



Cisco Nexus 2000 Series Hardware Installation Guide

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Cisco Nexus 2000 Series Fabric Extender

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Preface

This preface describes the audience, organization, and conventions of the *Cisco Nexus 2000 Series Hardware Installation Guide*. It also provides information on how to obtain related documentation.

This preface includes the following sections:

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Audience

To use this installation guide, you must be familiar with electronic circuitry and wiring practices and preferably be an electronic or electromechanical technician.

Organization

This guide is organized as follows:

| Chapter and Title | Description |
|--|--|
| Chapter 1, “Using a Fabric Extender with a Cisco Nexus 5000 Series Switch” | Provides an overview of the Cisco Nexus 2000 Series Fabric Extenders and their components as used with the Cisco Nexus 5000 Series switches. |
| Chapter 2, “Using a Fabric Extender with a Cisco Nexus 7000 Series Switch” | Provides an overview of the Cisco Nexus 2000 Series Fabric Extenders and their components as used with the Cisco Nexus 7000 Series switches. |
| Chapter 3, “Installing a Cisco Nexus 2000 Series Fabric Extender” | Describes how to install the Cisco Nexus 2000 Series Fabric Extenders, and how to install modules, power supplies, and fan assemblies. |
| Chapter 4, “Connecting a Cisco Nexus 2000 Series Fabric Extender” | Describes how to connect the Cisco Nexus 2000 Series Fabric Extenders, including the modules. |

| Chapter and Title | Description |
|--|--|
| Appendix A, “ Cabinet and Rack Installation ” | Provides guidelines for selecting an enclosed cabinet, and a procedure for installing a switch using the optional and EIA Shelf Bracket Kit. |
| Appendix B, “ Technical Specifications ” | Lists specifications for the Cisco Nexus 2000 Series Fabric Extenders and components including modules, power supplies, and transceivers. |
| Appendix C, “ Cable and Port Specifications ” | Lists cable and port specifications for the Cisco Nexus 2000 Series Fabric Extenders. |
| Appendix D, “ LEDs ” | Describes the conditions indicated by the chassis and module LEDs on the Cisco Nexus 2000 Series Fabric Extenders. |
| Appendix E, “ Troubleshooting Hardware Components ” | Provides troubleshooting information for the Cisco Nexus 2000 Series Fabric Extenders. |
| Appendix F, “ Accessory Kit ” | Lists the accessory kit contents for the Cisco Nexus 2000 Series Fabric Extenders. |
| Appendix G, “ Site Preparation and Maintenance Records ” | Provides site preparation information for the Cisco Nexus 2000 Series Fabric Extenders. |

Conventions

This document uses the following conventions for notes, cautions, and safety warnings.

Notes and Cautions contain important information that you should be aware of.



Note

Means *reader take note*. Notes contain helpful suggestions or references to material that are not covered in the publication.



Caution

Means *reader be careful*. You are capable of doing something that might result in equipment damage or loss of data.

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, can cause physical injuries. A warning symbol precedes each warning statement.



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelyyn liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI**Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE**Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES**¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES**Varning! VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告 重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

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이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES**Advarsel VIGTIGE SIKKERHEDSANVISNINGER**

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskade. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE**Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY**

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

הזרה

הוראות בטיחות חשובות

סימן הזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במגעלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל הזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОБИЕ НАПАТСТВИЈА

Ostrzeżenie WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhladajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Opozorilo **POMEMBNI VARNOSTNI NAPOTKI**

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitevno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!**警告****重要安全性指示**

此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。請妥善保留此指示

Related Documentation

Documentation for Cisco MDS 9200 Series Switches and Cisco Nexus 2000 Series Fabric Extenders is available at the following URL:

http://www.cisco.com/en/US/products/ps9670/tsd_products_support_series_home.html

The following are related Cisco MDS 9200 Series and Cisco Nexus 2000 Series Fabric Extender documents:

Release Notes

Cisco Nexus 5000 Series and Cisco Nexus 2000 Series Release Notes

Cisco Nexus 5000 Series Switch Release Notes

Configuration Guides

Cisco Nexus 5000 Series Configuration Limits for Cisco NX-OS Release 5.0(2)N1(1)

Cisco Nexus 5000 Series Configuration Limits for Cisco NX-OS Release 4.2(1)N1(1) and Release 4.2(1)N2(1)

Cisco Nexus 5000 Series NX-OS Fibre Channel over Ethernet Configuration Guide

Cisco Nexus 5000 Series NX-OS Layer 2 Switching Configuration Guide

Cisco Nexus 5000 Series NX-OS Multicast Routing Configuration Guide

Cisco Nexus 5000 Series NX-OS Quality of Service Configuration Guide

Cisco Nexus 5000 Series NX-OS SAN Switching Configuration Guide

Cisco Nexus 5000 Series NX-OS Security Configuration Guide

Cisco Nexus 5000 Series NX-OS System Management Configuration Guide
Cisco Nexus 5000 Series NX-OS Unicast Routing Configuration Guide
Cisco Nexus 5000 Series Switch NX-OS Software Configuration Guide
Cisco Nexus 5000 Series Fabric Manager Configuration Guide, Release 3.4(1a)
Cisco Nexus 7000 Series NX-OS Fundamentals Configuration Guide, Release 4.2
Cisco Nexus 2000 Series Fabric Extender Software Configuration Guide

Maintain and Operate Guides

Cisco Nexus 5000 Series NX-OS Operations Guide

Installation and Upgrade Guides

Cisco Nexus 5000 Series and Cisco Nexus 5500 Platform Hardware Installation Guide
Cisco Nexus 2000 Series Hardware Installation Guide
Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide, Release 4.2(1)N1(1)
Regulatory Compliance and Safety Information for the Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders

Licensing Guide

Cisco NX-OS Licensing Guide

Command References

Cisco Nexus 5000 Series Command Reference

Technical References

Cisco Nexus 5000 Series and Cisco Nexus 2000 Series Fabric Extender MIBs Reference

Error and System Messages

Cisco NX-OS System Messages Reference

Troubleshooting Guide

Cisco Nexus 5000 Troubleshooting Guide

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.



CHAPTER 1

Using a Fabric Extender with a Cisco Nexus 5000 Series Switch

This chapter describes the Cisco Nexus 2000 Series Fabric Extenders (FEXs) and includes these sections:

- [Information About Using a Fabric Extender with a Cisco Nexus 5000 Series Switch, page 1-1](#)
- [Cisco Nexus 2248TP-E, page 1-1](#)
- [Cisco Nexus 2248TP, page 1-10](#)
- [Cisco Nexus 2248PQ, page 1-17](#)
- [Cisco Nexus 2232TM-10GE, Cisco NexusN2K-C2232TM-E-10GE, page 1-21](#)
- [1Cisco Nexus 2224TP, page 1-27](#)
- [1Cisco Nexus 2224TP, page 1-27](#)
- [Cisco Nexus 2148T, page 1-31](#)

Information About Using a Fabric Extender with a Cisco Nexus 5000 Series Switch

The Cisco Nexus 2000 Series Fabric Extenders (FEXs) support Gigabit Ethernet and 10-Gigabit Ethernet environments while allowing transparent migration to 10-Gigabit Ethernet virtual machine aware unified fabric technologies. The Cisco Nexus 2000 Series FEXs behave as remote I/O modules for a parent Cisco Nexus 5000 Series switch. The FEX is an extension of the parent Cisco Nexus switch fabric, with the FEX and the parent Cisco Nexus switch together forming a virtual modular system.

A Cisco Nexus 2000 Series FEX forwards all the traffic to the parent Cisco Nexus 5000 Switch over 10-Gigabit Ethernet uplinks. Passing all traffic to the parent switch allows traffic to be shaped according to policies established on the parent Cisco Nexus 5000 Series switch with a single point of management.

Cisco Nexus 2248TP-E

The Cisco Nexus 2248TP-E is a stackable 1 RU 17.2-inch (45 cm) deep FEX that supports 48 1000-TX host-facing (downlink) ports and 4 10-Gigabit SFP+ network-facing (uplink) ports. You can order it with front-to-back or back-to-front air cooling, and with AC or DC power supplies.

You can use this FEX with the Cisco Nexus 5000 Series switch. The Cisco Nexus 2248TP-E is managed and configured by the upstream switch. The FEX software ships with the Cisco Nexus 5000 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

This section includes the following topics:

- [Chassis, page 1-2](#)
- [Ports, page 1-3](#)
- [Power Supplies, page 1-3](#)
- [Fan Trays, page 1-7](#)
- [Supported Transceivers and Cables, page 1-9](#)

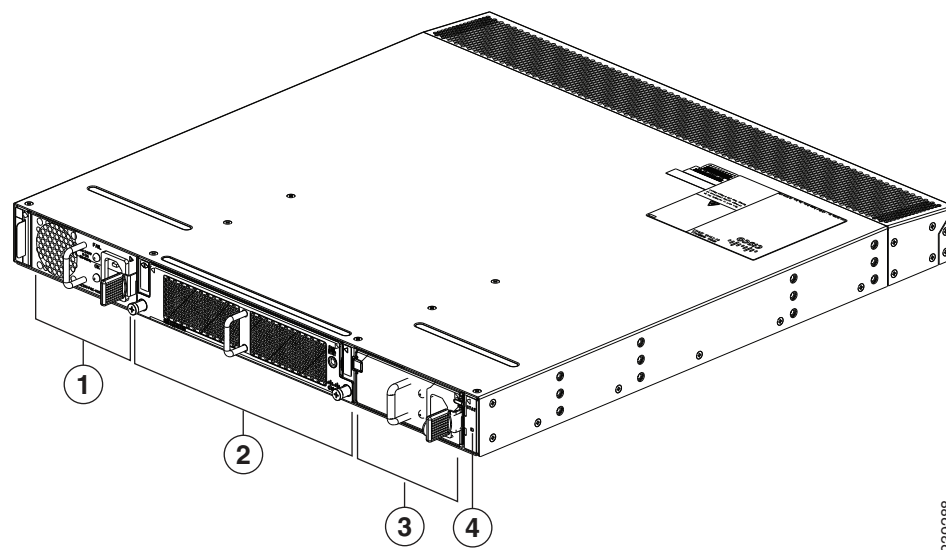
Chassis

The Cisco Nexus 2248TP-E FEX chassis has a height of 1.72 inches (4.37 cm), a width of 17.3 inches (43.94 cm), and a depth of 17.7 inches (44.96 cm). It weighs 17.7 pounds (8.0 kg). Its one-rack-unit (1 RU) form factor takes up relatively little space, making it easy to incorporate into rack designs. The FEX is mounted in a standard 19-inch (48.26 cm) rack. All switch ports at the rear of the unit are in close proximity to server ports, and all user-serviceable components are accessible from the front panel.

You can order it with front-to-back or back-to-front air cooling, and with AC or DC power supplies. If you are going to install the chassis with its front end facing the cold aisle, you must order the chassis with front-to-back air flow. If you are going to install the chassis with its back end facing the cold aisle, you must order the chassis with back-to-front airflow.

[Figure 1-1](#) shows the location of the components found on the front of the chassis, and [Figure 1-2](#) shows the location of components found on the rear of the chassis. For information on what the chassis and component LEDs indicate, see [Table D-1 on page D-2](#).

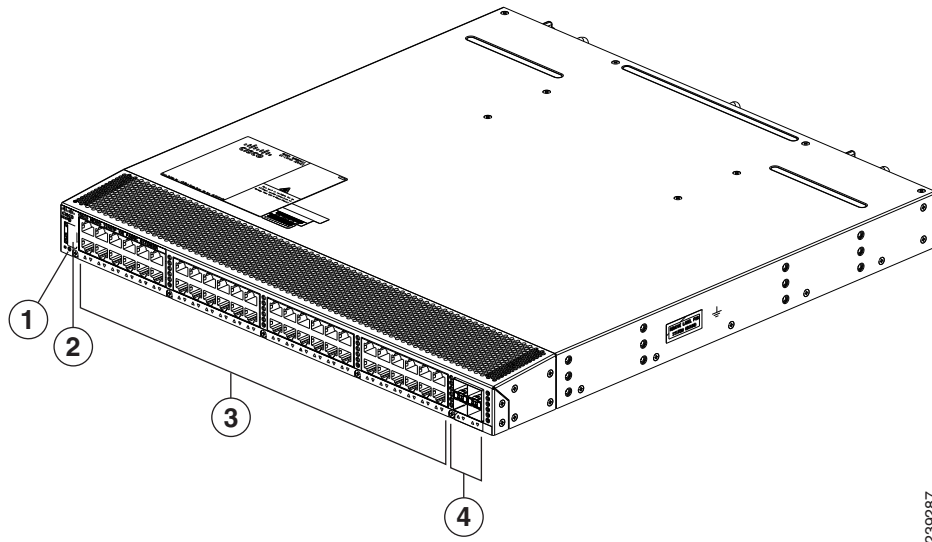
Figure 1-1 Front View of the Cisco Nexus 2248TP-E Chassis



239288

| | | | |
|---|--------------|---|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

Figure 1-2 Rear View of the Cisco Nexus 2248TP-E Chassis



239287

| | | | |
|---|-----------------------------------|---|------------------------------|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000 downlink ports (48) |
| 2 | HDMI port | 4 | SFP+ uplink ports (four) |

Ports

The Cisco Nexus 2248TP-E FEX supports a total of 48 100/1000BASE-T ports and four 10-Gigabit Ethernet uplinks (SFP+). It provides two types of ports: host-facing downlink ports and network-facing uplink ports. Uplink ports are colored with yellow for connectivity to the upstream parent Cisco Nexus 5000 Series switch.

Power Supplies

The Cisco Nexus 2248TP-E FEX chassis has two bays for front-end AC or DC power supplies. This chassis is fully functional with one power supply, but you can install a second power supply for power redundancy. The power supply is hot swappable during operations.

[Table 1-1](#) lists the power supplies that you can order with the Cisco Nexus 2248TP-E FEX.

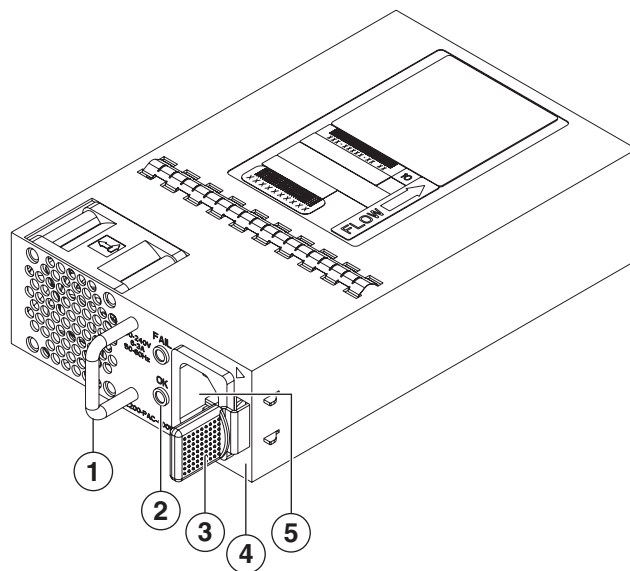
Table 1-1 Power Supplies for the Cisco Nexus 2200 Platform Chassis

| Power Supply | Part Number |
|--|------------------|
| AC power supply with front-to-back airflow | N2200-PAC-400W |
| AC power supply with back-to-front airflow | N2200-PAC-400W-B |

Table 1-1 Power Supplies for the Cisco Nexus 2200 Platform Chassis

| Power Supply | Part Number |
|---|------------------|
| DC power supply with front-to-back airflow | N2200-PDC-400W |
| DC power supply with with back-to-front airflow | N2200-PDC-350W-B |

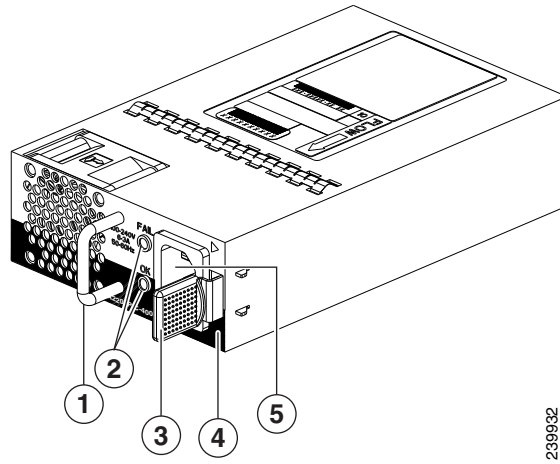
Figure 1-3 shows an AC power supply with front-to-back airflow. Figure 1-4 shows an AC power supply with back-to-front airflow. Figure 1-5 shows a DC power supply with front-to-back airflow. Figure 1-6 shows a DC power supply with back-to-front airflow.

Figure 1-3 AC Power Supply with Front-to-Back Airflow for the Cisco Nexus 2200 Platform Chassis

239843

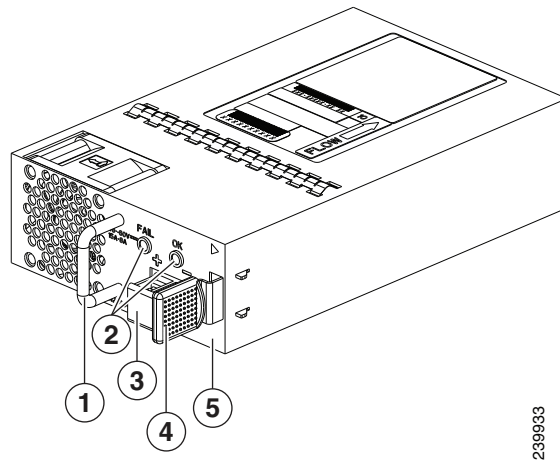
| | | | |
|---|---------------------------------|---|---|
| 1 | Handle | 4 | No black stripe (front-to-back airflow) |
| 2 | FAIL (top) and OK (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

Figure 1-4 AC Power Supply with Back-to-Front Airflow for the Cisco Nexus 2200 Platform Chassis



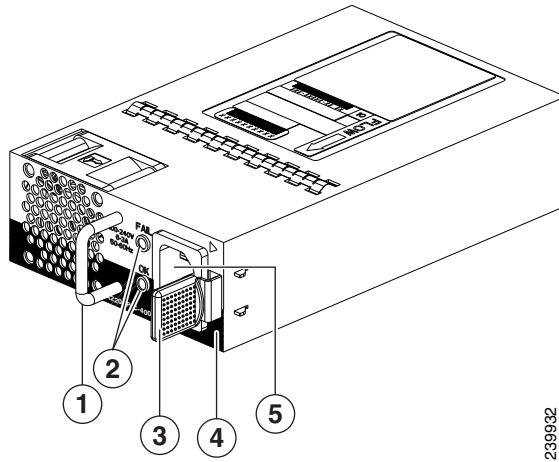
| | | | |
|----------|---------------------------------|----------|--------------------------------------|
| 1 | Handle | 4 | Black stripe (back-to-front airflow) |
| 2 | FAIL (top) and OK (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

Figure 1-5 DC Power Supply for the Cisco Nexus 2200 Platform Chassis



| | | | |
|----------|---------------------------------|----------|---|
| 1 | Handle | 4 | Ejector latch |
| 2 | FAIL (left) and OK (right) LEDs | 5 | No black stripe (front-to-back airflow) |
| 3 | DC power receptacle | | |

Figure 1-6 DC Power Supply with Back-to-Front Airflow for the Cisco Nexus 2200 Platform Chassis



| | | | |
|----------|---------------------------------|----------|--------------------------------------|
| 1 | Handle | 4 | Black stripe (back-to-front airflow) |
| 2 | FAIL (top) and OK (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

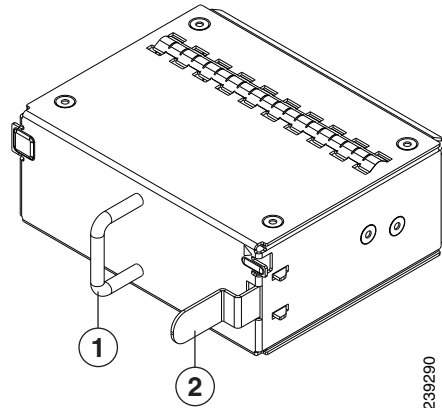
You can order the Cisco Nexus 2248TP-E FEX with AC power supplies that have front-to-back or back-to-front airflow for cooling or DC power supplies that offer front-to-back airflow. The back-to-front airflow components have a black stripe on their front surface for easy visual identification. The front-to-back airflow components do not have a black stripe.



Caution

Be sure that all of the power supply and fan tray modules in the same chassis have the same airflow direction and that the air intake for those modules is positioned on a cool aisle. If you install a module that uses a different direction of airflow from the other modules in your system, you will see an error message. If you position a chassis with its modules taking cooling air from a warm aisle, the switch can reach an overtemperature state and shut down.

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel (part number N2200-P-BLNK) to cover the empty slot. [Figure 1-7](#) shows a blank power supply filler panel.

Figure 1-7 Blank Power Supply Filler Panel for the Cisco Nexus 2200 Platform Chassis

| | | | |
|----------|--------|----------|---------------|
| 1 | Handle | 2 | Ejector latch |
|----------|--------|----------|---------------|

For power supply specifications, see the “[Power Specifications](#)” section on page B-1. To replace a power supply, see the “[Removing and Installing Power Supplies](#)” section on page 3-17. For LED descriptions, see [Table D-1](#) on page D-2.

Fan Trays

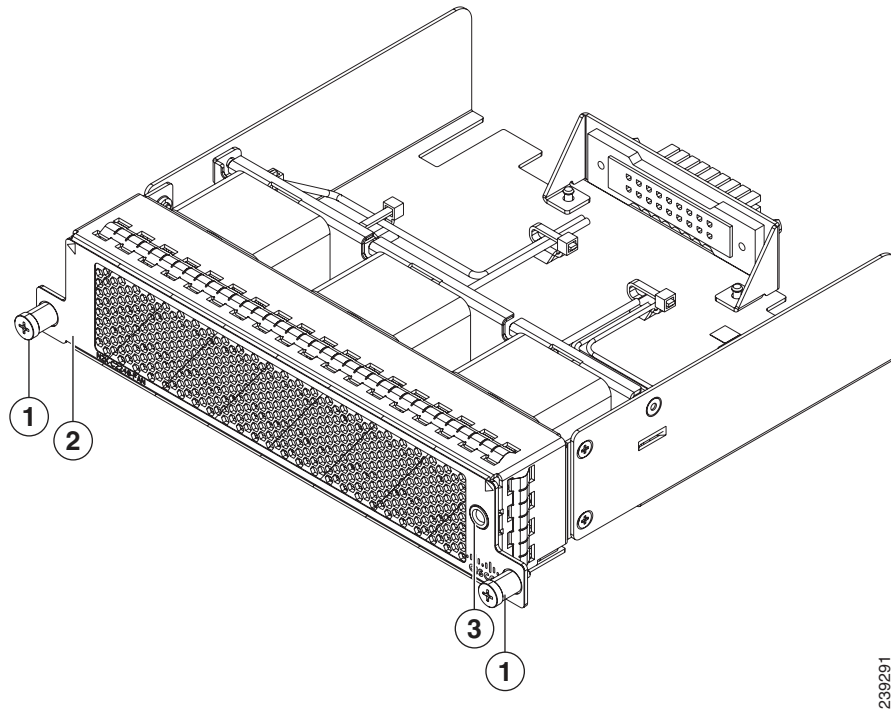
The Cisco Nexus 2248TP-E FEX has one fan tray that is hot swappable during operations. Depending on the arrangement of hot and cold aisles in your data center, you can order front-to-back airflow to position the front of the FEX chassis in a cold aisle or back-to-front airflow to position the back of the FEX chassis in a cold aisle. [Table 1-2](#) lists the part numbers for each of the fan trays that you can use with the Cisco Nexus 2248TP-E chassis.

Table 1-2 Fan Trays for the Cisco Nexus 2248TP-E FEXs

| Description | Part Number |
|-----------------------|-------------------|
| Front-to-back airflow | N2K-C2248TP-FAN |
| Back-to-front airflow | N2K-C2248TP-FAN-B |

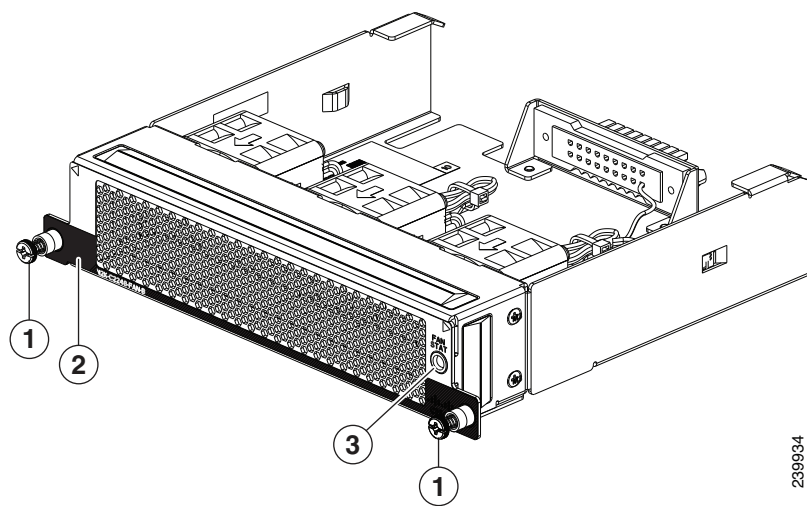
[Figure 1-8](#) shows a front-to-back airflow fan tray, and [Figure 1-9](#) shows a back-to-front airflow fan tray.

Figure 1-8 Front-to-Back Airflow Fan Tray Components for the Cisco Nexus 2248TP-E and 224TP FEXs



| | | | |
|----------|---|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | No black stripe indicates front-to-back airflow | | |

Figure 1-9 Back-to-Front Airflow Fan Tray for the Cisco Nexus 2248TP-E FEX



| | | | |
|----------|--|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | Black stripe indicates back-to-front airflow | | |

To replace a fan tray, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20. For LED descriptions, see [Table D-1](#) on page D-2.

Supported Transceivers and Cables

The Cisco Nexus 2248TP-E FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [SFP Transceivers, page 1-16](#)
- [SFP+ Copper Cables, page 1-17](#)

SFP Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2248TP-E FEX supports the short-range SFP and long-range SFP transceiver. [Table 1-3](#) describes the SFP+ transceivers used with the Cisco Nexus 2248TP-E FEX.

Table 1-3 SFP Transceivers for the Cisco Nexus 2248TP-E FEX

| Model | Description |
|--------------------|---|
| N2200 FET | 10-Gigabit Ethernet for connections with a Cisco Nexus 5000 Series switch |
| SFP-10-Gigabit -SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10-Gigabit -LR | 10-Gigabit Ethernet—long range SFP+ module |

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-4](#) lists the available cables and provides a brief description of the cables.

Table 1-4 Copper Cables for the Cisco Nexus 2248TP-E FEX

| Model | Description |
|----------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |

Cisco Nexus 2248TP

The Cisco Nexus 2248TP is a stackable 1 RU 17.2-inch (45 cm) deep FEX that supports 48 1000-TX host-facing (downlink) ports and 4 10-Gigabit SFP+ network-facing (uplink) ports. You can order it with front-to-back or back-to-front air cooling, and with AC or DC power supplies.

You can use this FEX with the Cisco Nexus 5000 Series switch. The Cisco Nexus 2248TP is managed and configured by the upstream switch. The FEX software ships with the Cisco Nexus 5000 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

This section includes the following topics:

- [Chassis, page 1-10](#)
- [Ports, page 1-12](#)
- [Power Supplies, page 1-12](#)
- [Fan Tray, page 1-15](#)
- [Supported Transceivers and Cables, page 1-16](#)

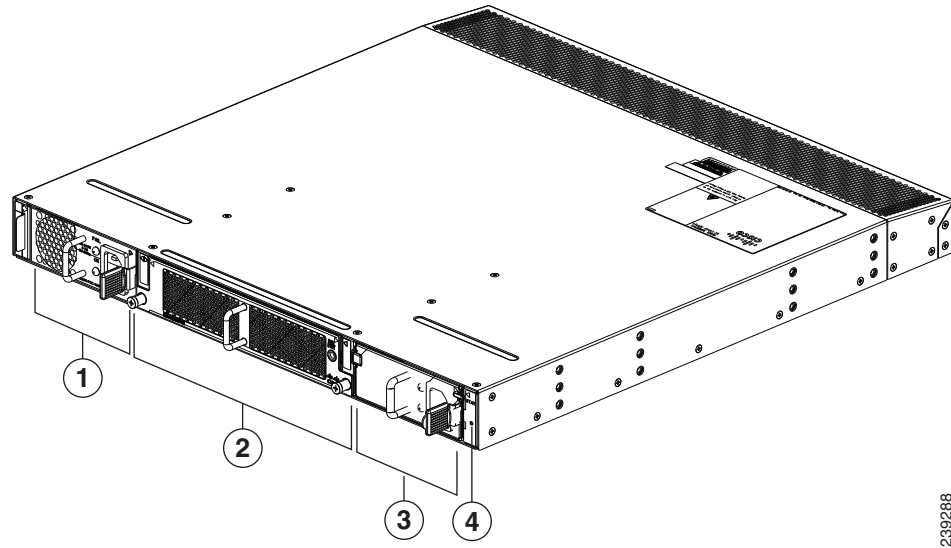
Chassis

The Cisco Nexus 2248TP FEX chassis has a height of 1.72 inches (4.37 cm), a width of 17.3 inches (43.94 cm), and a depth of 17.7 inches (44.96 cm). It weighs 17.7 pounds (8.0 kg). Its one-rack-unit (1 RU) form factor takes up relatively little space, making it easy to incorporate into rack designs. The FEX is mounted in a standard 19-inch (48.26 cm) rack. All switch ports at the rear of the unit are in close proximity to server ports, and all user-serviceable components are accessible from the front panel.

You can order it with front-to-back or back-to-front air cooling, and with AC or DC power supplies. If you are going to install the chassis with its front end facing the cold aisle, you must order the chassis with front-to-back airflow. If you are going to install the chassis with its back end facing the cold aisle, you must order the chassis with back-to-front airflow.

[Figure 1-10](#) shows the location of the components found on the front of the chassis, and [Figure 1-11](#) shows the location of components found on the rear of the chassis. For information on what the chassis and component LEDs indicate, see [Table D-1 on page D-2](#).

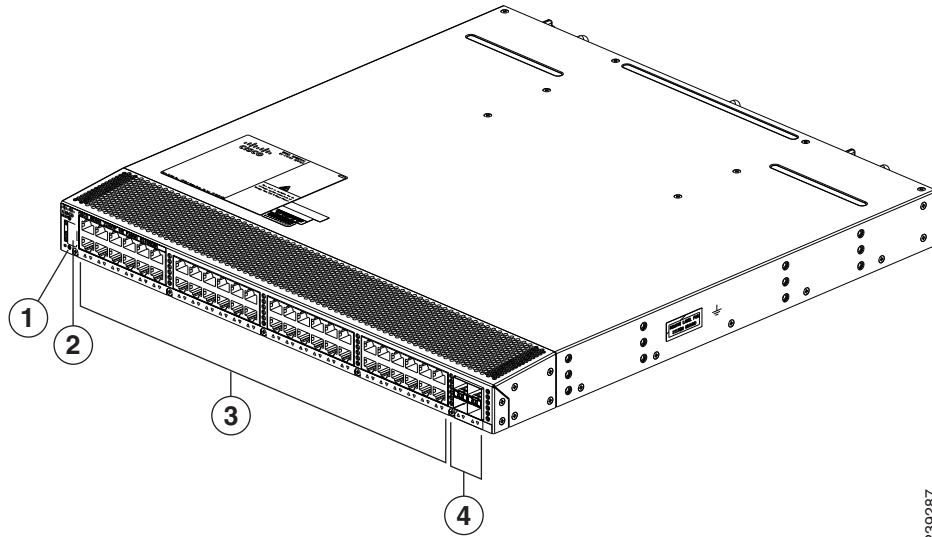
Figure 1-10 Front View of the Cisco Nexus 2248TP Chassis



239288

| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

Figure 1-11 Rear View of the Cisco Nexus 2248TP Chassis



239287

| | | | |
|----------|-----------------------------------|----------|------------------------------|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000 downlink ports (48) |
| 2 | HDMI port | 4 | SFP+ uplink ports (four) |

Ports

The Cisco Nexus 2248TP FEX supports a total of 48 100/1000BASE-T ports and four, 10-Gigabit Ethernet uplinks (SFP+). It provides two types of ports: host-facing downlink ports and network-facing uplink ports. Uplink ports are differentiated with yellow for connectivity to the upstream parent Cisco Nexus 5000 Series switch.

Power Supplies

The Cisco Nexus 2248TP FEX chassis has two bays for front-end AC or DC power supplies. This chassis is fully functional with one power supply, but you can install a second power supply for power redundancy. The power supply is hot swappable during operations.

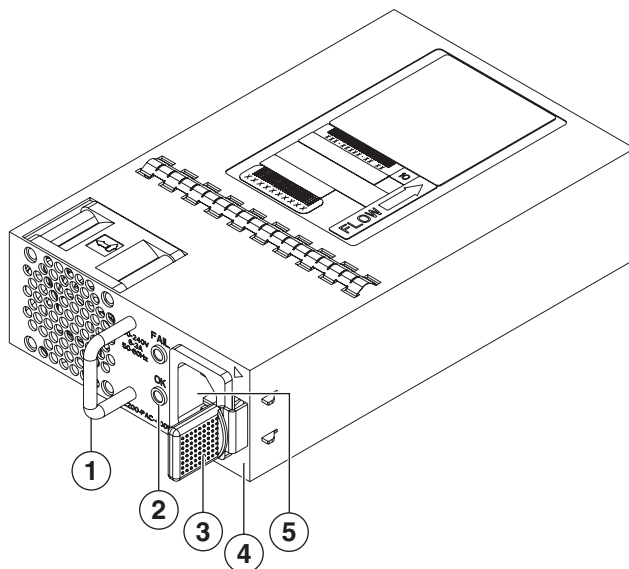
[Table 1-5](#) lists the power supplies that you can order with the Cisco Nexus 2248TP FEX.

Table 1-5 Power Supplies for the Cisco Nexus 2200 Platform Chassis

| Power Supply | Part Number |
|--|------------------|
| AC power supply with front-to-back airflow | N2200-PAC-400W |
| AC power supply with back-to-front airflow | N2200-PAC-400W-B |
| DC power supply with front-to-back airflow | N2200-PDC-400W |
| DC power supply with back-to-front airflow | N2200-PDC-350W-B |

[Figure 1-12](#) shows an AC power supply with front-to-back airflow. [Figure 1-13](#) shows an AC power supply with back-to-front airflow. [Figure 1-14](#) shows a DC power supply with front-to-back airflow.

