

Hardware Installation Guide for Cisco NCS 1004

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Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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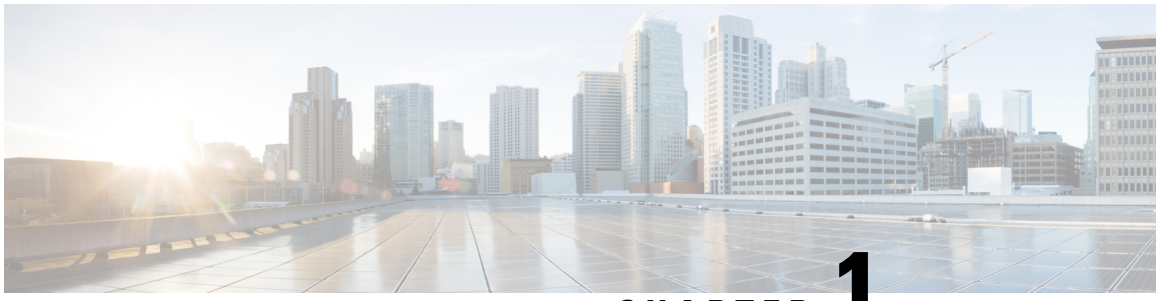
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CHAPTER 1

Cisco NCS 1004 Overview

This chapter provides an overview for Cisco NCS 1004.

- Cisco NCS 1004 Overview , on page 1
- Supported Pluggables, on page 4

Cisco NCS 1004 Overview

The Cisco NCS 1004 chassis is a 2RU chassis that delivers a universal transponder solution which provides excellent performance for metro, long-haul and submarine applications.

Cisco NCS 1004 chassis has the following modules:

- Removable controller
- Two replaceable power supply units (PSU)
- Three replaceable fan units
- Four line card slots
- Internal Storage: Two integrated SSDs, including a CPU SSD (D:13) and a Chassis SSD (D:14), each with 240 GB of storage capacity.

NCS 1004 chassis supports the following line cards:

- NCS1K4-1.2T-K9
- NCS1K4-1.2TL-K9
- NCS1K4-2-QDD-C-K9
- NCS1K4-OTN-XP
- NCS1K4-QXP-K9

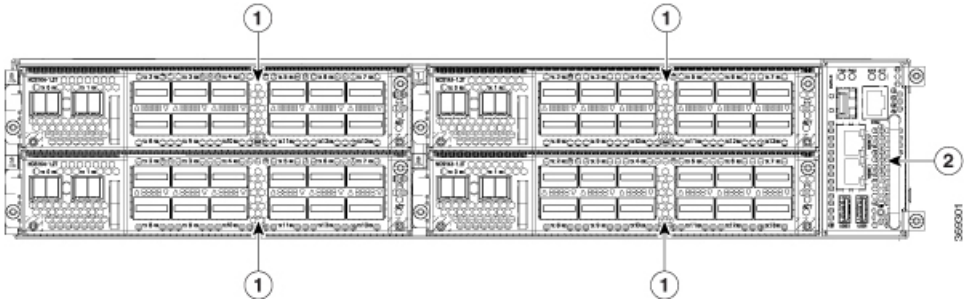
For more information about the Cisco NCS 1004 chassis, see Cisco NCS 1004 datasheet.

Cisco NCS 1004 Overview

Note "1.2T" refers to the NCS1K4-1.2T-K9 C-band line card, "1.2TL" refers to the NCS1K4-1.2TL-K9 L-band line card, "2-QDD-C" refers to the NCS1K4-2-QDD-C-K9 C-band line card, "OTN-XP" refers to the NCS1K4-OTN-XP line card, and "QXP-K9" refers to the NCS1K4-QXP-K9 line card.

The controller is on the front side. The PSUs and the fan units are on the rear side of the chassis. The line cards can be inserted in to the four slots as shown in the following figure.

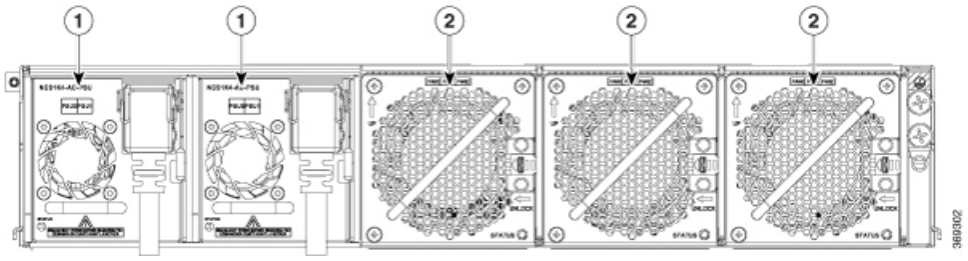
Figure 1: NCS 1004 Front View



1	Line Cards
2	Controller

The slots for the PSUs and fan units are indicated in the following figure.

Figure 2: NCS 1004 Rear View

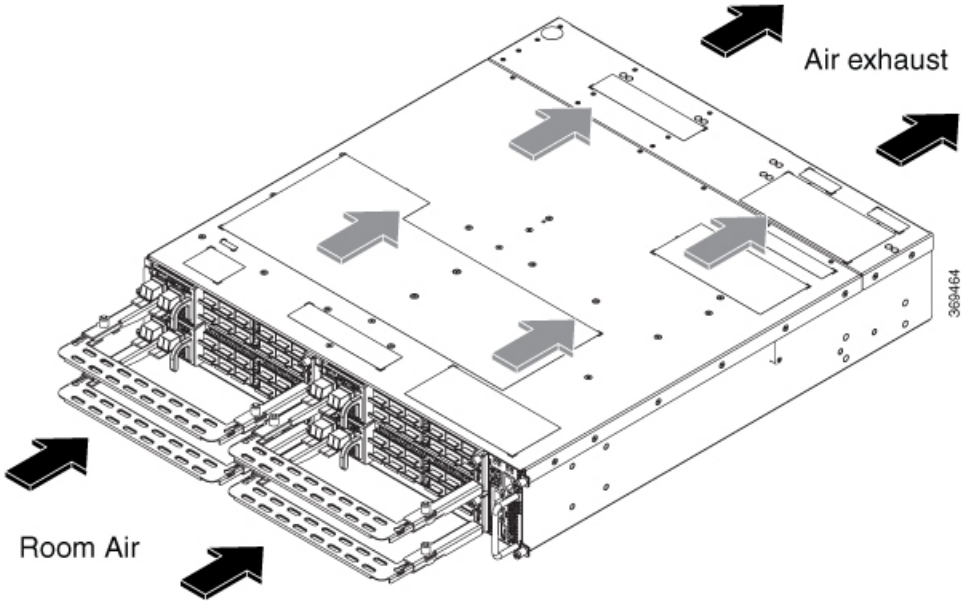


1	Power Supply Units (Slots 0 and 1)
2	Fan Units (Slots 0,1,2)

Both the power supply modules should be AC or DC. Mixed configuration is not allowed.

Cisco NCS 1004 has a front to back airflow scheme. The air inlet is at the front side of the chassis and the exhaust is on the rear side. Ensure that the airflow is not obstructed or impeded by any object as it may lead to reduced airflow in the system, causing components to operate at a higher temperature.

Figure 3: Airflow in NCS 1004



Class 1M Laser Product Label

The Class 1M Laser Product label is shown in the following figure.

Figure 4: Class 1M Laser Product Label



Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Conforme à la norme 21 CFR 1040.10 et 1040.11, sauf conformité avec la norme IEC 60825-1 Ed. 3., comme décrit dans l'avis relatif au laser no. 56, daté du 8 Mai 2019.

366295

Supported Pluggables

Table 1: Feature History

Feature Name	Release	Description
Pluggables Support	Cisco IOS XR Release 24.3.1	The QDD-4X100G-FR-S pluggable is now supported on the QXP line card.
Pluggables Support	Cisco IOS XR Release 24.1.1	The ONS-QC-4X3G-LW pluggable is supported on the OTN-XP card.
Pluggables Support	Cisco IOS XR Release 7.10.1	The following pluggables are supported on the QXP card: • DP04QSDD-HK9 • DP01QSDD-LK9 These are Cisco 400G QSFP-DD High-Power (Bright) Optical Modules.
Pluggables Support	Cisco IOS XR Release 7.5.2	The following pluggables are supported: • QSFP-100G-LR-S • DP04CFP2-M25-K9 (supported only on OTN-XP card)
Pluggables Support	Cisco IOS XR Release 7.3.2	The QSFP-100G-DR-S pluggable is supported.
Pluggables Support	Cisco IOS XR Release 7.3.1	The following pluggables are supported: • QSFP-40/100-SRBD • QSFP-100G-ER4L-S • QSFP-DD QDD-400G-FR4-S • QDD-400-AOCxM

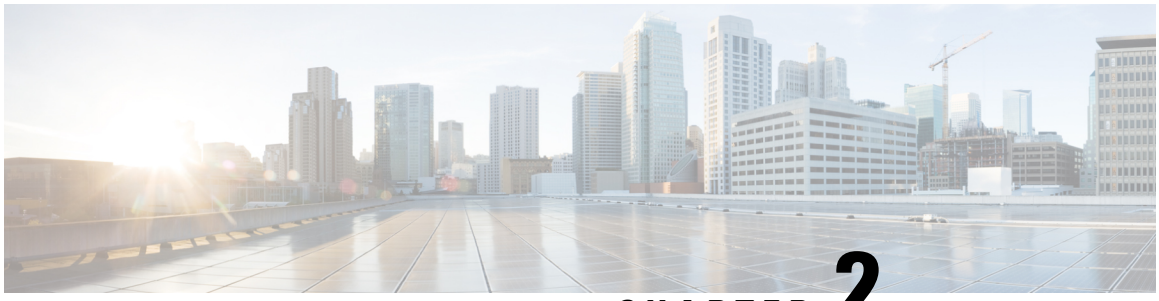
The following table provides you the list of client and trunk plaggables supported by the NCS 1004 cards and the releases from which they are supported:

Table 2: Supported Client and Trunk Pluggables

Pluggables	Pluggable Type	NCS1K4 -1.2T-K9	NCS1K4 -1.2TL-K9	NCS1K4 -2-QDD-C-K9	NCS1K4 -OTN-XP	NCS1K4 -QXP-K9
QSFP 28 BiDi	Client optics	7.3.1	7.3.1	—	—	—
QSFP-100G-ER4	Client optics	7.3.1	7.3.1	—	7.3.1	—
QSFP-100G-ER4L-S	Client optics	7.3.1	7.3.1	—	7.3.1	—
QSFP DR-S	Client optics	7.3.2	7.3.2	7.3.2	—	—
QSFP-100G-FR-S	Client optics	7.2.1	7.2.1	—	7.3.1	7.7.1
QSFP-100G-SM-SR	Client optics	7.0.1	7.2.1	7.3.1	7.3.1	—
QSFP-100G-CWDM4-S=	Client optics	7.0.1	7.2.1	7.3.1	7.3.1	7.8.1
QSFP-100G-LR4-S=	Client optics	7.0.1	7.2.1	7.3.1	7.3.1	7.7.1
QSFP-100G-SR4-S	Client optics	7.0.1	7.2.1	7.3.1	7.3.1	7.8.1
ONS-QSFP28-LR4=	Client optics	7.1.1	7.2.1	7.5.1	7.2.1	7.7.1
QSFP-100G-AOC1M	Client optics	7.2.1	—	7.3.1	7.3.2	—
QSFP-100G-AOC3M	Client optics	7.2.1	—	—	7.3.1	—
QSFP-100G-AOC10M	Client optics	7.2.1	—	—	7.3.1	—
QSFP-100G-AOC20M	Client optics	7.2.1	—	—	7.3.1	—
QSFP-100G-AOC25M	Client optics	7.2.1	—	—	7.3.1	—
QSFP-100G-CU1M	Client optics	7.2.1	—	—	—	—
QSFP-100G-CU2M	Client optics	7.2.1	—	—	—	—

Pluggables	Pluggable Type	NCS1K4 -1.2T-K9	NCS1K4 -1.2TL-K9	NCS1K4 -2-QDD-C-K9	NCS1K4 -OTN-XP	NCS1K4 -QXP-K9
QSFP-100G-CU3M	Client optics	7.2.1	—	—	—	—
QSFP-100G-CU5M	Client optics	7.2.1	—	—	—	—
QSFP-100G-AOC3M	Client optics	7.2.1	7.2.1	7.3.1	7.3.2	—
QSFP-100G-AOC1M	Client optics	7.2.1	7.2.1	7.3.1	7.3.2	—
QSFP-100G-AOC10M	Client optics	7.2.1	7.2.1	7.3.1	7.3.2	—
QSFP-100G-AOC20M	Client optics	7.2.1	7.2.1	7.3.1	7.3.2	—
QSFP-100G-AOC25M	Client optics	7.2.1	7.2.1	7.3.1	7.3.2	—
QDD-400G-FR4-S	Client optics	—	—	7.3.1	7.3.1	7.7.1
QDD-400G-DR4-S	Client optics	—	—	7.3.2	7.3.1	7.7.1
ONS-QSFP-4X10-MLR	Client optics	—	—	—	7.2.1	—
QSFP-40G-SR4	Client optics	—	—	—	7.2.1	—
QSFP-100G-LR-S=	Client optics	7.5.2	—	—	7.5.2	7.7.1
QDD-400-AOC15M	Client optics	—	—	7.3.2	7.3.2	7.7.1
ONS-QC-16GFC-SW	—	—	—	—	7.5.2	—
QDD-4x100G-LR-S	Client optics	—	—	—	—	7.7.1
QDD-4X100G-FR-S	Client optics	—	—	—	—	24.3.1
QSFP-100G-DR-S	Client optics	7.3.2	7.3.2	7.3.2	7.3.2	7.7.1
DS-SFP-4X32G-SW	—	—	—	—	7.5.2	—

Pluggables	Pluggable Type	NCS1K4 -1.2T-K9	NCS1K4 -1.2TL-K9	NCS1K4 -2-QDD-C-K9	NCS1K4 -OTN-XP	NCS1K4 -QXP-K9
ONS-QC-4X32G-LW	—	—	—	—	24.1.1	—
ONS-QC-4X3G-LW	—	—	—	—	24.1.1	—
DP04QSDD-HK9	Client optics	—	—	—	—	7.10.1
DP01QSDD-LK9	Client optics	—	—	—	—	7.10.1
QSFP-40/100-SRBD	Client optics	7.3.1	7.3.1	—	—	—
QDD-400G-FR4-S	Client optics	—	—	—	7.3.1	7.10.1
QDD-400G-DR4-S	Client optics	—	—	—	7.3.1	7.10.1
QDD-400G-LR8	Client optics	—	—	—	7.3.2	—
QDD-400G-ZRP-S	Trunk optics	—	—	—	7.3.2	7.7.1
ONS-CFP2D-400G-C	Trunk optics	—	—	—	7.3.1	—
DP04CFP2-M25-K9	Trunk optics	—	—	—	7.5.2	—
CFP2-WDM-DETS-1HL	Trunk optics	—	—	—	7.8.1	—



CHAPTER 2

Safety Guidelines

Before you perform any procedure in this publication, you must review the safety guidelines in this section to avoid injuring yourself or damaging the equipment. Note that this section contains *guidelines*, and does not include every potentially hazardous situation. During any installation procedure, always use caution and common sense.

Review the complete list of safety warnings available at Regulatory Compliance and Safety Information for *Cisco Network Convergence System 1001 and 1002*.

- Standard Warning Statements, on page 9
- General Safety Guidelines for Personal Safety and Equipment Protection, on page 12
- Safety Precaution for Module Installation and Removal, on page 12
- Safety with Electricity, on page 13
- Ground Connection Warnings, on page 14
- Safety Precaution for Energy Hazard, on page 15
- Optical Connection (SFP) Warnings, on page 15
- Rack-Mount Warnings, on page 16
- Prevent Electrostatic Discharge Damage , on page 16
- Network Equipment-Building System (NEBS) Statements, on page 17

Standard Warning Statements

Take note of the following general safety warnings:

Warning

Statement 1071—Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS



Note

Statement 407—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品使用における安全上の注意〉

www.cisco.com/web/JP/techdoc/index.html

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Warning

Statement 1015—Battery Handling

To reduce risk of fire, explosion, or leakage of flammable liquid or gas:

- Replace the battery only with the same or equivalent type recommended by the manufacturer.
- Do not dismantle, crush, puncture, use a sharp tool to remove, short the external contacts, or dispose of the battery in fire.
- Do not use if battery is warped or swollen.
- Do not store or use battery in a temperature > 70° Celsius.
- Do not store or use battery in low air pressure environment < 10.1 PSIA.



Warning **Statement 1029—**Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.



Warning **Statement 1073—**No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.



Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.



Note **Statement 1089—**Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.



Warning **Statement 1090—**Installation by a Skilled Person

Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person.



Warning **Statement 1091—**Installation by an Instructed Person or Skilled Person

Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed person or skilled person.



Warning **Statement 9001—**Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

General Safety Guidelines for Personal Safety and Equipment Protection

Follow these safety guidelines:

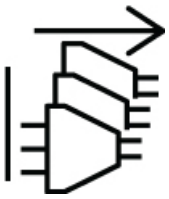
- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always unplug power cables when performing maintenance or working on the chassis, unless the replacement part is hot swappable and designed for online insertion and removal (OIR).
- Keep the work area clear and dust free during and after installation.
- Keep tools and chassis components away from walkways and equipment rack aisles.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the equipment.
- Fasten your tie or scarf and sleeves.
- Operate Cisco equipment safely by using it in accordance with its electrical ratings and product usage instructions.
- Do not work alone if potentially hazardous conditions exist.
- Ensure that the installation of the router is in compliance with national and local electrical codes: in the United States, National Fire Protection Association (NFPA) 70, United States National Electrical Code; in Canada, Canadian Electrical Code, part I, CSA C22.1; in other countries, International Electrotechnical Commission (IEC) 364, part 1 through part 7.

Safety Precaution for Module Installation and Removal



Warning **Statement 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.





Warning **Statement 1073—**No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Note **Statement 1089—**Instructed and Skilled Person Definitions

An instructed person is someone who has been instructed and trained by a skilled person and takes the necessary precautions when working with equipment.

A skilled person or qualified personnel is someone who has training or experience in the equipment technology and understands potential hazards when working with equipment.

Warning **Statement 1090—**Installation by a Skilled Person

Only a skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of a skilled person.

Warning **Statement 1091—**Installation by an Instructed Person or Skilled Person

Only an instructed person or skilled person should be allowed to install, replace, or service this equipment. See statement 1089 for the definition of an instructed person or skilled person.

Safety with Electricity

Take note of the following power safety warnings:

Warning **Statement 1003—**DC Power Disconnection

To reduce risk of electric shock or personal injury, disconnect DC power before removing or replacing components or performing upgrades.

Warning **Statement 1005—**Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than: 20 A for AC and 40 A for DC.

Warning **Statement 1017—**Restricted Area

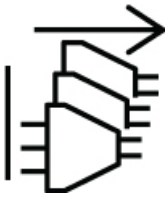
This unit is intended for installation in restricted access areas. Only skilled, instructed, or qualified personnel can access a restricted access area.

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning **Statement 1028—**More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning **Statement 1029—**Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Ground Connection Warnings

Take note of the following ground connection warnings:

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning **Statement 1101—**Connected To Grounded Outlet

In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

Safety Precaution for Energy Hazard

The Cisco NCS 1004 can be configured for a DC power source. Do not touch terminals with body parts or conductive objects while they are energized.

Optical Connection (SFP) Warnings

Warning **Statement 1051—**Laser Radiation

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

Warning **Statement 1055—**Class 1/1M Laser

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



Figure 5: Class 1M Laser Product Label



Rack-Mount Warnings

Take note of the following rack-mount safety warnings:



Warning **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.



Warning **Statement 1032—**Lifting the Chassis

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules, such as power supplies, fans, or cards. These types of handles are not designed to support the weight of the unit.



Warning **Statement 1098—**Lifting Requirement

2 people are required to lift the heavy parts of the product. To prevent injury, keep your back straight and lift with your legs, not your back.

Prevent Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD may occur when electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. When removing and replacing modules, always follow these ESD prevention procedures:

- Ensure that the device chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact.
- Handle components by only their handles or edges; do not touch the printed circuit boards or connectors.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.

Network Equipment-Building System (NEBS) Statements

NEBS describes the environment of a typical United States Regional Bell Operating Company (RBOC) central office. NEBS is the most common set of safety, spatial, and environmental design standards applied to telecommunications equipment in the United States. It is not a legal or regulatory requirement, but rather an industry requirement.

The following NEBS statements apply to the Cisco NCS 1004:

Note **Statement 7001—**ESD Mitigation

This equipment may be ESD sensitive. Always use an ESD ankle or wrist strap before handling equipment. Connect the equipment end of the ESD strap to an unfinished surface of the equipment chassis or to the ESD jack on the equipment if provided.

Warning **Statement 7003**—Shielded Cable Shielded Cable Requirements for Intrabuilding Lightning Surge

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

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

Management Ethernet Ports

Note **Statement 7004—**Special Accessories Required to Comply with GR-1089 Emission and Immunity Requirements

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

Management Ethernet Ports

Warning **Statement 7005**—Intrabuilding Lightning Surge and AC Power Fault

The intrabuilding port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

This statement applies to the intrabuilding ports listed below:

Management Ethernet Ports

Warning **Statement 7012—**Equipment Interfacing with AC Power Ports

Connect this equipment to AC mains that are provided with a surge protective device (SPD) at the service equipment that complies with NFPA 70, the National Electrical Code (NEC).

Note **Statement 7013—**Equipment Grounding Systems—Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

Note **Statement 7016**—Battery Return Conductor

Treat the battery return conductor of this equipment as Isolated DC return (DC-I).

Note **Statement 7018—**System Recover Time

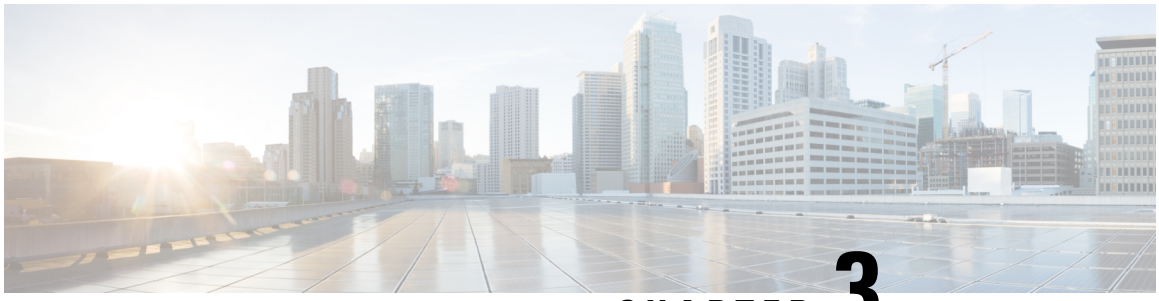
The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

Note **Statement 8015—**Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Note **Statement 8016—**Installation Location Where the National Electric Code (NEC) Applies

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



CHAPTER 3

Prepare to Install Cisco NCS 1004

This chapter explains how to prepare for the Cisco NCS 1004 installation.

- Shipping and Receiving, on page 19
- Unpack and Verify Cisco NCS 1004, on page 25

Shipping and Receiving

The chassis is shipped in one of the following ways:

- Chassis with filler cards and line cards— you receive the chassis with preinstalled line cards (based on the number of line cards you have ordered) and the rest of the line card slots have filler cards. If you have preordered four line cards, then, the chassis does not contain any filler cards. There are four fiber management brackets in the package, for each of the line card or filler cards preinstalled in the chassis. The controller and the three fan units are also preinstalled. The other items available in the same package (with the chassis) are:
  - Accessory kit, that has all the installation hardware.
  - Spare Serial Number label.
  - Two PSUs - AC or DC. Installation of PSUs is discussed in the Installation of Modules chapter.

    AC chassis - while ordering for an AC chassis, select the power cable. Based on your choice (NEMA or CEE), you get a pair of 90 degree and straight cables for each PSU. All the AC cables are 4.25 m long.

Table 3: Power cables for the chassis

Type of Cable	P1 Connector	P2 Connector	CPN
Straight cable	NEMA L6-20P	IEC 60320 – C21	72-101432-01
	CEE 7/7 (Europe)	IEC 60320 – C21	72-101434-01
90-degree cable	CEE 7/7 (Europe)	IEC 60320 – C21	72-101425-01
	NEMA L6-20P	IEC 60320 – C21	37-1138-01

Figure 6: 90-degree Cable (CEE 7/7)

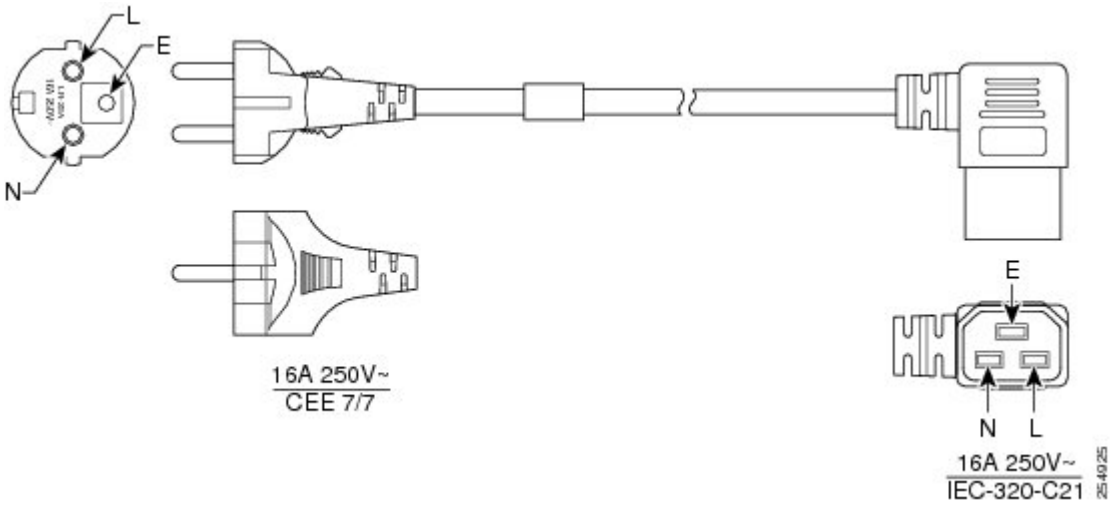


Figure 7: 90-degree Cable (NEMA L6-20P)

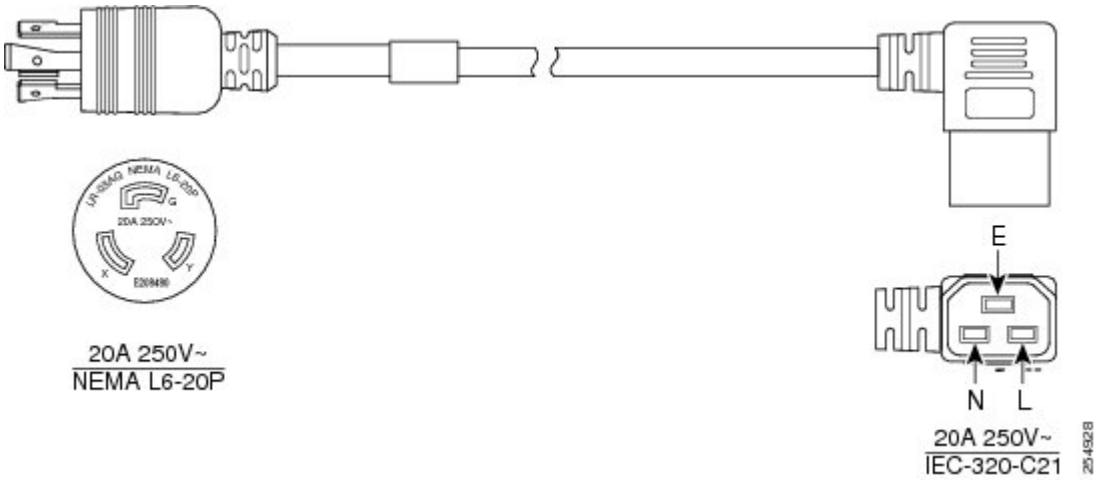


Figure 8: Straight Cable (NEMA L6-20P)

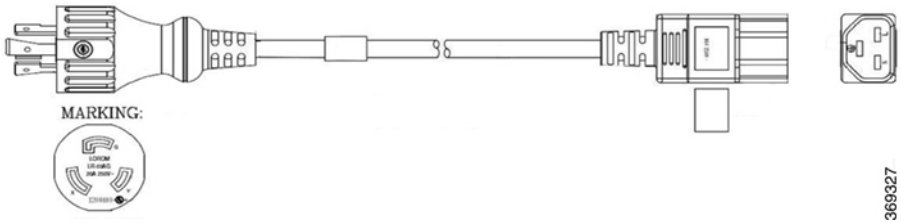
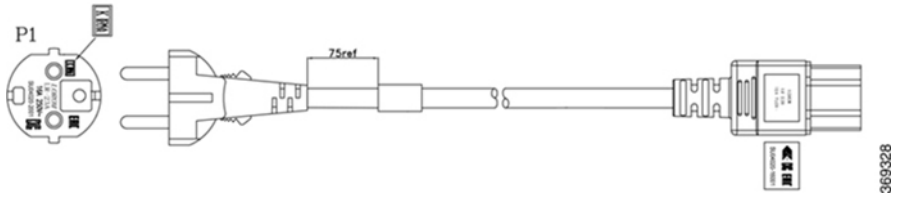


Figure 9: Straight Cable (CEE 7/7)



Note The 90deg cable is used only for ETSI racks to maintain a footprint of 600 mm.

