

Cisco Provider Connectivity Assurance Sensor LT-S Hardware Installation Guide

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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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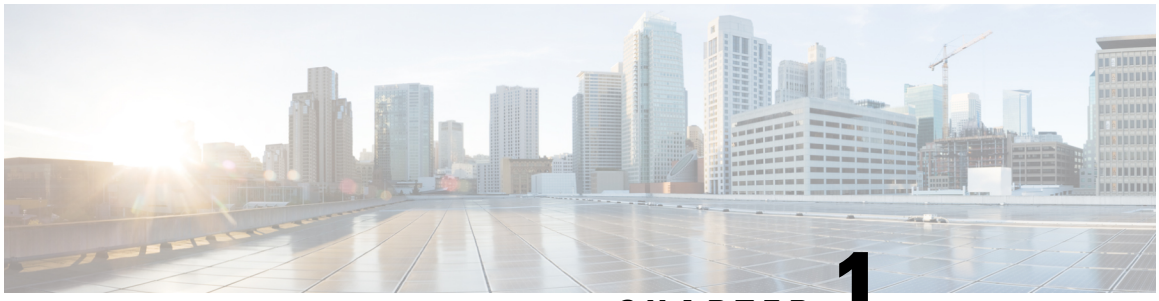
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CHAPTER 1

Overview

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Features

The Cisco® Provider Connectivity Assurance Sensor LT-S is a dense, multiport, 1/10 Gigabit Ethernet platform with ultra-low-latency packet forwarding and jitter. Designed for high-availability applications requiring MEF-type service assurance, the Assurance Sensor LT-S is optimized for scalable service delivery and high-precision performance monitoring. It is an ideal edge, aggregation, or external network-to-network interface (ENNI) unit for demanding wireless backhaul, SLA-backed business services, Ethernet wholesale, and dark fiber termination applications. Switch-free aggregation offers near-zero-latency multiservices for multitenant and multioperator endpoints.

The LT-S provides all the tools to establish, validate, and monitor Layer 2 and Layer 3 services in a single unit. It is a flexible, scalable alternative to switches and routers when delivering resilient services over optical linear or G.8032 ring topologies. Zero-touch provisioning and IPv4/IPv6 management make the LT-S easy to deploy, manage, and secure.

Fully integrated with the Cisco Provider Connectivity Assurance platform, the LT-S supports service delivery automation, scalable metrics collection, and reporting—along with actionable insights delivery and machine learning for accelerated service rollout and improved operational efficiencies.

The LT-S interoperates with other Provider Connectivity Assurance Sensors to deliver a scalable end-to-end and core-to-edge performance-assured networking solution tailored to your applications.

Figure 1: Cisco Provider Connectivity Assurance Sensor LT-S



The following table lists the features of the Assurance Sensor LT-S.

Table 1: Cisco Provider Connectivity Assurance Sensor LT-S Features

Feature	Description
Form factor	1RU
Rack mount	Standard 19-inch (48.3 cm) or 23-inch (58.42 cm) rack
Airflow	Front to rear
Management port	Built-in One RJ-45 connector (10M/100M/1GbE)
Traffic ports	Four SFP connectors (10M/100M/1GbE) Four SFP+ connectors (1G/10GbE) Four SFP/RJ-45 connectors (10M/100M/1GbE combo ports)
Console port	One RJ-45 connector (RS-232)
Dry contact inputs	One RJ-45 connector (four dry contacts)
Fans	Two fans for front-to-rear cooling

The following table lists the regulation and standard compliance features of the Assurance Sensor LT-S.

Table 2: Regulation and Standard Compliance (Model: NODE2)

Feature	Description
Safety	IEC 62368-1, EN IEC 62368-1, AS/NZS 62368.1, CSA/UL 62368-1, GB 4943.1, J62368-1, SASO-IEC 62368-1
EMC - Emission (Class A)	CISPR 32, EN 55032, FCC Part 15 (CFR 47), ICES-003, AS/NZS CISPR 32
EMC - Immunity	EN 55035
Telco	NEBS Level-3: GR-63, GR-1089

Feature	Description
Enviro	RoHS: IEC 63000, EN IEC 63000

Package Contents

Package contents for the Cisco Provider Connectivity Assurance Sensor LT-S include the following:

- Assurance Sensor LT-S (1)
- Rack-mount kit: brackets (2), screws #10-32 3/8″ (4), screws #8-32 1/4″ (8)
- Power kit DC connectors (2)
- *Cisco Provider Connectivity Assurance Sensor LT-S*

  This document contains URLs that point to the hardware installation guide, regulatory compliance and safety information guide, warranty, and licensing pages, and a QR code that points to the management center Documentation Portal.

Note The package can contain other ordering options.

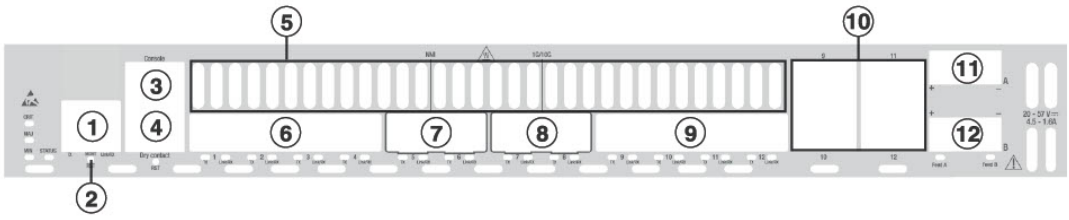
Serial Number Locations

The Serial Number (SN) and the Media Access Control (MAC) address are located at the bottom of the Cisco Provider Connectivity Assurance Sensor LT-S.