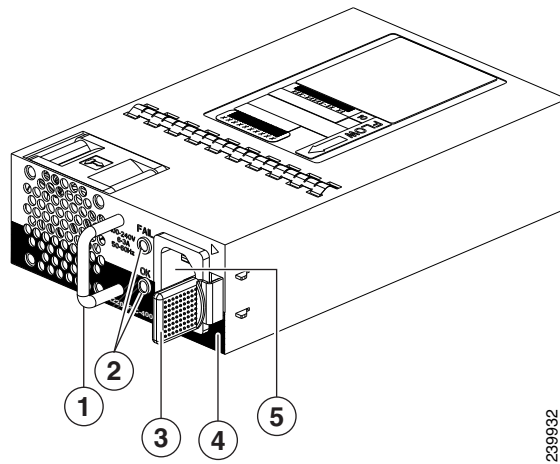
Figure 1-12 AC Power Supply with Front-to-Back Airflow for the Cisco Nexus 2200 Platform Chassis



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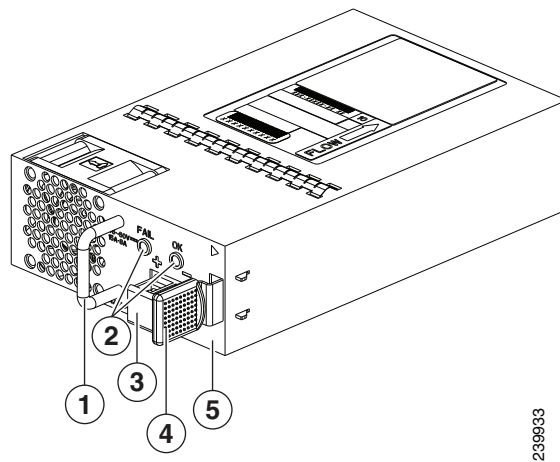
| | | | |
|---|----------------------------------|---|---|
| 1 | Handle | 4 | No black stripe (front-to-back airflow) |
| 2 | OK (top) and FAULT (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

Figure 1-13 AC Power Supply with Back-to-Front Airflow for the Cisco Nexus 2200 Platform Chassis



| | | | |
|---|----------------------------------|---|--------------------------------------|
| 1 | Handle | 4 | Black stripe (back-to-front airflow) |
| 2 | FAULT (top) and OK (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

Figure 1-14 DC Power Supply with Front-to-Back Airflow for the Cisco Nexus 2200 Platform Chassis



| | | | |
|---|----------------------------------|---|---|
| 1 | Handle | 4 | Ejector latch |
| 2 | FAULT (top) and OK (bottom) LEDs | 5 | No black stripe (front-to-back airflow) |
| 3 | DC power receptacle | | |

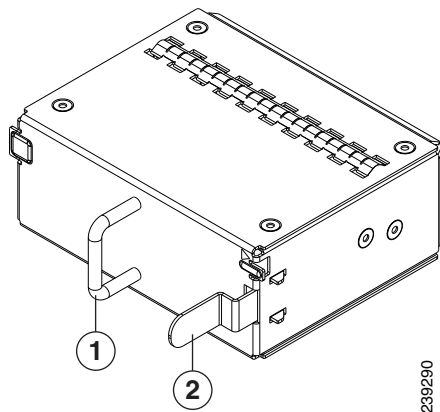
You can order the Cisco Nexus 2248TP FEX with AC power supplies that have front-to-back or back-to-front airflow for cooling or DC power supplies that offer front-to-back airflow. The back-to-front airflow components have a black stripe on their front surface for easy visual identification. The front-to-back airflow components do not have a black stripe.

**Caution**

Be sure that all of the power supply and fan tray modules in the same chassis have the same airflow direction and that the air intake for those modules is positioned on a cool aisle. If you install a module that uses a different direction of airflow from the other modules in your system, you will see an error message. If you position a chassis with its modules taking cooling air from a warm aisle, the switch can reach an overtemperature state and shut down.

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel (part number N2200-P-BLNK) to cover the empty slot. [Figure 1-15](#) shows a blank power supply filler panel.

Figure 1-15 Blank Power Supply Filler Panel for the Cisco Nexus 2200 Platform Chassis



| | | | |
|---|--------|---|---------------|
| 1 | Handle | 2 | Ejector latch |
|---|--------|---|---------------|

For power supply specifications, see the “[Power Specifications](#)” section on page B-1. To replace a power supply, see the “[Removing and Installing Power Supplies](#)” section on page 3-17. For LED descriptions, see [Table D-1](#) on page D-2.

Fan Tray

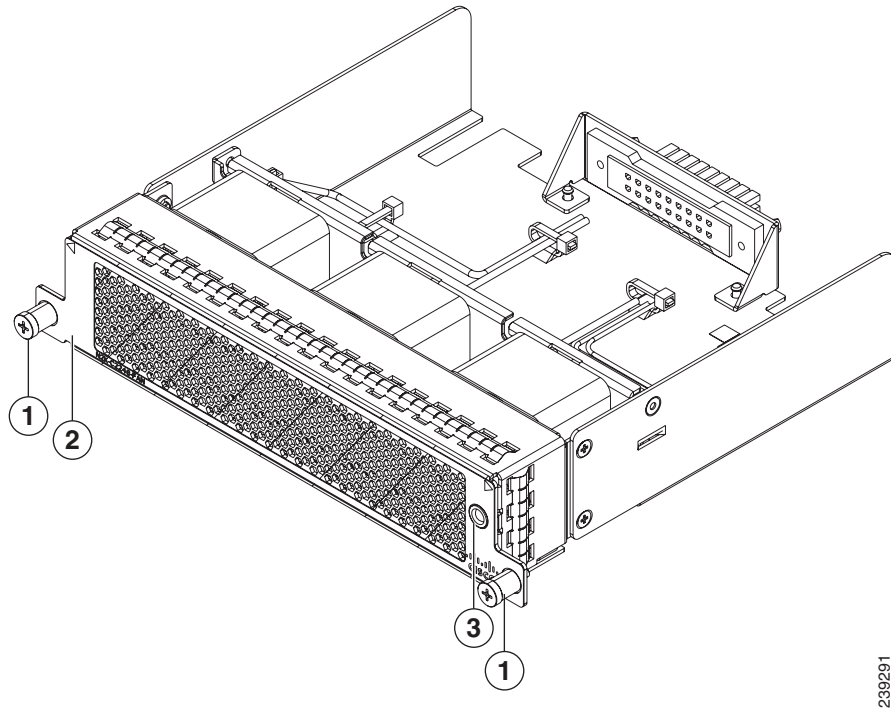
The Cisco Nexus 2248TP (and 2224TP) FEX has one fan tray that is hot swappable during operations. Depending on the arrangement of hot and cold aisles in your data center, you can order front-to-back airflow to position the front of the FEX chassis in a cold aisle or back-to-front airflow to position the back of the FEX chassis in a cold aisle. [Table 1-6](#) lists the part numbers for each of the fan trays that you can use with the Cisco Nexus 2248TP and 2224TP chassis.

Table 1-6 Fan Trays for the Cisco Nexus 2248TP and 2224TP FEXs

| Description | Part Number |
|-----------------------|-----------------|
| Front-to-back airflow | N2K-C2248-FAN |
| Back-to-front airflow | N2K-C2248-FAN-B |

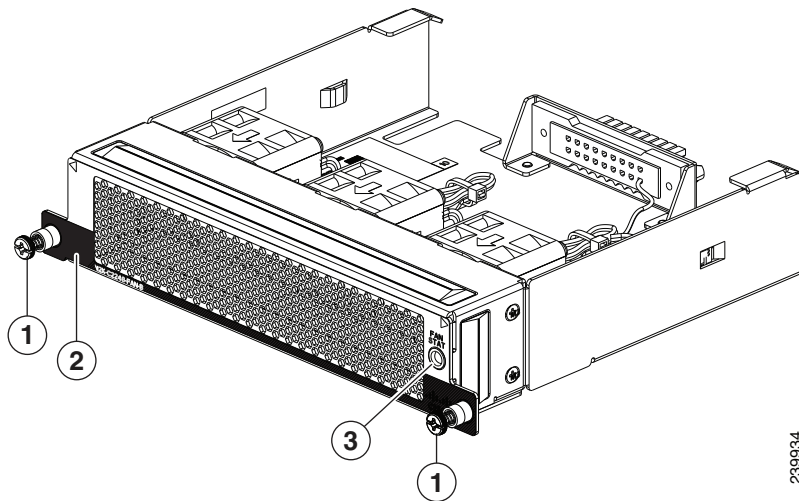
[Figure 1-16](#) shows a front-to-back airflow fan tray, and [Figure 1-17](#) shows a back-to-front airflow fan tray.

Figure 1-16 Front-to-Back Airflow Fan Tray Components for the Cisco Nexus 2248TP and 2224TP FEXs



| | | | |
|----------|---|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | No black stripe indicates front-to-back airflow | | |

Figure 1-17 Back-to-Front Airflow Fan Tray for the Cisco Nexus 2248TP and 224TP FEXs



| | | | |
|----------|--|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | Black stripe indicates back-to-front airflow | | |

To replace a fan tray, see the [“Removing and Installing the Fan Tray”](#) section on page 3-20. For LED descriptions, see [Table D-1](#) on page D-2.

Supported Transceivers and Cables

The Cisco Nexus 2248TP FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [SFP Transceivers, page 1-16](#)
- [SFP+ Copper Cables, page 1-17](#)

SFP Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2248TP FEX supports the short-range SFP and long-range SFP transceiver. [Table 1-7](#) describes the SFP+ transceivers used with the Cisco Nexus 2248TP FEX.

Table 1-7 SFP Transceivers used with the Cisco Nexus 2248TP FEX

| Model | Description |
|--------------------|---|
| N2200 FET | 10-Gigabit Ethernet for connections with a Cisco Nexus 5000 Series switch |
| SFP-10-Gigabit -SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10-Gigabit -LR | 10-Gigabit Ethernet—long range SFP+ module |

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-8](#) lists the available cables and provides a brief description of the cables.

Table 1-8 *Copper Cables Used with the Cisco Nexus 2248TP FEX*

| Model | Description |
|----------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |

Cisco Nexus 2248PQ

The Cisco Nexus 2248PQ is a stackable 1 RU 17.2 inch (45 cm) deep FEX that supports high-density 10-Gigabit Ethernet environments and has 48 1/10-Gigabit SFP+ host interfaces and 4 QSFP+ (16 10-Gigabit) on network interfaces. QSFP+ connectivity simplifies cabling while lowering power and solution costs. You can order it with front-to-back or back-to-front air cooling, which makes this FEX compatible with hot-aisle, cold aisle data center designs.

You can use this FEX with the Cisco Nexus 5500 Series switch and the Cisco Nexus 6004 parent switch (The supported software is Cisco Nexus OS Release 6.0(2)N1(1)). The Cisco Nexus 2248PQ is managed and configured by the upstream switch. The FEX software ships with the Cisco Nexus 5500 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

This section includes the following topics:

- [Chassis, page 1-17](#)
- [Ports, page 1-18](#)
- [Power Supplies, page 1-18](#)
- [Fan Trays, page 1-19](#)
- [Supported SFP+ Transceivers, page 1-19](#)

Chassis

The Cisco Nexus 2248PQ FEX chassis has a height of 1.72 inches (4.37 cm), a width of 17.3 inches (43.94 cm), and a depth of 17.7 inches (44.96 cm). It weighs 17.5 pounds (8.0 kg). Its one-rack-unit (1 RU) form factor takes up relatively little space, making it easy to incorporate into rack designs. The FEX is mounted in a standard 19-inch (48.26 cm) rack. All of the switch ports at the rear of the chassis are in close proximity to server ports, and all user-serviceable components are accessible from the front panel.

You can order front-to-back airflow or back-to-front airflow for cooling. If you are going to install the chassis with its front end facing the cold aisle, you must order the chassis with front-to-back air flow. If you are going to install the chassis with its back end facing the cold aisle, you must order the chassis with back-to-front airflow.

Ports

The Cisco Nexus 2248PQ FEX supports a total of 48 1/10-Gigabit Ethernet/Fibre Channel over Ethernet (FCoE) ports (SFP+) and 4 QSFP+ (16 10-Gigabit) fabric ports. The Cisco Nexus 2248PQ provides two types of ports: ports for end-host attachments and uplink ports. Uplink ports are differentiated with yellow for connectivity to the upstream parent Cisco Nexus 5000 Series switch.

The Cisco Nexus 2248PQ 10GE Fabric Extender supports FCoE and Data Center Bridging (DCB) which increases the reliability, efficiency, and scalability of Ethernet networks by allowing the switches to support multiple traffic classes over a lossless Ethernet fabric, enabling consolidation of LAN, SAN, and cluster environments.

Power Supplies

The Cisco Nexus 2248PQ FEX chassis has two bays for front-end AC or DC power supplies. This chassis is fully functional with one power supply, but you can install a second power supply for power redundancy. The power supply is hot swappable during operations.

[Table 1-9](#) lists the power supplies that you can order with the Cisco Nexus 2248PQ FEX.

Table 1-9 Power Supplies for the Cisco Nexus 2200 Platform Chassis

| Power Supply | Part Number |
|--|------------------|
| AC power supply with front-to-back airflow | N2200-PAC-400W |
| AC power supply with back-to-front airflow | N2200-PAC-400W-B |
| DC power supply with front-to-back airflow | N2200-PDC-400W |
| DC power supply with back-to-front airflow | N2200-PDC-350W-B |

[Figure 1-12 on page 1-12](#) shows an AC power supply with front-to-back airflow. [Figure 1-13 on page 1-13](#) shows an AC power supply with back-to-front airflow. [Figure 1-14 on page 1-13](#) shows a DC power supply with front-to-back airflow.

You can order the Cisco Nexus 2248PQ FEX with AC power supplies that have front-to-back or back-to-front airflow for cooling or DC power supplies that have front-to-back airflow. The back-to-front airflow components have a black stripe on their front surface for easy visual identification. The front-to-back airflow components do not have a black stripe.

[Table 1-5 on page 1-12](#) lists the power supplies that you can order with the Cisco Nexus 2200 Platform FEXs.

**Caution**

Be sure that all of the power supply and fan tray modules in the same chassis have the same airflow direction and that the air intake for those modules is positioned on a cool aisle. If you install a module that uses a different direction of airflow from the other modules in your system, you will see an error message. If you position a chassis with its modules taking cooling air from a warm aisle, the switch can reach an overtemperature state and shut down.

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel (N2200-P-BLNK) to cover the empty slot. [Figure 1-15 on page 1-14](#) shows a blank power supply filler panel.

For power supply specifications, see [Table B-1 on page B-2](#). To replace a power supply, see the [“Removing and Installing Power Supplies” section on page 3-17](#).

Fan Trays

The Cisco Nexus 2248PQ FEX has one fan tray that is hot swappable during operations. Depending on whether there is a cold aisle in front of or in back of the chassis, you can order front-to-back airflow or back-to-front airflow for the fan tray and the power supplies in the same chassis. [Table 1-10](#) lists the part numbers for each of the fan trays that you can use with this chassis.

Table 1-10 Fan Trays for the Cisco Nexus 2248PQ FEX

| Description | Part Number |
|--|-----------------|
| Front-to-back airflow (port side exhaust, Blue color coded fans) | NXA-FAN-30CFM-F |
| Back-to-front airflow (port side cold air intake, Red color coded fans) | NXA-FAN-30CFM-B |

To replace a fan tray, see the [“Removing and Installing the Fan Tray” section on page 3-20](#). For LED descriptions, see [Table D-1 on page D-2](#).

Supported SFP+ Transceivers

The Cisco Nexus 2248PQ Series FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [QSFP+ Transceivers, page 1-20](#)
- [SFP Transceivers, page 1-36](#)
- [SFP+ Copper Cables, page 1-36](#)

QSFP+ Transceivers

Table 1-11 lists the supported QSFP+ transceivers and provides a brief description of each.

Table 1-11 QSFP+ Transceivers Used with the Cisco Nexus 2248PQ FEX

| Model | Description |
|-------------------|---|
| QSFP-40G-SR4 | 40GBASE-SR4 QSFP module, (multi-mode fiber, MMF at 100m) |
| QSFP-40G-CSR4 | 40GBASE Extended CSR4 QSFP module, (multi-mode fiber, MMF at 300m) |
| QSFP-H40G-CU1M | Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 1-meter, passive |
| QSFP-H40G-CU3M | Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 3-meter, passive |
| QSFP-H40G-CU5M | Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 5-meter, passive |
| QSFP-4SFP10G-CU1M | Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 1-meter, passive |
| QSFP-4SFP10G-CU3M | Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 3-meter, passive |
| QSFP-4SFP10G-CU5M | Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 5-meter, passive |
| QSFP-H40G-AC7M | Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 7-meter, active |
| QSFP-H40G-AC10M | Cisco 40GBASE-CR4 QSFP+ direct-attach copper cable, 10-meter, active |
| QSFP-4X10G-AC7M | Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 7-meter, active |
| QSFP-4X10G-AC10M | Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 10-meter, active |

SFP+ Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2000 Series FEX supports the short-range SFP and long-range SFP transceiver. Table 1-12 describes the SFP+ transceivers used with the Cisco Nexus 2248PQ FEX.

Table 1-12 SFP+ Transceivers Used with the Cisco Nexus 2248PQ FEX

| Model | Description |
|------------|--|
| SFP-10G-SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10G-LR | 10-Gigabit Ethernet—long range SFP+ module |
| SFP-10G-ER | 10-Gigabit Ethernet—extended reach SFP+ module |

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-13](#) lists the available cables and provides a brief description of the cables.

Table 1-13 *Copper Cables Used with the Cisco Nexus 2248PQ FEX*

| Model | Description |
|------------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |
| SFP-H10GB-CU7MA | 10-Gigabit BASE-CU SFP+ Active Cable (7 meters) |
| SFP-H10GB-CU10MA | 10-Gigabit BASE-CU SFP+ Active Cable (10 meters) |

Cisco Nexus 2232TM-10GE, Cisco NexusN2K-C2232TM-E-10GE

The Cisco Nexus 2232TM-10GE is a stackable 1 RU 17.72 inch (45 cm) deep FEX that supports 32 1/10-Gigabit Base-T host-facing (downlink) ports and 8 10-Gigabit Ethernet (SFP+) network-facing (uplink) ports through an uplink module.

You can use this FEX with the Cisco Nexus 5000 Series switch. The Cisco Nexus 2232TM-10GE is managed and configured by the upstream switch. The FEX software ships with the Cisco Nexus 5000 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

You can use the Cisco Nexus 2232TM-E-10GE with the Cisco Nexus 5000 Series switch starting in the NX-OS 5.2(1)N1(1) release and beyond.

This section includes the following topics:

- [Chassis, page 1-21](#)
- [Ports, page 1-23](#)
- [Power Supplies, page 1-24](#)
- [Fan Trays, page 1-25](#)
- [Supported Transceivers and Cables, page 1-26](#)

Chassis

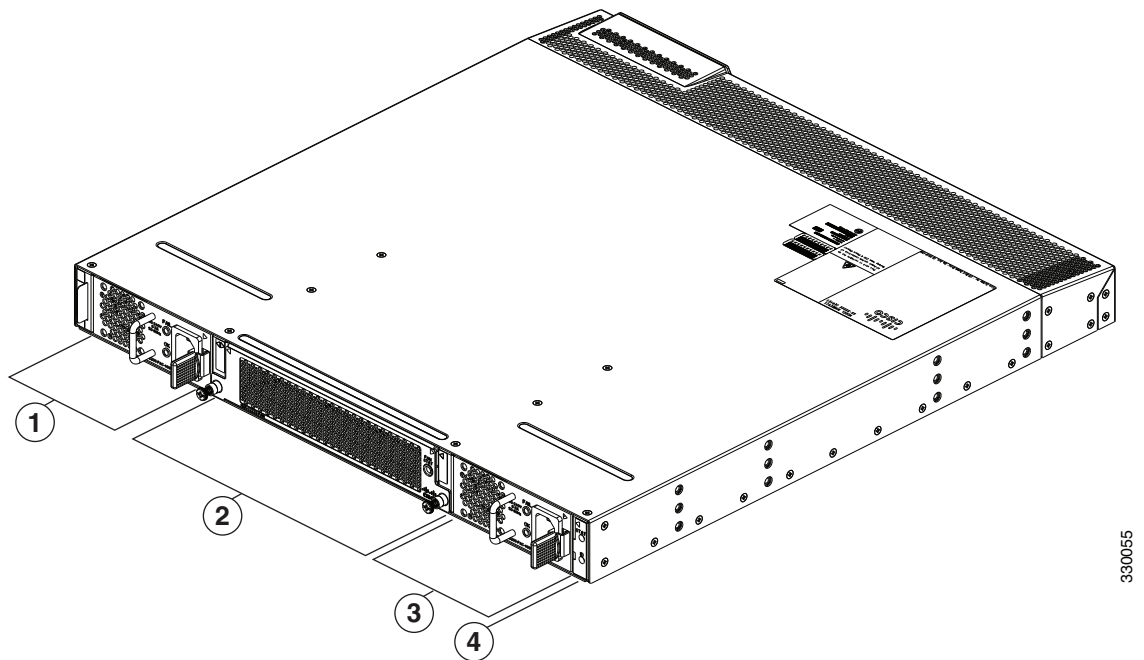
The Cisco Nexus 2232TM FEX chassis has a height of 1.72 inches (4.37 cm), a width of 17.3 inches (43.94 cm), and a depth of 17.7 inches (44.96 cm). It weighs 18.5 pounds (8.4 kg). Its one-rack-unit (1 RU) form factor takes up relatively little space, making it easy to incorporate into rack designs. The FEX

is mounted in a standard 19-inch (48.26 cm) rack and supports vertical orientation. All of the switch ports at the rear of the chassis are in close proximity to server ports, and all user-serviceable components are accessible from the front panel.

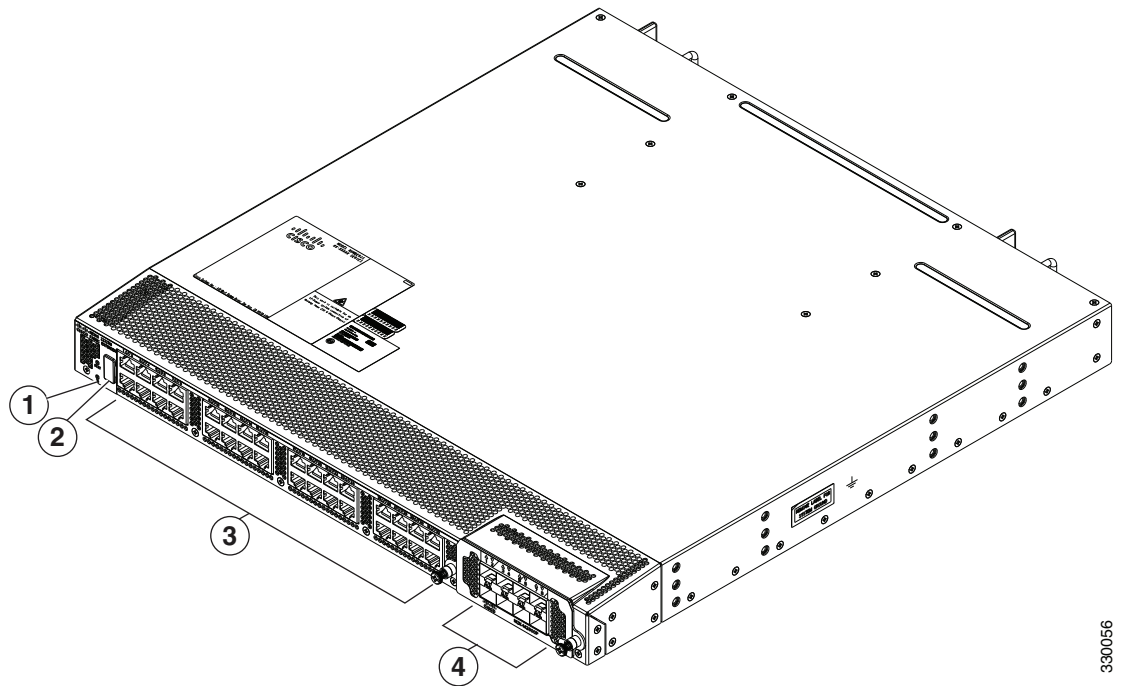
You can order it with front-to-back or back-to-front air cooling, and AC or DC power supplies. If you are going to install the chassis with its front end facing the cold aisle, you must order the chassis with front-to-back airflow. If you are going to install the chassis with its back end facing the cold aisle, you must order the chassis with back-to-front airflow.

[Figure 1-18](#) shows the location of the components on the front of the chassis, and [Figure 1-19](#) shows the location of components on the rear of the chassis. For information on what the chassis and component LEDs indicate, see [Table D-1 on page D-2](#).

Figure 1-18 Front View of the Cisco Nexus 2232TM-10GE Chassis



| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

Figure 1-19 Rear View of the Cisco Nexus 2232TM Chassis

| | | | |
|----------|--------------------|----------|---|
| 1 | Status and ID LEDs | 3 | 10-Gigabit Base-T host-facing (downlink) ports (32) |
| 2 | HDMI port | 4 | 10-Gigabit SFP+ ports (8) |

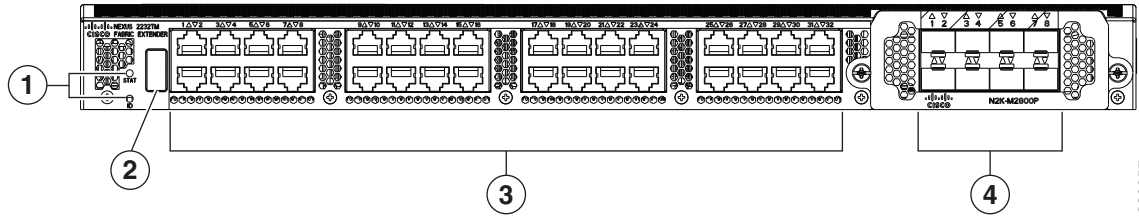
Ports

The Cisco Nexus 2232TM FEX supports a total of 32 10-Gigabit Ethernet ports (SFP+) and 8 10-Gigabit Ethernet/FCoE uplinks (SFP+). SFP transceivers can also be plugged into the SFP+ cages to allow a 1-Gigabit downlink. The Cisco Nexus 2232TM-10GE provides two types of ports: ports for end-host attachment and uplink ports. Uplink ports, which are colored yellow, connect to the upstream parent Cisco Nexus 5000 Series switch.

The Cisco Nexus 2232TM-10GE supports Data Center Bridging (DCB) which increases the reliability, efficiency, and scalability of Ethernet networks by allowing the switches to support multiple traffic classes over a lossless Ethernet fabric. These features allow the switches to support multiple traffic classes over a lossless Ethernet fabric, enabling consolidation of LAN, SAN, and cluster environments.

[Figure 1-20](#) shows the ports on the rear of the Cisco Nexus 2232TM-10GE chassis.

Figure 1-20 Ports Located on the Rear of the Cisco Nexus 2232TM-10GE Chassis



| | | | |
|---|-----------------------------------|---|--------------------------------|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 32 10-Gigabit BaseT host ports |
| 2 | HDMI Connector | 4 | 8 10-Gigabit SFP+ ports |

Power Supplies

The Cisco Nexus 2232TM-10GE FEX chassis has two bays for front-end AC or DC power supplies. This chassis is fully functional with one power supply, but you can install a second power supply for power redundancy. The power supply is hot-swappable during operations.

Table 1-14 lists the power supplies that you can order with the Cisco Nexus 2232TM-10GE FEX.

Table 1-14 Power Supplies for the Cisco Nexus 2232TM-10GE FEX

| Power Supply | Part Number |
|--|----------------|
| AC power supply with front-to-back airflow | N2K-PAC-400W |
| AC power supply with back-to-front airflow | N2K-PAC-400W-B |
| DC power supply with front-to-back airflow | N2K-PDC-400W |

Figure 1-12 on page 1-12 shows an AC power supply with front-to-back airflow. Figure 1-13 on page 1-13 shows an AC power supply with back-to-front airflow. Figure 1-14 on page 1-13 shows a DC power supply with front-to-back airflow.

You can order the Cisco Nexus 2232TM-10GE FEX with AC power supplies that have front-to-back or back-to-front airflow for cooling or DC power supplies that have front-to-back airflow. The back-to-front airflow components have a black stripe on their front surface for easy visual identification. The front-to-back airflow components do not have a black stripe.



Caution

Be sure that all of the power supply and fan tray modules in the same chassis have the same airflow direction and that the air intake for those modules is positioned on a cool aisle. If you install a module that uses a different direction of airflow from the other modules in your system, you will see an error message. If you position a chassis with its modules taking cooling air from a warm aisle, the switch can reach an overtemperature state and shut down.

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel (N2200-P-BLNK) to cover the empty slot. Figure 1-15 on page 1-14 shows a blank power supply filler panel.

For power supply specifications, see [Table B-1 on page B-2](#). To replace a power supply, see the “[Removing and Installing Power Supplies](#)” section on [page 3-17](#).

For LED descriptions, see [Table D-1 on page D-2](#).

Fan Trays

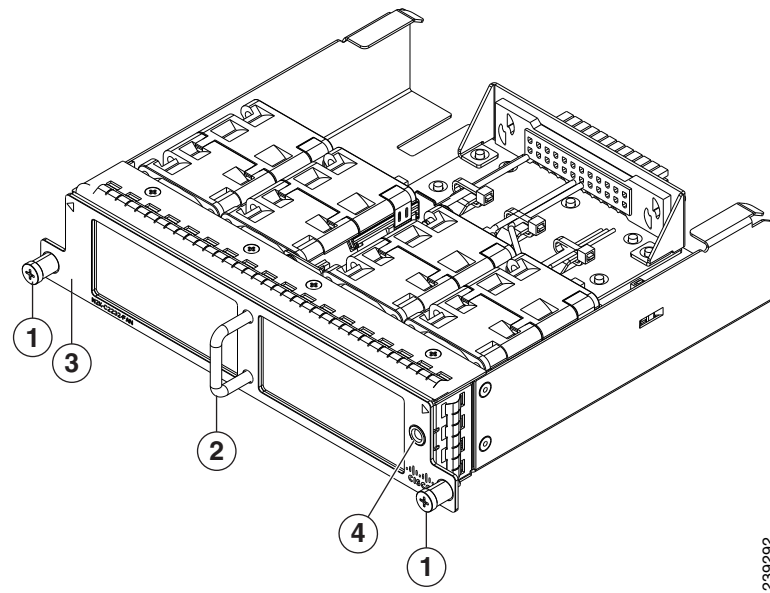
The Cisco Nexus 2232TM-10GE FEX has one fan tray that is hot swappable during operations. Depending on whether there is a cold aisle in front of or in back of the chassis, you can order front-to-back airflow or back-to-front airflow for the fan tray and the power supplies in the same chassis. [Table 1-15](#) lists the part numbers for each of the fan trays that you can use with this chassis.

Table 1-15 Fan Trays for the Cisco Nexus 2232TM-10GE FEX

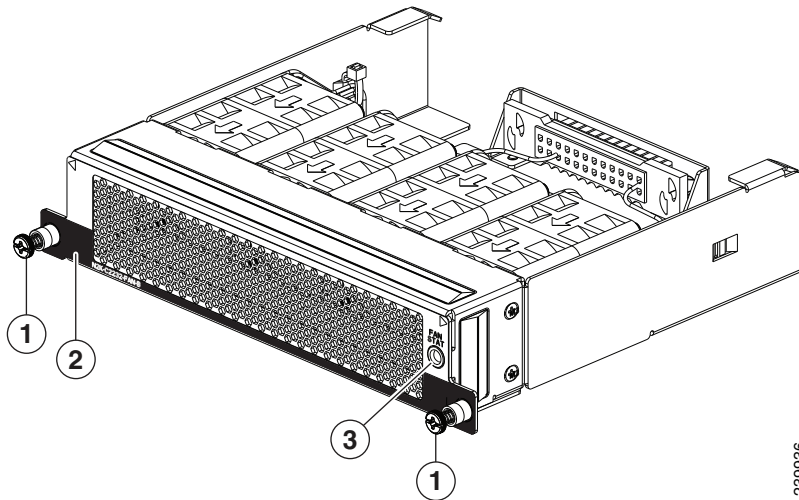
| Description | Part Number |
|-----------------------|-----------------|
| Front-to-back airflow | N2K-C2232-FAN |
| Back-to-front airflow | N2K-C2232-FAN-B |

To see the components used when installing a fan tray, see [Figure 1-21](#) (front-to-back airflow) or [Figure 1-22](#) (back-to-front airflow).

Figure 1-21 Front-to-Back Airflow Fan Tray for the Cisco Nexus 2232TM-10GE FEX



| | | | |
|---|--------------------|---|---|
| 1 | Captive screws (2) | 3 | No black stripe indicates front-to-back airflow |
| 2 | Handle | 4 | Status LED |

Figure 1-22 Back-to-Front Airflow Fan Tray for the Cisco Nexus 2232TM-10GE FEX

| | | | |
|----------|--|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | Black stripe indicates back-to-front airflow | | |

To replace a fan tray, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20. For LED descriptions, see [Table D-1](#) on page D-2.

Supported Transceivers and Cables

The Cisco Nexus 2232TM-10GE Series FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [SFP Transceivers, page 1-26](#)
- [SFP+ Copper Cables, page 1-27](#)

SFP Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2000 Series FEX supports the short-range SFP and long-range SFP transceiver. [Table 1-16](#) describes the SFP+ transceivers used with the Cisco Nexus 2232TM-10GE FEX.

Table 1-16 SFP+ Transceivers for the Cisco Nexus 2232TM-10GE FEX

| Model | Description |
|------------|---|
| N2200 FET | 10-Gigabit Ethernet for connections with a Cisco Nexus 5000 Series switch |
| SFP-10G-SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10G-LR | 10-Gigabit Ethernet—long range SFP+ module |

**Note**

The N2K-C2232TF-10GE includes 16 Cisco FEX Transceivers (FET-10G=)

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-17](#) lists the available cables and provides a brief description of the cables.