DC chassis - when you order for a DC chassis, you get four power lugs for each PSU (a pair of 90-degree and a pair of 180-degree lugs). 180-degree lugs are used for ETSI racks to maintain a footprint of 600 mm.

Figure 10: DC Power Cable Lug (180-degree)

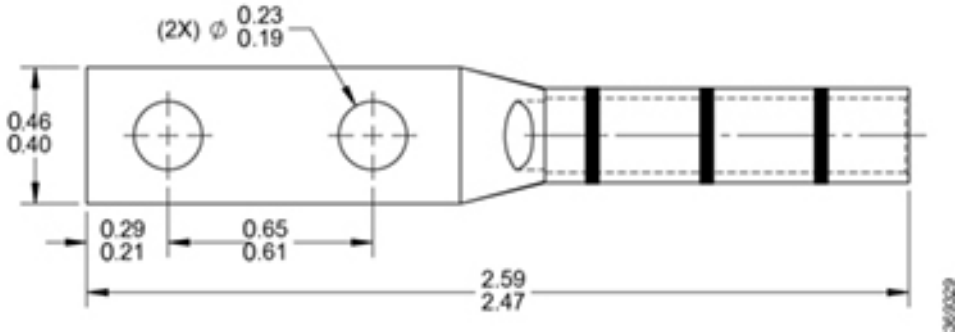


Figure 11: DC Power Cable Lug (90-degree)

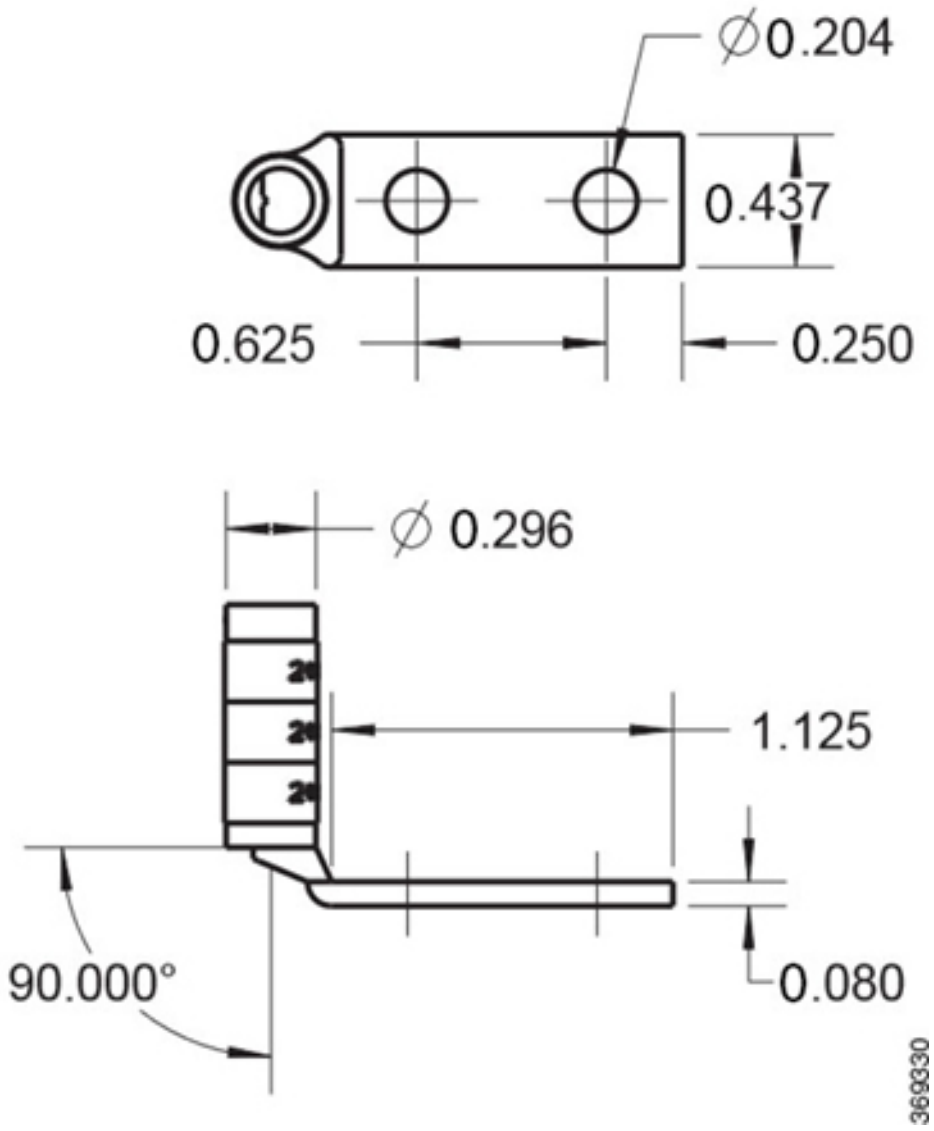
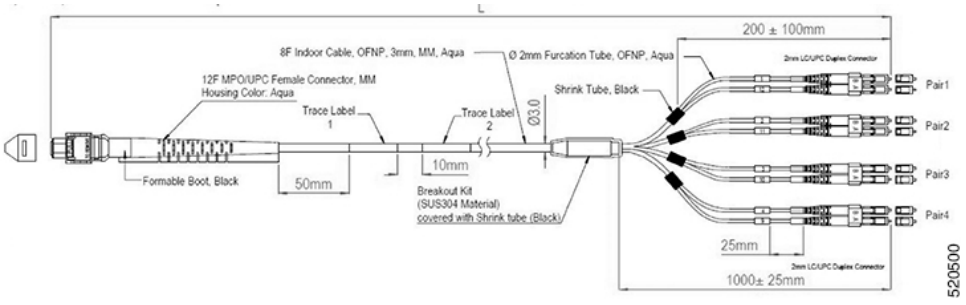


Figure 12: Breakout Cable



Note The breakout cable is used only for ETSI racks to maintain a footprint of 600 mm.

Table 4: Specifications of Breakout Cables

PID	CPN	MPN	Overall Length (in m)
ONS-4X10-MMCBL-5=	72-101758-01	BCJ7F3FM005CSO008	05 plus or minus 0.30
ONS-4X10-MMCBL-10=	72-101759-01	BCJ7F3FM010CSO008	10 plus or minus 0.30
ONS-4X10-MMCBL-20=	72-101760-01	BCJ7F3FM020CSO008	20 plus or minus 0.60

Figure 13: Cable with Formable Boot and Standard Boot



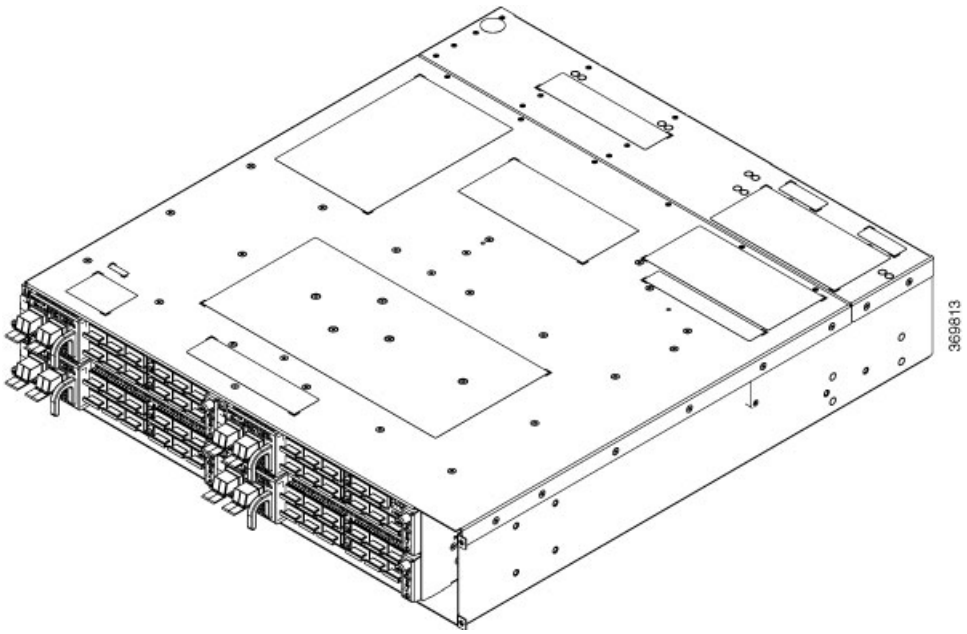
The formable boot must be used on the side of the line card.

Table 5: PIDs of Cable with Formable Boot and Standard Boot

PID#	CPN#	MPN#	Overall Length (M)
-ONS-FMPO-SM-5=	72-101717-01	MDD3F 3GM005CSO001	05±0.30 m
-ONS-FMPO-SM-10=	72-101718-01	MDD3F 3GM010CSO001	10±0.30 m
-ONS-FMPO-SM-20=	72-101719-01	MDD3F 3GM020CSO001	20±0.60 m
-ONS-FMPO-SM-30=	72-101720-01	MDD3F 3GM030CSO001	30±0.90 m
-ONS-FMPO-SM-40=	72-101721-01	MDD3F 3GM040CSO001	40±1.20 m
-ONS-FMPO-SM-50=	72-101722-01	MDD3F 3GM050CSO001	50±1.50 m
-ONS-FMPO-SM-60=	72-101723-01	MDD3F 3GM060CSO001	60±1.50 m

PID#	CPN#	MPN#	Overall Length (M)
-ONS-FMPO-SM-70=	72-101724-01	MDD3F 3GM070CSO001	70±1.50 m
-ONS-FMPO-SM-80=	72-101725-01	MDD3F 3GM080CSO001	80±1.50 m
-ONS-FMPO-SM-90=	72-101726-01	MDD3F 3GM090CSO001	90±1.50 m
-ONS-FMPO-SM-100=	72-101727-01	MDD3F 3GM100CSO001	100±1.50 m

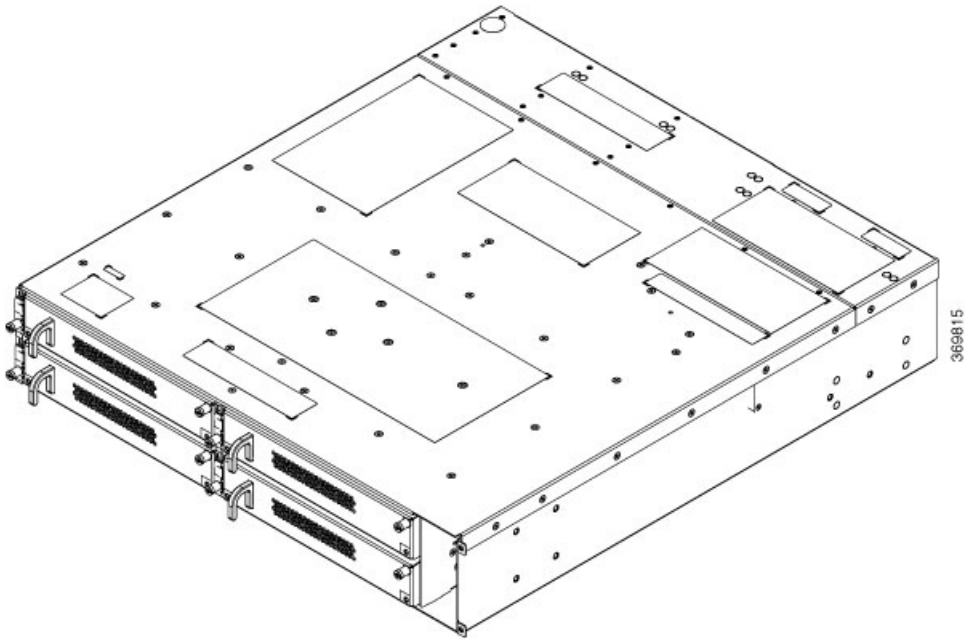
Figure 14: Chassis shipped with Line Cards



- Chassis with only filler cards— you receive the chassis with four filler cards in the line card slots. There are four fiber management brackets in the package, for each of the filler cards. Each line card ordered as a spare item is shipped separately and the extra fiber management bracket (for the line card) is available in the line card package. Only the accessory kit is available with the chassis (in the same package). You must order all the other modules (fan units, controller, PSUs) separately.

  For installation procedures of the modules, see Installation of Modules chapter.

Figure 15: Chassis shipped with Filler Cards



Unpack and Verify Cisco NCS 1004

This procedure enables the you to unpack and check if all the chassis modules that are required for installation have been shipped.

Procedure

Step 1 When you receive Cisco NCS 1004 equipment at the installation site, open the top of the box.

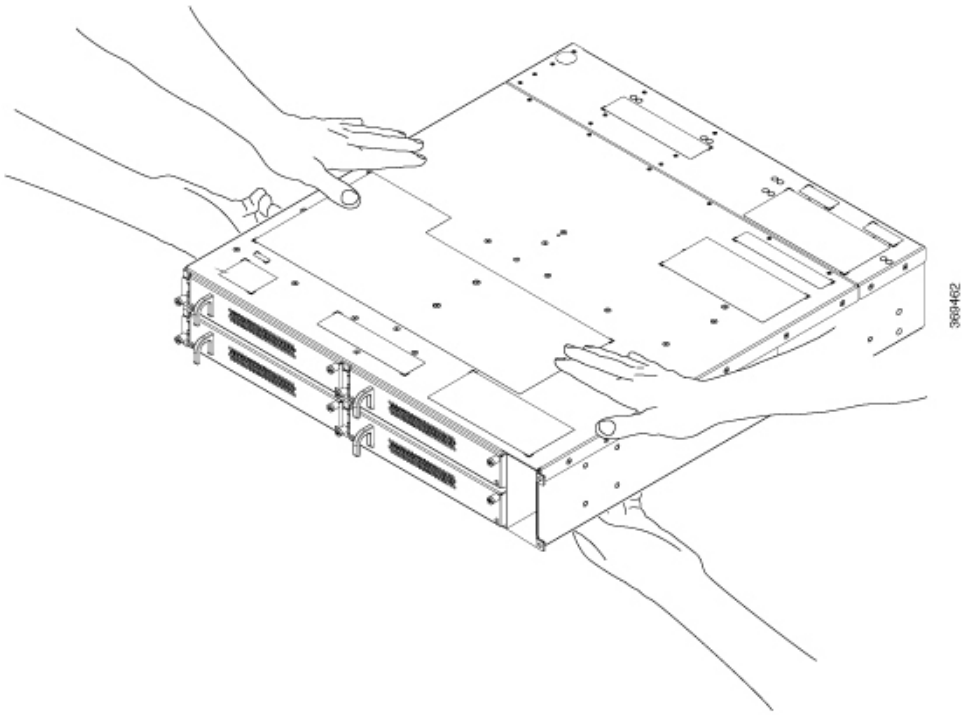
Step 2 Remove accessories and foam inserts from the box. The box contains Cisco NCS 1004 and other items needed for installation.

Step 3 To remove the chassis from the packaging, grasp the side of the chassis and lift it out of the box.

Use these lifting guidelines to avoid injury to yourself or damage to the equipment:

- Do not lift equipment alone; have another person help you to lift the equipment.

Figure 16: Lifting the NCS 1004



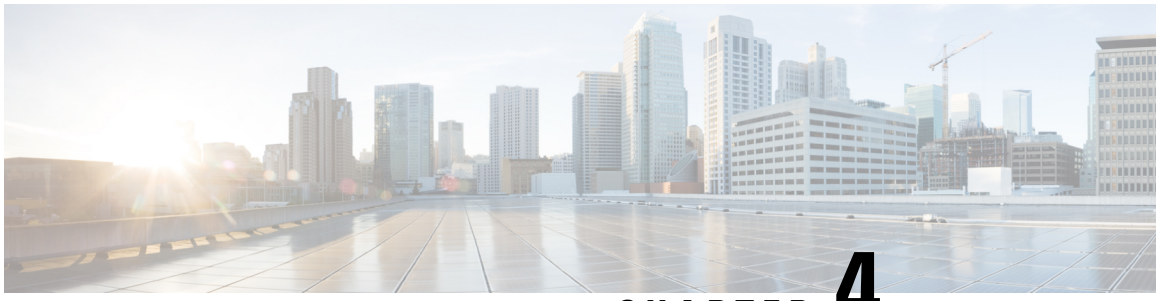
A fully loaded chassis can weigh as much as 28.7 kgs (63.3 lbs).

- Ensure that your footing is solid; balance the weight of the object between your feet.
- Lift the equipment slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. When bending down to lift equipment, bend at the knees (not at the waist), to reduce the strain on your lower back muscles.

Step 4 Verify the following:

- The Cisco NCS 1004 is not damaged. Check for a scratch, bend, discoloration or deformation on the Cisco NCS 1004 chassis.
- The modules that are shipped with the chassis or separately are not damaged.

Step 5 If there is any damage to the chassis or the modules, call your Cisco sales engineer for a replacement.



CHAPTER 4

Install Cisco NCS 1004

This chapter contains procedures to install Cisco NCS 1004.

- Rack Compatibility, on page 27
- Install NCS 1004 on an EIA/ANSI/ ETSI Rack, on page 30
- Stacking NCS 1004, on page 43
- General Power and Grounding Requirements, on page 44
- Power Supply, on page 46

Rack Compatibility

This section provides rack compatibility details for the Cisco NCS 1004.

Figure 17: Four Post Rack Type

4 – Post Type (Hole EIA Universal)		Compatibility
All 23" Type rack		✓
19" Type rack L-Type Post		✓
19" Type Racks Flat-Post		✓
19" Type racks C- Type Post		✗
ETSI Type rack (Hole ETSI Universal)		✓

Figure 18: Four Post Rack Type

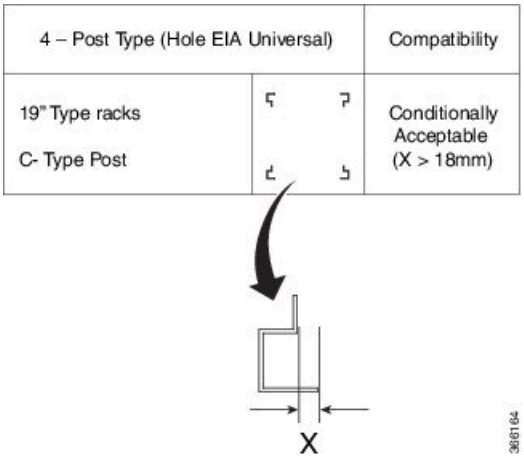


Figure 19: Two Post Rack Type

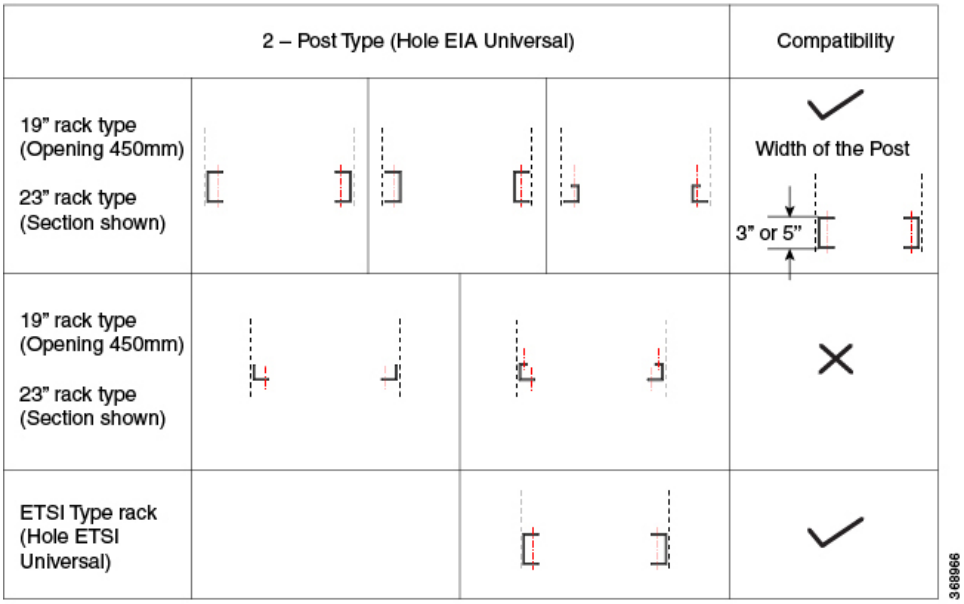
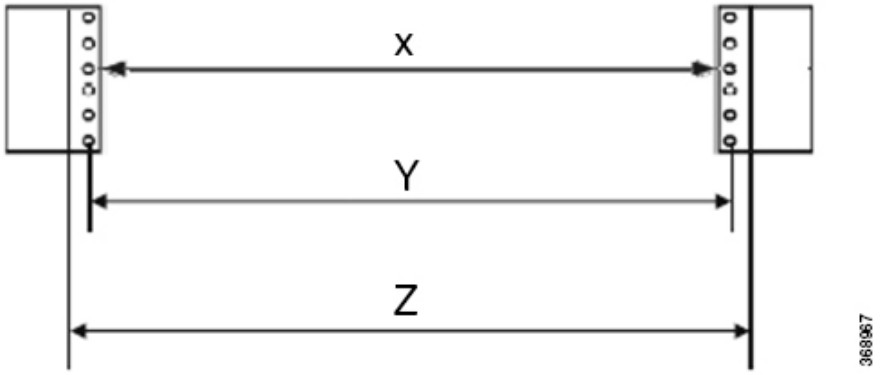


Figure 20: Rack Specification



Rack Type	Rack Front Opening X	Rack Mounting Hole Center-Center Y	Mounting Flange Dimension Z
19" racks	450.8mm (17.75")	465mm (18.312")	482.6mm (19")
23" racks	552.45mm (21.75")	566.7mm (22.312")	584.2mm (23")
ETSI racks	500.0mm(19.68")	515.0mm(20.276")	533.4mm(21")

Note The distance between the front and the rear post in a four post rack is 427 mm (closed position) and 707 mm (open position).

Install NCS 1004 on an EIA/ANSI/ ETSI Rack

Warning **Rack Mount Instructions**

The following or similar rack-mount instructions are included with the installation instructions:

- Elevated Operating Ambient—If installed in a closed or multirack assembly, the operating temperature of the rack environment may be greater than room temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified.
- Reduced Air Flow—Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading—Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading—Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing—Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

It is mandatory to fix the fiber management brackets for all the cards in the chassis before installing the Cisco NCS 1004 chassis onto the rack. See Attach Fiber Management Bracket section for the detailed procedure.

Figure 21: Line Cards fitted with Fiber Management Bracket

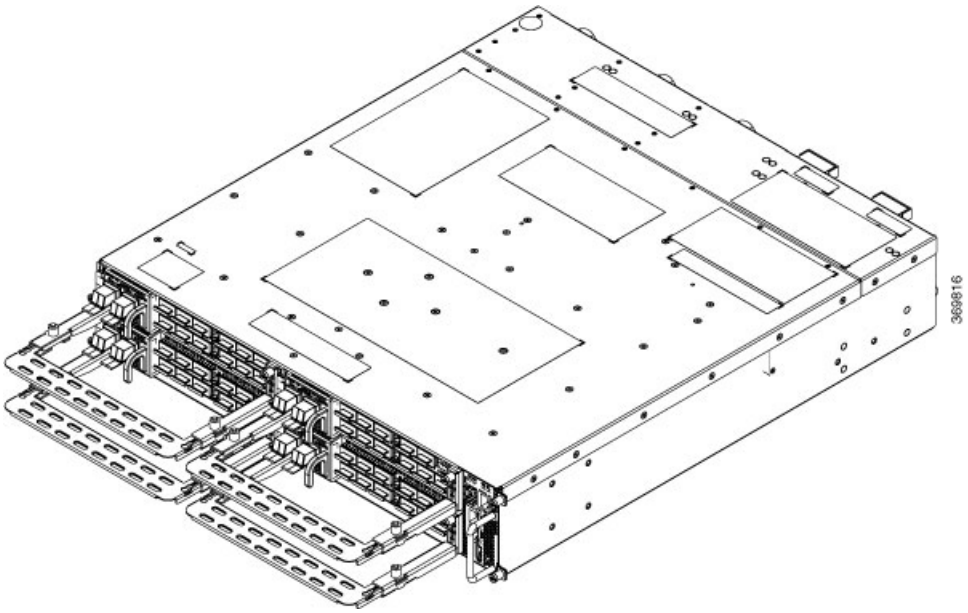
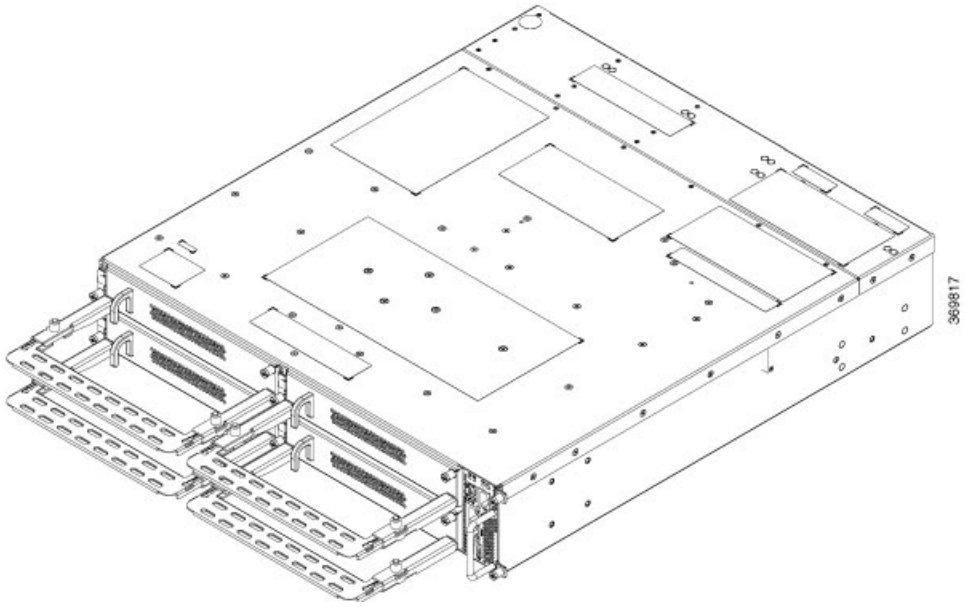


Figure 22: Filler Cards fitted with Fiber Management Bracket



Note In ETSI racks, to maintain a footprint of 600 mm, the cabinet door cannot be installed and the horizontal bar of the fiber management bracket should be maintained at the shortest length. See Adjusting the Fiber Management Bracket.

Caution The sliding rail must be used only for first chassis positioning. The chassis must be fixed with screws on the front side.

Caution Use only the fastening hardware provided with Cisco NCS 1004 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Before you begin

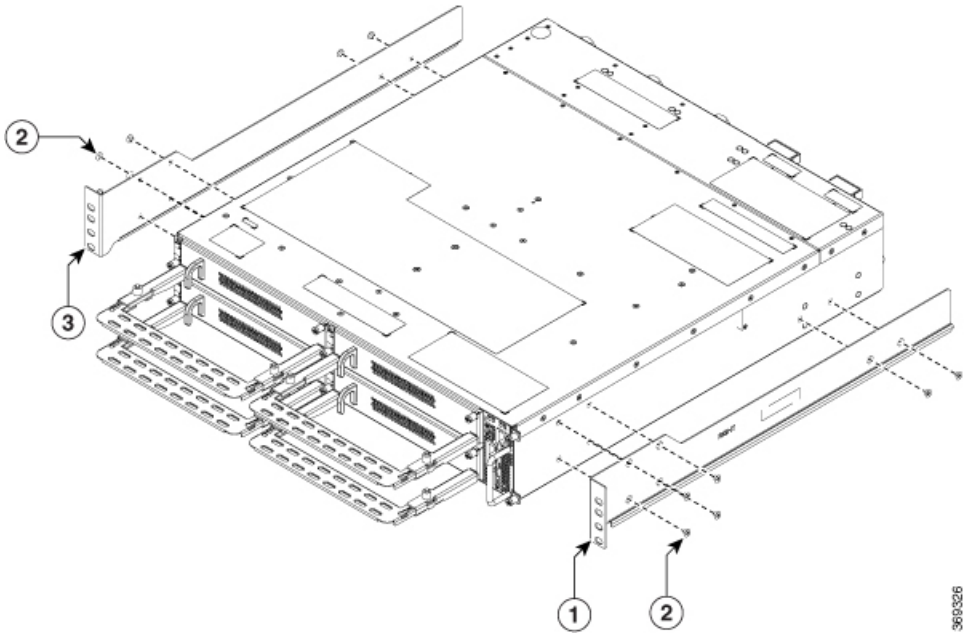
Ensure the rack is compatible. See the Rack Compatibility section.

Procedure

Step 1 Attach the left and right mounting brackets to the chassis using the screws (48-2029-01) and tighten them to a torque value of 1.5 N-m.

The left and right brackets have been marked accordingly.

Figure 23: Fixing the Brackets



1	Right Bracket (700-116388-01)
2	Screws used for brackets
3	Left Bracket (700-116386-01)

Step 2 Install the four post slider or two post slider on the rack.

a) Install Two Post Slider into an EIA/ ANSI Rack
b) Install Four Post Slider into an EIA/ ANSI Rack
c) Install Two Post Slider into an ETSI Rack
d) Install Four Post Slider into an ETSI Rack

Step 3 Insert the chassis (with brackets) onto the sliders assembled on the rack.

Step 4 After the chassis is completely inserted, fasten the chassis with four screws (48-101524-01) on each side of the bracket, and using a number-2 Phillps screwdriver, tighten them to a torque value of 4.65 N-m.

See Install Air Filter, on page 71 for the air filter installation procedure, before you fasten the chassis to the rack.

