



Cisco Provider Connectivity Assurance Sensor Module 1G Hardware Installation Guide

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CHAPTER 1

Overview

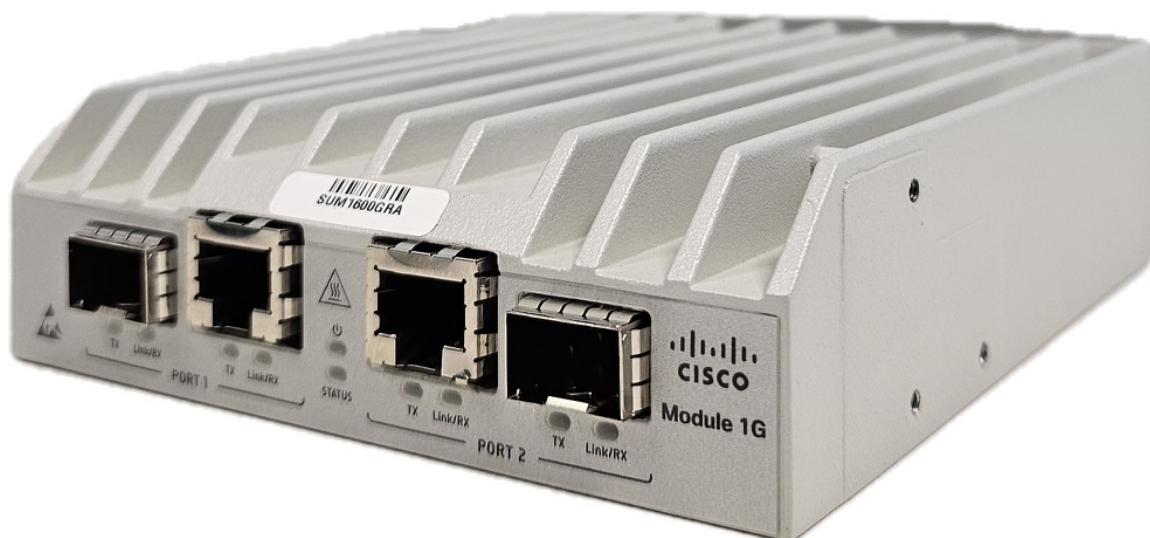
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Features

Cisco[®] Provider Connectivity Assurance Sensor Modules (formerly Accedian Skylight 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 1G



The following table lists the features for the Sensor Module 1G.

Table 1: Sensor Module 1G 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
Copper ports	Two fixed copper connectors

The following table lists the regulation and standard compliance features of the Sensor Module 1G.

Table 2: Regulation and Standard Compliance (Model: ANT2)

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 B)	CISPR 32, EN 55032, EN 61000-3-2, EN 61000-3-3, FCC Part 15 (CFR 47), ICES-003, AS/NZS CISPR 32, VCCI, KN32, CNS 13438
EMC - Immunity	CISPR 35, EN 55035, KN 35

Package Contents

The package contents for the Sensor Module 1G include:

- Sensor Module 1G (1x)
- AC model: power cord retainer clip (1x)
- Drywall anchor kit (1x)
- Rubber feet (4x)
- RJ-45 patch cord (1x)
- *Cisco Provider Connectivity Assurance Sensor Module 1G*—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