Table 1-17 *Copper Cables for the Cisco Nexus 2232TM-10GE FEX*

| Model | Description |
|------------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |
| SFP-H10GB-CU7MA | 10-Gigabit BASE-CU SFP+ Active Cable (7 meters) |
| SFP-H10GB-CU10MA | 10-Gigabit BASE-CU SFP+ Active Cable (10 meters) |

1Cisco Nexus 2224TP

The Cisco Nexus 2224TP is a stackable 1 RU FEX. This FEX is very similar to the Cisco Nexus 2248TP except that it has 24 100/1000BASE-T downlink ports, 2 SFP+ uplink ports and you can order it with front-to-back airflow or back-to-front airflow. You can use this FEX with the Cisco Nexus 5000 Series switch. The Cisco Nexus 2224TP is managed and configured by the upstream switch. The FEX software ships with the Cisco Nexus 5000 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

This section includes the following topics:

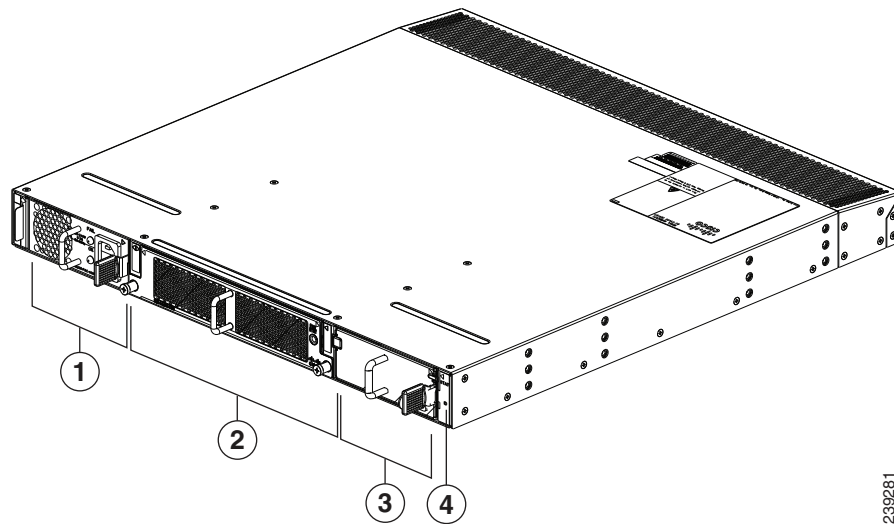
- [Chassis, page 1-28](#)
- [Ports, page 1-29](#)
- [Power Supplies, page 1-29](#)
- [Fan Tray, page 1-30](#)
- [Supported SFP+ Transceivers, page 1-30](#)

Chassis

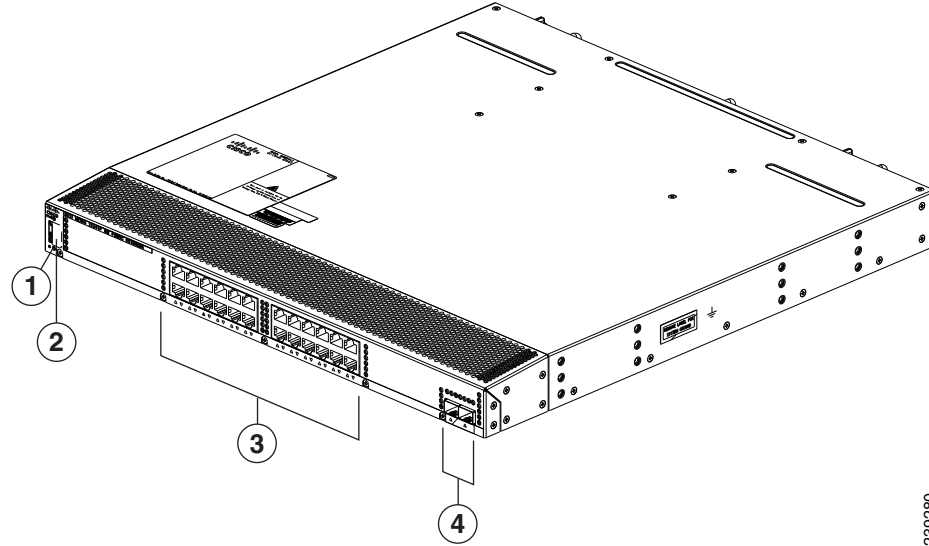
The Cisco Nexus 2224TP chassis has a height of 1.72 inches (4.37 cm), a width of 17.34 inches (44.04 cm), and a depth of 18.9 inches (48.1 cm). It weighs 18 pounds (8.0 kg). Its one-rack-unit (1 RU) form factor takes up relatively little space, making it easy to incorporate into rack designs. The FEX is mounted in a standard 19-inch (48.26-cm) rack. It has front-to-back or back-to-front airflow for cooling. All switch ports are located at the rear of the unit in close proximity to server ports, and all user-serviceable components are accessible from the front panel.

Figure 1-23 shows the location of the components on the front of the chassis, and Figure 1-24 shows the location of components on the rear of the chassis. For information on what the chassis and component LEDs indicate, see Table D-1 on page D-2.

Figure 1-23 Front of the Cisco Nexus 2224TP Chassis



| | | | |
|----------|--------------|----------|---|
| 1 | Power supply | 3 | Power supply (blank power supply shown) |
| 2 | Fan tray (1) | 4 | Status (top) and ID (bottom) LEDs |

Figure 1-24 Rear View of the Nexus 2224TP Chassis

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| | | | |
|----------|-----------------------------------|----------|--------------------------------|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000BASE-T data ports (24) |
| 2 | HDMI port | 4 | SFP+ uplink ports (2) |

Ports

The Cisco Nexus 2224TP FEX supports a total of 24 100/1000BASE-T downlink ports and two SFP+ uplink ports on the rear panel. There is an HDMI port on the rear panel for console and management port connectivity. Uplink ports are colored yellow for connectivity to the upstream parent Cisco Nexus 5000 Series switch.

Power Supplies

The Cisco Nexus 2224TP FEX chassis has two bays for front-end AC or DC power supplies (the same power supplies used for the Cisco Nexus 2248TP). This chassis is fully functional with one power supply, but you can install a second power supply for power redundancy. The power supply is hot swappable during operations.

[Table 1-18](#) lists the power supplies that you can order with the Cisco Nexus 2224TP FEX.

Table 1-18 Power Supplies for the Cisco Nexus 2224TP FEX

| Power Supply | Part Number |
|--|------------------|
| AC power supply with front-to-back airflow | N2200-PAC-400W |
| AC power supply with back-to-front airflow | N2200-PAC-400W-B |
| DC power supply with front-to-back airflow | N2200-PDC-400W |
| DC power supply with back-to-front airflow | N2200-PDC-350W-B |

To see the components that you use when installing a power supply unit, see [Figure 1-12 on page 1-12](#) for the AC power supply with front-to-back airflow, [Figure 1-13 on page 1-13](#) for the AC power supply with back-to-front airflow, and [Figure 1-14 on page 1-13](#) for the DC power supply with front-to-back airflow.

You can order the Cisco Nexus 2224TP FEX with AC power supplies that have front-to-back or back-to-front airflow for cooling or DC power supplies that have front-to-back airflow. The back-to-front airflow components have a black stripe on their front surface for easy visual identification. The front-to-back airflow components do not have a black stripe.



Caution

Be sure that all of the power supply and fan tray modules in the same chassis have the same airflow direction and that the air intake for those modules is positioned on a cool aisle. If you install a module that uses a different direction of airflow from the other modules in your system, you will see an error message. If you position a chassis with its modules taking cooling air from a warm aisle, the switch can reach an overtemperature state and shut down.

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel to cover the empty slot. [Figure 1-15 on page 1-14](#) shows a blank power supply filler panel.

For power supply specifications, see [Table B-1 on page B-2](#). To replace a power supply, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

Fan Tray

The Cisco Nexus 2224TP FEX has one fan tray that is hot swappable during operations. Depending on whether there is a cold aisle in front of or in back of the chassis, you can order front-to-back airflow or back-to-front airflow for the fan tray and the power supplies in the same chassis. [Table 1-19](#) lists the part numbers for each of the fan trays that you can use with this chassis.

Table 1-19 Fan Trays for the Cisco Nexus 2224TP and 2248TP FEXs

| Description | Part Number |
|-----------------------|-----------------|
| Front-to-back airflow | N2K-C2248-FAN |
| Back-to-front airflow | N2K-C2248-FAN-B |

To see the components used when installing one of these fan trays, see [Figure 1-16](#) (front-to-back airflow) or [Figure 1-17](#) (back-to-front airflow).

To replace a fan tray, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20. For LED descriptions, see [Table D-1 on page D-2](#).

Supported SFP+ Transceivers

The Cisco Nexus 2224TP FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [SFP+ Transceivers, page 1-31](#)
- [SFP+ Copper Cables, page 1-31](#)

SFP+ Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2224TP FEX supports the short-range SFP and long-range SFP transceiver. [Table 1-20](#) describes the SFP+ transceivers used with the Cisco Nexus 2224TP FEX.

Table 1-20 SFP+ Transceivers Used with the Cisco Nexus 2224TP FEX

| Model | Description |
|------------|---|
| N2200 FET | 10-Gigabit Ethernet for connections with a Cisco Nexus 5000 Series switch |
| SFP-10G-SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10G-LR | 10-Gigabit Ethernet—long range SFP+ module |

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-21](#) lists the available cables and provides a brief description of the cables.

Table 1-21 Copper Cables Used with the Cisco Nexus 2224TP FEX

| Model | Description |
|------------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |
| SFP-H10GB-CU7MA | 10-Gigabit BASE-CU SFP+ Active Cable (7 meters) |
| SFP-H10GB-CU10MA | 10-Gigabit BASE-CU SFP+ Active Cable (10 meters) |

Cisco Nexus 2148T

The Cisco Nexus 2148T FEX is a 1 RU device that acts as a remote I/O module on the Cisco Nexus 5000 Series switch. All device configurations are managed on the switch and configuration information is downloaded through inband communication to the FEX. You can use this FEX with the Cisco Nexus

5000 Series switch. The FEX software ships with the Cisco Nexus 5000 Series switch software. The FEX downloads the software image from the switch the same way that a module would download it from the supervisor in a modular chassis.

This section includes the following topics:

- [Features, page 1-32](#)
- [Chassis, page 1-32](#)
- [Ports, page 1-34](#)
- [Power Supplies, page 1-34](#)
- [Fan Tray, page 1-35](#)
- [Supported SFP Transceivers, page 1-36](#)

Features

The Cisco Nexus 2148T FEX has the following features:

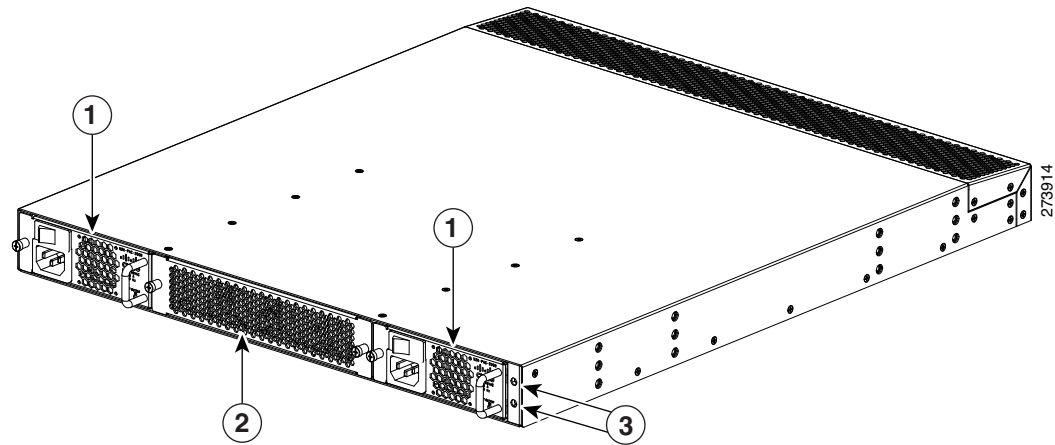
- Forty-eight 1-Gigabit Ethernet ports
- Four 10-Gigabit Ethernet ports
- Redundant (dual) 200-W modular, hot-swappable power supplies with a power switch on each supply
- Removable fan tray with redundant fans. The fan tray can be removed for hot swapping. If it is not replaced within 60 seconds, the system shuts down.
- Front-to-back airflow

Chassis

The Cisco Nexus 2148T FEX has a height of 1.72 inches (4.37 cm), a width of 17.3 inches (43.94 cm), and a depth of 20 inches (50.8 cm). The FEX is mounted in a standard 19-inch (48.24 cm) rack. The chassis requires 1 RU. One fan tray and two power supplies are located at the front of the device. The ports are located at the rear of the device. The airflow through the fan tray and power supplies is from front to back.

[Figure 1-25](#) identifies the front view of the Cisco Nexus 2148T FEX.

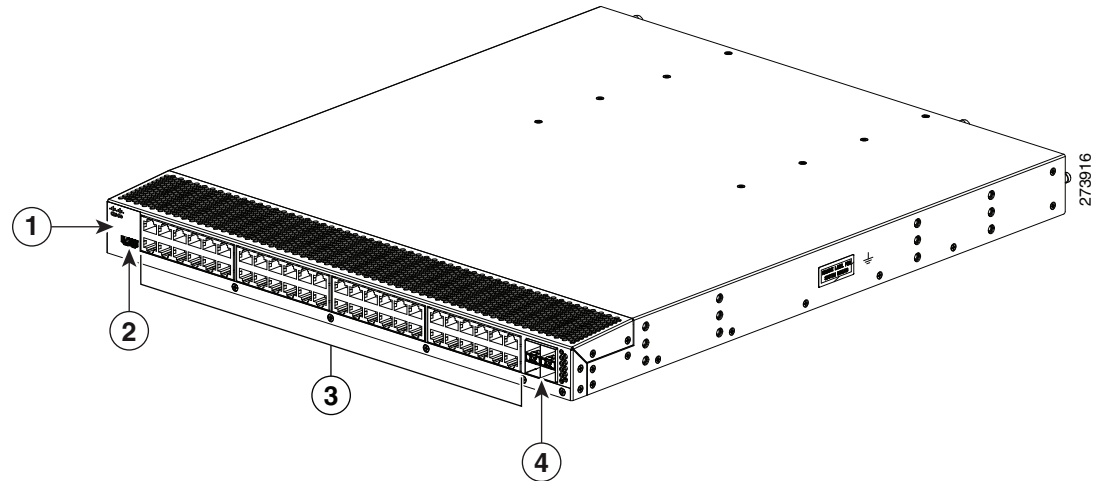
Figure 1-25 Front View of the Cisco Nexus 2148T FEX



| | | | |
|----------|--------------------|----------|-----------------------------------|
| 1 | Power supply (two) | 3 | Status (top) and ID (bottom) LEDs |
| 2 | Fan tray (1) | | |

The rear of the Cisco Nexus 2148T FEX has 48 1-Gigabit Ethernet ports, 4 10-Gigabit Ethernet ports, and status and ID LEDs. [Figure 1-26](#) identifies the components found on the rear of the Cisco Nexus 2148T FEX.

Figure 1-26 Rear View of the Cisco Nexus 2148T FEX



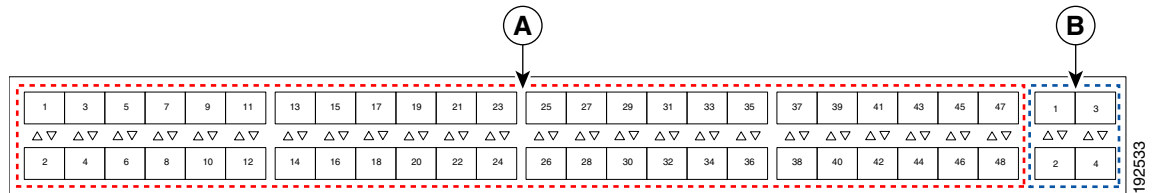
| | | | |
|----------|---|----------|--|
| 1 | System status (top) and Beacon (bottom) LED | 3 | 1-Gigabit Ethernet downlink ports (48) |
| 2 | HDMI port | 4 | 10-Gigabit Ethernet uplink ports (4) |

Ports

Each port on the Cisco Nexus 2148T FEX is numbered, and groups of ports are numbered based on their function. The ports are numbered from top to bottom and left to right.

Group 1 includes 48 1-Gigabit Ethernet data ports. Group 2 includes four 10-Gigabit Ethernet ports. [Figure 1-27](#) shows how ports are numbered and grouped by function.

Figure 1-27 Port Numbering on the Cisco Nexus 2148T FEX

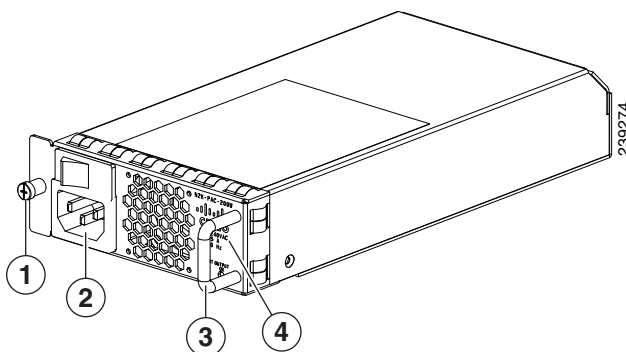


| | | | |
|----------|----------------------------------|----------|-----------------------------------|
| 1 | Group 1: Data ports 1 through 48 | 2 | Group 2: Uplink ports 1 through 4 |
|----------|----------------------------------|----------|-----------------------------------|

Power Supplies

The Cisco Nexus 2148T FEX uses a front-end 200-W AC power supply that has front-to-back airflow. The chassis has two bays for two power supplies. Two power supplies can be used for redundancy, but the Cisco Nexus 2148T FEX is fully functional with one power supply. [Figure 1-28](#) shows the power supply with two LEDs: one for power status and one for a failure condition. The power supply is hot-swappable. For details on how to install a power supply, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

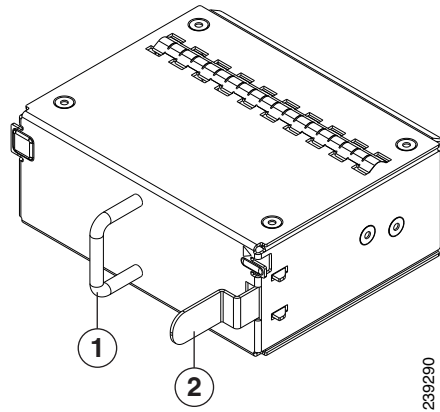
Figure 1-28 AC Power Supply for the Cisco Nexus 2148T Series FEX



| | | | |
|----------|---|----------|---|
| 1 | Green power LED indicates the power status. | 2 | Amber fail LED indicates a failure condition. |
|----------|---|----------|---|

If one power supply is installed in the chassis, but the other power supply slot is empty, you should use a blank filler panel to cover the empty slot. [Figure 1-29](#) shows a blank power supply filler panel.

Figure 1-29 Blank Power Supply Filler Panel

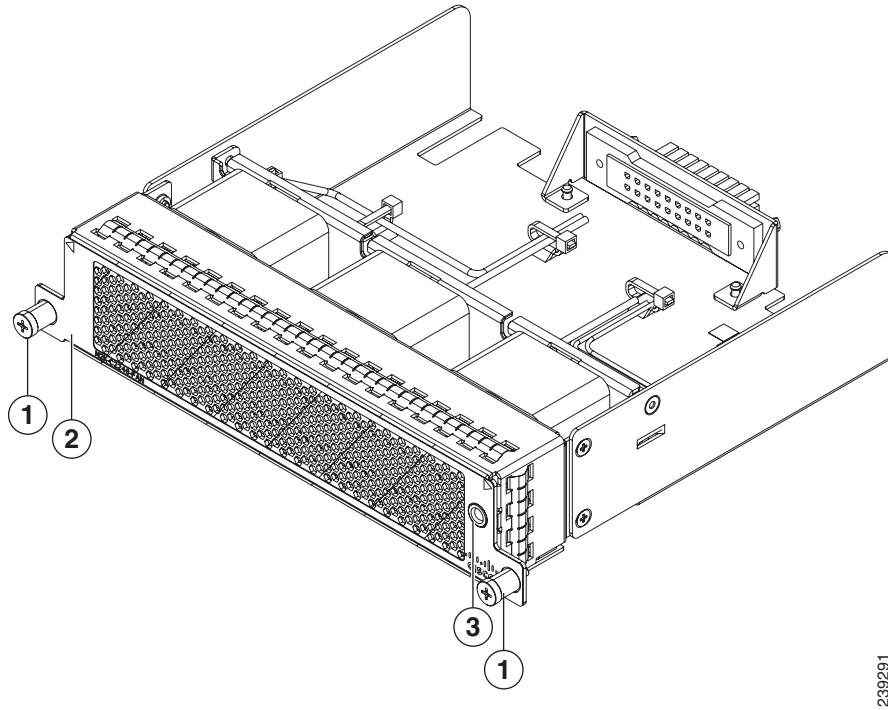


| | | | |
|----------|--------|----------|---------------|
| 1 | Handle | 2 | Ejector latch |
|----------|--------|----------|---------------|

Fan Tray

The Cisco Nexus 2148T FEX has one fan tray that has front-to-back airflow. [Figure 1-30](#) shows the fan tray. The fan tray is hot-swappable as long as you replace it within 60 seconds.

Figure 1-30 Front-to-Back Airflow Fan Tray for Cisco Nexus 2148T FEX



| | | | |
|----------|---|----------|-----------|
| 1 | Captive screws (2) | 2 | Staus LED |
| 3 | No blk stripe indicates front-to-back airflow | | |

Supported SFP Transceivers

The Cisco Nexus 2148T FEX supports SFP+ Ethernet transceivers. This section includes the following topics:

- [SFP Transceivers, page 1-36](#)
- [SFP+ Copper Cables, page 1-36](#)

SFP Transceivers

The enhanced Small-Form-Factor Pluggable (SFP+) 10-Gigabit Ethernet transceiver is a bidirectional device with a transmitter and receiver. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Currently, the Cisco Nexus 2000 Series FEX supports the short-range SFP and long-range SFP transceiver. [Table 1-22](#) describes the SFP+ transceivers used with the Cisco Nexus 2148T FEX.

Table 1-22 SFP+ Transceivers Used with the Cisco Nexus 2148T FEX

| Model | Description |
|------------|---|
| SFP-10G-SR | 10-Gigabit Ethernet—short range SFP+ module |
| SFP-10G-LR | 10-Gigabit Ethernet—long range SFP+ module |

SFP+ Copper Cables

Copper interface cables are available for use with the 10-Gigabit Ethernet SFP+ transceiver. [Table 1-23](#) lists the available cables and provides a brief description of the cables.

Table 1-23 Copper Cables Used with the Cisco Nexus 2148T FEX

| Model | Description |
|----------------|---|
| SFP-H10GB-CU1M | 10-Gigabit BASE-CU SFP+ Passive Cable (1 meter) |
| SFP-H10GB-CU3M | 10-Gigabit BASE-CU SFP+ Passive Cable (3 meters) |
| SFP-H10GB-CU5M | 10-Gigabit BASE-CU SFP+ Passive Cable (5 meters) |

Table 1-23 *Copper Cables Used with the Cisco Nexus 2148T FEX*

| Model | Description |
|------------------|---|
| SFP-H10GB-CU7MA | 10-Gigabit BASE-CU SFP+ Active Cable (7 meters) |
| SFP-H10GB-CU10MA | 10-Gigabit BASE-CU SFP+ Active Cable (10 meters) |



CHAPTER 2

Using a Fabric Extender with a Cisco Nexus 7000 Series Switch

This chapter describes the Cisco Nexus 2200 Platform Fabric Extender (FEX) chassis and the components that you can connect to a Cisco Nexus 7000 Series switch.

This chapter includes the following sections:

- [Information About Using a Fabric Extender with a Cisco Nexus 7000 Series Switch, page 2-1](#)
- [Cisco Nexus 2248TP-E FEX, page 2-2](#)
- [Cisco Nexus 2248TP FEX, page 2-11](#)
- [Cisco Nexus 2232TM FEX, page 2-15](#)
- [Cisco Nexus 2232PP FEX, page 2-20](#)
- [Cisco Nexus 2224TP FEX, page 2-25](#)

Information About Using a Fabric Extender with a Cisco Nexus 7000 Series Switch

You can extend the Cisco Nexus 7000 Series switch architecture by connecting up to 32 FEXs as remote I/O modules. Depending on which FEX model that you connect to the switch, the FEX provides top-of-the-rack connectivity for up to 48, 32, or 24 hosts, and it becomes an extension of the parent Cisco Nexus 7000 Series switch fabric, with the FEX and the switch becoming a virtual modular system. The FEX forwards all 100/1000 Ethernet or 1- and 10-Gigabit Ethernet traffic from the hosts to the switch over 10-Gbps uplinks. Traffic flows from the switch to the FEX over the 10-Gbps uplinks and to the individual hosts over 100/1000 Ethernet or 1- and 10-Gigabit Ethernet downlinks.

You connect a FEX uplink port to the Cisco Nexus 7000 Series switch through one of the following Ethernet I/O modules installed in the switch:

- F2 Series 48-port 1 or 10-Gigabit Ethernet I/O module (N7K-F248XP-25)
- M1 Series 32-port 10-Gigabit Ethernet I/O module (N7K-M132XP-12)
- M1 Series 32-port 10-Gigabit Ethernet I/O module with XL option (N7K-M132XP-12L)
- M2 Series 24-port 10-Gigabit Ethernet I/O module (N7K-M224XP-23L)

[Send documentation comments to nexus5kdocs@cisco.com](mailto:nexus5kdocs@cisco.com)

Cisco Nexus 2248TP-E FEX

The Cisco Nexus 2248TP-E FEX (N2K-C2248TP-E) is a stackable 1-RU FEX that has 48 100/1000 Ethernet host-facing (downlink) ports and four 10-Gigabit Ethernet network-facing (uplink) ports. It requires a 19-inch (48.26 cm) rack for its installation. [Table 2-1](#) lists its physical characteristics.

Table 2-1 Physical Characteristics for the Cisco Nexus 2248TP-E FEX

| Dimensions | |
|---------------------|-----------------------|
| Width | 17.3 inches (43.9 cm) |
| Depth | 20.0 inches (50.8 cm) |
| Height | 1.72 inches (4.4 cm) |
| Weight ¹ | |
| | 17.7 lb (8.0 kg) |

1. Measured with two power supplies and one fan module installed.

You can order the Cisco Nexus 2248TP-E with front-to-back (port-side exhaust) or back-to-front (port-side intake) airflow and with AC or DC power supplies. If you are going to install the port side in a hot aisle, then order front-to-back airflow for the fan trays and power supplies. If you are going to install the port side in the cold aisle, order back-to-front airflow for the fan trays and power supplies.

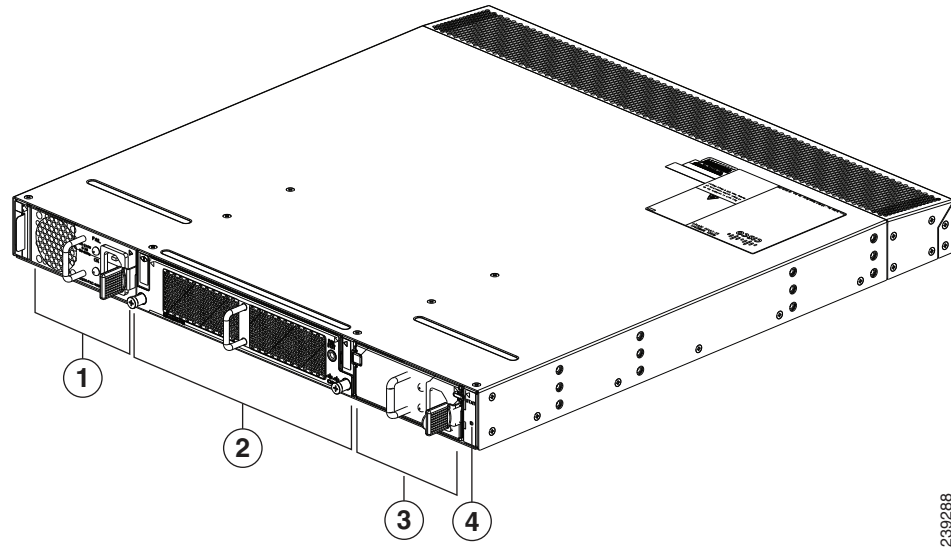


Note

For visual identification, back-to-front airflow power supplies and fan trays have a black stripe across their front, and front-to-back airflow modules do not have a black stripe across their front. All of the power supplies and fan trays must have the same direction of airflow for the components to properly function (all of these components must either have a black stripe or all of the components must not have a black stripe).

The front of the Cisco Nexus 2248TP-E FEX chassis has one or two power supplies, a fan tray, and two chassis LEDs as shown in [Figure 2-1](#). This FEX model requires one power supply, but if you want power redundancy, you must install a second power supply.

Figure 2-1 Front View of the Cisco Nexus 2248TP-E Chassis

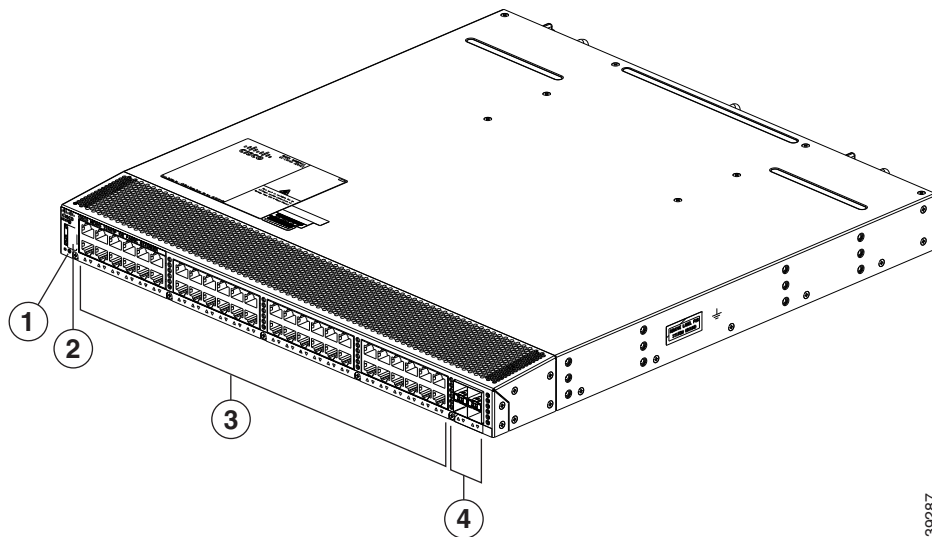


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| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

The rear of the Cisco Nexus 2248TP-E FEX chassis has 48 100/1000 Ethernet downlink ports, four 10-Gigabit Ethernet uplink ports, an HDMI port, and LEDs, as shown in [Figure 2-2](#).

Figure 2-2 Rear View of the Cisco Nexus 2248TP-E Chassis



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| | | | |
|----------|-----------------------------------|----------|---|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000 Ethernet host-facing (downlink) ports (48) |
| 2 | HDMI port | 4 | 10-Gigabit Ethernet network-facing (uplink) ports (4) |

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For LED descriptions, see [Table D-1 on page D-2](#).

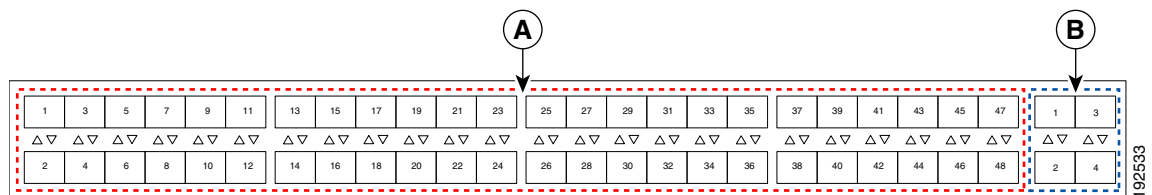
This section includes the following topics:

- [Ports for the Cisco Nexus 2248TP-E FEX, page 2-4](#)
- [Power Supplies for the Cisco Nexus 2248TP-E FEX, page 2-4](#)
- [Fan Tray for the Cisco Nexus 2248TP-E FEX, page 2-7](#)
- [Transceivers and Connectors Supported by the Cisco Nexus 2248TP-E FEX, page 2-9](#)

Ports for the Cisco Nexus 2248TP-E FEX

The downlink and uplink ports are numbered from top to bottom and then left to right as shown in [Figure 2-3](#).

Figure 2-3 Port Numbering on the Cisco Nexus 2248TP-E FEX



| | | | |
|----------|---|----------|--|
| A | 100/1000 Ethernet downlink ports, numbered 1 through 48 | B | 10-Gigabit Ethernet uplink ports, numbered 1 through 4 |
|----------|---|----------|--|



Note

For a fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module (either the N7K-M132XP-12 or N7K-M132XP-12L), connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX). If you are using the M2 Series 24-port, 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports for a fully dedicated bandwidth. If you are using the F2 Series 48-port, 10-Gigabit Ethernet I/O module (N7K-F248XP-25), use the connectivity rule order (connect the same port numbers for each port group (for example, if you connect ports 1 and 2 of a port-group, then connect the same ports of another port group).

For information about the transceivers and connectors that you can use with these ports, see the [“Transceivers and Connectors Supported by the Cisco Nexus 2248TP-E FEX” section on page 2-9](#).

Power Supplies for the Cisco Nexus 2248TP-E FEX

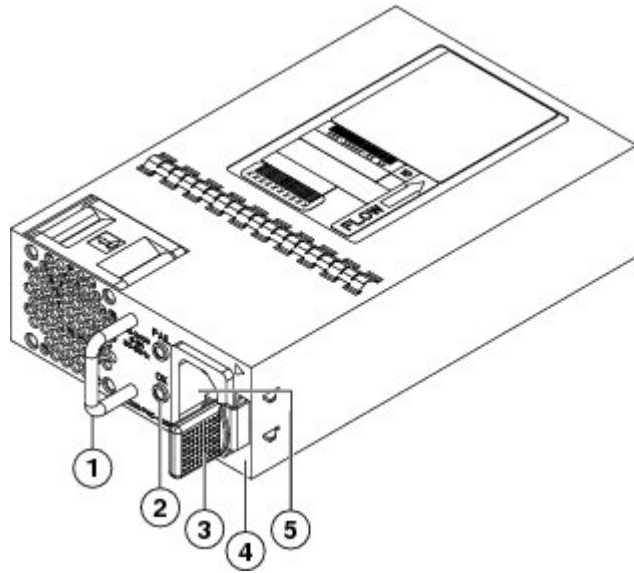
The Cisco Nexus 2200 Series FEX chassis have two slots for front-end AC or DC power supplies that have front-to-back or back-to-front airflow. These chassis are fully functional with one power supply, but you can install a second power supply for power redundancy. If you have only one power supply in the chassis, install a blank filler panel (N2200-P-BLNK) to maintain the designed airflow in the chassis. You can install any of the following power supplies in those two bays:

- AC power supply with front-to-back airflow (N2200-PAC-400W)

- AC power supply with back-to-front airflow (N2200-PAC-400W-B)
- DC power supply with front-to-back airflow (N2200-PDC-400W)
- DC power supply with back-to-front airflow (N2200-PDC-350W-B)

Figure 2-4 shows the exterior components on an AC power supply with front-to-back airflow (no black stripe on the front). Figure 2-5 shows the components on a DC power supply with front-to-back airflow. Figure 2-6 shows the black stripe used to indicate back-to-front airflow (in this case on an AC power supply). Figure 2-7 shows the blank filler panel that you should install in an open power supply slot if the chassis has only one power supply.