Install Two Post Slider into an EIA/ANSI Rack

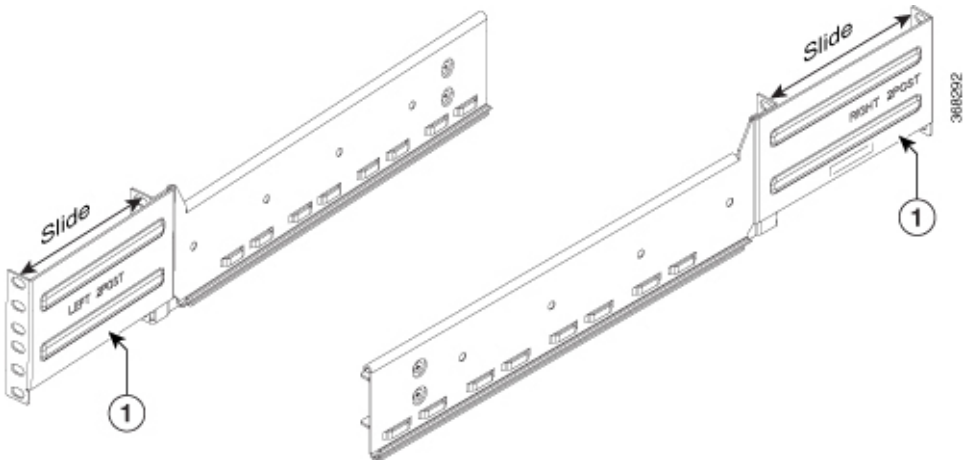
This procedure has details about installing the two post slider into an EIA/ ANSI rack.

Procedure

Step 1 Identify the two post slider and adjust the length of the slider (3" to 5").

Slide the inner sliders and adjust the length to mate with the rack surface.

Figure 24: Two Post Slider Identification

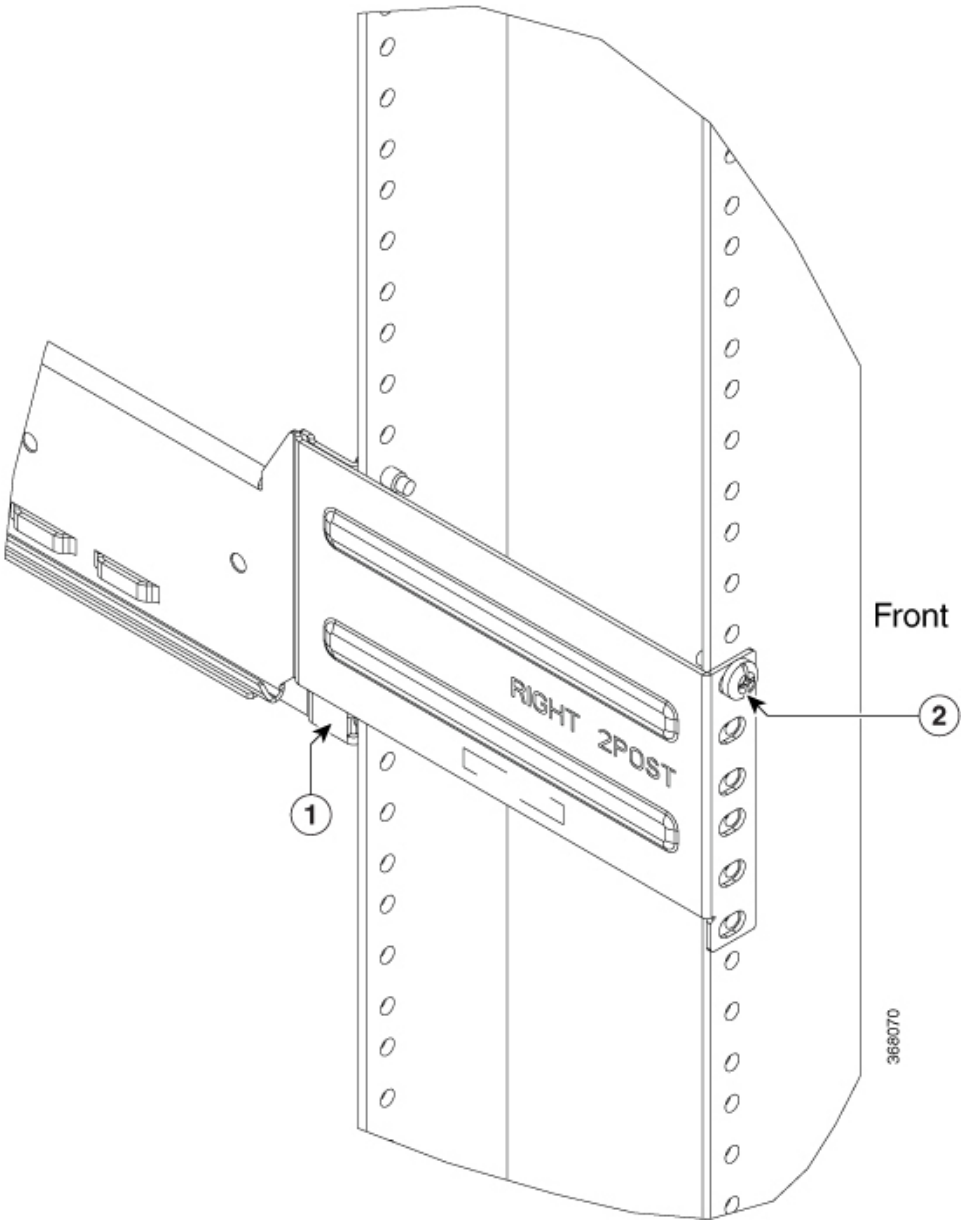


1	Check for marking on the sliders; the right and the left sliders are indicated.

Step 2 Integrate the two post slider with the rack. The procedure for 23" and 19" rack is discussed here:

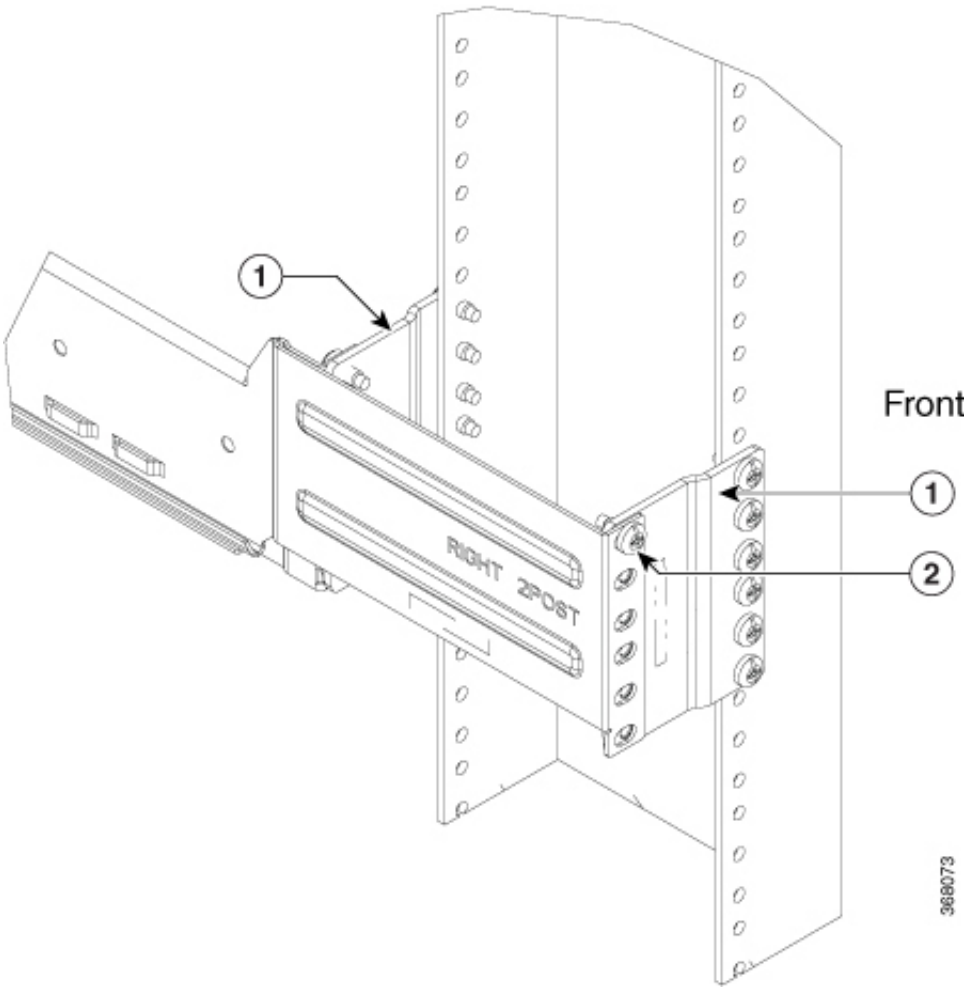
- 19" rack - the slider can be directly fitted on to a 19" rack. On the front side, insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side, insert three screws (48-101524-01) and tighten to a torque value of 4.65 N-m.
- 23" rack - the slider is fitted on to a 23" rack using an adapter (refer the following image). The formed surface must always face the inner side of the rack post. On the front side of the adapter (towards the chassis), insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side (towards the chassis), insert three screws (48-101524-01) and tighten them to a torque value of 4.65 N-m. For the adapter portion which is towards the rack, all the six screws are fitted on the front and rear side.

Figure 25: Two Post Slider Integration - 19" Rack



1	Inner surface of the sliding bracket.
2	Slider fixing screws (48-101524-01)

Figure 26: Two Post Slider Integration - 23" Rack



1	Adapter
2	Slider fixing screws (48-101524-01)

Install Four Post Slider into an EIA/ ANSI Rack

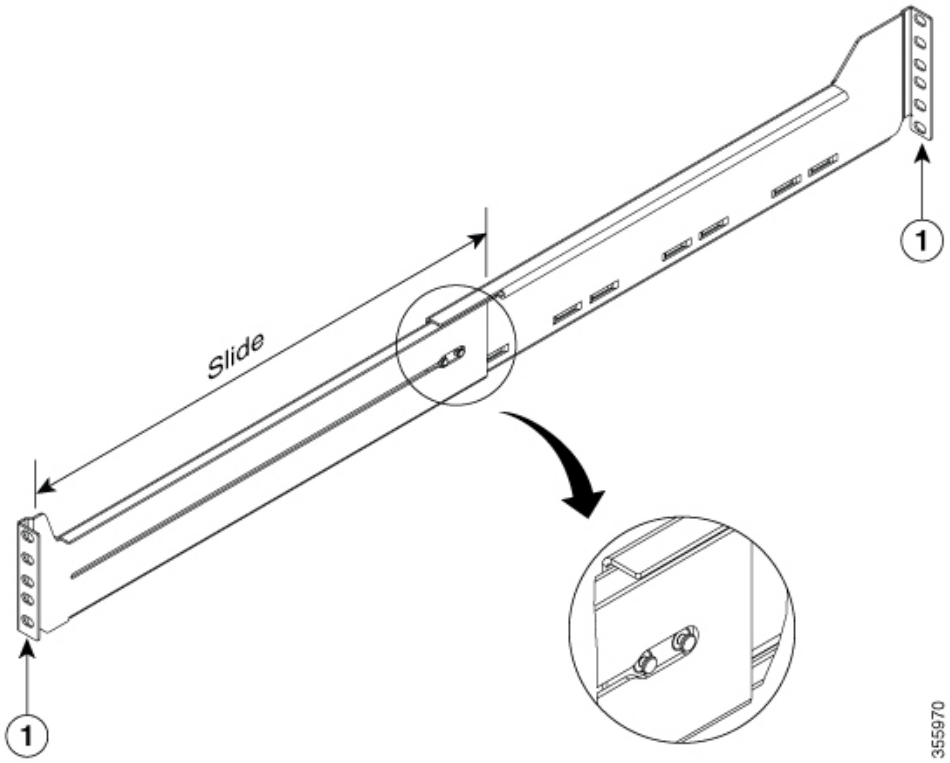
This procedure has details about installing the four post slider into an EIA/ ANSI rack.

Procedure

Step 1 Identify the four post slider and adjust the length of the slider.

Slide the inner slider arm and adjust the length to mate with the rack surface.

Figure 27: Four Post Slider Identification

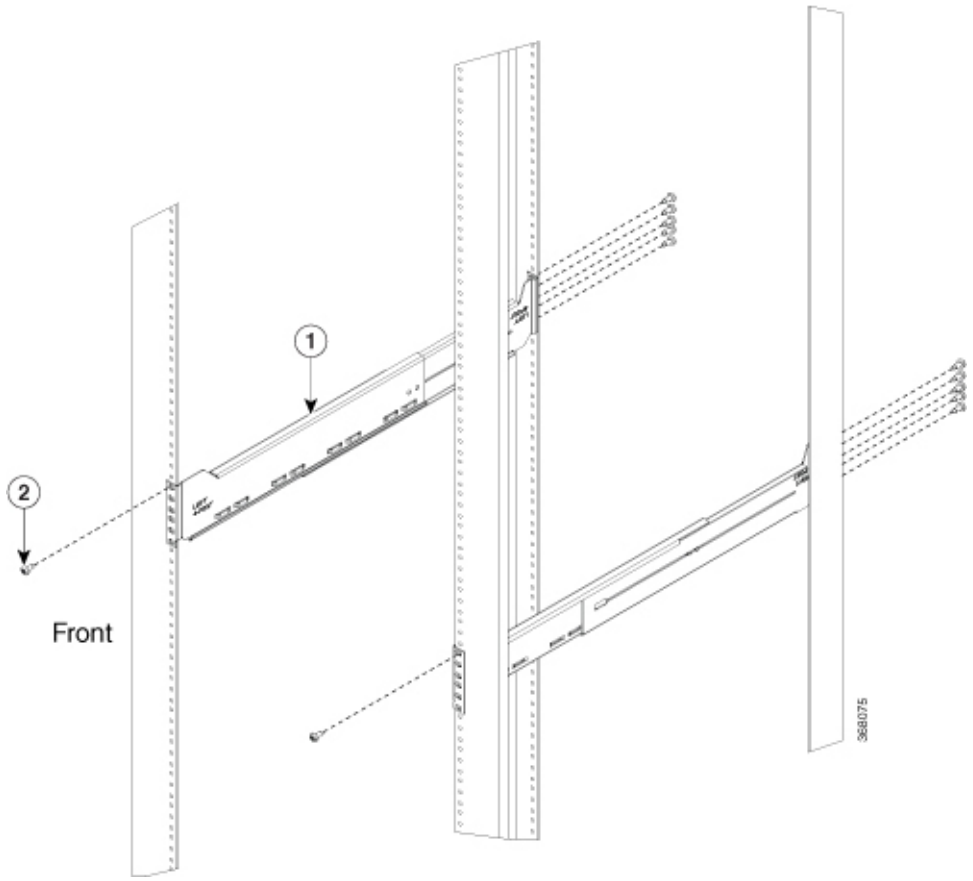


1	Slide and adjust the length of the slider arm.

Step 2 Integrate the four post slider with the rack. The procedure for the 23" and 19" rack is discussed here:

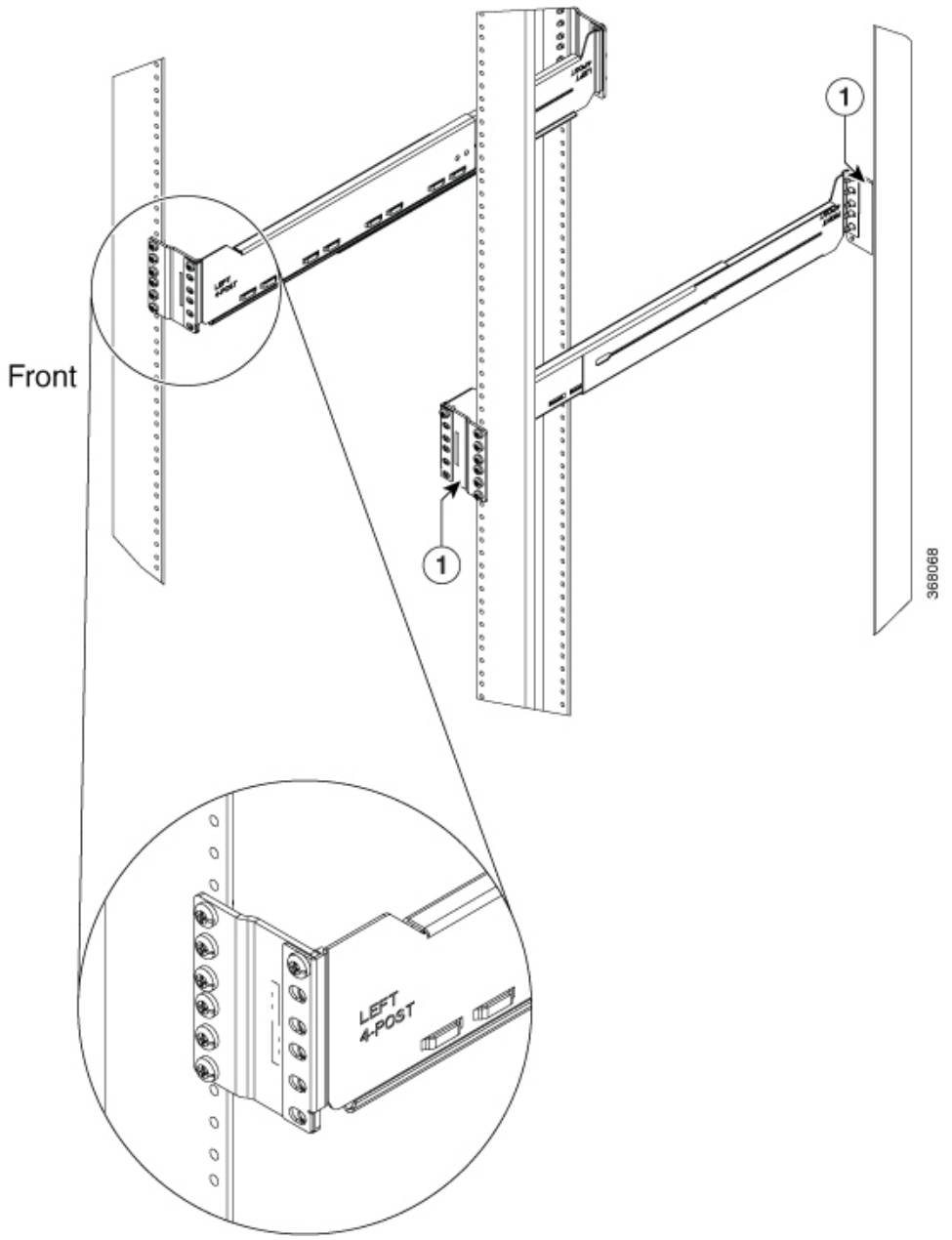
- 19" rack - the slider can be directly fitted on to a 19" rack. On the front side, insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side, insert five screws (48-101524-01) and tighten them to a torque value of 4.65 N-m.
- 23" rack - the slider is fitted on to a 23" rack using an adapter (refer the following image). The formed surface must always face the inner side of the rack post. On the front side (towards the chassis), insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side (towards the chassis), insert five screws (48-101524-01) and tighten them to a torque value of 4.65 N-m. For the adapter portion which is towards the rack, all the six screws are fitted on the front and rear side.

Figure 28: Four Post Slider Integration - 19" Rack



1	Edge surface of the slider
2	Slider fixing screws (48-101524-01)

Figure 29: Four Post Slider Integration - 23" Rack



1	Adapter

Install Two Post Slider into an ETSI Rack

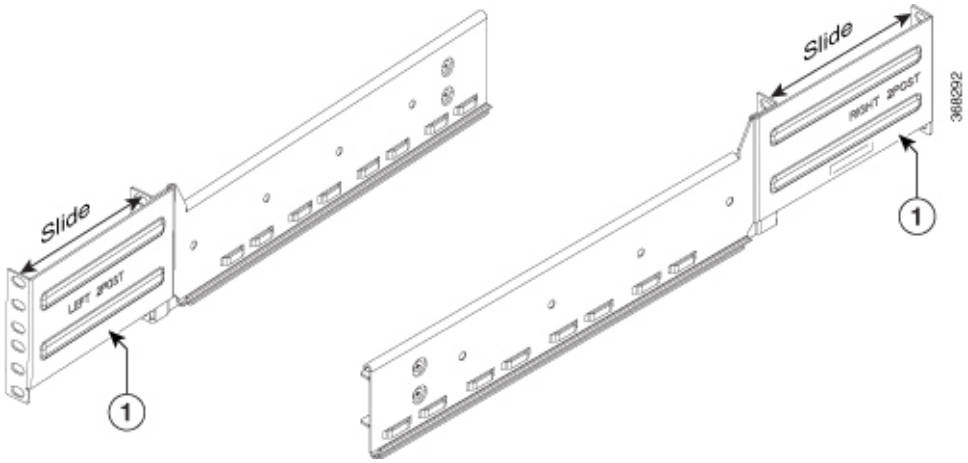
This procedure has details about installing the two post slider into an ETSI rack.

Procedure

Step 1 Identify the two post slider and adjust the length of the slider (3" to 5").

Slide the inner sliders and adjust the length to mate with the rack surface.

Figure 30: Two Post Slider Identification

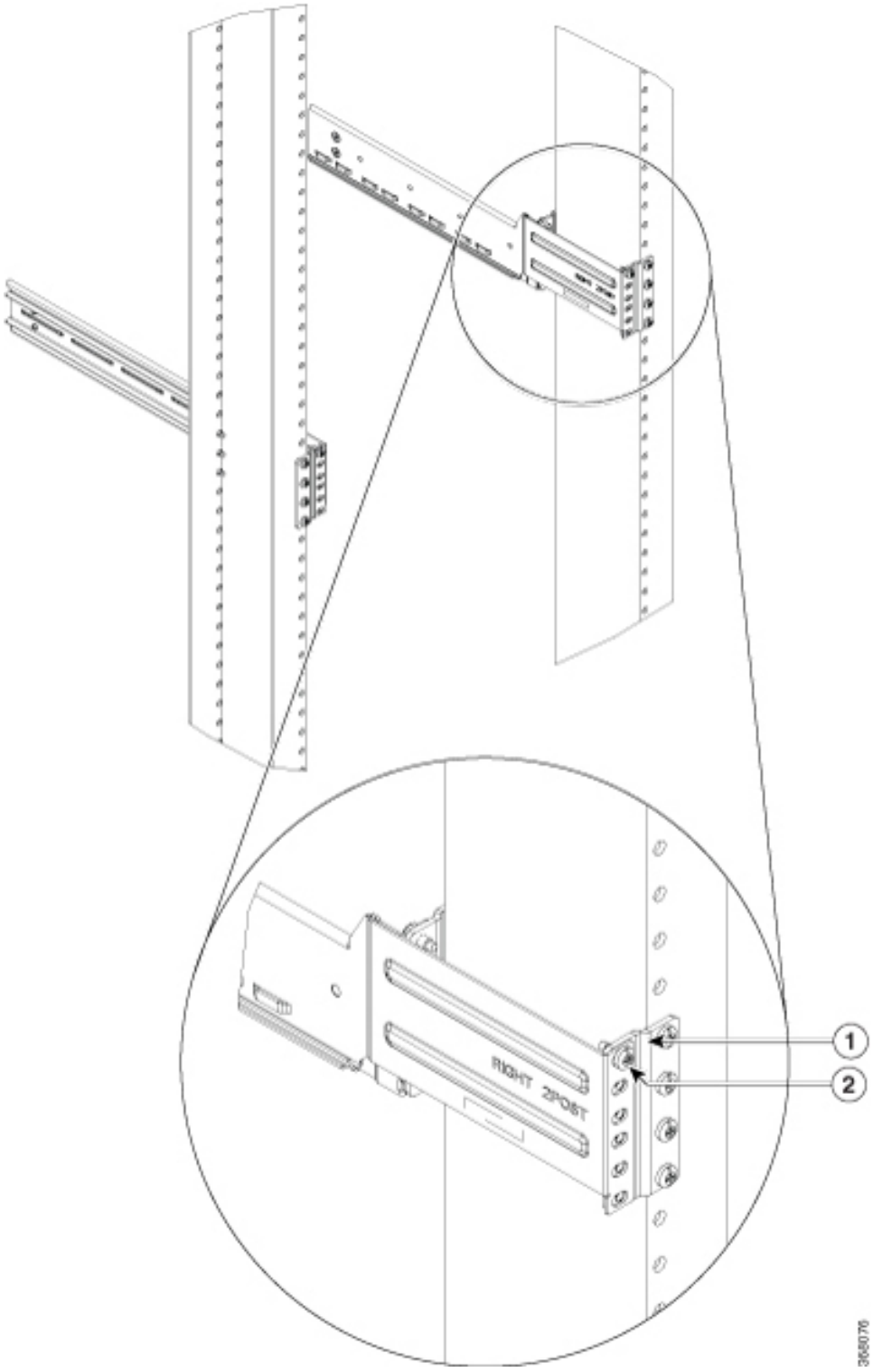


1	Check for marking on the sliders; slide the inner sliders to adjust the length.

Step 2 Integrate the two post slider with the rack.

The slider is fitted on to an ETSI rack using an adapter (refer the following image). The formed surface must always face the inner side of the rack post. On the front side, insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side, insert three screws (48-101524-01) and tighten them to a torque value of 4.65 N-m.

Figure 31: Two Post Slider Integration - ETSI Rack



1	Adapter

2	Slider fixing screws (48-101524-01)

Install Four Post Slider into an ETSI rack

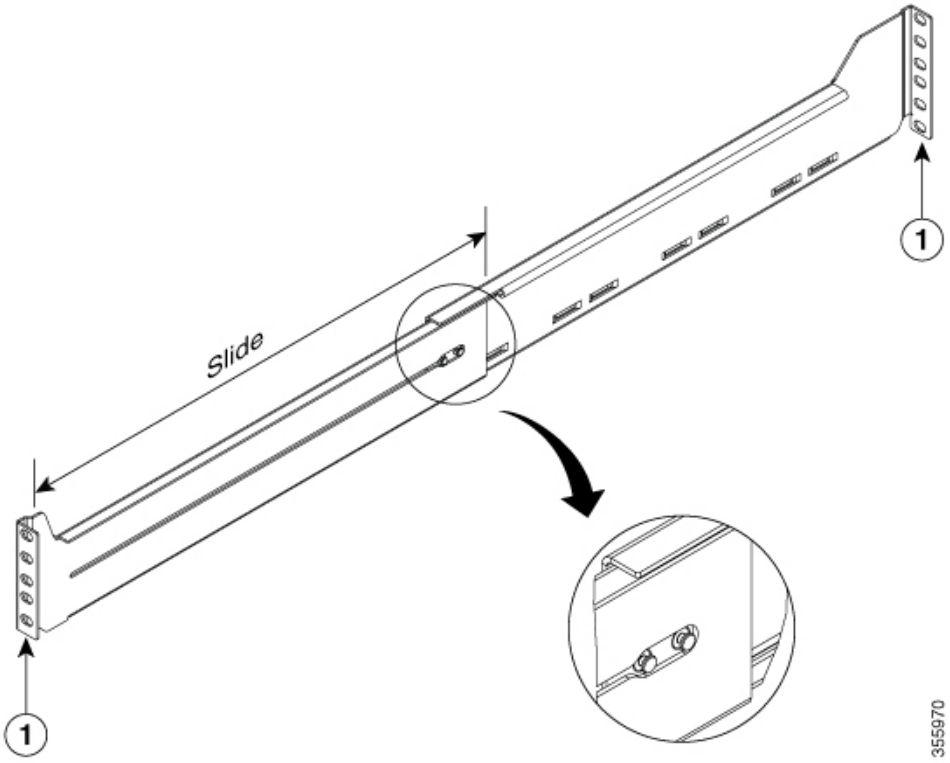
This procedure has details about installing a four post slider in to an ETSI rack.

Procedure

Step 1 Identify the four post slider and adjust the length of the slider.

Slide the inner slider arm and adjust the length to mate with the rack surface.