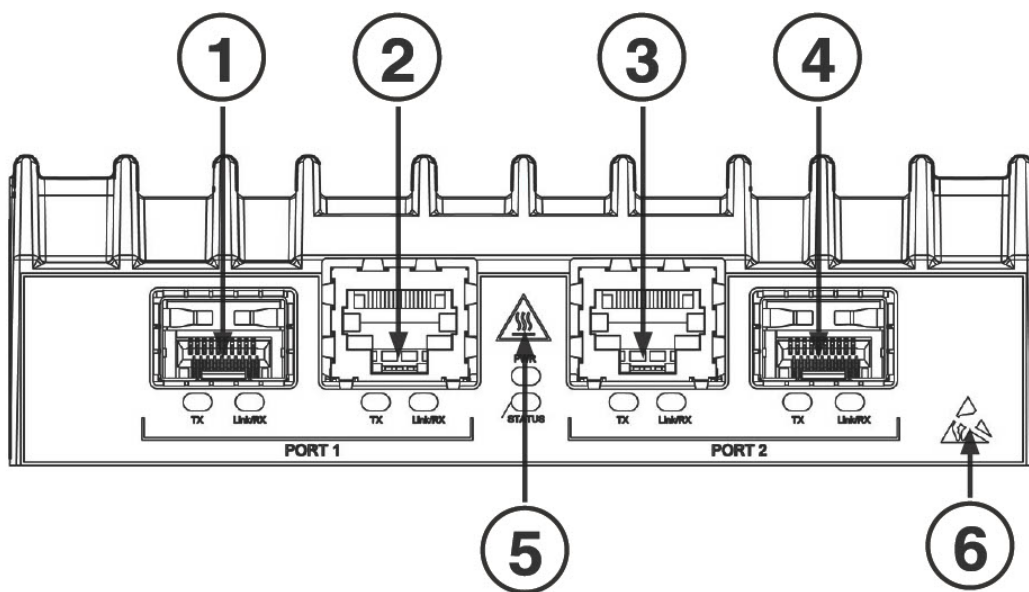
Serial Number Locations

The Serial Number (SN) and the Media Access Control (MAC) address are located at the bottom of the Sensor Module 1G.

Front Panel

The following figure shows the front panel features for the Sensor Module 1G. See [Front Panel LEDs, on page 4](#) for a description of the LEDs.

Figure 2: Sensor Module 1G Front Panel

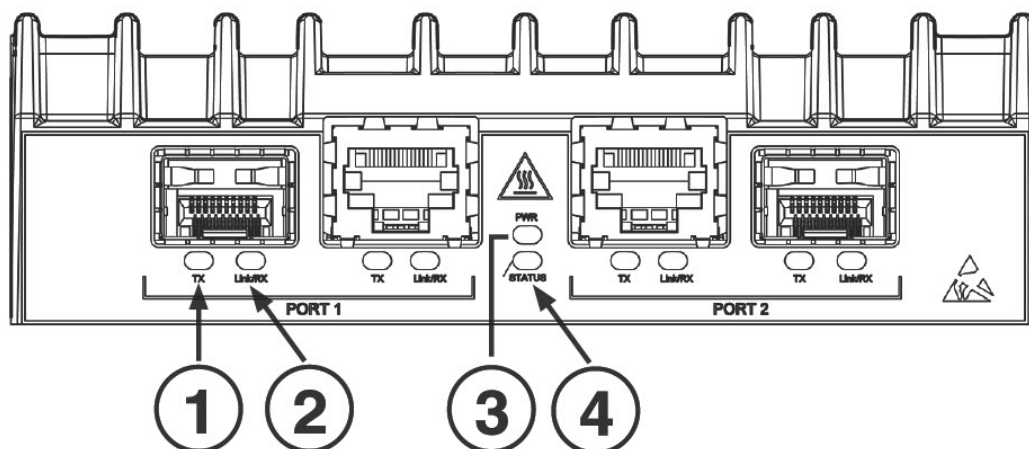


1	Optical port 1 SFP 1000 Mbps Ethernet Port 1 (combo models only)	2	Copper port 1 RJ-45 100/1000 Mbps Ethernet Port 1
3	Copper port 2 RJ-45 100/1000 Mbps Ethernet Port 2	4	Optical port 2 SFP 1000 Mbps Ethernet Port 2 (combo models only)
5	Hot surface Note that the surface is hot to touch.	6	ESD Electrostatic Discharge