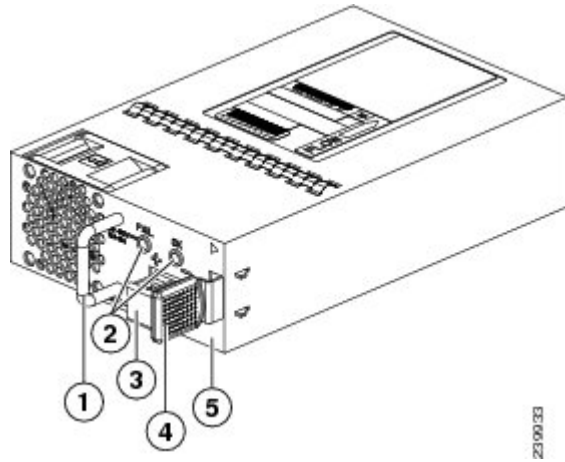
Figure 2-4 AC Power Supply with Front-to-Back Airflow for the Cisco Nexus 2200 Platform



| | | | |
|---|---------------------------------|---|---|
| 1 | Handle | 4 | No black stripe (front-to-back airflow) |
| 2 | FAIL (top) and OK (bottom) LEDs | 5 | AC power receptacle |
| 3 | Ejector latch | | |

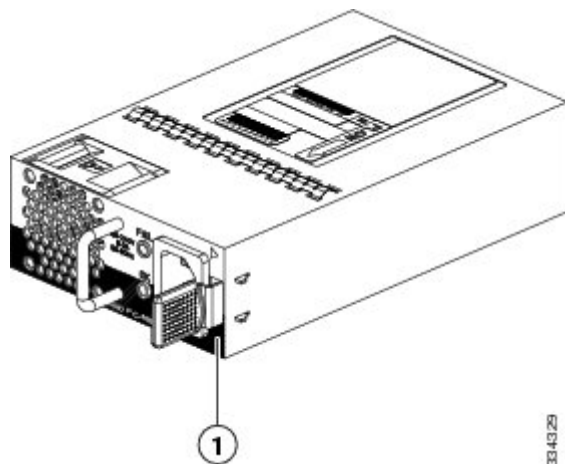
Send documentation comments to nexus5kdocs@cisco.com

Figure 2-5 DC Power Supply with Front-to-Back Airflow for the Cisco Nexus 2200 Platform

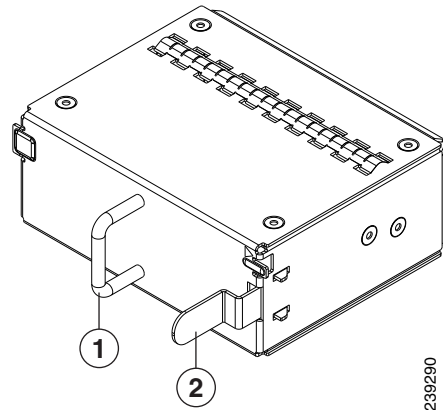


| | | | |
|----------|--------------------------------------|----------|---|
| 1 | Handle | 4 | Ejector latch |
| 2 | FAIL (left) and OK (right) LEDs | 5 | No black stripe (front-to-back airflow) |
| 3 | DC power connector with safety cover | | |

Figure 2-6 Black Stripe Used to Indicate Back-to-Front Airflow



| | | | |
|----------|--------------------------------------|--|--|
| 1 | Black stripe (back-to-front airflow) | | |
|----------|--------------------------------------|--|--|

Figure 2-7 Blank Power Supply Filler Panel for a Cisco Nexus 2200 Platform Power Supply Bay

| | |
|----------|-----------------|
| 1 Handle | 2 Ejector latch |
|----------|-----------------|

For LED descriptions, see [Table D-1 on page D-2](#).

For power supply specifications, see the “[Power Specifications](#)” section on page B-1. For details on how to replace a power supply, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

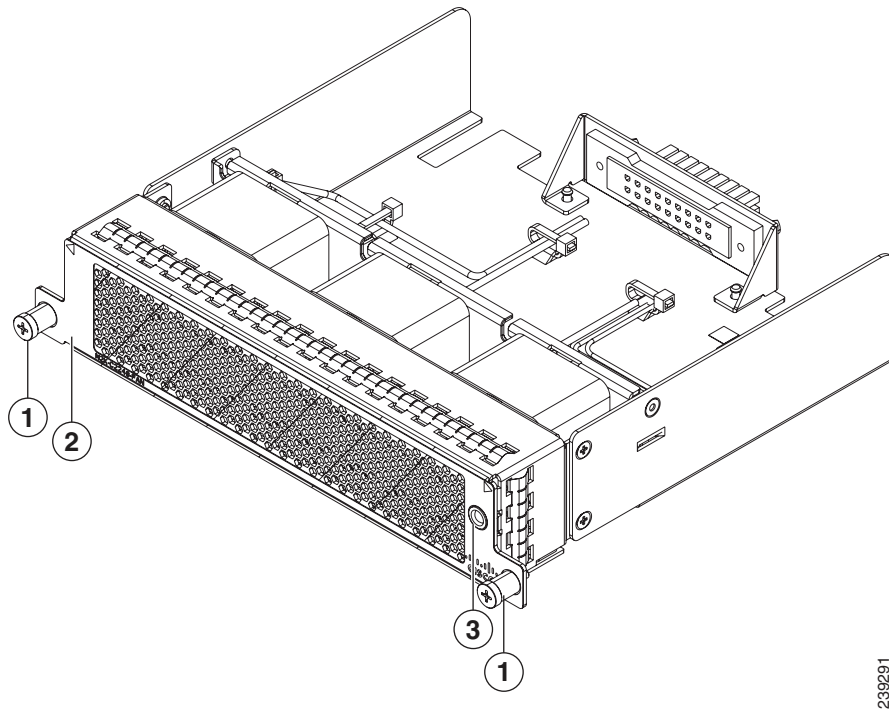
Fan Tray for the Cisco Nexus 2248TP-E FEX

The Cisco Nexus 2224TP, 2248TP, and 2248TP-E FEXs use the same fan tray that you can order with either front-to-back airflow (N2K-C2248-FAN) or back-to-front airflow (N2K-C2248-FAN-B). The fan tray includes a status LED that indicates whether the module is operational. You can hot swap the fan tray during operations as described in the “[Removing and Installing the Fan Tray](#)” section on page 3-20.

[Figure 2-8](#) shows the fan tray with front-to-back airflow (no black stripe on front) and identifies its components, and [Figure 2-9](#) shows the fan tray with back-to-front airflow (black stripe on front) and identifies its components.

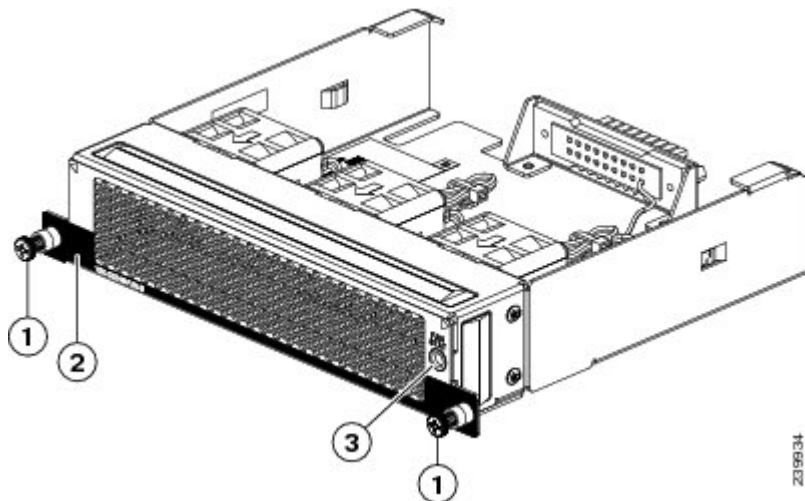
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Figure 2-8 Front-to-Back Airflow Fan Tray for the Cisco Nexus 2000 Series FEX



| | | | |
|---|--|---|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | No black stripe on the front indicates that this fan tray has front-to-back airflow. | | |

Figure 2-9 Back-to-Front Airflow Fan Tray for the Cisco Nexus 2000 Series FEX



| | | | |
|----------|---|----------|------------|
| 1 | Captive screws (2) | 3 | Status LED |
| 2 | Black stripe on the front indicates that this fan tray has back-to-front airflow. | | |

For information on this fan tray, see the “[Fan Tray for the Cisco Nexus 2248TP FEX](#)” section on [page 2-14](#) and the fan tray specifications in the “[Environmental Specifications](#)” section on [page B-4](#) and the “[Physical Specifications](#)” section on [page B-5](#). For LED descriptions, see [Table D-1](#) on [page D-2](#). To replace one of these fan trays, see the “[Removing and Installing the Fan Tray](#)” section on [page 3-20](#).

Transceivers and Connectors Supported by the Cisco Nexus 2248TP-E FEX

The Cisco Nexus 2248TP-E FEX supports SFP+ Ethernet optical and copper transceivers and optical FEX Transceivers (FETs) for up to four fabric uplink connections to Cisco Nexus 7000 Series switches, and it supports RJ-45 connectors for up to 48 downlink connections to hosts. For each uplink cable, you must use the same transceiver on both ends. [Table 2-2](#) lists the transceivers supported by this FEX for its uplink fabric .

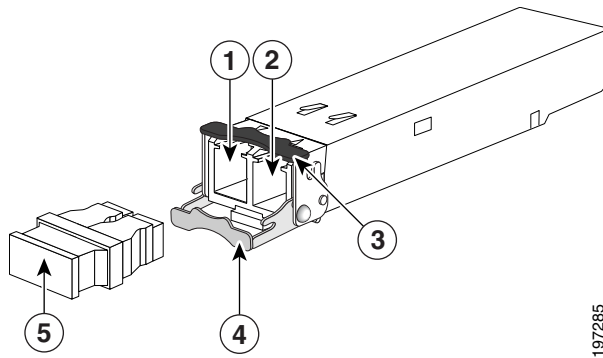
Table 2-2 Supported Transceivers and Connector for the Cisco Nexus 2248TP-E FEX Uplink Interfaces

| Transceiver or Connector | Cable Type | Fabric Interface (Uplink) | Host Interface (Downlink) | Comments |
|--------------------------|------------|---------------------------|---------------------------|--|
| FET-10G | Optical | X | – | 10 Gbps FEX transceiver |
| SFP-10G-LR | Optical | X | – | 10 Gbps long range transceiver (up to 6.2 miles [10 km]) |
| SFP-10G-SR | Optical | X | – | 10 Gbps Short range transceiver (up to 984 feet [300 m]) |
| SFP -H10GB-CU1M | Copper | X | – | 10 Gbps Twinax, passive transceiver (3.3 feet [1 meter]) |
| SFP -H10GB-CU3M | Copper | X | – | 10 Gbps Twinax, passive transceiver (9.8 feet [3 meters]) |
| SFP -H10GB-CU5M | Copper | X | – | 10 Gbps Twinax, passive transceiver (16.4 feet [5 meters]) |
| SFP -H10GB-ACU7M | Copper | X | – | 10 Gbps Twinax, active transceiver (23.0 feet [7 meters]) |
| SFP -H10GB-ACU10M | Copper | X | – | 10 Gbps Twinax, active transceiver (32.8 feet [10 meters]) |
| RJ-45 | Copper | – | X | 100/1000 Mbps Connector |

[Figure 2-10](#) shows the SFP+ optical transceiver used for uplink connections. For specifications that apply to these optical transceivers, see the “[SFP+ Optical Transceiver Specifications](#)” section on [page B-6](#).

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Figure 2-10 SFP+ Optical Transceivers and FETs

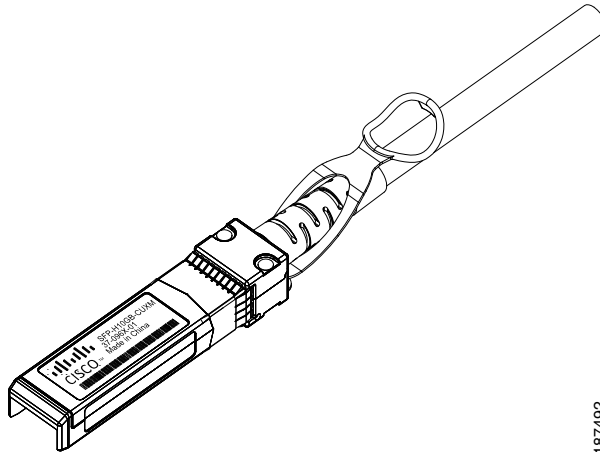


197285

| | | | |
|---|--------------------------------|---|---|
| 1 | Receive optical bore | 4 | Clasp shown in open position |
| 2 | Transmit optical bore | 5 | Dust plug (use this to protect the bores from dust contamination when the optical cables are removed) |
| 3 | Clasp shown in closed position | | |

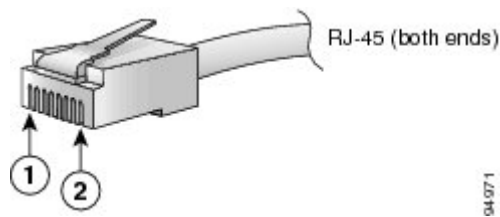
Figure 2-11 identifies the major features of the SFP+ copper transceiver and cable used for uplink connections. For the cable specifications that apply to these transceivers, see the “[SFP+ Copper Transceiver Specifications](#)” section on page B-7.

Figure 2-11 SFP+ Copper Transceiver Module



187492

Figure 2-12 identifies the major features of RJ-45 connectors, which are used for the downlink connections.

Figure 2-12 RJ-45 Connector

| | | | |
|---|-------|---|-------|
| 1 | Pin 1 | 2 | Pin 8 |
|---|-------|---|-------|

Cisco Nexus 2248TP FEX

The Cisco Nexus 2248TP FEX is a stackable 1-RU FEX that has 48 100/1000 Ethernet host-facing (downlink) ports and four 10-Gigabit Ethernet network-facing (uplink) ports. It requires a 19-inch (48.26 cm) rack for its installation. [Table 2-3](#) lists its physical characteristics.

Table 2-3 Physical Characteristics for the Cisco Nexus 2248TP FEX

| Dimensions | |
|---------------------|-----------------------|
| Width | 17.3 inches (43.9 cm) |
| Depth | 20.0 inches (50.8 cm) |
| Height | 1.72 inches (4.4 cm) |
| Weight ¹ | |
| | 17.7 lb (8.0 kg) |

1. Measured with two power supplies and one fan module installed.

You can order the Cisco Nexus 2248TP with front-to-back (port-side exhaust) or back-to-front (port-side intake) airflow and with AC or DC power supplies. If you are going to install the port side in a hot aisle, then order front-to-back airflow for the fan trays and power supplies. If you are going to install the port side in the cold aisle, order back-to-front airflow for the fan trays and power supplies.

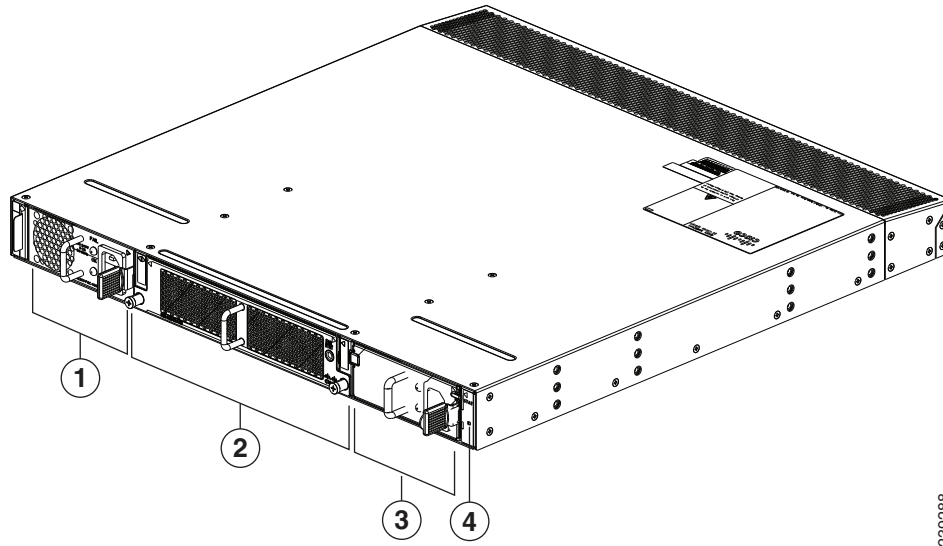
**Note**

For visual identification, back-to-front airflow fan trays and power supplies have a black stripe across their front, and front-to-back airflow modules do not have a black stripe across their front. All of the power supplies and fan trays must have the same direction of airflow for the components to properly function (all of these components must either have a black stripe or all of the components must not have a black stripe).

The front of the Cisco Nexus 2248TP FEX chassis has one or two power supplies, a fan tray, and two chassis LEDs as shown in [Figure 2-13](#). This FEX model requires one power supply, but if you want power redundancy, you must install a second power supply.

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Figure 2-13 Front View of the Cisco Nexus 2248TP Chassis

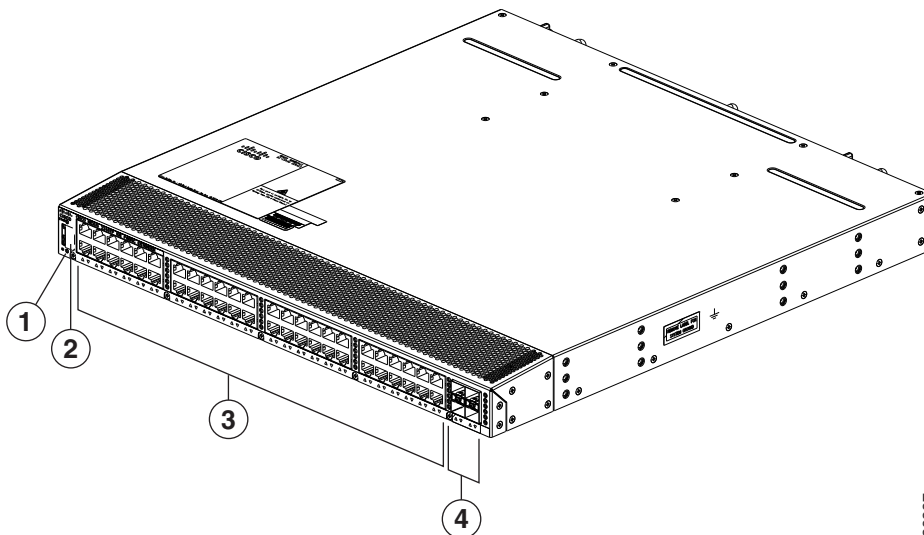


239288

| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

The rear of the Cisco Nexus 2248TP-E FEX has 48 100/1000 Ethernet downlink ports, four 10-Gigabit Ethernet uplink ports, an HDMI port, and LEDs, as shown in [Figure 2-14](#).

Figure 2-14 Rear View of the Cisco Nexus 2248TP Chassis



239287

| | | | |
|----------|-----------------------------------|----------|---|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000 Ethernet host-facing (downlink) ports (48) |
| 2 | HDMI port | 4 | 10-Gigabit Ethernet network-facing (uplink) ports (4) |

For LED descriptions, see [Table D-1 on page D-2](#).

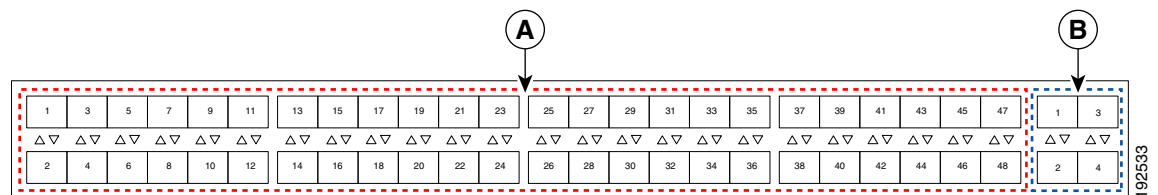
This section includes the following topics:

- [Ports for the Cisco Nexus 2248TP FEX, page 2-13](#)
- [Power Supplies for the Cisco Nexus 2248TP FEX, page 2-13](#)
- [Fan Tray for the Cisco Nexus 2248TP FEX, page 2-14](#)
- [Transceivers and Connectors Supported by the Cisco Nexus 2248TP FEX, page 2-14](#)

Ports for the Cisco Nexus 2248TP FEX

The downlink and uplink ports are numbered from top to bottom and then left to right as shown in [Figure 2-15](#).

Figure 2-15 Port Numbering on the Cisco Nexus 2248TP FEX



| | | | |
|----------|---|----------|--|
| A | 100/1000 Ethernet downlink ports, numbered 1 through 48 | B | 10-Gigabit Ethernet uplink ports, numbered 1 through 4 |
|----------|---|----------|--|



Note

For a fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module (either the N7K-M132XP-12 or N7K-M132XP-12L), connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX). If you are using the M2 Series 24-port, 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports for a fully dedicated bandwidth. If you are using the F2 Series 48-port, 10-Gigabit Ethernet I/O module (N7K-F248XP-25), use the connectivity rule order (connect the same port numbers for each port group (for example, if you connect ports 1 and 2 of a port-group, then connect the same ports of another port group)).

For information about the transceivers and connectors that you can use with these ports, see the [“Transceivers and Connectors Supported by the Cisco Nexus 2248TP FEX”](#) section on page 2-14.

Power Supplies for the Cisco Nexus 2248TP FEX

The Cisco Nexus 2200 Platform FEX chassis have two slots for front-end AC or DC power supplies that have front-to-back or back-to-front airflow. These chassis are fully functional with one power supply, but you can install a second power supply for power redundancy. You can install any of the following power supplies in those two bays:

- AC power supply with front-to-back airflow (N2200-PAC-400W)
- AC power supply with back-to-front airflow (N2200-PAC-400W-B)

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- DC power supply with front-to-back airflow (N2200-PDC-400W)
- DC power supply with back-to-front airflow (N2200-PDC-350W-B)

For information on these power supplies, see the “[Power Supplies for the Cisco Nexus 2248TP FEX](#)” section on page 2-13 and the power supply specifications in the “[Power Specifications](#)” section on page B-1. To replace one of these power supplies, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

Fan Tray for the Cisco Nexus 2248TP FEX

The Cisco Nexus 2244TP, 2248TP, and 2248TP-E FEXs use the same fan tray that you can order with either front-to-back airflow (N2K-C2248-FAN) or back-to-front airflow (N2K-C2248-FAN-B).

For information on this fan tray, see the “[Fan Tray for the Cisco Nexus 2248TP-E FEX](#)” section on page 2-7 and the fan tray specifications in the “[Environmental Specifications](#)” section on page B-4 and the “[Physical Specifications](#)” section on page B-5. For LED descriptions, see [Table D-1 on page D-2](#). To replace one of these fan trays, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20.

Transceivers and Connectors Supported by the Cisco Nexus 2248TP FEX

The Cisco Nexus 2248TP FEX supports SFP+ Ethernet optical and copper transceivers and optical FEX Transceivers (FETs) for up to four fabric uplink connections to Cisco Nexus 7000 Series switches, and it supports RJ-45 connectors for up to 48 downlink connections to hosts. For each uplink cable, you must use the same transceiver on both ends. [Table 2-2](#) lists the transceivers supported by this FEX for its uplink fabric .

Table 2-4 Supported Transceivers and Connector for the Cisco Nexus 2248TP FEX Uplink Interfaces

| Transceiver or Connector | Cable Type | Fabric Interface (Uplink) | Host Interface (Downlink) | Comments |
|--------------------------|------------|---------------------------|---------------------------|--|
| FET-10G | Optical | X | – | 10 Gbps FEX transceiver |
| SFP-10G-LR | Optical | X | – | 10 Gbps long range transceiver (up to 6.2 miles [10 km]) |
| SFP-10G-SR | Optical | X | – | 10 Gbps Short range transceiver (up to 984 feet [300 m]) |
| SFP -H10GB-CU1M | Copper | X | – | 10 Gbps Twinax, passive transceiver (3.3 feet [1 meter]) |
| SFP -H10GB-CU3M | Copper | X | – | 10 Gbps Twinax, passive transceiver (9.8 feet [3 meters]) |
| SFP -H10GB-CU5M | Copper | X | – | 10 Gbps Twinax, passive transceiver (16.4 feet [5 meters]) |
| SFP -H10GB-ACU7M | Copper | X | – | 10 Gbps Twinax, active transceiver (23.0 feet [7 meters]) |
| SFP -H10GB-ACU10M | Copper | X | – | 10 Gbps Twinax, active transceiver (32.8 feet [10 meters]) |
| RJ-45 | Copper | – | X | 100/1000 Mbps Connector |

[Figure 2-10 on page 2-10](#) shows the SFP+ optical transceiver used for uplink connections. For specifications that apply to these optical transceivers, see the “[SFP+ Optical Transceiver Specifications](#)” section on page B-6.

Figure 2-11 on page 2-10 identifies the major features of the SFP+ copper transceiver and cable used for uplink connections. For the cable specifications that apply to these transceivers, see the “SFP+ Copper Transceiver Specifications” section on page B-7.

Figure 2-12 on page 2-11 identifies the major features of RJ-45 connectors, which are used for the downlink connections.

Cisco Nexus 2232TM FEX

The Cisco Nexus 2232TM FEX is a stackable, 1- and 10-Gigabit FEX that has 32 1- and 10-Gbps Ethernet host-facing (downlink) 1/10GBASE-T ports and eight 10-Gbps Ethernet network-facing (uplink) SFP+ ports. It requires a 19-inch (48.26 cm) rack for its installation. Table 2-7 lists its physical characteristics.

Table 2-5 Physical Characteristics for the Cisco Nexus 2232TM FEX

| | |
|---------------------|------------------------|
| Dimensions | |
| Width | 17.3 inches (43.94 cm) |
| Depth | 17.7 inches (44.96 cm) |
| Height | 1.72 inches (4.37 cm) |
| Weight ¹ | 18.3 lb (8.3 kg) |

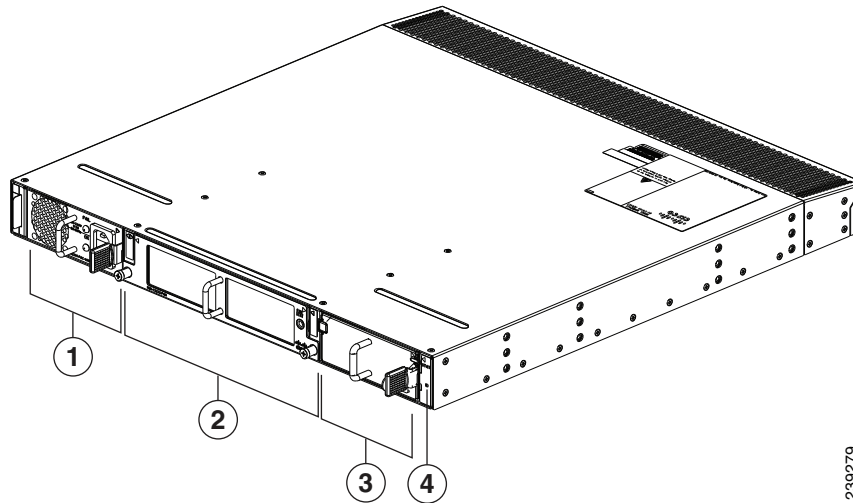
1. Measured with two power supplies and one fan module installed

You can order the Cisco Nexus 2232TM with front-to-back (port-side exhaust) or back-to-front (port-side intake) airflow and with AC or DC power supplies. If you are going to install the port side in a hot aisle, then order front-to-back airflow for the fan trays and power supplies. If you are going to install the port side in the cold aisle, order back-to-front airflow for the fan trays and power supplies.

The front of the Cisco Nexus 2232TM FEX chassis has one or two power supplies, a fan tray, and two LEDs as shown in Figure 2-16. This FEX model requires one power supply, but if you want power redundancy, you must install a second power supply.

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Figure 2-16 Front View of the Cisco Nexus 2232TM Chassis

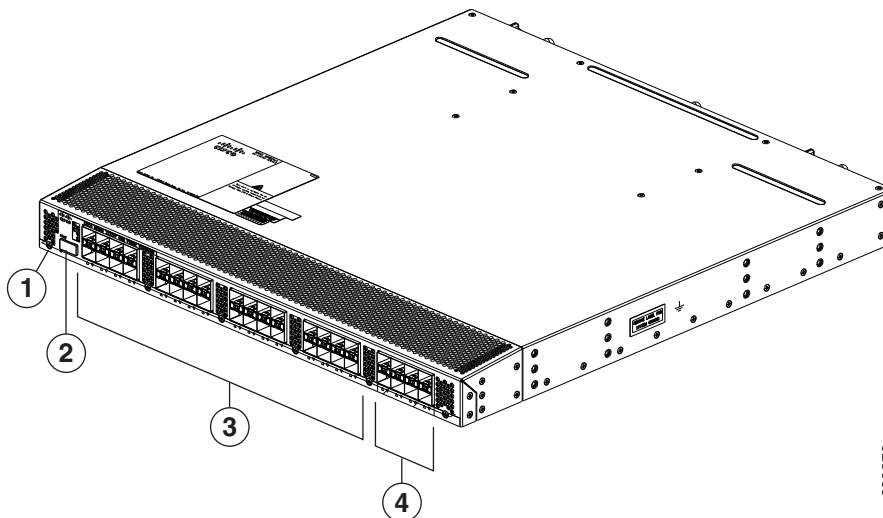


239279

| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

The rear of the Cisco Nexus 2232TM FEX has 32 1- and 10-Gigabit Ethernet downlink ports, eight 10-Gigabit Ethernet uplink ports, an HDMI port, and two LEDs, as shown in [Figure 2-22](#).

Figure 2-17 Rear View of the Cisco Nexus 2232TM Chassis



239278

| | | | |
|----------|-----------------------------------|----------|--|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 1- and 10-Gigabit host-facing Ethernet (downlink) ports (48) |
| 2 | HDMI port | 4 | 10-Gigabit network-facing Ethernet (uplink) ports (8) |

For LED descriptions, see [Table D-1 on page D-2](#).

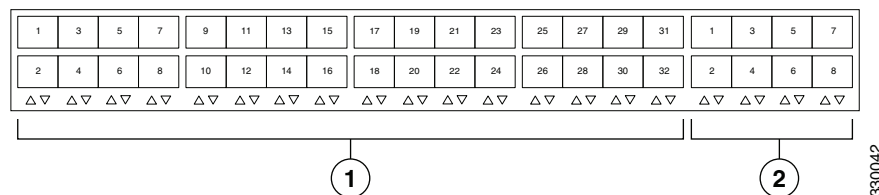
This section includes the following topics:

- [Ports for the Cisco Nexus 2232TM FEX, page 2-17](#)
- [Power Supplies for the Cisco Nexus 2232TM FEX, page 2-17](#)
- [Fan Tray for the Cisco Nexus 2232TM FEX, page 2-18](#)
- [Transceivers and Connectors Supported by the Cisco Nexus 2232TM FEX, page 2-19](#)

Ports for the Cisco Nexus 2232TM FEX

The downlink and uplink ports are numbered from top to bottom and then from left to right as shown in [Figure 2-23](#).

Figure 2-18 Port Numbering on the Cisco Nexus 2232TM FEX



| | | | |
|----------|--|----------|--|
| 1 | 1- and 10-Gigabit Ethernet downlink ports, numbered 1 through 32 | 2 | 10-Gigabit Ethernet uplink ports, numbered 1 through 8 |
|----------|--|----------|--|



Note

For a fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module (either the N7K-M132XP-12 or N7K-M132XP-12L), connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX). If you are using the M2 Series 24-port, 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports for a fully dedicated bandwidth. If you are using the F2 Series 48-port, 10-Gigabit Ethernet I/O module (N7K-F248XP-25), use the connectivity rule order (connect the same port numbers for each port group (for example, if you connect ports 1 and 2 of a port-group, then connect the same ports of another port group)).

For information about the transceivers and connectors that you can use with these ports, see the [“Transceivers and Connectors Supported by the Cisco Nexus 2232TM FEX” section on page 2-19](#).

Power Supplies for the Cisco Nexus 2232TM FEX

The Cisco Nexus 2200 Platform FEX chassis have two slots for front-end AC or DC power supplies that have front-to-back or back-to-front airflow. These chassis are fully functional with one power supply, but you can install a second power supply for power redundancy. You can install any of the following power supplies in those two bays:

- AC power supply with front-to-back airflow (N2200-PAC-400W)
- AC power supply with back-to-front airflow (N2200-PAC-400W-B)

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- DC power supply with front-to-back airflow (N2200-PDC-400W)
- DC power supply with back-to-front airflow (N2200-PDC-350W-B)

If you have only one power supply in a chassis, then you must install a blank filler plate (N2200-P-BLNK) in the open slot to maintain the designed airflow.

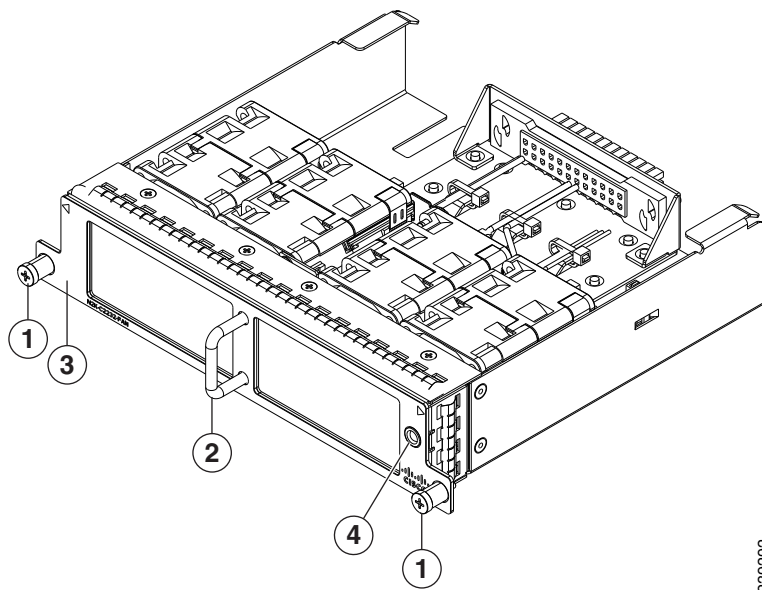
For more information on these power supplies, see the “[Power Supplies for the Cisco Nexus 2248TP-E FEX](#)” section on page 2-4 and the power supply specifications in the “[Power Specifications](#)” section on page B-1. To replace one of these power supplies, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

Fan Tray for the Cisco Nexus 2232TM FEX

The Cisco Nexus 2232PP and 2232TM FEX use the same fan tray, which you can order with either front-to-back airflow (N2K-C2248-FAN) or back-to-front airflow (N2K-C2248-FAN-B). The fan tray includes a status LED that indicates whether the module is operational. You can hot swap the fan tray during operations as described in the “[Removing and Installing the Fan Tray](#)” section on page 3-20.

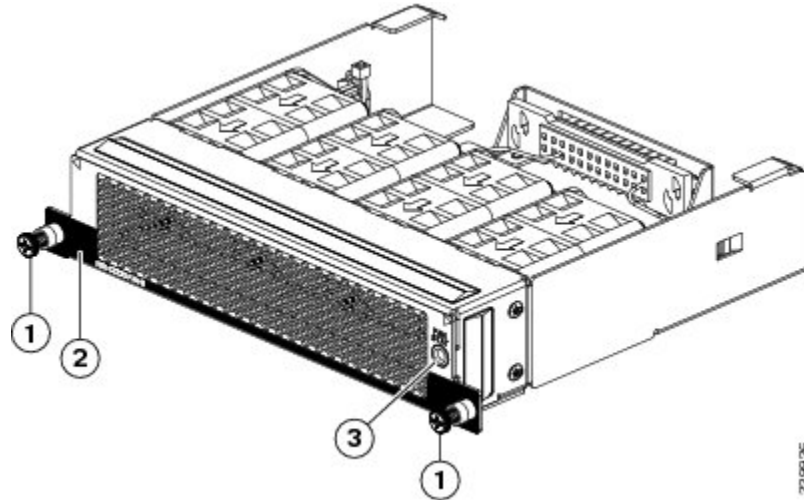
[Figure 2-19](#) shows the fan tray with front-to-back airflow (no black stripe across the front), and [Figure 2-20](#) shows the fan tray with back-to-front airflow (black stripe across the front).