Front Panel

The following figure shows the front panel features of the Assurance Sensor LT-S. See Front Panel LEDs, on page 4 for a description of the LEDs.

Figure 2: Font Panel

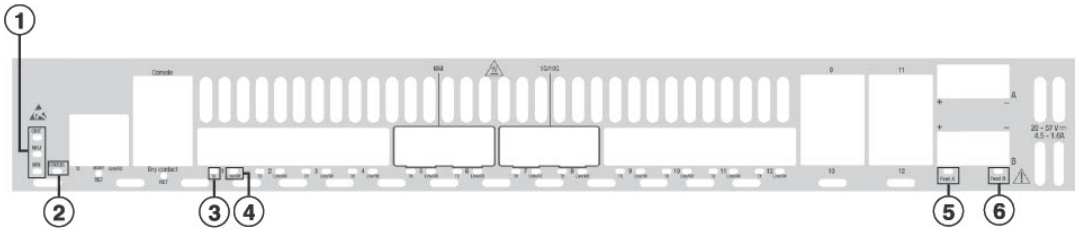


1	Management port One RJ-45 connector (10M/100M/1GbE)	**2**	RST System reset button **Note** Press the RST button for more than five seconds to reset the unit to factory defaults.
3	Console port One RJ-45 connector (RS-232) • Pin #1—Not connected • Pin #2—Not connected • Pin #3—RS-232 TX data • Pin #4—Ground • Pin #5—Ground • Pin #6—RS-232 RX data • Pin #7—Not connected • Pin #8—Not connected	**4**	Dry contact inputs One RJ-45 connector (four dry contacts) **Caution** The Dry Contacts Interface is strictly Safety Extra Low Voltage (SELV). • Pin #1—Ground 1 • Pin #2—Dry contact 1 • Pin #3—Ground 3 • Pin #4—Dry contact 2 • Pin #5—Ground 2 • Pin #6—Dry contact 3 • Pin #7—Ground 4 • Pin #8—Dry contact 4
5	System ventilation holes Fresh air intake	**6**	Traffic ports 1-4 Four SFP connectors (10M/100M/1GbE)
7	Traffic ports 5-6 Two SFP+ connectors (1G/10GbE)	**8**	Traffic ports 7-8 Two SFP+ connectors (1G/10GbE)
9	Traffic ports 9-12 Four SFP connectors (10M/100M/1GbE combo ports)	**10**	Traffic ports 9-12 Four RJ-45 connectors (10M/100M/1GbE combo ports)
11	Power input (feed A) One DC input connector: Wurth, 691332510004	**12**	Power input (feed B) One DC input connector: Wurth, 691332510004

Front Panel LEDs

The following figure shows the front panel LEDs and describes their states.

Figure 3: Front Panel LEDs and Their States

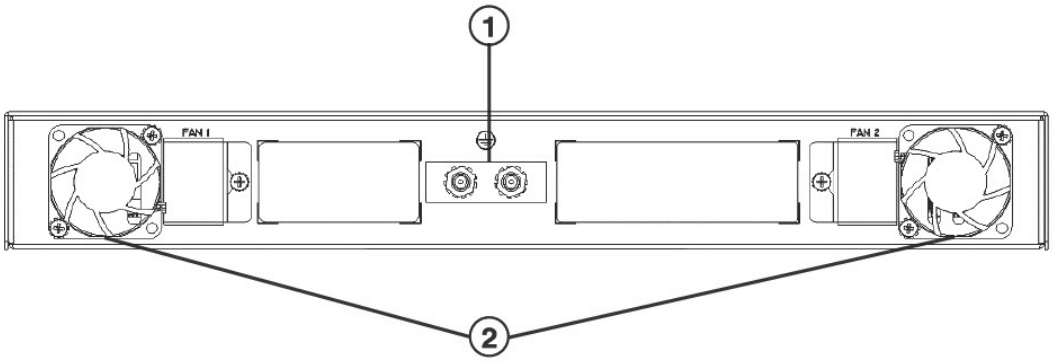


1	MIN MAJ CRIT LEDs • MIN Yellow—A minor alarm condition is present. • MAJ Red—A major alarm condition is present. • CRIT Red—A critical alarm condition is present.	**2**	STATUS LED • Green—Normal operation. • Green, flashing—The unit is booting up.
3	TX LED • Off—The port is not transmitting data. • Green, flashing—The port is transmitting data.	**4**	Link/RX LED • Off—The link is inactive. • Green—The link is active. • Green, flashing—The port is receiving data.
5	Feed A power LED • Off—Power is not applied to the unit's feed A. • Green—Power is applied to the unit's feed A.	**6**	Feed B power LED • Off—Power is not applied to the unit's feed B. • Green—Power is applied to the unit's feed B.

Rear Panel

The following figure shows the rear panel of the Assurance Sensor LT-S.

