

Cisco Provider Connectivity Assurance Sensor Module 10G Hardware Installation Guide

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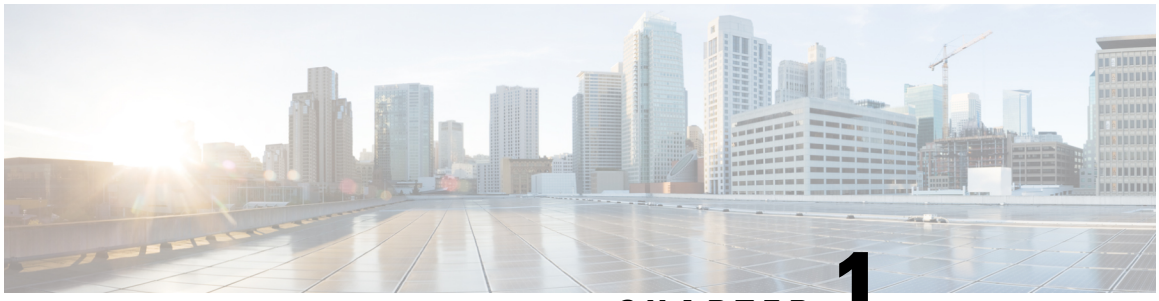
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CHAPTER 1

Overview

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Features

Cisco® Provider Connectivity Assurance Sensor Modules allow you to more effectively address end-to-end service lifecycles, from Service Activation Testing (SAT) to assurance management and service demarcation. The small form factor of the modules helps keep them power-efficient, and all management capabilities are automated and orchestrated through the Provider Connectivity Assurance Sensor Control software.

These modules are equipped with a fully featured Field-Programmable Gate Array (FPGA) capable of active Layer 2 through 4 testing and traffic generation—without compromising performance, scalability, and precision. This makes Assurance Sensor Modules an ideal fit for cost- and space-sensitive applications where performance is a key service differentiator.

Figure 1: Cisco Provider Connectivity Assurance Sensor Module 10G



The following table lists the features for the Module 10G.

Table 1: Sensor Module 10G Features

Feature	Description
Form factor	1 RU
Rack mount	Standard 19-in. (48.3 cm) or 23-in (58.42 cm) rack
Optical ports	Two fixed optical connectors

The following table lists the regulation and standard compliance features of the Module 10G.

Table 2: Regulation and Standard Compliance (Model: ANT10, ANT10h)

Feature	Description
Safety	IEC 60950-1, IEC 62368-1, EN 62368-1, CSA/UL 62368-1, AS/NZS 62368.1, J62368-1, CEI EN 62368-1, DS/EN 62368-1
EMC - Emission (Class A)	CISPR 32, EN 55032, FCC (47 CFR 15, Subpart B), ICES-003, AS/NZS CISPR 32, VCCI, KN 32, CNS 13438
EMC - Immunity	CISPR 35, EN 55035, KN 35
Telco	NEBS Level-3: GR-63, GR-1089 (DC model only)
RoHS	IEC 63000, EN IEC 63000

Package Contents

The package contents for the Sensor Module 10G include:

- Sensor Module 10G (1x)
- AC model: power cord retainer clip (1x)
- Drywall anchor kit (1x)
- Rubber feet (4x)
- L-bracket kit (1x)
- *Cisco Provider Connectivity Assurance Sensor Module 10G*—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

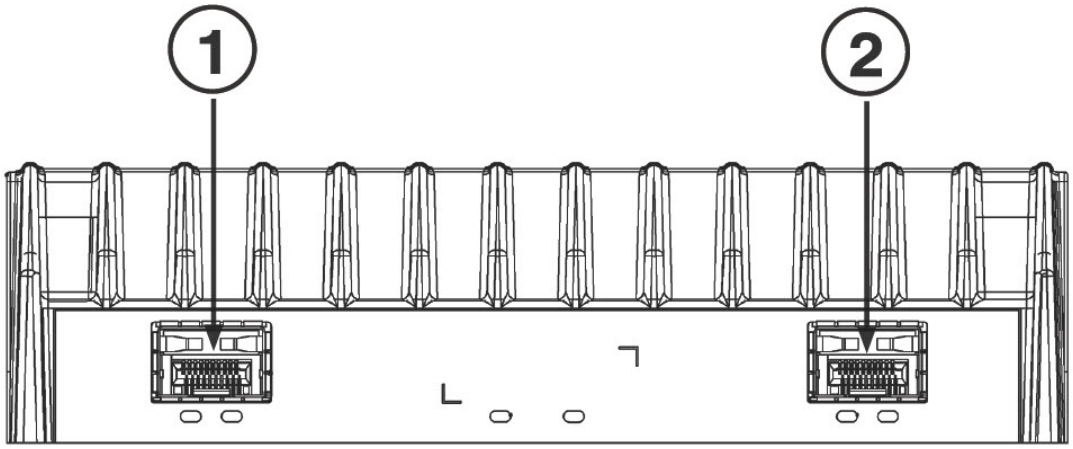
Serial Number Locations

The Serial Number (SN) and the Media Access Control (MAC) address are located at the bottom of the Sensor Module 10G.