Figure 2-19 Front-to-Back Airflow Fan Tray for the Cisco Nexus 2232PP and 2232TM FEXs



| | | | |
|---|--|---|---|
| 1 | Captive screws (2) | 3 | Front-to-back airflow indicated by a lack of black stripe on the front. |
| 2 | Handle used for removing and installing the module | 4 | Status LED |

Figure 2-20 Back-to-Front Airflow Fan Tray for the Cisco Nexus 2232PP and 2232TM FEXs



| | | | |
|---|--|---|---|
| 1 | Captive screws (2) | 3 | Back-to-front airflow indicated by a black stripe on the front. |
| 2 | Handle used for removing and installing the module | 4 | Status LED |

For more information on this fan tray, see the fan tray specifications in the “[Environmental Specifications](#)” section on page B-4 and the “[Physical Specifications](#)” section on page B-5. For LED descriptions, see [Table D-1](#) on page D-2. To replace one of these fan trays, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20.

Transceivers and Connectors Supported by the Cisco Nexus 2232TM FEX

The Cisco Nexus 2232TM FEX supports SFP+ Ethernet optical and copper transceivers and optical FEX Transceivers (FETs) for up to eight fabric uplink connections to the following Cisco Nexus 7000 Series switch I/O modules:

- F2 Series 48-port 10-Gigabit I/O module (N7K-F248XP-25)
- M1 Series 32-port, 10-Gigabit Ethernet I/O module (N7K-M132XP-12)
- M1 Series 32-port, 10-Gigabit Ethernet I/O module with XL option (N7K-M132XP-12L)
- M2 Series 24-port 10-Gigabit I/O module (N7K-M224XP-23L)

You must use the same transceivers on both ends of the same uplink cable.



Note

To get the fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module, connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX) and use the shared mode on the I/O module. If you are using the F2 Series 48-port 10-Gigabit Ethernet I/O module (N7K-F248XP-25) or the M2 Series 24-port 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports.

The Cisco Nexus 2232TM FEX also supports RJ-45 connectors for up to 32 downlink connections to hosts. [Table 2-2](#) lists the transceivers supported by this FEX for its uplink and downlink connections.

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Table 2-6 Supported Transceivers and Connector for the Cisco Nexus 2232TM FEX Uplink Interfaces

| Transceiver or Connector | Cable Type | Fabric Interface (Uplink) | Host Interface (Downlink) | Comments |
|------------------------------|------------|---------------------------|---------------------------|--|
| FET-10G | Optical | X | – | 10 Gbps FEX transceiver |
| SFP-10G-LR | Optical | X | – | 10 Gbps long range transceiver (up to 6.2 miles [10 km]) |
| SFP-10G-SR | Optical | X | – | 10 Gbps Short range transceiver (up to 984 feet [300 m]) |
| SFP -H10GB-CU1M ¹ | Copper | X | – | 10 Gbps Twinax, passive transceiver (3.3 feet [1 meter]) |
| SFP -H10GB-CU3M | Copper | X | – | 10 Gbps Twinax, passive transceiver (9.8 feet [3 meters]) |
| SFP -H10GB-CU5M | Copper | X | – | 10 Gbps Twinax, passive transceiver (16.4 feet [5 meters]) |
| SFP -H10GB-ACU7M | Copper | X | – | 10 Gbps Twinax, active transceiver (23.0 feet [7 meters]) |
| SFP -H10GB-ACU10M | Copper | X | – | 10 Gbps Twinax, active transceiver (32.8 feet [10 meters]) |
| RJ-45 | Copper | – | X | 100/1000 Mbps Connector |

1. The SFP-H10GB-CUxM transceivers are not supported by the M1 Series 32-port 10-Gigabit Ethernet I/O module (N7K-M132XP-12). These transceivers are supported by the other Cisco Nexus 7000 Series I/O modules.

Figure 2-10 on page 2-10 shows the major features of the SFP+ optical transceiver used for uplink connections. For specifications that apply to these optical transceivers, see the “[SFP+ Optical Transceiver Specifications](#)” section on page B-6.

Figure 2-11 on page 2-10 shows the major features of the SFP+ copper transceiver and cable used for uplink connections. For the cable specifications that apply to these transceivers, see the “[SFP+ Copper Transceiver Specifications](#)” section on page B-7.

Figure 2-12 on page 2-11 shows the major features of RJ-45 connectors, which are used for the downlink connections.

Cisco Nexus 2232PP FEX

The Cisco Nexus 2232PP FEX is a stackable 1- and 10-Gigabit FEX that has 32 1- and 10-Gbps Ethernet host-facing (downlink) SFP or SFP+ ports and eight 10-Gbps Ethernet and Fibre Channel over Ethernet (FCoE) network-facing (uplink) SFP+ or FET ports. It requires a 19-inch (48.26 cm) rack for its installation. [Table 2-7](#) lists its physical characteristics.

Table 2-7 Physical Characteristics for the Cisco Nexus 2232PP FEX

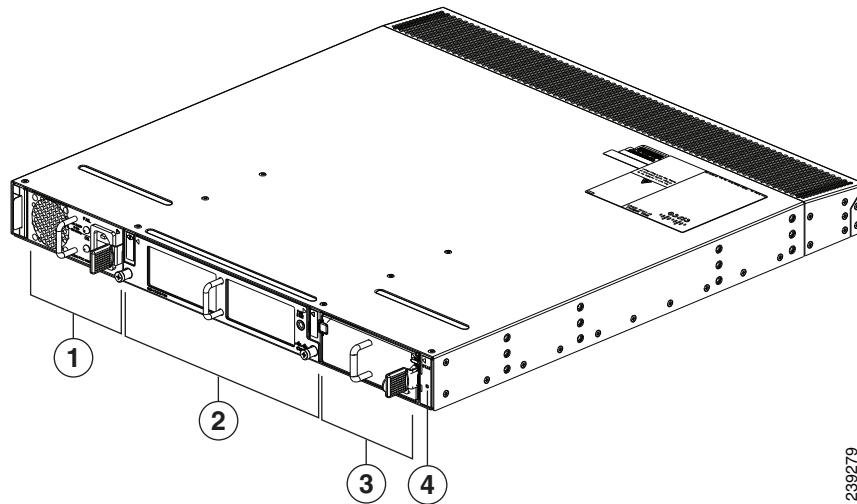
| | |
|---------------------|------------------------|
| Dimensions | |
| Width | 17.3 inches (43.94 cm) |
| Depth | 17.7 inches (44.96 cm) |
| Height | 1.72 inches (4.37 cm) |
| Weight ¹ | 18.3 lb (8.3 kg) |

1. Measured with two power supplies and one fan module installed

You can order the Cisco Nexus 2232PP with front-to-back (port-side exhaust) or back-to-front (port-side intake) airflow and with AC or DC power supplies. If you are going to install the port side in a hot aisle, then order front-to-back airflow for the fan trays and power supplies. If you are going to install the port side in the cold aisle, order back-to-front airflow for the fan trays and power supplies.

The front of the Cisco Nexus 2232PP FEX chassis has one or two power supplies, a fan tray, and two LEDs as shown in [Figure 2-21](#). This FEX model requires one power supply, but if you want power redundancy, you must install a second power supply.

Figure 2-21 Front View of the Cisco Nexus 2232PP Chassis

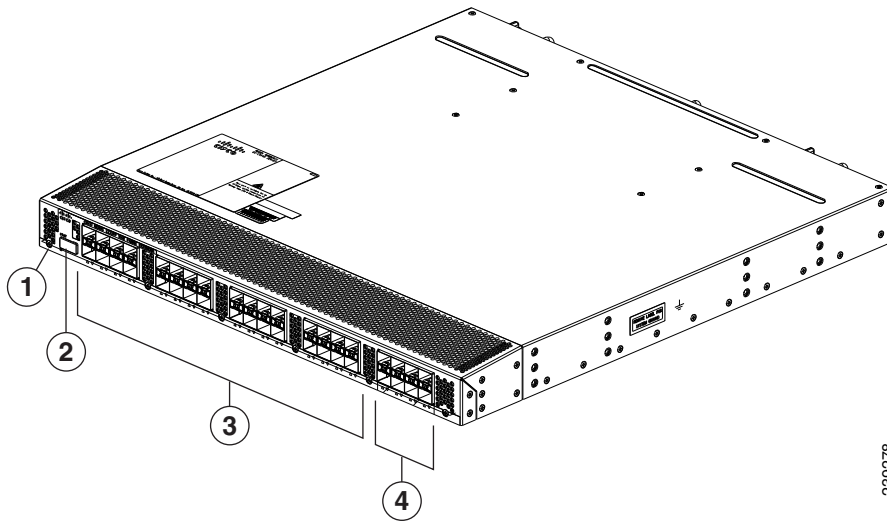


| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

The rear of the Cisco Nexus 2232PP FEX has 32 1- and 10-Gigabit Ethernet downlink SFP or SFP+ ports, eight 10-Gigabit Ethernet uplink SFP+ or FET ports, an HDMI port, and two LEDs, as shown in [Figure 2-22](#).

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Figure 2-22 Rear View of the Cisco Nexus 2232PP Chassis



| | | | |
|----------|-----------------------------------|----------|--|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 1- and 10-Gigabit host-facing Ethernet (downlink) SFP or SFP+ ports (48) |
| 2 | HDMI port | 4 | 10-Gigabit network-facing Ethernet (uplink) SFP+ ports (4) |

For LED descriptions, see [Table D-1 on page D-2](#).

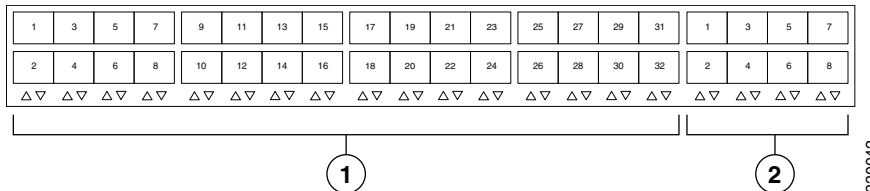
This section includes the following topics:

- [Ports for the Cisco Nexus 2232PP FEX, page 2-22](#)
- [Power Supplies for the Cisco Nexus 2232PP FEX, page 2-23](#)
- [Fan Tray for the Cisco Nexus 2232PP FEX, page 2-23](#)
- [Transceivers Supported by the Cisco Nexus 2232PP FEX, page 2-24](#)

Ports for the Cisco Nexus 2232PP FEX

The downlink and uplink ports are numbered from top to bottom and then from left to right as shown in [Figure 2-23](#).

Figure 2-23 Port Numbering on the Cisco Nexus 2232PP FEX



| | | | |
|----------|--|----------|--|
| 1 | 1- and 10-Gigabit Ethernet downlink ports, numbered 1 through 32 | 2 | 10-Gigabit Ethernet uplink ports, numbered 1 through 8 |
|----------|--|----------|--|

**Note**

For a fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module (either the N7K-M132XP-12 or N7K-M132XP-12L), connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX). If you are using the M2 Series 24-port, 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports for a fully dedicated bandwidth. If you are using the F2 Series 48-port, 10-Gigabit Ethernet I/O module (N7K-F248XP-25), use the connectivity rule order (connect the same port numbers for each port group (for example, if you connect ports 1 and 2 of a port-group, then connect the same ports of another port group)).

For information about the transceivers and connectors that you can use with these ports, see the [“Transceivers Supported by the Cisco Nexus 2232PP FEX”](#) section on page 2-24.

Power Supplies for the Cisco Nexus 2232PP FEX

The Cisco Nexus 2200 Platform FEX chassis have two slots for front-end AC or DC power supplies that have front-to-back or back-to-front airflow. These chassis are fully functional with one power supply, but you can install a second power supply for power redundancy. You can install any of the following power supplies in those two bays:

- AC power supply with front-to-back airflow (N2200-PAC-400W)
- AC power supply with back-to-front airflow (N2200-PAC-400W-B)
- DC power supply with front-to-back airflow (N2200-PDC-400W)
- DC power supply with back-to-front airflow (N2200-PDC-350W-B)

For information on these power supplies, see the [“Power Supplies for the Cisco Nexus 2248TP FEX”](#) section on page 2-13 and the power supply specifications in the [“Power Specifications”](#) section on page B-1. To replace one of these power supplies, see the [“Removing and Installing Power Supplies”](#) section on page 3-17.

Fan Tray for the Cisco Nexus 2232PP FEX

The Cisco Nexus 2232PP and 2232TM FEX use the same fan tray, which you can order with either front-to-back airflow (N2K-C2232-FAN) or back-to-front airflow (N2K-C2232-FAN-B).

For more information on this fan tray, see the [“Fan Tray for the Cisco Nexus 2232TM FEX”](#) section on page 2-18 and the fan tray specifications in the [“Environmental Specifications”](#) section on page B-4 and the [“Physical Specifications”](#) section on page B-5. For LED descriptions, see [Table D-1](#) on page D-2. To replace one of these fan trays, see the [“Removing and Installing the Fan Tray”](#) section on page 3-20.

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Transceivers Supported by the Cisco Nexus 2232PP FEX

The Cisco Nexus 2232PP FEX supports SFP+ Ethernet optical and copper transceivers and optical FEX Transceivers (FETs) for up to eight fabric uplink connections to the following Cisco Nexus 7000 Series switch I/O modules:

- F2 Series 48-port 10-Gigabit I/O module (N7K-F248XP-25)
- M1 Series 32-port 10-Gigabit Ethernet I/O module (N7K-M132XP-12)
- M1 Series 32-port 10-Gigabit Ethernet I/O module with XL option (N7K-M132XP-12L)
- M2 Series 24-port 10-Gigabit I/O module (N7K-M224XP-23L)

You must use the same transceivers on both ends of the same uplink cable.



Note

To get the fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module, connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX) and use the shared mode on the I/O module. If you are using the F2 Series 48-port 10-Gigabit Ethernet I/O module (N7K-F248XP-25) or the M2 Series 24-port 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports.

The Cisco Nexus 2232TM FEX also supports RJ-45 connectors for up to 32 downlink connections to hosts. [Table 2-2](#) lists the transceivers supported by this FEX for its uplink and downlink connections.

Table 2-8 Supported Transceivers and Connector for the Cisco Nexus 2232TM FEX Uplink Interfaces

| Transceiver or Connector | Cable Type | Fabric Interface (Uplink) | Host Interface (Downlink) | Comments |
|------------------------------|------------|---------------------------|---------------------------|---|
| FET-10G | Optical | X | – | 10 Gigabit FEX transceiver |
| GLC-LH-SM | Optical | – | X | Gigabit SFP transceiver |
| GLC-SX-MM | Optical | – | X | Gigabit SFP transceiver |
| GLC-T | Copper | – | X | Gigabit SFP transceiver |
| SFP-10G-LR | Optical | X | X | 10 Gigabit long range transceiver (up to 6.2 miles [10 km]) |
| SFP-10G-SR | Optical | X | X | 10 Gigabit Short range transceiver (up to 984 feet [300 m]) |
| SFP-GE-L | Optical | – | X | Gigabit SFP transceiver |
| SFP-GE-S | Optical | – | X | Gigabit SFP transceiver |
| SFP-GE-T | Copper | – | X | Gigabit SFP transceiver |
| SFP -H10GB-CU1M ¹ | Copper | X | X | 10 Gigabit Twinax, passive transceiver (3.3 feet [1 meter]) |
| SFP -H10GB-CU3M ¹ | Copper | X | X | 10 Gigabit Twinax, passive transceiver (9.8 feet [3 meters]) |
| SFP -H10GB-CU5M ¹ | Copper | X | X | 10 Gigabit Twinax, passive transceiver (16.4 feet [5 meters]) |
| SFP -H10GB-ACU7M | Copper | X | X | 10 Gigabit Twinax, active transceiver (23.0 feet [7 meters]) |
| SFP -H10GB-ACU10M | Copper | X | X | 10 Gigabit Twinax, active transceiver (32.8 feet [10 meters]) |

1. The SFP-H10GB-CUxM transceivers are not supported by the M1 Series 32-port 10-Gigabit Ethernet I/O module (N7K-M132XP-12). These transceivers are supported by the other Cisco Nexus 7000 Series I/O modules.

Figure 2-10 on page 2-10 shows the major features of the SFP+ optical transceiver used for uplink connections. For specifications that apply to these optical transceivers, see the “SFP+ Optical Transceiver Specifications” section on page B-6.

Figure 2-11 on page 2-10 shows the major features of the SFP+ copper transceiver and cable used for uplink connections. For the cable specifications that apply to these transceivers, see the “SFP+ Copper Transceiver Specifications” section on page B-7.

Figure 2-12 on page 2-11 shows the major features of RJ-45 connectors, which are used for the downlink connections.

Cisco Nexus 2224TP FEX

The Cisco Nexus 2224TP FEX is a stackable Gigabit Ethernet FEX that has 24 100/1000BASE-T Ethernet host-facing (downlink) RJ-45 ports and two 10-Gigabit Ethernet network-facing (uplink) SFP+ ports. It requires a 19-inch (48.26 cm) rack for its installation. Table 2-9 lists its physical characteristics.

Table 2-9 Physical Characteristics for the Cisco Nexus 2224TP FEX

| | |
|---------------------|------------------------|
| Dimensions | |
| Width | 17.3 inches (43.94 cm) |
| Depth | 17.7 inches (44.96 cm) |
| Height | 1.72 inches (4.37 cm) |
| Weight ¹ | 16.6 lb (7.53 kg) |

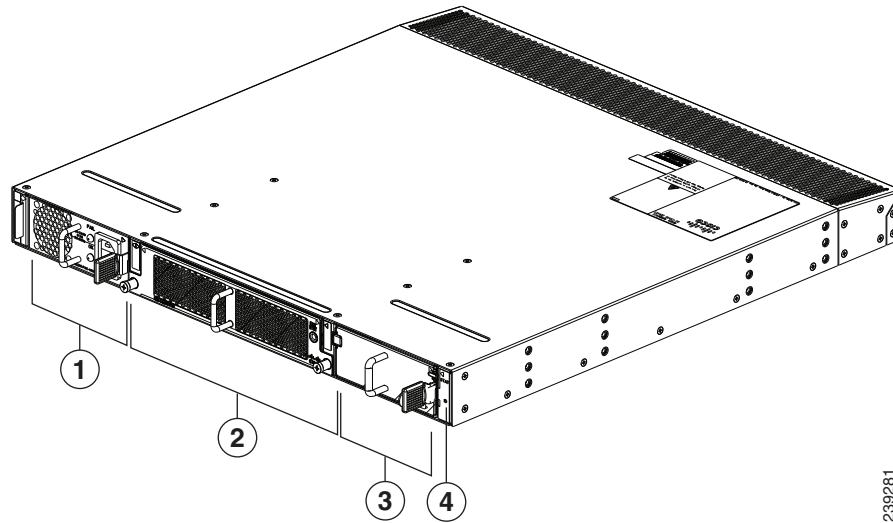
1. Measured with two power supplies and one fan module installed.

You can order the Cisco Nexus 2224TP FEX with front-to-back (port-side exhaust) or back-to-front (port-side intake) airflow and with AC or DC power supplies. If you are going to install the port side in a hot aisle, then order front-to-back airflow for the fan trays and power supplies. If you are going to install the port side in the cold aisle, order back-to-front airflow for the fan trays and power supplies.

The front of the Cisco Nexus 2224TP FEX chassis has one or two power supplies, a fan tray, and two LEDs as shown in Figure 2-24. This FEX model requires one power supply, but if you want power redundancy, you must install a second power supply.

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Figure 2-24 Front View of the Cisco Nexus 2224TP Chassis

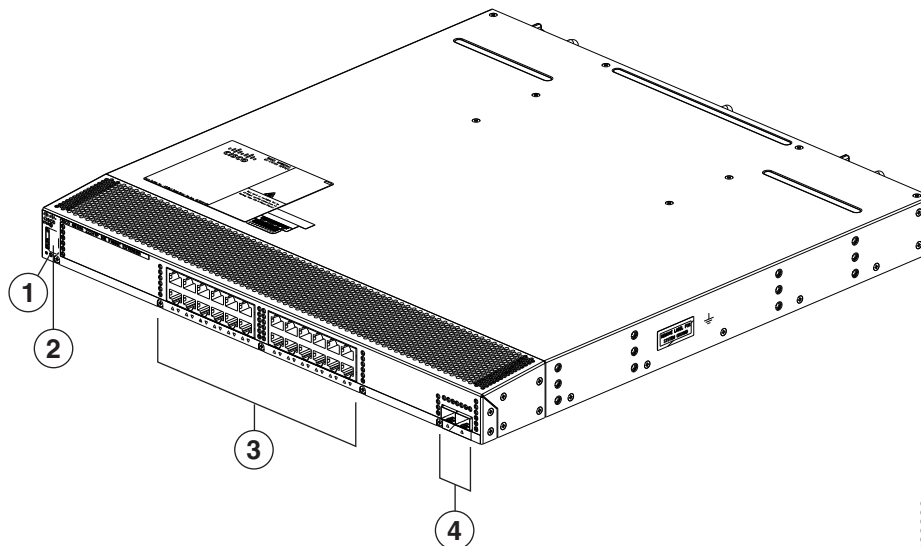


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| | | | |
|----------|--------------|----------|-----------------------------------|
| 1 | Power supply | 3 | Power supply (blank shown) |
| 2 | Fan tray | 4 | Status (top) and ID (bottom) LEDs |

The rear of the Cisco Nexus 2224TP FEX has 24 100/1000 BASE-T Ethernet downlink ports, two 10-Gigabit Ethernet uplink ports, an HDMI port, and LEDs, as shown in [Figure 2-25](#).

Figure 2-25 Rear View of the Cisco Nexus 2224TP Chassis



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| | | | |
|----------|-----------------------------------|----------|---------------------------------------|
| 1 | Status (top) and ID (bottom) LEDs | 3 | 100/1000 Ethernet downlink ports (24) |
| 2 | HDMI port | 4 | 10-Gigabit Ethernet uplink ports (2) |

For LED descriptions, see [Table D-1 on page D-2](#).

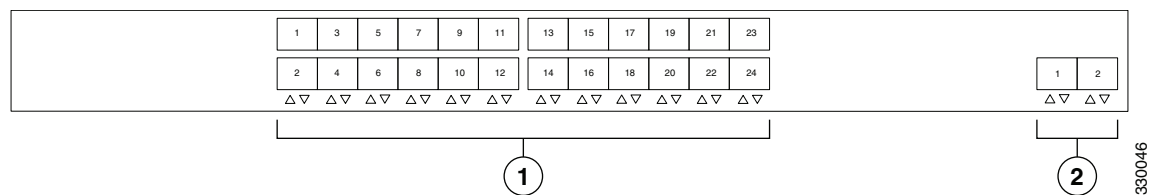
This section includes the following topics:

- [Ports for the Cisco Nexus 2224TP FEX, page 2-27](#)
- [Power Supplies for the Cisco Nexus 2224TP FEX, page 2-27](#)
- [Fan Tray for the Cisco Nexus 2224TP FEX, page 2-28](#)
- [Transceivers and Connectors Supported by the Cisco Nexus 2224TP FEX, page 2-28](#)

Ports for the Cisco Nexus 2224TP FEX

The downlink and uplink ports are numbered from top to bottom and then from left to right as shown in [Figure 2-26](#).

Figure 2-26 Port Numbering on the Cisco Nexus 2224TP FEX



| | | | |
|----------|--|----------|--|
| 1 | 1- and 10-Gigabit Ethernet downlink ports, numbered 1 through 24 | 2 | 10-Gigabit Ethernet uplink ports, numbered 1 through 2 |
|----------|--|----------|--|



Note

For a fully dedicated 10-Gbps bandwidth through a M1 Series 32-port 10-Gigabit Ethernet I/O module (either the N7K-M132XP-12 or N7K-M132XP-12L), connect each FEX to one port in a set of four shared ports on the module (you connect each set of shared ports to one FEX). If you are using the M2 Series 24-port, 10-Gigabit Ethernet I/O module (N7K-M224XP-23L), you can connect the FEX to any of its ports for a fully dedicated bandwidth. If you are using the F2 Series 48-port, 10-Gigabit Ethernet I/O module (N7K-F248XP-25), use the connectivity rule order (connect the same port numbers for each port group (for example, if you connect ports 1 and 2 of a port-group, then connect the same ports of another port group)).

For information about the transceivers and connectors that you can use with these ports, see the [“Transceivers and Connectors Supported by the Cisco Nexus 2224TP FEX” section on page 2-28](#).

Power Supplies for the Cisco Nexus 2224TP FEX

The Cisco Nexus 2200 Platform FEX chassis have two slots for front-end AC or DC power supplies that have front-to-back or back-to-front airflow. These chassis are fully functional with one power supply, but you can install a second power supply for power redundancy. You can install any of the following power supplies in those two bays:

- AC power supply with front-to-back airflow (N2200-PAC-400W)
- AC power supply with back-to-front airflow (N2200-PAC-400W-B)

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- DC power supply with front-to-back airflow (N2200-PDC-400W)
- DC power supply with back-to-front airflow (N2200-PDC-350W-B)

For information on these power supplies, see the “[Power Supplies for the Cisco Nexus 2248TP FEX](#)” section on page 2-13 and the power supply specifications in the “[Power Specifications](#)” section on page B-1. To replace one of these power supplies, see the “[Removing and Installing Power Supplies](#)” section on page 3-17.

Fan Tray for the Cisco Nexus 2224TP FEX

The Cisco Nexus 2224TP, 2248TP, and 2248TP-E FEXs use the same fan tray that you can order with either front-to-back airflow (N2K-C2248-FAN) or back-to-front airflow (N2K-C2248-FAN-B).

For information on this fan tray, see the “[Fan Tray for the Cisco Nexus 2248TP FEX](#)” section on page 2-14 and the fan tray specifications in the “[Environmental Specifications](#)” section on page B-4 and the “[Physical Specifications](#)” section on page B-5. For LED descriptions, see [Table D-1 on page D-2](#). To replace one of these fan trays, see the “[Removing and Installing the Fan Tray](#)” section on page 3-20.

Transceivers and Connectors Supported by the Cisco Nexus 2224TP FEX

The Cisco Nexus 2224TP FEX supports SFP+ Ethernet optical and copper transceivers and optical FEX Transceivers (FETs) for up to four fabric uplink connections to Cisco Nexus 7000 Series switches, and it supports RJ-45 connectors for up to 48 downlink connections to hosts. For each uplink cable, you must use the same transceiver on both ends. [Table 2-2](#) lists the transceivers supported by this FEX for its uplink fabric .

Table 2-10 Supported Transceivers and Connector for the Cisco Nexus 2224TP FEX Uplink Interfaces

| Transceiver or Connector | Cable Type | Fabric Interface (Uplink) | Host Interface (Downlink) | Comments |
|--------------------------|------------|---------------------------|---------------------------|--|
| FET-10G | Optical | X | – | 10 Gbps FEX transceiver |
| SFP-10G-LR | Optical | X | – | 10 Gbps long range transceiver (up to 6.2 miles [10 km]) |
| SFP-10G-SR | Optical | X | – | 10 Gbps Short range transceiver (up to 984 feet [300 m]) |
| SFP -H10GB-CU1M | Copper | X | – | 10 Gbps Twinax, passive transceiver (3.3 feet [1 meter]) |
| SFP -H10GB-CU3M | Copper | X | – | 10 Gbps Twinax, passive transceiver (9.8 feet [3 meters]) |
| SFP -H10GB-CU5M | Copper | X | – | 10 Gbps Twinax, passive transceiver (16.4 feet [5 meters]) |
| SFP -H10GB-ACU7M | Copper | X | – | 10 Gbps Twinax, active transceiver (23.0 feet [7 meters]) |
| SFP -H10GB-ACU10M | Copper | X | – | 10 Gbps Twinax, active transceiver (32.8 feet [10 meters]) |
| RJ-45 | Copper | – | X | 100/1000 Mbps Connector |

[Figure 2-10 on page 2-10](#) shows the SFP+ optical transceiver used for uplink connections. For specifications that apply to these optical transceivers, see the “[SFP+ Optical Transceiver Specifications](#)” section on page B-6.

[Figure 2-11 on page 2-10](#) identifies the major features of the SFP+ copper transceiver and cable used for uplink connections. For the cable specifications that apply to these transceivers, see the [“SFP+ Copper Transceiver Specifications” section on page B-7](#).

[Figure 2-12 on page 2-11](#) identifies the major features of RJ-45 connectors, which are used for the downlink connections.

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CHAPTER 3

Installing a Cisco Nexus 2000 Series Fabric Extender

This chapter describes how to install the Cisco Nexus 2000 Series Fabric Extenders (FEXs) and includes the following sections:

- [Preparing for Installation, page 3-2](#)
- [Installing the Cisco Nexus 2000 Series Fabric Extender Chassis in a Cabinet or Rack, page 3-5](#)
- [Grounding the System, page 3-9](#)
- [Grounding the Chassis, page 3-14](#)
- [Starting the Cisco Nexus 2000 Series Fabric Extender, page 3-15](#)
- [Removing and Installing Components, page 3-17](#)
- [Repacking the Cisco Nexus 2000 Series Fabric Extender for Return Shipment, page 3-22](#)



Note

Before you install, operate, or service the system, read the *Regulatory Compliance and Safety Information for the Cisco Nexus 5000 Series Switches and Cisco Nexus 2000 Series Fabric Extenders* for important safety information.



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.
Statement 1071



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 must be allowed to install, replace, or service this equipment.
Statement 1030

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Preparing for Installation

This section includes the following topics:

- [Installation Options, page 3-2](#)
- [Airflow Considerations, page 3-2](#)
- [Chassis Weight, page 3-3](#)
- [Installation Guidelines, page 3-3](#)
- [Required Tools and Equipment, page 3-4](#)
- [Unpacking and Inspecting the Cisco Nexus 2000 Series Fabric Extender, page 3-4](#)

Installation Options

The Cisco Nexus 2000 Series FEX can be installed using the following methods:

- In an open EIA rack, using the following items:
 - The rack-mount kit shipped with the device
 - The EIA Shelf Bracket Kit (an optional kit, purchased separately)
- In a perforated or solid-walled EIA cabinet, using one of the following:
 - The rack-mount kit shipped with the device
 - The EIA Shelf Bracket Kit (an optional kit, purchased separately)

For instructions on installing the device using the rack-mount kit shipped with the device, see the [“Installing the Cisco Nexus 2000 Series Fabric Extender Chassis in a Cabinet or Rack”](#) section on page 3-5.

**Note**

The optional EIA Shelf Bracket Kit is not provided with the device. To order the kit, contact your device provider.

Airflow Considerations

Airflow through the Cisco Nexus 2000 Series FEX is from the front to the back or the back to the front. To ensure proper airflow, follow these guidelines:

- Position the chassis so that its air intake side (front side for front-to-back airflow or back side for back-to-front airflow) is in a cold aisle. Otherwise, an overtemperature condition can occur and the system can shut down.
- Avoid having the air intake where other systems exhaust air.
- Due to the shallow depth of the Cisco Nexus 2000 Series FEX, it is also possible for air to recirculate across the top and bottom of the chassis in a partially populated rack.
- Make sure that the fan tray and power supply modules all use the same direction of airflow. All of the modules should have no black stripe (front-to-back airflow) or all of the modules should have a black stripe (back-to-front airflow).
- Maintain ambient airflow throughout the data center to ensure normal operation.

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- Consider the heat dissipation of all equipment when determining air-conditioning requirements. When evaluating airflow requirements, take into consideration that hot air generated by equipment at the bottom of the rack can be drawn in the intake ports of the equipment above.
- If you mount a chimney type of rack, avoid mounting it in a way that is contrary to the direction of flow in the chimney, where the chimney overpowers the system fans.

Chassis Weight

When lifting the system, follow these guidelines:

- Disconnect all power and external cables before lifting the system.
- Have two people lift the system. The Cisco Nexus 2000 Series FEXs can weigh up to 18.5 pounds (8.4 kg).
- 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.

Installation Guidelines

When installing the Cisco Nexus 2000 Series FEX, follow these guidelines:

- Plan your site configuration and prepare the site before installing the chassis. [Appendix G, “Site Preparation and Maintenance Records,”](#) lists the recommended site planning tasks.
- Record the information listed in [Appendix G, “Site Preparation and Maintenance Records,”](#) as you install and configure the device.
- Ensure that there is adequate space around the device to allow for servicing the device and for adequate airflow ([Appendix B, “Technical Specifications,”](#) lists airflow requirements).
- Ensure that the air-conditioning meets the heat dissipation requirements listed in [Appendix B, “Technical Specifications.”](#)
- Ensure that the air intake is not located where the FEX would take in exhaust air from other systems.
- Ensure that the cabinet or rack meets the requirements listed in [Appendix A, “Cabinet and Rack Installation.”](#)



Note Jumper power cords are available for use in a cabinet. See the [“Jumper Power Cord”](#) section on [page C-8](#).

- Ensure that the chassis is adequately grounded. If the device is not mounted in a grounded rack, we recommend connecting both the system ground on the chassis and the power supply ground to an earth ground.
- Ensure that the site power meets the power requirements listed in [Appendix B, “Technical Specifications.”](#) If available, you can use an uninterrupted power supply (UPS) to protect against power failures.

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Caution

Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco Nexus 2000 Series FEX, which can have substantial current draw fluctuations because of fluctuating data traffic patterns.

- Ensure that circuits are sized according to local and national codes. For North America, the power supply requires a 15-A or 20-A circuit.


Caution

To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the device are within the current ratings for the wiring and breakers.

- Use the following screw torques when installing the device:
 - Captive screws: 4 in-lb
 - M3 screws: 4 in-lb
 - M4 screws: 12 in-lb
 - 10-32 screws: 20 in-lb
 - 12-24 screws: 30 in-lb

Required Tools and Equipment

Before beginning the installation, ensure that the following items are ready:

- Number 1 and number 2 Phillips screwdrivers with torque capability
- 3/16-inches flat-blade screwdriver
- Tape measure and level
- ESD wrist strap or other grounding device
- Antistatic mat or antistatic foam

The following additional items (not found in the accessory kit) are required to ground the chassis:

- Grounding cable (6 AWG recommended), sized according to local and national installation requirements; the required length depends on the proximity of the Cisco Nexus 2000 Series FEX to proper grounding facilities
- Crimping tool large enough to accommodate girth of lug
- Wire-stripping tool

Unpacking and Inspecting the Cisco Nexus 2000 Series Fabric Extender


Caution

When handling device components, wear an ESD wrist strap and handle modules by the carrier edges only. An ESD socket is provided on the chassis. For the ESD socket to be effective, the chassis must be grounded through the power cable, the chassis ground, or the metal-to-metal contact with a grounded rack.

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Tip

Keep the shipping container in case the chassis requires shipping in the future.