Figure 4: Rear Panel



1	Ground lug Unit protective ground point (lug type: 2x stud #10 hole, 16 mm spacing)	**2**	Hot-swappable fans Hot air outtake

Power Supply

The following table lists the specifications for each power supply used in the Assurance Sensor LT-S

Table 3: Power Specifications

Description	Specification
Input power rating	20–57 VDC (polarity independent), 4.5–1.6 A maximum
Output power ratings	SFP+: 2.5 W maximum per port SFP: 1.2 W maximum per port **Caution** Transceivers used in the ports must stay within their specifications under all operating conditions of the system.
Power consumption	90 W maximum (307 BTU/hr maximum)

Hardware Specifications

The following table contains hardware specifications for the Assurance Sensor LT-S.

Dimensions (H x W x D)	1.75 x 13 x 8.9 inches (4.5 x 33 x 22.6 cm)

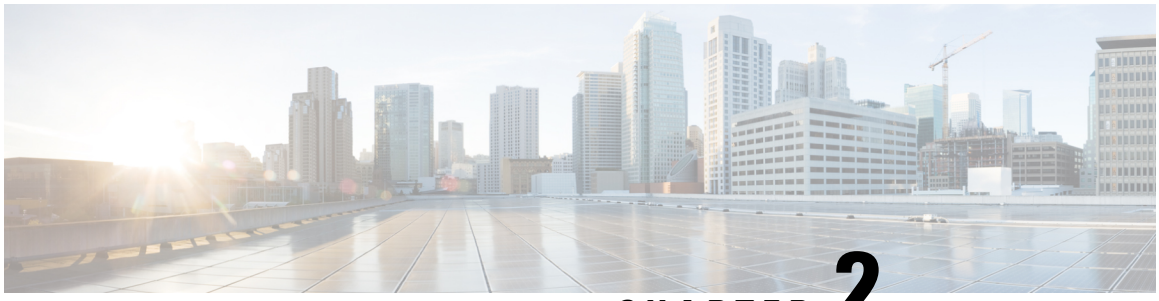
Weight	6 lb (2.7 kg)
Temperature	Operating: • Commercial: 32 to 122°F (0 to 50°C) • Hardened: -40 to 149°F (-40 to 65°C) Storage: -40 to 158°F (-40 to 70°C)
Humidity	Operating: 5 to 85% RH, noncondensing Storage: 5 to 95% RH, noncondensing
Altitude	Maximum: 6600 ft (2000 m), above sea level

Product ID Numbers

The following table lists the field-replaceable PIDs associated with the Cisco Provider Connectivity Assurance Sensor LT-S. If any internal components fail, you must get a return material authorization (RMA). See the Cisco Returns Portal for more information.

Table 4: Assurance Sensor LT-S PIDs

PID	Description
SKY-LTS-DD	Cisco Provider Connectivity Assurance Sensor LT-S - 4xSFP, 4xSFP+, 4xSFP/RJ-45 (combo) - Dual DC power supply - Commercial temperature
SKY-LTS-H-DD	Cisco Provider Connectivity Assurance Sensor LT-S - 4xSFP, 4xSFP+, 4xSFP/RJ-45 (combo) - Dual DC power supply - Hardened



CHAPTER 2

Installation Preparation

- Installation Warnings, on page 9
- Maintain Safety with Electricity, on page 11
- Prevent ESD Damage, on page 11
- Power Supply Considerations, on page 11
- Rack Configuration Considerations, on page 12
- Safety Recommendations, on page 12
- Site Considerations, on page 13
- Site Environment, on page 13

Installation Warnings

Read the Regulatory Compliance and Safety Information document before installing the Cisco Provider Connectivity Assurance Sensor LT-S.

Caution Do *not* open the appliance except under direction from TAC.

Take note of the following 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 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: AC 20 A/DC 40 A



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 1091—**Installation by an Instructed 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 or skilled person.

Warning **Statement 9001—**Product Disposal

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

Maintain Safety with Electricity

Warning Before working on a chassis, be sure the power cord is unplugged.

Read the Regulatory and Compliance Information document before installing the chassis.

Follow these guidelines when working on equipment powered by electricity:

- Do not work alone if potentially hazardous conditions exist anywhere in your work space.
- Never assume that power is disconnected; always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- Use the chassis within its marked electrical ratings and product usage instructions.

Prevent ESD Damage

ESD occurs when electronic components are improperly handled, and it can damage equipment and impair electrical circuitry, which can result in intermittent or complete failure of your equipment.

Always follow ESD-prevention procedures when removing and replacing components. Ensure that the chassis is electrically connected to an earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the grounding clip to an unpainted surface of the chassis frame to safely ground ESD voltages. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

For safety, periodically check the resistance value of the antistatic strap, which should be between one and 10 megohms.

Power Supply Considerations

See Power Supply, on page 6 for more detailed information about the power supply in the chassis.

When installing the chassis, consider the following:

- Check the power at the site before installing the chassis to ensure that it is free of spikes and noise. Install a power conditioner, if necessary, to ensure proper voltages and power levels in the appliance-input voltage.
- Install proper grounding for the site to avoid damage from lightning and power surges.
- The chassis does not have a user-selectable operating range. Refer to the label on the chassis for the correct appliance input-power requirement.
- If you are using dual redundant (1+1) power supplies, we recommend that you use independent electrical circuits for each power supply.
- Install an uninterruptible power source for your site, if possible.

Rack Configuration Considerations

See Rack-Mount the Chassis, on page 18 for the procedure for rack-mounting the chassis.