Front Panel

The following figure shows the front panel features for the Sensor Module 10G. See Front Panel LEDs, on page 4 for a description of the LEDs.

Figure 2: Sensor Module 10G Front Panel

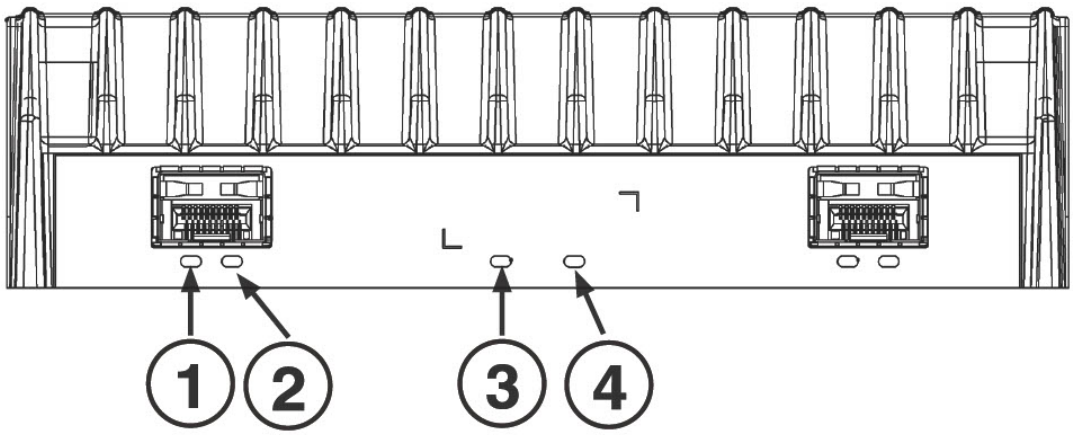


1	Optical port 1 SFP 1G/10G Ethernet port 1	**2**	Optical port 2 SFP 1G/10G Ethernet port 2

Front Panel LEDs

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

Figure 3: Sensor Module 10G Front Panel LEDs

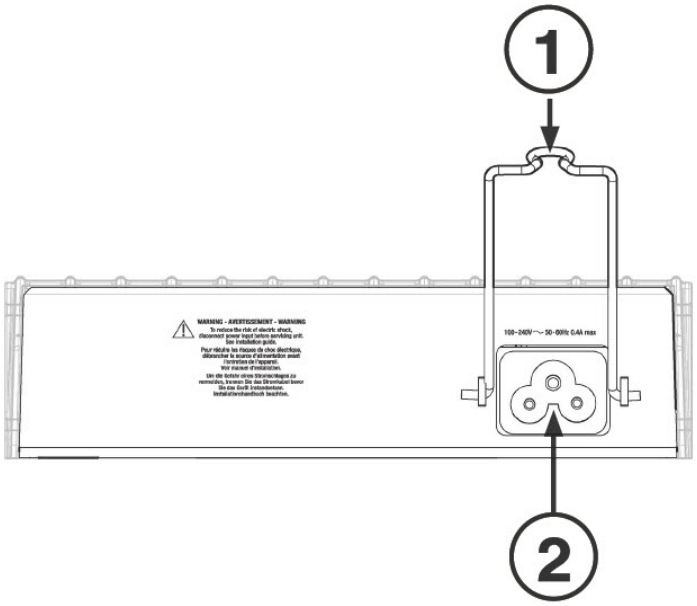


1	TX LED: • Off—Port is not transmitting data. • Flashing—Port is transmitting data.	**2**	Link/RX LED: • Off—Link is inactive. • On—Link is active. • Flashing—Port is receiving data.
3	PWR LED: • Off—Device is unpowered. • On—Device is powered.	**4**	STATUS LED: • Off—Device is not ready. • On—Device is ready, but unmanaged. • Flashing—Device is ready, and remotely managed. • Slow flashing means the system is currently managed by a remote controller. • Fast flashing means a critical system failure is detected.

Rear Panel

The following figure shows the rear panel of the Sensor Module 10G - AC Input Power Model.