Note

The device is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

To inspect the shipment, follow these steps:

-
- Step 1** Compare the shipment to the equipment list provided by your customer service representative and verify that you have received all items, including the following:
- Print documentation
 - Grounding lug kit
 - Rack-mount kit
 - ESD wrist strap
 - Cables with connectors
 - Any optional items ordered
- Step 2** Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:
- Invoice number of shipper (see packing slip)
 - Model and serial number of the damaged unit
 - Description of damage
 - Effect of damage on the installation
- Step 3** Make sure that the fan tray and power supplies all use the same direction of airflow.
- Front-to-back airflow modules do not have a black stripe across the front.
 - Back-to-front airflow modules have a black stripe across the front.
-

Installing the Cisco Nexus 2000 Series Fabric Extender Chassis in a Cabinet or Rack

This section describes how to use the rack-mount kit provided with the device to install the Cisco Nexus 2000 Series FEX into a cabinet or rack that meets the requirements described in [Appendix A, “Cabinet and Rack Installation.”](#)



Caution

If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

[Table 3-1](#) lists the items contained in the rack-mount kit provided with the device.

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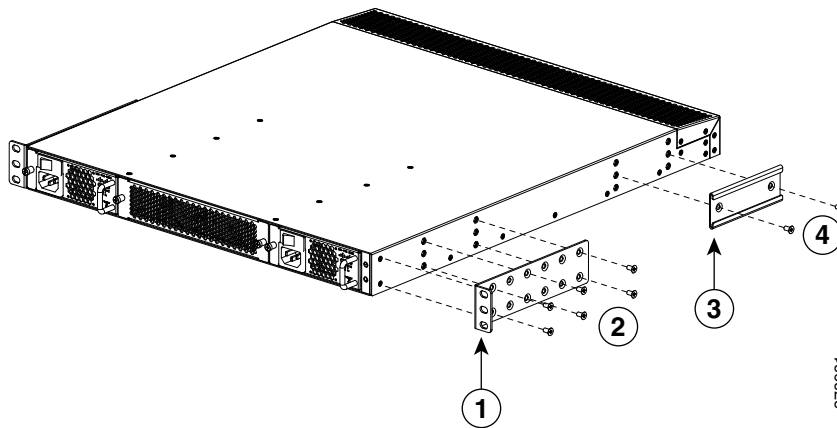
Table 3-1 Cisco Nexus 2000 Series FEX Rack-Mount Kit

| Quantity | Part Description |
|----------|---|
| 2 | Rack-mount brackets |
| 12 | M4x0.7 x 8-mm Phillips countersunk screws |
| 2 | Rack-mount guides |
| 10 | 10-32 rack nuts |
| 10 | 10-32 x 3/4-inch Phillips pan head screws |
| 2 | Slider rails |

To install the device in a cabinet or rack using the rack-mount kit provided with the device, follow these steps:

- Step 1** Install the front rack-mount brackets as follows:
- Position a front rack-mount bracket against the chassis and align the screw holes as shown in [Figure 3-1](#). Attach the front rack-mount bracket to the chassis with six of the M4 screws.
 - Repeat with the other front rack-mount bracket on the other side of the device.

Figure 3-1 Attaching the Front Rack-Mount Bracket and Rack-Mount Guide to a Cisco Nexus 2000 Series FEX

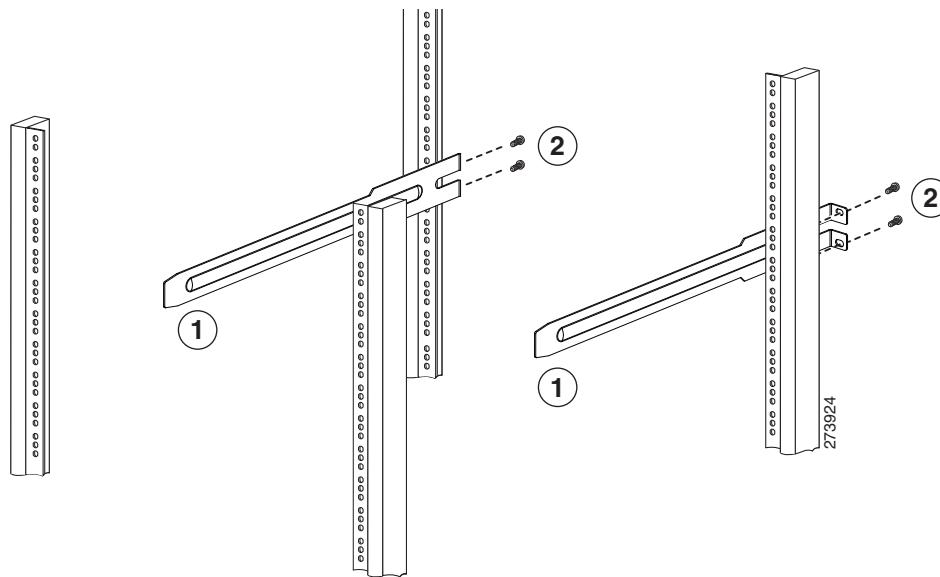


| | | | |
|----------|--|----------|--|
| 1 | Front rack-mount bracket aligned to six holes in chassis | 3 | Rack-mount guide |
| 2 | Six M4 screws used to fasten the front rack-mount bracket to the chassis | 4 | Two M4 screws used to fasten the rack-mount guide to the chassis |

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- Step 2** Install the rack-mount guides on the device as follows:
- Position one of the rack-mount brackets against the side of the device and align the screw holes as shown in [Figure 3-1](#). Attach the bracket to the device with two of the flat-head M4 screws.
 - Repeat with the other rack-mount bracket on the other side of the device.
- Step 3** Attach the slider rails to the rack as shown in [Figure 3-2](#). Use two 12-24 screws or two 10-32 screws, depending on the rack rail thread type. For racks with square holes, insert the 12-24 cage nuts in position behind the mounting holes in the slider rails.
- Repeat with the other slider rail on the other side of the rack.
 - Use the tape measure and level to verify that the rails are horizontal and at the same height.

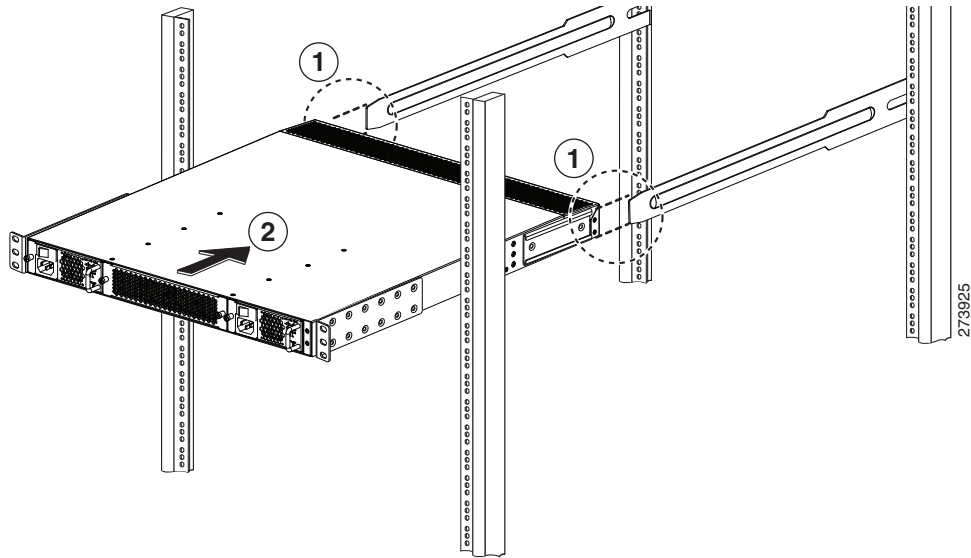
Figure 3-2 *Installing the Slider Rails*



- Step 4** Insert the device into the rack as follows:
- Using both hands, position the device with the back of the device between the front posts of the rack.
 - Align the two rack-mount guides on either side of the device with the slider rails installed in the rack. Slide the rack-mount glides onto the slider rails, and then gently slide the device all the way into the rack. See [Figure 3-3](#). If the device does not slide easily, try realigning the rack-mount glides on the slider rails.

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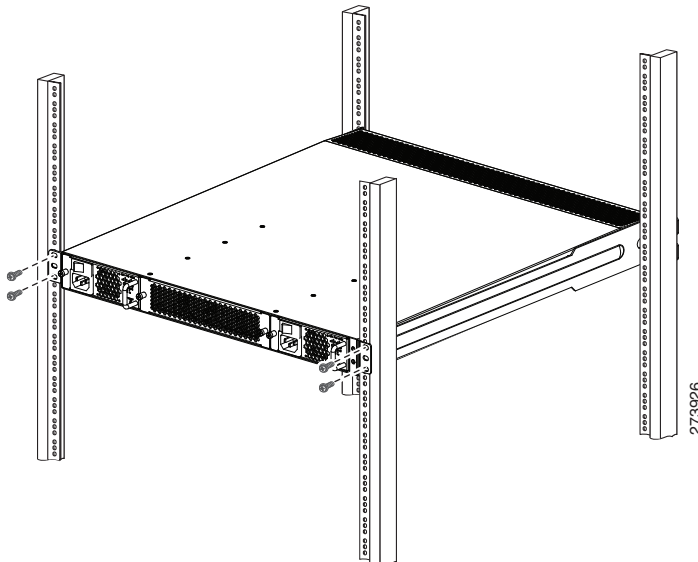
Figure 3-3 Sliding the Chassis Into the Rack



Step 5 Stabilize the device in the rack by attaching the front rack-mount brackets to the front rack-mounting rails as follows:

- a. Insert two screws (12-24 or 10-32, depending on the rack type) through the cage nuts and the holes in one of the front rack-mount brackets and into the threaded holes in the rack-mounting rail. See [Figure 3-4](#).
- b. Repeat for the front rack-mount bracket on the other side of the device.

Figure 3-4 Attaching the Device to the Rack



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Grounding the System

This section describes the need for system grounding and explains how to prevent damage from electrostatic discharge.

This section includes the following topics:

- [Proper Grounding Guidelines, page 3-9](#)
- [Preventing Electrostatic Discharge Damage, page 3-10](#)
- [Establishing the System Ground, page 3-13](#)
- [Required Tools and Equipment, page 3-13](#)

Proper Grounding Guidelines

Grounding is one of the most important parts of equipment installation. Proper grounding practices ensure that the buildings and the installed equipment within them have low-impedance connections and low-voltage differentials between chassis. When you properly ground systems during installation, you reduce or prevent shock hazards, equipment damage due to transients, and data corruption. [Table 3-2](#) lists some general grounding practice guidelines.

Table 3-2 Proper Grounding Guidelines

| Environment | Electromagnetic Noise Severity Level | Grounding Recommendations |
|--|--------------------------------------|--|
| Commercial building is subjected to direct lightning strikes. For example, some places in the United States, such as Florida, are subject to more lightning strikes than other areas. | High | All lightning protection devices must be installed in strict accordance with manufacturer recommendations. Conductors carrying lightning current should be spaced away from power and data lines in accordance with applicable recommendations and codes. Best grounding recommendations must be closely followed. |
| Commercial building is located in an area where lightning storms frequently occur but is not subject to direct lightning strikes. | High | Grounding recommendations must be closely followed. |
| Commercial building contains a mix of information technology equipment and industrial equipment, such as welding. | Medium to high | Grounding recommendations must be closely followed. |

Send document comments to nexus5kdocs@cisco.com**Table 3-2 Proper Grounding Guidelines**

| Environment | Electromagnetic Noise Severity Level | Grounding Recommendations |
|---|---|--|
| Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment. This installation has a history of malfunction due to electromagnetic noise. | Medium | Determine source and cause of noise if possible, and mitigate as closely as possible at the noise source or reduce coupling from the noise source to the affected equipment. Grounding recommendations must be closely followed. |
| New commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment. | Low | Electromagnetic noise problems are not anticipated, but installing a grounding system in a new building is often the least expensive route and the best way to plan for the future. Grounding recommendations should be followed as closely as possible. |
| Existing commercial building is not subject to natural environmental noise or man-made industrial noise. This building contains a standard office environment. | Low | Electromagnetic noise problems are not anticipated, but installing a grounding system is always recommended. Grounding recommendations should be followed as much as possible. |

**Note**

In all situations, grounding practices must comply with local National Electric Code (NEC) requirements or local laws and regulations.

**Note**

Always ensure that all of the devices are completely installed and that the captive installation screws are fully tightened. In addition, ensure that all I/O cables and power cords are properly seated. These practices are normal installation practices and must be followed in all installations.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when modules or other Field Replaceable Units (FRUs) are improperly handled, results in intermittent or complete failures. Devices consist of printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, always use an ESD grounding strap when handling modules.

For preventing ESD damage, follow these guidelines:

- Always use an ESD wrist strap and ensure that it makes maximum contact with bare skin.

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- ESD grounding straps are available with banana plugs, metal spring clips, or alligator clips. All Cisco Nexus 2000 Series FEX chassis are equipped with a banana plug connector (identified by the ground symbol next to the connector) somewhere on the front panel. We recommend that you use a personal ESD grounding strap equipped with a banana plug.
- If you choose to use the disposable ESD wrist strap supplied with most FRUs or an ESD wrist strap equipped with an alligator clip, you must attach the system ground lug to the chassis in order to provide a proper grounding point for the ESD wrist strap.

**Note**

This system ground is also referred to as the network equipment building system (NEBS) ground.

- If your chassis does not have the system ground attached, you must install the system ground lug. See the “[Establishing the System Ground](#)” section on page 3-13 for installation instructions and location of the chassis system ground pads.

**Note**

You do not need to attach a supplemental system ground wire to the system ground lug; the lug provides a direct path to the bare metal of the chassis.

After you install the system ground lug, follow these steps to correctly attach the ESD wrist strap:

-
- Step 1** Attach the ESD wrist strap to your bare skin as follows:
- a. If you are using the ESD wrist strap supplied with the FRUs, open the wrist strap package and unwrap the ESD wrist strap. Place the black conductive loop over your wrist and tighten the strap so that it makes good contact with your bare skin.
 - b. If you are using an ESD wrist strap equipped with an alligator clip, open the package and remove the ESD wrist strap. Locate the end of the wrist strap that attaches to your body and secure it to your bare skin.
- Step 2** Grasp the spring or alligator clip on the ESD wrist strap and momentarily touch the clip to a bare metal spot (unpainted surface) on the rack. We recommend that you touch the clip to an unpainted rack rail so that any built-up static charge is then safely dissipated to the entire rack.
- Step 3** Attach either the spring clip or the alligator clip to the ground lug screw as follows (see [Figure 3-5](#)):
- a. If you are using the ESD wrist strap that is supplied with the FRUs, squeeze the spring clip jaws open, position the spring clip to one side of the system ground lug screw head, and slide the spring clip over the lug screw head so that the spring clip jaws close behind the lug screw head.

**Note**

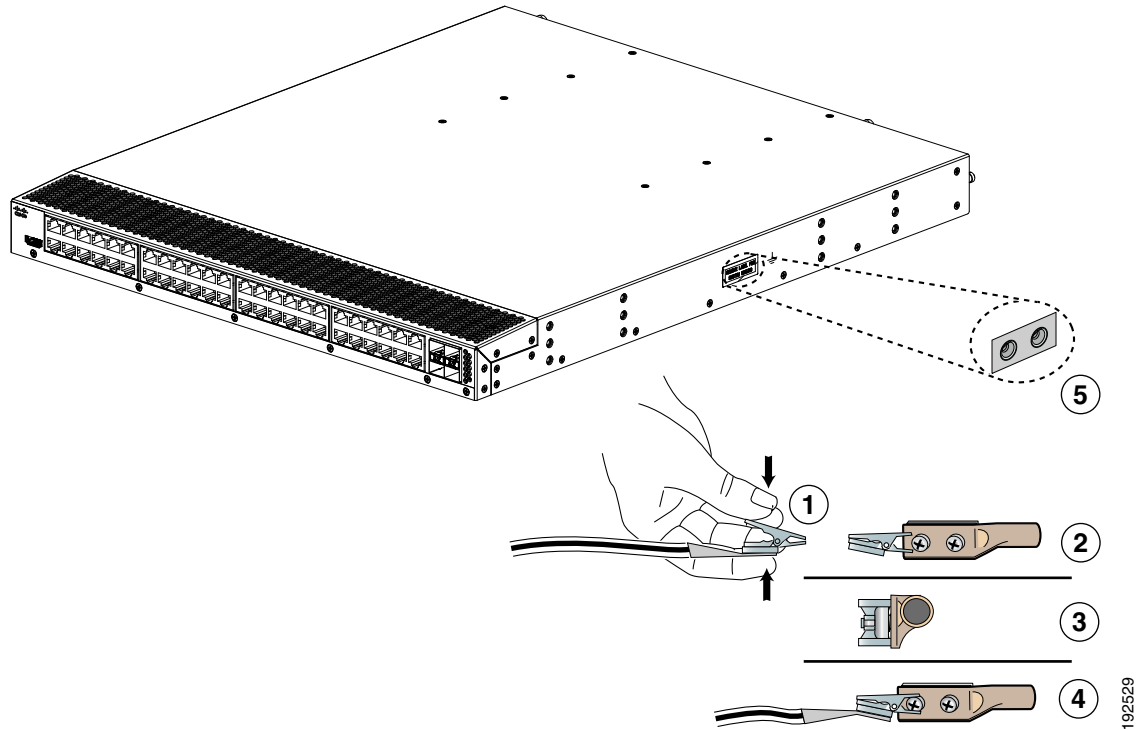
The spring clip jaws do not open wide enough to fit directly over the head of the lug screw or the lug barrel.

- b. If you are using an ESD wrist strap that is equipped with an alligator clip, attach the alligator clip directly over the head of the system ground lug screw or to the system ground lug barrel.

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Figure 3-5 shows how to attach the ESD wrist strap to the system ground lug screw for the Cisco Nexus 2000 Series FEX.

Figure 3-5 Attaching the ESD Wrist Strap to the System Ground Lug Screw



| | | | |
|----------|---|----------|-------------------------------|
| 1 | ESD ground strap | 4 | Clip installed (behind screw) |
| 2 | Clip and grounding lug | 5 | System ground connector |
| 3 | Side view of grounding lug (clip slid behind screw) | | |

In addition, follow these guidelines when handling these devices:

- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static-shielding container.
- Never attempt to remove the printed circuit board from the metal carrier.


Caution

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

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Establishing the System Ground

This section describes how to connect a system ground to the Cisco Nexus 2000 Series FEX.



Note

This system ground is also referred to as the network equipment building system (NEBS) ground.

You must use the system (NEBS) ground on AC-powered systems if you are installing this equipment in a U.S. or European Central Office.

The system (NEBS) ground provides additional grounding for EMI shielding requirements and grounding for the low-voltage supplies (DC-DC converters) on the devices and is intended to satisfy the Telcordia Technologies NEBS requirements for supplemental bonding and grounding connections. You must observe the following system grounding guidelines for your chassis:

- You must install the system (NEBS) ground connection with any other rack or system power ground connections that you make. The system ground connection is required if this equipment is installed in a U.S. or European Central Office.
- You must connect both the system (NEBS) ground connection and the power supply ground connection to an earth ground. The system (NEBS) ground connection is required if this equipment is installed in a U.S. or European Central Office.
- You do not need to power down the chassis because the Cisco Nexus 2000 Series FEX is equipped with AC-input power supplies.

Required Tools and Equipment

To connect the system ground, you need the following tools and materials:

- Grounding lug—A two-hole standard barrel lug that supports up to 6 AWG wire. This lug is supplied as part of accessory kit.
- Grounding screws—Two M4 x 8mm (metric) pan-head screws. The screws are supplied as part of the accessory kit.
- Grounding wire—Not supplied as part of the accessory kit. The grounding wire should be sized according to local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations. Commercially available 6 AWG wire is recommended. The length of the grounding wire depends on the proximity of the device to proper grounding facilities.
- No. 1 Phillips screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

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Grounding the Chassis

The chassis has a grounding pad with two threaded M4 holes for attaching a grounding lug. Figure 3-6 shows the system ground location on the Cisco Nexus 2000 Series FEX.



Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046



Caution

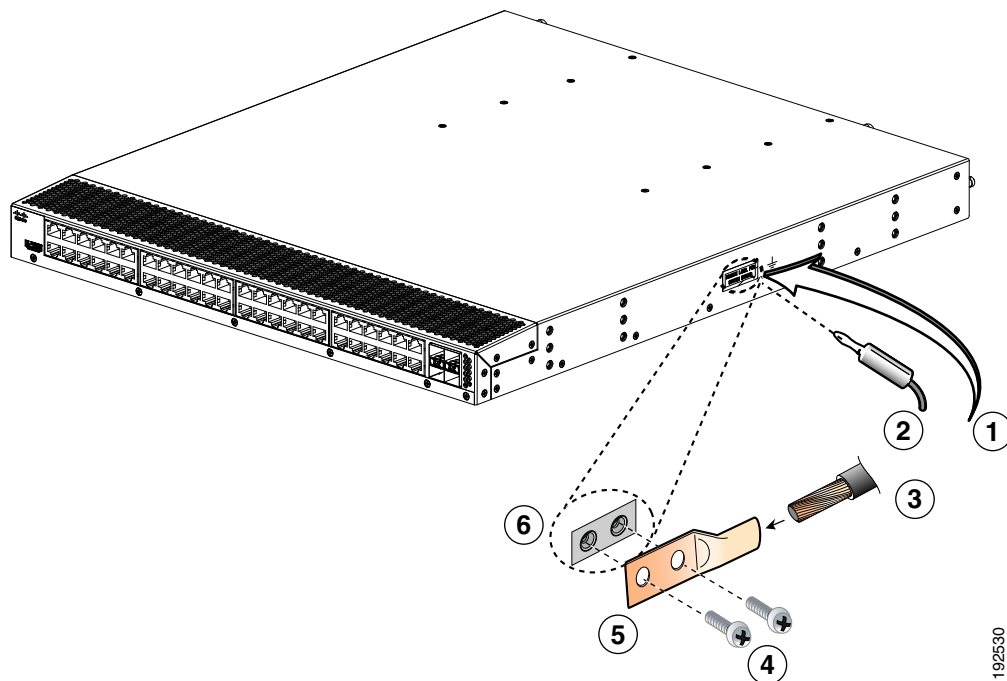
We recommend that you ground the chassis, even if the rack is already grounded.



Caution

You must ground all power supplies. The receptacles of the AC power cables used to provide power to the chassis must be the grounding type, and the grounding conductors should connect to protective earth ground at the service equipment.

Figure 3-6 Location of System Ground on a Cisco Nexus 2000 Series FEX



| | | | |
|---|--------------------------------------|---|-------------------------------------|
| 1 | ESD socket (on device) | 4 | NRTL-listed grounding lug |
| 2 | ESD plug | 5 | Grounding cable |
| 3 | Screws, M4, with square cone washers | 6 | Close-up of grounding pad on device |

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Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last.

Statement 1046



Caution

Grounding the chassis is required if you are using DC power supplies, even if the rack is already grounded. A grounding pad with two threaded M4 holes is provided on the chassis for attaching a grounding lug. The ground lug must be NRTL listed. In addition, the copper conductor (wires) must be used and the copper conductor must comply with the NEC code.

To attach the grounding lug and cable to the chassis, follow these steps:

- Step 1** Use a wire-stripping tool to remove approximately 0.75 inches (19 mm) of the covering from the end of the grounding cable.
- Step 2** Insert the stripped end of the grounding cable into the open end of the grounding lug.
- Step 3** Use the crimping tool to secure the grounding cable in the grounding lug.
- Step 4** Remove the adhesive label from the grounding pad on the chassis.
- Step 5** Place the grounding lug against the grounding pad so that there is solid metal-to-metal contact, and insert the two M4 screws with washers through the holes in the grounding lug and into the grounding pad.
- Step 6** Ensure that the lug and cable do not interfere with other equipment.
- Step 7** Prepare the other end of the grounding cable and connect it to an appropriate grounding point in your site to ensure adequate earth ground.

Starting the Cisco Nexus 2000 Series Fabric Extender

This section describes how to power up the device and verify the hardware operation.



Note

Do not connect the Ethernet port to the LAN until the initial device configuration has been performed. For instructions on configuring the device, see the *Cisco Nexus 2000 Series Fabric Extender Software Configuration Guide*. For instructions on connecting to the console port, see the [“Connecting to the 1-Gigabit Ethernet Port”](#) section on page 4-2.



Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last.

Statement 1046

To power up the device and verify the hardware operation, follow these steps:

- Step 1** Verify that the empty power supply bays have filler panels installed, the faceplates of all modules are flush with the front of the chassis, and the captive screws of the power supplies, fan tray, and all expansion modules are tight.

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Step 2 Verify that the power supply and the fan trays are installed.



Note Depending on the outlet receptacle on your power distribution unit, you may need the optional jumper power cord to connect the Cisco Nexus 2000 Series FEX to your outlet receptacle. See the “[Jumper Power Cord](#)” section on page C-8.

Step 3 Ensure that the device is adequately grounded as described in the “[Grounding the System](#)” section on page 3-9.

Step 4 If you are installing an AC power supply, connect the power supply to an AC power source as follows:

- a. Plug the power cable into the power receptacle on the power supply.
- b. Attach the other end of the power cable to the AC power source.
- c. If you are connecting cables to a Cisco Nexus 2148T power supply, flip the switch above the AC receptacle on the power supply to ON.
- d. Verify that the power supply is functioning by making sure that the OK LED turns green and the FAULT LED is off.

Step 5 If you are installing a DC power supply, connect the power supply to a DC power source as follows:

- a. Make sure that the DC power source is turned off at the circuit breaker.
- b. Connect a negative cable from the power source to the positive (+) terminal on the power supply and fasten with the screw from that terminal.
- c. Connect a positive cable from the power source to the negative (-) terminal on the power supply and fasten with the screw from that terminal.
- d. Turn on the power at the circuit breaker.
- e. Verify that the power supply is functioning by making sure that the OK LED turns green and the FAULT LED is off.

Step 6 Listen for the fans; they should begin operating when the power cable is plugged in.

Step 7 After the device boots, verify that the LED operation is as follows:

- Power supply—The system status LED is green.
- After initialization, the system status LED is green, indicating that all chassis environmental monitors are reporting that the system is operational. If this LED is orange or red, one or more environmental monitor is reporting a problem.
- The Link LEDs for the Ethernet connector should not be on unless the cable is connected.

If a component is not operating correctly, remove and reinstall that component. If it still does not operate correctly, contact your customer service representative for a replacement.



Note If you purchased this product through a Cisco reseller, contact the reseller directly for technical support. If you purchased this product directly from Cisco, contact Cisco Technical Support at this URL: http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.

Step 8 Verify that the system software has booted and the device has initialized without error messages.

If any problems occur, see [Appendix E, “Troubleshooting Hardware Components”](#). If you cannot resolve an issue, contact your customer service representative.

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- Step 9** Complete the worksheets provided in [Appendix G, “Site Preparation and Maintenance Records”](#) for future reference.
-

Removing and Installing Components

This section describes how to remove and install components on the Cisco Nexus 2000 Series FEX.

This section includes the following topics:

- [Removing and Installing Power Supplies, page 3-17](#)
- [Removing and Installing the Fan Tray, page 3-20](#)
- [Removing the Cisco Nexus 2000 Series Fabric Extender, page 3-22](#)



Caution

To prevent ESD damage, wear grounding wrist straps during these procedures and handle modules by the carrier edges only.

Removing and Installing Power Supplies

The Cisco Nexus 2000 Series FEX supports two front-end power supplies, but you can use only one power supply.

This section includes the following topics:

- [Removing an AC Power Supply, page 3-17](#)
- [Installing an AC Power Supply, page 3-18](#)
- [Removing a DC Power Supply, page 3-19](#)
- [Installing a DC Power Supply, page 3-19](#)



Note

You can replace a faulty power supply while the system is operating if the other power supply is functioning.

Removing an AC Power Supply



Caution

If you are using the Cisco Nexus 2000 Series FEX with one power supply, removing the power supply causes the device to shut down. If you are using two power supplies and you remove one of them, the device continues to operate.

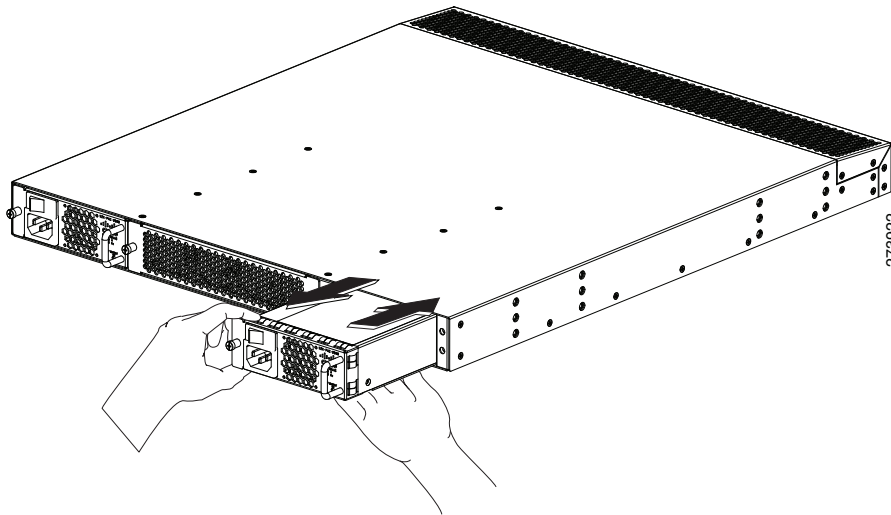
To remove an AC power supply, follow these steps:

- Step 1** Pull the power cord out from the power receptacle on the power supply.
- Step 2** Release the power supply from the chassis as follows:
- If you are removing a power supply from a Cisco Nexus 2148T chassis, loosen the captive screw and then pull the power supply part way out of the chassis.

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- If you are removing a power supply from a Cisco Nexus 2248T, 2232PP, or 2224TP chassis, push and hold the thumb latch to the left and pull the power supply part way out of the chassis (see [Figure 3-7](#)).
- Step 3** Place your other hand under the power supply to support it while you slide it out of the chassis.
- Step 4** If the power supply bay is to remain empty, install a blank power supply filler panel.

Figure 3-7 Removing an AC Power Supply from the Cisco Nexus 2000 Series FEX



Installing an AC Power Supply



Caution

Be sure that the power supply that you are installing has the same airflow direction as the fan tray module and the other power supply. Either all of the modules must have front-to-back airflow (no black stripe on the front of the module) or all of the modules must have back-to-front airflow (black stripe on the front of the module). If the modules have different airflow directions in the same chassis, you will see an error message.

To install a power supply, follow these steps:

- Step 1** Ensure that the system (earth) ground connection has been made for the chassis. For ground connection instructions, see the [“Grounding the System”](#) section on page 3-9.
- Step 2** If the power supply bay has a filler panel, remove it from the slot as follows:
- If you are removing a filler panel from a Cisco Nexus 2248TP, 2232PP, or 2224TP FEX, push its thumb latch to the left and pull the panel out of the chassis.
 - If you are removing a filler panel from a Cisco Nexus 2148T FEX, loosen its captive screw, and then pull the panel out of the power supply bay.
- Step 3** Hold the replacement power supply by its handle and position it so that the captive screw is on the left, and then slide it into the power supply bay, ensuring that the power supply is fully seated in the bay.

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Step 4 Secure the power supply to the chassis as follows:

- If you are installing a Cisco Nexus 2248TP, 2232PP, or 2224TP FEX, make sure that the thumb latch engages with the chassis so that the power supply is held in the slot.
- If you are installing a Cisco Nexus 2148T, fasten the power supply to the chassis by screwing its captive screw into its hole in the chassis and tightening it.



Note Depending on the outlet receptacle on your power distribution unit, you may need the optional jumper power cord to connect the Cisco Nexus 2000 Series FEX to your outlet receptacle. See the [“Jumper Power Cord” section on page C-8](#).

Step 5 Connect the other end of the power cable to an AC power source.



Caution In a system with dual power supplies, connect each power supply to a separate power source. If a power source failure occurs, the second source will most likely still be available.

Step 6 Verify power supply operation by checking that the power supply LED is green. For information about what the power supply LEDs indicate, see the [“Power Supply Status” section on page D-3](#).

Removing a DC Power Supply



Caution If you are using the Cisco Nexus 2200 platform FEX with one DC power supply, removing the power supply causes the device to shut down. If you are using two power supplies and you remove one of them, the device continues to operate.

To remove a DC power supply, follow these steps:

- Step 1** Shut off the DC power to the power supply at the circuit breaker. Make sure that both LEDs are off.
- Step 2** Unfasten the positive power cable from the negative (-) terminal.
- Step 3** Unfasten the negative power cable from the positive (+) terminal.
- Step 4** Press the thumb latch to disengage the power supply from the chassis and use the handle to pull it part way out of the chassis.
- Step 5** Place your other hand under the power supply to support it while you slide it out of the chassis. Place the power supply on an antistatic surface.
- Step 6** If the power supply bay is to remain empty, install a blank power supply filler panel.

Installing a DC Power Supply

In a system with dual power supplies, connect each power supply to a separate power source. If a power source failure occurs, the second source will most likely still be available.

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Caution

Be sure that the power supply that you are installing has the same airflow direction as the fan tray module and the other power supply. Either all of the modules must have front-to-back airflow (no black stripe on the front of the module) or all of the modules must have back-to-front airflow (black stripe on the front of the module). If the modules have different airflow directions in the same chassis, you will see an error message.

To install a power supply, follow these steps:

-
- Step 1** Ensure that the system (earth) ground connection has been made for the chassis. For ground connection instructions, see the [“Grounding the System”](#) section on page 3-9.
 - Step 2** If the power supply bay has a filler panel, push and hold the thumb latch to the left, and then slide the filler panel out of the power supply bay.
 - Step 3** Hold the replacement power supply by the handle and position it so that the thumb latch is on the right, and then slide it into the power supply bay, ensuring that the power supply is fully seated in the bay.
 - Step 4** Engage the thumb latch so that the power supply is firmly held in place in its slot.
 - Step 5** Fasten the positive cable to the negative (-) terminal.
 - Step 6** Fasten the negative cable to the positive (+) terminal.
 - Step 7** Turn on the power at the circuit breaker.
 - Step 8** Verify power supply operation by checking that the power supply LED is green. For information about what the power supply LEDs indicate, see the [“Power Supply Status”](#) section on page D-3.
-

Removing and Installing the Fan Tray

The fan tray is designed to be removed and replaced while the system is operating without causing an electrical hazard or damage to the system, if the replacement is performed within 1 minute.



Caution

Be sure that the fan tray that you are installing has the same airflow direction as the other power supply modules in the same chassis. Either all of the modules must have front-to-back airflow (no black stripe on the front of the module) or all of the modules must have back-to-front airflow (black stripe on the front of the module). If the modules have different airflow directions in the same chassis, you will see an error message.