Consider the following when planning a rack configuration:

- Standard 19-inch (48.3 cm) 4-post EIA rack with mounting rails that conform to English universal hole spacing according to section 1 of ANSI/EIA-310-D-1992.
- The rack-mounting posts need to be 2 to 3.5 mm thick to work with the slide rail rack mounting.
- If you are mounting a chassis in an open rack, make sure that the rack frame does not block the intake or exhaust ports.
- If your rack includes closing front and rear doors, the doors must have 65 percent open perforated area evenly distributed from top to bottom to permit adequate airflow.
- Be sure enclosed racks have adequate ventilation. Make sure that the rack is not overly congested as each chassis generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air.
- In an enclosed rack with a ventilation fan in the top, heat generated by equipment near the bottom of the rack can be drawn upward and into the intake ports of the equipment above it in the rack. Ensure that you provide adequate ventilation for equipment at the bottom of the rack.
- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack. Experiment with different arrangements to position the baffles effectively.

Safety Recommendations

Observe these safety guidelines:

- Keep the area clear and dust free before, during, and after installation.
- Keep tools away from walkways, where you and others might trip over them.
- Do not wear loose clothing or jewelry, such as earrings, bracelets, or chains that could get caught in the chassis.

- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Never attempt to lift an object that is too heavy for one person.

Site Considerations

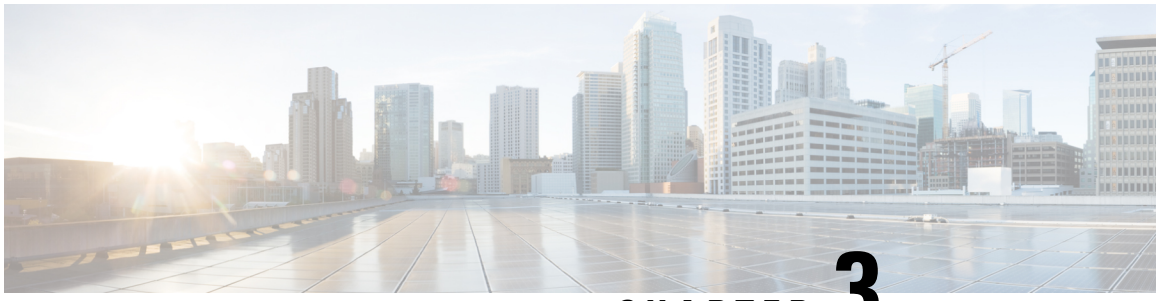
Considering the following helps you plan an acceptable operating environment for the chassis, and avoid environmentally-caused equipment failures.

- Electrical equipment generates heat. Ambient air temperature might not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Make sure that the room in which you operate your system has adequate air circulation.
- Always follow ESD prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Site Environment

See Hardware Specifications, on page 6 for information about physical specifications.

To avoid equipment failures and reduce the possibility of environmentally caused shutdowns, plan the site layout and equipment locations carefully. If you are currently experiencing shutdowns or unusually high error rates with your existing equipment, these considerations may help you isolate the cause of failures and prevent future problems.



CHAPTER 3

Mount the Chassis

- Unpack and Inspect the Chassis, on page 15
- Desktop-Mount the Chassis, on page 16
- Wall-Mount the Chassis, on page 16
- Rack-Mount the Chassis, on page 18
- Ground the Chassis, on page 21

Unpack and Inspect the Chassis

Note The chassis is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately. Keep the shipping container in case you need to send the chassis back due to damage.

See Package Contents, on page 3 for a list of what shipped with the chassis.

Note Mounting kits are ordered separately.

Warning You must install the unit in a restricted access location in the following cases:

- If you are using a DC power connection and the ambient temperature is more than 50°C.
- If you are using a centralized DC power connection.

Procedure

Step 1 Remove the chassis from its cardboard container and save all packaging material.

Step 2 Compare the shipment to the equipment list provided by your customer service representative. Verify that you have all items.

Step 3 Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:

- Invoice number of shipper (see the packing slip)
- Model and serial number of the damaged unit
- Description of damage
- Effect of damage on the installation

Desktop-Mount the Chassis

Attach the rubber feet (can be ordered separately) to the bottom of the unit for added stability when placing on a desktop or other flat surface.

Wall-Mount the Chassis

The Adapter Wallmount Kit is required for wallmount installations. When mounting a unit on a wall, ensure that:

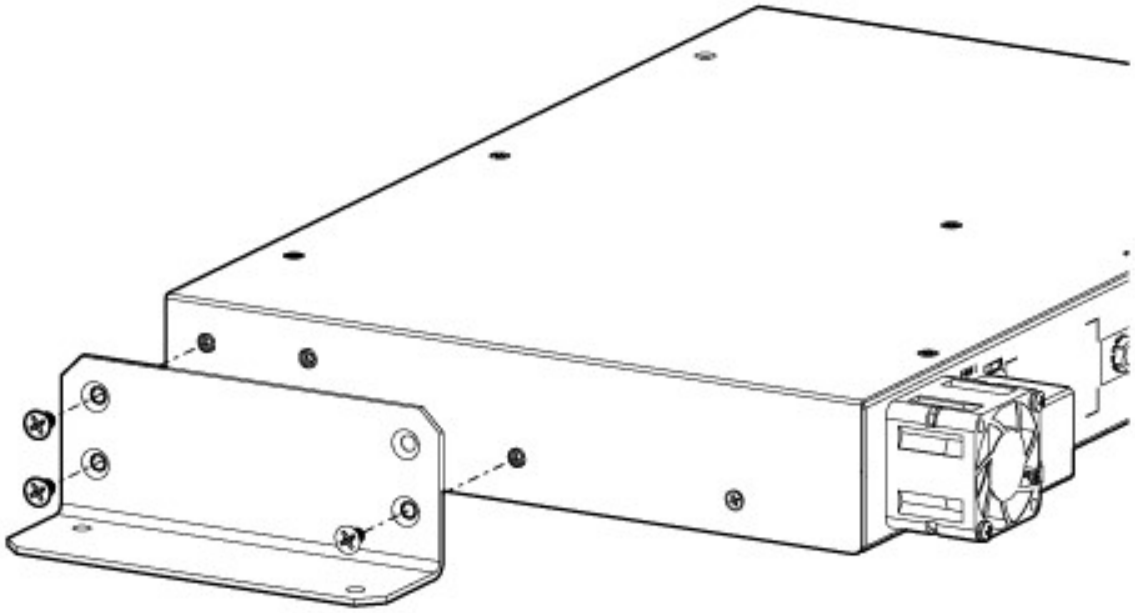
- The surface you attach the unit to and the fasteners you use are able to support at least 6 kg (13.2 lbs).
- Cable pull (accidental or otherwise) does not exceed the 2 kg (4.4 lbs) limit.

To mount your chassis on a wall:

Procedure

Step 1 Using a Philips screwdriver, align the Adapter Wallmount Kit brackets with the holes on the side of the unit and attach with four flat head screws provided.

Figure 5: Align and Attach the Adapter Wallmout Kit



Step 2 Secure to the wall using the screws provided.

Warning
Ensure to install the unit on the wall in the position shown below to ensure proper ventilation of the unit.

Figure 6: Wall Installation Position Option 1

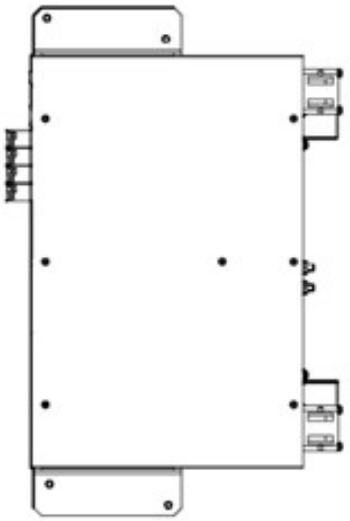
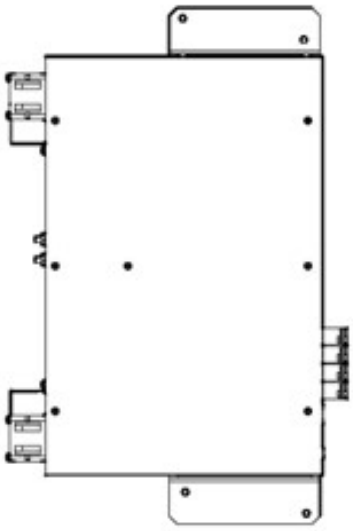


Figure 7: Wall Installation Position Option 2



Rack-Mount the Chassis

Note Mounting kits are ordered separately.

Safety Warnings

Take note of the following warnings:

Warning The unit must be installed in a restricted access location if either of the following applies:

- The unit is operating where the ambient temperature exceeds 50°C (122°F).
- A centralized DC power connection is being used.

Warning

- Do not place hands, fingers or foreign objects in any holes, insertion slots or gaps.
- To avoid damage to the equipment, keep objects clear of system ventilation inlets, outlets and system fans, if any, ensuring the air flow through the units is not obstructed, and that the fans rotate freely.
- Do not disassemble or alter the unit.
- The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring.

Tip Only the flush mounting options are NEBS compliant.

To conform to the NEBS Seismic Zone 4 requirements, the bracket must be secured, using screws specified by the rack manufacturer, to a NEBS Seismic Zone 4 compliant rack. Such screws are not provided with the bracket kit.

Procedure

Step 1 Secure the L-shaped mounting bracket vertically to both sides of each unit using the provided screws.