Figure 32: Four Post Slider Identification

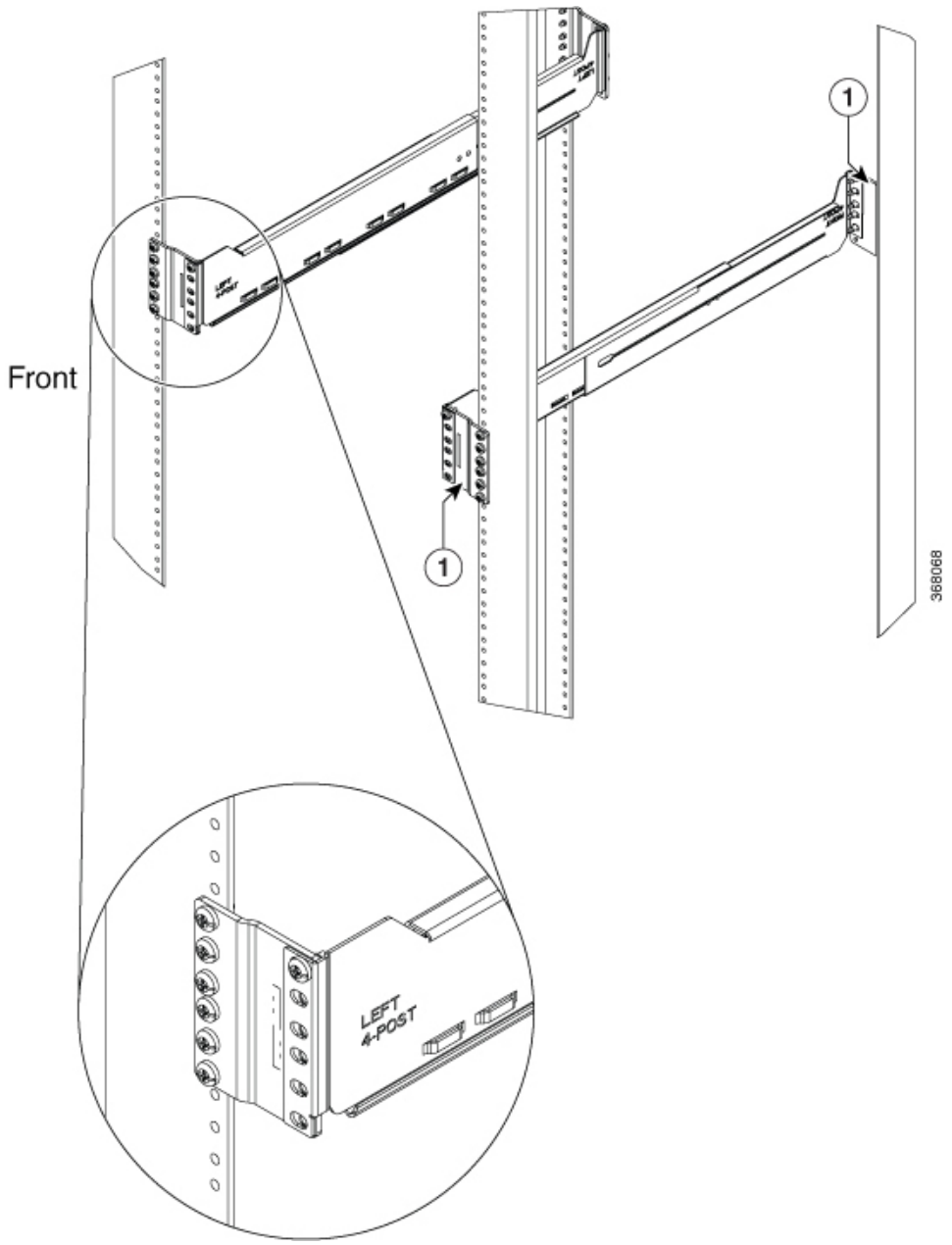


1	Slide and adjust the length of the slider arm.

Step 2 Integrate the four post slider with the rack.

The slider is fitted on to an ETSI rack using an adapter (refer the following image). The formed surface must always face the inner side of the rack post. On the front side, insert only the top most screw of the slider (48-101524-01) and tighten it to a torque value of 4.65 N-m. On the rear side, insert five screws (48-101524-01) and tighten them to a torque value of 4.65 N-m.

Figure 33: Four Post Slider Integration - ETSI Rack



1	Adapter

Stacking NCS 1004

While stacking multiple Cisco NCS 1004 chassis in a rack, it is recommended to start at the bottom. Install the first chassis of the stack at the bottom and move upwards.

Figure 34: Stacking the NCS 1004

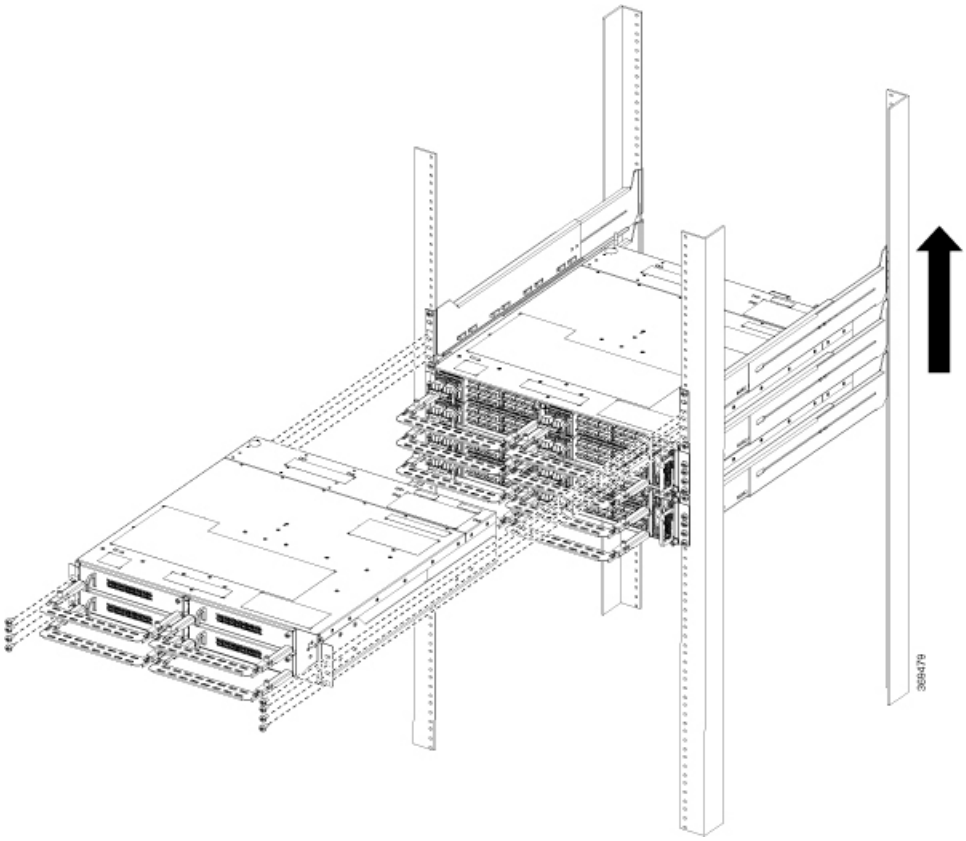
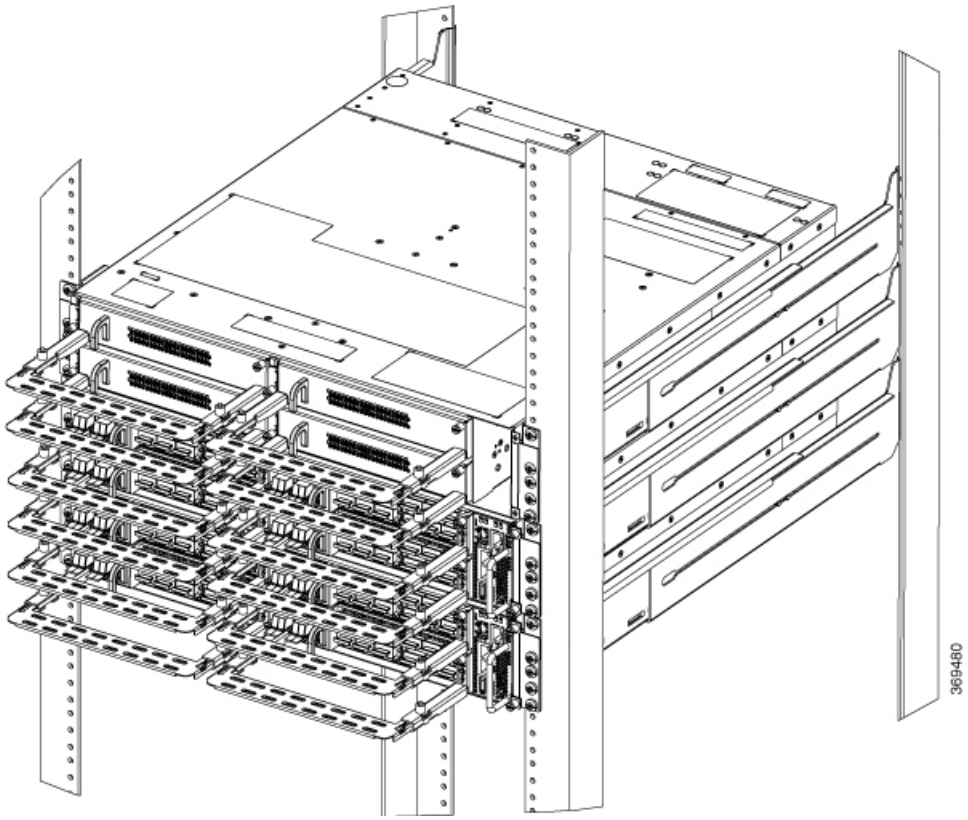


Figure 35: Stacking the NCS 1004



General Power and Grounding Requirements

General power and grounding requirements are:

- Installation of the routing system must follow national and local electrical codes:
  - In the United States: United States National Fire Protection Association (NFPA) 70 and United States National Electrical Code (NEC).
  - In Canada: Canadian Electrical Code, part I, CSA C22.1.
  - In other countries: International Electrotechnical Commission (IEC) 60364, parts 1 through 7.
- Two separate and independent AC or DC power sources are needed to provide 2N redundancy for system power. Each power source requires its own circuit breaker.
- Each power source must provide clean power to the site. If necessary, install a power conditioner.
- The site must provide short-circuit (over-current) protection for devices.
- Proper grounding is required at the site to ensure that equipment is not damaged by lightning and power surges.

Note Ground lug connection is mandatory for the AC chassis version too.

- Site power planning must include the power requirements for any external terminals and test equipment you will use with your system.

Note Be sure to review the safety warnings in the Cisco Network Convergence System *Regulatory Compliance and Safety Information for the Cisco Network Convergence System 1004* before attempting to install the chassis.

Ground NCS 1004

This task provides the grounding details for the NCS 1004 chassis. In the installation of the chassis, ground lug should be connected first.

There is one grounding point provided at the rear side of the NCS 1004 chassis. The following warning label is affixed on the chassis.

Warning High leakage current, earth connection essential before connecting supply.

Caution When terminating the frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick connect connectors, or other friction-fit connectors.

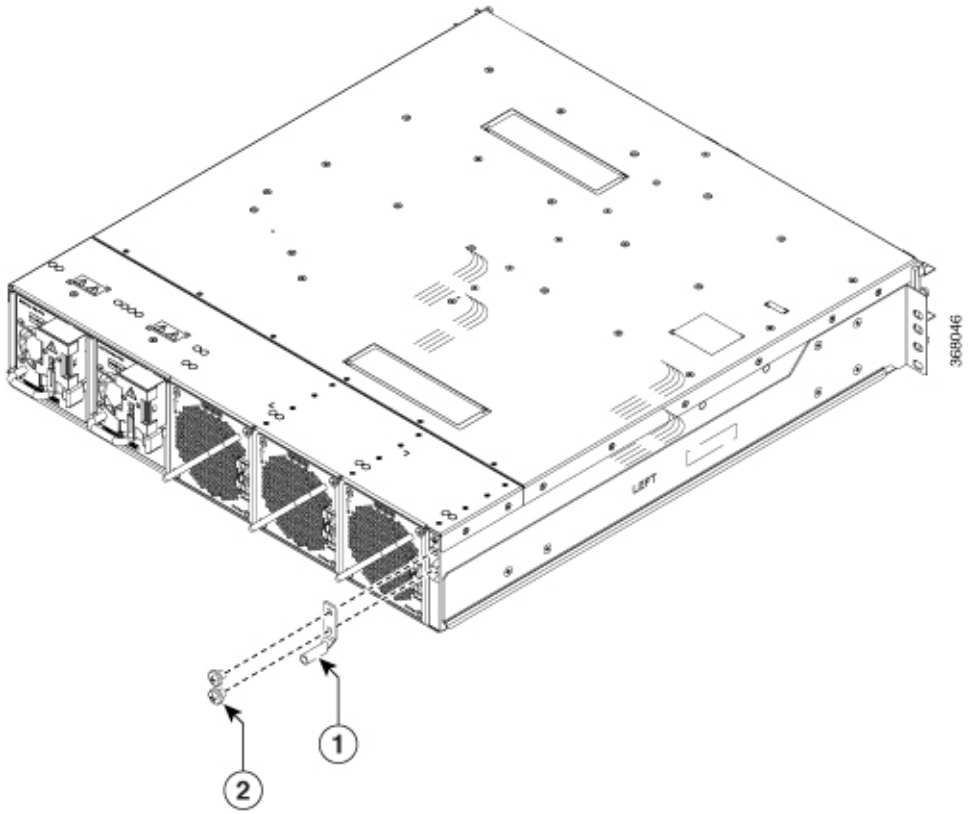
Procedure

Step 1 Verify that the office ground cable is connected to the top of the rack and the office ground, according to local site practice.

Step 2 Remove any paint and other nonconductive coatings from the surfaces between the shelf ground and bay frame ground point. Clean the mating surfaces and apply appropriate antioxidant compound to the bare conductors.

Step 3 Attach one end of the shelf ground cable (#6 AWG cable) to the ground point using the specified dual-hole lug connector.

Figure 36: NCS 1004 Ground Lug



1	Lug
2	Screws used for the lug

The orientation of the lug cable is always at the bottom side.

For ETSI racks, 180-degree lugs are used to maintain the chassis footprint of 600 mm.

Note
Ensure a gap of 50 mm below the chassis for routing the cables.

Step 4 Tighten the M5 pan-head screw (48-1169-01) to a torque value of 3.1 N-m.

Step 5 Attach the other end of the shelf ground cable to the bay frame using a dual-hole lug connector according to the equipment rack frame specifications.

Power Supply

The NCS 1004 has two slots for 2.1kW AC redundant Power Supply Units (PSU). Both the PSUs must be installed in the chassis at all times, except during replacement. When only one PSU is inserted in the chassis, the Power Module Redundancy Lost major alarm is raised.

PSU power de-rating and option table , including ambient temperature details are here. The power details are for input power.

- AC high voltage range input - 2100 W upto 40-degree C for 1 PSU; 2100 W upto 55-degree C for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- AC low voltage range input - 1300 W upto 40-degree C for 1 PSU; 1300 W upto 55-degree C for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).
- DC power supply - 2100 W upto 40-degree C for 1 PSU; 2100 W upto 55-degree C for 2 PSUs (for a short duration, as specified by Telcordia GR-63-Core).



Caution The NCS 1004 chassis needs to have both the PSUs at all times. In case, one of the PSUs is not energized (due to a fault or missing mains), ensure that the system works at an ambient temperature of not more than 40 C.

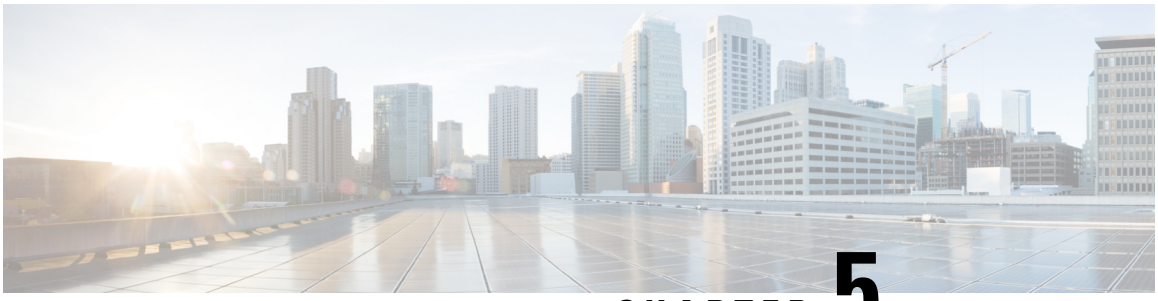
For DC-DC (2000W @12Vout)

- Input Voltage Rating = -48Vdc / -60Vdc
- Max. Input current @48Vdc = 44A
- Input Voltage range = 40.5 Vdc – 72 Vdc (operating)
- Input turn ON Voltage = -42 Vdc max
- Recommended FUSE rating = 60A max. per feed

For the AC-DC (2000W (HL) / 1300W (LL) @12Vout)

- Input Low Line (LL) Nominal voltage = 100Vac – 127Vac
- Input High Line (HL) Nominal voltage = 200Vac – 240Vac
- Max Input current @100Vac = 15A
- Max Input current @200Vac = 12A
- Input frequency rating = 50/ 60 Hz
- Input LL voltage range = 90Vac - 140 Vac
- Input HL voltage range = 180Vac - 264 Vac
- Input frequency range = 47Hz – 63Hz (nominal 50/60Hz)
- Input turn ON voltage = 80Vac / 175 Vac (LL/ HL)
- Recommended FUSE (HL) = 16A
- Recommended FUSE (LL) = 20A

For the trip time response, the breaker trip curve may be "D" or faster.

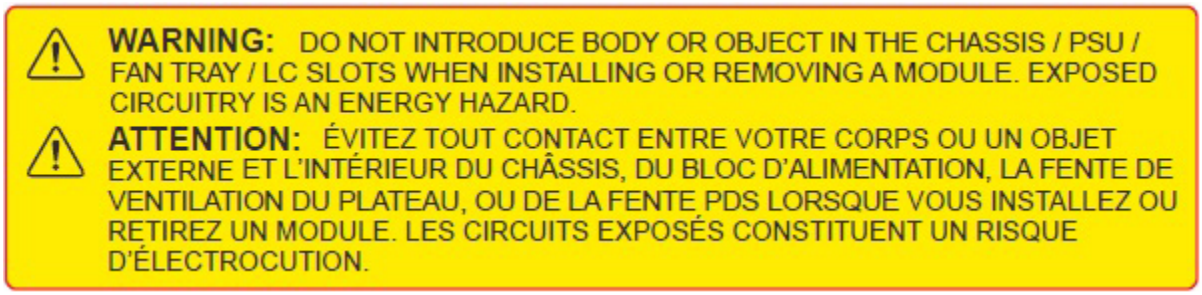


CHAPTER 5

Install Cisco NCS 1004 Modules

This chapter contains procedures to install the modules of Cisco NCS 1004.

Caution All the modular slots in the NCS 1004 chassis should always be populated with respective modules (line-cards, controller, PSU & fan units). Empty line card slots to be populated with filler modules, which are shipped with the chassis. The replacement or upgrade of the modules (Online Insertion or Removal, OIR) to be performed only when the ambient temperature is below 30-degree C. The OIR of modules should be completed within five minutes to prevent overheating of the components.



- Supported Controller Cards, on page 50
- About Line Cards, on page 51
- Install Power Supply, on page 57
- Install Fan Unit, on page 62
- Attach Fiber Management Bracket, on page 63
- Adjust Fiber Management Bracket of the 1.2T, 1.2TL, 2-QDD-C, and QXP-K9 Line Cards, on page 64
- Adjust Fiber Management Bracket of the OTN-XP Line Card, on page 65
- Install Pluggables, on page 66
- Air Filter, on page 71

Supported Controller Cards

Table 6: Feature History

Feature Name	Release Information	Description
NCS1K4-CNTLR-B-K9 Controller Card	Cisco IOS XR Release 7.5.1	NCS 1004 supports the NCS1K4-CNTLR-B-K9 controller card. The card supports a default of 9600 baud rate on the RS232 console port and runs on BIOS version 5.10.

The Cisco NCS 1004 supports the following controller cards:

- **NCS1K4-CNTLR-K9**

  The NCS1K4-CNTLR-K9 controller card supports a default of 115200 baud rate on the RS232 console port and runs on BIOS version 4.20. The controller card has two USB 3.0, two 10/100/1000 Ethernet, one RS232 console and one SFP ports. The SFP port of the controller card supports 1GE payload.

- **NCS1K4-CNTLR-B-K9**

  The NCS1K4-CNTLR-B-K9 controller card supports a default of 9600 baud rate on the RS232 console port and runs on BIOS version 5.10. The controller card has two USB 3.0, two 10/100/1000 Ethernet, one RS232 console and one SFP ports. The SFP port of the controller card supports 1GE payload.

Install Controller

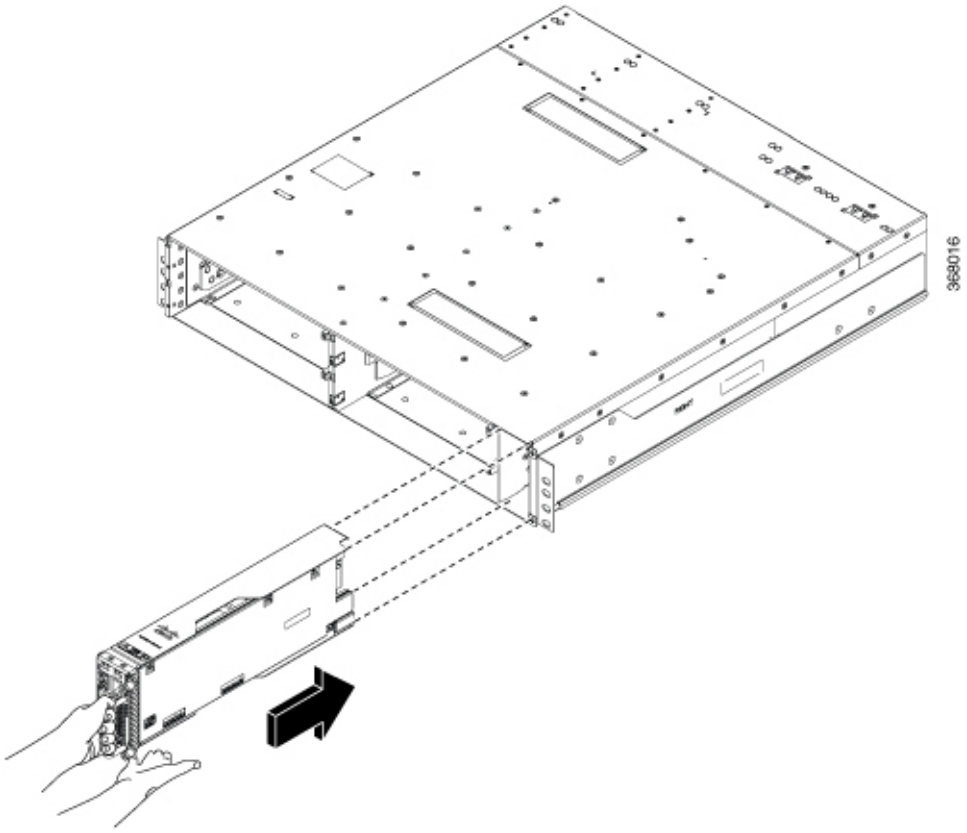
This task has information about installing the controller into the chassis.

Procedure

Step 1 Orient the controller correctly before inserting. Check for the *This Side Up* label.

Step 2 Supporting the controller at the bottom with one of your hands, slide the controller into the slot, using the handle.

Figure 37: Installing the Controller Unit



Step 3 Using a T15 Torx screwdriver, tighten the two M3 T15 torx screws to a torque value of 0.65 N-m.

About Line Cards

The Cisco NCS 1004 supports the following line cards:

- 1.2T DWDM Line Card
- 1.2TL DWDM Line Card
- 2-QDD-C DWDM Line Card
- OTN-XP DWDM Line Card
- NCS1K4-QXP-K9 Line Card

1.2T Line Card

1.2Tbps DWDM line card can provide up to 12 OTU4 or three 400G client ports. For more details of the 1.2T line card, see the data sheet.

The physical characteristics of the 1.2T line card are:

- Height—40.4 mm
- Breadth—191.9 mm
- Depth—277 mm without the fiber management bracket; 297.97 mm with the fiber management bracket
- Weight—3.2 kg

For the LED details of the line card, see the Line Card LEDs, on page 91 section.

1.2TL Line Card

1.2TL DWDM line card can provide up to 8 QSFP-28 based client ports and 2 trunk ports. For more details of the 1.2TL line card, see the data sheet.

The physical characteristics of the 1.2TL line card are same as that of the 1.2T line card. For the LED details of the line card, see the Line Card LEDs, on page 91 section.

2-QDD-C Line Card

Table 7: Feature History

Feature Name	Release Information	Description
NCS1K4-2-QDD-C-K9 C-Band Line Card	Cisco IOS XR Release 7.3.1	NCS 1004 supports the NCS1K4-2-QDD-C-K9 C-Band line card. The card has eight client ports (QSFP28 and QSFP-DD) and two DWDM dual sub-channel module trunk ports. Each trunk port is capable of 200, 300, and 400 Gbps line rate.

2-QDD-C DWDM line card can provide up to eight QSFP client ports, six of which can support QSFP-28 based client ports and remaining two can support QSFP-28, QSFP-DD, QSFP-ZR, and QSFP-ZR+ client ports. For more details of the 2-QDD-C line card, see the data sheet.

The eight client ports are divided into two sets of four slots each. The following two configurations are supported:

- A maximum of eight QSFP-28, four for each set, configured either as 100GE or 100G OTL4.4.
- A maximum of two QSFP-DD/ZR/ZR+, configured as 400GE.

The physical characteristics of the 2-QDD-C line card are:

- Height—40.4 mm
- Breadth—191.9 mm
- Depth—277 mm without the fiber management bracket; 297.97 mm with the fiber management bracket
- Weight—3.2 kg

For the LED details of the line card, see the Line Card LEDs, on page 91 section.

OTN-XP Line Card

The OTN-XP line card supports up to 1.6Tbps of OTN aggregation switching functionality to optimize the available bandwidth. A single line card supports 8x100GE muxponder or 2x400 GE transponder applications.

The OTN-XP line card contains:

- Eight QSFP 28 ports
- Four QSFP-DD ports
- Two CFP2 ports

For LED details of the card, see LEDs of OTN-XP Line Card , on page 94.

The OTN-XP line card supports 400GE/OTUC4, 100GE/OTU4, 10GE/OTU2/OTU2e, 16G FC, 32G FC client rates.

The supported operating modes are:

- 2x Muxponder
- 2x Transponder
- Single-card 1.2T OTN XPonder
- Dual-card 1.6T OTN XPonder

The physical dimensions of the OTN-XP line card are:

- Height—40.4 mm
- Breadth—191.9 mm
- Depth—282 mm without fiber management bracket; 366.7 mm with fiber management bracket
- Weight—2.6 kg



Note When the data path device temperature of the OTN-XP card exceeds the critical threshold level of 108° Celsius, a sensor alarm is raised and the data path is shut down. This impacts traffic. However, the card is still operational.

For more details about the OTN-XP line card, see the data sheet.

QXP-K9 Line Card

Table 8: Feature History

Feature Name	Release Information	Description
NCS1K4-QXP-K9 Line Card	Cisco IOS XR Release 7.7.1	NCS1K4-QXP-K9 line card delivers low cost 100G and 400G DWDM transmission with ZR+ optics on a router. This line card can be used in both traditional Optical Networking solution and in Routed Optical Networking solution. This line card has 16 pluggable ports with eight QSFP-DD client ports and eight QSFP-DD trunk ports. For more information about the NCS1K4-QXP-K9 card, see the datasheet. NCS1K4-QXP-K9 card supports the following key features: • Client rates: 400GE, 4x100GE, and 100GE Ethernet • Modulation formats: 16 QAM for 400GE Txp/4x100GE Mxp and QPSK for 100GE Txp • Smart licensing: The license calculation is based on the number of trunk slices provisioned. For more information about the key features, see QXP Card and smart licensing.

The QXP-K9 line card provides up to 16 QSFP-DD ports (eight QSFP-DD client ports and eight QSFP-DD trunk ports). The card supports 400G ETH, 4x100GE ETH, and 100G ETH without FEC client rates.

The supported operating modes are:

- 400G-TXP
- 4*100G MXP
- 100G TXP [without FEC]

The physical dimensions of the QXP-K9 line card are:

- Height—40.4 mm

- Breadth—191.9 mm
- Depth—277 mm without the fiber management bracket; 394.7 mm with the fiber management bracket
- Weight—2.5 kg

For LED details of the line card card, see LEDs of QXP-K9 Line Card, on page 96. For more details of the QXP-K9 line card, see the data sheet.

Install Line Card

Important Release 7.0.1 requires one of these options if the line card does not restart or crashes:

- Install the Mandatory Software Maintenance Upgrades

Cisco IOS XR Software Release	SMU File Names
7.0.1	ncs1004-7.0.1.CSCvr50760.tar
	ncs1004-sysadmin-7.0.1.CSCvr50760.tar

- Upgrade

  Migrate the software to Cisco IOS XR Software Release 7.1.1 or later. These releases do not require any of the SMUs.

  See the NCS 1001 Software Download page for the latest software releases.

This task has details about installing a line card in to the NCS 1004 chassis. The chassis is shipped with filler cards and/or line cards. The Cisco NCS 1004 chassis supports a maximum of four line cards.

Before you begin

It is mandatory to attach the fiber management brackets to the filler cards and line cards before installing the chassis onto a rack. For a detailed procedure, see the Attach Fiber Management Bracket section.

Note The following procedure is not required if the chassis is shipped with preinstalled line cards.

Procedure

Step 1 Unscrew the Torx screws of the filler card using a T15 Torx screwdriver.

Step 2 Holding the fiber management bracket of the filler card with one hand and supporting it with the other, remove the filler card from the chassis.

Step 3 Attach the fiber management bracket to the line card that needs to be installed. Follow the procedure as mentioned at the beginning of the section.

Step 4 Orient the line card. Check for the *This Side Up* label.

Step 5 Use both the hands while inserting a line card. Use one hand to hold the line card using the fiber management bracket and the other hand along the base of the card to guide it into the slot.

