FCoE, and FC. MACsec enabled. |

Both models of the Cisco 6600 Series Fabric Interconnect have many similarities when you prepare them for installation. However, there are some differences when you prepare each model for installation, primarily due to the different physical form factor of each.

You can assume that installation preparations are the same for each model unless documentation explains otherwise.

# Temperature Requirements

The operating temperature of the fabric interconnect is 32 to 104 degrees Fahrenheit (0 to 40 degrees Celsius). For every 300 meters (1000 feet) above sea level, the maximum temperature is reduced by 1 degree Celsius. The non-operating temperature of the fabric interconnect is -40 to 158 degrees Fahrenheit (-40 to 70 degrees Celsius).

**Overview of Module Temperatures**

Built-in, automatic sensors in the fabric interconnect monitor your fabric interconnect at all times. Each module has temperature sensors with two thresholds:

- Minor temperature threshold—If exceeded, a minor alarm occurs and these actions happen for all four sensors:
  - System messages display.
  - System sends Call Home alerts (if configured).
  - System sends SNMP notifications (if configured).
- Major temperature threshold—If exceeded, a major alarm occurs and these actions happen:

  For sensors 1, 3, and 4 (outlet and onboard sensors):
  - System messages display.
  - System sends Call Home alerts (if configured).
  - System sends SNMP notifications (if configured).

  For sensor 2 (intake sensor):
  - If the threshold is exceeded on a module, only that module is shut down.
  - If you do not have a standby supervisor module in your fabric interconnect, you have 2 minutes to decrease the temperature. During this interval, the software monitors the temperature every 5 seconds and continuously sends system messages, as configured.

# Humidity Requirements

High humidity can cause moisture to enter the fabric interconnect. Moisture can cause corrosion of internal components and degradation of properties such as electrical resistance, thermal conductivity, physical strength, and size. The fabric interconnect is rated to withstand from 5- to 95-percent (nonoperating) and 5- to 90-percent (operating) relative humidity.

Climate-controlled buildings usually maintain an acceptable level of humidity for the fabric interconnect equipment. If the fabric interconnect is located in an unusually humid location, use a dehumidifier to maintain the humidity within an acceptable range.

# Altitude Requirements

For every 1000 feet (300 meters) elevation, the maximum ambient temperature is reduced by one degree Celsius.

# Dust and Particulate Requirements

Exhaust fans cool power supplies. System fans cool fabric interconnects by drawing in air and exhausting air out through various openings in the chassis. Fans also introduce dust and other particles, causing contaminant buildup in the fabric interconnect and increased internal chassis temperature. Dust and particles can act as insulators and interfere with the mechanical components in the fabric interconnect. Keep a clean operating environment to reduce the negative effects of dust and other particles.

In addition to keeping your environment free of dust and particles, use these precautions to avoid contamination of your fabric interconnect:

- Do not smoke near the fabric interconnect.
- Do not eat or drink near the fabric interconnect.

# Minimizing Electromagnetic and Radio Frequency Interference

Electromagnetic interference (EMI) and radio frequency interference (RFI) from the fabric interconnect can adversely affect other devices, such as radio and television (TV) receivers. Radio frequencies that emanate from the fabric interconnect can also interfere with cordless and low-power telephones. Conversely, RFI from high-power telephones can cause spurious characters to appear on the fabric interconnect monitor.

RFI is defined as any EMI with a frequency above 10 kHz. This type of interference can travel from the fabric interconnect to other devices through connecting cables, the power cable and power source, or through the air as transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI that are emitted by computing equipment. Each fabric interconnect meets these FCC regulations.

To reduce the possibility of EMI and RFI, use these guidelines:

- Cover all open expansion slots with a blank filler plate.
- Always use shielded cables with metal connector shells for attaching peripherals to the fabric interconnect.

When wires are run for any significant distance in an electromagnetic field, interference can occur to the signals on the wires with these implications:

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

**Note** To predict and prevent strong EMI, consult experts in radio frequency interference (RFI).

The wiring is unlikely to emit radio interference if you use a twisted-pair cable with a good distribution of grounding conductors. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal, when applicable.