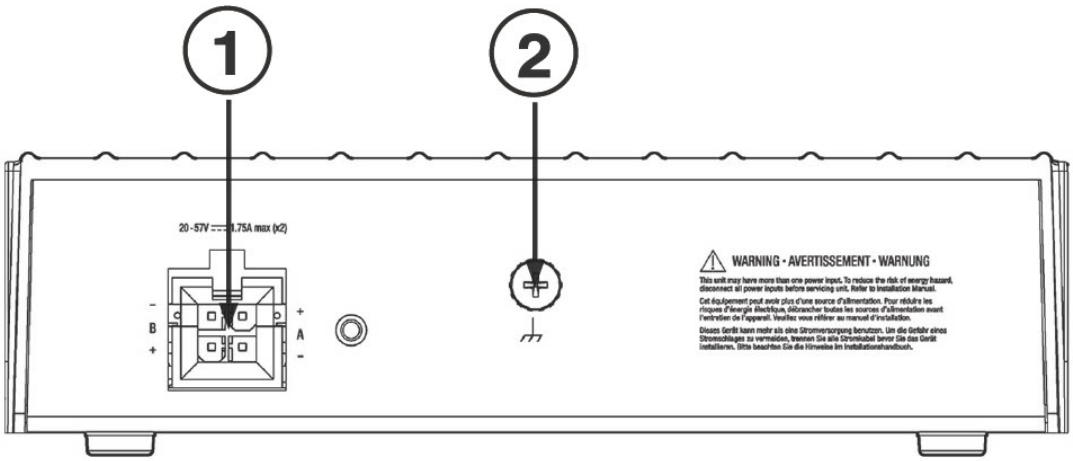
Figure 4: Sensor Module 10G Rear Panel - AC Input Power Model



1	AC cord retainer Secure the power cord through the retainer clip	**2**	AC power input Connect appropriate power cord here

The following figure shows the rear panel of the Sensor Module 10G - DC Input Power Model.

Figure 5: Sensor Module 10G Rear Panel - DC Input Power Model



1	DC power input (Feed A and B) Connect appropriate power source here **Note** The Module comes with two polarized DC feeds	**2**	Functional ground connection Fasten the ground lug here

Power Supply

The following table lists the specifications for each power supply used in the Sensor Module 10G.

Table 3: Power Specifications

Description	Specification
Input power ratings	AC: 100–240 VAC, 50–60 Hz, 0.4 A maximum DC: 20–57 VDC (polarity independent), 1.75 A maximum
Output power ratings	SFP: 2.5 W maximum per port, 4.0 W maximum for all ports **Warning** Transceivers used in the ports must stay within their specifications under all operating conditions of the system.

Description	Specification
Power consumption	18 W typical, 21 W maximum (61 BTU/hr typical, 72 BTU/hr maximum)

Hardware Specifications

The following table contains hardware specifications for the Sensor Module 10G.

Dimensions (H x W x D)	1.5 x 5.7 x 7.8 inches (3.8 x 14.5 x 19.8 cm)
Weight	3.3 lb (1.5 kg)
Temperature	Operating: • Commercial: 32 to 122°F (0 to 50°C) • Hardened*: -40 to 149°F (-40 to 65°C) *Cold Start: -13°F (-25°C) Storage: -40 to 158°F (-40 to 70°C)
Humidity	Operating: 5 to 85% RH, noncondensing Storage: 5 to 95% RH, noncondensing
Altitude	6562 ft (2000 m), above sea level

Product ID Numbers

The following table lists the field-replaceable PIDs associated with the Sensor Module 10G. If any internal components fail, you must get a return material authorization (RMA). See the Cisco Returns Portal for more information.

Table 4: Sensor Module 10G PIDs

PID	Description
SKY-MOD10G-A	Module 10G - 2xSFP+ - Single Internal AC Power Supply DHCP enabled
SKY-MOD10G-DD	Module 10G - 2xSFP+ - Dual DC Power Supply DHCP enabled
SKY-MOD10G-H-DD	Module 10G - 2xSFP+ - Dual DC Power Supply - Hardened DHCP enabled
SKY-MOD10G-H-A	Module 10G - 2xSFP+ - Single Internal AC Power Supply - Hardened DHCP enabled