Front Panel LEDs

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

Figure 3: Sensor Module 1G Front Panel LEDs



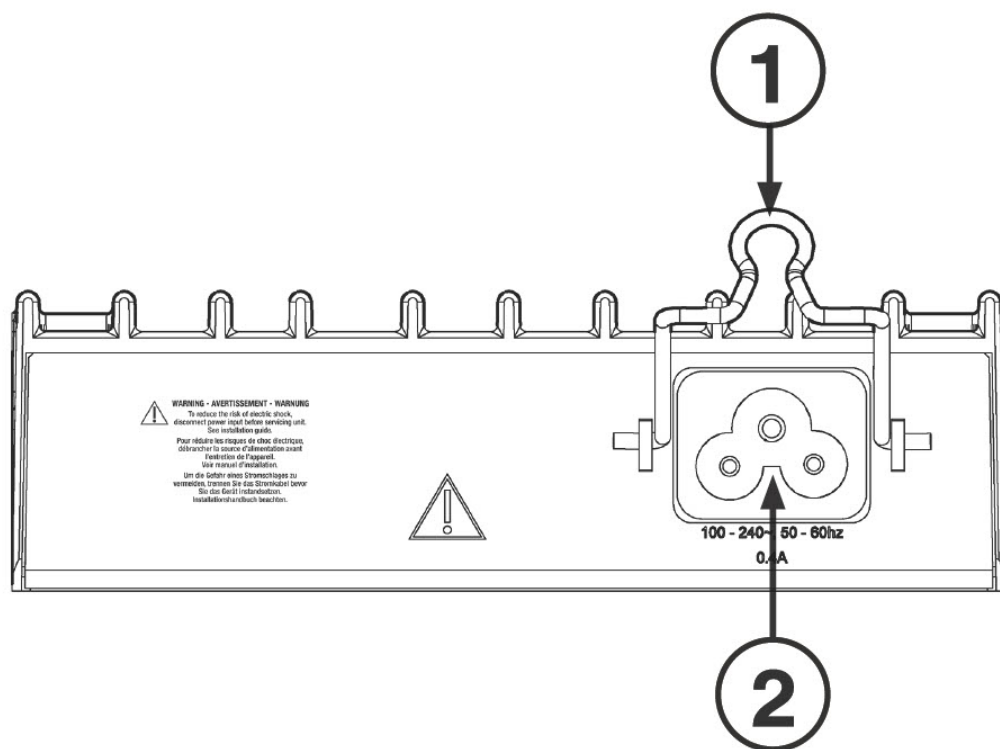
1	TX LED: • Off—Port is not transmitting data. • Flashing—Port is transmitting data.	2	Link/RX LED: • Off—Link is inactive. • On—Link is active. • Flashing—Port is receiving data.
---	---	---	--

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.
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Rear Panel

The following figure shows the rear panel of the Sensor Module 1G - AC Input Power Model.

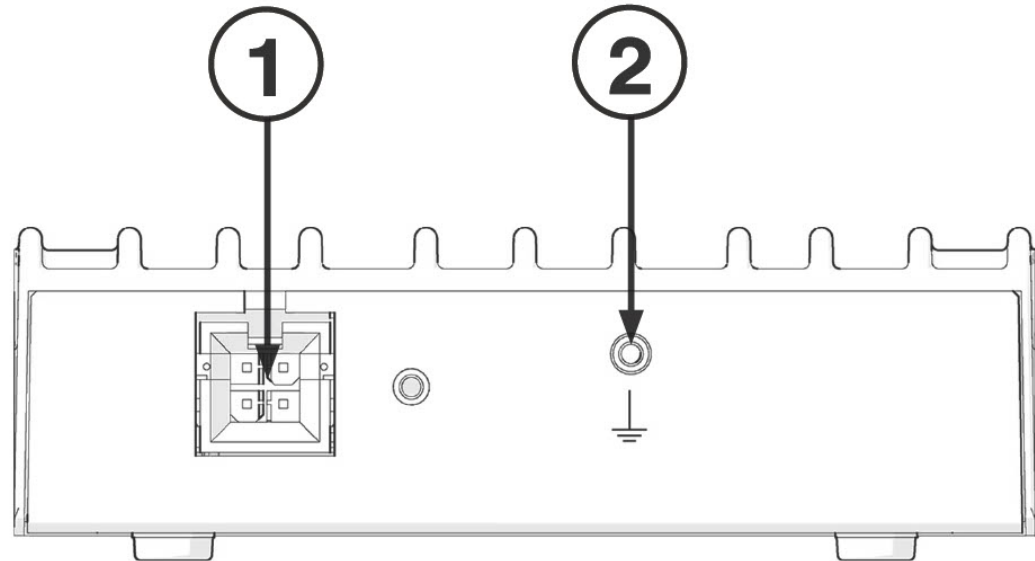
Figure 4: Sensor Module 1G Rear Panel - AC Input Power Model



1 AC cord retainer Secure the AC 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 1G - DC Input Power Model.

Figure 5: Sensor Module 1G Rear Panel - DC Input Power Model



1 DC power input (Feed A and B) Connect appropriate power source here Note The connector has 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 1G.