**Caution** If the wires exceed the recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse that is caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic fabric interconnect. Consult experts in electrical surge suppression and shielding if you have had similar problems in the past.

# Shock and Vibration Requirements

The fabric interconnect has been shock- and vibration-tested for operating ranges, handling, and earthquake standards.

# Grounding Requirements

The fabric interconnect is sensitive to variations in voltage that is supplied by the power sources. Overvoltage, undervoltage, and transients (spikes) can erase data from memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the fabric interconnect. Connect the grounding pad on the fabric interconnect either directly to the earth-ground connection or to a fully bonded and grounded rack.

When the chassis is properly installed in a grounded rack, the fabric interconnect is grounded because it has a metal-to-metal (no paint, stain, dirt, or anything else on it) connection to the rack. Alternatively, ground the chassis by using a customer-supplied grounding cable that meets your local and national installation requirements. For U.S. installations, we recommend 6-AWG wire. Connect your grounding cable to the chassis with a grounding lug (provided in the fabric interconnect accessory kit) and to the facility ground.

**Note** Create an electrical conducting path between the product chassis and the metal surface of the enclosure, or rack in which it is mounted, or to a grounding conductor. Provide electrical continuity by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Remove any paint or other non-conductive coatings on the surfaces between the mounting hardware and the enclosure or rack. Clean the surfaces and apply an antioxidant before installation.

# Planning for Power Requirements

The fabric interconnect includes two 1400W AC power supplies with 1-to-1 redundancy and current sharing.

**Note** For 1+1 redundancy, you must use two power sources and connect each power supply to a separate power source.

The power supplies are rated to output up to 1400 W (AC power supplies) but the fabric interconnect requires less than those amounts of power from the power supply. To operate the fabric interconnect, you must provision enough power from the power source to cover the requirements of both the fabric interconnect and a power supply. Typically, this fabric interconnect and a power supply require 605 W of power input from the power source, but you must provision as much as 1100 W power input from the power source to cover peak demand.

**Note** Some of the power supply modules have rating capabilities that exceed the fabric interconnect requirements. When calculating your power requirements, use the fabric interconnect requirements to determine the amount of power that is required for the power supplies.

To minimize the possibility of circuit failure, verify that each power-source circuit that is used by the fabric interconnect is dedicated to the fabric interconnect.

# Airflow Requirements

The fabric interconnect is positioned with its ports in either the front or the rear of the rack, depending on your cabling and maintenance requirements. To identify the airflow options for your fabric interconnect, see the user-replaceable components in the *Overview* section of this document. Position the fan and power supply modules to move the coolant air from the cold aisle to the hot aisle so that cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle.

You can identify the airflow direction of each fan and power supply module by its coloring; blue coloring indicates port-side exhaust airflow.

**Note** To prevent the fabric interconnect from overheating and shutting down, position the air intake for the fabric interconnect in a cold aisle. The fan and power supply modules must have the same direction of airflow. To change the airflow direction for the fabric interconnect, shut down the fabric interconnect before changing the modules.

# Rack and Cabinet Requirements

Install these types of racks or cabinets for your fabric interconnect:

- Standard perforated cabinets
- Solid-walled cabinets with a roof fan tray (bottom-to-top cooling)
- Standard open four-post Telco racks

Work with your cabinet vendors to determine which of their cabinets meet these requirements or see the Cisco Technical Assistance Center (TAC) for recommendations:

- Use a standard 19-inch (48.3-cm), four-post Electronic Industries Alliance (EIA) cabinet or rack with mounting rails that conform to English universal hole spacing per section 1 of the ANSI/EIA-310-D-1992 standard.
- The depth of a four-post rack must be 24 to 32 inches (61.0 to 81.3 cm) between the front and rear mounting rails (for proper mounting of the bottom-support brackets or other mounting hardware).