Figure 38: Installing the OTN-XP Line Card

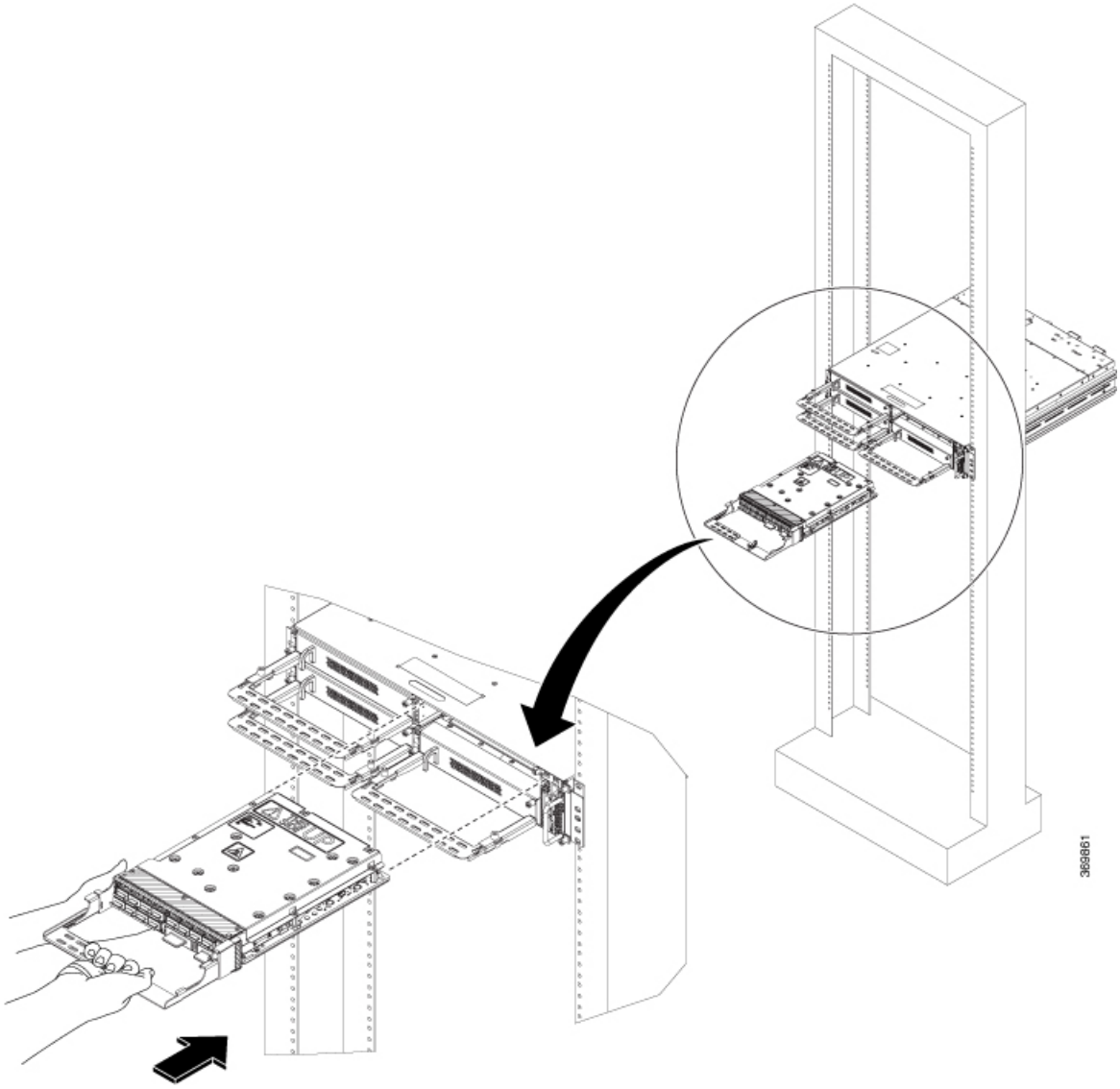
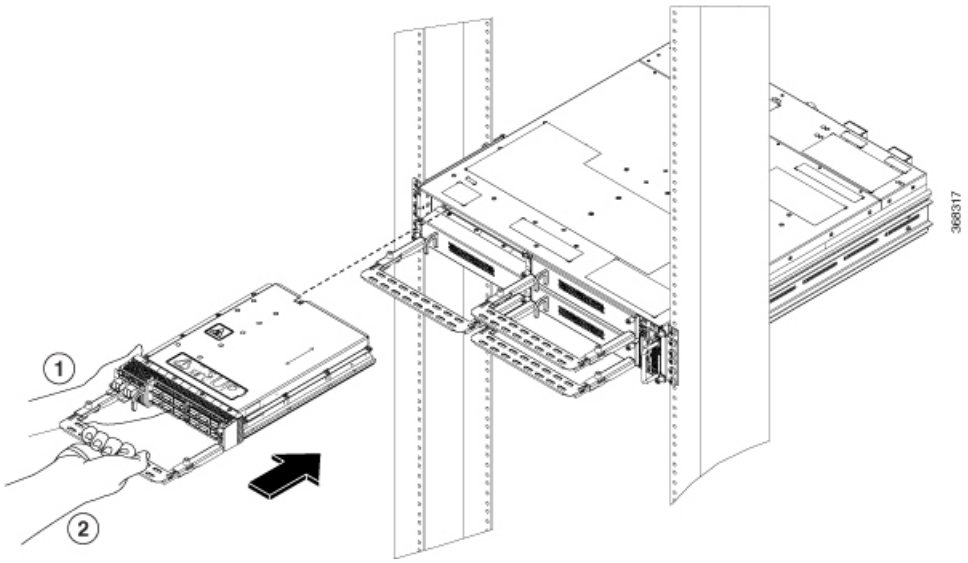


Figure 39: Installing the 1.2T, 1.2TL, 2-QDD-C, and QXP-K9 Line Cards



1	Support the line card with your hand at the bottom, while installing (or removing) a line card.
2	Use the fiber management bracket for holding the line card.

Caution
Use the fiber management brackets only for pulling out while removing or pushing in the card while installing line cards or filler cards. Do not use the fiber management brackets to carry the cards. Always support the line card (or filler card) at the bottom with your hand.

Step 6 Slide the line card completely inside, into the card guide.

Step 7 Using the Torx screwdriver, tighten the two M3, T15 Torx screws of the line card, to a torque value of 0.65 N-m.

Install Power Supply

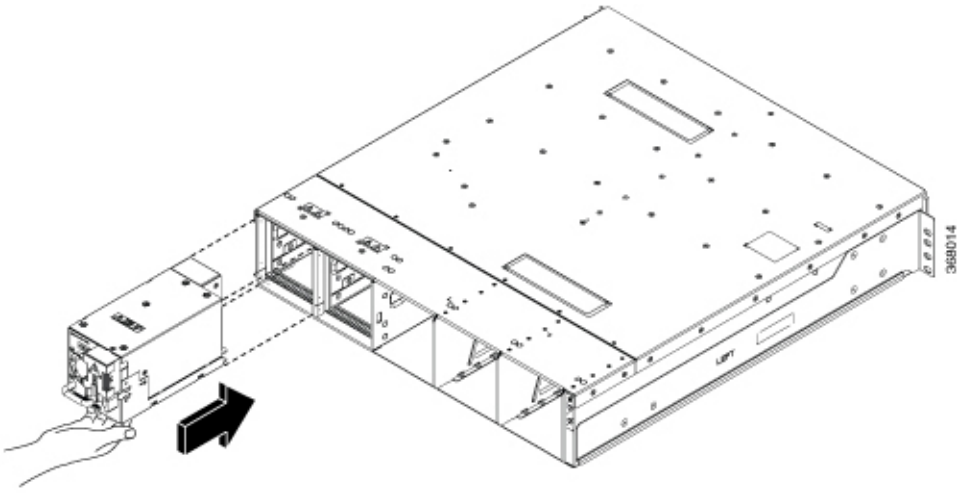
This task has information about installing the PSUs into the NCS 1004 chassis.

Procedure

Step 1 Orient the PSU correctly before inserting. Check for the *This Side Up* label.

Step 2 Using the handle, slide the PSU into the slot (support the PSU at the bottom with your hand) and push it in until you hear a *click* sound; direction of insertion is shown in the following figure. The click sound indicates that the unit has been latched (the locking latch needs to pressed and released only for removing the PSU).

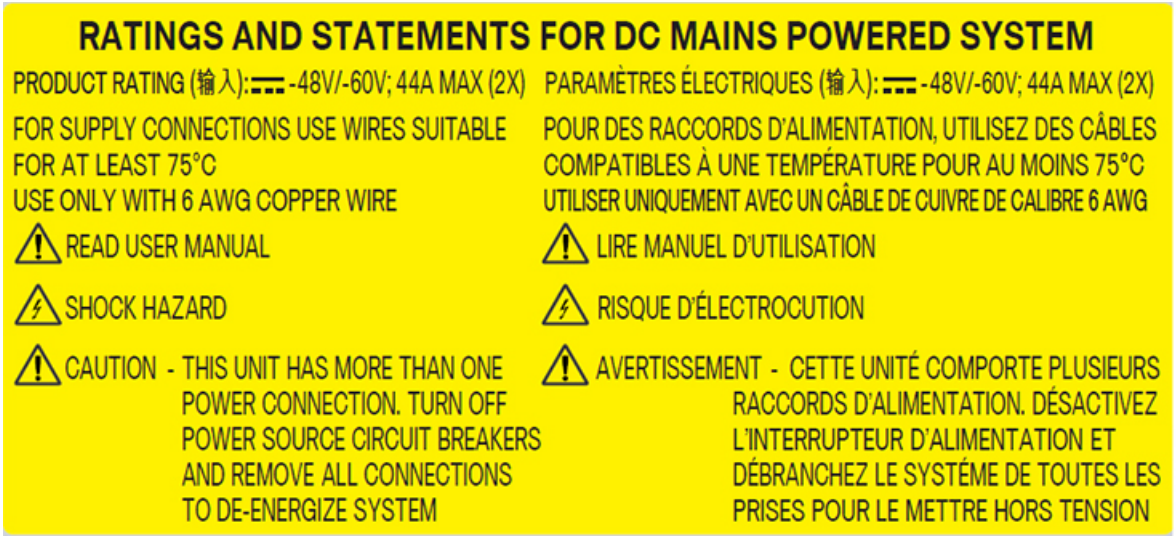
Figure 40: Installing a PSU



Connect DC Power to NCS 1004

Caution NCS 1004 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and national electrical codes.

Figure 41: Rating Label for DC Power



Procedure

Step 1 Verify that the correct fuse panel is installed in the top mounting space.

Step 2 Measure and cut the cables as needed to reach NCS 1004 from the fuse panel.

Step 3 Dress the power according to local practice.

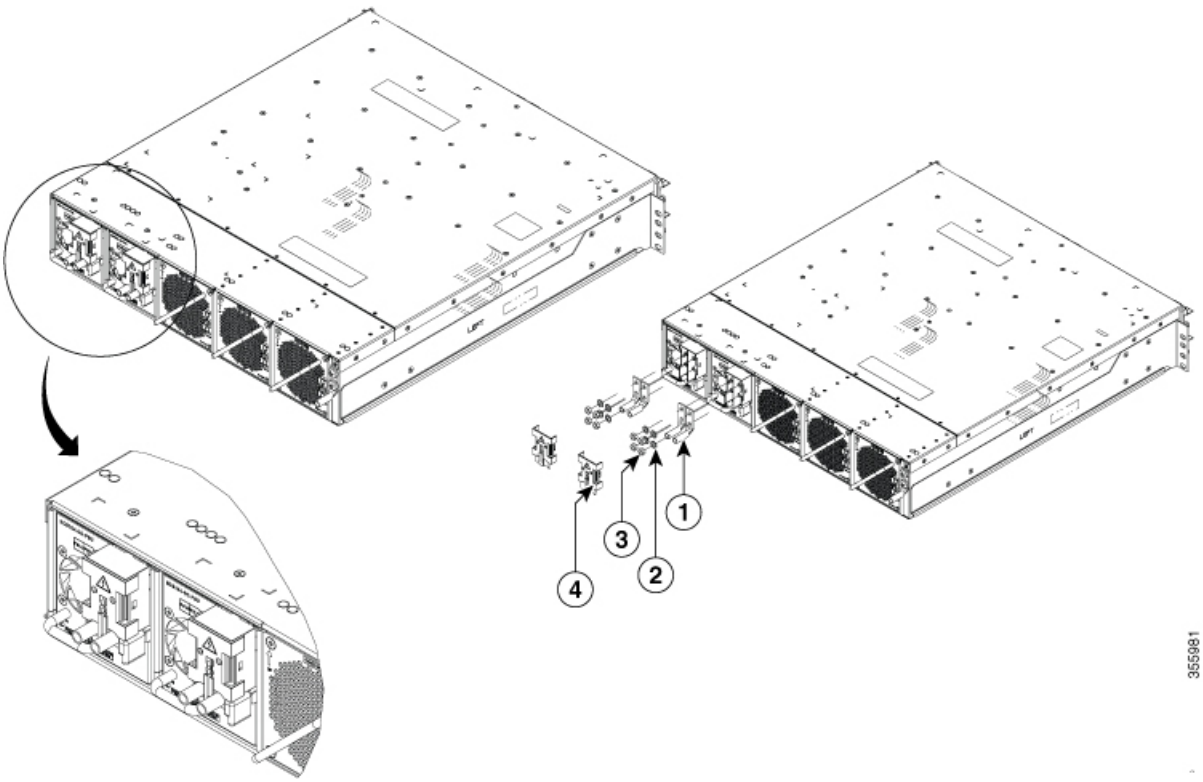
Step 4 Connect the office battery and return cables according to the fuse panel engineering specifications.

Step 5 Affix the power lug on the unit with two screws. Tighten the screws using a torque of 2.7 Nm +/- 0.3 Nm.

Caution
A torque level greater than 3.0 Nm may damage the unit.

Use #6AWG cables. Ensure a minimum gap of 50 mm below the chassis, for routing the cables. For ETSI racks, 180-degree power lugs are used to maintain 600 mm footprint.

Figure 42: Connecting DC Power



1	Lugs crimped with DC power cords
2,3	Fasteners for DC lugs
4	Protection Cover

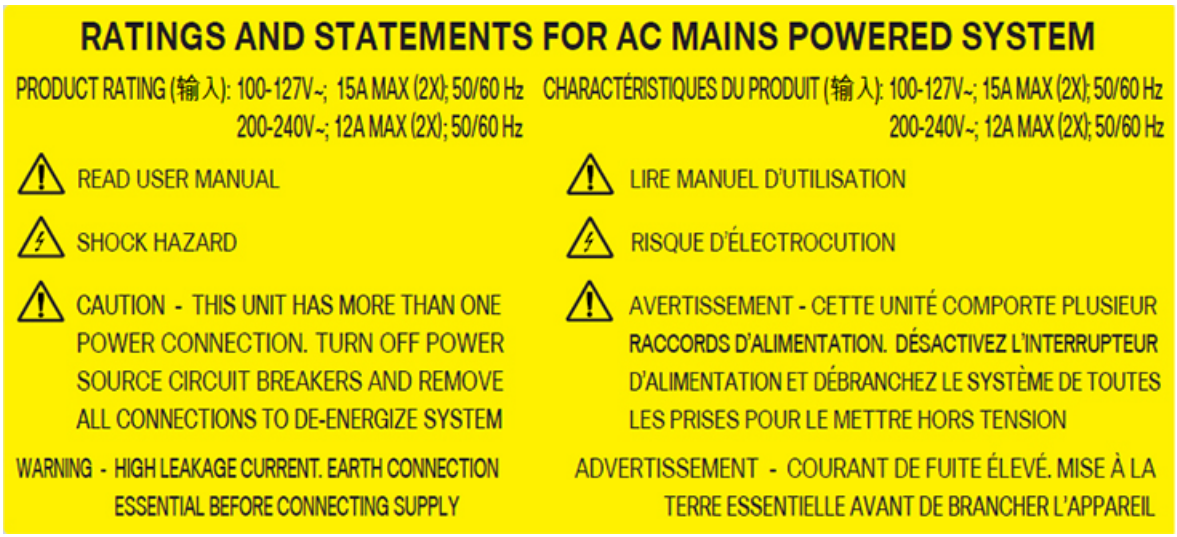
Step 6 Use protection covers to keep the lugs in place.

Snap fit the protection cover towards the top for 90-degrees lugs and push it down for straight lugs.

Connect AC Power to NCS 1004

Caution NCS 1004 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices comply with local and national electrical codes.

Figure 43: Rating Label for AC Power



The voltage rating value for AC power ranges either between 200 V to 240 V or between 100 V to 127 V depending on the standards in various countries.

Note A dual pole breaker is needed for the installation. The rating of the dual pole breaker for each feed is 16A for input voltage 200 Vac to 240 Vac, and 20A for input voltage 100 Vac to 127 Vac.

Procedure

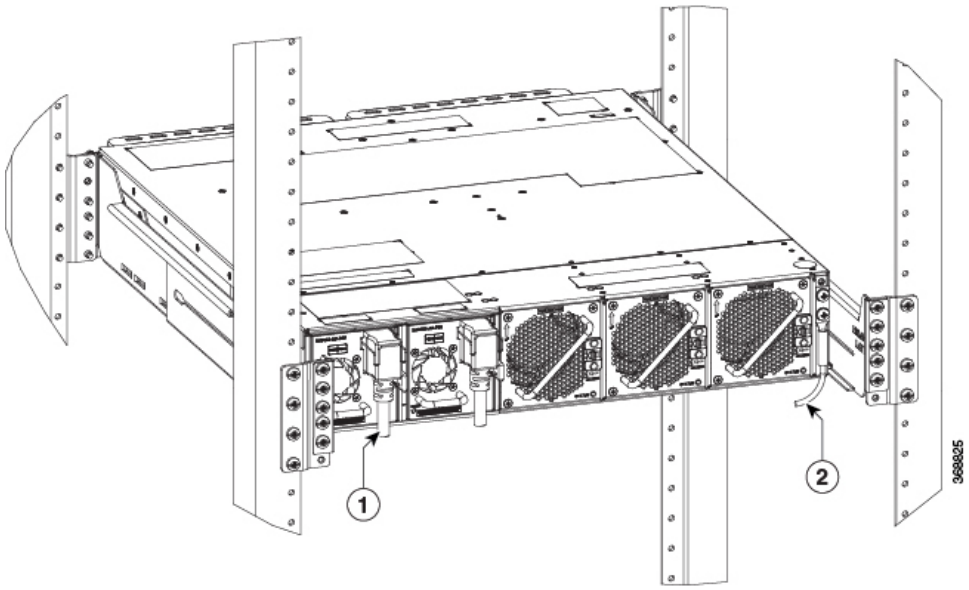
Step 1 Verify that the AC cable is installed in the correct AC source panel. Ensure that either the fuse is removed or the circuit breaker is in the off position and locked out.

Step 2 Attach the AC power cable to the cable connector in the AC power module.

Note
Ensure that there is a minimum gap of 50 mm for routing the cables. Use a 90-degree exit cable to maintain a footprint of 600 mm for ETSI racks.

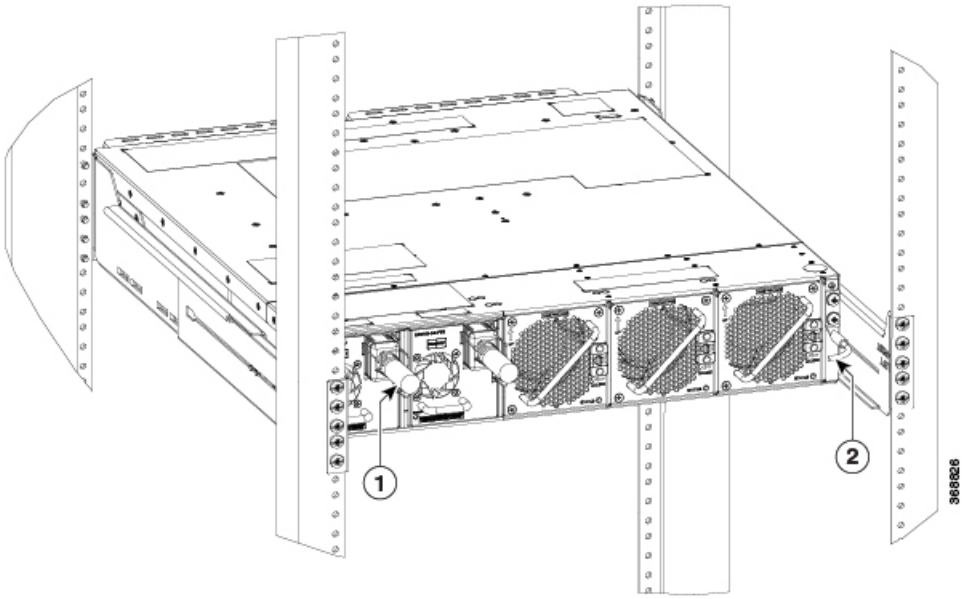
Step 3 Close the cable retention clips to secure the power cables and to prevent their accidental removal.

Figure 44: Connecting 90-degree Power Cable



1	90-degree exit cables
2	180-degree ground lug

Figure 45: Connecting Straight Power Cable



1	Straight exit cables

2	90-degree ground lug

Install Fan Unit

This task has information about installing the fan units into the chassis.

WARNING: DO NOT INTRODUCE BODY OR OBJECT IN THE CHASSIS / PSU / FAN TRAY / LC SLOTS WHEN INSTALLING OR REMOVING A MODULE. EXPOSED CIRCUITRY IS AN ENERGY HAZARD.

ATTENTION: ÉVITEZ TOUT CONTACT ENTRE VOTRE CORPS OU UN OBJET EXTERNE ET L'INTÉRIEUR DU CHÂSSIS, DU BLOC D'ALIMENTATION, LA FENTE DE VENTILATION DU PLATEAU, OU DE LA FENTE PDS LORSQUE VOUS INSTALLEZ OU RETIREZ UN MODULE. LES CIRCUITS EXPOSÉS CONSTITUENT UN RISQUE D'ÉLECTROCUTION.

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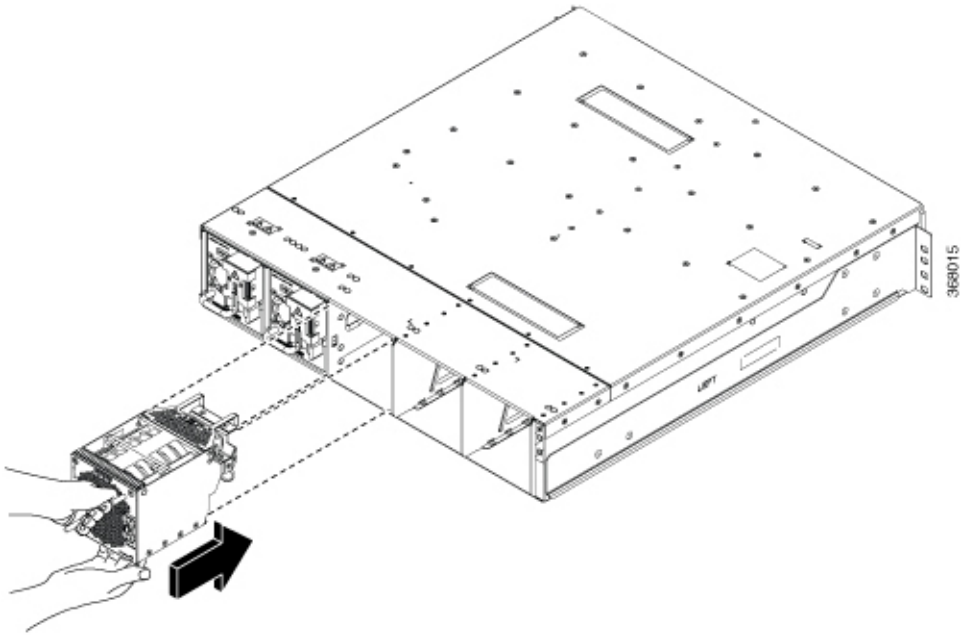
Procedure

Step 1 Orient the fan unit correctly before inserting. Check for the *This Side Up* label.

Step 2 Holding the handle with one hand and supporting the fan unit with the other hand, insert the fan unit in to the slot on the rear side of the chassis.

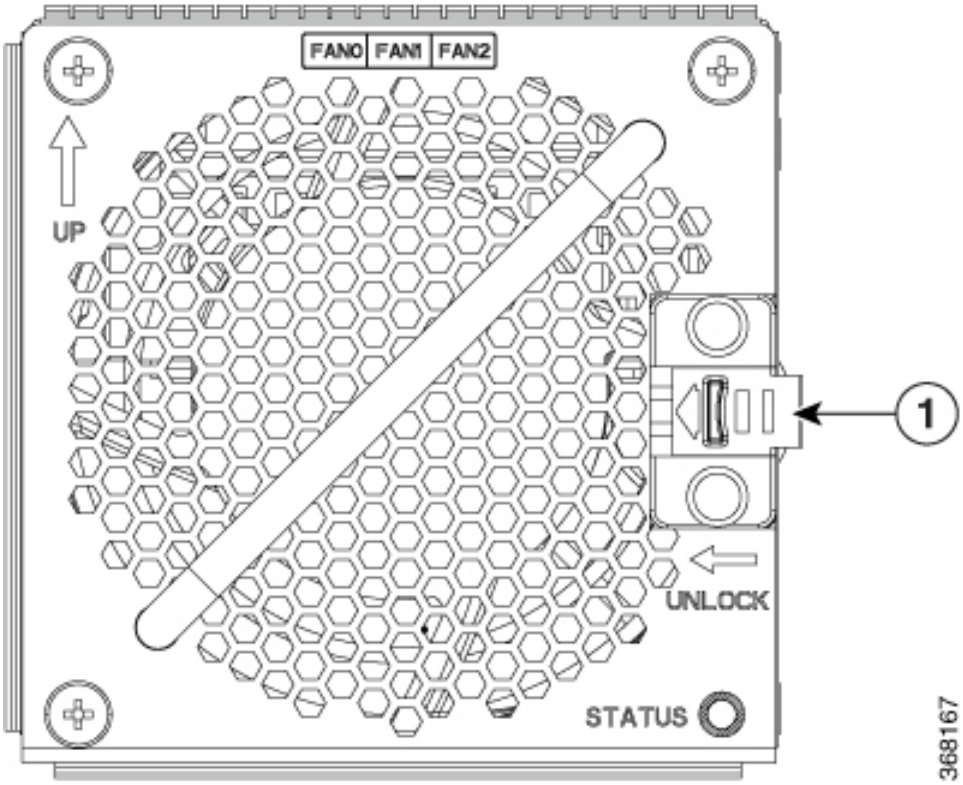
Push the spring loaded lever to the left and hold it in the unlock position (holding position) using your thumb while inserting the fan unit.

Figure 46: Inserting a Fan unit



Step 3 Release the spring-loaded lever to lock the fan unit in its position.

Figure 47: Spring-loaded Lever in Released Condition



1	Sping-loaded lever

Attach Fiber Management Bracket

This task has details about attaching a fiber management bracket to a line card or filler card.

Procedure

Step 1 Fix the fiber management bracket to the card (line card or filler card, as the case may be).

Step 2 Using a Torx screwdriver, tighten the two M3 T15 Torx screws of the fiber management bracket to a torque value of 0.65 N-m.

The procedure to adjust the length of the fiber management bracket is discussed in the subsequent section.

Adjust Fiber Management Bracket of the 1.2T, 1.2TL, 2-QDD-C, and QXP-K9 Line Cards

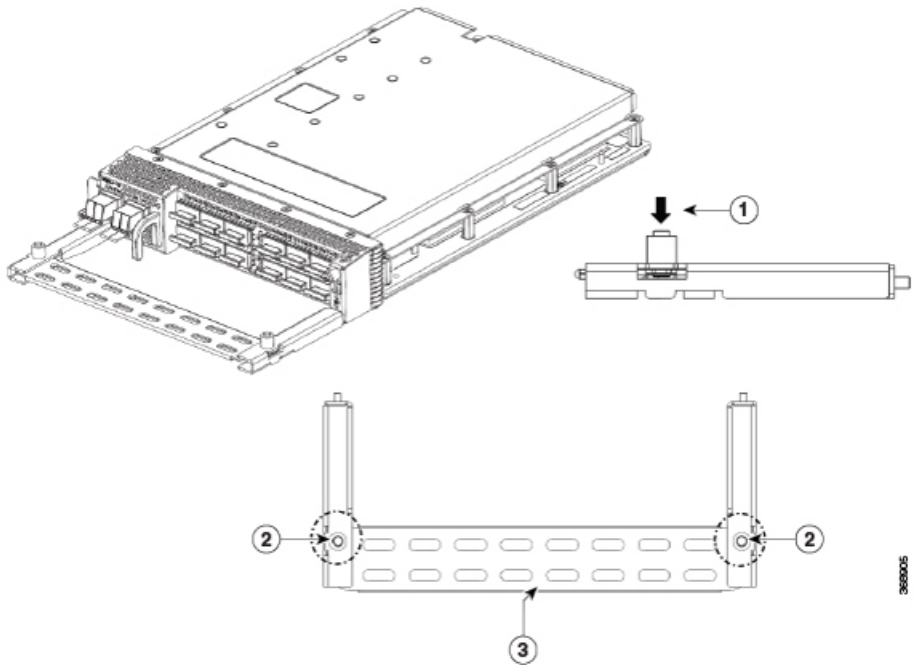
This task has details about how to adjust the length of the fiber management bracket.

Note We recommend that you maintain the fiber management bracket in the shorter position for ETSI racks, to maintain 600 mm footprint. We also recommend that you adjust the bracket length before the installation.

Procedure

Step 1 Push the plunger pins downwards on both the sides of the bracket, to disengage the horizontal bar.