Figure 8: 19" Flush Mounting Brackets

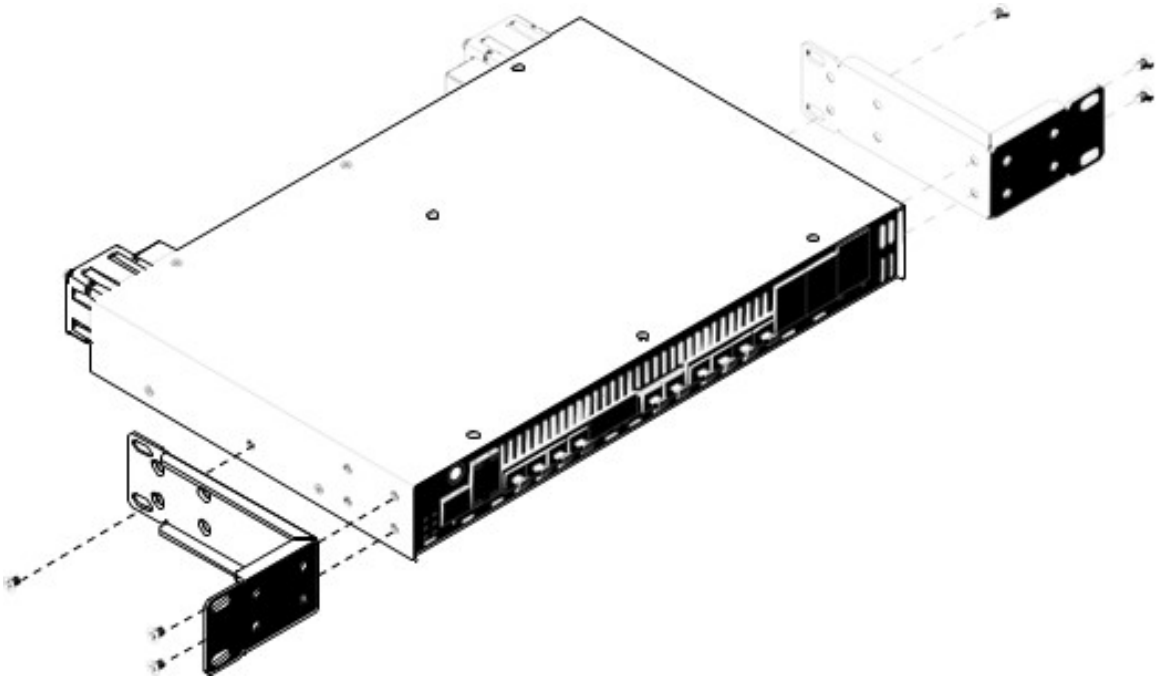


Figure 9: 19" Recessed Mounting Brackets

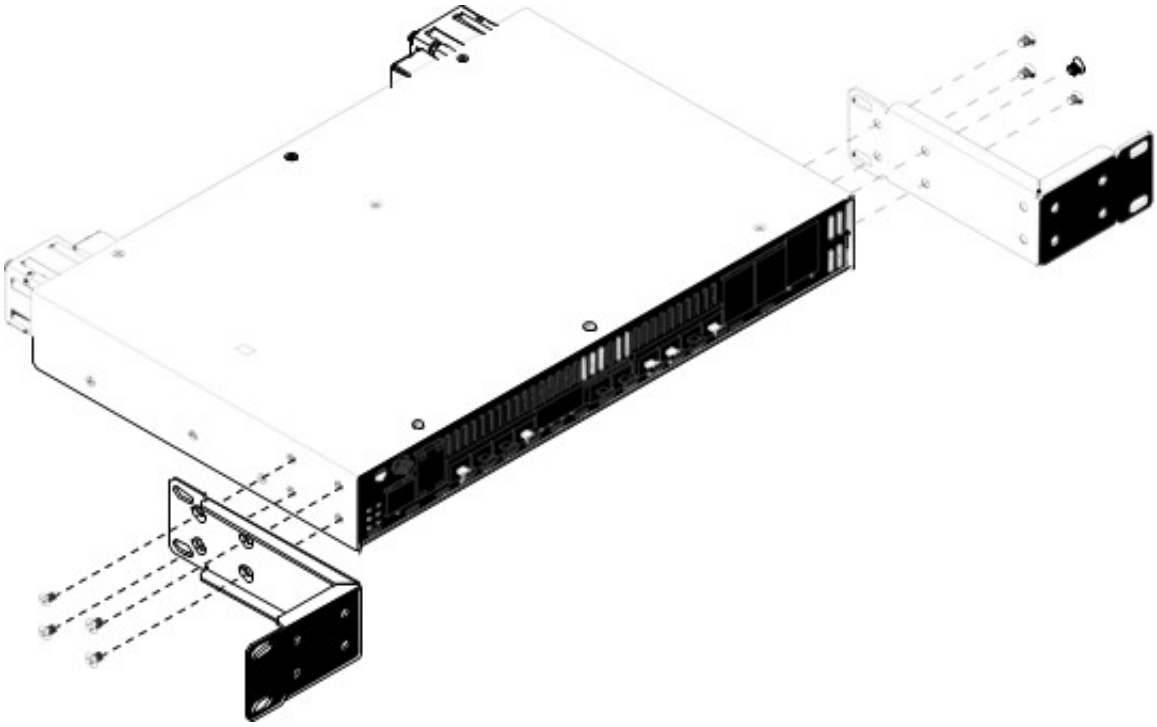
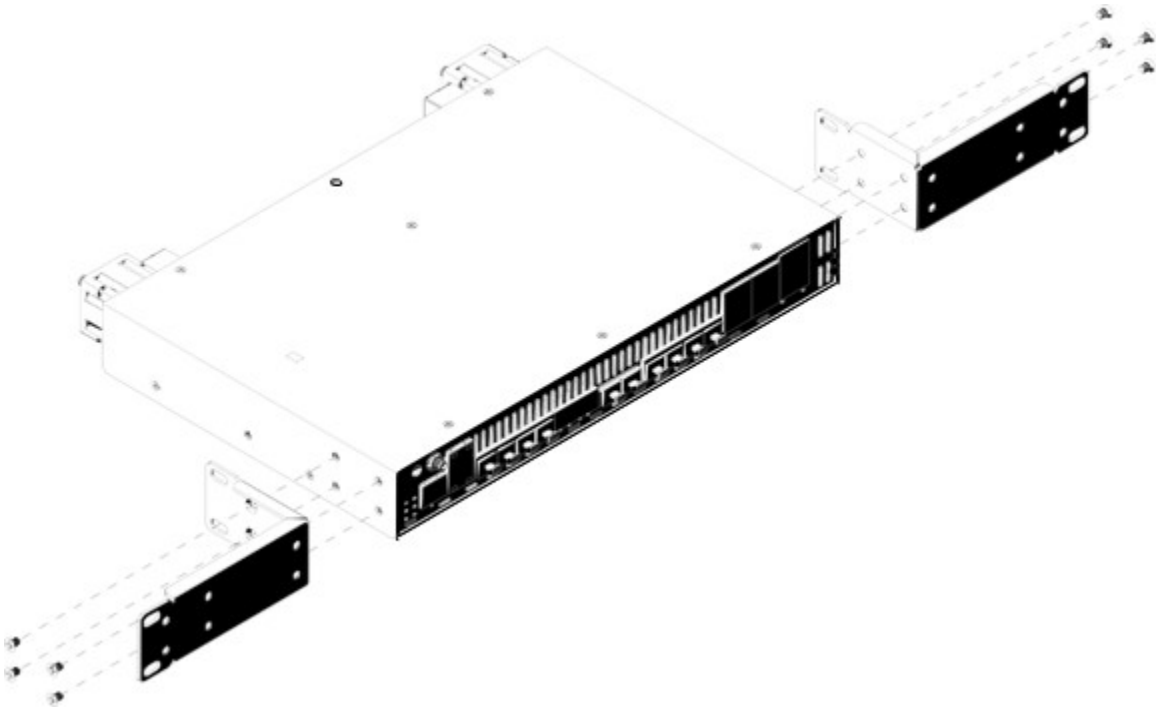