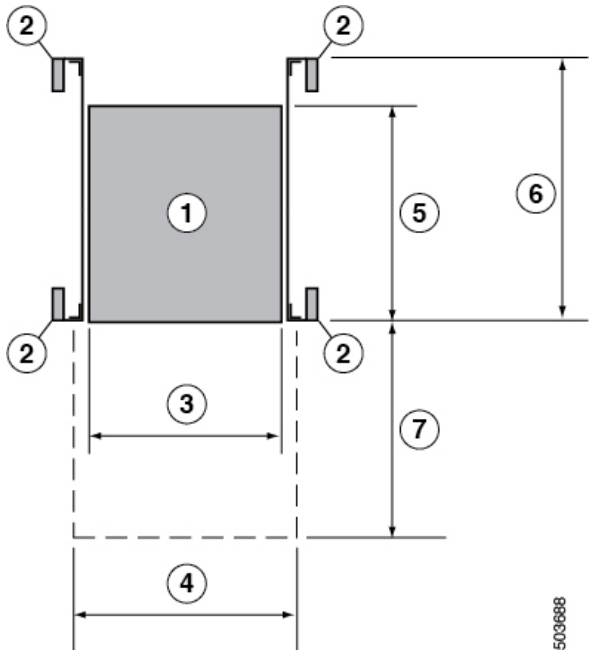
Also, you must have power receptacles that are located within reach of the power cords that are used with the fabric interconnect.

**Warning** **Statement 1048—**Rack Stabilization

The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before installation or servicing. Failure to stabilize the rack can cause bodily injury.

# Clearance Requirements

Provide the chassis with adequate clearance between the chassis and any other rack, device, or structure so that you can properly install the system. Provide the chassis with adequate clearance to route cables, provide airflow, and maintain the fabric interconnect. For the clearances required for an installation of this chassis in a four-post rack, see the figure.




| | | | |
|---|---|---|---|
| 1 | Chassis | 5 | Depth of the chassis |

| | | | |
|---|---|---|---|
| 2 | Vertical rack-mount posts and rails | 6 | Maximum extension of the bottom-support rails<br>36.0 in (91.0 cm) |
| 3 | Chassis width<br>17.3 in (43.9 cm) | 7 | Depth of the front clearance area (equal to the depth of the chassis). |
| 4 | Width of the front clearance area (equal to the width of the chassis with two rack-mount brackets that are attached to it).<br>19.0 in (43.3 cm) | | |

**Note** Both the front and rear of the chassis must be open to both aisles for airflow.

# Cautions and Regulatory Compliance Statements for NEBS

The regulatory compliance statements and requirements for the Network Equipment Building System (NEBS) certification are listed here.

**Warning** The intrabuilding port(s) of the equipment or subassembly must use shielded intrabuilding cabling/wiring that is grounded at both ends.

The following port(s) are considered intrabuilding ports on this equipment:

- RJ-45 Copper Ethernet Ports

**Note** To comply with the emission and immunity requirements of GR-1089, shielded cables are required for the following ports:

- RJ-45 Copper Ethernet Ports

**Warning** The intrabuilding port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring for more than 6 meters (approximately 20 feet). These interfaces are designed for use as intrabuilding interfaces only (Type 2, 4, or 4a ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metallically to an OSP wiring system.

The following ports are considered intrabuilding ports on the equipment:

- RJ-45 Copper Ethernet Ports

**Note** This equipment is suitable for installations using the CBN.

**Note** The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

**Note** This equipment is suitable for installation in network telecommunications facilities.

**Note** This equipment is suitable for installation in locations where the NEC applies.

**Warning** Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments, for example, eye loupes, magnifiers, and microscopes, within a distance of 100 mm, may pose an eye hazard.

**Warning** Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019.

# Statement 1055—Class 1/1M Laser

**Warning** Invisible laser radiation is present. Do not expose to users of telescopic optics. This applies to Class 1/1M laser products.




# Statement 1056—Unterminated Fiber Cable

**Warning** Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments, for example, eye loupes, magnifiers, and microscopes, within a distance of 100 mm, may pose an eye hazard.

| Fiber Type and Core Diameter (μm) | Wavelength (nm) | Maximum Power (mW) | Beam Divergence (rad) |
|---|---|---|---|
| SM 11 | 1200-1400 | 39-50 | 0.1-0.11 |
| MM 62.5 | 1200-1400 | 150 | 0.18 NA |
| MM 50 | 1200-1400 | 135 | 0.17 NA |
| SM 11 | 1400-1600 | 112-145 | 0.11-0.13 |

# Statement 1051—Laser Radiation



**Warning** Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.