Figure 48: Adjusting the Fiber Management Bracket



1	Press the plunger pins in the direction, as shown.
2	Plunger pins
3	Horizontal bar

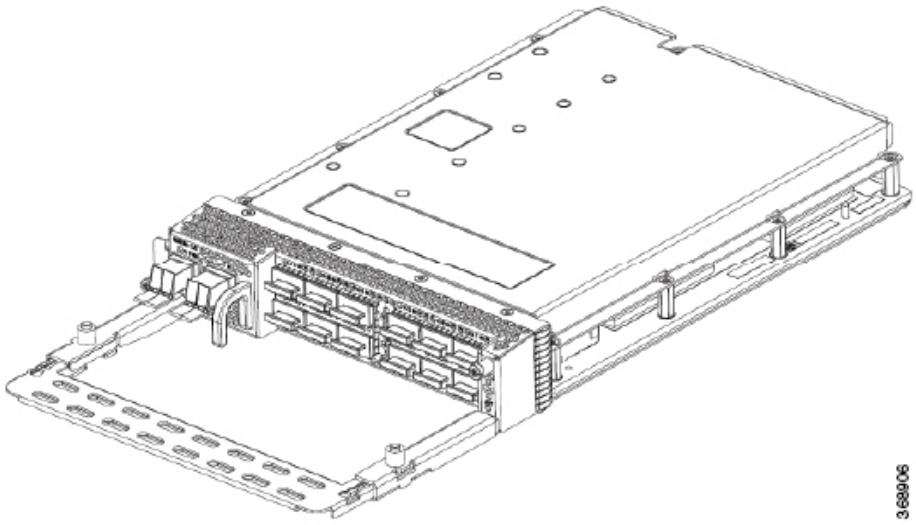
Step 2 Pull the horizontal bar of the fiber management bracket outwards to increase the length of the bracket.

The plunger pins lock the bracket when the horizontal bar is fully extended.

You can verify whether the plunger pins are locked based on the visibility of their grooves.

- If both grooves are visible, the pins are disengaged.
- If no one groove is visible, the bar is in transient stage.
- If one grove is visible, the bar is correctly installed and locked.

Figure 49: Fiber Management Bracket in the Extended Position



Adjust Fiber Management Bracket of the OTN-XP Line Card

This task has details about how to adjust the length of the fiber management bracket for racks.

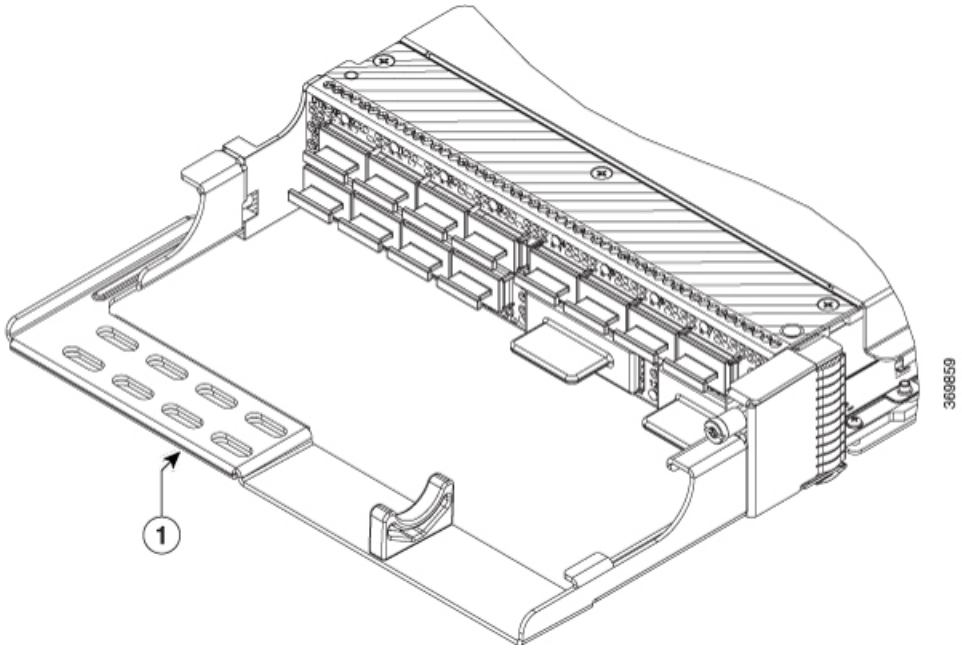
Before you begin

It is mandatory to attach the fiber management brackets to the filler cards and line cards before installing the chassis onto a rack. For a detailed procedure, see the Attach Fiber Management Bracket section.

Procedure

Using a T15 Torx screwdriver, unscrew and remove the two sets of screws on either side.

Figure 50: Fiber Management Bracket Set



1	Fiber management bracket

Install Pluggables

This task has information about installing the pluggables on a line card. The line card is shipped with dust caps.

Caution Protect the line card by inserting dust caps into the pluggable slots when no pluggable is inserted.

Transceivers, fiber-optic cables and optical ports on the line cards must be kept clean and free of dust to maintain high signal accuracy and to prevent damage to the connectors. They must be covered with protection or dust cap when not in use.

Procedure

Step 1 Remove the dust plugs.

You can retain and reuse the dust plugs.

Step 2 Orient the pluggable as shown in the following figure and slide it into the slot.

Figure 51: Inserting QSFP Pluggable (1.2T Line Card)

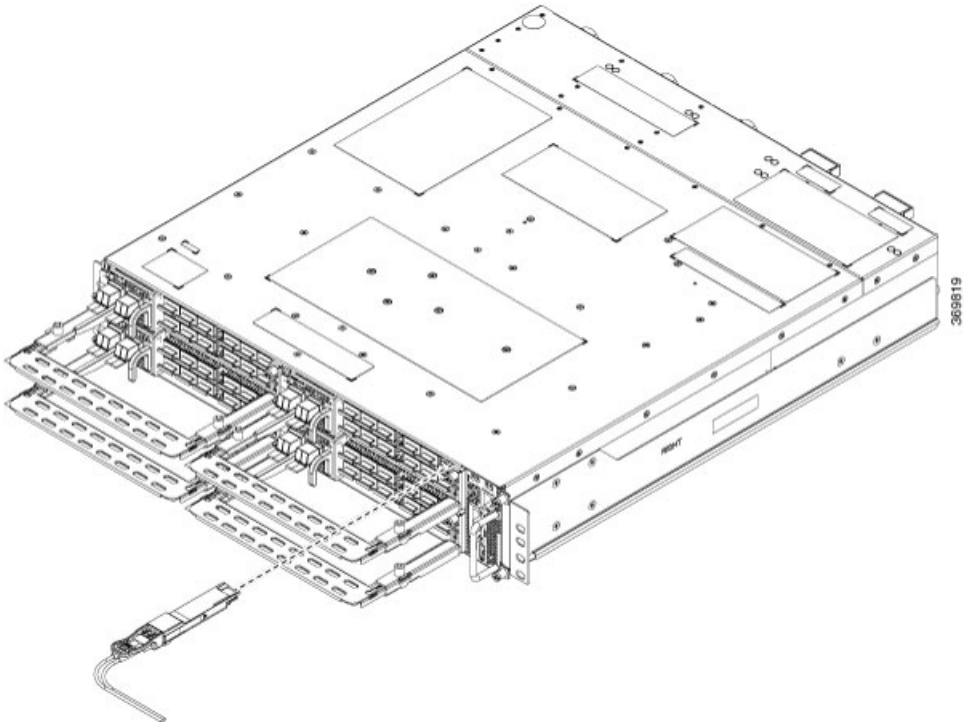
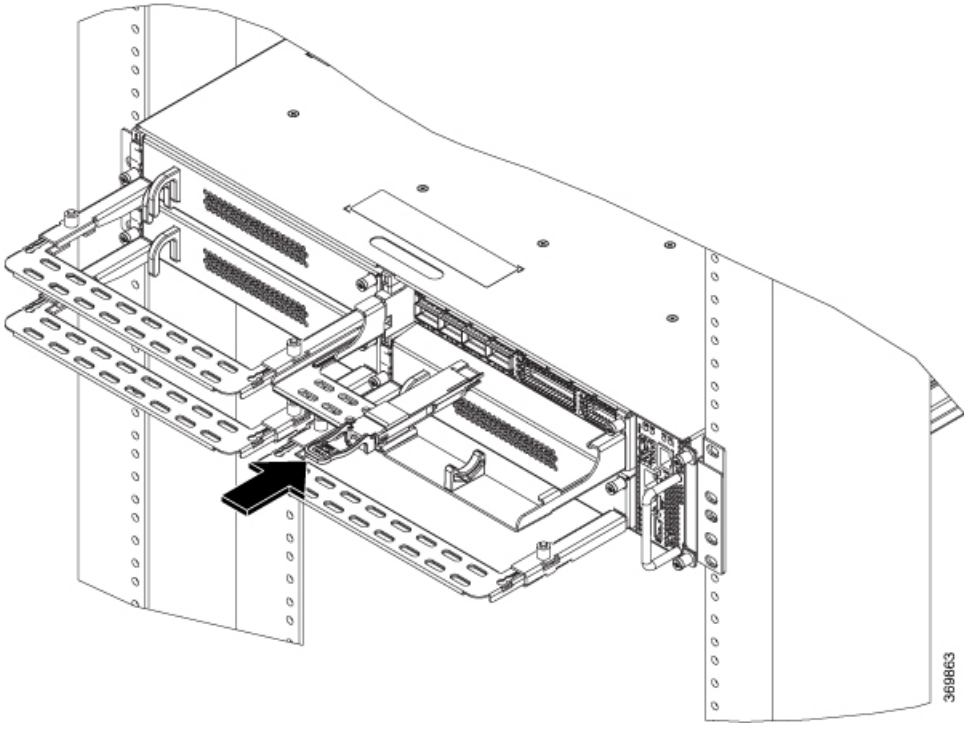


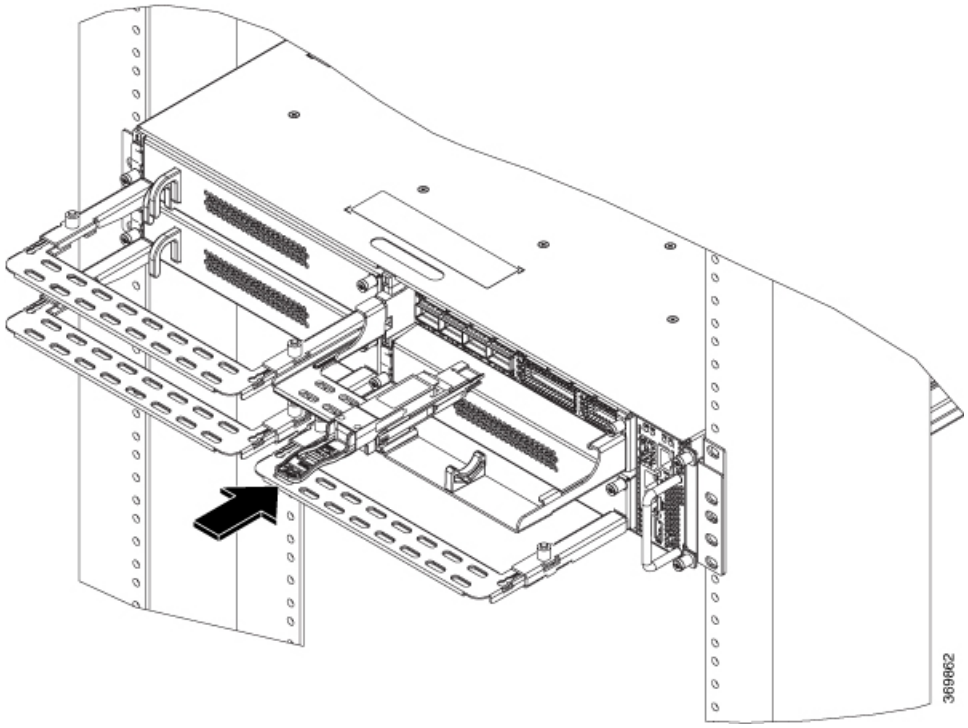
Figure 52: Inserting QSFP-DD Pluggable (OTN-XP Line Card)



Caution

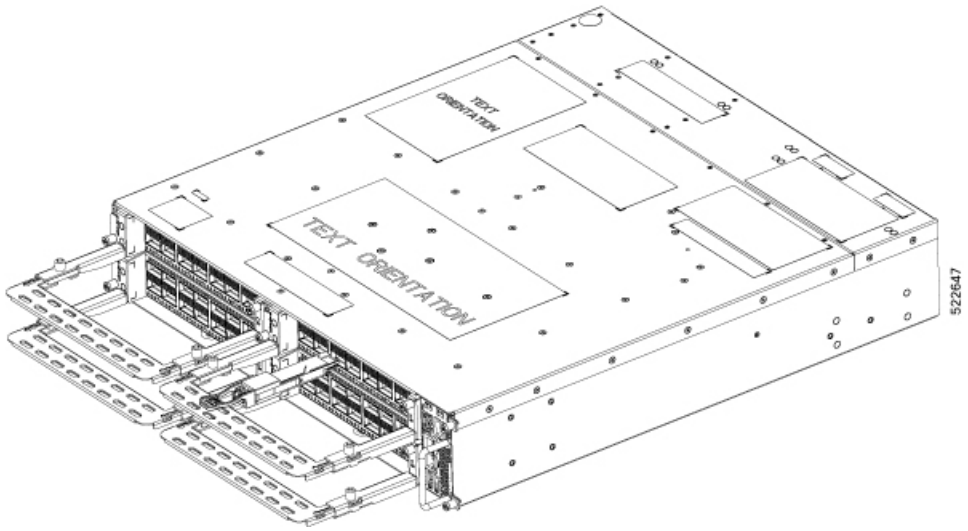
The pull tabs of the pluggables must always face down for top rows; the pull tabs of the pluggables must always face up for bottom rows.

Figure 53: Inserting QSFP-28 Pluggable (OTN-XP Line Card)



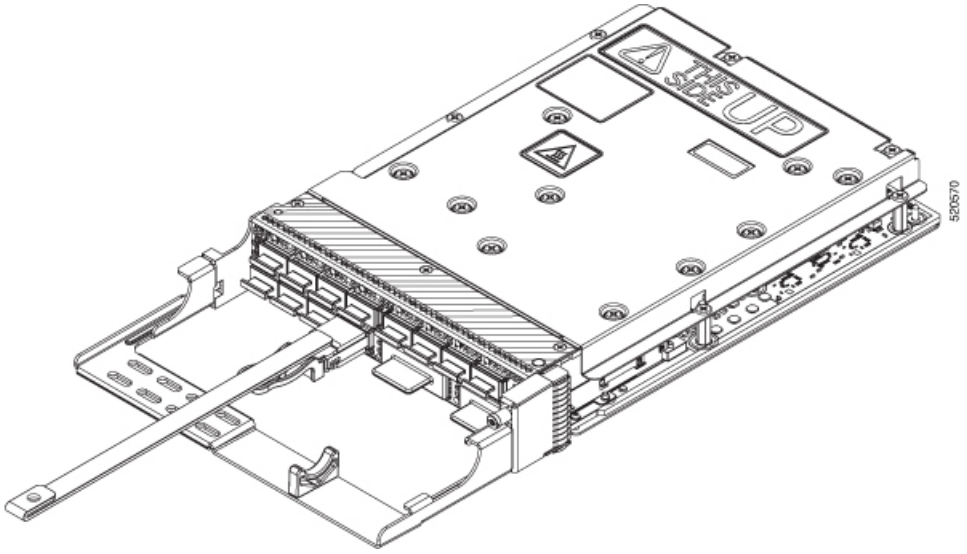
Do not forcibly push the pluggable into the slot, this might damage the pluggable and/or the slot.

Figure 54: Inserting QSFP-DD Pluggable (QXP-K9 Line Card)



Note
Use the push tool to push the QSFP-DD, QSFP-28, and CFP2 pluggables into position as shown below.

Figure 55: Using the Push Tool to Push the Pluggables



Step 3 Route the cables emerging from the pluggables using the fiber management bracket as shown in the following figure.

Figure 56: Fiber Management Bracket with fibers from Pluggables (1.2T, 1.2TL, 2-QDD-C, and QXP-K9 Line Cards)

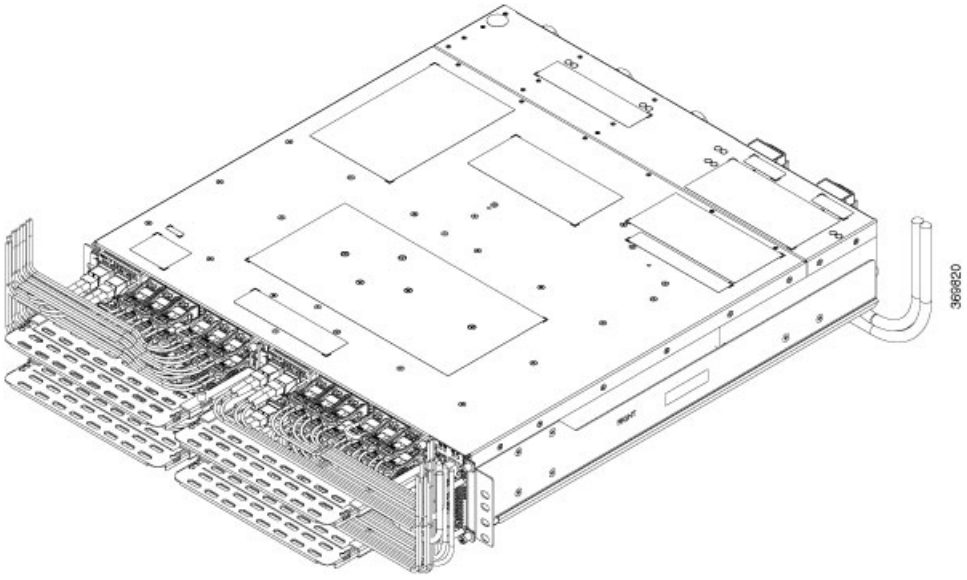
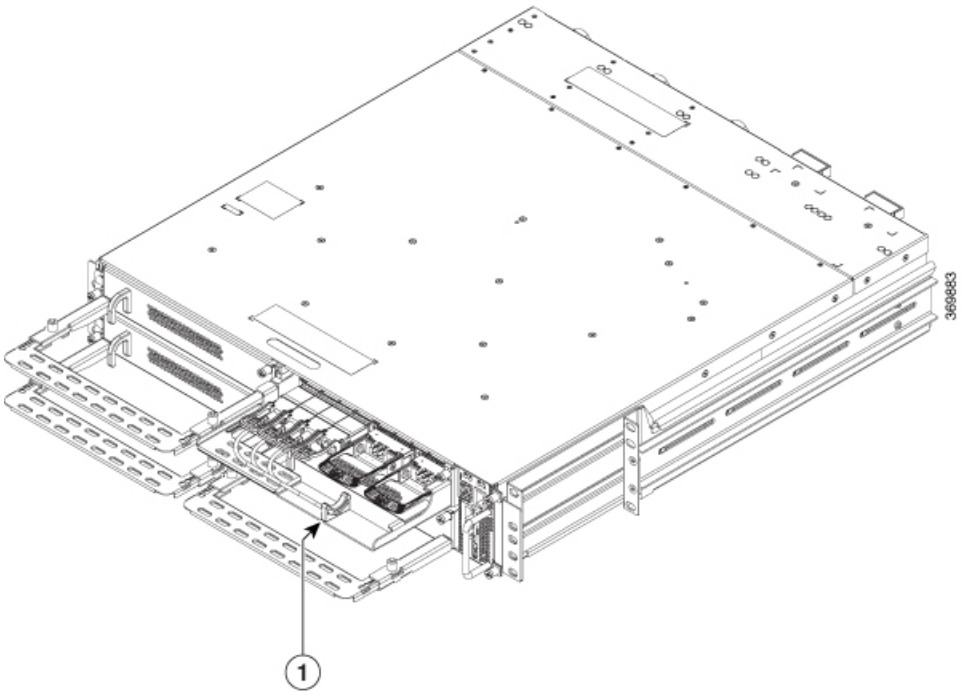


Figure 57: Fiber Management Bracket for the OTN-XP Line Card



1	Fibers from pluggables resting on the cable support bracket

Guidelines for managing the fibers and cables:

- Use velcro tapes to tie the fibers to the fiber management bracket.
- Fibers from the left line cards should exit from the left and fibers from the right line cards should exit from the right.
- Fibers and cables from the controller should exit from the right. Maintain sufficient slack to extract the controller during OIR.
- Cables from the PSU should exit from the left (when viewed from the rear side).
- Ground cable should exit from the right (when viewed from the rear side).
- For ETSI racks, route the power and the ground cables in the 50 mm space below the chassis, to maintain a chassis footprint of 600 mm.
- Rest the fibers exiting from the pluggables on the cable support bracket. Pass a velcro tape in the gap provided in the cable support bracket to tie the fibers. Ensure that there are no velcro tapes near the CFP2 ports, as this may hinder the insertion and removal of the CFP2 pluggables.

Note
The OTN-XP line card supports only the latest optics of QSFP-100G-SR4-S (CPN 10-3142-03 or higher). Older version of optics is not supported.

Air Filter

The air filter removes dust from the air drawn into the chassis by the fan units. If the air filters are damaged, dirty, or clogged with dust, they must be replaced with a new air filter. Failure to replace a compromised air filter can result in insufficient air circulation through the chassis and temperature-related environmental alarms.

The Cisco NCS 1004 air filter has the following components:

- Two air filter side brackets
- One air filter frame
- One air filter

All the three components need to be ordered for first-time installation. The combined PID for all these three components is NCS1K4-FLTR-ASL. The PID for the air filter unit is NCS1K4-FLTR. After first installation of the air filter unit, only the air filter needs to be replaced. The air filter side brackets and the frame can be reused.

Note Inspect the air filters every three months and replace them as needed. Air filters should be disposed of and replaced when they become dirty. According to NEBS guidelines, washing or cleaning them is not allowed. Make sure to order these consumable items separately and keep a spare stock. These parts cannot be replaced through the RMA process.

Note Air filter does not meet the ETSI 600 mm footprint.

Install Air Filter

This task has details about installing the air filter. It is recommended to include the air filter installation as part of the chassis installation.

Precautions while installing air filters

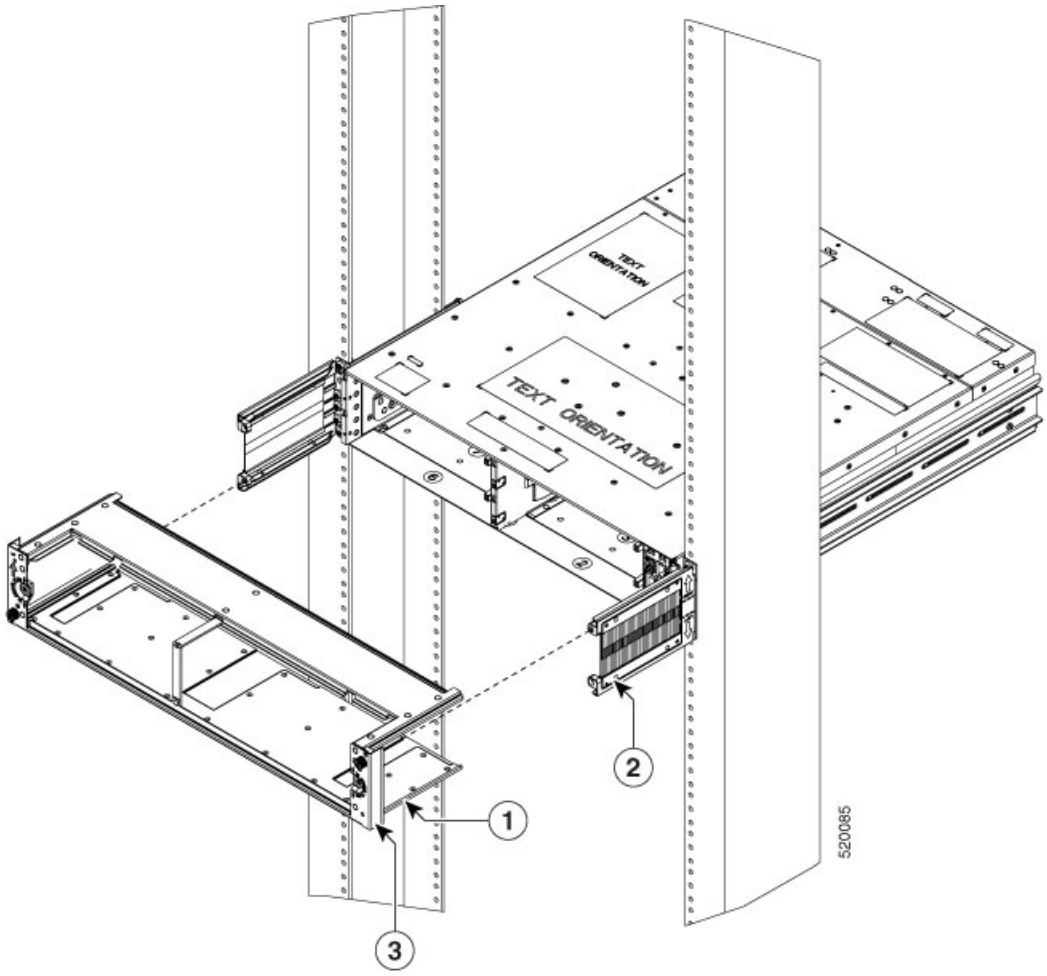
- Ensure that the pull tabs of the pluggables do not get damaged during installation.
- Ensure that the velcro of the fiber management bracket does not interfere with the air filter.
- To remove a chassis, placed in the middle, in a stacked configuration, the air filters of the chassis above and below also need to be removed to avoid accidental scratches on the surface of the chassis.
- Ensure that the cables from the controller exit from the right; maintain sufficient slack to enable easy removal and insertion of the controller during OIR.

Procedure

Step 1 After the chassis is inserted in the rack, fix the air filter side brackets on either side of the chassis. Check for the arrow indications on the side of the brackets. Using the Philps screws on either side, bind the chassis and the air filter side brackets to the rack. Tighten the Phillips screws (48-101524-01) using a number-2 Phillips screwdriver, to a torque value of 4.65 N-m.

Note
In case the air filter is being installed after the chassis installation is completed, then unscrew and remove the four screws (on either side) that bind the chassis to the rack. After fixing the air filter side brackets, only three screws are used on either side, to bind the chassis and air filter side brackets to the rack.

Figure 58: Installing the Air Filter Frame and Side Brackets



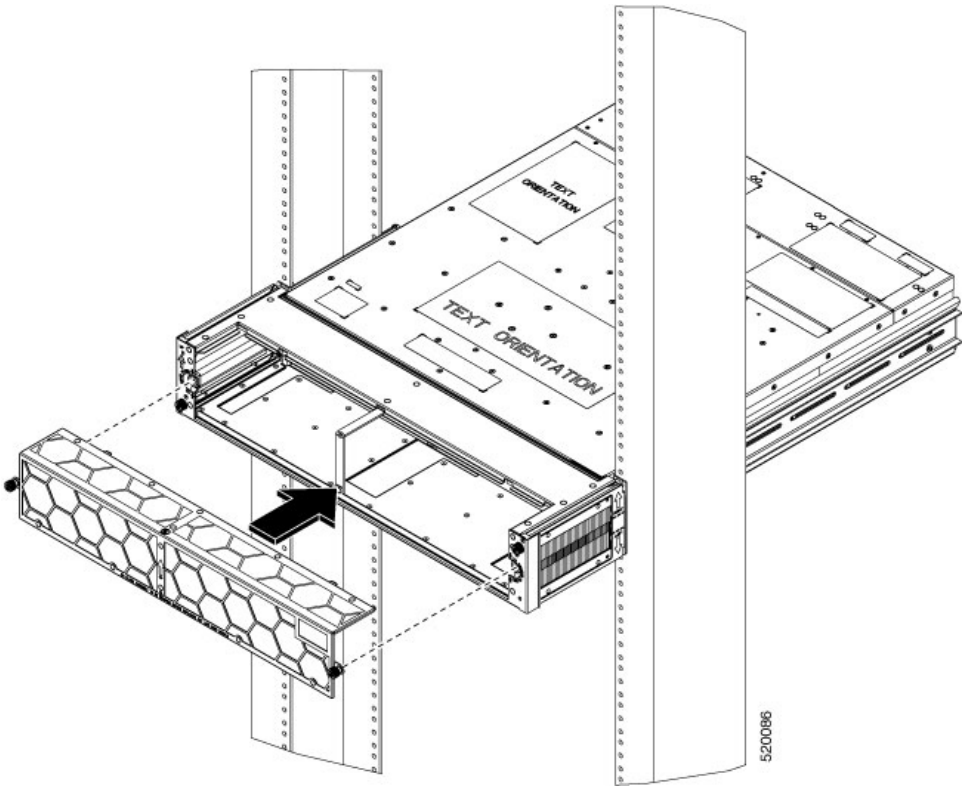
1	Air Filter Frame
2	Air Filter Side Brackets

3	Spare Serial Number label. We recommend that you place the spare label in this location.

Caution
Ensure that the air filter frame is tagged to a specific chassis and not mixed with other chassis.

Caution
Before placing the spare label on the air filter frame, verify that the serial number on the spare label matches with the serial number on top of the chassis. If the serial numbers do not match, there might be inconsistencies in inventory management.

Figure 59: Installing the Air Filter



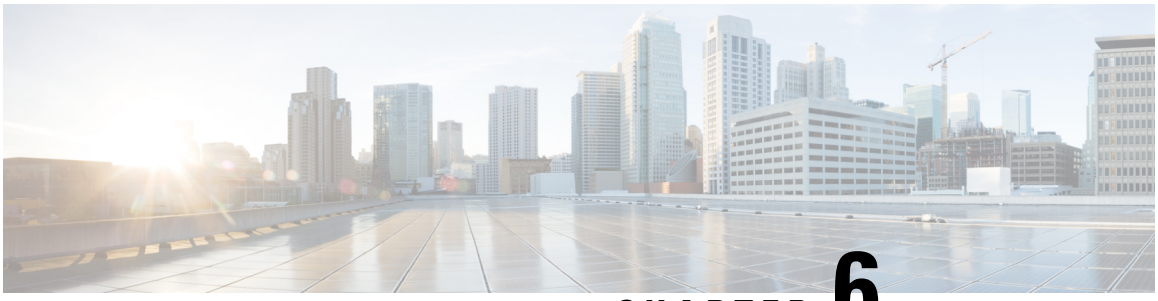
Step 2 Slide the air filter frame in to the air filter side brackets.