Power Cord Specifications

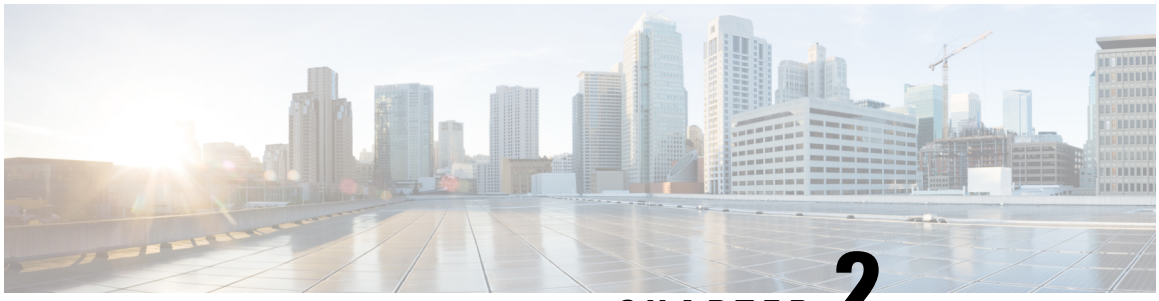
Each AC power input requires a separate power cord. Power cords are available for connection to the Sensor Module 10G.

If you do not order the optional power cord with the system, you are responsible for selecting the appropriate power cord for the product. Using a incompatible power cord with this product may result in electrical safety hazard.

PID	Description
SKY-PC-NA	North America – C5 termination
SKY-PC-EUR	Europe – C5 termination
SKY-PC-UK	United Kingdom – C5 termination
SKY-PC-JPN	Japan – C5 termination
SKY-PC-IND	India – C5 termination
SKY-PC-SIN	Singapore – C5 termination
SKY-PC-AUS	Australia / New Zealand – C5 termination
SKY-PC-SWI	Switzerland – C5 termination
SKY-PC-ITA	Italy – C5 termination
SKY-PC-ISL	Israel – C5 termination
SKY-PC-TWN	Taiwan – C5 termination
SKY-PC-ARG	Argentina – C5 termination
SKY-PC-BRZ	Brazil – C5 termination
SKY-PC-C20	C20 – C5 termination
SKY-PC-C14	C14 – C5 termination
SKY-PC-CHN	China – C5 termination



Note Only the approved power cords for the Sensor Module 10G are supported.



CHAPTER 2

Installation Preparation

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

Installation Warnings

Read the Regulatory Compliance and Safety Information document before installing the Sensor Module 10G.

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.

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.

Maintain Safety with Electricity

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

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

Follow these guidelines when working on equipment powered by electricity:

- Before beginning procedures that require access to the interior of the chassis, locate the emergency power-off switch for the room in which you are working. Then, if an electrical accident occurs, you can act quickly to turn off the power.
- 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.

- The chassis is equipped with an AC-input power supply, which is shipped with a three-wire electrical cord with a grounding-type plug that fits into a grounding-type power outlet only. Do not circumvent this safety feature. Equipment grounding should comply with local and national electrical codes.

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.

Site Environment

See Hardware Specifications, on page 7 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.

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.
- Ensure that the chassis cover is secure. The chassis is designed to allow cooling air to flow effectively within it. An open chassis allows air leaks, which may interrupt and redirect the flow of cooling air from the internal components.
- Always follow ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

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:

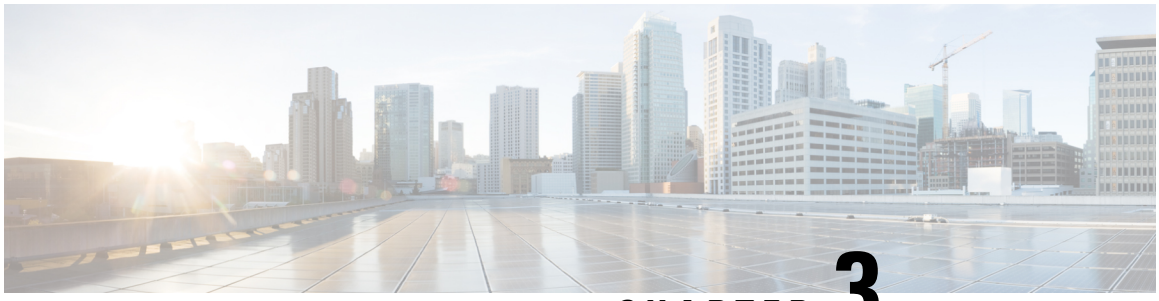
- Check the power at the site before installing the chassis to ensure that it is free of spikes and noise. Install a power conditioner, if necessary, to ensure proper voltages and power levels in the appliance-input voltage.
- Install proper grounding for the site to avoid damage from lightning and power 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.
- Several styles of AC-input power supply cords are available for the chassis; make sure that you have the correct style for your site.
- 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 16 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.