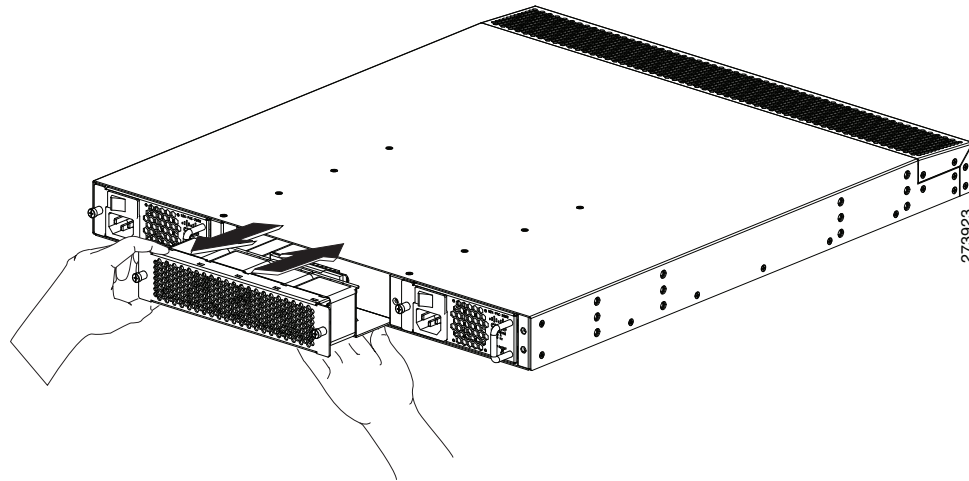
This section includes the following topics:

- [Removing a Fan Tray, page 3-21](#)
- [Installing a Fan tray, page 3-21](#)

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Figure 3-8 shows how to remove and install a fan tray for the Cisco Nexus 2000 Series FEX.

Figure 3-8 Fan Tray for the Cisco Nexus 2000 Series FEX



Removing a Fan Tray



Warning

When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you finish removing the fan tray. Statement 258

To remove a fan tray, follow these steps:

- Step 1** Loosen the captive screws on the fan tray by turning them counterclockwise, using a flat-blade or number 2 Phillips screwdriver if required.
- Step 2** Grasp the captive screws of the fan tray and pull it outward.
- Step 3** Pull the fan tray clear of the chassis and set it on an antistatic surface or repack it in packing materials.



Note

If you remove a fan tray while the system is running, you must install the new fan tray within 1 minute to prevent overheating.

Installing a Fan tray

To install a fan tray, follow these steps:

- Step 1** Hold the fan tray with the sheet metal flange holding the connector on the bottom.
- Step 2** Place the fan tray into the front chassis cavity so it rests on the chassis, and then push the fan tray into the chassis as far as it can go until the captive screw makes contact with the chassis.
- Step 3** Tighten the captive screw.

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- Step 4** Listen for the fans if the device is powered on. You should immediately hear them operating. If you do not hear them, ensure that the fan tray is inserted completely in the chassis and the faceplate is flush with the outside surface of the chassis.
- Step 5** Verify that the LED is green. If the LED is not green, one or more fans are faulty. If this problem occurs, contact your customer service representative for a replacement part.

**Note**

If you purchased this product through a Cisco reseller, contact the reseller directly for technical support. If you purchased this product directly from Cisco, contact Cisco Technical Support at this URL: http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.

Removing the Cisco Nexus 2000 Series Fabric Extender

**Caution**

The slider rail and front rack-mount brackets do not have a stop mechanism when sliding in and out. If the front of the chassis is unfastened from the rack and the chassis slides forward on the slider rails, it may slip off the end of the rails and fall out of the rack.

To remove the Cisco Nexus 2000 Series FEX from a rack, follow these steps:

- Step 1** Ensure that the weight of the FEX is fully supported and that the device is being held by another person.
- Step 2** Turn off the power at the circuit breaker.
- Step 3** Disconnect the power cord as follows:
- For AC power supplies, disconnect the power cord and the console cables.
 - For DC power supplies, disconnect the positive cable from the negative (-) terminal, and disconnect the negative cable from the positive (+) terminal.
- Step 4** Disconnect all ports.
- Step 5** Remove the screws that fasten the front rack-mount brackets to the mounting rails.
- Step 6** Gently slide the chassis toward you, off of the slider rails and out of the rack.

Repacking the Cisco Nexus 2000 Series Fabric Extender for Return Shipment

If you need to return the Cisco Nexus 2000 Series FEX, remove the device from the rack by following the steps in the “[Removing the Cisco Nexus 2000 Series Fabric Extender](#)” section on page 3-22, and repack it for shipment. If possible, use the original packing materials and container to repack the device. Contact your Cisco customer service representative to arrange for return shipment to Cisco.



CHAPTER 4

Connecting a Cisco Nexus 2000 Series Fabric Extender

This chapter describes how to connect the ports on a Cisco Nexus 2000 Series Fabric Extender (FEX).



Caution

When running power and data cables in overhead or subfloor cable trays, we strongly recommend that you have power cables and other potential noise sources as far away as practical from network cabling that terminates on Cisco equipment. In situations where long parallel cable runs cannot be separated by at least 3.3 feet (1 m), we recommend that you shield any potential noise sources by housing them in a grounded metallic conduit.

This chapter includes the following sections:

- [Preparing for Network Connections, page 4-2](#)
- [Connecting to the 1-Gigabit Ethernet Port, page 4-2](#)
- [Connecting to a 10-Gigabit Ethernet Port, page 4-2](#)

Preparing for Network Connections

When preparing your site for network connections to the Cisco Nexus 2000 Series FEX, consider the following for each type of interface, and gather all the required equipment before connecting the ports:

- Cabling required for each interface type
- Distance limitations for each signal type
- Additional interface equipment required

Connecting to the 1-Gigabit Ethernet Port

This section describes how to connect a 1-Gigabit Ethernet port to a host.

The 1-Gigabit Ethernet ports have RJ-45 interfaces. There are 48 1-Gigabit Ethernet server ports.

To connect a 1-Gigabit Ethernet port to a host, follow these steps:

-
- Step 1** Connect the appropriate modular cable to the 1-Gigabit Ethernet port.
- Step 2** Connect the other end of the cable to the device.
-

Connecting to a 10-Gigabit Ethernet Port

This section describes how to connect a 10-Gigabit Ethernet port to a host. There are four network facing 10-Gigabit Ethernet ports for the Cisco Nexus 2248GV, 2148T, and 2248TP, eight for the Cisco Nexus 2232TM, 2232PP, and two on the Cisco Nexus 2224TP. An SFP+ transceiver is used to connect to a 10-Gigabit Ethernet port.

This section includes the following topics:

- [Removing and Installing SFP+ Transceivers, page 4-2](#)
- [Removing and Installing Cables into SFP+ Transceivers, page 4-4](#)
- [Maintaining SFP+ Transceivers and Cables, page 4-6](#)

Removing and Installing SFP+ Transceivers



Caution

Excessively removing and installing an SFP transceiver can shorten its life. Do not remove and insert SFP+ transceivers more often than is necessary. We recommend that you disconnect cables before installing or removing SFP transceivers to prevent damage to the cable or transceiver.

This section describes how to install and remove an SFP+ transceiver. This section includes the following topics:

- [Installing an SFP+ Transceiver, page 4-3](#)
- [Removing an SFP+ Transceiver, page 4-3](#)

Installing an SFP+ Transceiver

To install an SFP+ transceiver, follow these steps:

-
- Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- Step 2** Remove the dust cover from the port cage.
- Step 3** Remove the dust cover from the port end of the transceiver.
- Step 4** Insert the transceiver into the port as follows:
- If the transceiver has a Mylar tab latch, position the transceiver with the tab on the bottom, and then gently insert the transceiver into the port until it clicks into place.
 - If the transceiver has a bale clasp latch, position the transceiver with the clasp on the bottom, close the clasp by pushing it up over the transceiver, and then gently insert the transceiver into the port until it clicks into place.



Caution If the transceiver does not install easily, ensure that it is correctly positioned and the tab or clasp are in the correct position before continuing.



Note If you cannot install the cable into the transceiver, insert or leave the dust cover in the cable end of the transceiver.

Removing an SFP+ Transceiver

To remove an SFP+ transceiver, follow these steps:

-
- Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- Step 2** If a cable is installed in the transceiver, do one of the following:
- a. Record the cable and port connections for later reference.
 - b. Press the release latch on the cable, grasp the connector near the connection point, and gently pull the connector from the transceiver.
 - c. Insert a dust plug into the cable end of the transceiver.



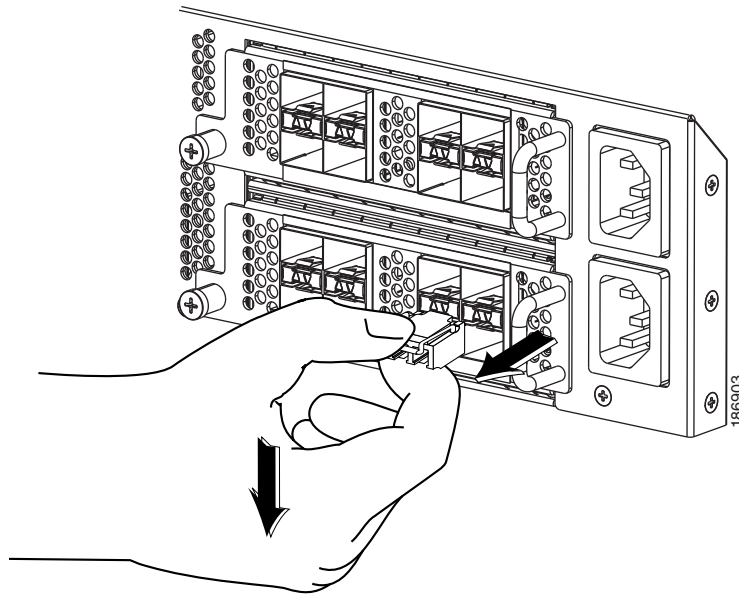
Caution If the transceiver does not remove easily in the next step, push the transceiver completely in and then ensure that the latch is in the correct position before continuing.

- Step 3** Remove the transceiver from the port as follows:
- If the transceiver has a Mylar tab latch, gently pull the tab straight out (do not twist), and then pull the transceiver out of the port.
 - If the transceiver has a bale clasp latch, open the clasp by pressing it downward, and then pull the transceiver out of the port.

**Note**

If you have difficulty removing a bale clasp SFP+ transceiver, you should reseal it by returning the bale clasp to the up position. Press the SFP+ transceiver inward and upward into the cage. Next, lower the bale clasp and pull the SFP+ transceiver straight out with a slight upward lifting force (see [Figure 4-1](#)). Be careful not to damage the port cage during this process.

Figure 4-1 Alternate Removal Method for Bale Clasp SFP+ Transceivers



- Step 4** Insert a dust cover into the port end of the transceiver and place the transceiver on an antistatic mat or into a static shielding bag if you plan to return it to the factory.
- Step 5** If another transceiver is not being installed, protect the optical cage by inserting a clean cover.

Removing and Installing Cables into SFP+ Transceivers

This section describes how to remove and install cables into and from SFP+ transceivers.

**Caution**

To prevent damage to the copper cables, do not place more tension on them than the rated limit and do not bend to a radius of less than 1 inch if there is no tension in the cable, or 2 inches if there is tension in the cable.

This section includes the following topics:

- [Installing a Cable into an SFP+ Transceiver, page 4-5](#)
- [Removing a Cable from an SFP+ Transceiver, page 4-5](#)

Removing a Cable from an SFP+ Transceiver

**Caution**

When pulling a cable from a transceiver, grip the body of the connector. Do not pull on the jacket sleeve, because this action can compromise the fiber-optic termination in the connector.

**Caution**

If the cable does not remove easily, ensure that any latch present on the cable has been released before continuing.

To remove the cable, follow these steps:

- Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- Step 2** Press the release latch on the cable, grasp the connector near the connection point, and gently pull the connector from the transceiver.
- Step 3** Insert a dust plug into the cable end of the transceiver.
- Step 4** Insert a dust plug onto the end of the cable.

Installing a Cable into an SFP+ Transceiver

**Caution**

To prevent possible damage to the cable or transceiver, install the transceiver in the port before installing the cable in the transceiver.

To install a cable into a transceiver, follow these steps:

- Step 1** Attach an ESD-preventive wrist strap and follow its instructions for use.
- Step 2** Remove the dust cover from the connector on the cable.
- Step 3** Remove the dust cover from the cable end of the transceiver.
- Step 4** Align the cable connector with the transceiver and insert the connector into the transceiver until it clicks into place.

**Caution**

If the cable does not install easily, ensure that it is correctly positioned before continuing.

For instructions on verifying connectivity, see the *Cisco Nexus 2000 Series Fabric Extender Software Configuration Guide*.

Maintaining SFP+ Transceivers and Cables

You must keep SFP+ transceivers clean and dust free to maintain high signal accuracy and prevent damage to the connectors. Attenuation (loss of light) is increased by contamination and should be below 0.35 dB.

Follow these maintenance guidelines:

- SFP+ transceivers are static sensitive. To prevent ESD damage, wear an ESD-preventive wrist strap that is connected to the chassis.
- Do not remove and insert a transceiver more often than is necessary. Repeated removals and insertions can shorten its life.
- Keep all optical connections covered when not in use. If they become dusty, clean before using to prevent dust from scratching the fiber-optic cable ends.
- Do not touch ends of connectors to prevent fingerprints and other contamination.
- Clean regularly; the required frequency of cleaning depends upon the environment. In addition, clean connectors if they are exposed to dust or accidentally touched. Both wet and dry cleaning techniques can be effective; refer to your site's fiber-optic connection cleaning procedure.
- Inspect routinely for dust and damage. If damage is suspected, clean and then inspect fiber ends under a microscope to determine if damage has occurred.



APPENDIX **A**

Cabinet and Rack Installation

This appendix provides the requirements for cabinet and rack installation and includes the following sections:

- [Cabinet and Rack Requirements, page A-1](#)
- [Cable Management Guidelines, page A-3](#)

Cabinet and Rack Requirements

This section provides the requirements for the following types of cabinets and racks, assuming an external ambient air temperature range of 0 to 104°F (0 to 40°C):

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

**Note**

If you are selecting an enclosed cabinet, we recommend one of the thermally validated types, either standard perforated or solid-walled with a fan tray.

**Note**

Do not use racks that have obstructions (such as power strips), because the obstructions could impair access to field-replaceable units (FRUs).

This section includes the following topics:

- [General Requirements for Cabinets and Racks, page A-1](#)
- [Requirements Specific to Perforated Cabinets, page A-2](#)
- [Requirements Specific to Standard Open Racks, page A-2](#)

General Requirements for Cabinets and Racks

The cabinet or rack must be one of the following types:

- Standard 19-in. (48.3 cm) (four-post EIA cabinet or rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992). See the [“Requirements Specific to Perforated Cabinets”](#) section on page A-2.

The cabinet or rack must also meet the following requirements:

- The minimum vertical rack space per Cisco Nexus 2000 Series FEX chassis must be one RU (rack units), equal to 1.75 inches (4.4 cm).
- The minimum vertical rack space per chassis must be one RU (rack unit), equal to 1.75 inches (4.4 cm).
- The width between the rack-mounting rails must be at least 17.75 inches (45.0 cm) if the rear of the device is not attached to the rack. For four-post EIA racks, this measurement is the distance between the two front rails.
- For four-post EIA cabinets (perforated or solid-walled), the requirements are as follows:
 - The minimum spacing for the bend radius for fiber-optic cables should have the front-mounting rails of the cabinet offset from the front door by a minimum of 3 inches (7.6 cm).
 - The distance between the outside face of the front mounting rail and the outside face of the back mounting rail should be 23.0 to 30.0 inches (58.4 to 76.2 cm) to allow for rear-bracket installation.
 - A minimum of 2.5 inches (6.4 cm) of clear space should exist between the side edge of the chassis and the side wall of the cabinet. No sizeable flow obstructions should be immediately in the way of chassis air intake or exhaust vents.

**Note**

Optional jumper power cords are available for use in a cabinet. See the [“Jumper Power Cord” section on page C-8](#).

Requirements Specific to Perforated Cabinets

A perforated cabinet is defined as a cabinet with perforated front and rear doors and solid side walls. In addition to the requirements listed in the [“General Requirements for Cabinets and Racks” section on page A-1](#), perforated cabinets must meet the following requirements:

- The front and rear doors must have at least a 60 percent open area perforation pattern with at least 15 square inches (96.774 square cm) of open area per rack unit of door height.
- The roof should be perforated with at least a 20 percent open area.
- The cabinet floor should be open or perforated to enhance cooling.

The Cisco R Series rack conforms to these requirements.

Requirements Specific to Standard Open Racks

In addition to the requirements listed in the [“General Requirements for Cabinets and Racks” section on page A-1](#), if mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets the following requirements:

- The minimum vertical rack space per chassis must be two rack units (RU), equal to 3.47 inches (8.8 cm).
- The horizontal distance between the chassis and any adjacent chassis should be 6 inches (15.2 cm), and the distance between the chassis air vents and any walls should be 2.5 inches (6.4 cm).

Cable Management Guidelines

To help with cable management, you might want to allow additional space in the rack above and below the chassis to make it easier to route as many as 56 fiber or copper cables through the rack.



APPENDIX **B**

Technical Specifications

This appendix describes the technical specifications for the Cisco Nexus 2000 Series Fabric Extenders (FEXs) and includes the following sections:

- [Power Specifications, page B-1](#)
- [Environmental Specifications, page B-4](#)
- [Physical Specifications, page B-5](#)
- [Transceiver Specifications, page B-6](#)
- [Airflow Optimization Accessories, page B-7](#)



Note

Specifications for cables and connectors are provided in [Appendix C, “Cable and Port Specifications.”](#)

Power Specifications

This section describes the power specifications for the Cisco Nexus 2000 Series FEXs.

The power supplies connect directly to the system through connectors attached to the baseboard through cables. One connector is on the baseboard for each power supply. AC input is through an IEC connector mounted on the power supply front panel. [Table B-1](#) lists the specifications for the Cisco Nexus 2000 Series FEX power supplies.

Table B-1 Power Specifications for the Cisco Nexus 2000 Series

| Cisco Nexus 2000 Series | Power Supply | | |
|-------------------------------|---|--|---|
| | | N2K-PAC-200 W | N2K-PAC-400W N2K-PAC-400W-B N2K-PDC-400W |
| FEXs | Cisco Nexus 2148T | Cisco Nexus 2248TP-E, 2248TP, 2232PP, 2224TP, 2248PQ and 2232TM | Cisco Nexus 2248TP-E, 2248TP, 2232PP, 2248PQ and 2224TP |
| Typical Input Operating Power | 165 W | 110 W (Cisco Nexus 2248TP-E and 2248TP) 270 W (Cisco Nexus 2232PP) 350 W to 386 W (Cisco Nexus 2232TM) | 110 W (Cisco Nexus 2248TP-E and 2248TP) 270 W (Cisco Nexus 2232PP) 95 W (Cisco Nexus 2224TP) |
| Maximum Output Power | 200 W | 400 W | 350 W |
| Input Voltage | 90 to 264 VAC | 90 to 264 VAC N2K-PDC-400W: -40 to -72 VDC | -40 to -72 VDC |
| Frequency | 50 to 60 Hz | 50 to 60 Hz N2K-PDC-400W: N/A | N/A |
| Input Current | 1.5 A/2.2 A* (typical/maximum) Note * The Input currents listed for 110 V; divide by two for 220 V | Cisco Nexus 2248TP-E: 1.0 A/1.2 A* (typical/maximum) Cisco Nexus 2248TP: 1.0 A/1.2 A* (typical/maximum) Cisco Nexus 2232PP: 2.5 A/4.1 A* (typical/maximum) Cisco Nexus 2224TP: 0.75 A/0.9 A* (typical/maximum) Cisco Nexus 2232TM 3.18 A/3.51 A* (typical/maximum) Note * Input currents listed for 110 V; divide by two for 220 V | Cisco Nexus 2248TP-E: 1.0 A/1.2 A* (typical/maximum) Cisco Nexus 2248TP: 1.0 A/1.2 A* (typical/maximum) Cisco Nexus 2232PP: 2.5 A/4.1 A* (typical/maximum) Cisco Nexus 2224TP: 0.75 A/0.9 A* (typical/maximum) * Input currents listed for 110 V; divide by two for 220 V |

Table B-1 Power Specifications for the Cisco Nexus 2000 Series (continued)

| Cisco Nexus 2000 Series | Power Supply | | |
|-------------------------|----------------------------------|--|---|
| | N2K-PAC-200 W | N2K-PAC-400W N2K-PAC-400W-B N2K-PDC-400W | N2200-PDC-350W-B |
| Output Current | 11.5 A/16.7 A (typical/maximum) | Cisco Nexus 2248TP-E: 8 A/10 A (typical/maximum) Cisco Nexus 2248TP: 8 A/10 A (typical/maximum) Cisco Nexus 2232PP: 20 A/33 A (typical/maximum) Cisco Nexus 2224TP: 5 A/7 A (typical/maximum) Cisco Nexus 2232TM: 26 A/28.9 A (typical/maximum) | Cisco Nexus 2248TP-E: 8 A/10 A (typical/maximum) Cisco Nexus 2248TP: 8 A/10 A (typical/maximum) Cisco Nexus 2232PP: 20 A/33 A (typical/maximum) Cisco Nexus 2224TP: 5 A/7 A (typical/maximum) |
| Efficiency | 84 percent at typical power draw | 90/92 percent (110/240 Vin) at typical power draw 88/91 percent (110/240 Vin) at max power draw N2K-PDC-400 W: 88% (-48 Vin) at typical power draw 85% (-48 Vin) at maximum power draw | 88% (-48Vin) at typical power draw 85% (-48Vin) at maximum power draw |
| RoHS Compliance | RoHS-5 compliant | RoHS-6 compliant | RoHS-6 compliant |
| Hot Swappable | Yes | Yes | Yes |
| Heat Dissipation | 670 BTU/hr | Cisco Nexus 2248TP-E: 322/403 BTU/hour (typical/maximum) Cisco Nexus 2248TP: 322/403 BTU/hour (typical/maximum) Cisco Nexus 2232PP: 806/1330 BTU/hour (typical/maximum) Cisco Nexus 2224TP: 202/282 BTU/hour (typical/maximum) Cisco Nexus 2232TM: 1176/1297 BTU/hour (typical/maximum) | Cisco Nexus 2248TP-E: 322/403 BTU/hour (typical/maximum) Cisco Nexus 2248TP: 322/403 BTU/hour (typical/maximum) Cisco Nexus 2232PP: 806/1330 BTU/hour (typical/maximum) Cisco Nexus 2224TP: 202/282 BTU/hour (typical/maximum) |

Table B-1 Power Specifications for the Cisco Nexus 2000 Series (continued)

| Cisco Nexus 2000 Series | Power Supply | | |
|-------------------------|---|---|---|
| | | N2K-PAC-200W | N2K-PAC-400W N2K-PAC-400W-B N2K-PDC-400W |
| Power Cord Rating | 3 A@100 Vin / 1.5 A@240 Vin maximum | 6 A@100 Vin / 3 A@240 Vin maximum N2K-PDC-400W: 15 A@-48 Vin/8 A@-60 Vin maximum | 15A@-48Vin/8A@-60Vin maximum |
| Cubic Inches | 51 in ³ | 39 in ³ | 39 in ³ |
| Power Density | 3.9 W/in ³ | 10.2 W/in ³ | 10.2 W/in ³ |
| Operating Temperature | 50°C | 50°C | 50°C |
| Cooling | Internal fans to cool the supply | Internal fans to cool the supply | Internal fans to cool the supply |
| Input connector | AC connector in the power supply face | AC connector in the power supply face | AC connector in the power supply face |
| Output connector | DC output connector in the back | DC output connector in the back | DC output connector in the back |
| Supply Indicators | Supply Health: Green indicates the power supply is operational and red indicates a fault. AC good indicator: Solid green indicates that AC is present and is within the supply specifications. | Supply Health: Green indicates the power supply is operational and amber indicates a fault. AC good indicator: Solid green indicates that AC is present and is within the supply specifications. | Supply Health: Green indicates the power supply is operational and amber indicates a fault. |

Environmental Specifications

Table B-2 lists the environmental specifications for a FEX.

Table B-2 Environmental Specifications for the Cisco Nexus 2000 Series FEX

| Description | Specification |
|------------------------------|-----------------------------|
| Temperature, operating | 32 to 104°F (0 to 40°C) |
| Temperature, nonoperating | –4 to 158°F (–20 to 70°C) |
| Humidity (RH), noncondensing | 5 to 95% |
| Altitude | 0 to 10000 ft (0 to 3000 m) |

The Cisco Nexus 2232PP, 2232TM, and the Cisco Nexus 2248TP-ETP FEXs can operate from 0 to 40°C ambient temperature in a horizontal or vertical rack mount configuration. They can withstand a nonoperational temperature of –25 to 70°C altitude of 10 to 90 percent noncondensing.

Physical Specifications

Table B-3 lists the dimensions and weights for the Cisco Nexus 2000 Series FEXs.

Table B-3 Physical Specifications for Installing the Cisco Nexus 2000 Series Fabric Extenders

| Cisco Nexus 2000 Series | Dimensions (Height x Width x Depth) ¹ | | Weight ² |
|------------------------------|--|-------------------------|---------------------|
| | Inches | Centimeters | |
| Cisco Nexus 2248TP-E chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 17.7 lb (8.03 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.4 lb (0.6 kg) |
| Cisco Nexus 2248TP chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 17.7 lb (8.03 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.4 lb (0.6 kg) |
| Cisco Nexus 2248PQ chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 17.5 lb (8.0 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.8 lb (0.8 kg) |
| Cisco Nexus 2232PP chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 18.3 lb (8.3 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.8 lb (0.8 kg) |
| Cisco Nexus 2224TP chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 16.6 lb (1.0 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.4 lb (0.6 kg) |
| Cisco Nexus 2148T chassis | 1.72 x 17.3 x 20.0 in. | 4.37 x 43.94 x 50.8 cm | 18.0 lb (8.2 kg) |
| Power supply | — | — | 1.5 lb (0.7 kg) |
| Fan tray | — | — | 1.5 lb (0.7 kg) |
| Cisco Nexus 2232TM chassis | 1.72 x 17.3 x 17.7 in. | 4.37 x 43.94 x 44.96 cm | 18.5 lb (8.4 kg) |
| Power supply | — | — | 2.2 lb (1.0 kg) |
| Fan tray | — | — | 1.8 lb (0.8 kg) |

1. Dimensions are presented for only the chassis rack size and service clearance requirements.
2. Combine the chassis, power supply, and fan tray weights for the overall weight of the switch to be installed. Remember to double the power supply weights if there are two power supplies installed in the FEX.

Transceiver Specifications

This section describes the transceiver specifications for the Cisco Nexus 2000 Series FEX. This section includes the following topics:

- [SFP+ Optical Transceiver Specifications, page B-6](#)

SFP+ Optical Transceiver Specifications

This section provides the general and environmental specifications for the SFP+ transceivers used with optical cables.

For the general specifications that apply to SFP+ transceivers, see [Table B-4](#). For the environmental specifications, see [Table B-5](#).

Table B-4 SFP+ Transceiver General Specifications

| Transceiver | Cable Type | Connector Type | Wavelength (nm) | Core Size (microns) | Modal Bandwidth (MHz-km) | Maximum Cable Distance |
|-------------|------------|----------------|-----------------|---------------------|--------------------------|------------------------|
| N2200 FET | MMF | Dual LC/PC | 850 | 50 | 500 | 82 feet (25 meters) |
| | | | | 50 | 2000 | 328 feet (100 meters) |
| SFP-10G-SR | MMF | Dual LC/PC | 850 | 62.5 | 160 | 85 feet (26 meters) |
| | | | | 62.5 | 200 | 108 feet (33 meters) |
| | | | | 50.0 | 400 | 216 feet (66 meters) |
| | | | | 50.0 | 500 | 269 feet (82 meters) |
| | | | | 50.0 | 2000 | 984 feet (984 meters) |
| SFP-10G-LR | SMF | Dual LC/PC | 1310 | G.652 fiber | — | 6.2 miles (10 km) |

Table B-5 Environmental and Power Specifications for the 10-Gbps SFP+ Optical Transceivers

| Parameter ¹ | Specification |
|-------------------------------|----------------------------|
| Storage temperature | −40 to 185°F (−40 to 85°C) |
| Case temperature ² | 32 to 158°F (0 to 70°C) |
| Relative humidity | 5 to 95% |
| Module supply voltage | 3.1 to 3.5 V |

1. Absolute maximum ratings are those values beyond which damage to the device may occur if these limits are exceeded for other than a short period of time.

- Functional performance is not intended, device reliability is not implied, and damage to the device may occur over an extended period of time between absolute maximum ratings and the recommended operating conditions.

SFP+ Copper Transceiver Specifications

This section provides the general and environmental specifications for the SFP+ transceivers used with copper cables.

For the cable specifications that apply to SFP+ copper transceivers, see [Table B-6](#).

Table B-6 Cable Specifications for the 10-Gbps SFP+ Copper Transceivers

| Transceiver | Cable Length |
|-----------------|-----------------------|
| SFP-H10GB-CU7M | 23.0 feet (7 meters) |
| SFP-H10GB-CU10M | 32.8 feet (10 meters) |

Airflow Optimization Accessories

This section describes the airflow optimization accessories for the Cisco Nexus 2000 Series FEX.

For the details of the Cisco Nexus airflow extension sleeve and the Cisco Nexus airflow vent, see [Table B-7](#).

Table B-7 Airflow Optimization Accessories

| Accessories | Airflow Extension Sleeve | Airflow Vent |
|--|---|---|
| PID | NXA-AIRFLOW-SLV | NXA-ACC-KIT-BAV |
| Name | Cisco Nexus Airflow Extension Sleeve. | Cisco Nexus Airflow Vent. |
| Description | Optimizes airflow in front-to-back airflow deployments (port side exhaust) for alignment of port in back of rack and extension of power supply side of chassis to front of rack with airflow sleeve | Optimizes airflow in back-to-front top of rack deployments (port side intake). Airflow vent consists of metallic cover to place on the upper exhaust of the FEX port side and mounting rails with snap on holes for airflow vent. |
| Compatibility | Nexus 2200 chassis | Nexus 2200 chassis |
| Dimensions (height x width x depth) | 1.72" (1RU) x 17.3" x 8.5" (fully retracted)* or 12.9" (fully extended)* Adjustable depth for the FEX, between 26 and 30 inches | Vent cover is part of the mounting hardware kit and its size is meaningless to overall form factor of the chassis: 0.42" x 17.53" x 2.56" |
| Weight | 5.7 lbs or 2.6 kg | 0.42 lbs or 0.19 kg |



APPENDIX C

Cable and Port Specifications

This appendix provides cable and port specifications for the Fabric Extender (FEX) and includes the following sections:

- [Supported Power Cords and Plugs, page C-1](#)
- [Jumper Power Cord, page C-8](#)

Supported Power Cords and Plugs

Each power supply has a separate power cord. Standard power cords or jumper power cords are available for connection to a power distribution unit that has IEC 60320 C19 outlet receptacles. The jumper power cords, for use in cabinets, are available as an optional alternative to the standard power cords.

Power Cords

The standard power cords have an IEC C19 connector on the end that plugs into the device. The optional jumper power cords have an IEC C19 connector on the end that plugs into the device and an IEC C20 connector on the end that plugs into an IEC C19 outlet receptacle.



Note

Only the regular power cords or jumper power cords provided with the device are supported.

[Table C-1](#) lists the AC power cords for the Cisco Nexus 2000 Series FEX and provides their lengths in feet and meters.