Figure 10: 23" Flush Mounting Brackets



Step 2 Secure to the rack using four pan head screws.

Ground the Chassis

For safety reasons, connect the protective ground screw to a suitable grounding point before applying power.

Safety Warnings

Take note of the following warnings:

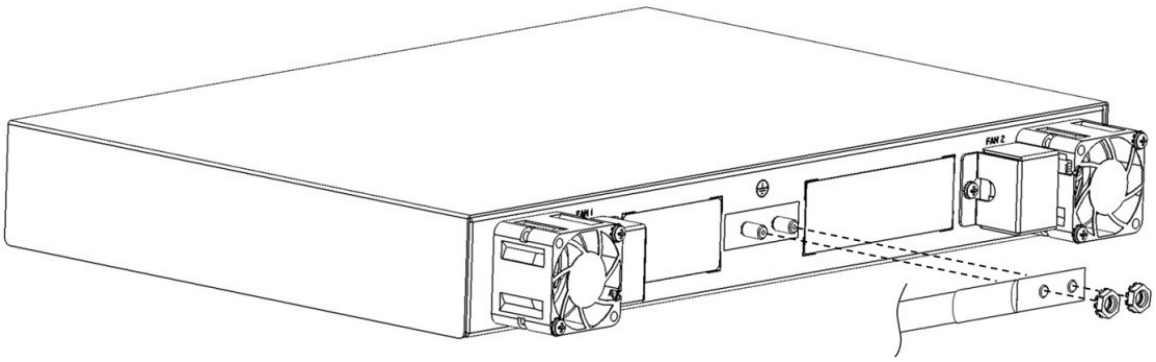
Warning **Statement 1101—**Connected To Grounded Outlet

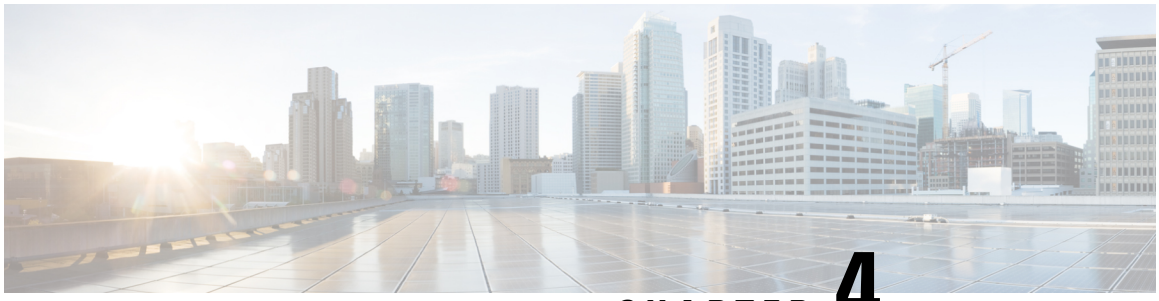
In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

Note Applicable wire range: 2.5 to 5.25 mm^2 (14 to 10 AWG)

Lug type: 2x Stud #10 hole, 16 mm spacing

Figure 11: Ground the Chassis





CHAPTER 4

Installation, Maintenance, and Upgrade

- Power the Unit via DC Power Cable, on page 23
- Connect to the Network, on page 24
- Remove and Replace the Fans, on page 24

Power the Unit via DC Power Cable

Safety Warnings

Take note of the following warnings:

Warning

- The unit is designed for Common Bonding Network (CBN) installations only.
- The unit is suitable for installation in network telecommunication facilities and where the National Electrical Code (NEC) applies.
- The DC Battery Return (BR) input terminals of the unit are not connected to the equipment frame or grounding means of the equipment and must be configured as isolated DC Return (DC-I) in compliance with GR-1089-CORE requirements.

Warning DC power connections:

- Ensure that the unit's power sources have been turned OFF before servicing.
- An approved external power supply switch or circuit breaker must be installed in the supply lines and be readily accessible to act as a disconnect device. The switch or circuit breaker must disconnect all poles simultaneously and be rated 8 A Max (Quick/Fast).