CHAPTER 3

Mount the Chassis

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

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 2 for a list of what shipped with the chassis.

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:

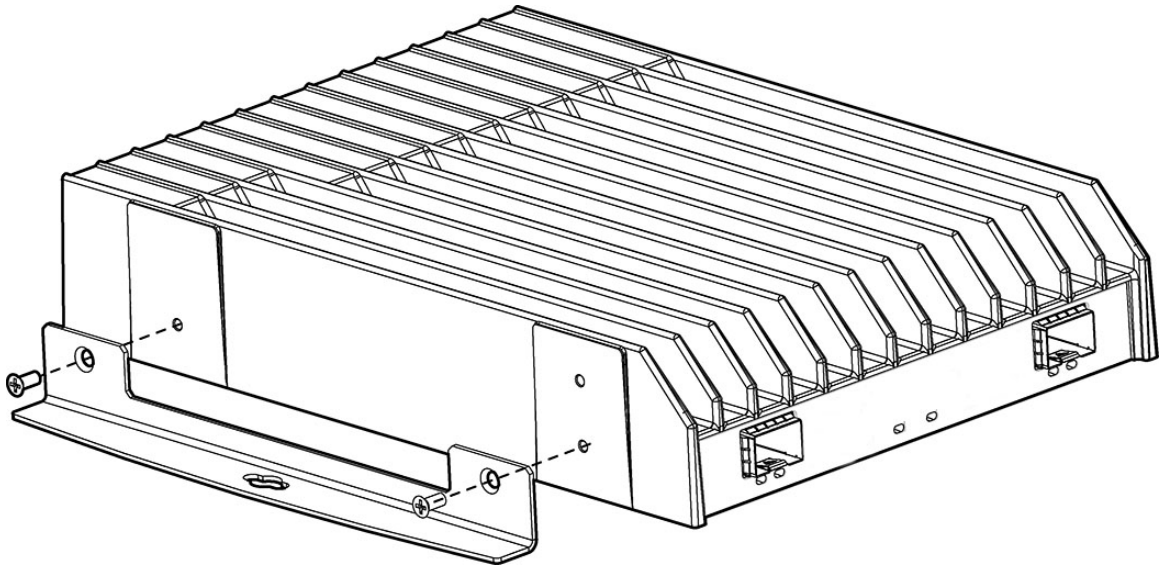
- Invoice number of shipper (see the packing slip)
- Model and serial number of the damaged unit

- Description of damage
- Effect of damage on the installation

Wall-Mount the Chassis

Secure the Wallmount Kit to both sides of the Module using the provided screws.

Figure 6: Secure the Wallmount Kit



When mounting a Module on a wall:

- The support surface and the fasteners you use must support at least 6 kg (13.25 lbs).
- Cable pull—accidental or otherwise—should not exceed the 4.5 kg (10 lbs) limit.

Rack-Mount the Chassis

Warning Only the standard mounting brackets are NEBS compliant. The recessed brackets are not NEBS compliant.

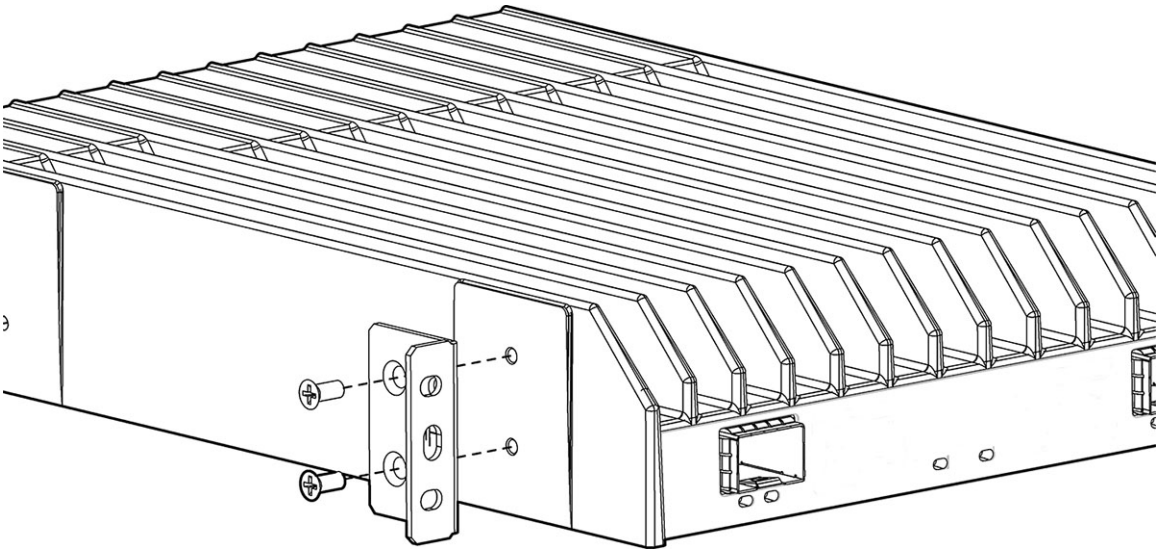
To conform to the NEBS Seismic Zone 4 requirements, the bracket must be secured, using screws specified by the rack manufacturer, to a NEBS Seismic Zone 4 compliant rack. Such screws are not provided with the bracket kit.