Table C-1 AC Power Cords for the Cisco Nexus 2000 Series FEX

| Description | Length | | Power Cord Reference Illustration |
|---|--------|--------|-----------------------------------|
| | Feet | Meters | |
| SFS-250V-10A-AR Power Cord, 250 VAC 10 A IRAM 2073 Plug Argentina | 8.2 | 2.5 | Figure C-1 |
| CAB-9K10A-AU 250 VAC 10 A 3112 Plug, Australia | 8.2 | 2.5 | Figure C-2 |

Table C-1 AC Power Cords for the Cisco Nexus 2000 Series FEX (continued)

| Description | Length | | Power Cord Reference Illustration |
|--|--------|--------|-----------------------------------|
| | Feet | Meters | |
| SFS-250V-10A-CN Power Cord, 250 VAC 10 A GB 2009 Plug China | 8.2 | 2.5 | Figure C-3 |
| CAB-9K10A-EU Power Cord, 250 VAC 10 A M 2511 Plug Europe | 8.2 | 2.5 | Figure C-4 |
| SFS-250V-10A-ID Power Cord, 250 VAC 16A EL-208 Plug South Africa, United Arab Emerits, India | 8.2 | 2.5 | Figure C-5 |
| SFS-250V-10A-IS Power Cord, 250 VAC 10 A SI32 Plug Israel | 8.2 | 2.5 | Figure C-6 |
| CAB-9K10A-IT Power Cord, 250 VAC 10 A CEI 23-16 Plug Italy | 8.2 | 2.5 | Figure C-7 |
| CAB-9K10A-SW Power Cord, 250 VAC 10 A MP232 Plug Switzerland | 8.2 | 2.5 | Figure C-8 |
| CAB-9K10A-UK Power Cord, 250 VAC 10 A BS1363 Plug (13 A fuse) United Kingdom | 8.2 | 2.5 | Figure C-9 |
| CAB-AC-250V/13A Power Cord, 250 VAC 13 A IEC60320 Plug North America | 6.6 | 2.0 | Figure C-10 |
| CAB-N5K6A-NA Power Cord, 250 VAC 13 A NEMA 6-15 Plug, North America | 8.2 | 2.5 | Figure C-11 |
| CAB-9K12A-NA Power Cord, 125VAC 15A NEMA 5-15 Plug, North America | 8.2 | 2.5 | Figure C-12 |
| CAB-C13-CBN Cabinet Jumper Power Cord, 250 VAC 16A, C14-C13 Connectors | 2.25 | 0.686 | Figure C-13 |
| CAB-IND-10A(=) 10A Power cable for India | 8.2 | 2.5 | Figure C-14 |
| CAB-C13-CBN Cabinet Jumper Power Cord, 250 VAC 16A, C14-C13 Connector | 2.25 | 0.686 | Figure C-15 |
| CAB-C13-C14-JMPR Cabinet Jumper Power Cord, 250 VAC 13 A, C14-C15 Connector | 2.2 | 0.7 | Figure C-16 |

Table C-1 AC Power Cords for the Cisco Nexus 2000 Series FEX (continued)

| Description | Length | | Power Cord Reference Illustration |
|--|--------|--------|-----------------------------------|
| | Feet | Meters | |
| CAB-C13-C14-2M(=) Power Cord Jumper, C13-C14 Connectors, 2 Meter Length | 6.6 | 2.0 | |
| CAB-C13-C14-AC(=) Power Cord Jumper, C13-C14 Connectors, 3 Meter Length | | 3.0 | |

Figure C-1 SFS-250V-10A-AR

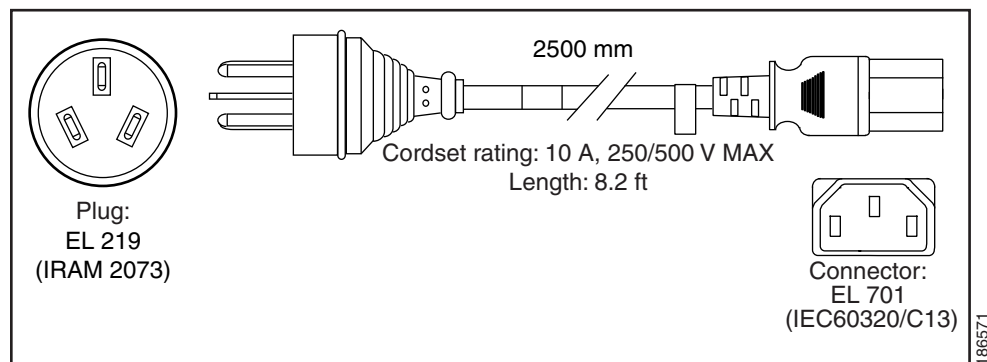


Figure C-2 CAB-9K10A-AU

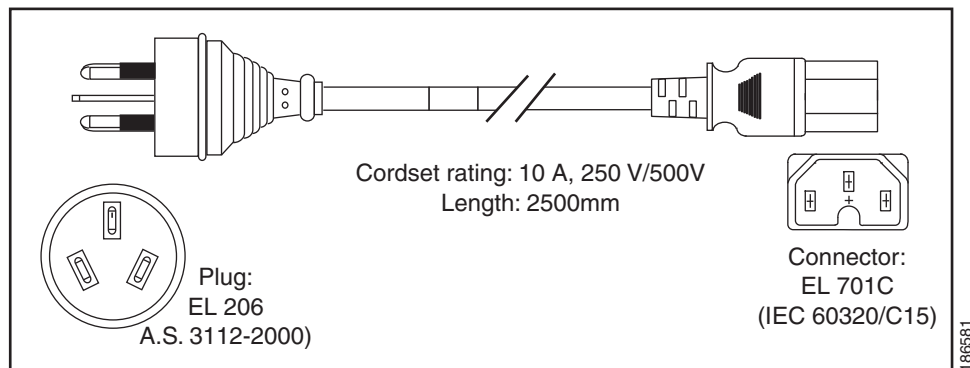
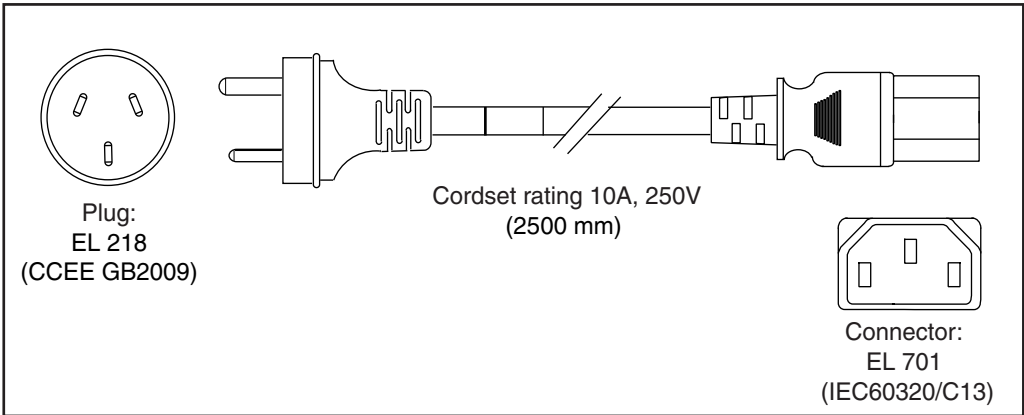
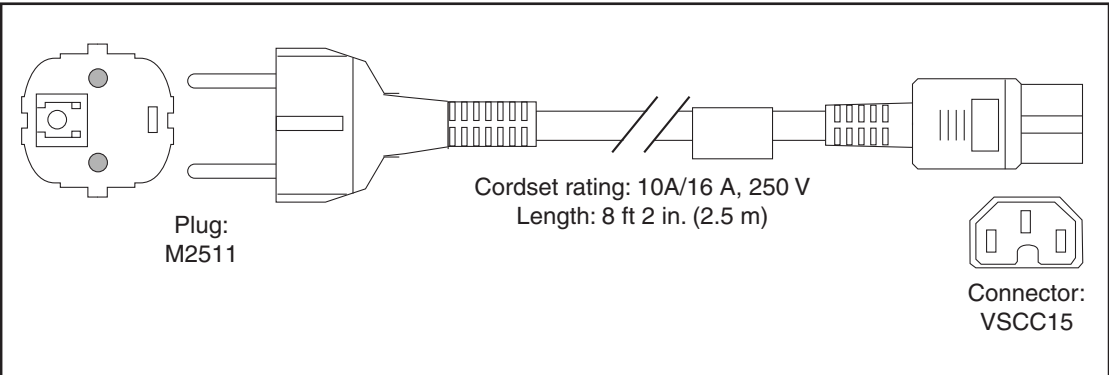


Figure C-3 SFS-250V-10A-CN



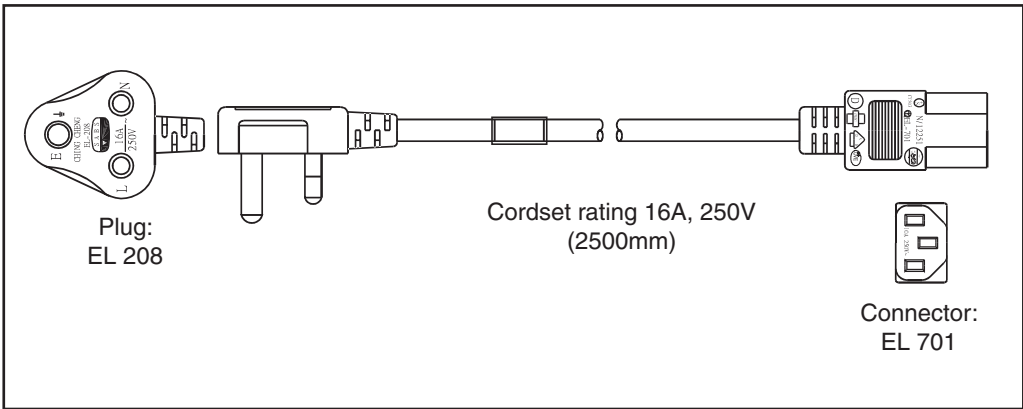
186573

Figure C-4 CAB-9K10A-EU



186576

Figure C-5 SFS-250V-10A-ID



187490

Figure C-6 SFS-250V-10A-IS

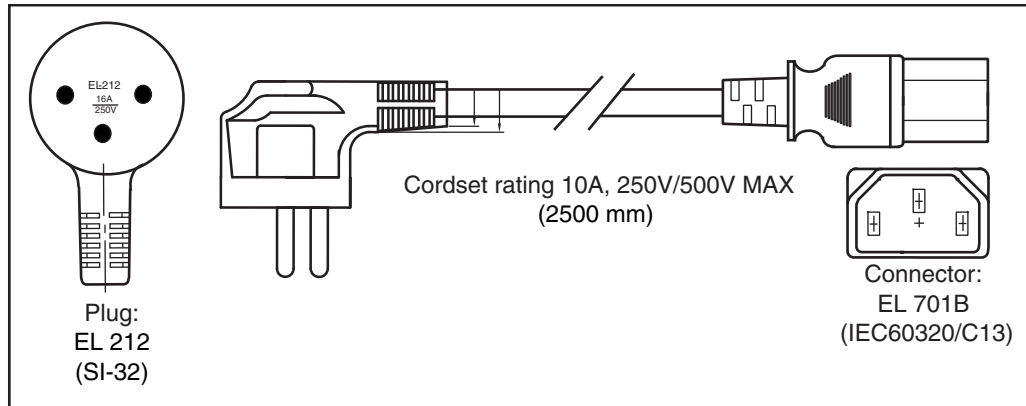


Figure C-7 CAB-9K10A-IT

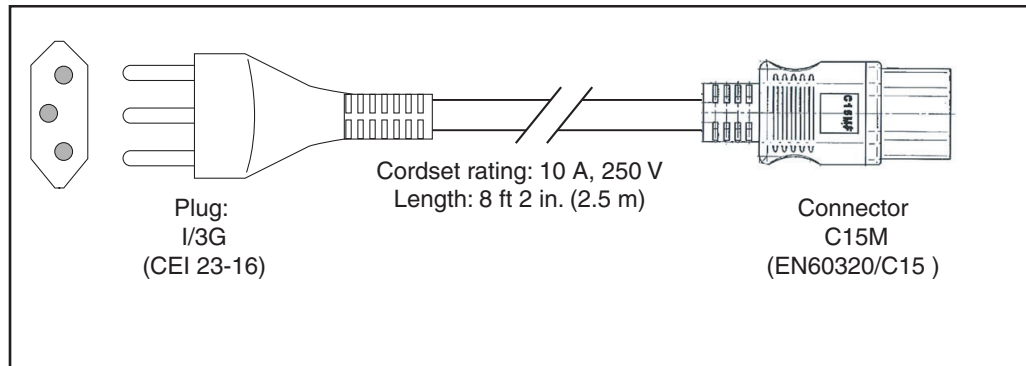


Figure C-8 CAB-9K10A-SW

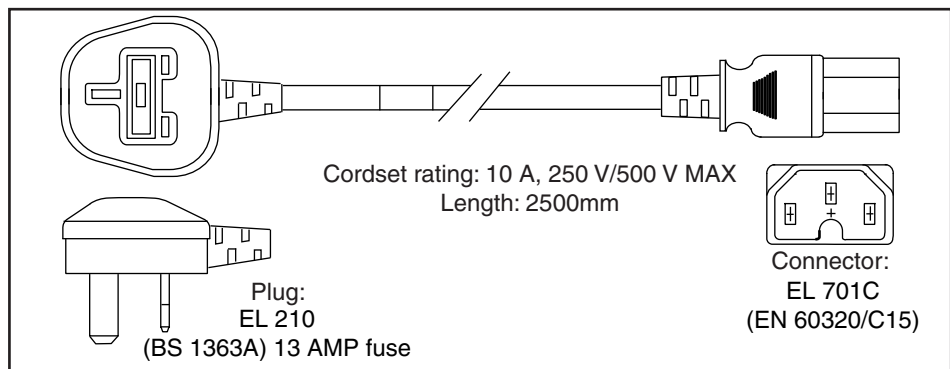


Figure C-9 CAB-9K10A-UK

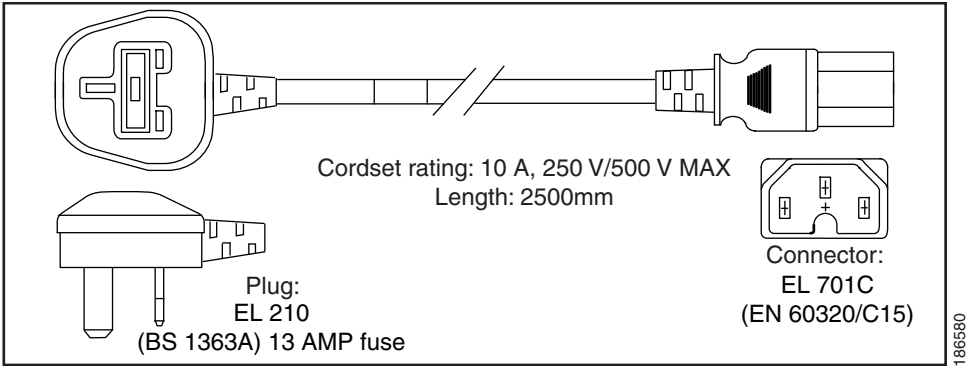


Figure C-10 CAB-AC-250V/13A

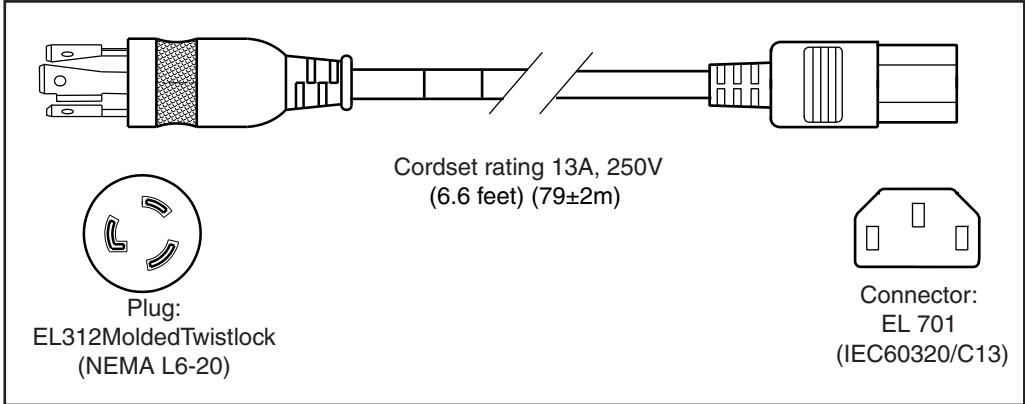


Figure C-11 CAB-N5K6A-NA

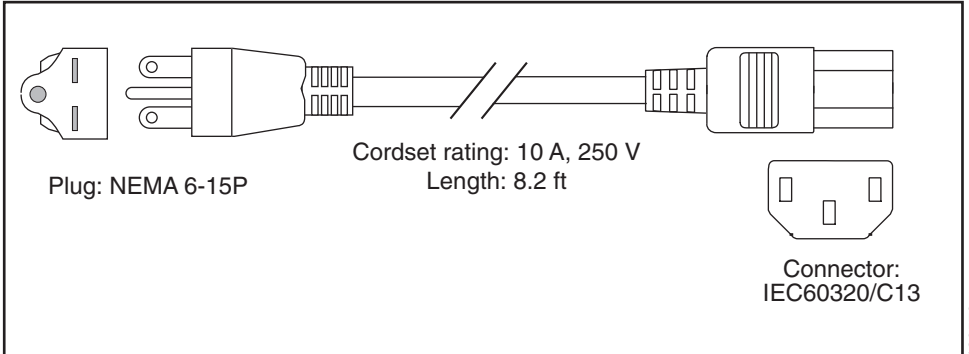


Figure C-12 CAB-9K12A-NA

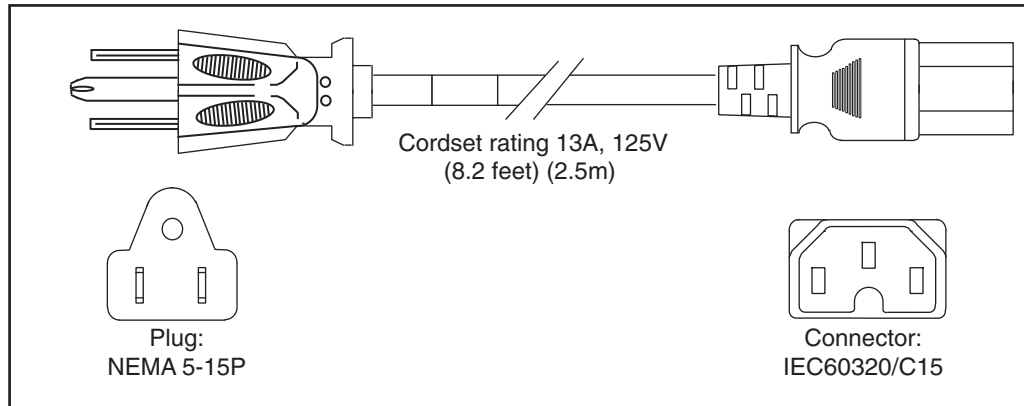


Figure C-13 CAB-C13-CBN

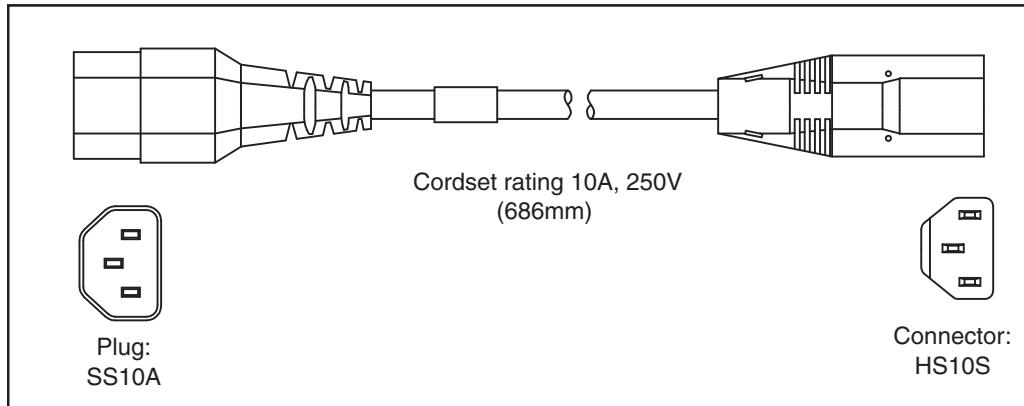


Figure C-14 CAB-IND-10A

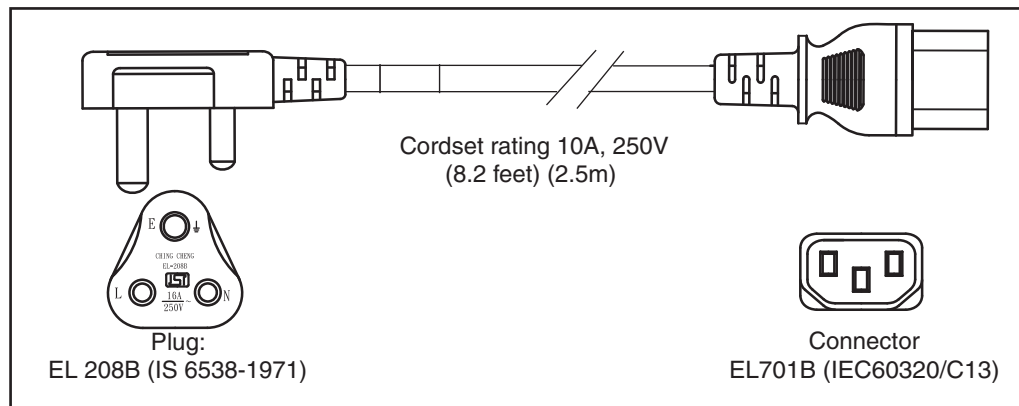


Figure C-15 CAB-C13-CBN

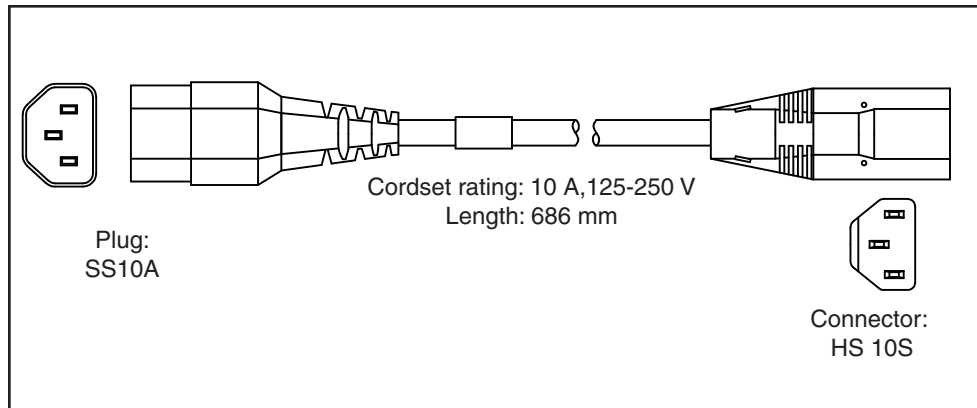


Table C-2 lists the AC power cords for the Cisco Nexus 2232TM.

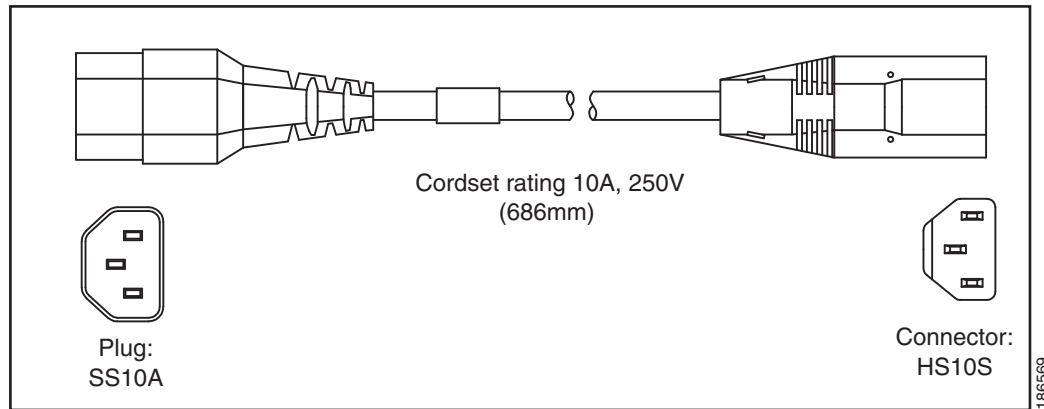
Table C-2 AC Power Cords for the Cisco Nexus 2232TM

| Power Cords | Description |
|----------------|----------------------------------|
| CAB-3KX-AC= | AC power card for North America |
| CAB-3KX-AC-AP= | AC power card for Australia |
| CAB-3KX-AC-AR= | AC power card for Argentina |
| CAB-3KX-AC-SW= | AC power card for Switzerland |
| CAB-3KX-AC-UK= | AC power card for United Kingdom |
| CAB-3KX-AC-JP= | AC power card for Japan |
| CAB-3KX-AC-EU= | AC power card for Europe |
| CAB-3KX-AC-IT= | AC power card for Italy |
| CAB-3KX-AC-IN= | AC power card for India |
| CAB-3KX-AC-CN= | AC power card for China |
| CAB-3KX-AC-DN= | AC power card for Denmark |
| CAB-3KX-AC-IS= | AC power card for Israel |

Jumper Power Cord

Figure C-16 shows the plug connector on the optional jumper power cord for the Cisco Nexus 2000 Series FEX. The plug plugs into the Cisco Nexus 2000 Series FEX power supply, while the connector plugs into the receptacle of a power distribution unit for a cabinet.

Figure C-16 CAB-C13-C14-JMPR, Jumper Power Cord





APPENDIX **D**

LEDs

This appendix describes the conditions indicated by the chassis and module LEDs on the Cisco Nexus 2000 Series Fabric Extenders (FEXs).

This appendix includes the following sections:

- [Chassis and Module LEDs for the Cisco Nexus 2000 Series Fabric Extenders, page D-1](#)
- [Port LEDs, page D-4](#)

Chassis and Module LEDs for the Cisco Nexus 2000 Series Fabric Extenders

This section includes the following topics:

- [Chassis and Module LED Descriptions, page D-2](#)
- [Power Supply Status, page D-3](#)

Chassis and Module LED Descriptions

Table D-1 describes the chassis LEDs for the Cisco Nexus 2000 Series FEXs.

Table D-1 LEDs for the Cisco Nexus 2000 Series FEXs

| Component | LED | Status | Description |
|------------------------------------|---------------|---------------------|---|
| Chassis (front and back) | ID | On (blue) | Identifies the chassis receiving the beacon signal. |
| | Status | Solid on (green) | All diagnostics pass. The module is operational. |
| | | Off | The module is not receiving power. |
| | | On (amber) | The module is booting or running diagnostics. An overtemperature condition has occurred. The temperature threshold has been exceeded by a small value during environmental monitoring. |
| | | Blinking (amber) | An overtemperature condition has occurred. The temperature threshold has been exceeded by a large value during environmental monitoring. If the module fails during initial reset, the LED continues to blink and the module does not come online. The module has a runtime failure and is brought offline. |
| Fan tray (front of chassis) | Status | Solid on (green) | All diagnostics pass. The module is operational. |
| | | Off | The module is not receiving power. |
| | | Solid on (amber) | The module is booting or running diagnostics. |
| | | Blinking (amber) | If the module fails during initial reset, the LED continues to blink and the module does not come online. The module has a runtime failure and is brought offline. |
| Power supply (front of chassis) | OK (green) | Solid on | Power supply is on and okay. |
| | | Blinking | 12 voltage standby (VSB) is on but the power supply unit is not powering the other modules. |
| | | Off | No AC power to the power supply. |
| | FAULT (amber) | Solid on | Power supply failures, overvoltage, overcurrent, or overtemperature has occurred. |
| | | Blinking | AC is present, 12 VSB on, and the power supply is off. |
| | | Off | Operating normally. |

Table D-1 LEDs for the Cisco Nexus 2000 Series FEXs (continued)

| Component | LED | Status | Description |
|-----------|----------------------|------------------|---|
| Port LED | Indicates LED status | Off | The port is not active or the link is not connected. |
| | | Solid on (green) | The port is active. The link is connected and operational. |
| | | Solid on (amber) | The module or port is disabled through the CLI command or the module is initializing. |
| | | Blinking (amber) | The port is faulty and has been disabled. |

For a description of the two power supply status, see the [“Power Supply Status”](#) section on page D-3.

Power Supply Status

This section describes the power supply LED indicators for the Cisco Nexus 2000 Series FEXs. [Table D-2](#) describes the status indicated by the Cisco Nexus 2248TP-ETP, 2232PP, and 2224TP power supply LEDs. [Table D-3](#) describes the status indicated by the Cisco Nexus 2148T power supply LEDs.

Table D-2 Power Supply LED Indicators for the Cisco Nexus 2248TP-ETP, 2232PP, and 2224TP

| Condition | OK LED Status (Green) | FAIL LED Status (Amber) |
|--|-----------------------|-------------------------|
| No AC power to the power supplies | Off | Off |
| Power supply failure (includes overvoltage, overcurrent, overtemperature, and fan failure) | Off | On |
| Power supply warning events where the power supply continues to operate (high temperature, high power, and slow fan) | Off | 1 blinking |
| AC present /voltage standby (VSB) on, and power supply unit off | blinking | Off |
| Power supply On and OK | On | Off |

Table D-3 Power Supply LED Indicators for the Cisco Nexus 2148T

| Condition | INPUT OK LED Status (Green) | OUTPUT OK LED Status (Red) |
|--|-----------------------------|----------------------------|
| No AC power to the power supplies | Off | Off |
| Power supply failure (includes overvoltage, overcurrent, overtemperature, and fan failure) | Off | On |

Table D-3 Power Supply LED Indicators for the Cisco Nexus 2148T (continued)

| Condition | INPUT OK LED Status (Green) | OUTPUT OK LED Status (Red) |
|--|-----------------------------|----------------------------|
| Power supply warning events where the power supply continues to operate (high temperature, high power, and slow fan) | Off | Blinking |
| AC present and power supply unit off | Blinking | Off |
| Power supply On and OK | On | Off |

Port LEDs

This section includes the following topics:

- [Ethernet Port LEDs, page D-4](#)
- [Ethernet and Fibre Channel LEDs, page D-4](#)

Ethernet Port LEDs

[Table D-4](#) lists the LED descriptions for the RJ-45 Ethernet port LEDs.

Table D-4 Ethernet Port LED Descriptions

| LED | Status | Description |
|-------|----------------|---------------|
| Left | Off | No link |
| | Solid green | Physical link |
| Right | Off | No activity |
| | Blinking green | Activity |

Ethernet and Fibre Channel LEDs

There are 20 to 26 port activity LEDs on the FEX depending on whether the module is a Fibre Channel or 10-Gigabit Ethernet module. [Table D-5](#) describes the behavior of the port LEDs.

Table D-5 Port-Level LEDs

| Link State | LED State | Notes |
|---------------------|-----------------------|-------|
| Link Down | OFF | — |
| POST failed on port | AMBER blinking yellow | — |

Table D-5 *Port-Level LEDs*

| Link State | LED State | Notes |
|---|------------------|--|
| Administrative disabled | AMBER_ON | Depending on the product you look at, the LED could be off, or solid amber |
| Link Up, port in STP forwarding state | GREEN_ON | Blinks based on network activity |



Troubleshooting Hardware Components

This chapter describes how to identify and resolve problems that might occur with the hardware components of the Cisco Nexus 2000 Series Fabric Extender (FEX). It includes the following sections:

- [Overview, page E-1](#)
- [SNMP Traps, page E-1](#)
- [Device Hardware Guidelines, page E-2](#)
- [Contacting Customer Service, page E-3](#)

Overview

The key to success when troubleshooting the system hardware is to isolate the problem to a specific system component. The first step is to compare what the system is doing to what it should be doing. Because a startup problem can usually be attributed to a single component, it is more efficient to isolate the problem to a subsystem rather than troubleshoot each separate component in the system.

Problems with the initial power up are often caused by a module that is not firmly connected to the backplane or a power supply that has been disconnected from the power cord connector.

Overheating can also cause problems with the system, though typically only after the system has been operating for an extended period of time. The most common cause of overheating is the failure of a fan tray.

SNMP Traps

You can set SNMP traps to monitor fans, power supplies, and temperature settings, or to test a call home application. Use the following commands to set SNMP traps:

- **test pfmtest-SNMP-trap fan**
- **test pfmtest-SNMP-trap power supply**
- **test pfmtest-SNMP-trap temp-sensor**

Device Hardware Guidelines

Use the recommendations in this section to ensure the proper installation, initialization, and operation of the device. This section includes the following topics:

- [Installation, page E-2](#)
- [Initialization, page E-2](#)
- [Device Operation, page E-2](#)

Installation

When installing the device, follow these best practices:

- Plan your site configuration and prepare the site before installing the chassis.
- Verify that you have the appropriate power supplies and fan trays for your chassis configuration. For each chassis, each module must have the same airflow direction. Either all modules have front-to-back airflow (no black stripe on the front) or all have back-to-front airflow (black stripe on the front). If you have modules that use different airflow directions in the same chassis, you will see an error message.
- Install the chassis following the rack and airflow guidelines in this publication.
- Verify that the chassis and DC power supplies are adequately grounded.

Initialization

When the initial system boot is complete, verify the following:

- Power supplies are supplying power to the system.
- Fan trays are operating normally.
- The system software boots successfully. See the *Cisco Nexus 2000 Series Fabric Extender Software Configuration Guide* for information about booting the system and initial configuration task.

Device Operation

To ensure proper operation of your device, do the following:

- Make a copy of the running configuration to CompactFlash for a safe backup.
- Always enter the **copy running-config startup-config** command after you modify the running configuration and ensure that the system is operating properly.
- Never use the **init system** command unless you understand that you will lose the running and startup configuration as well as the files stored on bootflash:.
- Keep backup copies of the running kickstart and the system images on CompactFlash.

Contacting Customer Service

If you are unable to solve a startup problem after using the troubleshooting suggestions in this chapter, contact a customer service representative for assistance and additional instructions. Before you call, have the following information ready to help your service provider assist you as quickly as possible:

- Date that you received the device
- Chassis serial number (located on a label on the right of the rear panel of the chassis)
- Type of software and release number
- Maintenance agreement or warranty information
- Brief description of the problem
- Brief explanation of the steps that you have already taken to isolate and resolve the problem

To contact customer service, go to <http://www.cisco.com/en/US/support/index.html>



Accessory Kit

This appendix lists the accessory kit contents for the Cisco Nexus 2000 Series Fabric Extenders (FEXs). This appendix includes the following sections:

- [Accessory Kit for Cisco Nexus 2248TP-E, 2224TP, 2232PP, 2248TP, 2232TM, and 2148T, page F-5](#)

Accessory Kit for Cisco Nexus 2248TP-E, 2224TP, 2232PP, 2248TP, 2232TM, and 2148T

Accessory kits for the Cisco Nexus 2148T, 2224TP, 2232PP, 2248TP, 2248TP-E, and 2232TM FEXs contain the following items:

- 2 slider rails
- 2 rack-mount guides
- 2 rack-mount brackets
- 16 M4 x 0.7 x 8-mm Phillips countersunk screws
- 1 ground lug kit
- 1 ESD wrist strap

[Table F-1](#) provides ordering information for the Cisco Nexus 2148T, 2224TP, 2232PP, 2248TP-ETP, and 2232TM FEXs.

Table F-1 *Accessory Kit Information for the Cisco Nexus 2148T, 2224TP, 2232PP, 2248TP, 2248TP-E, and 2232TM Fabric Extenders*

| Accessory Kit | Details |
|----------------|---|
| N2K-C2148T-ACC | Cisco Nexus 2000 FEX 1GE accessory kit, spare |
| N2200-ACC-KIT | Cisco Nexus 2200 FEX accessory kit, spare |



Note

Additional parts can be ordered from your customer service representative.



Site Preparation and Maintenance Records

This appendix includes the following records to use when installing the Cisco Nexus 2000 Series Fabric Extender (FEX):

- [Site Preparation Checklist, page G-1](#)
- [Contact and Site Information, page G-3](#)
- [Chassis and Module Information, page G-4](#)

**Note**

For information about how to query the device for configuration information, see the *Cisco Nexus 2000 Switch Configuration Guide*.

Site Preparation Checklist

Planning the location and layout of your equipment rack or wiring closet is essential for successful device operation, ventilation, and accessibility. [Table G-1](#) lists the site planning tasks that we recommend completing before installing the Cisco Nexus 2000 Series Fabric Extender.

Consider heat dissipation when sizing the air-conditioning requirements for an installation. See [Table B-2 on page B-5](#) for the environmental requirements and the “[Power Specifications](#)” section on [page B-1](#) for power and heat ratings.

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Table G-1 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 • Air flow | | | |
| 3 | Power evaluation: <ul style="list-style-type: none"> • Input power type • Power receptacles¹ • Receptacle proximity to the equipment • Dedicated circuit for power supply • Dedicated (separate) circuits for redundant power supplies • UPS² for power failures | | | |
| 4 | Grounding evaluation: <ul style="list-style-type: none"> • Circuit breaker size • CO ground (AC-powered systems) | | | |
| 5 | Cable and interface equipment evaluation: <ul style="list-style-type: none"> • Cable type • Connector type • Cable distance limitations • Interface equipment (transceivers) | | | |
| 6 | EMI ³ evaluation: <ul style="list-style-type: none"> • Distance limitations for signaling • Site wiring • RFI⁴ levels | | | |

1. Verify that the power supply installed in the chassis has a dedicated AC source circuit.

2. UPS = uninterruptible power supply.

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3. EMI = electromagnetic interference.
4. RFI = radio frequency interference.

Contact and Site Information

Use the following worksheet (see [Table G-2](#)) to record contact and site information.

Table G-2 **Contact and Site Information**

| | |
|-----------------------------|--|
| Contact person | |
| Contact phone | |
| Contact e-mail | |
| Building/site name | |
| Data center location | |
| Floor location | |
| Address (line 1) | |
| Address (line 2) | |
| City | |
| State | |
| Zip code | |
| Country | |

Send documentation comments to nexus5kdocs@cisco.com

Chassis and Module Information

Use the following worksheets (see [Table G-3](#) and [Table G-4](#)) to record information about the chassis and modules.

Contract Number _____

Chassis Serial Number _____

Product Number _____

Table G-3 *Network-Related Information*

| | |
|-------------------------------|--|
| Device IP address | |
| Device IP netmask | |
| Host Name | |
| Domain name | |
| IP broadcast address | |
| Gateway/router address | |
| DNS address | |
| Modem telephone number | |

Table G-4 *Module Information*

| Slot | Module Type | Module Serial Number | Notes |
|------|-------------|----------------------|-------|
| 1 | Supervisor | | |
| 2 | | | |



Note

The supervisor module and the interface module are not removable.



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