To power the unit via the power cable:

Note Applicable wire range: 0.75 to 4.0 mm^2 (18 to 12 AWG).

Before you begin

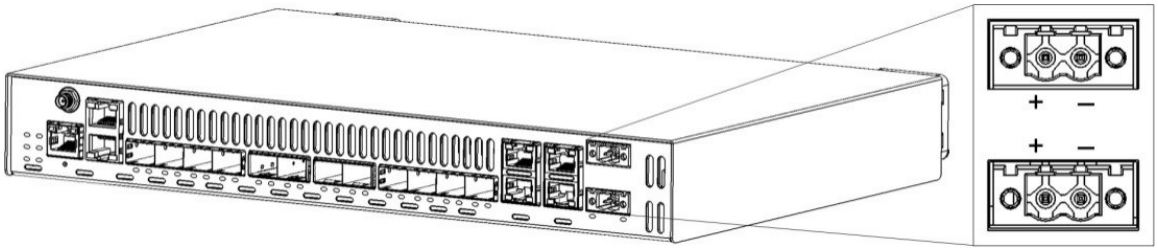
- Make sure that the chassis ground is connected on the chassis before you begin installing the DC power supply. See Ground the Chassis, on page 21 for the procedure.

Note Powering options are ordered separately.

Procedure

Step 1 Establish the Ethernet connections to the unit by plugging the appropriate media types into the proper ports of the unit (see Front Panel, on page 3).

Figure 12: DC Power Input



Step 2 Connect the DC connector to the front of the unit.

Connect to the Network

Establish the Ethernet connections to the unit by plugging the appropriate media types to the proper ports of the unit (see Front Panel, on page 3).

Note For more information, refer to the User Material.

Remove and Replace the Fans

This procedure describes how to replace a fan in the event of a fan failure. The fan replacement kit SKY-FANKIT-LT contains two fans.

If a fan failure is reported by the Cisco Provider Connectivity Assurance Sensor LT-S (formerly Skylight element: LT-S) fan monitoring circuit, you must replace the fan. However, as a preventative measure, it is recommended to replace **both** fans in the event of a failure.

Caution The fans must be replaced one at a time.

Note The replacement of the fans should be carefully planned, as the procedure must be completed within five minutes to reduce the thermal impact on the unit.

Safety Warnings

The following are safety guidelines that you must follow for personal safety and to operate the units correctly. All personnel working directly on the units must be trained, authorized, and qualified to perform the tasks described herein. You must read and follow these guidelines before you begin.

- Power to the unit remains on throughout this process.
- To avoid personal injury, equipment damage and/or service interruptions, keep your fingers away from the fan's moving parts.
- This equipment is sensitive to electrostatic discharge (ESD). When handling, ensure you wear a properly functioning heel grounder and/or an anti-static wrist strap or another personal-grounding device.
- Incorrect handling may void warranty.

Take note of the following warnings:

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

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

Warning **Statement 1093—**Avoid Sharp Edges

Risk of personal injury. Avoid sharp edges when installing or removing replaceable units.



Prepare for Fan Replacement

To prepare for fan replacement:

Procedure

Step 1 Log in to the unit where the fan failure occurred.

Step 2 Identify which fan on the unit has malfunctioned:

a) Access the page **Show** ▸ **Alarm** to view alarm status.

b) Look in the list of alarms for either Fan 1 or Fan 2 failures. The number of the failure corresponds to the defective fan.

Replace the Fan

To replace the fan:

Procedure

Step 1 Loosen the screw that holds the fan cable cover in place, then remove the fan cable cover.

Step 2 Disconnect the cable that connects the fan to the fan connector from the unit's chassis.

Note
You can pull the wire while the retaining clip is depressed.

Step 3 Remove the two screws holding the fan to the unit’s chassis.

Note
Keep the two screws aside.

Step 4 Remove the defective fan, as identified in Prepare for Fan Replacement, on page 25.

Step 5 Install the new fan in place.

Step 6 Secure the fan to the unit’s chassis using the two screws kept aside.

Step 7 Reconnect the fan cables.

Step 8 Install the fan cable cover, securing it in place with the screw.

Step 9 Ensure that the fan is fully functional by following the instructions in Fan Replacement Verification, on page 27.

Step 10 (Optional) To replace the other fan as a preventative measure, continue with Optional Preventative Maintenance Fan Replacement , on page 26.

Optional Preventative Maintenance Fan Replacement

To perform an optional fan preventive maintenance:

Procedure

Step 1 Disconnect the cable that connects the other fan to the fan connector from the unit’s chassis.

Note
You can pull the wire while the retaining clip is depressed.

Step 2 Remove the two screws holding the fan to the unit's chassis.

Note
Keep the two screws aside.

Step 3 Remove the fan to be replaced as a preventative measure.

Step 4 Install the new fan in place.

Step 5 Secure the fan to the unit's chassis using the two screws kept aside.

Step 6 Reconnect the fan cables.

Step 7 Install the fan cable cover, securing it in place with the screw.

Step 8 Ensure that the fan is fully functional by following the instructions in Fan Replacement Verification, on page 27.

Fan Replacement Verification

To verify the fan replacement:

Procedure

Step 1 Log in to the unit where the fan failure occurred.

Step 2 Access the page **Show** ▸ **Alarm** and confirm that the fan failure alarms are no longer listed in the grid.