To rack-mount the chassis:

Procedure

Step 1 Secure two L-shaped mounting brackets vertically to both sides of each Module using the provided screws.

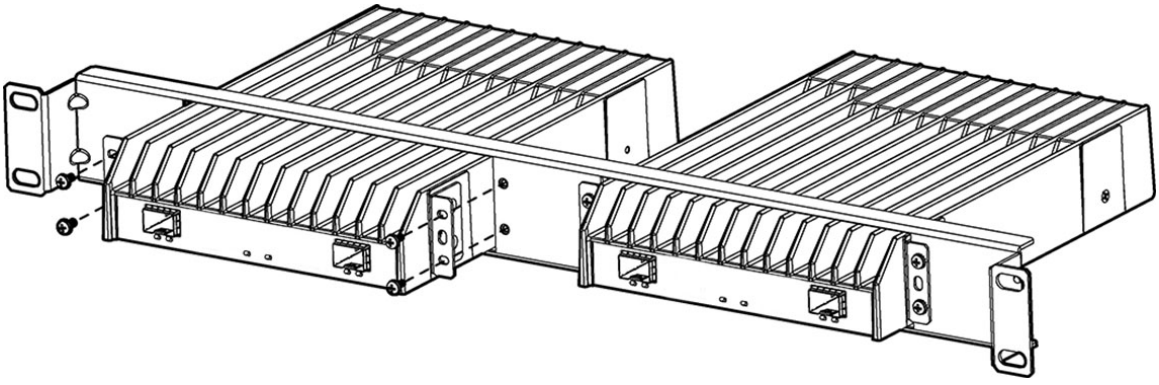
Figure 7: Secure the L-shaped Mounting Brackets



Step 2 Carefully slide each Module into the rack-mount bracket with its heat sink facing upward. The rack-mount bracket may provide up to three bays.

Step 3 Align the L-shaped brackets with the pre-drilled holes and secure each Module to the rack-mount bracket.

Figure 8: Align the L-shaped Brackets



Step 4 Secure the rack-mount bracket to the rack using the fasteners as recommended by the manufacturer.

Ground the Chassis

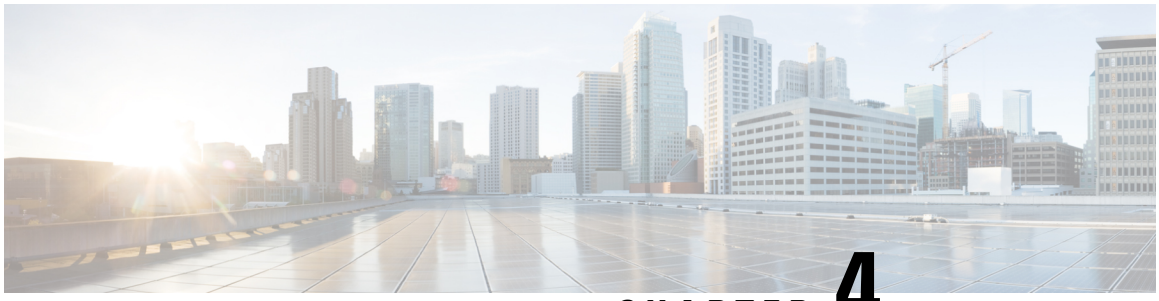
Note **Statement 7013—**Equipment Grounding Systems—Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

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

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

Warning For optimal performance, connect the functional ground screw to a suitable grounding point before applying power.



CHAPTER 4

Installation, Maintenance, and Upgrade

- Power the Unit via the AC Power Supply, on page 19
- Power the Unit via DC Power Cable, on page 19
- Power the Unit via DC Terminal Block Adapter, on page 21
- Connect to the Network, on page 22
- Remove and Replace the Fan Tray, on page 22

Power the Unit via the AC Power Supply

Safety Warnings

Take note of the following warnings:

Warning The AC appliance couple is used as a disconnect. The AC plug must be connected to a properly grounded AC outlet.