Step 3 Using a T15 Torx screwdriver, tighten the screw on either side (placed diagonally) to a torque value of 0.65 N-m.

Step 4 Orient the air filter correctly. The arrow must point upwards.

Step 5 Push the air filter onto the frame and adjust so that it engages with the edges of the frame.

Step 6 Using a T15 Torx screwdriver, tighten the screw on either side of the air filter, to a torque value of 0.65 N-m.

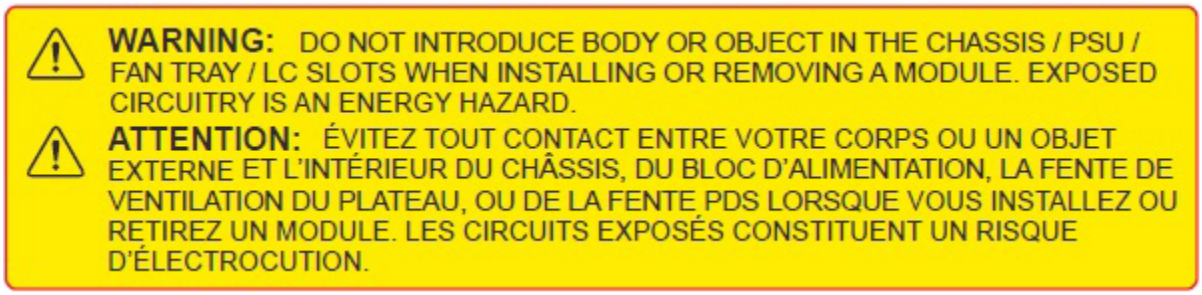


CHAPTER 6

Remove and Replace Cisco NCS 1004 Modules

This chapter describes the procedures to replace Cisco NCS 1004 modules.

Caution All the modular slots in the NCS 1004 chassis should always be populated with respective modules (line-cards, controller, PSU & fan units). Empty line card slots to be populated with filler modules, which are shipped with the chassis. The replacement or upgrade of the modules (Online Insertion or Removal, OIR) to be performed only when the ambient temperature is below 30-degree C. The OIR of modules should be completed within five minutes to prevent overheating of the components.



- Online Insertion and Removal of a Line Card, on page 75
- Remove and Replace Power Supply Unit, on page 77
- Remove and Replace Controller, on page 80
- Remove and replace the battery in the controller, on page 81
- Remove and Replace Fan Unit, on page 88
- Wipe Data in Disk Using Secure Erase, on page 89

Online Insertion and Removal of a Line Card

The Cisco NCS1004 controller unit provides a push button to initiate Online Insertion and Removal (OIR) during the upgrade or replacement of line cards. The same process is to be followed when a filler module is replaced with a line card. This button is used to prepare the system for the imminent loss of thermal efficiency due to the air leakage from the open slot (when the line card or filler card is removed from the chassis). The OIR button sets all fan units to maximum speed for 90 seconds which brings down the temperature of all internal components. After 90 seconds, the user can safely remove the line card or filler module from the chassis.

Caution The OIR of procedure for line card or filler module to be performed only when the ambient temperature is below 30-degree C and should be completed within five minutes to prevent overheating of the chassis components.

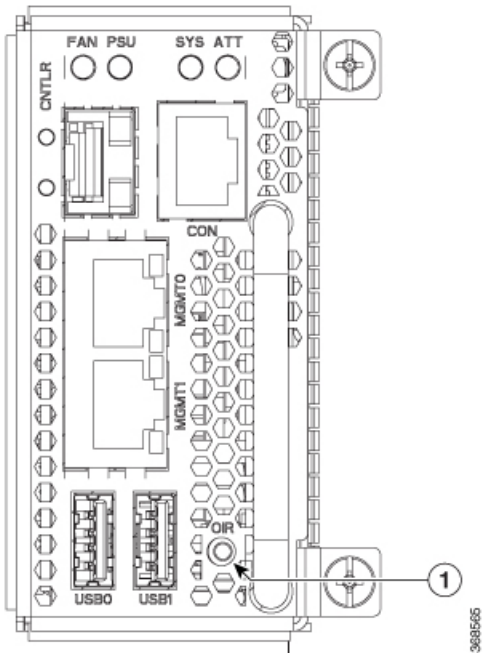
Procedure

Step 1 Press the OIR button; refer the following image.

The ATT LED on the controller unit starts blinking and the fan units are set to the maximum speed.

Caution
Wait for 90 seconds before proceeding.

Figure 60: Replacing a Line Card - OIR Button on the Controller



1	OIR Button

Step 2 After the blinking stops, remove the line card from the chassis and replace it with another line card. For the detailed line card installation procedure, see Line Card Installation.

Fan units continue to run at maximum speed, until the new line card module is inserted back. After the new line card is detected, the speed of the fan units return to their normal speed.

Note

If the filler card or line card is not removed from the chassis within 10 seconds after the ATT LED stops blinking, the fan units return to the normal speed.

Remove and Replace Power Supply Unit

This task has information about removing and replacing the power supply units.

Before you begin

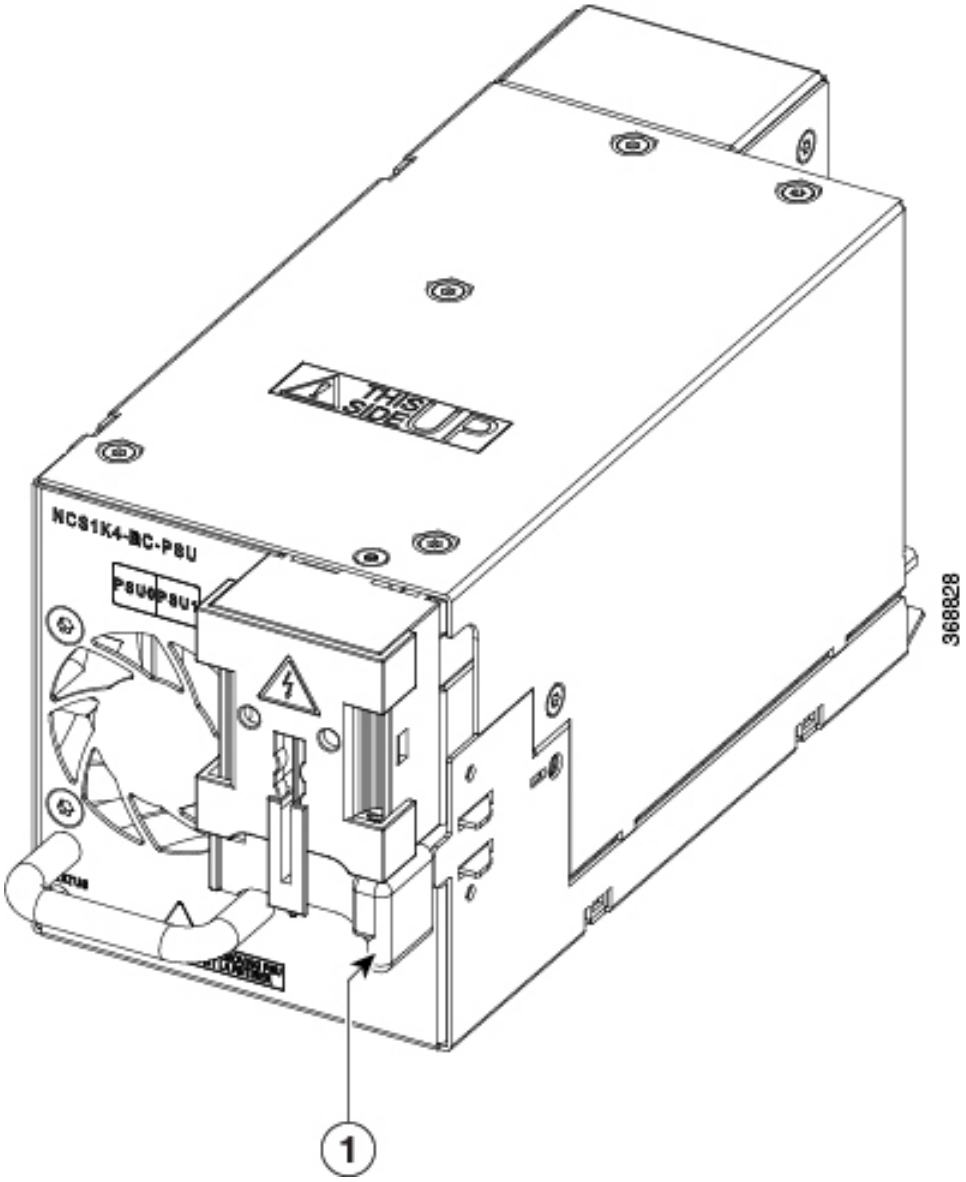
Remove the connections to the power supply:

- Disconnect power from the breaker before disconnecting power from the power supply unit.
- Remove the cable retainers and the power cables, in case of an AC power supply unit.
- Remove the protection covers, fasteners and lugs, in case of a DC power supply.

Procedure

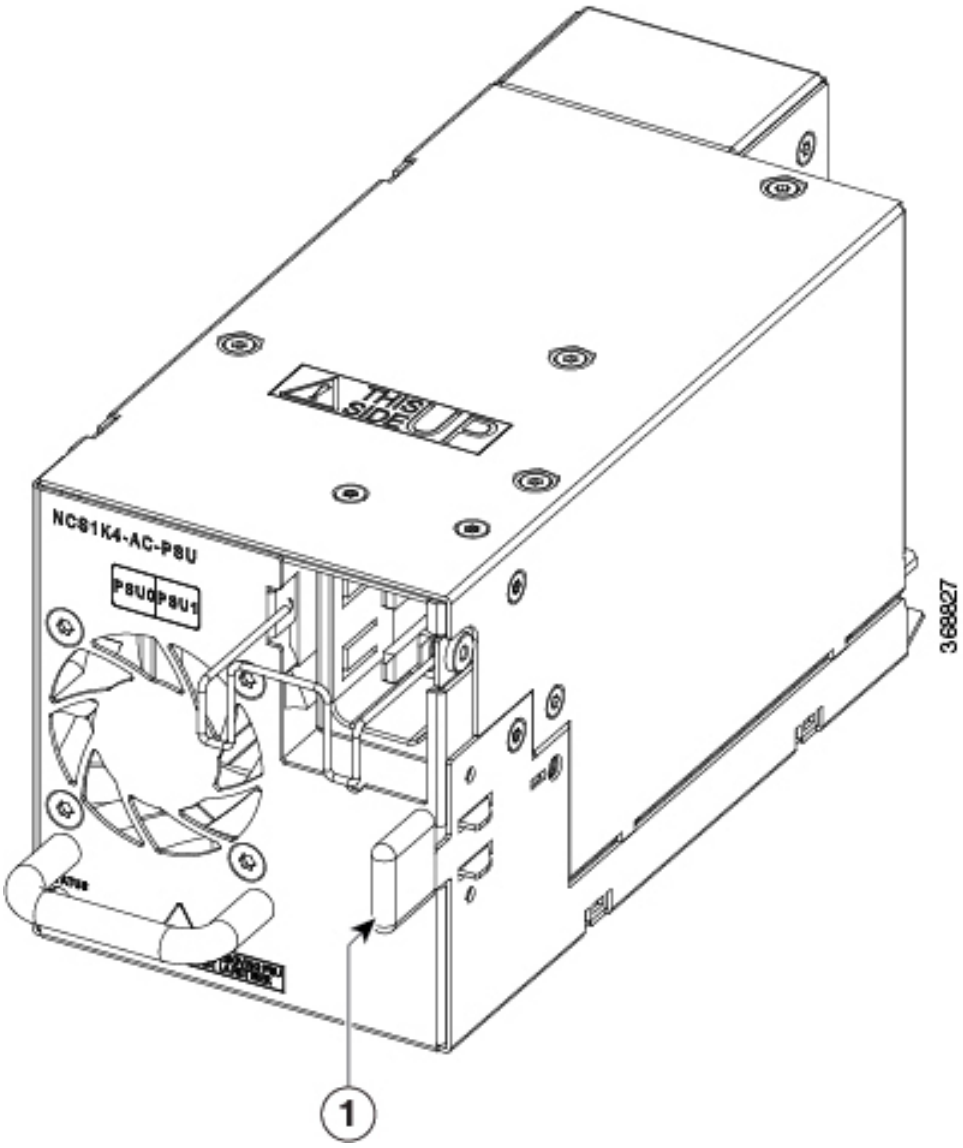
Step 1 Press the locking latch towards the left to release the lock.

Figure 61: Locking Latch on the DC PSU



1	Locking latch

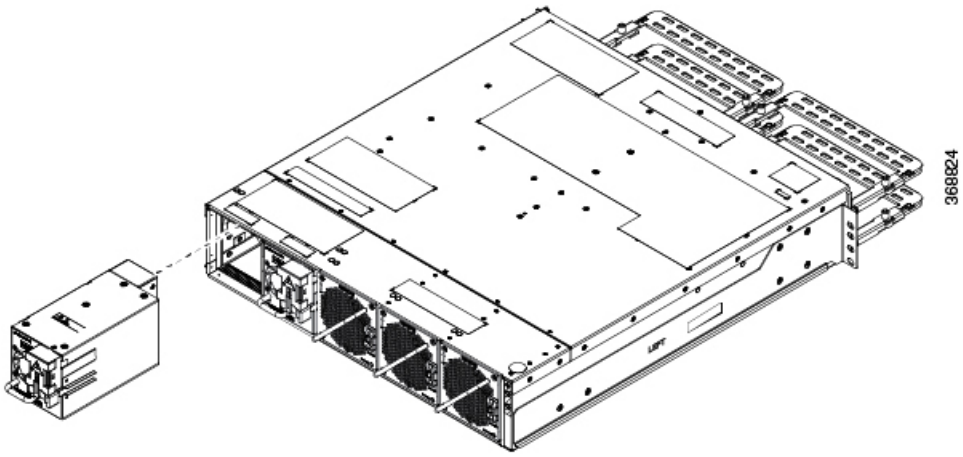
Figure 62: Locking Latch on the AC PSU



1	Locking latch

Step 2 Using the handle with one hand and supporting the PSU with the other, gently pull out the PSU from the slot.

Figure 63: Removing the Power Supply Unit



For replacing the PSU, see Power Supply.

Remove and Replace Controller

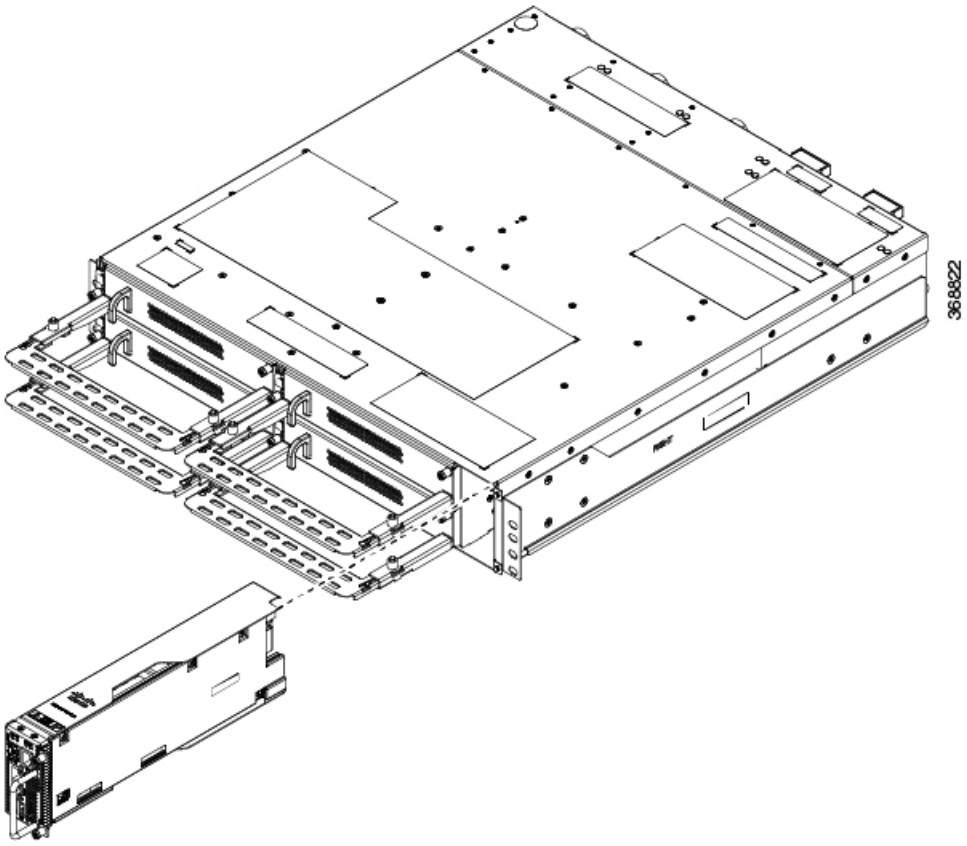
This procedure has details about removing and replacing the controller.

Procedure

Step 1 Using a Torx screwdriver, unfasten the two screws on the controller.

Step 2 Using the handle with one hand, and supporting the controller with the other, gently remove the controller from the slot.

Figure 64: Removing the Controller



What to do next

For replacing the controller, see Install Controller.

Remove and replace the battery in the controller

Use this task to remove and replace the controller battery.

Before you begin

Ensure you have these tools and equipment

- #1 Phillips-head, Hex 5.5 torque screwdriver
- Plastic spudger/pry tool
- Plastic or ceramic tweezers
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat
- Replacement Battery – Choose any one from the options:

- CR-2032L/BN — Panasonic
- 06032 101 501 — Varta Microbattery Inc.
- 100272 — Renata

Caution Handle them only by carrier edges and use an electrostatic discharge (ESD) wrist-strap or other grounding device to avoid damage.

Warning Ensure the system is shut down and power is removed before proceeding.

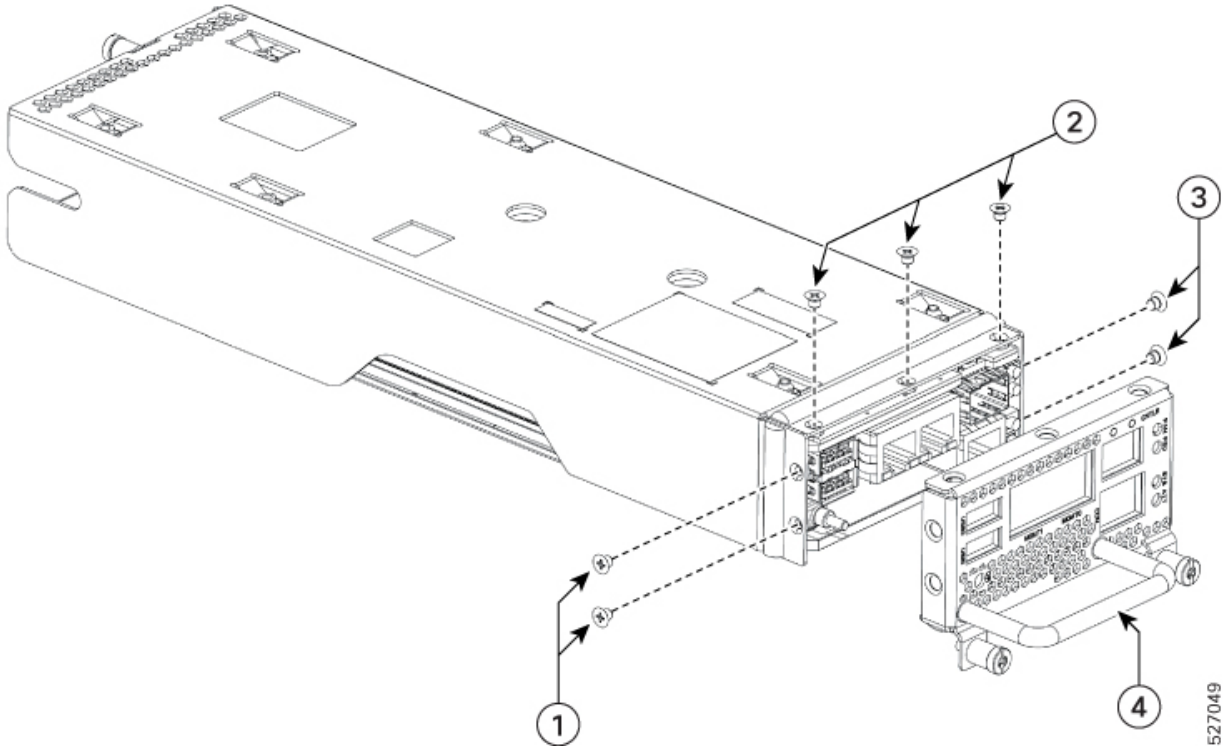
There is danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Procedure

Step 1 Remove the PCB assembly from the controller.

a) Remove the face plate by unscrewing the seven M3x0.5x3 mm screws with the #1 Phillips-head screwdriver.

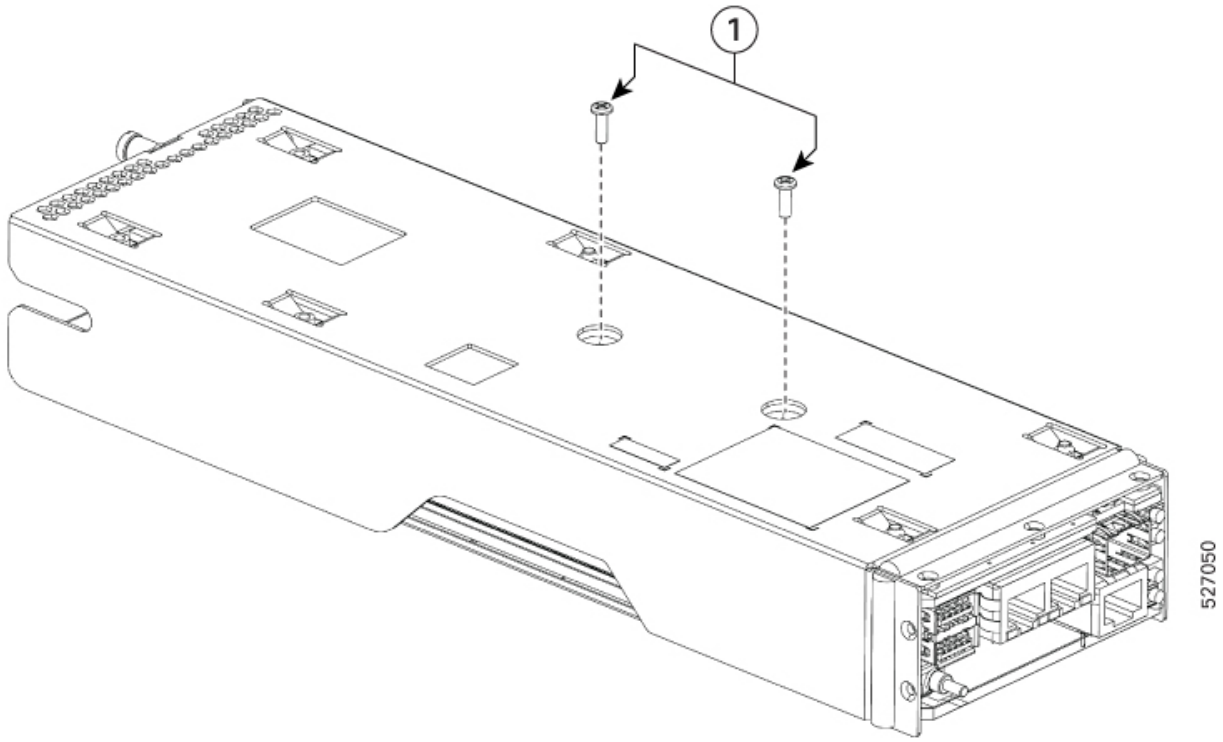
Figure 65: Dettaching the controller faceplate



1	Bottom M3x0.5x3 mm screws
2	Left side M3x0.5x3 mm screws
3	Top M3x0.5x3 mm screws
4	Controller handle

b) Remove the two M2.5x0.45x8 mm screws on the side with the #1 Phillips-head screwdriver.

Figure 66: Dettaching the side screws



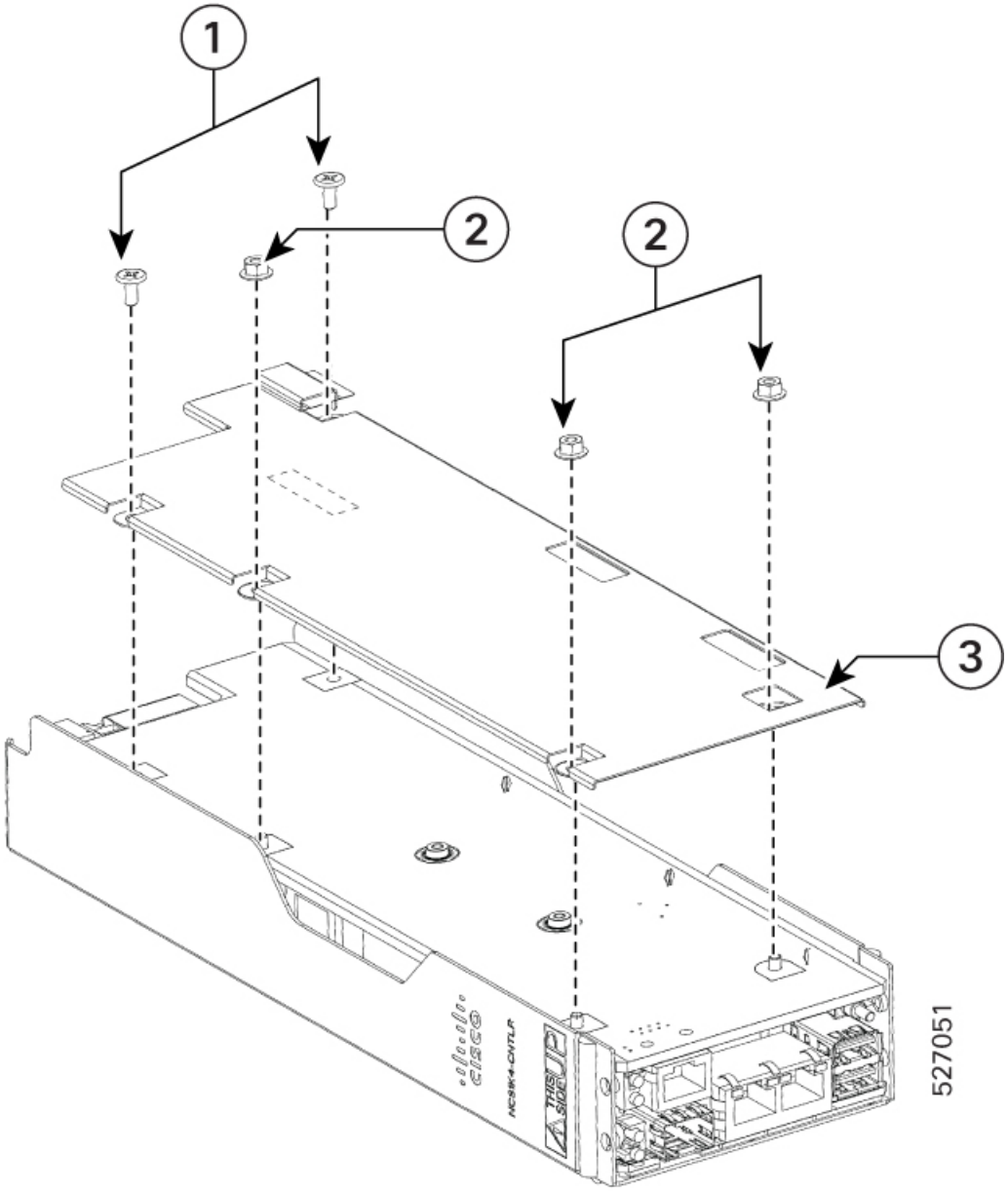
1	Two M2.5x0.45x8 mm screws

c) Turn the controller and remove the protection cover by unscrewing.