Table 3: Power Specifications

Description	Specification
Input power ratings	AC: 100 to 240 V AC, 50 to 60 Hz, 0.5 to 0.4 A _{Max} DC: 20 to 57 V DC, 0.75 A _{Max}
Output power ratings	SFP: 2.6 W _{Max} per port, 3.4 W _{Max} 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	7.8 W _{Max} (27 BTU/hr _{Max})

Hardware Specifications

The following table contains hardware specifications for the Sensor Module 1G.

Dimensions (H x W x D)	1.4 x 4.7 x 5.3 inches (3.6 x 11.9 x 13.3 cm)
Weight	1.4 lb (0.63 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) Nonoperating: -40 to 158°F (-40 to 70°C)
Humidity	Operating and nonoperating: 5 to 95 % 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 1G. 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 1G PIDs

PID	Description
SKY-MOD1G-HR-A	Module 1G - 2xCombo - Single Internal AC Power Supply with Relay - Hardened DHCP enabled
SKY-MOD1G-DD	Module 1G - 2xCombo - Dual DC Power Supply DHCP enabled
SKY-MOD1G-HR-DD	Module 1G - 2xCombo - Dual DC Power Supply with Relay - Hardened DHCP enabled
SKY-MOD1G-H-A	Module 1G - 2xCombo - Single Internal AC Power Supply - Hardened DHCP enabled
SKY-MOD1G-H-DD	Module 1G - 2xCombo - Dual DC 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 1G.

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 an 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 1G 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 Cisco Provider Connectivity Assurance Sensor Module 1G.



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.

〈製品仕様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.



Warning **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.

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



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.

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

**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 17](#)

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.

**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

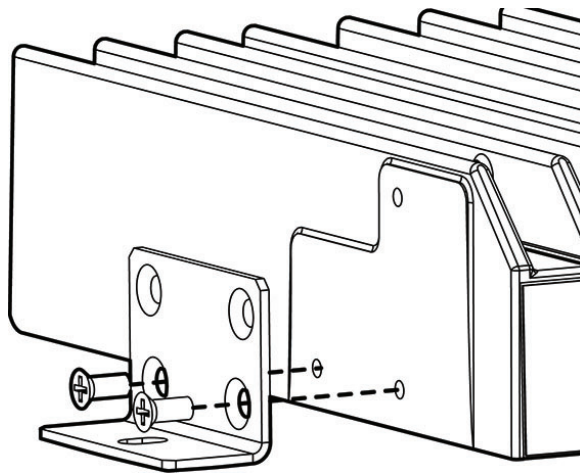
-
- Step 1** Remove the chassis from its cardboard container and save all packaging material.
- Step 2** Compare the shipment to the equipment list provided by your customer service representative. Verify that you have all items.
- Step 3** Check for damage and report any discrepancies or damage to your 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



- The support surface and the fasteners you use must support at least 2.5 kg (5.5 lbs.).
- Cable pull—accidental or otherwise—should not exceed the 2.5 kg (5.5 lbs.) limit.

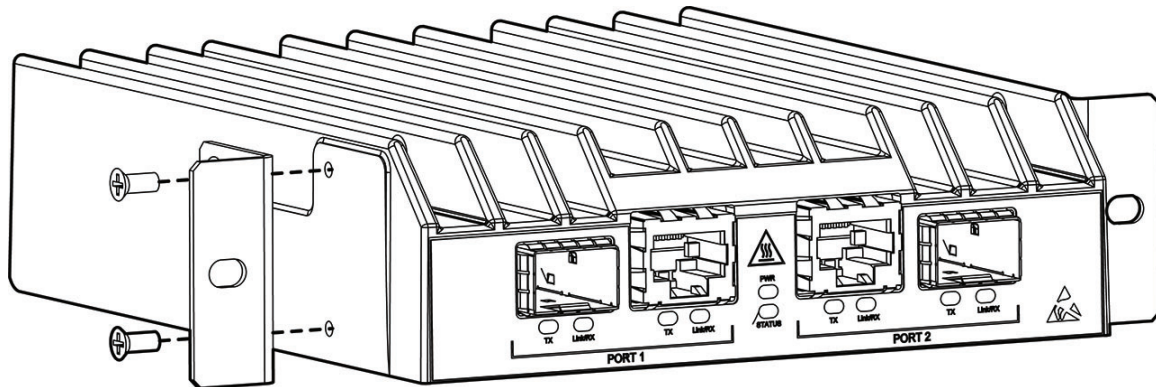
Rack-Mount the Chassis

To rack-mount the chassis:

Procedure

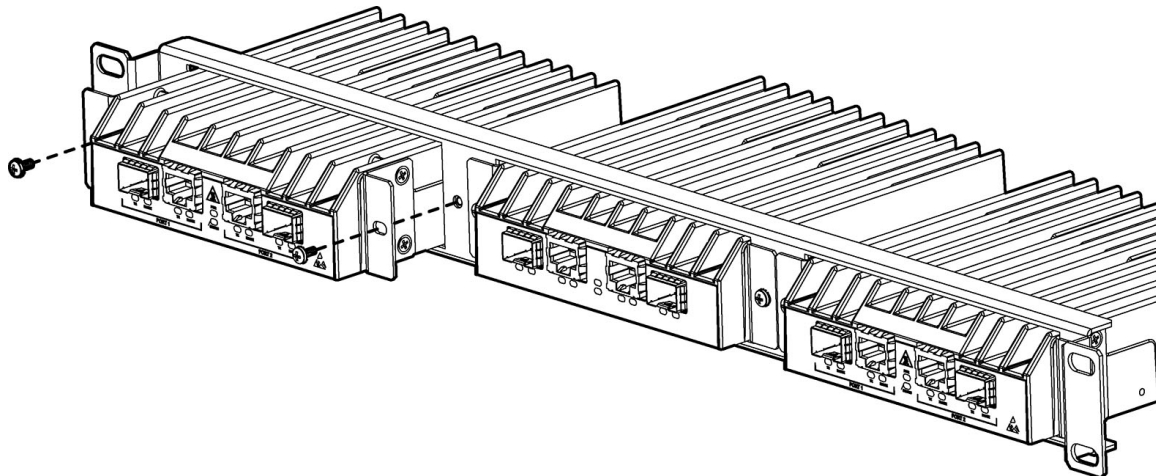
- Step 1** Secure two L-shaped mounting brackets vertically to both sides of each Module using the provided screws.

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.

Figure 8: Slide the Module



- Step 3** Align the L-shaped brackets with the pre-drilled holes and secure each Module to the rack mount bracket.
- Step 4** Secure the rack-mount bracket to the rack using the fasteners as recommended by the manufacturer.

Ground the Chassis



Note Grounding is applicable for the DC Power Input Model only.



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 **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.



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 20](#)
- [Connect to the Network, on page 22](#)

Power the Unit via the AC Power Supply

Safety Warnings

Take note of the following warnings:



Warning

Ensure the unit's power source(s) have been turned OFF before servicing.

To power the unit:

Procedure

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

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

Step 3 Secure the power cord through the retainer clip.

Warning

The AC plug must be connected to a properly grounded AC outlet.

Power the Unit via DC Power Cable

Safety Warnings

Take note of the following warning:

**Warning**

Each input should be protected by a 1.5 to 2.0 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).

To power the unit via the DC power cable:

Before you begin

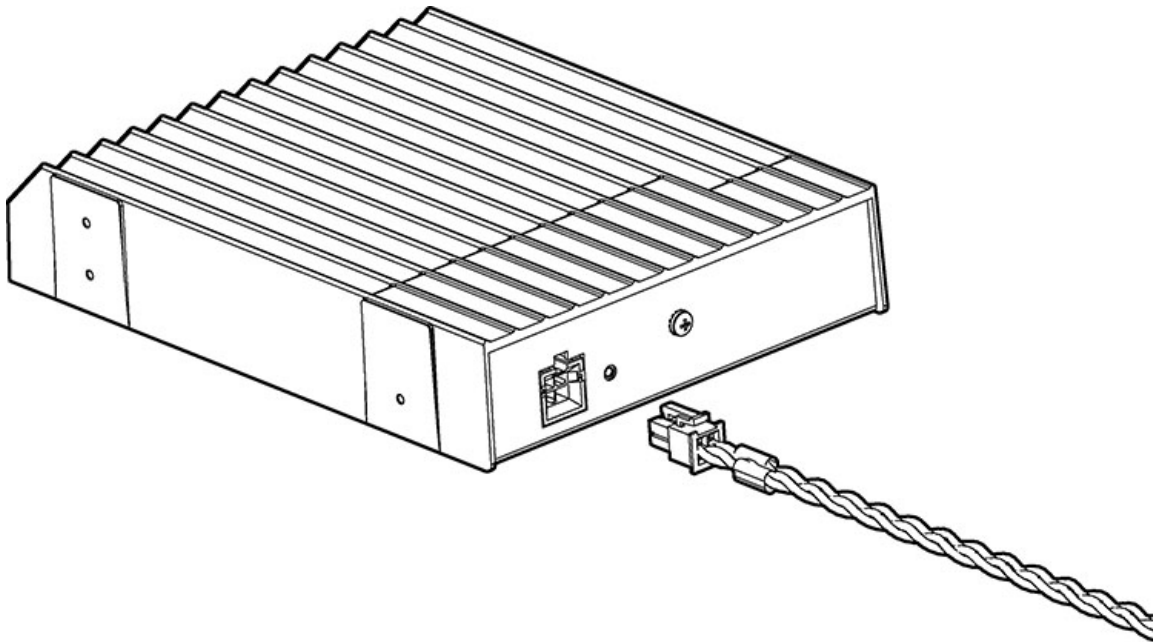
- Make sure that the chassis ground is connected on the chassis before you begin installing the DC power supply. See [Ground the Chassis, on page 17](#) for the procedure.

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 1.5 to 2.0 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).

To power the unit via the terminal block adapter:

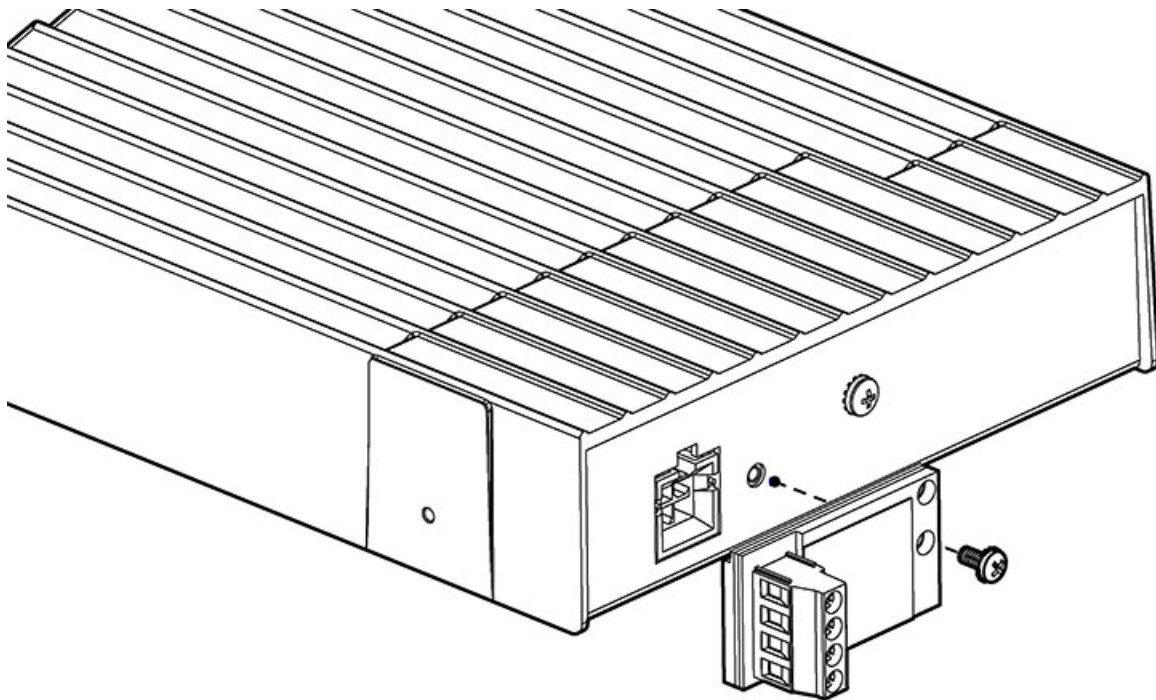
Before you begin

- 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 17](#) 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: 0.34 to 4 mm² (22 to 12AWG)

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.



Warning 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.