To power the unit via an AC power connection:

Procedure

Step 1 Connect the AC plug to the AC appliance coupler.

Step 2 Plug the power cord into a suitable power outlet.

The power LED will light, indicating that the Module is powered.

Power the Unit via DC Power Cable

Safety Warnings

Take note of the following warning:

Warning Each input should be protected by a 4.0 A to 5.0 A externally-mounted fast-acting fuse or equivalent. There should be one fuse per power feed. Disconnect all power sources before servicing. Removing fuses can be used as a disconnect method.

Fuses must be installed on the live wire(s) and not on the grounded wire(s).

The DC power Battery Return (BR) input terminals of the unit are not connected to the equipment frame (chassis) and are configured as DC-I in compliance with GR- 1089-CORE.

To power the unit via the DC power cable:

Before you begin

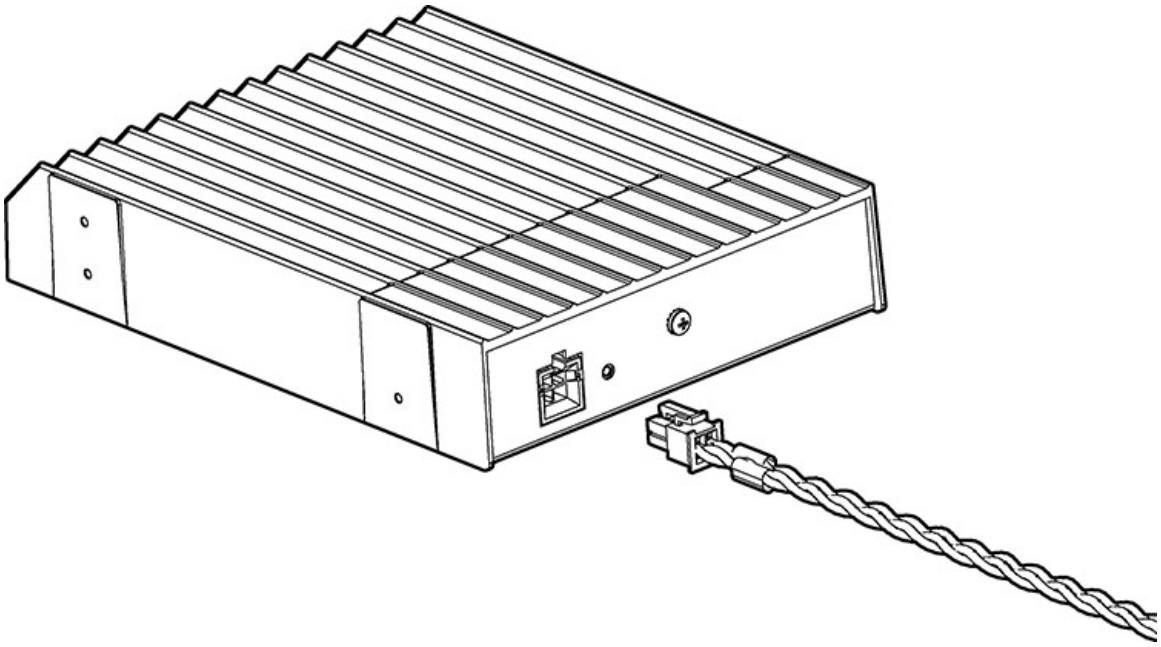
- Make sure that the chassis ground is connected on the chassis before you begin installing the DC power supply. See Ground the Chassis, on page 18 for the procedure.

Procedure

Step 1 Establish the proper connections between the cable end and the power sources.

Step 2 Connect the DC connector to the back of the Module.

Figure 9: Connect the DC Connector



Power the Unit via DC Terminal Block Adapter

Safety Warnings

Take note of the following warning:

Warning Each input should be protected by a 4.0 A to 5.0 A externally-mounted fast-acting fuse or equivalent. There should be one fuse per power feed. Disconnect all power sources before servicing. Removing fuses can be used as a disconnect method. Fuses must be installed on the live wire(s) and not on the grounded wire(s).

The DC power Battery Return (BR) input terminals of the unit are not connected to the equipment frame (chassis) and are configured as DC-I in compliance with GR- 1089-CORE.