1. three M3x0.5x3.70 mm Hex nuts using Hex 5.5 driver

2. two M3x0.5x7 mm screws using #1 Phillips-head screwdriver

Figure 67: Removing the side panel

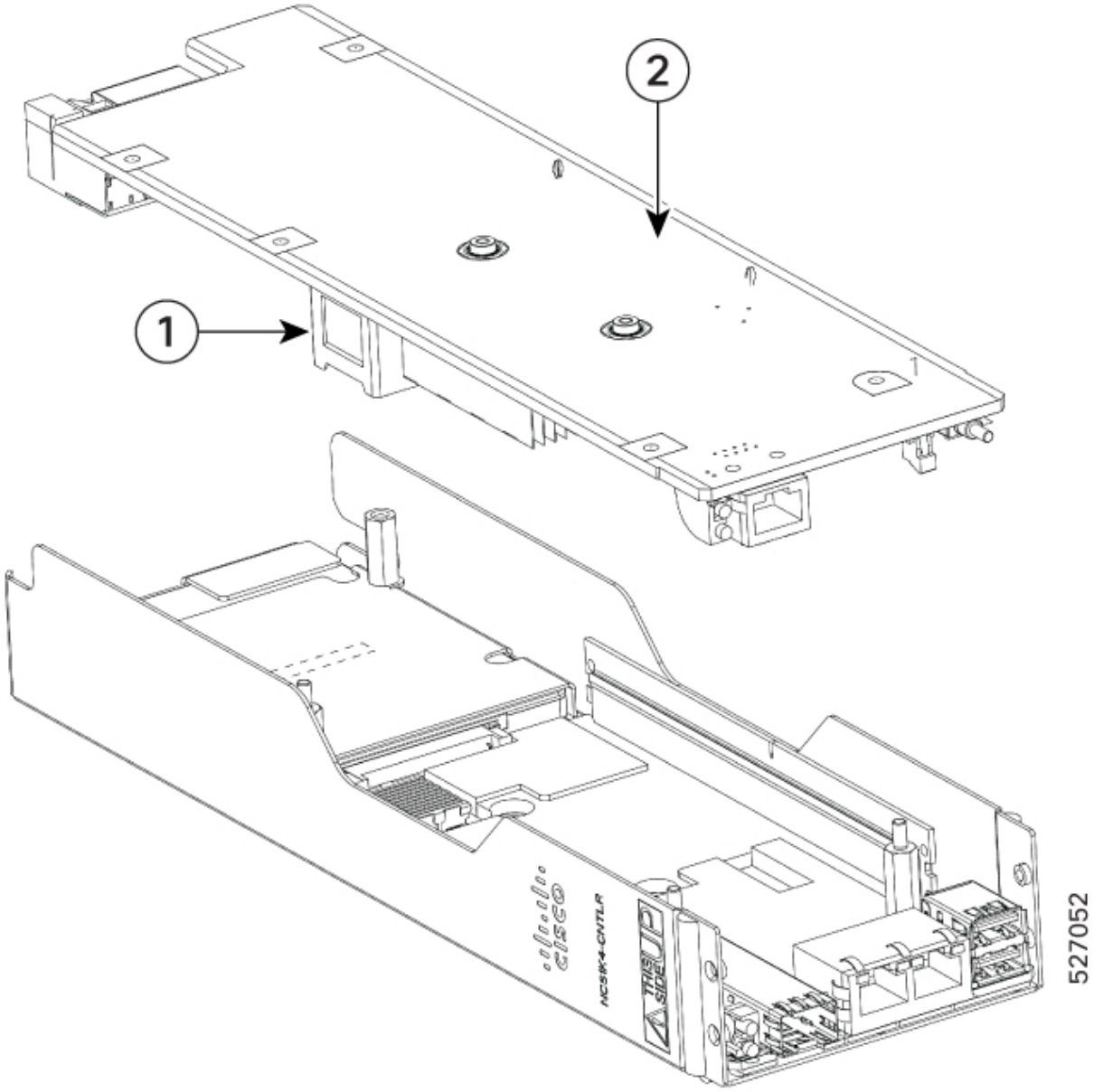


1	Two M3x0.5x7 mm screws
2	Three M3x0.5x3.70 mm Hex nuts
3	Protection cover

Note
Keep the removed screws and nuts organized for reassembly.

d) Remove the PCB assembly carefully, avoiding damage to the Interposer connector.

Figure 68: Removing the PCB assembly

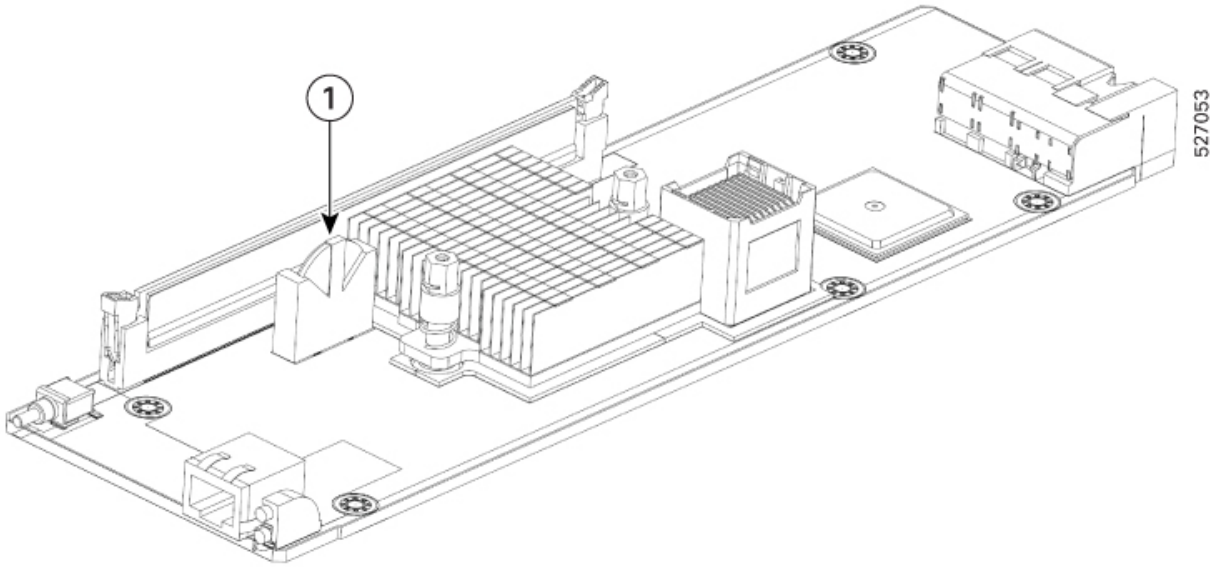


1	Interposer connector
2	PCB assembly

Step 2 Remove the RTC battery.

a) Locate the vertical RTC battery socket on the PCB assembly.

Figure 69: Locating the vertical RTC battery socket



1	Vertical RTC battery socket

b) Remove the battery from the socket using the plastic spudger tool to push against the spring and release the battery.

Step 3 Install the new RTC battery.

a) Identify the battery polarity.

The positive side of the battery has the "CR2032" text and a plus sign (+) on it, and the negative side is flat.

b) Insert the battery at a slight angle around 30-degrees to the holder's opening, with the negative flat side facing the internal lower spring contact.

c) Gently push the battery inward toward the spring, then press down until it clicks securely into place under the retaining tabs.

d) Ensure the battery is seated snugly and correctly. The positive side of the battery should be facing the retainer clip/tab when installed in the vertical holder.

Step 4 Reassemble the controller unit.

a) Mount the PCB assembly back onto the carrier, ensuring the Interposer connector locks in place.

b) Attach the protection cover by tightening the Hex nuts and screws to a torque of 5.5 ± 0.5 in.lb where specified.

c) Turn the controller and tighten the two M2.5x0.45x8 mm screws using the #1 Phillips-head screwdriver to a torque of 3.3 ± 0.3 in.lb.

d) Reattach the face plate by tightening the seven M3x0.5x3 mm screws using #1 Phillips-head screwdriver to a torque of 3.3 ± 0.3 in.lb.

Note
Fasten the side screws of the face plate first, followed by the bottom screws, to align the connector location.

The new RTC battery is correctly installed and seated. The controller is ready for reassembly and power-up.

What to do next

- Power on the controller and verify that it recognizes the new RTC battery and no battery errors are reported.
- Safely dispose the old battery according to local practices.

Remove and Replace Fan Unit

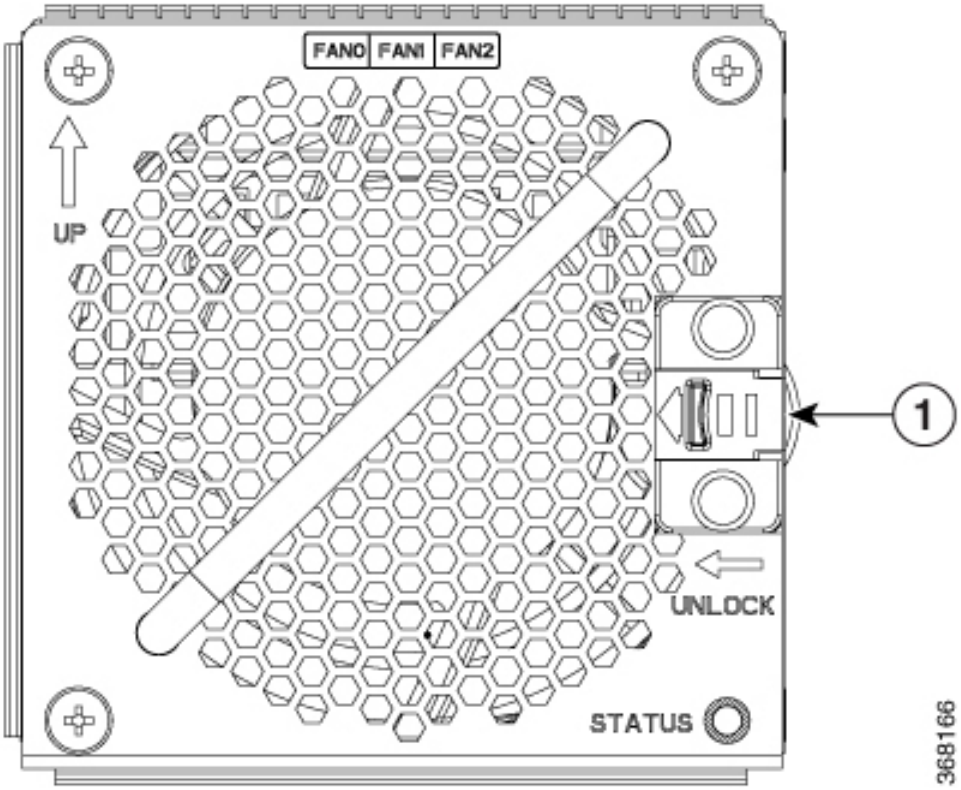
This task has information about removing and replacing the fan unit.

Caution OIR duration for the fan tray unit at 30-degree C ambient temperature, is five minutes.

Procedure

Step 1 Push and hold the spring-loaded lever towards the left with your thumb (unlock position).

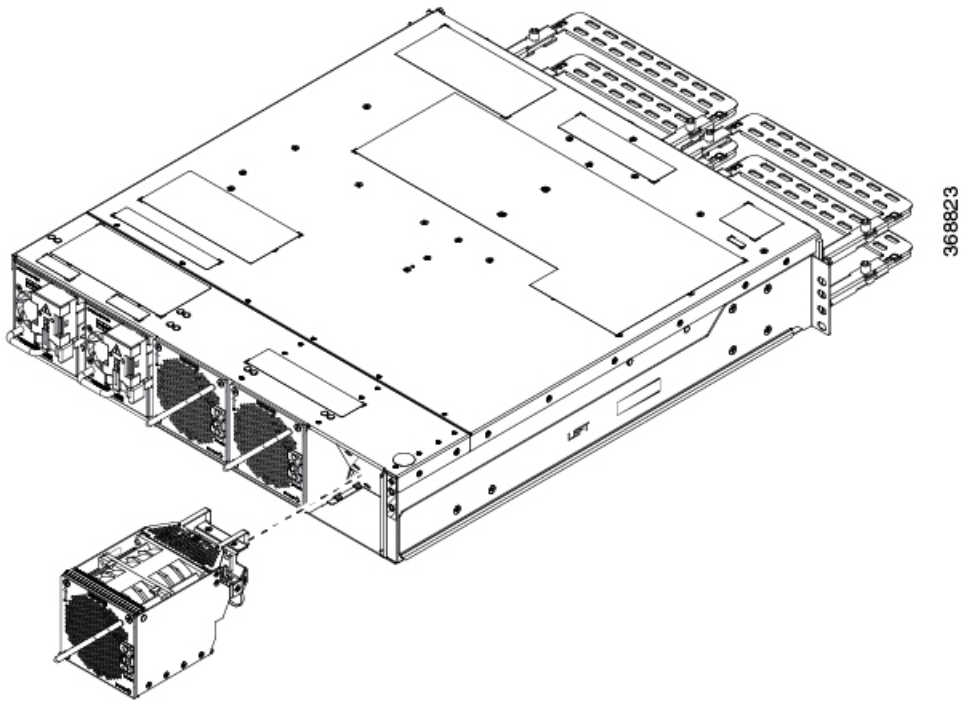
Figure 70: Spring-loaded Lever in Holding or Unlock Position



1	Sping-loaded lever

Step 2 Use the handle on the fan unit to pull the fan unit out of the chassis, while supporting it with the other hand.

Figure 71: Removing the Fan Unit



What to do next

For replacing the fan unit, see Install Fan Unit.

Wipe Data in Disk Using Secure Erase

When NCS 1004 becomes faulty, contact TAC to open a Return Material Authorization (RMA) request. Before opening a RMA request, the user can securely erase data in NCS 1004 disks using the Secure Erase feature.

Warning Use this procedure only during RMA.

Before you begin

The NCS 1004 unit that is planned for RMA must be taken out of the data center and the network. The user must access NCS 1004 only using the console port.

Procedure

Step 1 When NCS 1004 boots (power cycle), the following message appears.

```
Version 2.19.1266. Copyright (C) 2019 American Megatrends, Inc.
BIOS Date: 07/09/2019 14:44:28 Ver: 0ACHI420
Press <DEL> or <ESC> to enter setup.
Press DEL or ESC key to enter BIOS.
```

Press DEL or ESC key to enter BIOS.

Step 2 Select the **Advanced** tab using the arrow keys.

The disk security details such as HDD Secure Erase are displayed in the Advanced tab.

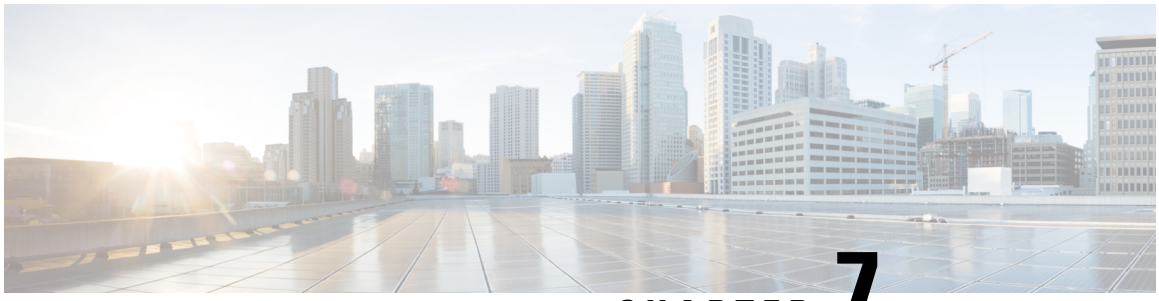
Step 3 Select **HDD Secure Erase** to securely erase data.

The list of SSDs that support Secure Erase is displayed. D:13 is CPU SSD and D:14 is Chassis SSD.

Step 4 Select the SSD from which you want to erase data using the arrow keys.

Step 5 Select **Yes** in the Confirmation screens.

The system proceeds to securely erase data in the selected SDD after these confirmations.



CHAPTER 7

LEDs

This section provides details of the LEDs in the controller unit and line card.

- Line Card LEDs, on page 91
- Controller LEDs, on page 97
- Power Supply Unit LED, on page 99
- Fan Unit LED, on page 100

Line Card LEDs

The LEDs of the 1.2T line card, and 1.2TL line card and OTN-XP line card are discussed here.

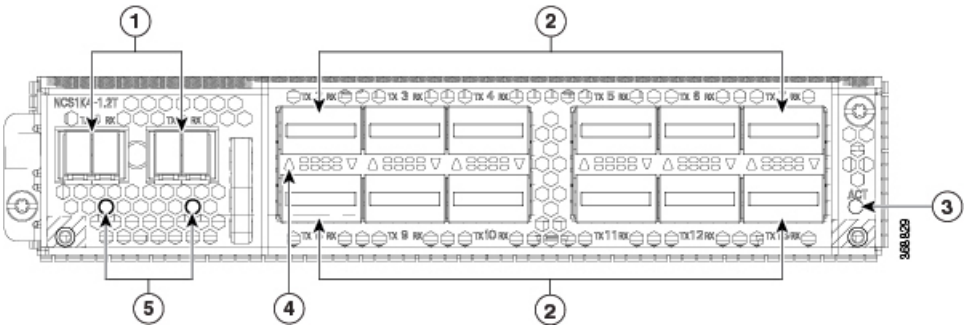
Table 9: Feature History

Feature Name	Release Information	Description
Attention LED	Cisco IOS XR Release 7.7.1	The attention LED is available on all ports of the NCS 1004 line cards. This LED can be selectively turned on for a specific QSFP port or simultaneously on all of the QSFP ports using the **hw-module location** command. When turned on, the LED flashes yellow. This LED flashing functionality helps field engineers quickly identify a specific port on the line card for troubleshooting, especially in a cluttered environment.

LEDs of 1.2T, 1.2TL, and 2-QDD-C Line Cards

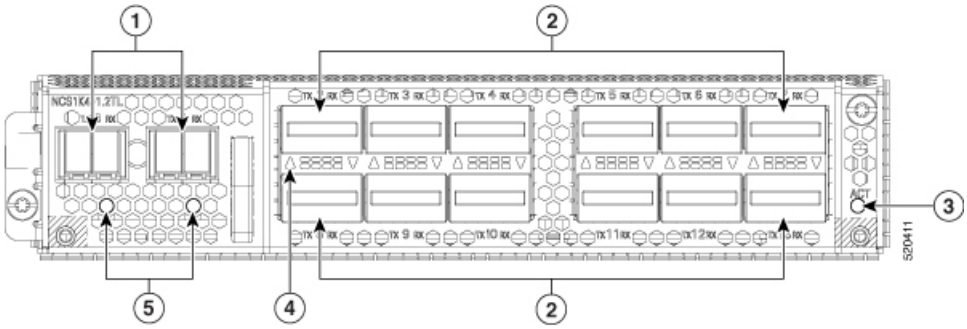
The front view of the 1.2T line card is as below.

Figure 72: Front View of the 1.2T Line Card



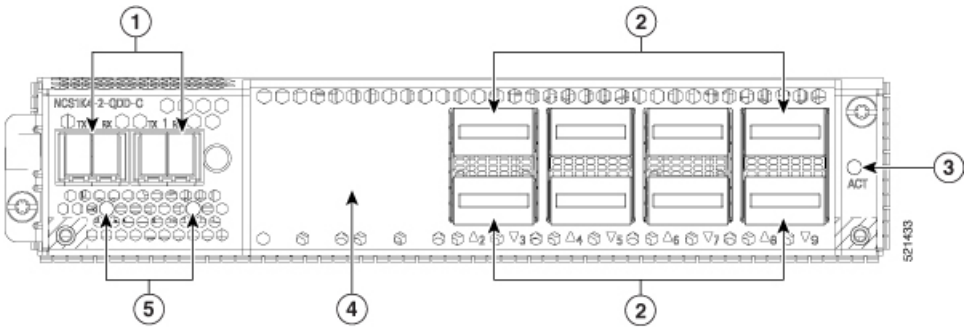
The front view of the 1.2TL line card is as below.

Figure 73: Front View of the 1.2TL Line Card



The front view of the 2-QDD-C line card is as below.

Figure 74: Front View of the 2-QDD-C Line Card



1	Trunk ports (0 and 1)
2	• 1.2T and 1.2TL line card 12 QSFP ports (2 to 13). Each QSFP port has Attention LED. • 2-QDD-C line card 8 QSFP ports (2 to 9). Each QSFP port has Attention LED.
3	ACT LED

4	QSFP port LEDs The LEDs for the QSFPs are embedded in the card cage. The *triangles* shown upwards or downwards (in 2-QDD-C, 1.2T and 1.2TL line cards) indicate the status of the corresponding QSFP.
5	Trunk port LEDs

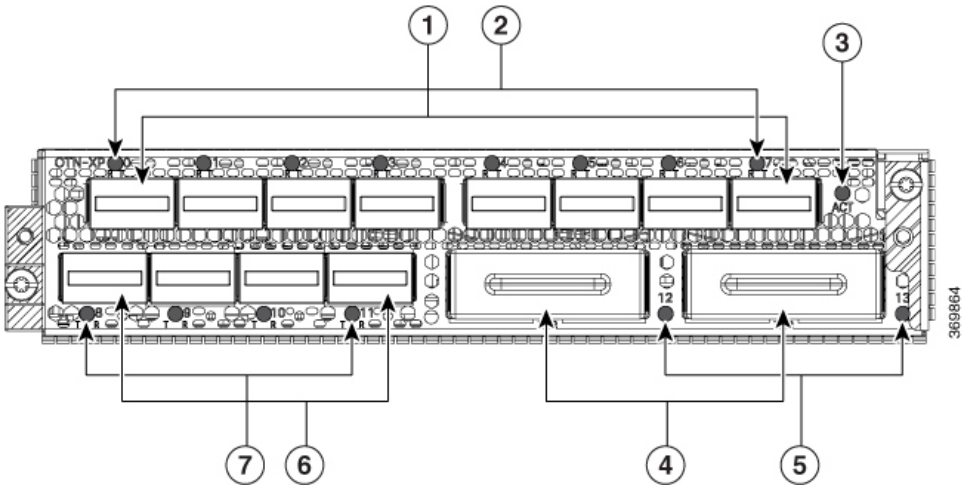
Table 10: Status of the Line Card LEDs

LED	Color	Status
Attention LED	Yellow Flashing	Used by the field engineers to identify a specific port in the line card. This is used for troubleshooting purposes. • Use the **hw-module location** *location***attention-led all-ports** command to turn on this LED on all the ports of the line card. • Use the **hw-module location** *location***attention-led** *port-number* command to turn on this LED on a specific port of the line card. • Use the **show controllers optics** *rack/slot/instance/port* **| in LED** command to display the LED status of ports.
ACT LED	Amber (solid)	The line card is booting. This colour appears as soon as the line card is inserted in to the chassis.
	Flashing Red	The line card is in the booting phase.
	Green	The line card is up and operational (not associated to the traffic status).
QSFP and Trunk port LEDs	Off	The port has not been provisioned.
	Red	Major alarm that could lead to a traffic-impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of a line card. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card. The port is configured in maintenance mode or the attention LED is enabled for this port. **Note** Attention LED is not supported on ACT LED.

LEDs of OTN-XP Line Card

The front view of the OTN-XP line card is as below.

Figure 75: Front View of the OTN-XP Line Card



1	Eight QSFP-28 ports (0 to 7) Ports 1 and 5 are client ports for 100G TXP.
2	Corresponding LEDs for the eight QSFP-28 ports. Each QSFP-28 port has Attention LED.
3	ACT LED
4	Two CFP2 ports (12 and 13) Both are trunk ports.
5	Corresponding LEDs for the two CFP2 ports
6	Four QSFP-DD ports (8 to 11) QSFP-DD trunk ports are ports 9 and 11.
7	Corresponding LEDs for the four QSFP-DD ports.

Table 11: Status of the OTN-XP Line Card LEDs

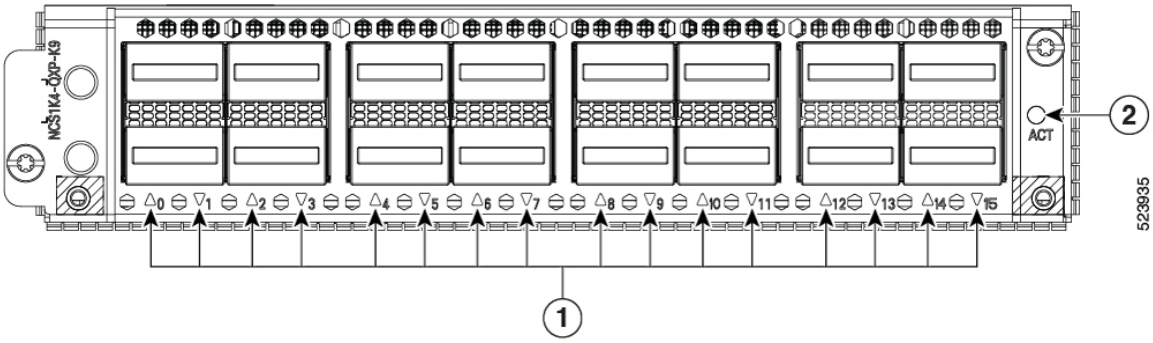
LED	Colour	Status
Attention LED	Red	The corresponding port is shut down.
	Green	The corresponding port is working.
	Yellow Flashing	Used by the field engineers to identify a specific port in the line card. This is used for troubleshooting purposes. • Use the **hw-module location** *location* **attention-led all-ports** command to enable this LED on all the ports of the line card. • Use the **hw-module location** *location* **attention-led** *port-number* command to enable this LED on a specific port of the line card. • Use the **show controllers optics** *rack/slot/instance/port* **| in LED** command to display the LED status of ports.
ACT LED	Flashing Red	The line card is booting. This colour appears as soon as the line card is inserted in to the chassis.
	Amber (solid)	Indicates that the line card is in the booting phase.
	Green	Indicates that the line card is up and operational (not associated to the traffic status).

LED	Colour	Status
QSFP and CFP2 port LEDs	Off	This indicates that the port has not been provisioned.
	Red	Indicates a major alarm, which could be a traffic impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port in the line card. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card.

LEDs of QXP-K9 Line Card

The front view of the QXP-K9 line card is as below.

Figure 76: Front View of the QXP-K9 Line Card



1	16 QSFP-DD ports (0 to 15)
2	ACT LED

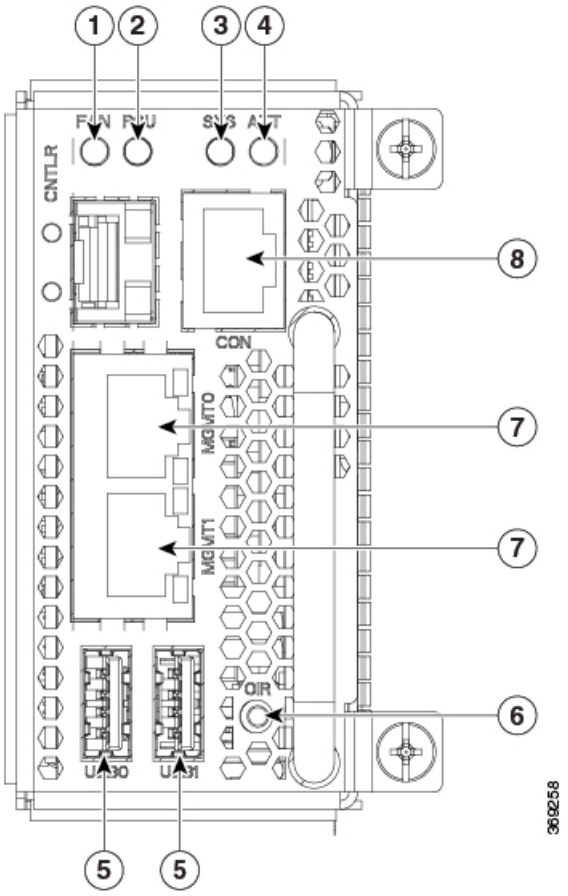
Table 12: Status of the QXP-K9 Line Card LEDs

LED	Color	Status
ACT LED	Flashing Red	The line card is booting. This color appears as soon as the line card is inserted in to the chassis.
	Amber (solid)	Indicates that the line card is in the booting phase.
	Green	Indicates that the line card is up and operational (not associated to the traffic status).
QSFP-DD port LEDs	Off	This indicates that the port has not been provisioned.
	Red	Indicates a major alarm, which could be a traffic impacting situation.
	Green	Indicates that the module is operational and has no alarm.
	Amber (solid)	Indicates a minor alarm (such as low Rx or Tx power), which could lead to a traffic impacting situation.
	Amber (flashing)	This is used for troubleshooting, to identify the faulty port of a line card. Use the **controller optics** command in the configuration mode to point to a faulty port in the line card.

Controller LEDs

The controller unit has four LEDs to indicate the system status and the status of the components.

Figure 77: Front View of the Controller



1	Fan Unit Status
2	Power Supply Unit Status
3	System Status
4	Attention LED
5	USB Ports (0 and 1)
6	OIR Button
7	Management Ports (0 and 1)
8	Console Port

Table 13: Status of the Controller LEDs

LED	Colour	Status
FAN LED	Green	Indicates all fans present in the chassis are in working condition.
	Red	Indicates either a fan is missing from its slot or is faulty.
PSU LED	Green	Indicates all PSUs present in the chassis are in working condition.
	Red	Indicates either a PSU is missing from its slot or is faulty.
SYS LED (during controller boot up)	Red	Indicates that the controller unit is powering ON.
	Red (flashing slowly)	Indicates BIOS loading.
	Yellow (flashing slowly)	Indicates OS loading.
	Red (flashing fast)	Indicates secure boot failure. Replace the controller unit.
	Yellow (flashing fast)	Indicates that the controller unit is not seated properly.
SYS LED (controller is operational)	Red	Indicates a major or critical alarm.
	Yellow	Indicates a minor alarm.
	Green	The module is operational and has no active alarms.
Attention LED	Blue (flashing)	Applicable during OIR procedures. Indicates that the system is cooling down.
	Blue	Used to identify a specific chassis in a rack or room. This is used for troubleshooting purposes. Use the **hw-module attention led location** command to turn on this LED.

Power Supply Unit LED

The following table has details of the PSU LED:

Table 14: Status of the PSU LED

LED	Colour	Status
PSU LED	Off (no colour)	Indicates no input to the PSU and the 12V from the other PSU (parallel unit) is not available.
	Amber (solid)	Indicates a critical fault on the PSU or that the PSU is in OFF condition. This occurs when there is no input to the PSU, 12V from the other PSU (parallel unit) is available.
	Green(blinking)	Indicates that the PSU is disabled. This occurs when input is present but the PSU is disabled by the system (the Enable pin is in OFF position).
	Amber (blinking)	Indicates a minor fault on the PSU. The minor fault could be - fan fault or 12V over-current warning or temperature warning.
	Green (solid)	Indicates that the PSU is working fine and that the Vout (output voltage) is in regulation.

Fan Unit LED

The following table has details of the fan unit LED:

Table 15: Status of the Fan Unit LED

LED	Colour	Status
FAN LED	Off (no colour)	Indicates that the fan unit is not inserted properly or chassis is powered off.
	Red (solid)	Indicates a fault in the fan unit. This occurs when the fan speed is out of range or the fan unit is inserted but not powered on.
	Green (solid)	Indicates that the fan unit is working fine.