To power the unit via the terminal block adapter:

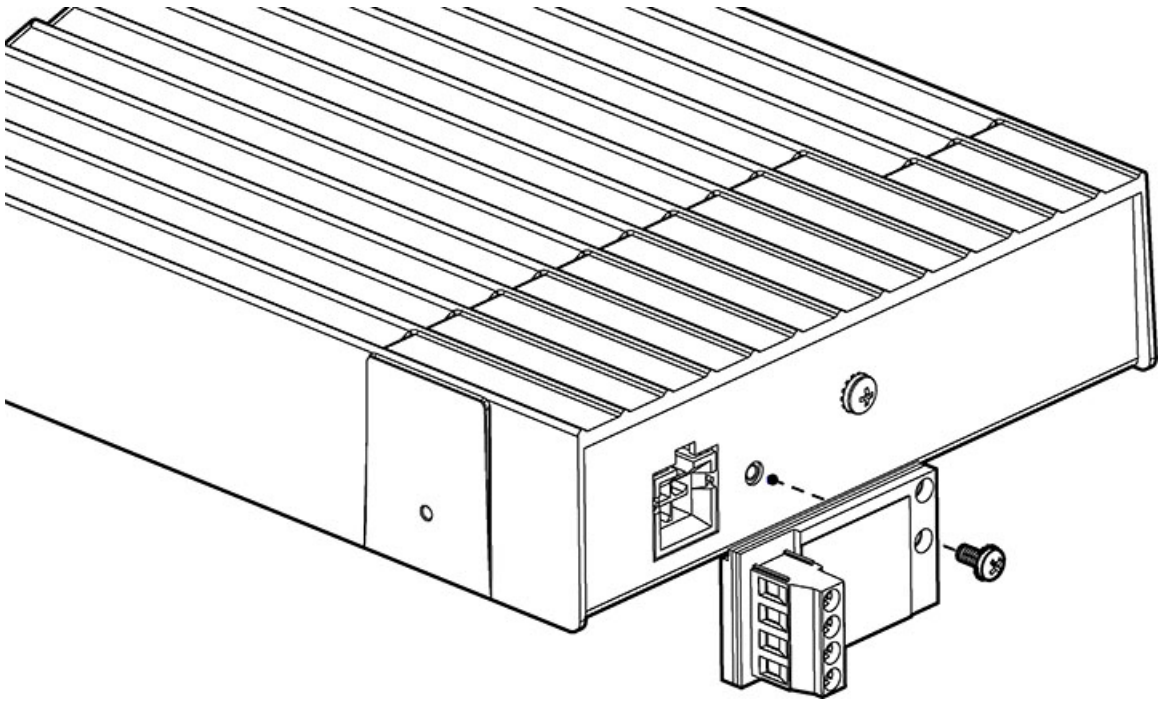
Before you begin

- 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 18 for the procedure.

Procedure

Step 1 Fasten the Terminal Block Adapter to the back of the Module.

Figure 10: Fasten the Terminal Block Adapter



Step 2 Establish the proper connections between the wires and the power sources.

Step 3 Connect wires to the terminal block connector of the adapter.

Note
Applicable wire range: 12 to 22 AWG

Connect to the Network

Establish the Ethernet connections to the Module by plugging the appropriate media types to the proper ports of the Module, per the predefined network architecture (see Front Panel, on page 3).

Note For more information, refer to the User Material.

Remove and Replace the Fan Tray

This procedure describes how to replace a fan tray in the event of a fan failure. The fan replacement kit SKY-FANKIT-MOD10G= contains one fan tray. The Module 10G has two fans inherent in its design to prevent the unit from overheating. The fans are installed into a separate replaceable fan tray should the fans fail. This procedure describes the method to replace the fan tray. It is recommended that you complete the procedure within five minutes of removing the fan tray to prevent overheating of the unit.

Note This procedure only applies to the following PIDs:

- SKY-MOD10G-H-DD
- SKY-MOD10G-H-A

Note The fan replacement kit SKY-FANKIT-MOD10G= must be ordered separately.

Caution The replacement of the fan tray 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 to 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.



Replace the Fan Tray

You will need:

- Replacement fan tray
- Module 10G
- Slotted #1 Phillips screwdriver

Figure 11: Fan Tray Replacement Items



To replace the fan tray:

Procedure

Step 1 With the Module 10G front facing you, use a screwdriver to loosen the screws to the right and left of the fan tray.

Figure 12: Loosen the Screws



Step 2 Slide the fan tray towards you to remove it. You do not need to keep this piece; place it in the appropriate electronic recycling.

Step 3 Take the new replacement fan tray and slide it into the Module 10G.

Figure 13: Slide the Replacement Fan Tray into the Module 10G



Step 4 Tighten the right and left screws to secure the replacement fan tray to the Module 10G.